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March 29, 2010

Kathy Hunter, Deputy Assistant Director, Transportation Safety
Washington Utilities and Transportation Commission
1300 S. Evergreen Park Dr. SW
PO Box 47250
Olympia, WA 98504-7250

RE: NE 72nd Avenue Southbound Railroad Crossing Arm

Dear Ms. Hunter:

In mid-January 2010 the railroad crossing gate arm, serving southbound traffic on NE 72nd Avenue, snapped at the approximate mid-point of the arm. The arm was removed and below summarizes the project team's review of the damage, assessment and recommendation for replacement.

Background

The arm was installed in 2009 as part of a design-build bid item included in the NE 72nd Avenue Widening Project, CRP #310122. There was concern over the arm's ability to withstand higher velocity winds that occur in the area. These concerns were summarized and submitted in a memo to the contractor, Tapani Underground Inc., in May 2009. Additionally, the 45' arm length installed is longer than the recommended length of 38' for crossing arms, as well as the maximum 42' length typically manufactured for this application. Clark County Public Works observed severe deflections of the arm and made modifications by installing guide wires and high wind brackets, "elephant tusks", in an effort to contain the movement.

Assessment

A review of the project records and documents was completed. The contractor had provided, as required, manufacturer cut sheets for the cantilevered structure that supports both the crossing arm as well as the crossing gate signal system. The manufacturer data provided shows that the structure is appropriate for the application in terms of wind loading and other live loadings. The contractor had provided, as required, a site specific engineered foundation design to support the cantilevered structure. Clark County Public Works had its project structural engineer review the submittal and respond with comments. The comments were addressed and the package resubmitted. The most recent review of the foundation design shows that its demand/capacity ratio is low. Depending on the load condition, the foundation has 28% to 75% additional capacity. The governing load conditions all involved

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MANAGEMENT\CORRESPONDENCE\EXTERNAL\LETTER WUTC REPLACEMENT RR CROSSING ARM .DOC

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the crossing gate signal system, not the crossing arm. Therefore, the failure of the crossing arm does not seem to be a foundation issue.

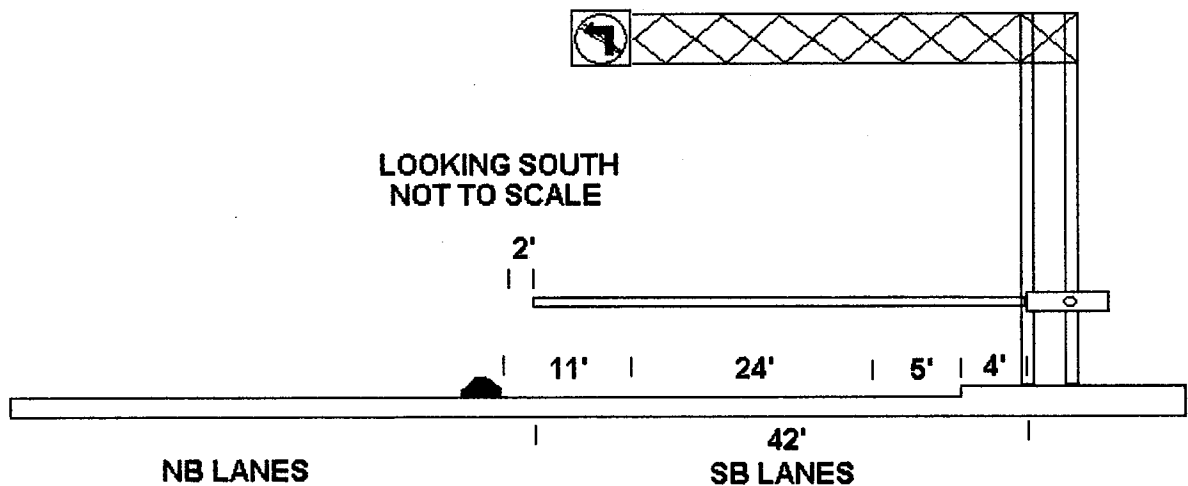
The cut sheet for the 45' crossing arm installed does not provide its allowable loadings so it is unclear whether this arm was appropriate for the site conditions. As noted above, it is significantly longer than the recommended crossing arm length and three feet longer than the maximum length typically manufactured.

Discussions were held with Clark County Public Works staff, the manufacturer of the cantilever crossing gate structure and manufacturers of crossing arms to formulate the recommendation below.

Recommendation

The recommendation is to install a new, lighter and more ridged 42' Alumi-Lite crossing arm which is specifically designed for 80 mph wind conditions. The manufacturer of the proposed 42' crossing arm has a good reputation amongst the railroad community. The existing cantilever structure will also be fitted with a 10' length extension which will include an additional set of high wind brackets. The extension is designed by the cantilever structure manufacturer and we have documentation from the manufacturer that the structure will support the minimal additional weight. As mentioned above, the foundations are well under capacity and the additional loading incurred will be less than 10%. The 42' crossing arm will provide coverage of 90% of the travel way. Design guidance requires that the crossing arm provide sufficient coverage to block vehicles from traveling around the arm without crossing the center line. At this location the southbound left turn lane includes an overhead LED "NO LEFT TURN" sign that is activated with the gate also a C-curb which will not allow for vehicles to travel around the crossing arm.

The cost of the new crossing arm, extended mast arm and additional set of high wind brackets is \$2300, plus installation.



Sincerely,

Jean Singer
Project Manager

MG/file