CITY OF EL PASO, TEXAS
AGENDA ITEM
DEPARTMENT HEAD'S SUMMARY FORM

DEPARTMENT: Streets and Maintenance

AGENDA DATE: November 24, 2020

PUBLIC HEARING DATE: November 24, 2020

CONTACT PERSON NAME AND PHONE NUMBER: Sergio Reyes, (915) 212-7047

DISTRICT(S) AFFECTED: 1 and 8

STRATEGIC GOAL: 2 – Set the Standard for a Safe and Secure City

SUBJECT:
Resolution for authorization to execute a Highway-Rail traffic Signal Pre-emption interface agreement between the City of El Paso and Burlington Northern and Santa Fe Railway Company (BNSF) for Doniphan/Bird and Doniphan/West Green traffic signals.

BACKGROUND / DISCUSSION:
The Highway-Rail traffic Signal Pre-emption interface agreement is needed for design and installation of underground connection from traffic signals to railroad controller cabinets.

Recommendations to be discussed/approved by City Council:

1. that the Highway-Rail traffic Signal Pre-emption interface equipment be installed to allow advance warning to traffic signal safe operations from approaching locomotives toward future traffic signal intersections.

PRIOR COUNCIL ACTION:
No prior council action

AMOUNT AND SOURCE OF FUNDING:
If approved: Railroad Preemption Equipment for Doniphan/Bird in an amount not to exceed $65,840 and Doniphan/West Green in an amount not to exceed $51,590

**********REQUIRED AUTHORIZATION**********

DEPARTMENT HEAD: Harold Duty FOR RJB

(If Department Head Summary Form is initiated by Purchasing, client department should sign also)

RESOLUTION

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF EL PASO THAT:

The City Manager or designee is authorized to execute Highway-Rail Signal Interface Agreements between the City of El Paso and BNSF Railway Company to preempt the highway traffic control signals with the grade crossing warning devices located at the intersections of Doniphan and Green, and Doniphan and Bird. Further that the City Manager or designee is authorized to sign any amendments to the Agreements follow consultation with the City Attorney's office.

APPROVED this _____ day of _____, 2020.

THE CITY OF EL PASO:

_____
Dee Margo
Mayor

ATTEST:

_____
Laura D. Prine
City Clerk

APPROVED AS TO FORM:

_____
Omar A. De La Rosa
Assistant City Attorney

APPROVED AS TO CONTENT:

Richard Bristol
_____
Richard J. Bristol, Director
Streets and Maintenance Department

HIGHWAY-RAIL SIGNAL INTERFACE AGREEMENT

BNSF File No.: BF10016524
Mile Post 1145.80
Line Segment 7300
U.S. DOT Number 019620W
El Paso Subdivision

THIS HIGHWAY-RAIL SIGNAL INTERFACE AGREEMENT (hereinafter called, this "Agreement"), is entered into effective as of October 8, 2020 ("Effective Date"), by and between BNSF Railway Company, a Delaware Corporation (hereinafter called, "BNSF"), and City of El Paso, Texas (hereinafter called, the "Agency").

W I T N E S S E T H

WHEREAS, BNSF has grade crossing warning devices located at the intersection of W. Green Avenue, DOT # 019620W, Line Segment 7300, Mile Post 1145.80, as indicated on Exhibit A attached hereto and made a part hereof;

WHEREAS, Agency desires to preempt the highway traffic control signals with the grade crossing warning devices shown on Exhibit A; and

WHEREAS, BNSF will allow the Agency to preempt the highway traffic control signals with the grade crossing warning devices shown on Exhibit A subject to the mutual covenants contained in this Agreement.

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

A G R E E M E N T

1. PURPOSE

The purpose of this Agreement is as follows: provide for the installation and maintenance of the improvements described below at the W Green Avenue at-grade crossing.

BNSF hereby grants to Agency, its successors and assigns, upon and subject to the terms and conditions set forth in this Agreement, a non-exclusive license to enter upon and use the portion of BNSF's right-of-way as is necessary for the installation and maintenance of the improvements described below, and as shown on the Exhibit A, at the W. Green Avenue at-grade crossing, excepting and reserving BNSF's rights, and the rights of any others who have obtained, or may obtain, permission or authority from BNSF, to do the following:

a. Operate, maintain, renew and/or relocate any and all existing railroad track or tracks, wires, pipelines and other facilities of like character upon, over or under the surface of said right- of-way;

b. Construct, operate, maintain, renew and/or relocate upon said right-of-way, without limitation, such facilities as the BNSF may from time to time deem appropriate;

c. Otherwise use or operate the right-of-way as BNSF may from time to time deem appropriate.

Agency will construct the improvements in strict accordance with the requirements of this Agreement. The term of the license begins upon the Effective Date and ends upon termination of this Agreement for reasons of default following reasonable opportunity to cure or mutual agreement between the parties.

2. SCOPE OF WORK

a. The Agency must provide BNSF in writing, using the BNSF Preemption Worksheet attached hereto and made part of this Agreement as Exhibit D, with the total preempt cycle time required from the start of the preempt cycle of highway traffic control signals until the arrival of the train at the highway-rail crossing.

b. BNSF will provide an interface box with contact terminals, at Agency's expense on the side of the railroad instrument cabin.

c. Agency or its contractor will place all necessary cable and conduit on Railroad property, as approved by BNSF and in compliance with the BNSF Utility Accommodation Manual http://www.bnsf.com/communities/faqs/pdf/utility.pdf , at the locations shown on Exhibit A, attached to and made a part of this Agreement.

d. The Agency or its contractor will connect the highway traffic control signals to the contact terminals in the interface box including all necessary cable and conduit.

e. BNSF will provide flagging services, at Agency's sole expense as set forth in more detail on Exhibit C attached to and made a part of this Agreement.

f. The Agency or its contractor must install the new highway traffic control signals.

g. An estimate of the actual costs for BNSF work is shown on Exhibit B attached to and made a part of this Agreement. In the event installation of the improvements has not commenced within six (6) months following the effective date of this Agreement, BNSF may, in its sole and absolute discretion, revise the cost estimates set forth on Exhibit B. If the cost estimates are revised, the revised cost estimates will become a part of this Agreement as though originally set forth herein. Any item of work incidental to the items listed on Exhibit B not specifically mentioned therein may be included as a part of this Agreement upon written approval of the Agency, which approval will not be unreasonably withheld.

h. The Agency must pay BNSF for the actual costs of any work performed by BNSF under this Agreement within thirty (30) days of the date of the invoice for such work. During the construction of the improvements, BNSF may send Agency progressive invoices detailing the costs of the railroad work performed by BNSF under this Agreement. Upon completion of the improvements and all associated work, BNSF will send Agency a detailed invoice of final costs, segregated as to labor and materials for each item in the recapitulation shown on Exhibit B. Agency must pay the final invoice within ninety (90) days of the date of the final invoice. BNSF will assess a finance charge up to the maximum extent allowed by Texas law applicable to municipalities on any unpaid sums or other charges due under this Agreement which are past its credit terms.

3. CONSTRUCTION AND MAINTENANCE

a. BNSF will operate and maintain, at its expense, the necessary relays and the other materials required to preempt the highway traffic control signals with the grade crossing warning devices.

b. BNSF will to operate and maintain, at its expense, the railroad crossing warning devices up to the contact terminals in the interface box.

c. The Agency or its contractor must, at the Agency's expense, install the highway traffic control signals up to and including connection to the contact terminals in the interface box including all necessary cable and conduit.

d. Following installation of the traffic control signals, the Agency will own, operate and maintain, at its expense, the highway traffic control signals up to and including connection to the contact terminals in the interface box including all necessary cable and conduit.

e. For any future inspections or maintenance, routine or otherwise, performed by subcontractors on behalf of the Agency, Agency shall require the subcontractors to execute the C documents. Prior to performing any future maintenance with its own personnel, Agency shall: comply with all of BNSF's applicable safety rules and regulations; require any Agency employee performing maintenance to complete the safety training program at the BNSF's Internet Website "**www.BNSFContractor.com**"; notify BNSF when, pursuant to the requirements of exhibit C, a flagger is required to be present; procure, and have approved by BNSF's Risk Management Department, a Railroad Protective Liability insurance.

4. PROTECTION OF UNDERGROUND SYSTEMS

a. Agency and its contractor is placed on notice that fiber optic, communication and other cable lines and systems (collectively, the "Lines") owned by various telecommunications or utility companies may be buried on BNSF's property or right-of-way. The Agency or its contractor must contact appropriate personnel to have the Lines located and make arrangements with the owner of the Lines regarding protective measures that must be followed prior to the commencement of any work on BNSF's property. The Agency or its contractor will be responsible for contacting BNSF and the telecommunications or utility companies and notifying them of any work that may damage these Lines or facilities and/or interfere with their service. The Agency or its contractor must also mark all Lines in order to verify their locations. Agency or its contractor must also use all reasonable methods when working in the BNSF right-of-way or on BNSF property to determine if any other Lines (fiber optic, cable, communication or otherwise) may exist.

b. Agency or its contractor will be responsible for the rearrangement of any facilities or Lines determined to interfere with the installation or construction of the improvements. Agency and/or its Contractor must cooperate fully with any telecommunications or utility company(ies) in performing such rearrangements.

c. Failure to mark or identify Lines will be sufficient cause for BNSF to stop construction at no cost to BNSF until these items are completed.

d. In addition to the liability terms contained elsewhere in this Agreement, Agency and its contractor hereby indemnify, defend and hold harmless BNSF for, from and against all cost, liability, and expense whatsoever (including, without limitation, attorney's fees and court costs and expenses) arising out of or in any way contributed to by any act or omission of Agency or its contractor, subcontractors, agents and/or employees that cause or in any way or degree contribute to (1) any

damage to or destruction of any Lines on BNSF's property or within BNSF's right-of-way, (2) any injury to or death of any person employed by or on behalf of (a) any telecommunications or utility company, (b) Agency's contractor or subcontractors, or (c) Agency, and (3) any claim or cause of action for alleged loss of profits or revenue by, or loss of service by a customer or user of such telecommunications or utility company(ies).**THE LIABILITY ASSUMED BY AGENCY OR ITS CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY, DEATH, CAUSE OF ACTION OR CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE INTENTIONAL MISCONDUCT OR GROSS NEGLIGENCE OF BNSF.**

5. INDEMNIFICATION

a. Notwithstanding anything to the contrary in this Agreement, any obligation of the Agency to indemnify is only to the extent allowed under Texas law and providing that nothing obligates the Agency to levy a special tax or create a sinking fund to cover any indemnification obligations. Agency hereby indemnifies, defends and holds harmless BNSF for, from and against any and all claims, suits, losses, damages, costs and expenses for injury to or death to third parties or BNSF's officers and employees, and for loss and damage to property belonging to any third parties (including damage to the property of BNSF officers and employees), to the extent caused by the negligence of the Agency or any of its employees, agents or contractors. The Agency also releases BNSF from and waives any claims for injury or damage to the Agency's highway traffic control signals or other equipment which may occur as a result of any of the work provided for in this Agreement or the operation or the maintenance thereafter of any of the Agency's highway traffic control signals, cables, connections at and about the grade crossing.

b. To the fullest extent permitted by law, Agency hereby releases, indemnifies, defends and holds harmless BNSF and BNSF's affiliated companies, partners, successors, assigns, legal representatives, officers, directors, employees and agents for, from and against any and all claims, suits, liabilities, losses, damages, costs and expenses (including, without limitation, attorney's fees and court costs) for injury to or death to Agency employees, agents or representatives arising out of, resulting from or related to any act or omission of Agency or any work performed on or about BNSF's property or right-of-way. **THE LIABILITY ASSUMED BY THE AGENCY IN THIS PROVISION WILL NOT BE AFFECTED BY THE**

FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILROAD, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE GROSS NEGLIGENCE OR INTENTIONAL MISCONDUCT OF BNSF.

c. The Agency further agrees, at its expense, in the name and on behalf of BNSF, that it will adjust and settle any claims made against BNSF and will appear and defend any suits or actions at law or in equity brought against BNSF on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by the Agency under this Agreement for which BNSF is alleged to be liable. BNSF will give notice to the Agency in writing of the receipt of pendency of such claims and thereupon the Agency must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against BNSF, BNSF may forward the summons and complaint or process in connection therewith to the Agency, and the Agency must defend, adjust or settle such suits and protect, indemnify, and save harmless BNSF from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

d. Notwithstanding anything to the contrary in this Agreement, any obligation of the Agency to indemnify is only to the extent allowed under Texas law and provided that nothing obligates the City to levy a special tax or create a sinking fund to cover any indemnification obligations.

6. AGENCY CONTRACTOR REQUIREMENTS

a. While on or about BNSF property, Agency and its contractors must fully comply with BNSF's "Contractor Requirements" set forth in Exhibit "C" attached to and made a part of this Agreement. The "Contractor Requirements" include clearance requirements and personal protective equipment requirements. Agency and its contractors will be responsible for becoming familiar with BNSF's "Contractor Requirements". Prior to entering BNSF property, Agency's Contractor must execute Exhibit C-1 attached to and made a part of this Agreement.

b. Prior to entering BNSF property, each person providing labor, material, supervision or services connected with the work to be performed on or about BNSF property must complete the safety training program (hereinafter called "BNSF Contractor

Safety Orientation") at the following internet website: "**www.BNSFContractor.com**". Agency must ensure that each of its contractors, employees, subcontractors, agents or invitees completes the BNSF Contractor Safety Orientation before any work is performed under this Agreement. Additionally, Agency must ensure that each and every contractor, employee, subcontractor, agent or invitee possesses a card certifying completion of the BNSF Contractor Safety Orientation prior to entering BNSF property. Agency must renew the BNSF Contractor Safety Orientation annually.

c. Prior to entering BNSF property, Agency or its contractors must prepare and implement a safety action plan acceptable to BNSF. Agency must audit compliance with the plan during the course of Agency's work. A copy of the plan and audit results must be kept at the work site and will be available for inspection by BNSF at all reasonable times.

7. INSURANCE

Agency will require its contractors to procure and maintain while performing any work on BNSF property the following insurance coverage:

A. Commercial General Liability insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of $2,000,000 each occurrence and an aggregate limit of at least $4,000,000 but in no event less than the amount otherwise carried by the Contractor. Coverage must be purchased on a post 2004 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- ♦ Bodily Injury and Property Damage
- ♦ Personal Injury and Advertising Injury
- ♦ Fire legal liability
- ♦ Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

- ♦ The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.

- Waver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

It is agreed that the workers' compensation and employers' liability related exclusions in the Commercial General Liability insurance policy(s) required herein are intended to apply to employees of the policy holder and shall not apply to ***Railway*** employees.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy with regard to the work being performed under this agreement.

B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least $1,000,000 per occurrence, and include coverage for, but not limited to the following:

- Bodily injury and property damage
- Any and all vehicles owned, used or hired

The policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- Contractor's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.

- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 by disease policy limit, $500,000 by disease each employee.

This policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.

D. Railroad Protective Liability insurance naming only the ***Railway*** as the Insured with coverage of at least $2,000,000 per occurrence and $6,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 12 04 and include the following:

- Endorsed to include the Pollution Exclusion Amendment
- Endorsed to include the Limited Seepage and Pollution Endorsement.
- Endorsed to remove any exclusion for punitive damages.
- No other endorsements restricting coverage may be added.
- The original policy must be provided to the ***Railway*** prior to performing any work or services under this Agreement.
- Definition of "Physical Damage to Property" shall be endorsed to read: "means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured' care, custody, and control arising out of the acts or omissions of the contractor named on the Declarations.

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate (if available) in Railway's Blanket Railroad Protective Liability Insurance Policy.

Other Requirements:

Where allowable by law, all policies (applying to coverage listed above) shall contain no exclusion for punitive damages.

Contractor agrees to waive its right of recovery against ***Railway*** for all claims and suits against ***Railway***. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against ***Railway*** for all claims and suits. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against ***Railway*** for loss of its owned or leased property or property under Contractor's care, custody or control.

Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Contractor is not allowed to self-insure without the prior written consent of ***Railway.*** If granted by ***Railway***, any self-insured retention or other financial responsibility for claims shall be covered directly by Contractor in lieu of insurance. Any and all ***Railway*** liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Contractor's insurance will be covered as if Contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing services, Contractor shall furnish to ***Railway*** an acceptable certificate(s) of insurance from an authorized representative evidencing the required coverage(s), endorsements, and amendments. The certificate should be directed to the following address:

BNSF Railway Company
c/o CertFocus
Toll Free: 877-576-2378
Fax number: 817-840-7487
Email: BNSF@certfocus.com

Contractor shall notify ***Railway*** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration.

Any insurance policy shall be written by a reputable insurance company acceptable to ***Railway*** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

If coverage is purchased on a "claims made" basis, Contractor hereby agrees to maintain coverage in force for a minimum of three years after expiration, cancellation or termination of this Agreement. Annually Contractor agrees to provide evidence of such coverage as required hereunder.

Contractor represents that this Agreement has been thoroughly reviewed by Contractor's insurance agent(s)/broker(s), who have been instructed by Contractor to procure the insurance coverage required by this Agreement.

Not more frequently than once every five years, ***Railway*** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Contractor, Contractor shall require that the subcontractor shall provide and maintain insurance coverage(s) as set forth herein, naming ***Railway*** as an additional insured, and shall require that the subcontractor shall

release, defend and indemnify ***Railway*** to the same extent and under the same terms and conditions as Contractor is required to release, defend and indemnify ***Railway*** herein.

Failure to provide evidence as required by this section shall entitle, but not require, ***Railway*** to terminate this Agreement immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Contractor shall not be deemed to release or diminish the liability of Contractor including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by ***Railway*** shall not be limited by the amount of the required insurance coverage.

In the event of a claim or lawsuit involving ***Railway*** arising out of this agreement, Contractor will make available any required policy covering such claim or lawsuit.

These insurance provisions are intended to be a separate and distinct obligation on the part of the Contractor. Therefore, these provisions shall be enforceable and Contractor shall be bound thereby regardless of whether or not indemnity provisions are determined to be enforceable in the jurisdiction in which the work covered hereunder is performed.

For purposes of this section, ***Railway*** shall mean “Burlington Northern Santa Fe LLC”, “BNSF Railway Company” and the subsidiaries, successors, assigns and affiliates of each.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

AGENCY

CITY OF EL PASO, TEXAS

By:

_____

Printed Name:

_____

Title:

_____

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(AGENCY Signature Page for W. Green Avenue Agreement)

BNSF

BNSF RAILWAY COMPANY

By:

_____

Printed Name: Lynn Leibfried

Title: Assistant Director Public Projects

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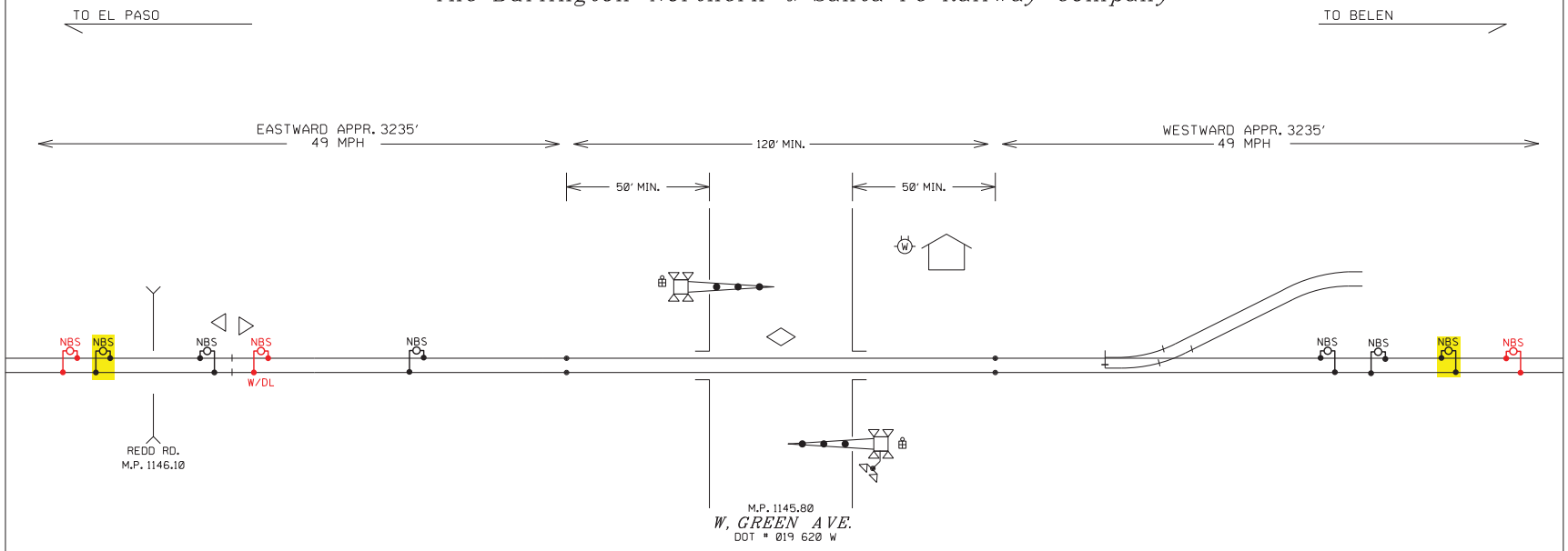
The Burlington Northern & Santa Fe Railway Company



PROJECT# 79350

EXHIBIT A - RR SIGNAL SKETCH

REUSE: FLASHERS, GATES & BUNGALOW
CONTROL DEVICES: CONSTANT WARNING
SALVAGE: NONE

RED = IN YELLOW = OUT

- 8X8 INSTRUMENT HOUSE
- BELL
- METER
- CROSSING CONTROLL CONNECTIONS
- BIDIRECTIONAL CROSSING CONTROL
- UNIDIRECTIONAL CROSSING CONTROL
- COUPLER OR TERMINATION
- GUARD RAIL

Warning device placement:
Clearance to C.L. Track = Min. 12'
Edge of Road to C.L. Foundation:
Min. 4'3" with curb,
Min. 8'3" without curb,
Max. 12'
House Clearance: 25' Min. to Near Rail
30' Min. to Edge of Road
ALL LIGHTS TO BE LED

BNSF RAILWAY CO.
LOCATION: EL PASO, TX
STREET: W. GREEN AVE.
LS: 7300
M.P. 1145.80
DOT # 019 620 W
DIVISION: SOUTHWEST
SUBDIVISION: EL PASO
KANSAS CITY
NO SCALE
DATE: 12/04/2019
FILE: 79350-STATESKETCH-.dgn
AMW

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

EXHIBIT B - Railroad Signal Estimate for W GREEN AVE - DOT No. 019620W Revised on 12/04/19

BNSF RAILWAY COMPANY
FHPM ESTIMATE FOR
CITY OF EL PASO

LOCATION EAST MONTOYA TO WEST MONTOYA | DETAILS OF ESTIMATE | PLAN ITEM : 000321486 | VERSION : 3

PURPOSE, JUSTIFICATION AND DESCRIPTION

W GREEN AVENUE - EL PASO, TX; REPLACE PRE-EMPTION; SOUTHWEST DIV; EL PASO SUBDIV; LS 7300; MP 1145.80; DOT# 019620W; SEQ# 79350.

MONTHLY POWER UTILITY COST CENTER : 61694.

THE MATERIAL LIST BELOW REFLECTS TYPICAL REPRESENTATIVE PACKAGES USED FOR ESTIMATING PURPOSES ONLY.

THIS ESTIMATE IS GOOD FOR 180 DAYS. THE ESTIMATE IS SUBJECT TO CHANGE IN COST FOR LABOR, MATERIAL, AND OVERHEAD.

CONTRACTS HAVE BEEN ESTABLISHED FOR PORTIONS OF SIGNAL WORK ON THE BNSF RAILROAD.

********** SIGNAL WORK ONLY **********

THE CITY OF EL PASO, TX IS FUNDING 100% OF THIS PROJECT.

MAINTAIN PROPRIETARY CONFIDENTIALITY.

PRIMARY FUNDING SOURCE IS FHWA
** BUY AMERICA(N) APPLIES **

DESCRIPTION	QUANTITY U/M	COST	TOTAL $
**********			
LABOR			
**********			
SIGNAL FIELD - REPLACE	168.0 MH	5,180	
PAYROLL ASSOCIATED COSTS		3,386	
DA OVERHEADS		5,621	
EQUIPMENT EXPENSES		1,152	
INSURANCE EXPENSES		906	
TOTAL LABOR COST		16,245	16,245
**********			
MATERIAL			
**********			
ADVANCED PRE-EMPTION KIT	1.0 LS N	6,539	
GCP 3K MODULE (80214)	2.0 EA N	4,575	
INDUCTOR, DUMMY LOAD	1.0 EA N	842	
MISC WIRING	1.0 LS N	750	
RELAY	1.0 EA N	750	
RELAY, (HEALTH)	1.0 EA N	750	
SHUNT, NBS	3.0 EA N	2,974	
USE TAX		1,441	
OFFLINE TRANSPORTATION		213	
TOTAL MATERIAL COST		18,834	18,834
**********			
OTHER			
**********			
CONTRACT ENGINEERING	1.0 LS N	6,000	
TRAFFIC ENGINEERING STUDY	1.0 LS N	10,000	
TOTAL OTHER ITEMS COST		16,000	16,000
PROJECT SUBTOTAL			51,079
CONTINGENCIES			0
BILL PREPARATION FEE			511
GROSS PROJECT COST			51,590
LESS COST PAID BY BNSF			0
TOTAL BILLABLE COST			51,590

EXHIBIT "C"

CONTRACTOR REQUIREMENTS

1.01 General:

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "**Railway**" where work is over or under on or adjacent to Railway property and/or right-of-way, hereafter referred to as "Railway Property", during the **install conduit and cable for traffic signal preemption interconnection at W. Green Avenue - DOT No. 019620W, located at railroad milepost 1145.80 on Railway's El Paso Subdivision, Line Segment 7300 in El Paso, Texas in El Paso County in accordance with the ATTACHMENT # 1.**

- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1". Questions regarding procurement of the Railroad Protective Liability Insurance should be directed to Rosa Martinez at Marsh, USA, 214-303-8519.

- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.

- **1.01.04** The Contractor's right to enter Railway's Property is subject to the absolute right of Railway to cause the Contractor's work on Railway's Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to Railway's Property, employees, and/or operations. Railway will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by Railway; (ii) Contractor (or any of its subcontractors), in Railway's opinion, prosecutes the Project work in a manner which is hazardous to Railway property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) Contractor fails to pay Railway for the Temporary Construction License or the Easement. The work stoppage will continue until all necessary actions are taken by Contractor or its subcontractor to rectify the situation to the satisfaction of Railway's Division Engineer or until additional insurance has been delivered to and accepted by Railway. Any such work stoppage under this provision will not give rise to any liability on the part of Railway. Railway's right to stop the work is in addition to any other rights Railway may have including, but not limited to, actions or suits for damages or lost profits. In the event that Railway desires to stop construction work on the Project, Railway agrees to immediately notify the following individual in writing:

Richard Bristol
Director, Streets and Maintenance Department
City of El Paso
218 N. Campbell Street
El Paso, TX 79901
Email: BristolRX@elpasotexas.gov

- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.

- **1.01.06** The Contractor must notify **Richard Bristol (City of El Paso) at 915-212-7015** and Railway's Manager Public Projects, telephone number **817-352-2902** at least thirty (30) calendar days before commencing any work on Railway Property. Contractor's notification to Railway must refer to Railway's file: **019620W – Traffic Signal Intertie**.

- **1.01.07** For any bridge demolition and/or falsework above any tracks or any excavations located with any part of the excavations located within, whichever is greater, twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 2 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting Railway Property and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. For all excavation and shoring submittal plans, the current "BNSF-UPRR Guidelines for Temporary Shoring" must be used for determining the design loading conditions to be used in shoring design, and all calculations and submittals must be in accordance with the current "BNSF-UPRR Guidelines for Temporary Shoring". All submittal drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and

calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. The Contractor must not begin work until notified by the Railway that plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over Railway's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.

- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01 No employee of the Contractor, its subcontractors, agents or invitees may enter Railway Property without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.BNSFContractor.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering Railway Property. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.**

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by the Agency.

- **1.03.02 INTENTIONALL LEFT BLANK**

- **1.03.03** The Contractor must abide by the following temporary clearances during construction:

- 15’-0” Horizontally from centerline of nearest track
- 21’-6” Vertically above top of rail
- 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
- 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
- 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
- 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
  - 25’ Horizontally from centerline of nearest track
  - 23’ 6” Vertically above top of rail

- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to **City of El Paso** and must not be undertaken until approved in writing by the Railway, and until **City of El Paso** has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.

- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by the Agency.

- **1.03.07** The details of construction affecting the Railway's Property and tracks not included in the contract plans must be submitted to the Railway by **City of El Paso** for approval before work is undertaken and this work must not be undertaken until approved by the Railway.

- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across Railway's tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Construction Crossing Agreement" from the Railway prior to moving his equipment or materials across the Railways tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be constructed and, at the completion of the project, removed at the expense of the Contractor.

- **1.03.09** Discharge, release or spill on the Railway Property of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the **Railway's Resource Operations Center at 1(800) 832-5452**, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Railway Property to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.

- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Railway's Property all of Contractor's tools, equipment, implements and other materials, whether brought upon said property by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Railway's Property to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan:

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site **www.BNSFContractor.com**, which will be made available to Railway prior to commencement of any work on Railway Property. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.

- **1.04.02** Contractor shall have a background investigation performed on all of its employees, subcontractors and agents who will be performing any services for Railroad under this Agreement which are determined by Railroad in its sole discretion **a)** to be on Railroad's property, or **b)** that require access to Railroad Critical Infrastructure, Railroad Critical Information Systems, Railroad's Employees, Hazardous Materials on Railroad's property or is being transported by or otherwise in the custody of Railroad, or Freight in Transit involving Railroad.

The required background screening shall at a minimum meet the rail industry background screening criteria defined by the e-RAILSAFE Program as outlined at **www.eVerifile.com**, in addition to any other applicable regulatory requirements.

Contractor shall obtain written consent from all its employees, subcontractors or agents screened in compliance with the e-RAILSAFE Program to participate in the Program on their behalf and to release completed background information to Railroad's designee. Contractor shall be subject to periodic audit to ensure compliance.

Contractor subject to the e-RAILSAFE Program hereunder shall not permit any of its employees, subcontractors or agents to perform services hereunder who are not first approved under e-RAILSAFE Program standards. Railroad shall have the right to deny entry onto its premises or access as described in this section above to any of Contractor's employees, subcontractors or agents who do not display the authorized identification badge issued by a background screening service meeting the standards set forth in the e-RAILSAFE Program, or who in Railroad's opinion, which may not be unreasonable, may pose a threat to the safety or security of Railroad's operations, assets or personnel.

Contractors shall be responsible for ensuring that its employees, subcontractors and agents are United States citizens or legally working in the United States under a lawful and appropriate work VISA or other work authorization.

1.05 Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's **Roadmaster** Esequiel Abeyta at mobile # 505-859-6307 or Esequiel.Abeyta@BNSF.com a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.
  - **FOR THIS PROJECT, RAILROAD FLAGGING SERVICES WILL BE PROVIDED BY RAILPROS (NOT A BNSF EMPLOYEE). The Contractor must contact Railpros directly at Office # 877-315-0513 or e-mail: BNSFinfo@railprosfs.com to enter into a reimbursement agreement for flagging services and to request and schedule a railroad flagger. The Railpros flagger(s), the Contractor, and the BNSF Roadmaster must**

participate in a job safety briefing PRIOR TO the start of any work on/over/under Railway's right of way. The Railway reserves the right to utilize its employees to provide railroad flagging services when those resources become available. In this event, the Railpros flagger and the Contractor will be notified by the Railway.

- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:

    - **1.05.02a** When, upon inspection by Railway's Representative, other conditions warrant.

    - **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.

    - **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.

    - **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.

    - **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.

- **1.05.03** Flagging services will be performed by qualified Railway flaggers.

    - **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railways Representative.

    - **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.

    - **1.05.03c** The cost of flagger services provided by the Railway will be borne by **CONTRACTOR**. The estimated cost for one (1) flagger is approximately between $800.00-$1,600.00 for an eight (8) hour basic

day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, vehicle, transportation, meals, lodging, radio, equipment, supervision and other costs incidental to performing flagging services. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. **THE FLAGGING RATE IN EFFECT AT THE TIME OF PERFORMANCE BY THE CONTRACTOR HEREUNDER WILL BE USED TO CALCULATE THE ACTUAL COSTS OF FLAGGING PURSUANT TO THIS PARAGRAPH.**

- **1.05.03d** The average train traffic on this route is **8** freight trains per 24-hour period at a timetable speed **49** MPH and **0** passenger trains at a timetable speed of **N/A** MPH.

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.

- **1.06.02** Before beginning any task on Railway Property, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Railway track(s).

- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.

- **1.06.04** When Contractor employees are required to work on the Railway Property after normal working hours or on weekends, the Railway's representative in charge of

the project must be notified. A minimum of two employees must be present at all times.

- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Railway's Property and subsequently released to the custody of a representative of Contractor management. Future access to the Railway's Property by that employee will be denied.

- **1.06.06** Any damage to Railway Property, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.

- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on Railway's Property.

- **1.06.08** All personnel protective equipment (PPE) used on Railway Property must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, **www.BNSFContractor.com,** however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats; c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railway's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information contained on the web site and the information in this paragraph, the web site will govern.)**

- **1.06.09 THE CONTRACTOR MUST NOT PILE OR STORE ANY MATERIALS, MACHINERY OR EQUIPMENT CLOSER THAN 25'-0" TO THE CENTER LINE OF THE NEAREST RAILWAY TRACK. MATERIALS, MACHINERY OR EQUIPMENT MUST NOT BE STORED OR LEFT WITHIN 250 FEET OF ANY HIGHWAY/RAIL AT-GRADE CROSSINGS OR TEMPORARY CONSTRUCTION CROSSING, WHERE STORAGE OF THE SAME WILL OBSTRUCT THE VIEW OF A TRAIN APPROACHING THE CROSSING. PRIOR TO BEGINNING WORK, THE CONTRACTOR MUST ESTABLISH A STORAGE AREA WITH CONCURRENCE OF THE RAILWAY'S REPRESENTATIVE.**

- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Railway's Property must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)

- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.

- **1.06.12** All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation:

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Railway's Property could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact **BNSF's Roadmaster** Esequiel Abeyta at mobile # 505-859-6307 **and BNSF's Signal Supervisor** Joshua LeMar at mobile # 913-953-7039**.** All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. **It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.**

- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be

performed until the exact location has been determined. There will be no exceptions to these instructions.

- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.

- **1.07.04** Any excavations, holes or trenches on the Railway's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon as possible.

1.08 Hazardous Waste, Substances and Material Reporting:

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Railway's Property must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

(If injuries are in connection with rail equipment accident/incident, highway rail grade crossing accident or automobile accident, ensure that appropriate information is obtained, forms completed and that data entry personnel are aware that injuries relate to that specific event.)

Injured Person Type:

- ☐ Passenger on train (C)
- ☐ Non-employee (N)
  (i.e., emp of another railroad, or, non-BNSF emp involved in vehicle accident, including company vehicles)
- ☐ Contractor/safety sensitive (F)
- ☐ Contractor/non-safety sensitive (G)
- ☐ Volunteer/safety sensitive (H)
- ☐ Volunteer/other non-safety sensitive (I)
- ☐ Non-trespasser (D) - to include highway users involved in highway rail grade crossing accidents who did not go around or through gates
- ☐ Trespasser (E) - to include highway users involved in highway rail grade crossing accidents who went around or through gates
- ☐ Non-trespasser (J) - Off railroad property

If train involved, Train ID: _____

Transmit attached information to Accident/Incident Reporting Center by:
Fax 1-817-352-7595 or by Phone 1-800-697-6736 **or email to: Accident-Reporting.Center@BNSF.com**
AND COPY TO: ROADMASTER **Esequiel.Abeyta@BNSF.com** & MANAGER PUBLIC PROJECTS **Tim.Huya@BNSF.com**

Officer Providing Information:

_____ _____ _____
(Name) (Employee No.) (Phone #)

REPORT PREPARED TO COMPLY WITH FEDERAL ACCIDENT REPORTING REQUIREMENTS AND PROTECTED FROM DISCLOSURE PURSUANT TO 49 U.S.C. 20903 AND 83 U.S.C. 490

BNSF RAILWAY

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IT IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St: _____ 2. Date: _____ Time: _____

County: _____ 3. Temperature: _____ 4. Weather: _____
(if non BNSF location)

Mile Post / Line Segment: _____

5. Driver's License No (and state) or other ID: _____ **SSN (required)**: _____

6. Name (last, first, mi): _____

7. Address: _____ City: _____ St: _____ Zip: _____

8. Date of Birth: _____ and/or Age: _____ Gender: _____
(if available)

Phone Number: _____ Employer: _____

9. Injury: _____ 10. Body Part: _____
(i.e., Laceration, etc.) (i.e., Hand, etc.)

11. Description of Accident (To include location, action, result, etc.): _____

_____

_____

_____

12. Treatment:

- ☐ First Aid Only _____
- ☐ Required Medical Treatment _____
- ☐ Other Medical Treatment _____

13. Dr. Name: _____ Date: _____

14. Dr. Address:

Street: _____ City: _____ St: _____ Zip: _____

15. Hospital Name: _____

16. Hospital Address:

Street: _____ City: _____ St: _____ Zip: _____

17. Diagnosis: _____

REPORT PREPARED TO COMPLY WITH FEDERAL ACCIDENT REPORTING REQUIREMENTS AND PROTECTED FROM DISCLOSURE PURSUANT TO 49 U.S.C. 20903 AND 83 U.S.C. 490

ATTACHMENT 1

(updated 1/23/2014)

General Construction Specifications for conduit work by AGENCY on BNSF Railway (revised 01/14/2014):

1) The agency or its contractor must obtain a fully executed railroad right of entry agreement (ROE) and meet all of its specifications and requirements prior to working on railroad property. This **ATTACHMENT 1** must be made a part of or incorporated into the ROE.
2) All traffic signal preemption wires or other data cables located within the railroad's right of way must be placed in conduit(s) that is capable of withstanding the railroad loads and other loads superimposed upon them.
3) On traffic signal preemption projects that include conduit placement by the Agency's contractor:
    a. The agency's Pull Box must be located off railroad's right of way.
    b. Agency's contractor to install conduit from the Agency's Pull Box to the Key Box located on the side of the Railroad's crossing signal control house.
    c. The Agency's contractor will pull the preemption wires through the conduit from the Agency's Pull Box and connect to the terminals in the Key Box located on the side of the crossing signal control house.
4) On projects where wires are proposed to be installed across railroad right of way and under the railroad track(s):
    a. The approved plans shall specify the size, type, and location of proposed conduits and wires.
    b. Wires shall be placed in METAL conduit. In circumstances where it is not feasible to install metal conduit from railroad's right of way line to right of way line, the metal conduit shall extend to the greater of the following distances, measured at right angles to the centerline of track:
        i. Two feet (2'-0") beyond the toe of slope.
        ii. Three feet (3'-0") beyond the ditch line.
        iii. Twenty five feet (25'-0") from centerline of outside track.
        iv. If additional track is planned for future construction, conduit must extend far enough to meet above distance given the additional track requirements.
5) The conduit pipe must be buried with a minimum cover of three feet (3'-0") below the flow line of any ditch or ground surface and five feet and six inches (5'-6") from base of rail. In fill sections, the natural ground line at the toe of slope will be considered as ditch grade.
6) Jacking pits must be located a minimum of thirty feet (30'-0") from centerline of track.
7) A railroad signal representative must be present during installation if railroad signals are in the vicinity of conduit location unless signal representative authorizes otherwise.
8) The execution of the track work on railroad property shall be subject to the inspection and direction of the railroad's flagger, at the Agency contractor's expense.
9) The Agency will own and maintain the wires and conduit encasement for the traffic signal preemption wires or other data wires or cables located on the railroad's right of way.

EXHIBIT "C-1"

Agreement Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR

Railway File: **DOT No. 019620W**

Agency Project: **Installation of Conduit & Cables for Traffic Signal – RR Signal interconnection at W Green Avenue and Doniphan Drive**

_____ (hereinafter called "**Contractor**"), has entered into an agreement (hereinafter called "Agreement") with the **City of El Paso, Texas (CITY)** for the performance of certain work in connection with the following project: **install conduit and cable for traffic signal preemption interconnection at W. Green Avenue - DOT No. 019620W, located at railroad milepost 1145.80 on Railway's El Paso Subdivision, Line Segment 7300 in El Paso, Texas in El Paso County in accordance with the ATTACHMENT # 1.** Performance of such work will necessarily require Contractor to enter **BNSF RAILWAY COMPANY** (hereinafter called "Railway") right of way and property (hereinafter called "Railway Property"). The Agreement provides that no work will be commenced within Railway Property until the Contractor employed in connection with said work for **CITY** (i) executes and delivers to Railway an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon Railway Property and as an inducement for such entry, Contractor, effective on the date of the Agreement, has agreed and does hereby agree with Railway as follows:

1) RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH,**

OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE INTENSIONAL MISCONDUCT OR GROSS NEGLIGENCE OF RAILWAY.

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE LOCOMOTIVE INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

In addition to any other provision of this Agreement, in the event that all or any portion of this Article shall be deemed to be inapplicable for any reason, including without limitation as a result of a decision of an applicable court, legislative enactment or regulatory order, the parties agree that this Article shall be interpreted as requiring Contractor to indemnify Railway to the fullest extent permitted by applicable law. **THROUGH THIS AGREEMENT THE PARTIES EXPRESSLY INTEND FOR CONTRACTOR TO INDEMNIFY RAILWAY FOR RAILWAY'S ACTS OF NEGLIGENCE.**

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

2) TERM

This Agreement is effective from the date of the Agreement until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

3) INSURANCE

Contractor shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. Commercial General Liability insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of $2,000,000 each occurrence and an aggregate limit of at least $4,000,000 but in no event less than the amount otherwise carried by the Contractor. Coverage must be purchased on a post 2004 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- Bodily Injury and Property Damage
- Personal Injury and Advertising Injury
- Fire legal liability
- Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

- The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- Waver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

It is agreed that the workers' compensation and employers' liability related exclusions in the Commercial General Liability insurance policy(s) required herein are intended to apply to employees of the policy holder and shall not apply to ***Railway*** employees.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy with regard to the work being performed under this agreement.

B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least $1,000,000 per occurrence, and include coverage for, but not limited to the following:

- Bodily injury and property damage
- Any and all vehicles owned, used or hired

The policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- Contractor's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 by disease policy limit, $500,000 by disease each employee.

This policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.

D. Railroad Protective Liability insurance naming only the ***Railway*** as the Insured with coverage of at least $2,000,000 per occurrence and $6,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 12 04 and include the following:

- Endorsed to include the Pollution Exclusion Amendment
- Endorsed to include the Limited Seepage and Pollution Endorsement.
- Endorsed to remove any exclusion for punitive damages.
- No other endorsements restricting coverage may be added.
- The original policy must be provided to the ***Railway*** prior to performing any work or services under this Agreement
- Definition of "Physical Damage to Property" shall be endorsed to read: "means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured' care, custody, and control arising out of the acts or omissions of the contractor named on the Declarations.

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate (if available) in Railway's Blanket Railroad Protective Liability Insurance Policy.

Other Requirements:

Where allowable by law, all policies (applying to coverage listed above) shall contain no exclusion for punitive damages.

Contractor agrees to waive its right of recovery against ***Railway*** for all claims and suits against ***Railway***. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against ***Railway*** for all claims and suits. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against ***Railway*** for loss of its owned or leased property or property under Contractor's care, custody or control.

Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Contractor is not allowed to self-insure without the prior written consent of ***Railway.*** If granted by ***Railway***, any self-insured retention or other financial responsibility for claims shall be covered directly by Contractor in lieu of insurance. Any and all ***Railway*** liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Contractor's insurance will be covered as if Contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing services, Contractor shall furnish to ***Railway*** an acceptable certificate(s) of insurance from an authorized representative evidencing the required coverage(s), endorsements, and amendments. The certificate should be directed to the following address:

BNSF Railway Company
c/o CertFocus
Toll Free: 877-576-2378
Fax number: 817-840-7487
Email: BNSF@certfocus.com

Contractor shall notify ***Railway*** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration.

Any insurance policy shall be written by a reputable insurance company acceptable to ***Railway*** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

If coverage is purchased on a "claims made" basis, Contractor hereby agrees to maintain coverage in force for a minimum of three years after expiration, cancellation or termination of this Agreement. Annually Contractor agrees to provide evidence of such coverage as required hereunder.

Contractor represents that this Agreement has been thoroughly reviewed by Contractor's insurance agent(s)/broker(s), who have been instructed by Contractor to procure the insurance coverage required by this Agreement.

Not more frequently than once every five years, ***Railway*** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Contractor, Contractor shall require that the subcontractor shall provide and maintain insurance coverage(s) as set forth herein, naming ***Railway*** as an additional insured, and shall require that the subcontractor shall release, defend and indemnify ***Railway*** to the same extent and under the same terms and conditions as Contractor is required to release, defend and indemnify ***Railway*** herein.

Failure to provide evidence as required by this section shall entitle, but not require, ***Railway*** to terminate this Agreement immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Contractor shall not be deemed to release or diminish the liability of Contractor including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by ***Railway*** shall not be limited by the amount of the required insurance coverage.

In the event of a claim or lawsuit involving ***Railway*** arising out of this agreement, Contractor will make available any required policy covering such claim or lawsuit.

These insurance provisions are intended to be a separate and distinct obligation on the part of the Contractor. Therefore, these provisions shall be enforceable and Contractor shall be bound thereby regardless of whether or not indemnity provisions are determined to be enforceable in the jurisdiction in which the work covered hereunder is performed.

For purposes of this section, ***Railway*** shall mean "Burlington Northern Santa Fe LLC", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

4) SALES AND OTHER TAXES

In the event applicable sales taxes of a state or political subdivision of a state of the United States are levied or assessed in connection with and directly related to any amounts invoiced by Contractor to Railway ("Sales Taxes"), Railway shall be responsible for paying only the Sales Taxes that Contractor separately states on the invoice or other billing documents provided to Railway; *provided, however,* that (i) nothing herein shall preclude Railway from claiming whatever Sales Tax exemptions are applicable to amounts Contractor bills Railway, (ii)

Contractor shall be responsible for all sales, use, excise, consumption, services and other taxes which may accrue on all services, materials, equipment, supplies or fixtures that Contractor and its subcontractors use or consume in the performance of this Agreement, (iii) Contractor shall be responsible for Sales Taxes (together with any penalties, fines or interest thereon) that Contractor fails to separately state on the invoice or other billing documents provided to Railway or fails to collect at the time of payment by Railway of invoiced amounts (except where Railway claims a Sales Tax exemption), and (iv) Contractor shall be responsible for Sales Taxes (together with any penalties, fines or interest thereon) if Contractor fails to issue separate invoices for each state in which Contractor delivers goods, provides services or, if applicable, transfers intangible rights to Railway.

Upon request, Contractor shall provide Railway satisfactory evidence that all taxes (together with any penalties, fines or interest thereon) that Contractor is responsible to pay under this Agreement have been paid. If a written claim is made against Contractor for Sales Taxes with respect to which Railway may be liable for under this Agreement, Contractor shall promptly notify Railway of such claim and provide Railway copies of all correspondence received from the taxing authority. Railway shall have the right to contest, protest, or claim a refund, in Railway's own name, any Sales Taxes paid by Railway to Contractor or for which Railway might otherwise be responsible for under this Agreement; provided, however, that if Railway is not permitted by law to contest any such Sales Tax in its own name, Contractor shall, if requested by Railway at Railway's sole cost and expense, contest in Contractor's own name the validity, applicability or amount of such Sales Tax and allow Railway to control and conduct such contest.

Railway retains the right to withhold from payments made under this Agreement amounts required to be withheld under tax laws of any jurisdiction. If Contractor is claiming a withholding exemption or a reduction in the withholding rate of any jurisdiction on any payments under this Agreement, before any payments are made (and in each succeeding period or year as required by law), Contractor agrees to furnish to Railway a properly completed exemption form prescribed by such jurisdiction. Contractor shall be responsible for any taxes, interest or penalties assessed against Railway with respect to withholding taxes that Railway does not withhold from payments to Contractor.

5) EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with all provisions, obligations, requirements and limitations contained in the Agreement, and the Contractor Requirements set forth on Exhibit "C" attached to the Agreement and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site. Contractor shall execute a Temporary Construction Crossing Agreement or Private Crossing Agreement

(http://www.bnsf.com/communities/faqs/permits-real-estate/), for any temporary crossing requested to aid in the construction of this Project, if approved by BNSF.

6) TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train delays, whether caused by Contractor, or subcontractors, or by the Railway performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. The rate then in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of train delay pursuant to this agreement.

Contractor and its subcontractors must give Railway's representative Roadmaster **Esequiel Abeyta at mobile # 505-859-6307 or Esequiel.Abeyta@BNSF.com** four (4) weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

IN WITNESS WHEREOF, each of the parties hereto has caused this Agreement to be executed by its duly authorized officer the day and year first above written.

Contractor

By: _____

Printed Name: _____

Title: _____

Address: _____

Address: _____

City: _____

State: _____ Zip: _____

Phone: _____

Fax: _____

On-site Project
Contact Person: _____ Mobile: _____
E-mail: _____

Contact Person: _____ Mobile: _____
E-mail: _____

BNSF Railway Company

By: _____

Name: Timothy J. Huya
Manager Public Projects

Accepted and effective this _____ day

of _____, 2020.

HIGHWAY-RAIL GRADE CROSSING
TRAFFIC SIGNAL PREEMPTION REQUEST FORM

The Road Authority traffic controller circuitry requires railroad preemption contacts to initiate the preemption sequence. Per BNSF standard, we will provide normally closed "dry" preemption relay contacts to interconnect the railroad active warning system to the Road Authority traffic signal controller assembly. These contacts are rated at 4 amps. With no trains in the area, these contacts remain closed. The Road Authority Traffic Department will be responsible for installing the interconnection cable between the traffic signal controller and the crossing warning signal control housing. If exit gates are utilized, the Road Authority Traffic Department will be responsible for installing and maintaining the "in pavement" vehicle detection loops from the street to the cable junction box.

To estimate and or design the crossing warning system, BNSF needs to know certain timing parameters.

Definitions:

"Advance Preemption" – The system will be designed to open the preemption contacts for a predetermined amount of time (Advance Preemption Time) prior to activation of the warning devices (flashing lights).

"Simultaneous Preemption" – The system will be designed to open the preemption contact at the same time the warning devices (flashing lights) are activated. Additional warning time may be requested.

"Gate Down Logic" – Per BNSF standard, we will provide normally open "dry" gate down relay contacts to interconnect the crossing warning system to the Road Authority traffic signal controller assembly. These contacts are rated at 4 amps. The system will be designed to close the gate down contacts upon the gates arrival in the down position. This logic is normally utilized to hold track clearance green until the gates are down since the time from preemption to gate down will vary depending upon the traffic signal cycle. In the event the gate does not descend; BNSF provides a parallel island circuit that provides input to terminate track clearance green once track occupies the crossing (island). This circuit will reduce parallel street delays by allowing the traffic signal to exit the track clearance phase after railroad gate is horizontal and providing a green indication for parallel street.

"Minimum Warning Time" – Per the MUTCD and FRA regulations, BNSF must provide at least 20 seconds of warning time for through trains (typically main track applications). However, per BNSF standards for constant warning time train detection equipment, the system will be designed to provide a "nominal" warning time of 30 seconds to ensure MUTCD/FRA minimums are met and to compensate for accelerating trains and ballast conditions.

"Minimum Track Clearance Distance" – For standard two-quadrant railroad warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the railroad stop line, warning device or 12 ft. perpendicular to the far rail, along the centerline or edge line of the highway, as appropriate, to obtain the longer distance. For locations with exit gate warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the railroad stop line or entrance warning device to the point clear of the exit gate. Note that in cases where the exit gate arm is parallel to the track(s) and/or not perpendicular to the roadway, clearance will be either along the centerline or edge line of the highway, as appropriate, to obtain the longer distance.

When (entrance) gates are used they are typically designed to start their decent within 3 to 5 seconds of the warning lights flashing, descend in an additional 10 to 15 seconds, and reach horizontal at least 5 seconds prior to train arrival per FRA regulations.

The length of the railroad's control circuit approach distance is directly related to the amount of requested "Advanced Preemption Time" (APT). Typically, the longer the APT requirement is, the longer the approach distance, and thus the more control equipment that will be required.

Please provide the following information in order to process your request:

Date of Request:
Requesting Agency: City of El Paso

Requested by: Juan D. Diaz
Title: Engineering Associate

E-mail: diazjd@elpasotexas.gov
Phone: 915-212-7042

Grade Crossing Information:

State: TX
City: El Paso
County: El Paso
Crossing Street Name: West Green Avenue
Parallel Street Name: Doniphan Drive (State Highway 20)

DOT #: 019620W
District: El Paso
RR Subdivision: El Paso
Mile Post: 1145.80

Signalized Intersection Information:

1) Provide interconnection configuration: ☐ Single break circuit ☒ Double break circuit

2) Is a Supervised circuit being requested? ☒ Yes ☐ No

3) Is this request for Simultaneous Preemption Operation? ☐ Yes ☒ No

   If "Yes", what is your requested Additional Warning Time? (if needed) ____ Seconds

4) Is this request for Advance Preemption Operation? ☒ Yes ☐ No

   If "Yes", what is your requested Vehicle Advance Preemption Time (APT)? 11 Seconds

   If "Yes", is a Gate Down circuit being requested? ☒ Yes ☐ No
   ** The purpose of the gate-down circuit is to comply with the Institute of Traffic Engineers (ITE) recommended practice to ensure that the Track Clearance Green interval remains on until gates are fully lowered to prevent a "preempt trap". Railroad will provide relay contacts for the gate down circuit.*

5) Is this request for additional time for Advance Pedestrian Preemption Operation? ☐ Yes ☒ No

   If "Yes", what is your requested additional time for Advance Pedestrian Preemption Time (APPT)? ____ Seconds
   **Note: Pedestrian Detection is required when using Advance Pedestrian Preemption Operation.*

6) Is a Crossing Active (XC) circuit required to activate blank-out signs or another traffic control device? ☐ Yes ☒ No

7) Is a Traffic Signal Health circuit being requested? ☒ Yes ☐ No

Comments / Additional Info:

The above information has been completed by the undersigned representative of the public agency responsible for the traffic signal. The public agency agrees to have all work related to the preemption of the traffic signal complete and operational prior to the activation of the railroad signal system. The public agency further agrees to not change any traffic signal design or timing parameters which may affect the preemption operation without coordinating said change with Railroad.

Signature of public agency representative

7-17-19
Date

Richard Bristol
Print or type name of public agency representative

Please sign, scan this page, and submit electronically along with support documentation to appropriate Manager of Industry and Public Projects.

Review of Interconnected Highway-Rail Grade Crossing

Prepared by CTC, Inc., for
The City of El Paso

March 29, 2019

TX, El Paso
W Green Ave @ Doniphan Dr (SH 20)
DOT # 019620W, MP 1145.80
El Paso Subdivision
Line Segment 7300

Review of Interconnected
Highway-Rail Grade Crossing

TX, El Paso
West Green Avenue @ Doniphan Drive (State Highway 20)
BNSF Railway
DOT # 019620W, MP 1145.80
El Paso Subdivision, Line Segment 7300

Prepared by:

I hereby certify that this Report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Texas. This report represents an electronic version of the original hard copy report, sealed, signed and dated by Nicole L. Jackson, PE, PTOE. The content of the electronically transmitted report can be confirmed by referring to the original hard copy which will be kept on file with CTC, Inc.

3/29/19
Nicole L. Jackson, PE, PTOE
Texas License No. 112466

CTC, Inc.
9601 Camp Bowie West
Fort Worth, TX 76116
817-866-8210
www.ctcinc.com

Table of Contents

1.0 General Information 3
2.0 References 3
3.0 Contact Information 5
4.0 Preemption Design Elements 5
5.0 Proposed Railroad Preemption Values 8
6.0 Recommendations for the Agency 8
7.0 Conclusion 13
APPENDIX A – End Notes 14
APPENDIX B – Preemption Calculation Form 22

List of Figures

Figure 1 - DOT# 019620W; W Green Ave @ Doniphan Dr (SH 20) 6

List of Tables

Table 1 - Right-of-Way Transfer Time 7

1.0 General Information

Advance preemption time[1] (APT) is being requested for the BNSF Railway (Railroad) highway-rail grade crossing (DOT# 019620W) on the El Paso Subdivision, Line Segment 7300 located in El Paso, Texas near the intersection of West Green Avenue and Doniphan Drive (State Highway 20).

CTC, Inc. (CTC) has reviewed the above referenced highway-rail grade crossing at the request of the Agency, which includes an analysis of the design, calculations and other documents submitted by the Agency and the Railroad. The review has been summarized in this report, which includes proposed preemption time requirements and recommendations for other improvements which may be required by the MUTCD and/or general industry practices.

In accordance with the 2009 MUTCD Chapter 8C, Section 8C.09

The Railroad acknowledges that its actions are limited to those permitted under the MUTCD and/or applicable regulatory agency and that the decision to implement any of the recommendations contained in this report rests solely with the Agency.

2.0 References

CTC utilized the following supporting documents and recommended operational practices in evaluating the preemption operation and design:

- AREMA (2018). *Manual for Communications and Signals (C&S Manual)*. Landover, MD: American Railway Engineering and Maintenance-of-Way Association (AREMA).
- FHWA (2009). *Manual on Uniform Traffic Control Devices (MUTCD)*. Federal Highway Administration (FHWA).
- FHWA (June 2008). *Traffic Signal Timing Manual, Publication No HOP-08-024, Section 5.3 - Minimum Green to Satisfy Driver Expectancy*. Federal Highway Administration (FHWA).
- FHWA (2007). *Railroad-Highway Grade Crossing Handbook - Revised Second Edition*. Federal Highway Administration (FHWA).
- FRA (July 25, 2012). *Technical Bulletin S-12-0, Guidance Regarding the Appropriate Processes for the Inspection of Highway-Rail Grade Crossing Warning System Pre-emption Interconnections with Highway Traffic Signals*. Federal Railroad Administration (FRA).
- FRA (October 1, 2010). *Federal Register Volume 75, Issue 190 - Safety Advisory 2010-02, Signal Recording Devices for Highway-Rail Grade Crossing Active Warning*

[1] **Advance Preemption Time (APT)** - The period of time that is the difference between the required maximum highway traffic signal preemption time and the activation of the railroad or light rail transit warning devices. (MUTCD, Chapter 1A, Section 1A.13)

Systems that are Interconnected with Highway Traffic Signal Systems. Federal Railroad Administration (FRA).

- ITE (2006). *Preemption of Traffic Signals Near Railroad Crossings, An ITE Recommended Practice*. Washington, DC: Institute of Transportation Engineers (ITE).
- NTSB (2003). *Collision Between Metrolink Train 210 and Ford Crew Cab, Stake Bed Truck at Highway-Rail Grade Corrsing in Burbank, California, on January 6, 2003, Highway Accident Report NTSB/HAR-03/04*. Washington, DC: National Transportation Safety Board (NTSB).
- TTC (December 2012). *2011 Texas Manual on Uniform Traffic Control Devices* (TXMUTCD). Texas Transportation Commission (TTC).
- TRB (2003). *National Cooperative Highway Research Program (NCHRP), Report 493, Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control.* Transportation Research Board (TRB).
- TRB (1999). *National Cooperative Highway Research Program (NCHRP), Synthesis 271, Traffic Signal Operations near Highway-Rail Grade Crossings. Chepater 3, Highway Traffic Signals near Highway-Rail Grade Crossings.* Transportation Research Board (TRB).
- TTI (March 2002). *Report 1752-9, The Preempt Trap: How to Make Sure You Do Not Have One.* Texas A&M Transportation Institute (TTI).
- TXDOT (March 2009). *Form 2304 Instructions, Instructions for the Guide for Determining Time Requirements for Traffic Signal Preemption at Highway Grade Crossings*. Texas Department of Transportation (TXDOT).
- TXDOT (March 2009). *Form 2304, Guide for Determining Time Requirements for Traffic Signal Preemption at Highway Grade Crossings*. Texas Department of Transportation (TXDOT).
- TXDOT (December 2016). *Railroad Crossing Design Guidelines.* Texas Department of Transportation – Traffic Operations Division (TXDOT).

Unless otherwise noted, the analysis of the proposed traffic signal railroad preemption was based on the following documents submitted by the Agency:

- Preemption Calculation Form dated September 18, 2018
- Traffic Signal Plan dated June 13, 2017

3.0 Contact Information

Agency:

Juan D. Diaz
Engineering Associate
City of El Paso
7968 San Paulo Drive
El Paso, TX 79907
915-212-7042
diazjd@elpasotexas.gov

Railroad:

Tim Huya
Manager of Public Projects
BNSF Railway
5800 North Main Street
Fort Worth, TX 76179
817-352-2902
tim.huya@bnsf.com

4.0 Preemption Design Elements

The Agency must consider several elements when proposing a railroad preemption design. The design should incorporate such elements as, but not limited to, current roadway conditions, traffic signal controller functional capabilities, future site improvements, as well as, other mitigating conditions. The design elements used in this review are outlined below:

- The Railroad operates on one main line track through the crossing.
- There is one lane over the track approaching the intersection with Doniphan Drive (State Highway 20).
- Flashing-light signals with automatic gates are provided at the crossing.

The preemption calculation design values used in the determination of the amount of APT being requested are outlined below:

- The design vehicle overall length provided on the preemption calculation form is a 75-ft. tractor-trailer.

- The clear storage distance[2] (CSD) of 42 feet and minimum track clearance distance[3] (MTCD) of 32 feet was provided on the preemption calculation form.
- The roadway grade approaching, over and departing the MTCD does not exceed 1½%.

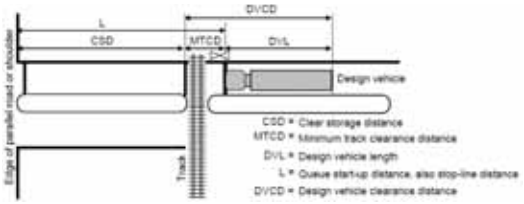
The measurements provided on the preemption calculation form were reviewed in Google Earth and the plans provided, but were not field verified by CTC.

Aerial of subject crossing:

Figure 1 - DOT# 019620W; W Green Ave @ Doniphan Dr (SH 20)

[2] **Clear Storage Distance** - The distance available for vehicle storage measured between 6 feet from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway. (MUTCD, Chapter 1A, Section 1A.13)

[3] **Minimum Track Clearance Distance** – For standard two-quadrant warning devices, the minimum track clearance distance is the length along a highway at one or more railroad or light rail transit tracks, measured from the highway stop line, warning device, or 12 feet perpendicular to the track center line, to 6 feet beyond the furthest track(s) measured perpendicular to the far rail, along the center line or edge line of the highway, as appropriate, to obtain the longer distance. (MUTCD, Chapter 1A, Section 1A.13)



The proposed traffic signal controller is 170.

The proposed traffic signal controller firmware is not specified.

The proposed right-of-way transfer time[4] provided on the preemption form:

	Proposed Values (Seconds)
Controller Preemption Delay Time[5]	0.0
Controller Preemption Response Time[6]	0.0
Minimum Green before Track Clearance	0
Walk before Track Clearance	0
Pedestrian Change before Track Clearance	0
Yellow Change before Track Clearance	4.3
Red Clearance before Track Clearance	2.0
Additional Right-of-Way Transfer Time	0
Maximum Right-of-Way Transfer Time	**6.3**

Table 1 - Right-of-Way Transfer Time

During the review, CTC recommended that the Agency provide a minimum green before track clearance to satisfy driver expectancy in accordance with the FHWA Traffic Signal Timing Manual. The Agency elected not to implement a minimum green at this time. Currently, the 2009 MUTCD allows for the minimum green to be truncated during railroad preemption (MUTCD Chapter 4, Section 4D.27). If the Agency elects to provide a minimum green in the future, then additional APT will need to be requested from the Railroad prior to implementation.

[4] **Right-of-Way Transfer Time** – The maximum amount of time needed for the worst case condition, prior to the display of the track clearance green interval. This includes any railroad or light rail transit or highway traffic signal control equipment time to react to a preemption call, and any traffic control signal green, pedestrian walk and clearance, yellow change, and red clearance intervals for conflicting traffic. (MUTCD, Chapter 1A, Section 1A.13)

[5] **Controller Preemption Delay Time** – The traffic signal controller programmed time between receipt of the preemption call and initialization of the preemption sequence.

[6] **Controller Preemption Response Time** – Time provided by the traffic signal controller application designer to account for controller reaction time of individual components prior to initiating activation of the preemption sequence.

5.0 Proposed Railroad Preemption Values

As a result of the design and preemption calculation review, the following outlines the proposed APT requested by the Agency:

The APT requested by the Agency is 11 seconds (Line 35 of the preemption calculation form).

For more details regarding the preemption values, see the preemption calculation form in appendix B.

6.0 Recommendations for the Agency

As a result of the plan review, CTC proposes the following recommendations for Agency consideration to improve the operation of the preemption system. The Agency is the authority regarding the design and operation of the preemption system in accordance with the MUTCD Chapter 8C, Section 8C.09.

Note: Should the Agency decide to pursue the following recommendations, the Agency should be aware that multiple solutions exist for any recommendation. The Agency should perform due diligence to determine the solution(s) or product(s) that best meet site-specific conditions for the highway-rail grade crossing.

2009 MUTCD Chapter 8C, Section 8C.09 Paragraph 6
"The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if applicable, should jointly determine the preemption operation and the timing of traffic control signals interconnected with highway-rail grade crossings adjacent to signalized highway intersections."

The Railroad is available to assist the Agency with any of the proposed recommendations.

Recommendations:

- **Review traffic signal controller hardware and firmware capabilities for railroad preemption.** The traffic signal controller is an integral part of the operation of the preemption system and understanding the traffic signal controller functionality during railroad preemption is critical to the safety of the preemption operation. Many conditions such as, but not limited to, coordinated operation, train restart or second train events, emergency vehicle preemption, transit priority, or manual control will alter the operation of the traffic signal controller when those conditions are in effect. The Agency must thoroughly inspect and test the functionality of the traffic signal

controller and firmware to ensure the recommended railroad preemption features can be provided. Periodic updates or revisions to the controller unit firmware or hardware may negatively affect the operation and/or programming parameters of the traffic signal controller. Any change in the firmware or hardware should be followed by a performance test in order to assure that the traffic signal controller is functioning in accordance with the design plans.

- **Review traffic signal controller capabilities for train restart.** Due to the potential of a train stopping and restarting within the approach of the crossing, the traffic signal controller may not be able to transition back to the track clearance interval to provide a sufficient amount of time to clear the design vehicle from the MTCD. Modifications or additional logic may be needed for the traffic signal controller to provide the transition to the track clearance interval during the event.

- **Ensure that the actual right-of-way transfer time during railroad preemption does not exceed the design value of 6.3 seconds (see the preemption calculation form in appendix B).** If the right-of-way transfer time is programmed to exceed this value, then additional APT would need to be requested by the Agency.

- **Review the preemption operation of the traffic signal controller and make the appropriate modifications to ensure adequate track clearance green time[A] is provided to clear the design vehicle from the MTCD.** The track clearance green time is the period of time programmed into the traffic signal controller that the green indication is displayed to vehicles stopped within the CSD and MTCD. The track clearance green indication affords these vehicles an opportunity to start and move clear of the track provided there is adequate railroad warning time. It is critical that the track clearance green not end until after the flashing-lights have started their operation and the automatic gate arms have reached the horizontal position. The recommended practice to ensure that the traffic signal sequence does not terminate the track clearance interval early is to implement a gate down circuit.

    - **A gate down circuit is not specified in the documents provided.** If the Agency elects not to implement the gate down circuit, then the Agency must request a not-to-exceed advance preemption timer be implemented in the railroad warning system in order to limit APT which exceeds the specified APT (AREMA Part 3.1.10). Additional APT can result from variability in train speed. The Agency must also determine the traffic signal preemption time variability and increase the track clearance green time appropriately.

      CTC does not take exception to the track clearance green time of 29 seconds noted on line 51 of the preemption calculation form, provided a not-to-exceed advance preemption timer has been implemented in the railroad warning system.

- **Improve the interconnection circuits between the traffic signal controller and the railroad warning system and ensure the interconnection cable has an adequate number of conductors for the circuits requested.** The interconnection between the traffic signal controller and the railroad warning system requires careful consideration as to the types of circuits to be utilized. In older installations, the majority of interconnection circuits used a single pair of wires to initiate the preemption sequence in the controller unit. However, experience and extensive research on railroad preemption operation has revealed that additional interconnection circuits are necessary in order to assure that the highway-rail grade crossing and highway-highway intersection are operating together as one system. Dependent on the location, the number of circuits that would be utilized in the preemption system generally vary from two to five. Some complex systems could require more than five circuits. Intersection geometry, phasing, pedestrian considerations, type of controller unit, train volumes, train speeds and passenger station stops are all factors which must be considered in order to determine which circuits are necessary.

  The following list identifies the most commonly used interconnection circuits:

  - Advance Preemption Circuit[B] - This circuit begins the preemption sequence when the railroad warning system first notifies the traffic signal controller of the approaching train.

  - Supervised Circuit[C] - This circuit provides a means to verify the integrity of the interconnection cable between the traffic signal controller and the railroad warning system. The purpose is to provide notification to the traffic signal controller in the event there is a failure (open or short) in the cable or associated circuitry.

  - Crossing Active Circuit[D] - This circuit will notify the traffic signal controller of an approaching train at the point the active warning devices (railroad flashing-lights) begin their operation. This circuit is commonly referred to as an "XC" circuit by the railroad. It is also the circuit typically used for "Simultaneous Preemption." By using the crossing active circuit, the traffic signal controller can be notified when the railroad flashing-lights and automatic gates begin operation, and adjustments to the preemption sequence can be implemented as programmed.

  - Gate Down Circuit[E] - This circuit will notify the traffic signal controller when the automatic gate arms controlling access to the railroad tracks are lowered to within approximately five (5) degrees of horizontal. This circuit prevents the traffic signal controller from terminating the track clearance green prior to the railroad warning devices becoming active and the lowering of the automatic gates.

- Traffic Signal Health Circuit[E] - Where there is an advance preemption circuit, the traffic signal health circuit may be used to notify the railroad warning system if the traffic signal has an operational failure where the traffic signals are flashing or dark. When the traffic signal health circuit has de-energized, the railroad warning system devices may be activated early. The amount of additional time the railroad warning devices will be active can be extended up to the APT provided by the train detection equipment. By activating the systems early, the automatic gates will be lowered, preventing additional traffic from queuing onto the tracks and affording a longer period of time for stopped vehicles to start up and move clear of the tracks

Note: The Agency must notify the Railroad which circuits are being requested at each location.

Another item to be addressed as a part of the interconnection determination is the electrical arrangement of the circuits. There are three possible interconnection options:

1. Single Break[G] with Supervision – This option provides a means to open a single energy source conductor through the railroad circuitry. In order to provide a means to verify the integrity of the interconnection cable between the traffic signal controller and the railroad warning system, an additional conductor is provided that closes upon approach of a train. This is known as a supervised circuit.

2. Double Break[H] – This option provides a means to open both the positive and negative or line and neutral energy source leads through the railroad circuitry. By opening both conductors of the circuit, a level of reliability equal to single break with supervision is achieved.

3. Double Break with Supervision - This option makes use of #1 and #2 where both conductors are opened through the railroad circuitry and a supervision circuit is included. By opening both conductors of the circuit and providing a supervision circuit, a higher level of reliability is achieved.

There are several railroad preemption interface methods[I] that have been used successfully to implement the above circuits. Examples can be found in appendix A.

- **Implement a maximum preemption timer[J].** The purpose of this timer is to allow the traffic signal to transition to an all-red flash mode in the event the railroad warning system "fails-safe" for an extended period of time.

- **Program the emergency/CMU-MMU and maintenance flash mode to all-red flash operation.** When the CSD is less than the length of the design vehicle or when an engineering study or a Diagnostic Team determines a need, emergency/CMU-MMU

and maintenance flash should be all-red flash to allow the design vehicle some opportunity to clear the tracks when a train is approaching.

- **Ensure scheduled flashing operation[7] is not implemented.** When the CSD is less than the length of the design vehicle, scheduled flashing operation should not be implemented since the track clearance interval may not be provided during railroad preemption. As a result, motorists may not be given an opportunity to clear the track area prior to train arrival.

- **Include a left turn green arrow indication and associated left turn phase for the track clearance interval.** The track clearance movement should include a left turn arrow indication to avoid driver confusion regarding yielding to oncoming traffic. This left turn indication does not need to be served at any time other than when preempted, if desired.

- **Install vehicle detection prior to the crossing.** When the CSD is less than the length of the design vehicle, vehicle detection prior to the crossing should be considered so that commercial vehicles and school buses required to stop at the crossing in accordance with the Federal Motor Carriers Safety Administration Rule Title 49 CFR §392.12, will still place a call to the traffic signal controller.

- **Install a back-up power supply for the traffic signal equipment.** When local power outages occur, a dark traffic signal loses its ability to provide a track clearance interval. Railroad warning devices are required to be equipped with a back-up power supply to provide continuous operation for a number of hours. With the advent of LED technology, back-up power for traffic signals is now a realistic option. A back-up power supply maintains the operation of the traffic signal and its ability to display a track clearance interval. The MUTCD recommends the use of back-up power for interconnected signals in Chapter 4D, Section 4D.27.

- **Install a Grade Crossing Advance Warning (W10-2) sign on Doniphan Drive (State Highway 20).** If the distance between the tracks to the edge of the parallel roadway, is less than 100 feet, a W10-2 sign shall be installed on each approach of the parallel highway to warn users making a turn that they will encounter a grade crossing soon after making a turn. As provided in Chapter 8B, Section 8B.06, paragraph 5 (MUTCD 2009).

- **Install "DO NOT STOP ON TRACKS" signs (R8-8) downstream of the track.** Vehicles may extend over the tracks based on the existing preemption system operation and the installation of these signs provides additional emphasis to alert road users not to stop on the tracks

[7] **Scheduled Flashing Operation** – Based on engineering study or engineering judgment, traffic control signals may be operated in the flashing mode on a scheduled basis during one or more periods of the day rather than operated continuously in the steady (stop-and-go) mode. (MUTCD, Chapter 4D, Section 4D.28)

- **Install storage space signs (W10-11a or W10-11b).** The installation of storage space warning signs is helpful to advise motorists and commercial vehicle drivers of the amount of space available between the tracks and the intersecting street.

- **Implement a Preemption Operation and Maintenance Program[K].** In accordance with the FRA Safety Advisory 2010-02 and FRA Technical Bulletin S-12-01, a comprehensive joint inspection program should be established between the Agency and the Railroad to provide, at a minimum, an annual operational test of the preemption system. Operational tests should also be conducted when traffic signal controller changes are made, including firmware updates.

  The Agency should develop a notification plan to contact the Railroad in the event the traffic control signal fails to operate as intended. The Agency should also develop a traffic management plan for special events or construction to help prevent motorists from stopping on the tracks as a result of the downstream traffic queues.

- **Install a warning label as recommended by the U.S. Department of Transportation Highway-Rail Grade Crossing Technical Working Group (USDOT TWG) in the traffic signal cabinet to alert traffic signal technicians to the presence of the interconnection with the railroad control equipment.**

7.0 Conclusion

This report recommends preemption operational improvements that the Agency should consider as a result of CTC's design review. The Agency should contact the Railroad to review recommendations contained in this report and to resolve issues. If desired, the Agency may contact the Railroad to assist with implementing any recommendations, answer questions or participate in a diagnostic team inspection to review outstanding items and progress changes that may be needed.

APPENDIX A – End Notes

[A] Track Clearance Green Time:

The track clearance green time is the period of time programmed into the traffic signal controller that the green indication is displayed to vehicles stopped within the MTCD and the CSD. It is determined by calculating the time required for a design vehicle of maximum length to start up and move clear of the MTCD prior to the arrival of the train under normal conditions. The rule-of-thumb to determine the amount of track clearance green time is to use the greater of either the queue clearance time (time required for the design vehicle to start up and clear the MTCD) or a value 15 seconds greater than the APT (track clearance green time = APT+15) provided the railroad has a not-to-exceed advance preemption timer in their circuitry. Since the railroad warning devices activate following the APT and the automatic gate arm reaches the horizontal position approximately 15 seconds after activation of the warning devices, this rule-of-thumb estimates the track clearance green time needed to keep the track clearance interval green until the automatic gates are horizontal for a best case right-of-way transfer time condition (usually 0 seconds). If the railroad does not have a not-to-exceed advance preemption timer in their circuitry, a thorough analysis of train operations must be conducted in order to determine the effect of train deceleration on the preemption operation. It should be noted that this method may lead to inefficient traffic signal operations as it will hold the track clearance interval in green after the automatic gate is down when the actual right-of-way transfer time is not best case. Also, this rule-of-thumb should be considered an interim measure due to the fact that it does not take into account variability in actual APT versus design APT caused by accelerating or decelerating trains. Where APT is implemented, a gate down circuit is the preferred and best method for determining when to terminate the track clearance interval, but may require additional interconnect capabilities.

[B] Advance Preemption Circuit:

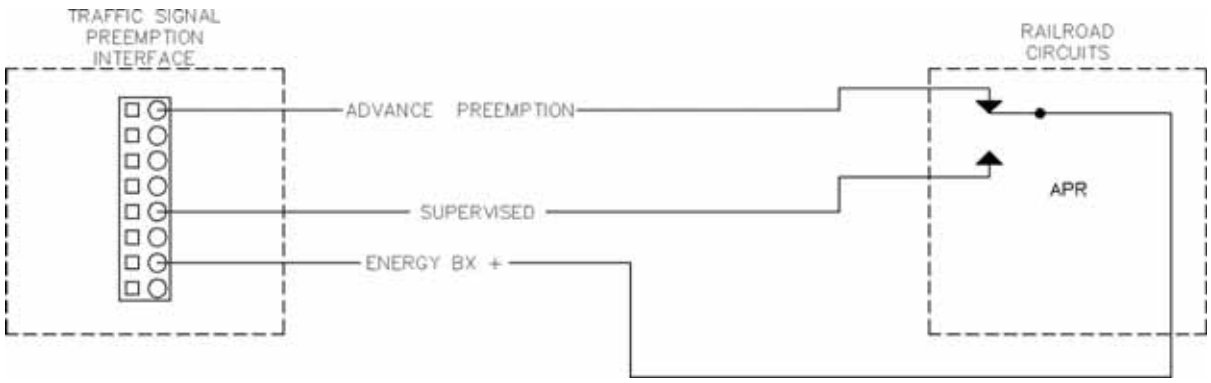
The advance preemption circuit will notify the traffic signal controller of an approaching train prior to the activation and operation of the railroad active warning devices. The period of time between this notification and the instant when the grade crossing warning devices are activated is known as APT. APT is used by the traffic signal controller to terminate any active non-track clearance movements and to change to a programmed track clearance interval.

[C] Supervised Circuit:

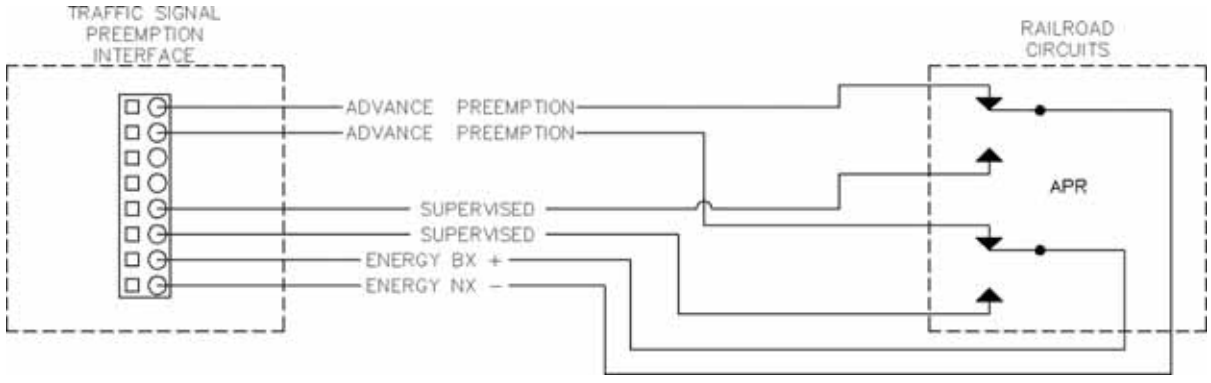
The supervised circuit is an additional circuit that works in conjunction with either the advance preemption circuit or the crossing active circuit (“XR” or “XC” circuit). The supervised circuit closes when the advance preemption circuit or crossing active circuit (“XR” or “XC” circuit) opens, providing a means to verify the integrity of the interconnection cable between the traffic signal controller and the railroad warning system. The purpose of this circuit is to provide notification to the traffic signal

controller in the event there is a failure (open or short) in the cable or associated circuitry. Potential failure can occur for a variety of reasons. Examples include: 1) a utility inadvertently digs up the cable and severs the wire; 2) shorting the wires or cable or; 3) if the interconnect cable connection is loose in one or both cabinets. With a supervised circuit, the traffic signal will be notified of the cable failure and respond as programmed. One possible response includes first clearing the tracks and then displaying all-way flashing red signals, in order to quickly gain attention of the Agency that a problem exists. This response allows all traffic movements at the intersection to continue. Once the Agency is notified of the all-red flashing signals, repairs must be made in order to return the traffic signal to normal operation, since the supervised circuit will not allow the traffic signal to operate with failed preemption interconnect cable. Below are examples of a supervised circuit applied to a single-break advance preemption circuit and to a double-break advance preemption circuit:

Supervised Advance Preemption Circuit Single-Break



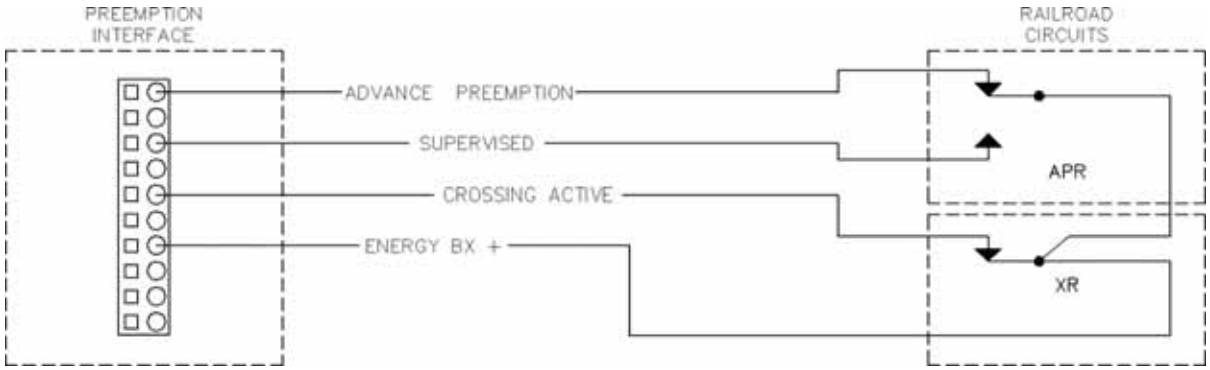
Supervised Advance Preemption Circuit Double-Break



D Crossing Active Circuit:

This circuit, commonly referred to as "XR" or "XC", can be utilized to check the minimum APT provided by the railroad in varying conditions, such as when a train approaches and stops short of the crossing. Once the train remains stopped for approximately 20 seconds, the crossing warning system will usually de-activate, the preemption request will be cancelled, and the automatic gates will rise. When the train begins to move toward the crossing after this time period, the result can be reduced or no APT. In this case, the operation of the train over the crossing will be governed by operating rules of the railroad. These rules generally require the train crew to assure the crossing is clear prior to entering the roadway. When the APT is shortened or eliminated, the traffic signal sequence should advance to the track clearance green interval as quickly as possible. Therefore, the traffic signal controller may be required to abbreviate or eliminate the minimum green time and/or pedestrian change intervals from its normal sequence. By using the crossing active circuit, the traffic signal controller can be notified when the railroad flashing-lights and automatic gates begin operation and adjustments to the preemption sequence can be implemented as programmed.

Crossing Active Circuit



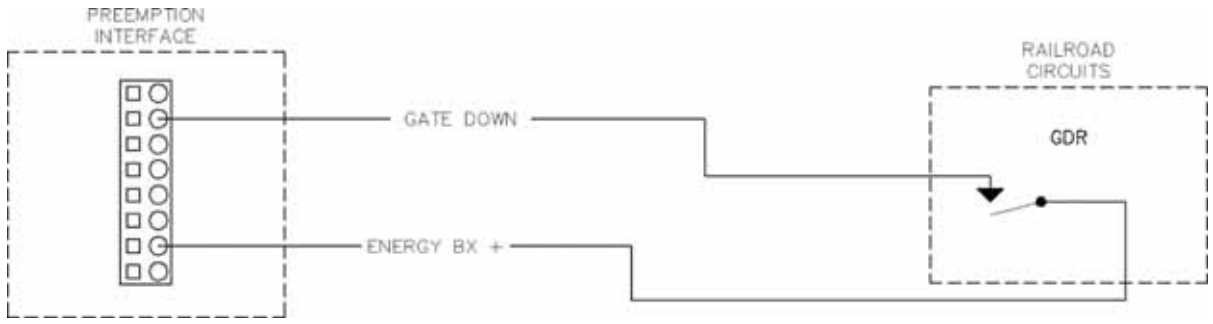
E Gate Down Circuit:

A gate down circuit will notify the traffic signal controller when the automatic gate arms controlling access over the railroad tracks approaching the intersection are lowered to within approximately five (5) degrees of horizontal. This circuit prevents the traffic signal controller from terminating the track clearance green interval before the railroad warning devices become active and the automatic gates are lowered.

It is critical that the track clearance green interval not end until after the flashing-lights have started their operation and the automatic gate arms warning vehicles approaching the intersection have reached the horizontal position. A preemption anomaly occurs if, due to time variability in the preemption sequence, the track clearance green ends before the automatic gate arms are not yet lowered. This may allow vehicles to continue to cross and queue onto the railroad tracks in the path of the approaching train, also known as a preempt trap, found in TTI Report 1752-9.

Although a gate down circuit should be implemented to improve safety, it also improves traffic operations by minimizing the excessive track clearance green time displayed. If there is not a gate down circuit present, the track clearance green time must be increased to account for right-of-way transfer time variability, train speed variability, track circuit design and other variable conditions. This timing correction may result in excessive track clearance green times that extend long after the automatic gates have already reached their horizontal position. For many traffic signal controller units, the implementation of gate down circuitry is straightforward and inexpensive.

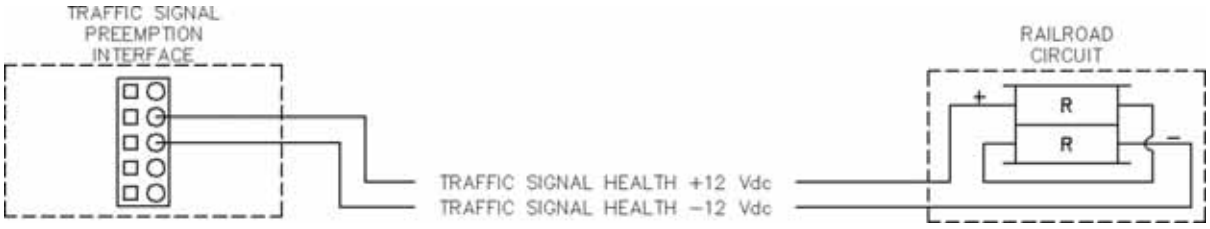
Gate Down Circuit



F Traffic Signal Health Circuit:

This circuit is an output from the traffic signal cabinet that notifies the railroad warning system whenever the traffic signal has entered conflict flash, manual flash, soft flash, manual signals off, or when commercial power and back-up power system has failed (signals off). It is typically connected to the traffic controller cabinet signal bus and/or a red vehicle indication output so that it will de-energize any time the traffic signals are flashing or a loss of power has occurred. It is a nominal 12 volts of direct current (V dc), which is output whenever the traffic signal is not in flash operation and power is on. If the traffic signal is in flash operation or the power is off, the output becomes 0 V dc. The output should be fused for 500 mA @ 12 V dc.

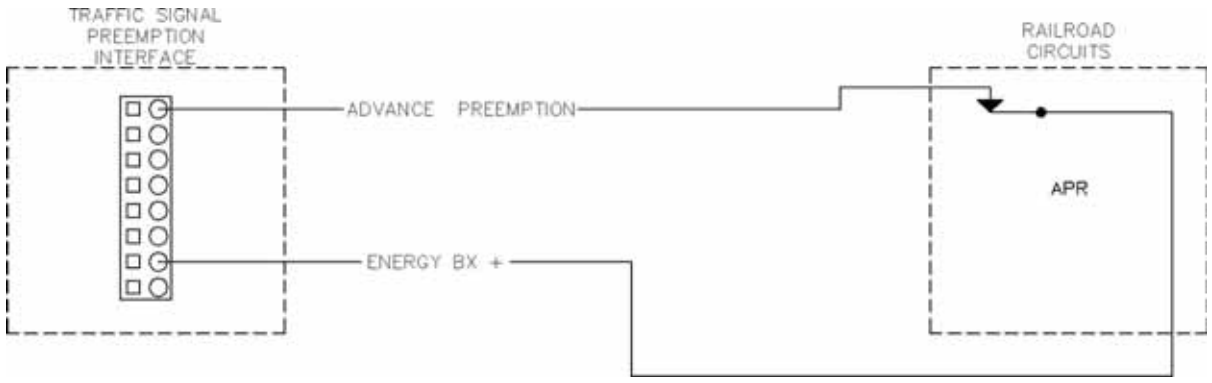
Traffic Signal Health Circuit



G Single-Break Interconnect Circuit:

A single-break interconnect circuit is a preemption interconnection circuit design technique where only one energy source lead is opened or closed through a control circuit or relay. It is not considered to be the most reliable method to activate or de-activate a circuit in a separate control case or cabinet by the railroad signal industry. This circuit design technique can be applied to all interconnection circuits. Below is an example of a single-break advance preemption circuit:

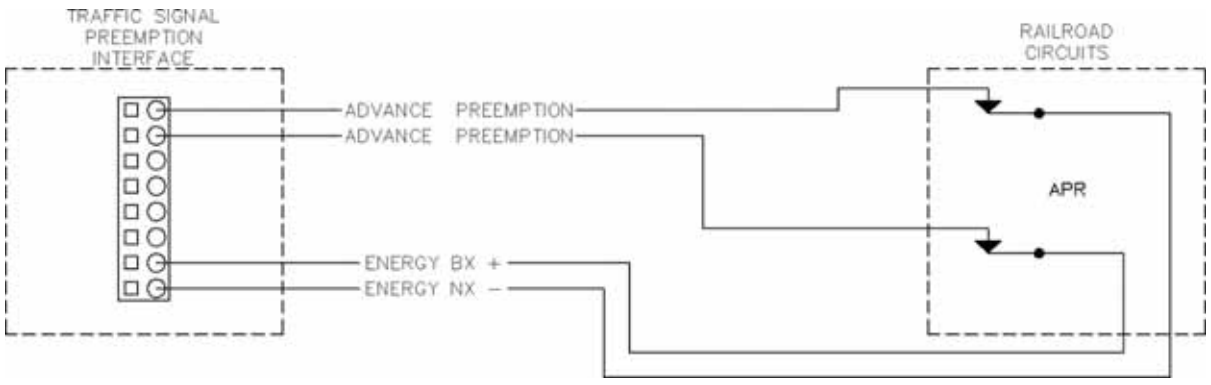
Advance Preemption Single-Break Circuit



H Double-Break Interconnect Circuit:

A double-break interconnect circuit is a preemption interconnection circuit design technique where both the positive and negative or line and neutral energy source leads are open or closed through a control circuit or relay. It is considered to be the most reliable method to activate or de-activate a circuit in a separate control case or cabinet by the railroad signal industry. This circuit design technique can be applied to all interconnection circuits. Below is an example of a double-break advance preemption circuit:

Advance Preemption Double-Break Circuit



I Railroad Preemption Interface Methods:

Where railroad preemption is required, various interconnection circuits can be used between the railroad warning system and the traffic signal controller for railroad preemption. In order for the interconnect circuits to interface with the traffic signal controller and railroad warning system, additional equipment is required in the traffic signal cabinet. As a general rule, traffic signal equipment manufacturers and distributors have the ability to provide the various interconnection circuits required for a specific application. Below are pictures of various methods used by agencies for implementation of interconnection circuits.

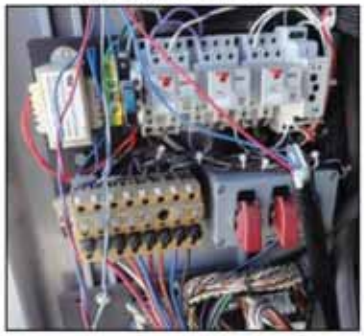
Ohio DOT

Relay Logic

Wyoming DOT

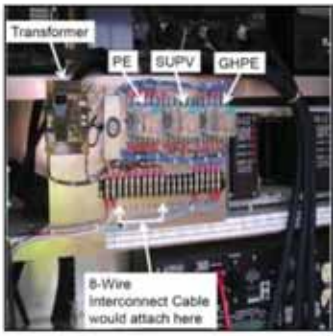
Isolator Card &
Traffic Controller Logic

Minnesota DOT



Relay Logic

Missouri DOT



Relay Logic

J Maximum Preemption Timer:

A maximum preemption timer is a timer in the traffic signal controller that limits the amount of time the preemption can be in effect. Implementation of a maximum preemption timer does require additional interconnection circuits from the railroad. The purpose of this timer is to allow the traffic signal to exit the preemption sequence in the event the railroad warning system "fails-safe". Because railroad warning systems are safety critical systems, they are designed in such a manner as to fail in a "safe" state in the event of a non-catastrophic fault. What this means is that the warning devices will operate to indicate that it is not safe to proceed even when no

train is present. This is a "safe" failure mode. However, when a fail-safe condition occurs, the traffic control signal will remain in preemption if a maximum preemption timer has not been provided. Because of the limited sequence operation during the dwell interval, non-allowable movements are inhibited. Road users may become frustrated and attempt to make moves against a red traffic signal indication. The maximum preemption timer will cause the traffic signal to transition to all-red flash after a predetermined period of time until the preemption circuit returns to its normal state, at which time normal operation of the traffic signal resumes.

Note: Although it is the decision of the Agency as to the value programmed for the maximum preemption time, the Agency should take caution to ensure that the time is not set to a value that is too short. If the time set is too short, the timer could expire and place the traffic signal into all-red flash while a train is occupying the crossing. Therefore, the maximum preemption time should be set to a value two times greater than the longest train move, which may include switching moves.

Not all traffic signal manufactures have the ability to program a maximum preemption timer in the controller unit that will cause the traffic signal to transition to all-red flash after a predetermined period of time and/or exceed a maximum allowed value of 255 seconds. In those cases, an external timing relay may be used to implement the maximum preemption time operation.

K Implement a Preemption Operation and Maintenance Program:

In accordance with the FRA Safety Advisory 2010-02, a joint program should be established between the Agency and the Railroad to provide for an annual (minimum) operational test of the preemption system.

- The program should provide for a joint inspection with a representative from the Agency and the Railroad.
- The program should require a live operational test of the system under the maximum right-of-way transfer time condition.
- The program should include review of data recorder logs, where available, to verify proper operation of the system.
- The program should determine that no operational changes have been made to the grade crossing, warning system, roadway, traffic control signal or other facility that modifies the operation of the system as it is presently functioning.

Develop a plan to notify the Railroad in the event the traffic control signal fails to operate as intended.

The plan should include the following elements:

- If the traffic control signal enters flashing mode, notify the Railroad and provide law enforcement or flaggers to allow for the safe movement of roadway users over the grade crossing.

- If the traffic control signal loses power or all of the signals are dark, notify the Railroad and provide law enforcement or flaggers to allow for the safe movement of roadway users over the grade crossing.
- Notify the Railroad once the system has been restored to normal operation.

If a traffic signal technician is required to perform a joint test of the preemption system, notify the Railroad.

Implement procedures to provide flagging or other suitable temporary traffic control plan in the event a lane closure or traffic density caused by a high traffic volume event that has been planned downstream from the grade crossing causes roadway users to queue onto the crossing. (See MUTCD Section 8A.08 for additional information.)

Notify the Railroad any time changes are made to the roadway, the traffic control signal, or preemption operation, in accordance with MUTCD, Section 8A.02 Paragraph 6.

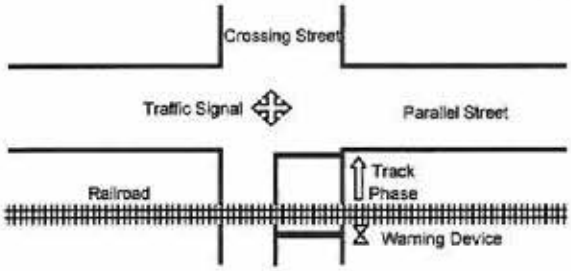
APPENDIX B – Preemption Calculation Form

GUIDE FOR DETERMINING TIME REQUIREMENTS FOR TRAFFIC SIGNAL PREEMPTION AT HIGHWAY RAIL GRADE CROSSINGS

City: El Paso
County: El Paso
District: El Paso

Date: 09/18/18
Completed by: Juan Diaz
District Approval:

Show North Arrow



Parallel Street Name: Doniphan Dr.
Crossing Street Name: West Green Ave.

Railroad: BNSF
Crossing DOT#: 019620W

Railroad Contact: Tim Huya
Phone: (817) 352-2902

SECTION 1: RIGHT-OF-WAY TRANSFER TIME CALCULATION

Preempt verification and response time

			Remarks
1. Preempt delay time (seconds)	1.	0.0	
2. Controller response time to preempt (seconds)	2.	0.0	Controller type: 170E
3. Preempt verification and response time (seconds): add lines 1 and 2	3.	0.0	

Worst-case conflicting vehicle time

			Remarks
4. Worst-case conflicting vehicle phase number	4.	28	
5. Minimum green time during right-of-way transfer (seconds)	5.	0.00	Green terminates at pre-emption.
6. Other green time during right-of-way transfer (seconds)	6.	0.00	
7. Yellow change time (seconds)	7.	4.30	
8. Red clearance time (seconds)	8.	2.00	
9. Worst-case conflicting vehicle time (seconds): add lines 5 through 8	9.	6.3	

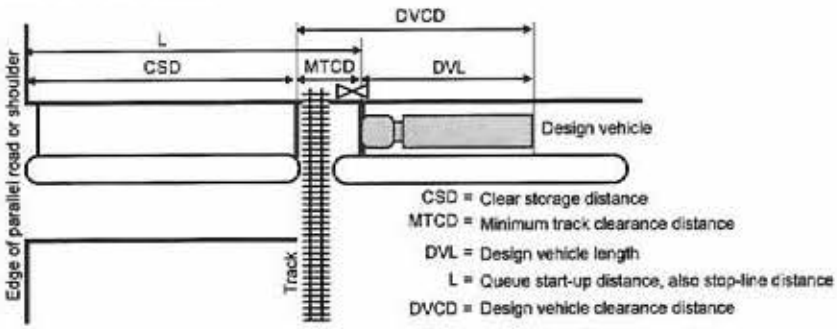
Worst-case conflicting pedestrian time

			Remarks
10. Worst-case conflicting pedestrian phase number	10.	8	
11. Minimum walk time during right-of-way transfer (seconds)	11.	0.0	Walk/Flash don't walk terminate
12. Pedestrian clearance time during right-of-way transfer (seconds)	12.	0.0	
13. Vehicle yellow change time, if not included on line 12 (seconds)	13.	4.0	
14. Vehicle red clearance time, if not included on line 12 (seconds)	14.	2.0	
15. Worst-case conflicting pedestrian time (seconds): add lines 11 through 14	15.	6.0	

Worst-case conflicting vehicle or pedestrian time

16. Worst-case conflicting vehicle or pedestrian time (seconds): maximum of lines 9 and 15	16.	6.3
17. Right-of-way transfer time (seconds): add lines 3 and 16	**17.**	6.3

SECTION 2: QUEUE CLEARANCE TIME CALCULATION



			Remarks
18. Clear storage distance (CSD, feet)	18.	42	
19. Minimum track clearance distance (MTCD, feet)	19.	32	
20. Design vehicle length (DVL, feet)	20.	75	Design vehicle type: WB-50
21. Queue start-up distance, L (feet): add lines 18 and 19	21.	74	
22. Time required for design vehicle to start moving (seconds): calculate as 2+(L÷20)	22.	5.7	Remarks
23. Design vehicle clearance distance, DVCD (feet): add lines 19 and 20	23.	107	
24. Time for design vehicle to accelerate through the DVCD (seconds)	24.	14.1	Read from Figure 2 in Instructions.
25. Queue clearance time (seconds): add lines 22 and 24	**25.**	19.8	

SECTION 3: MAXIMUM PREEMPTION TIME CALCULATION

			Remarks
26. Right-of-way transfer time (seconds): line 17	26.	6.3	
27. Queue clearance time (seconds): line 25	27.	19.8	
28. Desired minimum separation time (seconds)	28.	4.0	
29. Maximum preemption time (seconds): add lines 26 through 28	**29.**	30.1	

SECTION 4: SUFFICIENT WARNING TIME CHECK

				Remarks
30. Required minimum time, MT (seconds): per regulations	30.	20.0		
31. Clearance time, CT (seconds): get from railroad	31.	0.0		
32. Minimum warning time, MWT (seconds): add lines	32.		20.0	Excludes buffer time (BT)
33. Advance preemption time, APT, if provided (seconds): get from railroad	33.		0.0	
34. Warning time provided by the railroad (seconds): add lines 32 and 33	34.		20.0	
35. Additional warning time required from railroad (seconds): subtract line 34 from line 29, round up to nearest full second, enter 0 if less than 0	**35.**		11	

If the additional warning time required (line 35) is greater than zero, additional warning time has to be requested from the railroad. Alternatively, the maximum preemption time (line 29) may be decreased after performing an engineering study to investigate the possibility of reducing the values on lines 1, 5, 6, 7, 8, 11, 12, 13 and 14.

Remarks: City is not requesting vehicle gate interaction check timing.

SECTION 5: TRACK CLEARANCE GREEN TIME CALCULATION (OPTIONAL)

Preempt Trap Check

36. Advance preemption time (APT) provided (seconds):	36.	11.0	Line 33 only valid if line 35 is zero.	
37. Multiplier for maximum APT due to train handling	37.	1.25	See Instructions for details.	
38. Maximum APT (seconds): multiply line 36 and 37	38.	13.8	Remarks	
39. Minimum duration for the track clearance green interval (seconds)	39.	15.0	For zero advance preemption time	
40. Gates down after start of preemption (seconds): add lines 38 and 39	40.	28.8		
41. Preempt verification and response time (seconds): line 3	41.	0.0	Remarks	
42. Best-case conflicting vehicle or pedestrian time (seconds): usually 0.....	42.	0.0		
43. Minimum right-of-way transfer time (seconds): add lines 41 and 42	43.	0.0		
44. Minimum track clearance green time (seconds): subtract line 43 from line 40	44.	28.8		

Clearing of Clear Storage Distance

45. Time required for design vehicle to start moving (seconds), line 22	45.	5.7	
46. Design vehicle clearance distance (DVCD, feet), line 23	46.	107	Remarks
47. Portion of CSD to clear during track clearance phase (feet) ...	47.	42	CSD* in Figure 3 in Instructions.
48. Design vehicle relocation distance (DVRD, feet): add lines 46 and 47	48.	149	
49. Time required for design vehicle to accelerate through DVRD (seconds)	49.	9.5	Read from Figure 2 in Instructions.
50. Time to clear portion of clear storage distance (seconds): add lines 45 and 49	50.	15.2	
51. Track clearance green interval (seconds): maximum of lines 44 and 50, round up to nearest full second ..... 51.		29	

SECTION 6: VEHICLE-GATE INTERACTION CHECK (OPTIONAL)

52. Right-of-way transfer time (seconds): line 17	52.	6.3		
53. Time required for design vehicle to start moving (seconds), line 22	53.	5.7		
54. Time required for design vehicle to accelerate through DVL (on line 20, seconds)	54.		Read from Table 3 in Instructions.	
55. Time required for design vehicle to clear descending gate (seconds): add lines 52 though 54	55.	12.0		
			Remarks	
56. Duration of flashing lights before gate descent start (seconds): get from railroad	56.			
			Remarks	
57. Full gate descent time (seconds): get from railroad	57.			
58. Proportion of non-interaction gate descent time	58.		Read from Figure 5 in Instructions.	
59. Non-interaction gate descent time (seconds): multiply lines 57 and 58	59.	0.0		
60. Time available for design vehicle to clear descending gate (seconds): add lines 56 and 59	60.	0.0		
61. Advance preemption time (APT) required to avoid design vehicle-gate interaction (seconds): subtract line 60 from line 55, round up to nearest full second, enter 0 if less than 0 ..... 61.		12		

HIGHWAY-RAIL SIGNAL INTERFACE AGREEMENT

BNSF File No.: BF10016523
Mile Post 1148.58
Line Segment 7300
U.S. DOT Number 019784M
El Paso Subdivision

THIS HIGHWAY-RAIL SIGNAL INTERFACE AGREEMENT (hereinafter called, this"Agreement"), is entered into effective as of October 8, 2020 ("Effective Date"), by and between BNSF Railway Company, a Delaware Corporation (hereinafter called, "BNSF"), and City of El Paso, Texas (hereinafter called, the "Agency").

W I T N E S S E T H

WHEREAS, BNSF has grade crossing warning devices located at the intersection of Bird Avenue, DOT # 019784M, Line Segment 7300, Mile Post 1148.58, as indicated on Exhibit A attached hereto and made a part hereof;

WHEREAS, Agency desires to preempt the highway traffic control signals with the grade crossing warning devices shown on Exhibit A; and

WHEREAS, BNSF will allow the Agency to preempt the highway traffic control signals with the grade crossing warning devices shown on Exhibit A subject to the mutual covenants contained in this Agreement.

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

A G R E E M E N T

1. PURPOSE

The purpose of this Agreement is as follows: provide for the installation and maintenance of the improvements described below at the Bird Avenue at-grade crossing.

BNSF hereby grants to Agency, its successors and assigns, upon and subject to the terms and conditions set forth in this Agreement, a non-exclusive license to enter upon and use the portion of BNSF's right-of-way as is necessary for the installation and maintenance of the improvements described below, and as shown on the Exhibit A, at the Bird Avenue at-grade crossing, excepting and reserving BNSF's rights, and the rights of any others who have obtained, or may obtain, permission or authority from BNSF, to do the following:

a. Operate, maintain, renew and/or relocate any and all existing railroad track or tracks, wires, pipelines and other facilities of like character upon, over or under the surface of said right- of-way;

b. Construct, operate, maintain, renew and/or relocate upon said right-of-way, without limitation, such facilities as the BNSF may from time to time deem appropriate;

c. Otherwise use or operate the right-of-way as BNSF may from time to time deem appropriate.

Agency will construct the improvements in strict accordance with the requirements of this Agreement. The term of the license begins upon the Effective Date and ends upon termination of this Agreement for reasons of default following reasonable opportunity to cure or mutual agreement between the parties.

2. SCOPE OF WORK

a. The Agency must provide BNSF in writing, using the BNSF Preemption Worksheet attached hereto and made part of this Agreement as Exhibit D, with the total preempt cycle time required from the start of the preempt cycle of highway traffic control signals until the arrival of the train at the highway-rail crossing.

b. BNSF will provide an interface box with contact terminals, at Agency's expense on the side of the railroad instrument cabin.

c. Agency or its contractor will place all necessary cable and conduit on Railroad property, as approved by BNSF and in compliance with the BNSF Utility Accommodation Manual http://www.bnsf.com/communities/faqs/pdf/utility.pdf , at the locations shown on Exhibit A, attached to and made a part of this Agreement.

d. The Agency or its contractor will connect the highway traffic control signals to the contact terminals in the interface box including all necessary cable and conduit.

e. BNSF will provide flagging services, at Agency's sole expense as set forth in more detail on Exhibit C attached to and made a part of this Agreement.

f. The Agency or its contractor must install the new highway traffic control signals.

g. An estimate of the actual costs for BNSF work is shown on Exhibit B attached to and made a part of this Agreement. In the event installation of the improvements has not commenced within six (6) months following the effective date of this Agreement, BNSF may, in its sole and absolute discretion, revise the cost estimates set forth on Exhibit B. If the cost estimates are revised, the revised cost estimates will become a part of this Agreement as though originally set forth herein. Any item of work incidental to the items listed on Exhibit B not specifically mentioned therein may be included as a part of this Agreement upon written approval of the Agency, which approval will not be unreasonably withheld.

h. The Agency must pay BNSF for the actual costs of any work performed by BNSF under this Agreement within thirty (30) days of the date of the invoice for such work. During the construction of the improvements, BNSF may send Agency progressive invoices detailing the costs of the railroad work performed by BNSF under this Agreement. Upon completion of the improvements and all associated work, BNSF will send Agency a detailed invoice of final costs, segregated as to labor and materials for each item in the recapitulation shown on Exhibit B. Agency must pay the final invoice within ninety (90) days of the date of the final invoice. BNSF will assess a finance charge up to the maximum extent allowed by Texas law applicable to municipalities on any unpaid sums or other charges due under this Agreement which are past its credit terms.

3. CONSTRUCTION AND MAINTENANCE

a. BNSF will operate and maintain, at its expense, the necessary relays and the other materials required to preempt the highway traffic control signals with the grade crossing warning devices.

b. BNSF will to operate and maintain, at its expense, the railroad crossing warning devices up to the contact terminals in the interface box.

c. The Agency or its contractor must, at the Agency's expense, install the highway traffic control signals up to and including connection to the contact terminals in the interface box including all necessary cable and conduit.

d. Following installation of the traffic control signals, the Agency will own, operate and maintain, at its expense, the highway traffic control signals up to and including connection to the contact terminals in the interface box including all necessary cable and conduit.

e. For any future inspections or maintenance, routine or otherwise, performed by subcontractors on behalf of the Agency, Agency shall require the subcontractors to execute the C documents. Prior to performing any future maintenance with its own personnel, Agency shall: comply with all of BNSF's applicable safety rules and regulations; require any Agency employee performing maintenance to complete the safety training program at the BNSF's Internet Website "**www.BNSFContractor.com**"; notify BNSF when, pursuant to the requirements of exhibit C, a flagger is required to be present; procure, and have approved by BNSF's Risk Management Department, a Railroad Protective Liability insurance.

4. PROTECTION OF UNDERGROUND SYSTEMS

a. Agency and its contractor is placed on notice that fiber optic, communication and other cable lines and systems (collectively, the "Lines") owned by various telecommunications or utility companies may be buried on BNSF's property or right-of-way. The Agency or its contractor must contact appropriate personnel to have the Lines located and make arrangements with the owner of the Lines regarding protective measures that must be followed prior to the commencement of any work on BNSF's property. The Agency or its contractor will be responsible for contacting BNSF and the telecommunications or utility companies and notifying them of any work that may damage these Lines or facilities and/or interfere with their service. The Agency or its contractor must also mark all Lines in order to verify their locations. Agency or its contractor must also use all reasonable methods when working in the BNSF right-of-way or on BNSF property to determine if any other Lines (fiber optic, cable, communication or otherwise) may exist.

b. Agency or its contractor will be responsible for the rearrangement of any facilities or Lines determined to interfere with the installation or construction of the improvements. Agency and/or its Contractor must cooperate fully with any telecommunications or utility company(ies) in performing such rearrangements.

c. Failure to mark or identify Lines will be sufficient cause for BNSF to stop construction at no cost to BNSF until these items are completed.

d. In addition to the liability terms contained elsewhere in this Agreement, Agency and its contractor hereby indemnify, defend and hold harmless BNSF for, from and against all cost, liability, and expense whatsoever (including, without limitation, attorney's fees and court costs and expenses) arising out of or in any way contributed to by any act or omission of Agency or its contractor, subcontractors, agents and/or employees that cause or in any way or degree contribute to (1) any

damage to or destruction of any Lines on BNSF's property or within BNSF's right-of-way, (2) any injury to or death of any person employed by or on behalf of (a) any telecommunications or utility company, (b) Agency's contractor or subcontractors, or (c) Agency, and (3) any claim or cause of action for alleged loss of profits or revenue by, or loss of service by a customer or user of such telecommunications or utility company(ies).**THE LIABILITY ASSUMED BY AGENCY OR ITS CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY, DEATH, CAUSE OF ACTION OR CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE INTENTIONAL MISCONDUCT OR GROSS NEGLIGENCE OF BNSF.**

5. INDEMNIFICATION

a. Not Notwithstanding anything to the contrary in this Agreement, any obligation of the Agency to indemnify is only to the extent allowed under Texas law and providing that nothing obligates the City to levy a special tax or create a sinking fund to cover any indemnification obligations. Agency hereby indemnifies, defends and holds harmless BNSF for, from and against any and all claims, suits, losses, damages, costs and expenses for injury to or death to third parties or BNSF's officers and employees, and for loss and damage to property belonging to any third parties (including damage to the property of BNSF officers and employees), to the extent caused by the negligence of the Agency or any of its employees, agents or contractors. The Agency also releases BNSF from and waives any claims for injury or damage to the Agency's highway traffic control signals or other equipment which may occur as a result of any of the work provided for in this Agreement or the operation or the maintenance thereafter of any of the Agency's highway traffic control signals, cables, connections at and about the grade crossing.

b. To the fullest extent permitted by law, Agency hereby releases, indemnifies, defends and holds harmless BNSF and BNSF's affiliated companies, partners, successors, assigns, legal representatives, officers, directors, employees and agents for, from and against any and all claims, suits, liabilities, losses, damages, costs and expenses (including, without limitation, attorney's fees and court costs) for injury to or death to Agency employees, agents or representatives arising out of, resulting from or related to any act or omission of Agency or any work performed on or about BNSF's property or right-of-way. **THE LIABILITY ASSUMED BY THE AGENCY IN THIS PROVISION WILL NOT BE AFFECTED BY THE**

FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILROAD, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE GROSS NEGLIGENCE OR INTENTIONAL MISCONDUCT OF BNSF.

c. The Agency further agrees, at its expense, in the name and on behalf of BNSF, that it will adjust and settle any claims made against BNSF and will appear and defend any suits or actions at law or in equity brought against BNSF on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by the Agency under this Agreement for which BNSF is alleged to be liable. BNSF will give notice to the Agency in writing of the receipt of pendency of such claims and thereupon the Agency must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against BNSF, BNSF may forward the summons and complaint or process in connection therewith to the Agency, and the Agency must defend, adjust or settle such suits and protect, indemnify, and save harmless BNSF from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

d. Notwithstanding anything to the contrary in this Agreement, any obligation of the Agency to indemnify is only to the extent allowed under Texas law and provided that nothing obligates the City to levy a special tax or create a sinking fund to cover any indemnification obligations.

6. AGENCY CONTRACTOR REQUIREMENTS

a. While on or about BNSF property, Agency and its contractors must fully comply with BNSF's "Contractor Requirements" set forth in Exhibit "C" attached to and made a part of this Agreement. The "Contractor Requirements" include clearance requirements and personal protective equipment requirements. Agency and its contractors will be responsible for becoming familiar with BNSF's "Contractor Requirements". Prior to entering BNSF property, Agency's Contractor must execute Exhibit C-1 attached to and made a part of this Agreement.

b. Prior to entering BNSF property, each person providing labor, material, supervision or services connected with the work to be performed on or about BNSF property must complete the safety training program (hereinafter called "BNSF Contractor

Safety Orientation") at the following internet website: "**www.BNSFContractor.com**". Agency must ensure that each of its contractors, employees, subcontractors, agents or invitees completes the BNSF Contractor Safety Orientation before any work is performed under this Agreement. Additionally, Agency must ensure that each and every contractor, employee, subcontractor, agent or invitee possesses a card certifying completion of the BNSF Contractor Safety Orientation prior to entering BNSF property. Agency must renew the BNSF Contractor Safety Orientation annually.

c. Prior to entering BNSF property, Agency or its contractors must prepare and implement a safety action plan acceptable to BNSF. Agency must audit compliance with the plan during the course of Agency's work. A copy of the plan and audit results must be kept at the work site and will be available for inspection by BNSF at all reasonable times.

7. INSURANCE

Agency will require its contractors to procure and maintain while performing any work on BNSF property the following insurance coverage:

A. Commercial General Liability insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of $2,000,000 each occurrence and an aggregate limit of at least $4,000,000 but in no event less than the amount otherwise carried by the Contractor. Coverage must be purchased on a post 2004 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- Bodily Injury and Property Damage
- Personal Injury and Advertising Injury
- Fire legal liability
- Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

- The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.

- Waver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

It is agreed that the workers' compensation and employers' liability related exclusions in the Commercial General Liability insurance policy(s) required herein are intended to apply to employees of the policy holder and shall not apply to ***Railway*** employees.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy with regard to the work being performed under this agreement.

B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least $1,000,000 per occurrence, and include coverage for, but not limited to the following:

- Bodily injury and property damage
- Any and all vehicles owned, used or hired

The policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- Contractor's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.

- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 by disease policy limit, $500,000 by disease each employee.

This policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.

D. Railroad Protective Liability insurance naming only the ***Railway*** as the Insured with coverage of at least $2,000,000 per occurrence and $6,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 12 04 and include the following:

- Endorsed to include the Pollution Exclusion Amendment
- Endorsed to include the Limited Seepage and Pollution Endorsement.
- Endorsed to remove any exclusion for punitive damages.
- No other endorsements restricting coverage may be added.
- The original policy must be provided to the ***Railway*** prior to performing any work or services under this Agreement.
- Definition of "Physical Damage to Property" shall be endorsed to read: "means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured' care, custody, and control arising out of the acts or omissions of the contractor named on the Declarations.

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate (if available) in Railway's Blanket Railroad Protective Liability Insurance Policy.

Other Requirements:

Where allowable by law, all policies (applying to coverage listed above) shall contain no exclusion for punitive damages.

Contractor agrees to waive its right of recovery against ***Railway*** for all claims and suits against ***Railway***. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against ***Railway*** for all claims and suits. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against ***Railway*** for loss of its owned or leased property or property under Contractor's care, custody or control.

Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Contractor is not allowed to self-insure without the prior written consent of ***Railway.*** If granted by ***Railway***, any self-insured retention or other financial responsibility for claims shall be covered directly by Contractor in lieu of insurance. Any and all ***Railway*** liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Contractor's insurance will be covered as if Contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing services, Contractor shall furnish to ***Railway*** an acceptable certificate(s) of insurance from an authorized representative evidencing the required coverage(s), endorsements, and amendments. The certificate should be directed to the following address:

BNSF Railway Company
c/o CertFocus
Toll Free: 877-576-2378
Fax number: 817-840-7487
Email: BNSF@certfocus.com

Contractor shall notify ***Railway*** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration.

Any insurance policy shall be written by a reputable insurance company acceptable to ***Railway*** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

If coverage is purchased on a "claims made" basis, Contractor hereby agrees to maintain coverage in force for a minimum of three years after expiration, cancellation or termination of this Agreement. Annually Contractor agrees to provide evidence of such coverage as required hereunder.

Contractor represents that this Agreement has been thoroughly reviewed by Contractor's insurance agent(s)/broker(s), who have been instructed by Contractor to procure the insurance coverage required by this Agreement.

Not more frequently than once every five years, ***Railway*** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Contractor, Contractor shall require that the subcontractor shall provide and maintain insurance coverage(s) as set forth herein, naming ***Railway*** as an additional insured, and shall require that the subcontractor shall

release, defend and indemnify ***Railway*** to the same extent and under the same terms and conditions as Contractor is required to release, defend and indemnify ***Railway*** herein.

Failure to provide evidence as required by this section shall entitle, but not require, ***Railway*** to terminate this Agreement immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Contractor shall not be deemed to release or diminish the liability of Contractor including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by ***Railway*** shall not be limited by the amount of the required insurance coverage.

In the event of a claim or lawsuit involving ***Railway*** arising out of this agreement, Contractor will make available any required policy covering such claim or lawsuit.

These insurance provisions are intended to be a separate and distinct obligation on the part of the Contractor. Therefore, these provisions shall be enforceable and Contractor shall be bound thereby regardless of whether or not indemnity provisions are determined to be enforceable in the jurisdiction in which the work covered hereunder is performed.

For purposes of this section, ***Railway*** shall mean “Burlington Northern Santa Fe LLC”, “BNSF Railway Company” and the subsidiaries, successors, assigns and affiliates of each.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

AGENCY

CITY OF EL PASO, TEXAS

By:

_____

Printed Name:

_____

Title:

_____

[REMAINDER OF THIS PAGE LEFT INTENTIONALLY BLANK]

(AGENCY Signature Page for Bird Avenue Agreement)

BNSF

BNSF RAILWAY COMPANY

By:

_____

Printed Name: Lynn Leibfried

Title: Assistant Director Public Projects

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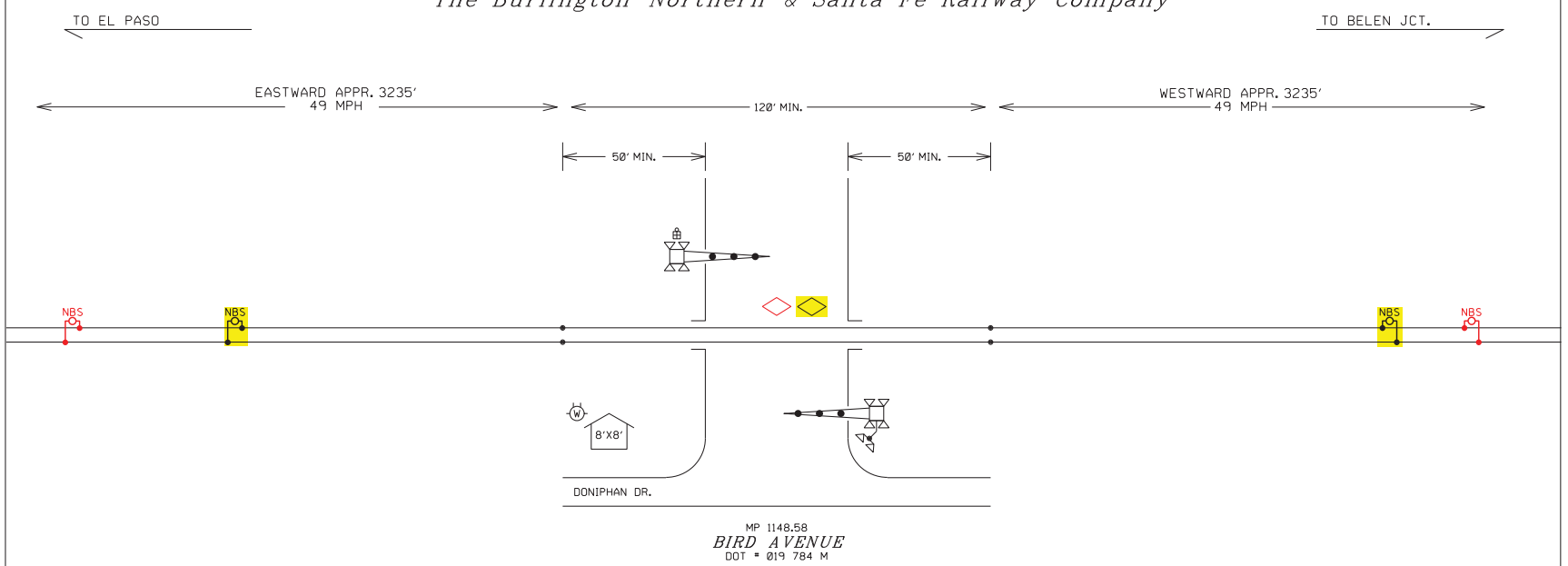
(BNSF Signature Page for Bird Avenue Agreement)

The Burlington Northern & Santa Fe Railway Company



MP 1148.58
BIRD AVENUE
DOT # 019 784 M

PROJECT# 79351

REUSE: FLASHERS, GATES & BUNGALOW
CONTROL DEVICES: CONSTANT WARNING
SALVAGE: NONE
RED = IN YELLOW = OUT

8X8	INSTRUMENT HOUSE
	BELL
W	METER
•	CROSSING CONTROLL CONNECTIONS
◇	BIDIRECTIONAL CROSSING CONTROL
▷	UNIDIRECTIONAL CROSSING CONTROL
	COUPLER OR TERMINATION
	GUARD RAIL

Warning device placement:
Clearance to C.L. Track = Min. 12'
Edge of Road to C.L. Foundation:
Min. 4'3" with curb,
Min. 8'3" without curb,
Max. 12'
House Clearance: 25' Min. to Near Rail
30' Min. to Edge of Road
ALL LIGHTS TO BE LED

EXHIBIT A - RR SIGNAL SKETCH

BNSF RAILWAY CO.
LOCATION: EL PASO, TX
STREET: BIRD AVENUE
LS: 7300
M.P. 1148.58
DOT # 019 784 M
DIVISION: SOUTHWEST
SUBDIVISION: EL PASO
KANSAS CITY
NO SCALE
DATE: 12/04/2019
FILE: 79351-STATESKETCH-.dgn
AMW

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

EXHIBIT B - Railroad Signal Estimate for
BIRD AVE - DOT No. 019784M
Revised on 12/04/19

BNSF RAILWAY COMPANY
FHPM ESTIMATE FOR
TX DOT

LOCATION WEST MONTOYA TO MP 1152.8 | DETAILS OF ESTIMATE | PLAN ITEM : 000321485 | VERSION : 3

PURPOSE, JUSTIFICATION AND DESCRIPTION

BIRD AVENUE - EL PASO, TX; REPLACE PRE-EMPTION; SOUTHWEST DIV; EL PASO SUBDIV; LS 7300; MP 1148.58; DOT# 019784M; SEQ# 79351.

MONTHLY POWER UTILITY COST CENTER : 61694.

THE MATERIAL LIST BELOW REFLECTS TYPICAL REPRESENTATIVE PACKAGES USED FOR ESTIMATING PURPOSES ONLY.

THIS ESTIMATE IS GOOD FOR 180 DAYS. THE ESTIMATE IS SUBJECT TO CHANGE IN COST FOR LABOR, MATERIAL, AND OVERHEAD.

CONTRACTS HAVE BEEN ESTABLISHED FOR PORTIONS OF SIGNAL WORK ON THE BNSF RAILROAD.

********** SIGNAL WORK ONLY **********

THE CITY OF EL PASO, TX IS FUNDING 100% OF THIS PROJECT.

MAINTAIN PROPRIETARY CONFIDENTIALITY.

PRIMARY FUNDING SOURCE IS FHWA
** BUY AMERICA(N) APPLIES **

DESCRIPTION	QUANTITY U/M	COST	TOTAL $
**********			
LABOR			
**********			
SIGNAL FIELD - REPLACE	168.0 MH	5,180	
PAYROLL ASSOCIATED COSTS		3,386	
DA OVERHEADS		5,621	
EQUIPMENT EXPENSES		1,152	
INSURANCE EXPENSES		906	
TOTAL LABOR COST		16,245	16,245
**********			
MATERIAL			
**********			
ADVANCED PRE-EMPTION KIT	1.0 LS N	6,539	
ARRESTOR, MDSA-2 XS	1.0 EA N	686	
CONSTANT WARNING, XP4, 1TK	1.0 EA N	16,015	
MISC WIRING	1.0 LS N	750	
RELAY	2.0 EA N	1,500	
RELAY, (HEALTH)	1.0 EA N	750	
SHUNT, NBS	2.0 EA N	1,983	
USE TAX		2,369	
OFFLINE TRANSPORTATION		351	
TOTAL MATERIAL COST		30,943	30,943
**********			
OTHER			
**********			
CONTRACT ENGINEERING	1.0 LS N	8,000	
TRAFFIC ENGINEERING STUDY	1.0 LS N	10,000	
TOTAL OTHER ITEMS COST		18,000	18,000
PROJECT SUBTOTAL			65,188
CONTINGENCIES			0
BILL PREPARATION FEE			652
GROSS PROJECT COST			65,840
LESS COST PAID BY BNSF			0
TOTAL BILLABLE COST			65,840

EXHIBIT "C"

CONTRACTOR REQUIREMENTS

1.01 General:

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "**Railway**" where work is over or under on or adjacent to Railway property and/or right-of-way, hereafter referred to as "Railway Property", during the **install conduit and cable for traffic signal preemption interconnection at Bird Avenue - DOT No. 019784M, located at railroad milepost 1148.58 on Railway's El Paso Subdivision, Line Segment 7300 in El Paso, Texas in El Paso County in accordance with the ATTACHMENT # 1.**

- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1". Questions regarding procurement of the Railroad Protective Liability Insurance should be directed to Rosa Martinez at Marsh, USA, 214-303-8519.

- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.

- **1.01.04** The Contractor's right to enter Railway's Property is subject to the absolute right of Railway to cause the Contractor's work on Railway's Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to Railway's Property, employees, and/or operations. Railway will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by Railway; (ii) Contractor (or any of its subcontractors), in Railway's opinion, prosecutes the Project work in a manner which is hazardous to Railway property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) Contractor fails to pay Railway for the Temporary Construction License or the Easement. The work stoppage will continue until all necessary actions are taken by Contractor or its subcontractor to rectify the situation to the satisfaction of Railway's Division Engineer or until additional insurance has been delivered to and accepted by Railway. Any such work stoppage under this provision will not give rise to any liability on the part of Railway. Railway's right to stop the work is in addition to any other rights Railway may have including, but not limited to, actions or suits for damages or lost profits. In the event that Railway desires to stop construction work on the Project, Railway agrees to immediately notify the following individual in writing:

Richard Bristol
Director, Streets and Maintenance Department
City of El Paso
218 N. Campbell Street
El Paso, TX 79901
Email: BristolRX@elpasotexas.gov

- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.

- **1.01.06** The Contractor must notify **Richard Bristol (City of El Paso) at 915-212-7015** and Railway's Manager Public Projects, telephone number **817-352-2902** at least thirty (30) calendar days before commencing any work on Railway Property. Contractor's notification to Railway must refer to Railway's file: **019784M – Traffic Signal Intertie**.

- **1.01.07** For any bridge demolition and/or falsework above any tracks or any excavations located with any part of the excavations located within, whichever is greater, twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 2 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting Railway Property and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. For all excavation and shoring submittal plans, the current "BNSF-UPRR Guidelines for Temporary Shoring" must be used for determining the design loading conditions to be used in shoring design, and all calculations and submittals must be in accordance with the current "BNSF-UPRR Guidelines for Temporary Shoring". All submittal drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and

calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. The Contractor must not begin work until notified by the Railway that plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over Railway's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.

- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01 No employee of the Contractor, its subcontractors, agents or invitees may enter Railway Property without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.BNSFContractor.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering Railway Property. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.**

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by the Agency.

- **1.03.02 INTENTIONALL LEFT BLANK**

- **1.03.03** The Contractor must abide by the following temporary clearances during construction:

- 15’-0” Horizontally from centerline of nearest track
- 21’-6” Vertically above top of rail
- 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
- 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
- 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
- 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
  - 25’ Horizontally from centerline of nearest track
  - 23’ 6” Vertically above top of rail

- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to **City of El Paso** and must not be undertaken until approved in writing by the Railway, and until **City of El Paso** has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.

- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by the Agency.

- **1.03.07** The details of construction affecting the Railway's Property and tracks not included in the contract plans must be submitted to the Railway by **City of El Paso** for approval before work is undertaken and this work must not be undertaken until approved by the Railway.

- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across Railway's tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Construction Crossing Agreement" from the Railway prior to moving his equipment or materials across the Railways tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be constructed and, at the completion of the project, removed at the expense of the Contractor.

- **1.03.09** Discharge, release or spill on the Railway Property of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the **Railway's Resource Operations Center at 1(800) 832-5452**, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Railway Property to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.

- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Railway's Property all of Contractor's tools, equipment, implements and other materials, whether brought upon said property by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Railway's Property to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan:

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site **www.BNSFContractor.com**, which will be made available to Railway prior to commencement of any work on Railway Property. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.

- **1.04.02** Contractor shall have a background investigation performed on all of its employees, subcontractors and agents who will be performing any services for Railroad under this Agreement which are determined by Railroad in its sole discretion **a)** to be on Railroad's property, or **b)** that require access to Railroad Critical Infrastructure, Railroad Critical Information Systems, Railroad's Employees, Hazardous Materials on Railroad's property or is being transported by or otherwise in the custody of Railroad, or Freight in Transit involving Railroad.

The required background screening shall at a minimum meet the rail industry background screening criteria defined by the e-RAILSAFE Program as outlined at **www.eVerifile.com**, in addition to any other applicable regulatory requirements.

Contractor shall obtain written consent from all its employees, subcontractors or agents screened in compliance with the e-RAILSAFE Program to participate in the Program on their behalf and to release completed background information to Railroad's designee. Contractor shall be subject to periodic audit to ensure compliance.

Contractor subject to the e-RAILSAFE Program hereunder shall not permit any of its employees, subcontractors or agents to perform services hereunder who are not first approved under e-RAILSAFE Program standards. Railroad shall have the right to deny entry onto its premises or access as described in this section above to any of Contractor's employees, subcontractors or agents who do not display the authorized identification badge issued by a background screening service meeting the standards set forth in the e-RAILSAFE Program, or who in Railroad's opinion, which may not be unreasonable, may pose a threat to the safety or security of Railroad's operations, assets or personnel.

Contractors shall be responsible for ensuring that its employees, subcontractors and agents are United States citizens or legally working in the United States under a lawful and appropriate work VISA or other work authorization.

1.05 Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's **Roadmaster** Esequiel Abeyta at mobile # 505-859-6307 or Esequiel.Abeyta@BNSF.com a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.
  - **FOR THIS PROJECT, RAILROAD FLAGGING SERVICES WILL BE PROVIDED BY RAILPROS (NOT A BNSF EMPLOYEE). The Contractor must contact Railpros directly at Office # 877-315-0513 or e-mail: BNSFinfo@railprosfs.com to enter into a reimbursement agreement for flagging services and to request and schedule a railroad flagger. The Railpros flagger(s), the Contractor, and the BNSF Roadmaster must**

participate in a job safety briefing PRIOR TO the start of any work on/over/under Railway's right of way. The Railway reserves the right to utilize its employees to provide railroad flagging services when those resources become available. In this event, the Railpros flagger and the Contractor will be notified by the Railway.

- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:

    - **1.05.02a** When, upon inspection by Railway's Representative, other conditions warrant.

    - **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.

    - **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.

    - **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.

    - **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.

- **1.05.03** Flagging services will be performed by qualified Railway flaggers.

    - **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railways Representative.

    - **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.

    - **1.05.03c** The cost of flagger services provided by the Railway will be borne by **CONTRACTOR**. The estimated cost for one (1) flagger is approximately between $800.00-$1,600.00 for an eight (8) hour basic

day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, vehicle, transportation, meals, lodging, radio, equipment, supervision and other costs incidental to performing flagging services. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. **THE FLAGGING RATE IN EFFECT AT THE TIME OF PERFORMANCE BY THE CONTRACTOR HEREUNDER WILL BE USED TO CALCULATE THE ACTUAL COSTS OF FLAGGING PURSUANT TO THIS PARAGRAPH.**

- **1.05.03d** The average train traffic on this route is **8** freight trains per 24-hour period at a timetable speed **49** MPH and **0** passenger trains at a timetable speed of **N/A** MPH.

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.

- **1.06.02** Before beginning any task on Railway Property, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Railway track(s).

- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.

- **1.06.04** When Contractor employees are required to work on the Railway Property after normal working hours or on weekends, the Railway's representative in charge of

the project must be notified. A minimum of two employees must be present at all times.

- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Railway's Property and subsequently released to the custody of a representative of Contractor management. Future access to the Railway's Property by that employee will be denied.

- **1.06.06** Any damage to Railway Property, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.

- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on Railway's Property.

- **1.06.08** All personnel protective equipment (PPE) used on Railway Property must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, **www.BNSFContractor.com,** however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats; c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railway's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information contained on the web site and the information in this paragraph, the web site will govern.)**

- **1.06.09 THE CONTRACTOR MUST NOT PILE OR STORE ANY MATERIALS, MACHINERY OR EQUIPMENT CLOSER THAN 25'-0" TO THE CENTER LINE OF THE NEAREST RAILWAY TRACK. MATERIALS, MACHINERY OR EQUIPMENT MUST NOT BE STORED OR LEFT WITHIN 250 FEET OF ANY HIGHWAY/RAIL AT-GRADE CROSSINGS OR TEMPORARY CONSTRUCTION CROSSING, WHERE STORAGE OF THE SAME WILL OBSTRUCT THE VIEW OF A TRAIN APPROACHING THE CROSSING. PRIOR TO BEGINNING WORK, THE CONTRACTOR MUST ESTABLISH A STORAGE AREA WITH CONCURRENCE OF THE RAILWAY'S REPRESENTATIVE.**

- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Railway's Property must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)

- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.

- **1.06.12** All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation:

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Railway's Property could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact **BNSF's Roadmaster** Esequiel Abeyta at mobile # 505-859-6307 **and BNSF's Signal Supervisor** Joshua LeMar at mobile # 913-953-7039**.** All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. **It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.**

- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be

performed until the exact location has been determined. There will be no exceptions to these instructions.

- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.

- **1.07.04** Any excavations, holes or trenches on the Railway's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon as possible.

1.08 Hazardous Waste, Substances and Material Reporting:

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Railway's Property must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

(If injuries are in connection with rail equipment accident/incident, highway rail grade crossing accident or automobile accident, ensure that appropriate information is obtained, forms completed and that data entry personnel are aware that injuries relate to that specific event.)

Injured Person Type:

- ☐ Passenger on train (C)
- ☐ Non-employee (N)
  (i.e., emp of another railroad, or, non-BNSF emp involved in vehicle accident, including company vehicles)
- ☐ Contractor/safety sensitive (F)
- ☐ Contractor/non-safety sensitive (G)
- ☐ Volunteer/safety sensitive (H)
- ☐ Volunteer/other non-safety sensitive (I)
- ☐ Non-trespasser (D) - to include highway users involved in highway rail grade crossing accidents who did not go around or through gates
- ☐ Trespasser (E) - to include highway users involved in highway rail grade crossing accidents who went around or through gates
- ☐ Non-trespasser (J) - Off railroad property

If train involved, Train ID: _____

Transmit attached information to Accident/Incident Reporting Center by:
Fax 1-817-352-7595 or by Phone 1-800-697-6736 **or email to: Accident-Reporting.Center@BNSF.com**
AND COPY TO: ROADMASTER **Esequiel.Abeyta@BNSF.com** & MANAGER PUBLIC PROJECTS **Tim.Huya@BNSF.com**

Officer Providing Information:

_____ _____ _____
(Name) (Employee No.) (Phone #)

REPORT PREPARED TO COMPLY WITH FEDERAL ACCIDENT REPORTING REQUIREMENTS AND PROTECTED FROM DISCLOSURE PURSUANT TO 49 U.S.C. 20903 AND 83 U.S.C. 490

BNSF RAILWAY

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IT IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St: _____ 2. Date: _____ Time: _____

County: _____ 3. Temperature: _____ 4. Weather: _____
(if non BNSF location)

Mile Post / Line Segment: _____

5. Driver's License No (and state) or other ID: _____ **SSN (required)**: _____

6. Name (last, first, mi): _____

7. Address: _____ City: _____ St: _____ Zip: _____

8. Date of Birth: _____ and/or Age: _____ Gender: _____
(if available)

Phone Number: _____ Employer: _____

9. Injury: _____ 10. Body Part: _____
(i.e., Laceration, etc.) (i.e., Hand, etc.)

11. Description of Accident (To include location, action, result, etc.): _____

_____

_____

_____

12. Treatment:

- ☐ First Aid Only _____
- ☐ Required Medical Treatment _____
- ☐ Other Medical Treatment _____

13. Dr. Name: _____ Date: _____

14. Dr. Address:

Street: _____ City: _____ St: _____ Zip: _____

15. Hospital Name: _____

16. Hospital Address:

Street: _____ City: _____ St: _____ Zip: _____

17. Diagnosis: _____

REPORT PREPARED TO COMPLY WITH FEDERAL ACCIDENT REPORTING REQUIREMENTS AND PROTECTED FROM DISCLOSURE PURSUANT TO 49 U.S.C. 20903 AND 83 U.S.C. 490

ATTACHMENT 1

(updated 1/23/2014)

General Construction Specifications for conduit work by AGENCY on BNSF Railway (revised 01/14/2014):

1) The agency or its contractor must obtain a fully executed railroad right of entry agreement (ROE) and meet all of its specifications and requirements prior to working on railroad property. This **ATTACHMENT 1** must be made a part of or incorporated into the ROE.
2) All traffic signal preemption wires or other data cables located within the railroad's right of way must be placed in conduit(s) that is capable of withstanding the railroad loads and other loads superimposed upon them.
3) On traffic signal preemption projects that include conduit placement by the Agency's contractor:
    a. The agency's Pull Box must be located off railroad's right of way.
    b. Agency's contractor to install conduit from the Agency's Pull Box to the Key Box located on the side of the Railroad's crossing signal control house.
    c. The Agency's contractor will pull the preemption wires through the conduit from the Agency's Pull Box and connect to the terminals in the Key Box located on the side of the crossing signal control house.
4) On projects where wires are proposed to be installed across railroad right of way and under the railroad track(s):
    a. The approved plans shall specify the size, type, and location of proposed conduits and wires.
    b. Wires shall be placed in METAL conduit. In circumstances where it is not feasible to install metal conduit from railroad's right of way line to right of way line, the metal conduit shall extend to the greater of the following distances, measured at right angles to the centerline of track:
        i. Two feet (2'-0") beyond the toe of slope.
        ii. Three feet (3'-0") beyond the ditch line.
        iii. Twenty five feet (25'-0") from centerline of outside track.
        iv. If additional track is planned for future construction, conduit must extend far enough to meet above distance given the additional track requirements.
5) The conduit pipe must be buried with a minimum cover of three feet (3'-0") below the flow line of any ditch or ground surface and five feet and six inches (5'-6") from base of rail. In fill sections, the natural ground line at the toe of slope will be considered as ditch grade.
6) Jacking pits must be located a minimum of thirty feet (30'-0") from centerline of track.
7) A railroad signal representative must be present during installation if railroad signals are in the vicinity of conduit location unless signal representative authorizes otherwise.
8) The execution of the track work on railroad property shall be subject to the inspection and direction of the railroad's flagger, at the Agency contractor's expense.
9) The Agency will own and maintain the wires and conduit encasement for the traffic signal preemption wires or other data wires or cables located on the railroad's right of way.

EXHIBIT "C-1"

Agreement Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR

Railway File: **DOT No. 019784M**

Agency Project: **Installation of Conduit & Cables for Traffic Signal – RR Signal interconnection at Bird Avenue and Doniphan Drive**

_____ (hereinafter called "**Contractor**"), has entered into an agreement (hereinafter called "Agreement") with the **City of El Paso, Texas (CITY)** for the performance of certain work in connection with the following project: **install conduit and cable for traffic signal preemption interconnection at Bird Avenue - DOT No. 019784M, located at railroad milepost 1148.58 on Railway's El Paso Subdivision, Line Segment 7300 in El Paso, Texas in El Paso County in accordance with the ATTACHMENT # 1.** Performance of such work will necessarily require Contractor to enter **BNSF RAILWAY COMPANY** (hereinafter called "Railway") right of way and property (hereinafter called "Railway Property"). The Agreement provides that no work will be commenced within Railway Property until the Contractor employed in connection with said work for **CITY** (i) executes and delivers to Railway an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon Railway Property and as an inducement for such entry, Contractor, effective on the date of the Agreement, has agreed and does hereby agree with Railway as follows:

1) RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH,**

OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE INTENSIONAL MISCONDUCT OR GROSS NEGLIGENCE OF RAILWAY.

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE LOCOMOTIVE INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

In addition to any other provision of this Agreement, in the event that all or any portion of this Article shall be deemed to be inapplicable for any reason, including without limitation as a result of a decision of an applicable court, legislative enactment or regulatory order, the parties agree that this Article shall be interpreted as requiring Contractor to indemnify Railway to the fullest extent permitted by applicable law. **THROUGH THIS AGREEMENT THE PARTIES EXPRESSLY INTEND FOR CONTRACTOR TO INDEMNIFY RAILWAY FOR RAILWAY'S ACTS OF NEGLIGENCE.**

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

2) TERM

This Agreement is effective from the date of the Agreement until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

3) INSURANCE

Contractor shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. Commercial General Liability insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of $2,000,000 each occurrence and an aggregate limit of at least $4,000,000 but in no event less than the amount otherwise carried by the Contractor. Coverage must be purchased on a post 2004 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- Bodily Injury and Property Damage
- Personal Injury and Advertising Injury
- Fire legal liability
- Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

- The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- Waver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

It is agreed that the workers' compensation and employers' liability related exclusions in the Commercial General Liability insurance policy(s) required herein are intended to apply to employees of the policy holder and shall not apply to ***Railway*** employees.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy with regard to the work being performed under this agreement.

B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least $1,000,000 per occurrence, and include coverage for, but not limited to the following:

- Bodily injury and property damage
- Any and all vehicles owned, used or hired

The policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- Contractor's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 by disease policy limit, $500,000 by disease each employee.

This policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.

D. Railroad Protective Liability insurance naming only the ***Railway*** as the Insured with coverage of at least $2,000,000 per occurrence and $6,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 12 04 and include the following:

- Endorsed to include the Pollution Exclusion Amendment
- Endorsed to include the Limited Seepage and Pollution Endorsement.
- Endorsed to remove any exclusion for punitive damages.
- No other endorsements restricting coverage may be added.
- The original policy must be provided to the ***Railway*** prior to performing any work or services under this Agreement
- Definition of "Physical Damage to Property" shall be endorsed to read: "means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured' care, custody, and control arising out of the acts or omissions of the contractor named on the Declarations.

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate (if available) in Railway's Blanket Railroad Protective Liability Insurance Policy.

Other Requirements:

Where allowable by law, all policies (applying to coverage listed above) shall contain no exclusion for punitive damages.

Contractor agrees to waive its right of recovery against ***Railway*** for all claims and suits against ***Railway***. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against ***Railway*** for all claims and suits. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against ***Railway*** for loss of its owned or leased property or property under Contractor's care, custody or control.

Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Contractor is not allowed to self-insure without the prior written consent of ***Railway.*** If granted by ***Railway***, any self-insured retention or other financial responsibility for claims shall be covered directly by Contractor in lieu of insurance. Any and all ***Railway*** liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Contractor's insurance will be covered as if Contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing services, Contractor shall furnish to ***Railway*** an acceptable certificate(s) of insurance from an authorized representative evidencing the required coverage(s), endorsements, and amendments. The certificate should be directed to the following address:

BNSF Railway Company
c/o CertFocus
Toll Free: 877-576-2378
Fax number: 817-840-7487
Email: BNSF@certfocus.com

Contractor shall notify ***Railway*** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration.

Any insurance policy shall be written by a reputable insurance company acceptable to ***Railway*** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

If coverage is purchased on a "claims made" basis, Contractor hereby agrees to maintain coverage in force for a minimum of three years after expiration, cancellation or termination of this Agreement. Annually Contractor agrees to provide evidence of such coverage as required hereunder.

Contractor represents that this Agreement has been thoroughly reviewed by Contractor's insurance agent(s)/broker(s), who have been instructed by Contractor to procure the insurance coverage required by this Agreement.

Not more frequently than once every five years, ***Railway*** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Contractor, Contractor shall require that the subcontractor shall provide and maintain insurance coverage(s) as set forth herein, naming ***Railway*** as an additional insured, and shall require that the subcontractor shall release, defend and indemnify ***Railway*** to the same extent and under the same terms and conditions as Contractor is required to release, defend and indemnify ***Railway*** herein.

Failure to provide evidence as required by this section shall entitle, but not require, ***Railway*** to terminate this Agreement immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Contractor shall not be deemed to release or diminish the liability of Contractor including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by ***Railway*** shall not be limited by the amount of the required insurance coverage.

In the event of a claim or lawsuit involving ***Railway*** arising out of this agreement, Contractor will make available any required policy covering such claim or lawsuit.

These insurance provisions are intended to be a separate and distinct obligation on the part of the Contractor. Therefore, these provisions shall be enforceable and Contractor shall be bound thereby regardless of whether or not indemnity provisions are determined to be enforceable in the jurisdiction in which the work covered hereunder is performed.

For purposes of this section, ***Railway*** shall mean "Burlington Northern Santa Fe LLC", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

4) SALES AND OTHER TAXES

In the event applicable sales taxes of a state or political subdivision of a state of the United States are levied or assessed in connection with and directly related to any amounts invoiced by Contractor to Railway ("Sales Taxes"), Railway shall be responsible for paying only the Sales Taxes that Contractor separately states on the invoice or other billing documents provided to Railway; *provided, however,* that (i) nothing herein shall preclude Railway from claiming whatever Sales Tax exemptions are applicable to amounts Contractor bills Railway, (ii)

Contractor shall be responsible for all sales, use, excise, consumption, services and other taxes which may accrue on all services, materials, equipment, supplies or fixtures that Contractor and its subcontractors use or consume in the performance of this Agreement, (iii) Contractor shall be responsible for Sales Taxes (together with any penalties, fines or interest thereon) that Contractor fails to separately state on the invoice or other billing documents provided to Railway or fails to collect at the time of payment by Railway of invoiced amounts (except where Railway claims a Sales Tax exemption), and (iv) Contractor shall be responsible for Sales Taxes (together with any penalties, fines or interest thereon) if Contractor fails to issue separate invoices for each state in which Contractor delivers goods, provides services or, if applicable, transfers intangible rights to Railway.

Upon request, Contractor shall provide Railway satisfactory evidence that all taxes (together with any penalties, fines or interest thereon) that Contractor is responsible to pay under this Agreement have been paid. If a written claim is made against Contractor for Sales Taxes with respect to which Railway may be liable for under this Agreement, Contractor shall promptly notify Railway of such claim and provide Railway copies of all correspondence received from the taxing authority. Railway shall have the right to contest, protest, or claim a refund, in Railway's own name, any Sales Taxes paid by Railway to Contractor or for which Railway might otherwise be responsible for under this Agreement; provided, however, that if Railway is not permitted by law to contest any such Sales Tax in its own name, Contractor shall, if requested by Railway at Railway's sole cost and expense, contest in Contractor's own name the validity, applicability or amount of such Sales Tax and allow Railway to control and conduct such contest.

Railway retains the right to withhold from payments made under this Agreement amounts required to be withheld under tax laws of any jurisdiction. If Contractor is claiming a withholding exemption or a reduction in the withholding rate of any jurisdiction on any payments under this Agreement, before any payments are made (and in each succeeding period or year as required by law), Contractor agrees to furnish to Railway a properly completed exemption form prescribed by such jurisdiction. Contractor shall be responsible for any taxes, interest or penalties assessed against Railway with respect to withholding taxes that Railway does not withhold from payments to Contractor.

5) EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with all provisions, obligations, requirements and limitations contained in the Agreement, and the Contractor Requirements set forth on Exhibit "C" attached to the Agreement and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site. Contractor shall execute a Temporary Construction Crossing Agreement or Private Crossing Agreement

(http://www.bnsf.com/communities/faqs/permits-real-estate/), for any temporary crossing requested to aid in the construction of this Project, if approved by BNSF.

6) TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train delays, whether caused by Contractor, or subcontractors, or by the Railway performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. The rate then in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of train delay pursuant to this agreement.

Contractor and its subcontractors must give Railway's representative Roadmaster **Esequiel Abeyta at mobile # 505-859-6307 or Esequiel.Abeyta@BNSF.com** four (4) weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

IN WITNESS WHEREOF, each of the parties hereto has caused this Agreement to be executed by its duly authorized officer the day and year first above written.

Contractor

By: _____

Printed Name: _____

Title: _____

Address: _____

Address: _____

City: _____

State: _____ Zip: _____

Phone: _____

Fax: _____

On-site Project
Contact Person: _____ Mobile: _____
E-mail: _____

Contact Person: _____ Mobile: _____
E-mail: _____

BNSF Railway Company

By: _____

Name: Timothy J. Huya
Manager Public Projects

Accepted and effective this _____ day

of _____, 2020.

HIGHWAY-RAIL GRADE CROSSING
TRAFFIC SIGNAL PREEMPTION REQUEST FORM

The Road Authority traffic controller circuitry requires railroad preemption contacts to initiate the preemption sequence. Per BNSF standard, we will provide normally closed "dry" preemption relay contacts to interconnect the railroad active warning system to the Road Authority traffic signal controller assembly. These contacts are rated at 4 amps. With no trains in the area, these contacts remain closed. The Road Authority Traffic Department will be responsible for installing the interconnection cable between the traffic signal controller and the crossing warning signal control housing. If exit gates are utilized, the Road Authority Traffic Department will be responsible for installing and maintaining the "in pavement" vehicle detection loops from the street to the cable junction box.

To estimate and or design the crossing warning system, BNSF needs to know certain timing parameters.

Definitions:

"Advance Preemption" – The system will be designed to open the preemption contacts for a predetermined amount of time (Advance Preemption Time) prior to activation of the warning devices (flashing lights).

"Simultaneous Preemption" – The system will be designed to open the preemption contact at the same time the warning devices (flashing lights) are activated. Additional warning time may be requested.

"Gate Down Logic" – Per BNSF standard, we will provide normally open "dry" gate down relay contacts to interconnect the crossing warning system to the Road Authority traffic signal controller assembly. These contacts are rated at 4 amps. The system will be designed to close the gate down contacts upon the gates arrival in the down position. This logic is normally utilized to hold track clearance green until the gates are down since the time from preemption to gate down will vary depending upon the traffic signal cycle. In the event the gate does not descend; BNSF provides a parallel island circuit that provides input to terminate track clearance green once track occupies the crossing (island). This circuit will reduce parallel street delays by allowing the traffic signal to exit the track clearance phase after railroad gate is horizontal and providing a green indication for parallel street.

"Minimum Warning Time" – Per the MUTCD and FRA regulations, BNSF must provide at least 20 seconds of warning time for through trains (typically main track applications). However, per BNSF standards for constant warning time train detection equipment, the system will be designed to provide a "nominal" warning time of 30 seconds to ensure MUTCD/FRA minimums are met and to compensate for accelerating trains and ballast conditions.

"Minimum Track Clearance Distance" – For standard two-quadrant railroad warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the railroad stop line, warning device or 12 ft. perpendicular to the far rail, along the centerline or edge line of the highway, as appropriate, to obtain the longer distance. For locations with exit gate warning devices, the minimum track clearance distance is the length along a highway at one or more railroad tracks, measured either from the railroad stop line or entrance warning device to the point clear of the exit gate. Note that in cases where the exit gate arm is parallel to the track(s) and/or not perpendicular to the roadway, clearance will be either along the centerline or edge line of the highway, as appropriate, to obtain the longer distance.

When (entrance) gates are used they are typically designed to start their decent within 3 to 5 seconds of the warning lights flashing, descend in an additional 10 to 15 seconds, and reach horizontal at least 5 seconds prior to train arrival per FRA regulations.

The length of the railroad's control circuit approach distance is directly related to the amount of requested "Advanced Preemption Time" (APT). Typically, the longer the APT requirement is, the longer the approach distance, and thus the more control equipment that will be required.

Please provide the following information in order to process your request:

Date of Request:
Requesting Agency: City of El Paso

Requested by: Juan D. Diaz
Title: Engineering Associate

E-mail: diazjd@elpasotexas.gov
Phone: 915-212-7042

Grade Crossing Information:

State: TX
City: El Paso
County: El Paso
Crossing Street Name: Bird Drive
Parallel Street Name: Doniphan Drive

DOT #: 019784M
District: El Paso
RR Subdivision: El Paso
Mile Post: 1148.58

Signalized Intersection Information:

1) Provide interconnection configuration: ☐ Single break circuit ☒ Double break circuit

2) Is a Supervised circuit being requested? ☒ Yes ☐ No

3) Is this request for Simultaneous Preemption Operation? ☐ Yes ☒ No

   If "Yes", what is your requested Additional Warning Time? (if needed) ____ Seconds

4) Is this request for Advance Preemption Operation? ☒ Yes ☐ No

   If "Yes", what is your requested Vehicle Advance Preemption Time (APT)? 11 Seconds

   If "Yes", is a Gate Down circuit being requested? ☒ Yes ☐ No
   ** The purpose of the gate-down circuit is to comply with the Institute of Traffic Engineers (ITE) recommended practice to ensure that the Track Clearance Green interval remains on until gates are fully lowered to prevent a "preempt trap". Railroad will provide relay contacts for the gate down circuit.*

5) Is this request for additional time for Advance Pedestrian Preemption Operation? ☐ Yes ☒ No

   If "Yes", what is your requested additional time for Advance Pedestrian Preemption Time (APPT)? ____ Seconds
   **Note: Pedestrian Detection is required when using Advance Pedestrian Preemption Operation.*

6) Is a Crossing Active (XC) circuit required to activate blank-out signs or another traffic control device? ☐ Yes ☒ No

7) Is a Traffic Signal Health circuit being requested? ☒ Yes ☐ No

Comments / Additional Info:

The above information has been completed by the undersigned representative of the public agency responsible for the traffic signal. The public agency agrees to have all work related to the preemption of the traffic signal complete and operational prior to the activation of the railroad signal system. The public agency further agrees to not change any traffic signal design or timing parameters which may affect the preemption operation without coordinating said change with Railroad.

Signature of public agency representative

6-3-19
Date

Richard Bristol
Print or type name of public agency representative

Please sign, scan this page, and submit electronically along with support documentation to appropriate Manager of Industry and Public Projects.

Review of Interconnected Highway-Rail Grade Crossing

Prepared by CTC, Inc., for
BNSF Railway

March 27, 2019

TX, El Paso
Bird Dr @ Doniphan Dr
DOT # 019784M, MP 1148.58
El Paso Subdivision
Line Segment 7300

Review of Interconnected
Highway-Rail Grade Crossing

TX, El Paso
Bird Drive @ Doniphan Drive
BNSF Railway
DOT # 019784M, MP 1148.58
El Paso Subdivision, Line Segment 7300

Prepared by:

I hereby certify that this Report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Texas. This report represents an electronic version of the original hard copy report, sealed, signed and dated by Nicole L. Jackson, PE, PTOE. The content of the electronically transmitted report can be confirmed by referring to the original hard copy which will be kept on file with CTC, Inc.

3/27/19

Nicole L. Jackson, PE, PTOE
Texas License No. 112466

CTC, Inc.
9601 Camp Bowie West
Fort Worth, TX 76116
817-866-8210
www.ctcinc.com

Table of Contents

1.0 General Information 3
2.0 References 3
3.0 Contact Information 5
4.0 Preemption Design Elements 5
5.0 Proposed Railroad Preemption Values 8
6.0 Recommendations for the Agency 8
7.0 Conclusion 13
APPENDIX A – End Notes 14
APPENDIX B – Preemption Calculation Form 22

List of Figures

Figure 1 - DOT# 019784M; Bird Dr @ Doniphan Dr 6

List of Tables

Table 1 - Right-of-Way Transfer Time 7

1.0 General Information

Advance preemption time[1] (APT) is being requested for the BNSF Railway (Railroad) highway-rail grade crossing (DOT# 019784M) on the El Paso Subdivision, Line Segment 7300 located in El Paso, Texas near the intersection of Bird Drive and Doniphan Drive.

CTC, Inc. (CTC) has reviewed the above referenced highway-rail grade crossing at the request of the Agency, which includes an analysis of the design, calculations and other documents submitted by the Agency and the Railroad. The review has been summarized in this report, which includes proposed preemption time requirements and recommendations for other improvements which may be required by the MUTCD and/or general industry practices.

In accordance with the 2009 MUTCD Chapter 8C, Section 8C.09

The Railroad acknowledges that its actions are limited to those permitted under the MUTCD and/or applicable regulatory agency and that the decision to implement any of the recommendations contained in this report rests solely with the Agency.

2.0 References

CTC utilized the following supporting documents and recommended operational practices in evaluating the preemption operation and design:

- AREMA (2018). *Manual for Communications and Signals (C&S Manual)*. Landover, MD: American Railway Engineering and Maintenance-of-Way Association (AREMA).
- FHWA (2009). *Manual on Uniform Traffic Control Devices (MUTCD)*. Federal Highway Administration (FHWA).
- FHWA (June 2008). *Traffic Signal Timing Manual, Publication No HOP-08-024, Section 5.3 - Minimum Green to Satisfy Driver Expectancy*. Federal Highway Administration (FHWA).
- FHWA (2007). *Railroad-Highway Grade Crossing Handbook - Revised Second Edition*. Federal Highway Administration (FHWA).
- FRA (July 25, 2012). *Technical Bulletin S-12-0, Guidance Regarding the Appropriate Processes for the Inspection of Highway-Rail Grade Crossing Warning System Pre-emption Interconnections with Highway Traffic Signals*. Federal Railroad Administration (FRA).
- FRA (October 1, 2010). *Federal Register Volume 75, Issue 190 - Safety Advisory 2010-02, Signal Recording Devices for Highway-Rail Grade Crossing Active Warning*

[1] **Advance Preemption Time (APT)** - The period of time that is the difference between the required maximum highway traffic signal preemption time and the activation of the railroad or light rail transit warning devices. (MUTCD, Chapter 1A, Section 1A.13)

Systems that are Interconnected with Highway Traffic Signal Systems. Federal Railroad Administration (FRA).

- ITE (2006). *Preemption of Traffic Signals Near Railroad Crossings, An ITE Recommended Practice*. Washington, DC: Institute of Transportation Engineers (ITE).
- NTSB (2003). *Collision Between Metrolink Train 210 and Ford Crew Cab, Stake Bed Truck at Highway-Rail Grade Corrsing in Burbank, California, on January 6, 2003, Highway Accident Report NTSB/HAR-03/04*. Washington, DC: National Transportation Safety Board (NTSB).
- TTC (December 2012). *2011 Texas Manual on Uniform Traffic Control Devices* (TXMUTCD). Texas Transportation Commission (TTC).
- TRB (2003). *National Cooperative Highway Research Program (NCHRP), Report 493, Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control.* Transportation Research Board (TRB).
- TRB (1999). *National Cooperative Highway Research Program (NCHRP), Synthesis 271, Traffic Signal Operations near Highway-Rail Grade Crossings. Chepater 3, Highway Traffic Signals near Highway-Rail Grade Crossings.* Transportation Research Board (TRB).
- TTI (March 2002). *Report 1752-9, The Preempt Trap: How to Make Sure You Do Not Have One.* Texas A&M Transportation Institute (TTI).
- TXDOT (March 2009). *Form 2304 Instructions, Instructions for the Guide for Determining Time Requirements for Traffic Signal Preemption at Highway Grade Crossings*. Texas Department of Transportation (TXDOT).
- TXDOT (March 2009). *Form 2304, Guide for Determining Time Requirements for Traffic Signal Preemption at Highway Grade Crossings*. Texas Department of Transportation (TXDOT).
- TXDOT (December 2016). *Railroad Crossing Design Guidelines.* Texas Department of Transportation – Traffic Operations Division (TXDOT).

Unless otherwise noted, the analysis of the proposed traffic signal railroad preemption was based on the following documents submitted by the Agency:

- Preemption Calculation Form dated September 21, 2018
- Traffic Signal Plan dated June 8, 2017

3.0 Contact Information

Agency:

Juan D. Diaz
Engineering Associate
City of El Paso
7968 San Paulo Drive
El Paso, TX 79907
915-212-7042
diazjd@elpasotexas.gov

Railroad:

Tim Huya
Manager of Public Projects
BNSF Railway
5800 North Main Street
Fort Worth, TX 76179
817-352-2902
tim.huya@bnsf.com

4.0 Preemption Design Elements

The Agency must consider several elements when proposing a railroad preemption design. The design should incorporate such elements as, but not limited to, current roadway conditions, traffic signal controller functional capabilities, future site improvements, as well as, other mitigating conditions. The design elements used in this review are outlined below:

- The Railroad operates on one main line track through the crossing.
- There is one lane over the track approaching the intersection with Doniphan Drive.
- Flashing-light signals with automatic gates are provided at the crossing.

The preemption calculation design values used in the determination of the amount of APT being requested are outlined below:

- The design vehicle overall length provided on the preemption calculation form is a 75-ft. tractor-trailer.

- The clear storage distance[2] (CSD) of 47 feet and minimum track clearance distance[3] (MTCD) of 32 feet was provided on the preemption calculation form.
- The roadway grade approaching, over and departing the MTCD does not exceed 1½%.

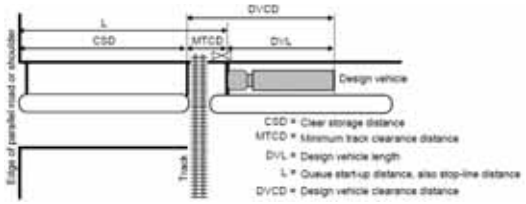
The measurements provided on the preemption calculation form were reviewed in Google Earth and the plans provided, but were not field verified by CTC.

Aerial of subject crossing:

Figure 1 - DOT# 019784M; Bird Dr @ Doniphan Dr

[2] **Clear Storage Distance** - The distance available for vehicle storage measured between 6 feet from the rail nearest the intersection to the intersection stop line or the normal stopping point on the highway. (MUTCD, Chapter 1A, Section 1A.13)

[3] **Minimum Track Clearance Distance** – For standard two-quadrant warning devices, the minimum track clearance distance is the length along a highway at one or more railroad or light rail transit tracks, measured from the highway stop line, warning device, or 12 feet perpendicular to the track center line, to 6 feet beyond the furthest track(s) measured perpendicular to the far rail, along the center line or edge line of the highway, as appropriate, to obtain the longer distance. (MUTCD, Chapter 1A, Section 1A.13)



The proposed traffic signal controller is 170E.

The proposed traffic signal controller firmware is not specified.

The proposed right-of-way transfer time[4] provided on the preemption form:

	Proposed Values (Seconds)
Controller Preemption Delay Time	0.0
Controller Preemption Response Time	0.0
Minimum Green before Track Clearance	0
Walk before Track Clearance	0
Pedestrian Change before Track Clearance	0
Yellow Change before Track Clearance	4.7
Red Clearance before Track Clearance	2.0
Additional Right-of-Way Transfer Time	0.0
Maximum Right-of-Way Transfer Time	**6.7**

Table 1 - Right-of-Way Transfer Time

During the review, CTC recommended that the Agency provide a minimum green before track clearance to satisfy driver expectancy in accordance with the FHWA Traffic Signal Timing Manual. The Agency elected not to implement a minimum green at this time. Currently, the 2009 MUTCD allows for the minimum green to be truncated during railroad preemption (MUTCD Chapter 4, Section 4D.27). If the Agency elects to provide a minimum green in the future, then additional APT will need to be requested from the Railroad prior to implementation.

[4] **Right-of-Way Transfer Time** – The maximum amount of time needed for the worst case condition, prior to the display of the track clearance green interval. This includes any railroad or light rail transit or highway traffic signal control equipment time to react to a preemption call, and any traffic control signal green, pedestrian walk and clearance, yellow change, and red clearance intervals for conflicting traffic. (MUTCD, Chapter 1A, Section 1A.13)

5.0 Proposed Railroad Preemption Values

As a result of the design and preemption calculation review, the following outlines the proposed APT requested by the Agency:

The APT requested by the Agency is 11 seconds (Line 35 of the preemption calculation form).

For more details regarding the preemption values, see the preemption calculation form in appendix B.

6.0 Recommendations for the Agency

As a result of the plan review, CTC proposes the following recommendations for Agency consideration to improve the operation of the preemption system. The Agency is the authority regarding the design and operation of the preemption system in accordance with the MUTCD Chapter 8C, Section 8C.09.

Note: Should the Agency decide to pursue the following recommendations, the Agency should be aware that multiple solutions exist for any recommendation. The Agency should perform due diligence to determine the solution(s) or product(s) that best meet site-specific conditions for the highway-rail grade crossing.

2009 MUTCD Chapter 8C, Section 8C.09 Paragraph 6
"The highway agency or authority with jurisdiction and the regulatory agency with statutory authority, if applicable, should jointly determine the preemption operation and the timing of traffic control signals interconnected with highway-rail grade crossings adjacent to signalized highway intersections."

The Railroad is available to assist the Agency with any of the proposed recommendations.

Recommendations:

- **Review traffic signal controller hardware and firmware capabilities for railroad preemption.** The traffic signal controller is an integral part of the operation of the preemption system and understanding the traffic signal controller functionality during railroad preemption is critical to the safety of the preemption operation. Many conditions such as, but not limited to, coordinated operation, train restart or second train events, emergency vehicle preemption, transit priority, or manual control will alter the operation of the traffic signal controller when those conditions are in effect. The Agency must thoroughly inspect and test the functionality of the traffic signal

controller and firmware to ensure the recommended railroad preemption features can be provided. Periodic updates or revisions to the controller unit firmware or hardware may negatively affect the operation and/or programming parameters of the traffic signal controller. Any change in the firmware or hardware should be followed by a performance test in order to assure that the traffic signal controller is functioning in accordance with the design plans.

- **Review traffic signal controller capabilities for train restart.** Due to the potential of a train stopping and restarting within the approach of the crossing, the traffic signal controller may not be able to transition back to the track clearance interval to provide a sufficient amount of time to clear the design vehicle from the MTCD. Modifications or additional logic may be needed for the traffic signal controller to provide the transition to the track clearance interval during the event.

- **Ensure that the actual right-of-way transfer time during railroad preemption does not exceed the design value of 6.7 seconds (see the preemption calculation form in appendix B).** If the right-of-way transfer time is programmed to exceed this value, then additional APT would need to be requested by the Agency.

- **Review the preemption operation of the traffic signal controller and make the appropriate modifications to ensure adequate track clearance green time[A] is provided to clear the design vehicle from the MTCD.** The track clearance green time is the period of time programmed into the traffic signal controller that the green indication is displayed to vehicles stopped within the CSD and MTCD. The track clearance green indication affords these vehicles an opportunity to start and move clear of the track provided there is adequate railroad warning time. It is critical that the track clearance green not end until after the flashing-lights have started their operation and the automatic gate arms have reached the horizontal position. The recommended practice to ensure that the traffic signal sequence does not terminate the track clearance interval early is to implement a gate down circuit.

    - **A gate down circuit is not specified in the documents provided.** If the Agency elects not to implement the gate down circuit, then the Agency must request a not-to-exceed advance preemption timer be implemented in the railroad warning system in order to limit APT which exceeds the specified APT (AREMA Part 3.1.10). Additional APT can result from variability in train speed. The Agency must also determine the traffic signal preemption time variability and increase the track clearance green time appropriately.

      CTC does not take exception to the track clearance green time of 29 seconds noted on line 51 of the preemption calculation form, provided a not-to-exceed advance preemption timer has been implemented in the railroad warning system.

- **Improve the interconnection circuits between the traffic signal controller and the railroad warning system and ensure the interconnection cable has an adequate number of conductors for the circuits requested.** The interconnection between the traffic signal controller and the railroad warning system requires careful consideration as to the types of circuits to be utilized. In older installations, the majority of interconnection circuits used a single pair of wires to initiate the preemption sequence in the controller unit. However, experience and extensive research on railroad preemption operation has revealed that additional interconnection circuits are necessary in order to assure that the highway-rail grade crossing and highway-highway intersection are operating together as one system. Dependent on the location, the number of circuits that would be utilized in the preemption system generally vary from two to five. Some complex systems could require more than five circuits. Intersection geometry, phasing, pedestrian considerations, type of controller unit, train volumes, train speeds and passenger station stops are all factors which must be considered in order to determine which circuits are necessary.

  The following list identifies the most commonly used interconnection circuits:

  - Advance Preemption Circuit[B] - This circuit begins the preemption sequence when the railroad warning system first notifies the traffic signal controller of the approaching train.

  - Supervised Circuit[C] - This circuit provides a means to verify the integrity of the interconnection cable between the traffic signal controller and the railroad warning system. The purpose is to provide notification to the traffic signal controller in the event there is a failure (open or short) in the cable or associated circuitry.

  - Crossing Active Circuit[D] - This circuit will notify the traffic signal controller of an approaching train at the point the active warning devices (railroad flashing-lights) begin their operation. This circuit is commonly referred to as an "XC" circuit by the railroad. It is also the circuit typically used for "Simultaneous Preemption." By using the crossing active circuit, the traffic signal controller can be notified when the railroad flashing-lights and automatic gates begin operation, and adjustments to the preemption sequence can be implemented as programmed.

  - Gate Down Circuit[E] - This circuit will notify the traffic signal controller when the automatic gate arms controlling access to the railroad tracks are lowered to within approximately five (5) degrees of horizontal. This circuit prevents the traffic signal controller from terminating the track clearance green prior to the railroad warning devices becoming active and the lowering of the automatic gates.

- Traffic Signal Health Circuit[F] - Where there is an advance preemption circuit, the traffic signal health circuit may be used to notify the railroad warning system if the traffic signal has an operational failure where the traffic signals are flashing or dark. When the traffic signal health circuit has de-energized, the railroad warning system devices may be activated early. The amount of additional time the railroad warning devices will be active can be extended up to the APT provided by the train detection equipment. By activating the systems early, the automatic gates will be lowered, preventing additional traffic from queuing onto the tracks and affording a longer period of time for stopped vehicles to start up and move clear of the tracks.

Note: The Agency must notify the Railroad which circuits are being requested at each location.

Another item to be addressed as a part of the interconnection determination is the electrical arrangement of the circuits. There are three possible interconnection options:

1. Single Break[G] with Supervision – This option provides a means to open a single energy source conductor through the railroad circuitry. In order to provide a means to verify the integrity of the interconnection cable between the traffic signal controller and the railroad warning system, an additional conductor is provided that closes upon approach of a train. This is known as a supervised circuit.

2. Double Break[H] – This option provides a means to open both the positive and negative or line and neutral energy source leads through the railroad circuitry. By opening both conductors of the circuit, a level of reliability equal to single break with supervision is achieved.

3. Double Break with Supervision - This option makes use of #1 and #2 where both conductors are opened through the railroad circuitry and a supervision circuit is included. By opening both conductors of the circuit and providing a supervision circuit, a higher level of reliability is achieved.

There are several railroad preemption interface methods[I] that have been used successfully to implement the above circuits. Examples can be found in appendix A.

- **Implement a maximum preemption timer[J].** The purpose of this timer is to allow the traffic signal to transition to an all-red flash mode in the event the railroad warning system "fails-safe" for an extended period of time.

- **Program the emergency/CMU-MMU and maintenance flash mode to all-red flash operation.** When the CSD is less than the length of the design vehicle or when an engineering study or a Diagnostic Team determines a need, emergency/CMU-MMU

and maintenance flash should be all-red flash to allow the design vehicle some opportunity to clear the tracks when a train is approaching.

- **Ensure scheduled flashing operation[5] is not implemented.** When the CSD is less than the length of the design vehicle, scheduled flashing operation should not be implemented since the track clearance interval may not be provided during railroad preemption. As a result, motorists may not be given an opportunity to clear the track area prior to train arrival.

- **Install vehicle detection prior to the crossing.** When the CSD is less than the length of the design vehicle, vehicle detection prior to the crossing should be considered so that commercial vehicles and school buses required to stop at the crossing in accordance with the Federal Motor Carriers Safety Administration Rule Title 49 CFR §392.12, will still place a call to the traffic signal controller.

- **Install a back-up power supply for the traffic signal equipment.** When local power outages occur, a dark traffic signal loses its ability to provide a track clearance interval. Railroad warning devices are required to be equipped with a back-up power supply to provide continuous operation for a number of hours. With the advent of LED technology, back-up power for traffic signals is now a realistic option. A back-up power supply maintains the operation of the traffic signal and its ability to display a track clearance interval. The MUTCD recommends the use of back-up power for interconnected signals in Chapter 4D, Section 4D.27.

- **Install "DO NOT STOP ON TRACKS" signs (R8-8) downstream of the tracks.** Vehicles may extend over the tracks based on the existing preemption system operation and the installation of these signs provides additional emphasis to alert road users not to stop on the tracks.

- **Install storage space signs (W10-11a or W10-11b).** The installation of storage space warning signs is helpful to advise motorists and commercial vehicle drivers of the amount of space available between the tracks and the intersecting street.

- **Implement a Preemption Operation and Maintenance Program[K].** In accordance with the FRA Safety Advisory 2010-02 and FRA Technical Bulletin S-12-01, a comprehensive joint inspection program should be established between the Agency and the Railroad to provide, at a minimum, an annual operational test of the preemption system. Operational tests should also be conducted when traffic signal controller changes are made, including firmware updates.

[5] **Scheduled Flashing Operation** – Based on engineering study or engineering judgment, traffic control signals may be operated in the flashing mode on a scheduled basis during one or more periods of the day rather than operated continuously in the steady (stop-and-go) mode. (MUTCD, Chapter 4D, Section 4D.28)

The Agency should develop a notification plan to contact the Railroad in the event the traffic control signal fails to operate as intended. The Agency should also develop a traffic management plan for special events or construction to help prevent motorists from stopping on the tracks as a result of the downstream traffic queues.

- **Install a warning label as recommended by the U.S. Department of Transportation Highway-Rail Grade Crossing Technical Working Group (USDOT TWG) in the traffic signal cabinet to alert traffic signal technicians to the presence of the interconnection with the railroad control equipment.**

7.0 Conclusion

This report recommends preemption operational improvements that the Agency should consider as a result of CTC's design review. The Agency should contact the Railroad to review recommendations contained in this report and to resolve issues. If desired, the Agency may contact the Railroad to assist with implementing any recommendations, answer questions or participate in a diagnostic team inspection to review outstanding items and progress changes that may be needed.

APPENDIX A – End Notes

[A] Track Clearance Green Time:

The track clearance green time is the period of time programmed into the traffic signal controller that the green indication is displayed to vehicles stopped within the MTCD and the CSD. It is determined by calculating the time required for a design vehicle of maximum length to start up and move clear of the MTCD prior to the arrival of the train under normal conditions. The rule-of-thumb to determine the amount of track clearance green time is to use the greater of either the queue clearance time (time required for the design vehicle to start up and clear the MTCD) or a value 15 seconds greater than the APT (track clearance green time = APT+15) provided the railroad has a not-to-exceed advance preemption timer in their circuitry. Since the railroad warning devices activate following the APT and the automatic gate arm reaches the horizontal position approximately 15 seconds after activation of the warning devices, this rule-of-thumb estimates the track clearance green time needed to keep the track clearance interval green until the automatic gates are horizontal for a best case right-of-way transfer time condition (usually 0 seconds). If the railroad does not have a not-to-exceed advance preemption timer in their circuitry, a thorough analysis of train operations must be conducted in order to determine the effect of train deceleration on the preemption operation. It should be noted that this method may lead to inefficient traffic signal operations as it will hold the track clearance interval in green after the automatic gate is down when the actual right-of-way transfer time is not best case. Also, this rule-of-thumb should be considered an interim measure due to the fact that it does not take into account variability in actual APT versus design APT caused by accelerating or decelerating trains. Where APT is implemented, a gate down circuit is the preferred and best method for determining when to terminate the track clearance interval, but may require additional interconnect capabilities.

[B] Advance Preemption Circuit:

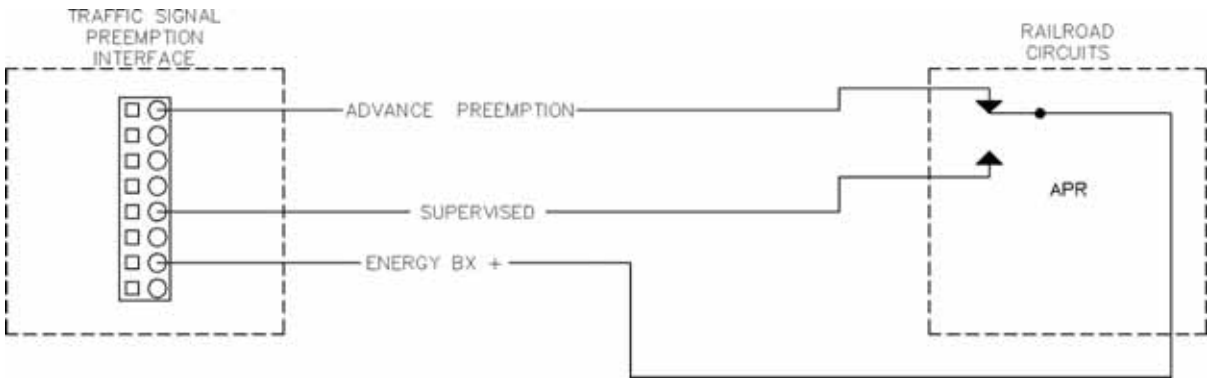
The advance preemption circuit will notify the traffic signal controller of an approaching train prior to the activation and operation of the railroad active warning devices. The period of time between this notification and the instant when the grade crossing warning devices are activated is known as APT. APT is used by the traffic signal controller to terminate any active non-track clearance movements and to change to a programmed track clearance interval.

[C] Supervised Circuit:

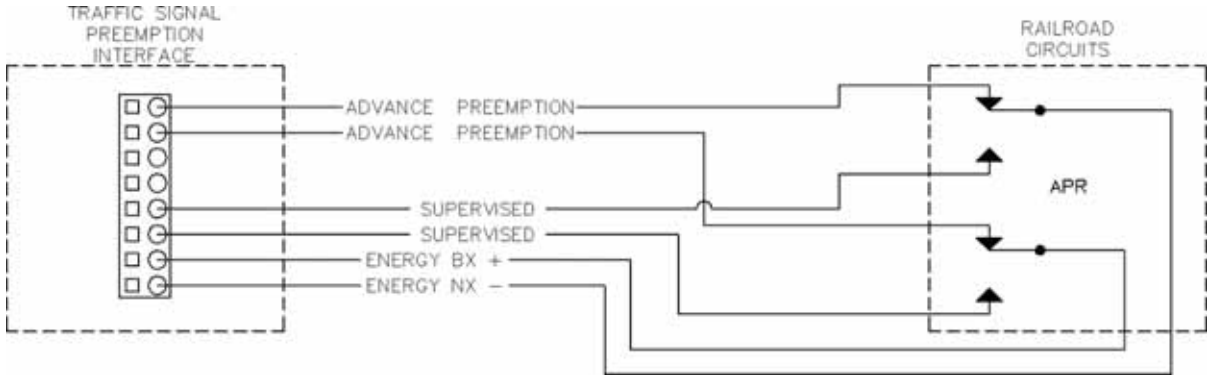
The supervised circuit is an additional circuit that works in conjunction with either the advance preemption circuit or the crossing active circuit (“XR” or “XC” circuit). The supervised circuit closes when the advance preemption circuit or crossing active circuit (“XR” or “XC” circuit) opens, providing a means to verify the integrity of the interconnection cable between the traffic signal controller and the railroad warning system. The purpose of this circuit is to provide notification to the traffic signal

controller in the event there is a failure (open or short) in the cable or associated circuitry. Potential failure can occur for a variety of reasons. Examples include: 1) a utility inadvertently digs up the cable and severs the wire; 2) shorting the wires or cable or; 3) if the interconnect cable connection is loose in one or both cabinets. With a supervised circuit, the traffic signal will be notified of the cable failure and respond as programmed. One possible response includes first clearing the tracks and then displaying all-way flashing red signals, in order to quickly gain attention of the Agency that a problem exists. This response allows all traffic movements at the intersection to continue. Once the Agency is notified of the all-red flashing signals, repairs must be made in order to return the traffic signal to normal operation, since the supervised circuit will not allow the traffic signal to operate with failed preemption interconnect cable. Below are examples of a supervised circuit applied to a single-break advance preemption circuit and to a double-break advance preemption circuit:

Supervised Advance Preemption Circuit Single-Break



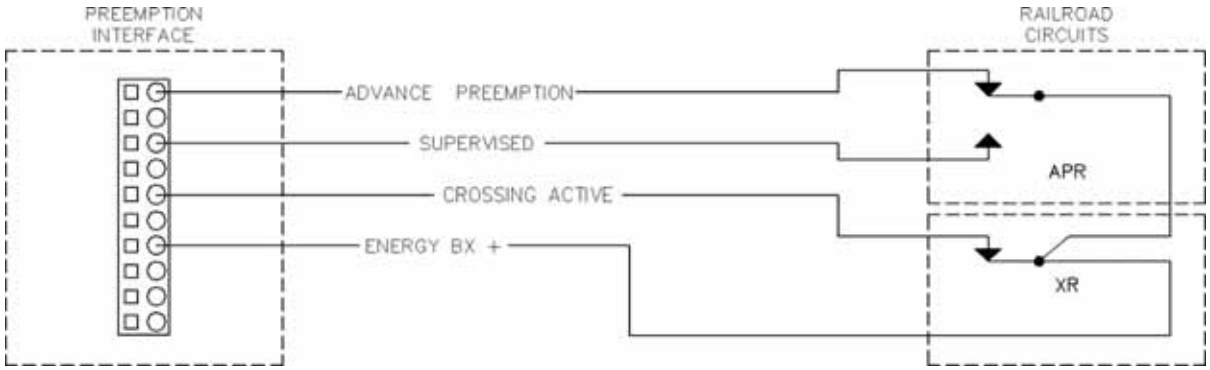
Supervised Advance Preemption Circuit Double-Break



D Crossing Active Circuit:

This circuit, commonly referred to as "XR" or "XC", can be utilized to check the minimum APT provided by the railroad in varying conditions, such as when a train approaches and stops short of the crossing. Once the train remains stopped for approximately 20 seconds, the crossing warning system will usually de-activate, the preemption request will be cancelled, and the automatic gates will rise. When the train begins to move toward the crossing after this time period, the result can be reduced or no APT. In this case, the operation of the train over the crossing will be governed by operating rules of the railroad. These rules generally require the train crew to assure the crossing is clear prior to entering the roadway. When the APT is shortened or eliminated, the traffic signal sequence should advance to the track clearance green interval as quickly as possible. Therefore, the traffic signal controller may be required to abbreviate or eliminate the minimum green time and/or pedestrian change intervals from its normal sequence. By using the crossing active circuit, the traffic signal controller can be notified when the railroad flashing-lights and automatic gates begin operation and adjustments to the preemption sequence can be implemented as programmed.

Crossing Active Circuit



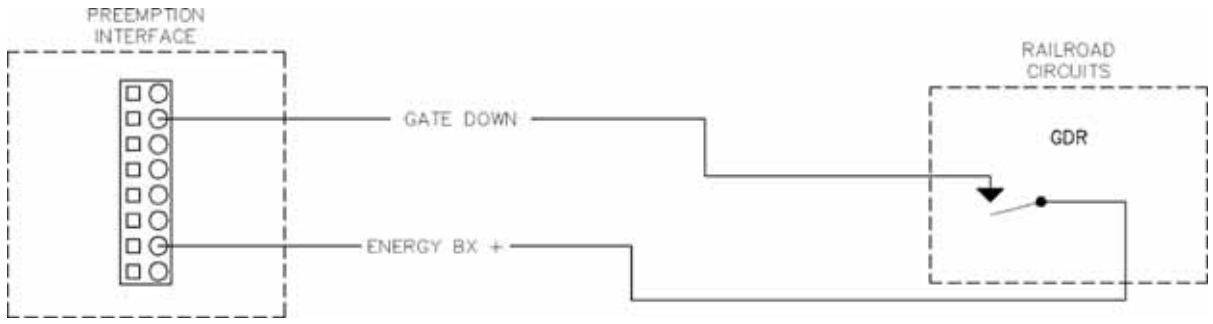
E Gate Down Circuit:

A gate down circuit will notify the traffic signal controller when the automatic gate arms controlling access over the railroad tracks approaching the intersection are lowered to within approximately five (5) degrees of horizontal. This circuit prevents the traffic signal controller from terminating the track clearance green interval before the railroad warning devices become active and the automatic gates are lowered.

It is critical that the track clearance green interval not end until after the flashing-lights have started their operation and the automatic gate arms warning vehicles approaching the intersection have reached the horizontal position. A preemption anomaly occurs if, due to time variability in the preemption sequence, the track clearance green ends before the automatic gate arms are not yet lowered. This may allow vehicles to continue to cross and queue onto the railroad tracks in the path of the approaching train, also known as a preempt trap, found in TTI Report 1752-9.

Although a gate down circuit should be implemented to improve safety, it also improves traffic operations by minimizing the excessive track clearance green time displayed. If there is not a gate down circuit present, the track clearance green time must be increased to account for right-of-way transfer time variability, train speed variability, track circuit design and other variable conditions. This timing correction may result in excessive track clearance green times that extend long after the automatic gates have already reached their horizontal position. For many traffic signal controller units, the implementation of gate down circuitry is straightforward and inexpensive.

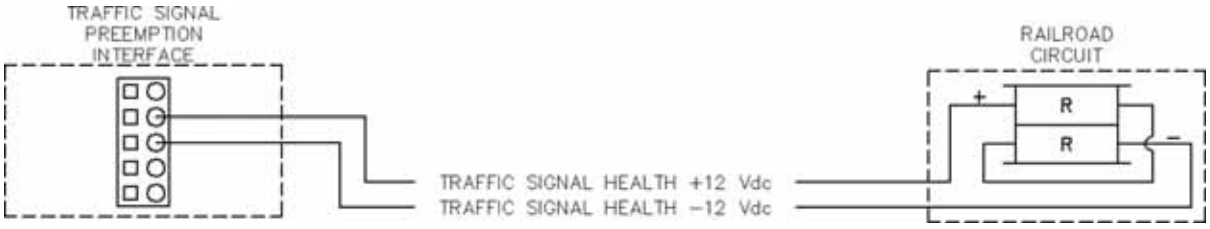
Gate Down Circuit



F Traffic Signal Health Circuit:

This circuit is an output from the traffic signal cabinet that notifies the railroad warning system whenever the traffic signal has entered conflict flash, manual flash, soft flash, manual signals off, or when commercial power and back-up power system has failed (signals off). It is typically connected to the traffic controller cabinet signal bus and/or a red vehicle indication output so that it will de-energize any time the traffic signals are flashing or a loss of power has occurred. It is a nominal 12 volts of direct current (V dc), which is output whenever the traffic signal is not in flash operation and power is on. If the traffic signal is in flash operation or the power is off, the output becomes 0 V dc. The output should be fused for 500 mA @ 12 V dc.

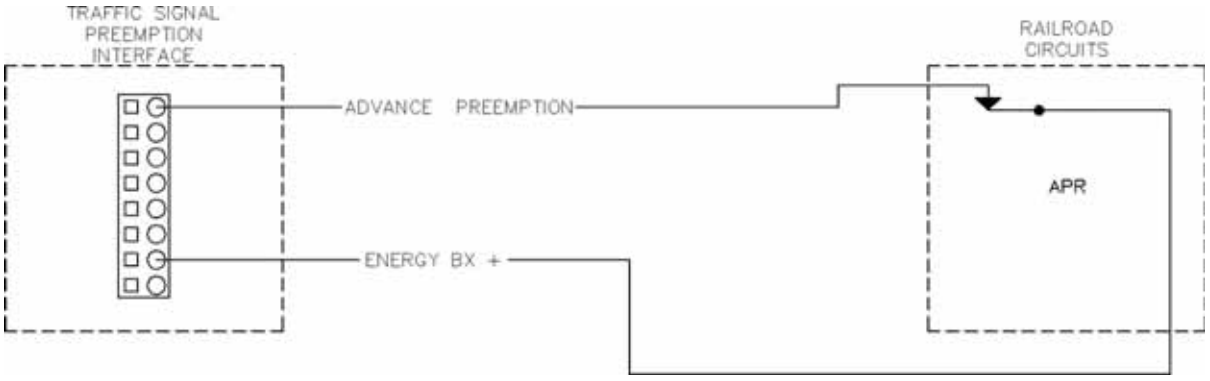
Traffic Signal Health Circuit



G Single-Break Interconnect Circuit:

A single-break interconnect circuit is a preemption interconnection circuit design technique where only one energy source lead is opened or closed through a control circuit or relay. It is not considered to be the most reliable method to activate or de-activate a circuit in a separate control case or cabinet by the railroad signal industry. This circuit design technique can be applied to all interconnection circuits. Below is an example of a single-break advance preemption circuit:

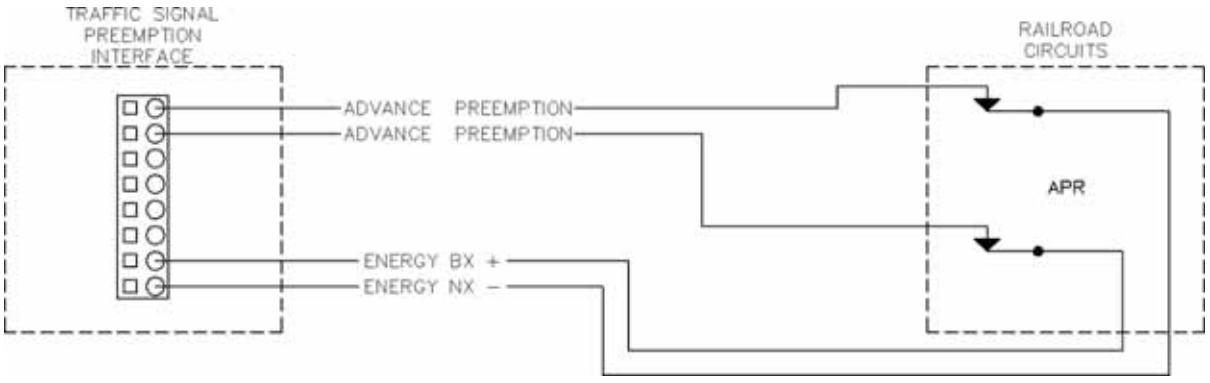
Advance Preemption Single-Break Circuit



H Double-Break Interconnect Circuit:

A double-break interconnect circuit is a preemption interconnection circuit design technique where both the positive and negative or line and neutral energy source leads are open or closed through a control circuit or relay. It is considered to be the most reliable method to activate or de-activate a circuit in a separate control case or cabinet by the railroad signal industry. This circuit design technique can be applied to all interconnection circuits. Below is an example of a double-break advance preemption circuit:

Advance Preemption Double-Break Circuit



I Railroad Preemption Interface Methods:

Where railroad preemption is required, various interconnection circuits can be used between the railroad warning system and the traffic signal controller for railroad preemption. In order for the interconnect circuits to interface with the traffic signal controller and railroad warning system, additional equipment is required in the traffic signal cabinet. As a general rule, traffic signal equipment manufacturers and distributors have the ability to provide the various interconnection circuits required for a specific application. Below are pictures of various methods used by agencies for implementation of interconnection circuits.

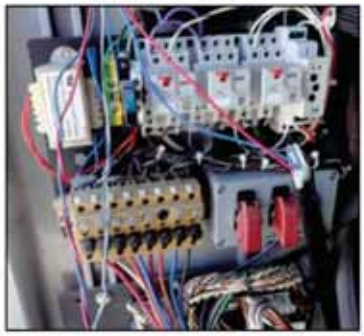
Ohio DOT

Relay Logic

Wyoming DOT

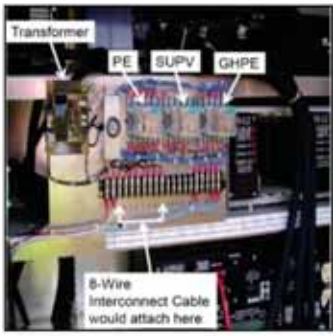
Isolator Card &
Traffic Controller Logic

Minnesota DOT



Relay Logic

Missouri DOT



Relay Logic

J Maximum Preemption Timer:

A maximum preemption timer is a timer in the traffic signal controller that limits the amount of time the preemption can be in effect. Implementation of a maximum preemption timer does require additional interconnection circuits from the railroad. The purpose of this timer is to allow the traffic signal to exit the preemption sequence in the event the railroad warning system "fails-safe". Because railroad warning systems are safety critical systems, they are designed in such a manner as to fail in a "safe" state in the event of a non-catastrophic fault. What this means is that the warning devices will operate to indicate that it is not safe to proceed even when no

train is present. This is a "safe" failure mode. However, when a fail-safe condition occurs, the traffic control signal will remain in preemption if a maximum preemption timer has not been provided. Because of the limited sequence operation during the dwell interval, non-allowable movements are inhibited. Road users may become frustrated and attempt to make moves against a red traffic signal indication. The maximum preemption timer will cause the traffic signal to transition to all-red flash after a predetermined period of time until the preemption circuit returns to its normal state, at which time normal operation of the traffic signal resumes.

Note: Although it is the decision of the Agency as to the value programmed for the maximum preemption time, the Agency should take caution to ensure that the time is not set to a value that is too short. If the time set is too short, the timer could expire and place the traffic signal into all-red flash while a train is occupying the crossing. Therefore, the maximum preemption time should be set to a value two times greater than the longest train move, which may include switching moves.

Not all traffic signal manufactures have the ability to program a maximum preemption timer in the controller unit that will cause the traffic signal to transition to all-red flash after a predetermined period of time and/or exceed a maximum allowed value of 255 seconds. In those cases, an external timing relay may be used to implement the maximum preemption time operation.

K Implement a Preemption Operation and Maintenance Program:

In accordance with the FRA Safety Advisory 2010-02, a joint program should be established between the Agency and the Railroad to provide for an annual (minimum) operational test of the preemption system.

- The program should provide for a joint inspection with a representative from the Agency and the Railroad.
- The program should require a live operational test of the system under the maximum right-of-way transfer time condition.
- The program should include review of data recorder logs, where available, to verify proper operation of the system.
- The program should determine that no operational changes have been made to the grade crossing, warning system, roadway, traffic control signal or other facility that modifies the operation of the system as it is presently functioning.

Develop a plan to notify the Railroad in the event the traffic control signal fails to operate as intended.

The plan should include the following elements:

- If the traffic control signal enters flashing mode, notify the Railroad and provide law enforcement or flaggers to allow for the safe movement of roadway users over the grade crossing.

- If the traffic control signal loses power or all of the signals are dark, notify the Railroad and provide law enforcement or flaggers to allow for the safe movement of roadway users over the grade crossing.
- Notify the Railroad once the system has been restored to normal operation.

If a traffic signal technician is required to perform a joint test of the preemption system, notify the Railroad.

Implement procedures to provide flagging or other suitable temporary traffic control plan in the event a lane closure or traffic density caused by a high traffic volume event that has been planned downstream from the grade crossing causes roadway users to queue onto the crossing. (See MUTCD Section 8A.08 for additional information.)

Notify the Railroad any time changes are made to the roadway, the traffic control signal, or preemption operation, in accordance with MUTCD, Section 8A.02 Paragraph 6.

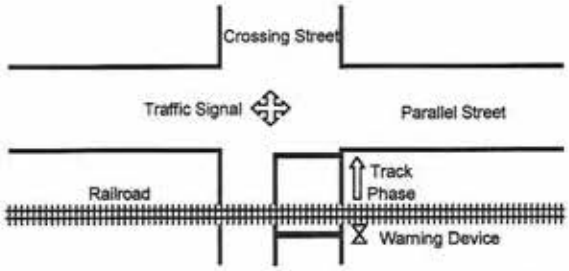
APPENDIX B – Preemption Calculation Form

GUIDE FOR DETERMINING TIME REQUIREMENTS FOR TRAFFIC SIGNAL PREEMPTION AT HIGHWAY RAIL GRADE CROSSINGS

City EL PASO
County EL PASO
District EL PASO

Date 09/21/18
Completed by IVAN CHAN
District Approval

Show North Arrow



Parallel Street Name: DONIPHAN DR
Crossing Street Name: BIRD AVE

Railroad BNSF
Crossing DOT# 019784M

Railroad Contact TIM HUYA
Phone (817) 352-2902

SECTION 1: RIGHT-OF-WAY TRANSFER TIME CALCULATION

Preempt verification and response time

			Remarks
1. Preempt delay time (seconds)	1.	0.0	
2. Controller response time to preempt (seconds)	2.	0.0	Controller type: 170E
3. Preempt verification and response time (seconds): add lines 1 and 2	3.	0.0	

Worst-case conflicting vehicle time

			Remarks
4. Worst-case conflicting vehicle phase number	4.	26	
5. Minimum green time during right-of-way transfer (seconds)	5.	0.00	Green terminate @ pre-emption
6. Other green time during right-of-way transfer (seconds)	6.	0.00	
7. Yellow change time (seconds)	7.	4.70	
8. Red clearance time (seconds)	8.	2.00	
9. Worst-case conflicting vehicle time (seconds): add lines 5 through 8	9.	6.7	

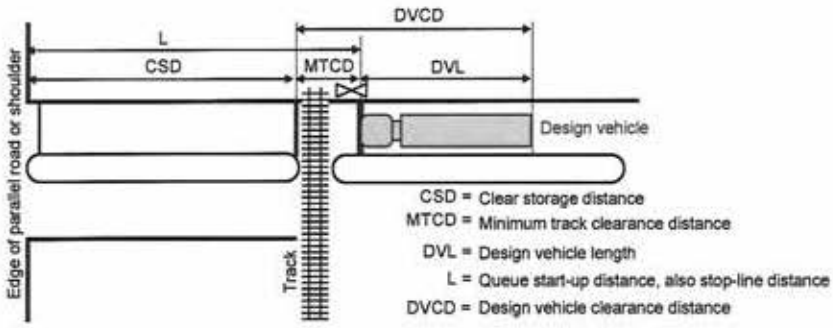
Worst-case conflicting pedestrian time

			Remarks
10. Worst-case conflicting pedestrian phase number	10.	8	
11. Minimum walk time during right-of-way transfer (seconds)	11.	0.0	
12. Pedestrian clearance time during right-of-way transfer (seconds)	12.	0.0	
13. Vehicle yellow change time, if not included on line 12 (seconds)	13.	4.0	
14. Vehicle red clearance time, if not included on line 12 (seconds)	14.	2.0	
15. Worst-case conflicting pedestrian time (seconds): add lines 11 through 14	15.	6.0	

Worst-case conflicting vehicle or pedestrian time

16. Worst-case conflicting vehicle or pedestrian time (seconds): maximum of lines 9 and 15	16.	6.7
17. Right-of-way transfer time (seconds): add lines 3 and 16	**17.**	6.7

SECTION 2: QUEUE CLEARANCE TIME CALCULATION



			Remarks
18. Clear storage distance (CSD, feet)	18.	47	
19. Minimum track clearance distance (MTCD, feet)	19.	32	
20. Design vehicle length (DVL, feet)	20.	75	Design vehicle type: Tractor Trailer
21. Queue start-up distance, L (feet): add lines 18 and 19	21.	79	
22. Time required for design vehicle to start moving (seconds): calculate as 2+(L÷20)	22.	6.0	Remarks
23. Design vehicle clearance distance, DVCD (feet): add lines 19 and 20	23.	107	
24. Time for design vehicle to accelerate through the DVCD (seconds)	24.	14.1	Read from Figure 2 in Instructions.
25. Queue clearance time (seconds): add lines 22 and 24	**25.**	20.1	

SECTION 3: MAXIMUM PREEMPTION TIME CALCULATION

			Remarks
26. Right-of-way transfer time (seconds): line 17	26.	6.7	
27. Queue clearance time (seconds): line 25	27.	20.1	
28. Desired minimum separation time (seconds)	28.	4.0	
29. Maximum preemption time (seconds): add lines 26 through 28	**29.**	30.8	

SECTION 4: SUFFICIENT WARNING TIME CHECK

				Remarks
30. Required minimum time, MT (seconds): per regulations	30.	20.0		
31. Clearance time, CT (seconds): get from railroad	31.	0.0		
32. Minimum warning time, MWT (seconds): add lines	32.		20.0	Excludes buffer time (BT)
33. Advance preemption time, APT, if provided (seconds): get from railroad	33.		0.0	
34. Warning time provided by the railroad (seconds): add lines 32 and 33	34.		20.0	
35. Additional warning time required from railroad (seconds): subtract line 34 from line 29, round up to nearest full second, enter 0 if less than 0	**35.**		11	

If the additional warning time required (line 35) is greater than zero, additional warning time has to be requested from the railroad. Alternatively, the maximum preemption time (line 29) may be decreased after performing an engineering study to investigate the possibility of reducing the values on lines 1, 5, 6, 7, 8, 11, 12, 13 and 14.

Remarks: City not requesting vehicle gate interaction check timing.

SECTION 5: TRACK CLEARANCE GREEN TIME CALCULATION (OPTIONAL)

Preempt Trap Check

36.	Advance preemption time (APT) provided (seconds):	36.	11.0	Line 33 only valid if line 35 is zero.
37.	Multiplier for maximum APT due to train handling	37.	1.25	See Instructions for details.
38.	Maximum APT (seconds): multiply line 36 and 37	38.	13.8	**Remarks**
39.	Minimum duration for the track clearance green interval (seconds)	39.	15.0	For zero advance preemption time
40.	Gates down after start of preemption (seconds): add lines 38 and 39	40.	28.8	
41.	Preempt verification and response time (seconds): line 3	41.	0.0	**Remarks**
42.	Best-case conflicting vehicle or pedestrian time (seconds): usually 0	42.	0.0	
43.	Minimum right-of-way transfer time (seconds): add lines 41 and 42	43.	0.0	
44.	Minimum track clearance green time (seconds): subtract line 43 from line 40	44.	28.8	

Clearing of Clear Storage Distance

45.	Time required for design vehicle to start moving (seconds), line 22	45.	6.0	
46.	Design vehicle clearance distance (DVCD, feet), line 23	46.	107	**Remarks**
47.	Portion of CSD to clear during track clearance phase (feet)	47.	47	CSD* in Figure 3 in Instructions.
48.	Design vehicle relocation distance (DVRD, feet): add lines 46 and 47	48.	154	
49.	Time required for design vehicle to accelerate through DVRD (seconds)	49.	9.7	Read from Figure 2 in Instructions.
50.	Time to clear portion of clear storage distance (seconds): add lines 45 and 49	50.	15.7	
51.	**Track clearance green interval (seconds): maximum of lines 44 and 50, round up to nearest full second**	51.	29	

SECTION 6: VEHICLE-GATE INTERACTION CHECK (OPTIONAL)

52.	Right-of-way transfer time (seconds): line 17	52.	6.7	
53.	Time required for design vehicle to start moving (seconds), line 22	53.	6.0	
54.	Time required for design vehicle to accelerate through DVL (on line 20, seconds)	54.		Read from Table 3 in Instructions.
55.	Time required for design vehicle to clear descending gate (seconds): add lines 52 though 54	55.	12.7	
				Remarks
56.	Duration of flashing lights before gate descent start (seconds): get from railroad	56.		
				Remarks
57.	Full gate descent time (seconds): get from railroad	57.		
58.	Proportion of non-interaction gate descent time	58.		Read from Figure 5 in Instructions.
59.	Non-interaction gate descent time (seconds): multiply lines 57 and 58	59.	0.0	
60.	Time available for design vehicle to clear descending gate (seconds): add lines 56 and 59	60.	0.0	
61.	**Advance preemption time (APT) required to avoid design vehicle-gate interaction (seconds): subtract line 60 from line 55, round up to nearest full second, enter 0 if less than 0**	61.	13	