Exhibit No. ___ (KH-15)
Docket TR-100098
Witness: Kathy Hunter

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

CITY OF FIFE, **Petitioner,** **v.** **UNION PACIFIC RAILROAD,** **Respondent.**	**DOCKET TR-100098**

EXHIBIT TO TESTIMONY OF

Kathy Hunter

STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

U.S. Dep't of Transportation, Federal Highway Administration
"Guidance on Traffic Control Devices at Highway-Rail Grade Crossings" (2002)
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GUIDANCE ON TRAFFIC CONTROL DEVICES AT HIGHWAY-RAIL GRADE CROSSINGS

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

HIGHWAY/RAIL GRADE CROSSING TECHNICAL WORKING GROUP (TWG)

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U.S. Department of Transportation
Highway-Railroad Grade Crossing Technical Working Group

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Flashing-Light Signal

A standard flashing-light signal consists of two red lights in a horizontal line flashing alternately at approaching highway traffic. At a crossing with highway traffic approaching in both directions, flashing-lights are installed facing oncoming traffic in a back-to-back configuration in accordance with the MUTCD. The support used for the lights should also include a standard crossbuck sign and, where there is more that one track, an auxiliary "multiple tracks" R15-2 sign. Back lights may be eliminated with one-way highway traffic, based on engineering judgment. An audible control device may be included.

Cantilever Flashing-Light Signal

This device supplements the standard flashing-light signal. Cantilever flashing-lights consist of an additional one or two sets of lights mounted over the roadway on a cantilever arm and directed at approaching highway traffic. Cantilevered lights provide better visibility to approaching highway traffic, particularly on multi-lane approaches. This device is also useful on high-speed two-lane highways, where there is a high percentage of trucks, or where obstacles by the side of the highway could obstruct visibility of standard mast mounted flashing-lights. An example is where the terrain or topography of the approaching highway is such that the sight of a roadside mounted signal light could not be readily seen by an approaching driver due to vertical or horizontal curves.

Cantilever flashing-light signals may be mounted back-to-back and should also have an additional crossbuck added to the overhead structure, based on site conditions and engineering judgment.

Automatic Gate

The automatic gate provides supplemental visual display when used with both road side mounted flashing-lights and cantilever flashing-light signals. The device consists of a drive unit and a gate arm. The drive mechanism can be mounted on flashing-light posts or cantilever pole supports, or on a stand-alone support. The gate arm is fully reflectorized on both sides with 45 degree diagonal red and white stripes and has at least three lights; the tip light is continuously lit and the others alternately flash when the gate is activated and lowered. When lowered, the gate should extend across approaching highway traffic lanes. Special consideration should be given to clearances for movement of the counter weight arm portion of the gate drive unit in a median and adjacent to sidewalk locations with pedestrians, particularly with the requirements of the Americans with Disabilities Act (ADA) of 1990.

Additional Flashing-Light Signals

Additional approaches to active highway-rail grade crossings require additional flashing-light signals be directed at the approaching traffic. These lights can be mounted on existing flashing-light masts, extension arms, additional traffic signal masts, cantilever supports, in medians or other locations on the left side of the roadway.

SUPPLEMENTAL ACTIVE DEVICES

Active Advance Warning Signs with Flashers

A train activated advance warning sign (utilizing the W-10 sign) should be considered at locations where sight distance is restricted on the approach to a crossing, and the flashing-light signals cannot be seen until an approaching driver has passed the decision point (the distance to the track from which a safe stop can be made).[10] Two yellow lights can be placed on the sign to warn drivers in advance of a crossing

[10] *Manual on Uniform Traffic Control Devices For Streets and Highways* - 2000 Edition. FHWA. Sections 2C.26 and 4K.01. Official website is http://mutcd.fhwa.dot.gov or 202-289-0222

of island track circuits, key selector switches, inductive loops, train to way-side communications and other technologies.

Where LRT vehicles move within the street median or through the intersection of two or more city streets, and where train operating speeds and sight distances are consistent with safe stopping distances, the train may operate through these intersections controlled by traffic signal indications without stopping. In such cases, special transit signal aspects, which clearly indicate traffic signal controlled right-of-way, must govern train moves. Special transit indications may also provide information concerning track alignment to the transit operator. Automatic train stops and other train control devices may be used to enforce a train=s compliance with the signal indication. Where special train aspects are present and safe stopping distance is assured, transit vehicles may utilize train to way-side communications, inductive loops, cantenary detector switches or other forms of detection to activate the traffic signals. Great care should be exercised in the location of special train indicators to avoid confusion to drivers approaching the intersection. Programmed heads and special aspects are helpful in this regard.

(SECOND) TRAIN COMING ACTIVE WARNING SIGN

Train detection systems can also be used to activate a "2nd Train Coming" supplemental warning sign. This sign is used on a limited basis, normally near commuter stations where multiple tracks and high volumes of pedestrian traffic are present. The sign will activate when a train is located within the crossing's approach circuits and a 2nd train approaches the crossing. It is also being evaluated at multiple track highway-rail grade crossings as a supplement to automatic gates. (Since this sign is not currently in the MUTCD, any jurisdictions wishing to use symbols to convey any part of this message, must request permission to experiment from the FHWA.)

PEDESTRIAN AND BICYCLIST CONSIDERATIONS

Non-motorist-crossing safety should be considered at all highway-rail grade crossings, particularly at or near commuter stations and at non-motorist facilities, such as bicycle/walking trails, pedestrian only facilities, and pedestrian malls.[17]

Passive and active devices may be used to supplement highway related active control devices to improve non-motorist safety at highway-rail crossings. Passive devices include fencing, swing gates, pedestrian barriers, pavement markings and texturing, refuge areas and fixed message signs. Active devices include flashers, audible active control devices, automated pedestrian gates, pedestrian signals, variable message signs and blank out signs.

These devices should be considered at crossings with high pedestrian traffic volumes, high train speeds or frequency, extremely wide crossings, complex highway-rail grade crossing geometry with complex right-of-way assignment, school zones, inadequate sight distance, and/or multiple tracks. All pedestrian facilities should be designed to minimize pedestrian crossing time and devices should be designed to avoid trapping pedestrians between sets of tracks.

Guidelines for the use of active and passive devices for Non-motorist Signals and Crossings are found in section 10D of Part 10 of the MUTCD.

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[17] *Traffic Control Devices Handbook.* Institute of Transportation Engineers. Washington, D.C.: 2001. Section 13.2.12, Railroad and Light Rail Transit Grad Crossings, www.ite.org or 202-289-0222.

B. Active devices, with automatic gates should be considered *as an option* at public highway-rail grade crossings whenever they can be economically justified based on fully allocated life cycle costs *and* one or more of the following conditions exist:
   1) Multiple tracks exist at or in the immediate crossing vicinity where the presence of a moving or standing train on one track effectively reduces the clearing sight distance below the minimum relative to a train approaching the crossing on an adjacent track (absent some other acceptable means of warning drivers to be alert for the possibility of a 2nd train); [See Figure 1.]
   2) An average of 20 or more trains per day;
   3) Posted highway speed exceeds 64 km/h (40mph) in urban areas, or exceeds 88 km/h (55 mph) in rural areas;
   4) Annual Average Daily Traffic (AADT) exceeds 2000 in urban areas, or 500 in rural areas;
   5) Multiple lanes of traffic in the same direction of travel (usually this will include cantilevered signals);
   6) The crossing exposure (the product of the number of trains per day and AADT) exceeds 5,000 in urban areas, or 4,000 in rural areas;
   7) The expected accident frequency (EAF) as calculated by the USDOT Accident Prediction formula, including 5-year accident history, exceeds 0.075;
   8) An engineering study indicates that the absence of active devices would result in the highway facility performing at a level of service below Level C;
   9) Any new project or installation of active devices to significantly replace or upgrade existing non-gated active devices. For purposes of this item, replacements or upgrades should be considered "significant" whenever the cost of the otherwise intended improvement (without gates) equals or exceeds one-half the cost of a comparable new installation, and should exclude maintenance replacement of individual system components and/or emergency replacement of damaged units; or
   10) As otherwise recommended by an engineering study or diagnostic team.

C. Warning/Barrier Gate Systems should be considered as supplemental safety devices at:
   1) Crossings with passenger trains;
   2) Crossings with high-speed trains;
   3) Crossings in quiet zones; or
   4) As otherwise recommended by an engineering study or diagnostic team.

D. Enhancements for Pedestrian Treatments
   1) Design to avoid stranding pedestrians between sets of tracks;
   2) Add audible devices, based on an engineering study;
   3) Consider swing gates carefully; the operation of the swing gate should be consistent with the requirements of Americans with Disability Act. The gate should be checked for pedestrian safety within the limits of its operation;
   4) Provide for crossing control at pedestrian crossings where a station is located within the proximity of a crossing or within crossing approach track circuit for the highway-rail crossing;
   5) Utilize a Train to Wayside Controller to reduce traffic delays in areas of stations; and
   6) Delay the activation of the gates, flashers and bells for a period of time at the highway-rail grade crossing in station areas, based on an engineering study.

5. ***CLOSURE*** - Highway-rail grade crossings should be considered for closure and vacated across the railroad right-of-way whenever one or more of the following apply: