Council Meeting Date: December 1, 2014 **Agenda Item:** 7(b)

CITY COUNCIL AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Motion to Authorize the City Manager to Execute an Agreement with KPFF Consulting Engineers for the Design of the 10th Avenue NW Bridge Project
DEPARTMENT:	Public Works
PRESENTED BY:	Mark Relph, Public Works Director
ACTION:	____ Ordinance ____ Resolution __X_ Motion ____ Discussion ____ Public Hearing

PROBLEM/ISSUE STATEMENT:

The 2014-2019 Capital Improvement Program adopted by Council includes the 10th Avenue NW Bridge Project. Staff is requesting Council authorize the City Manager to execute a contract with KPFF Consulting Engineers for $84,383 to provide design services for the 10th Avenue NW Bridge Project.

FINANCIAL IMPACT:

In the 2015-2020 CIP includes a total project budget of $548,086. The Roads Capital Fund will fund the expenditures for this project.

RECOMMENDATION

Staff recommends that Council move to authorize the City Manager to execute an agreement with KPFF Consulting Engineers for $84,383 to provide design services for the 10th Avenue NW Bridge Project.

Approved By: City Manager ***DT*** City Attorney ***MK***

BACKGROUND

The 10th Avenue NW Bridge (formally known as Hidden Lake Bridge) was originally constructed in 1931 and is a two lane, 310 foot long concrete bridge built into the side of a hill along a ravine up from Hidden Lake. The bridge is a “half" bridge that is located in an environmentally sensitive area within the Innis Arden Neighborhood (see Attachment A). Although the bridge was retrofitted in 1996 to address several deficiencies, it is currently deteriorating and requires either replacement or rehabilitation.

At the September 9, 2013 Council meeting, staff requested a contract with KPFF Consulting Engineers be authorized to analyze the 10th Avenue NW Bridge and make recommendations for funding and repair/replacement. The staff report for that meeting can be accessed at the following link: http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2013/staffreport090913-7c.pdf

KPFF conducted their analysis and collected further data on the bridge and surrounding geology in late 2013/early 2014. Their scope of work included reviewing the structural data available on the bridge, updating the load rating of the bridge, reviewing options for replacing the bridge versus providing repairs to extend the life of the current bridge, and investigating and evaluating any grant opportunities for replacement or rehabilitation of the bridge. The analysis also addressed the following:

- The load carrying capacity of the bridge
- A revised bridge rating
- A recommended option to address the bridges deficiencies
- An engineer’s estimate for construction
- Other documentation as needed to prepare grant applications for construction

DISCUSSION

The conclusion of KPFF's analysis of the 10th Avenue NW Bridge is that the current bridge rating was updated to 43.7 (out of a rating of 100). This rating easily meets the threshold for rehabilitation (a minimum score of 80 is needed), and also meets the threshold for replacement (a minimum score of 50 is needed). Attached to this staff report is a copy of the evaluation report (Attachment B) and load rating report (Attachment C) performed by KPFF.

Based upon the final results of the analysis, KPFF reviewed the City's options for grant funding. Unfortunately the current condition of the bridge is not eligible for federal funds for replacement and was not severe enough to be competitive for rehabilitation under the federal bridge grant program. Since the bridge is not located on a priority transportation corridor, it would not compete well for state transportation grants. With limited funds, it was determined that rehabilitation of the bridge was the most cost effective solution and would extend the life of the bridge under its current use.

With the limited amount of funding available, KPFF recommended that specific repairs be made to the bridge to extend its life. The recommended repairs were:

- Repairing cracks under the bridge deck,

- Repairing the bridge deck itself,
- Increasing foundation support at the bridge ends,
- Replacing the center bridge slab, and
- Repairing the bridge guard rail.

It is projected that completing the above repairs will extend the life of the bridge. Funding for design and construction of the improvements was included and approved in the 2015-2020 CIP. Tonight's action would authorize an agreement with KPFF Consulting Engineers to design the need bridge repairs noted above.

ALTERNATIVES ANALYSIS

The alternative to awarding this contract is to do nothing. Doing nothing will not address the deterioration of the bridge and it will continue to deteriorate resulting in either load restrictions or closure all together. Allowing the bridge to deteriorate further, would increase the bridge's likelihood of qualifying for bridge replacement funds. However, the bridge replacement funds are currently highly competitive and there is no guarantee the bridge would receive grant funding once it qualified.

COUNCIL GOAL(S) ADDRESSED

This project addresses City Council goal #2: Improve Shoreline's utility, transportation and environmental infrastructure.

RESOURCE/FINANCIAL IMPACT

Below is a breakdown of the budget for the 10th Avenue NW Bridge Project:

Pre-Design:			
	Staff and other Direct Expenses		$4,925
	Consultant Contracts		$76,790
Design:			
	Staff and other Direct Expenses		$10,690
	Consultant Contracts		$84,383
Construction:			
	Staff and other Direct Expenses	$6,250	
	Consultant Contracts	$36,500	
	Construction Estimate	$295,000	
	Total Construction		$337,750
Contingency			$30,598
1% for the Arts			$2,950
Total Project Cost			$548,086
Total Revenue			
	Roads Capital Fund - 10th Avenue NW Bridge project		$548,086
Project Balance (Revenue -Expenditures)			**$0**

RECOMMENDATION

Staff recommends that Council move to authorize the City Manager to execute an agreement with KPFF Consulting Engineers for $84,383 to provide design services for the 10th Avenue NW Bridge Project.

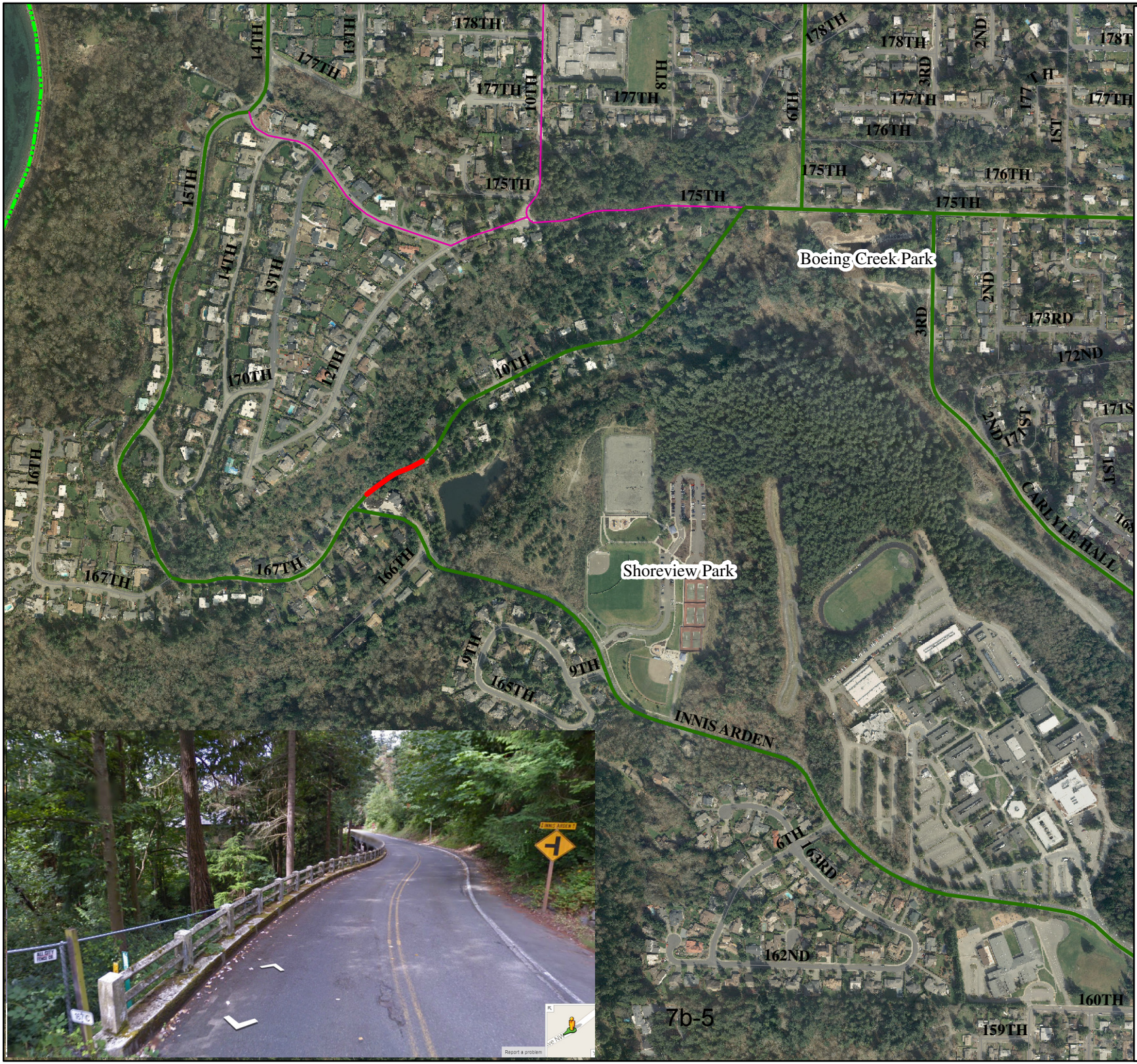
ATTACHMENTS

Attachment A: 10th Avenue NW Bridge Vicinity Map
Attachment B: KPFF 10th Avenue NW Bridge Evaluation Report
Attachment C: KPFF 10th Avenue NW Bridge Load Rating Report

SHORELINE
Geographic Information System

10th Ave NW Bridge Vicinity Map

Attachment A



Legend

- City Limit-outline
- Outside Shoreline
- Interstate
- Principal Arterial
- Minor Arterial
- Collector Arterial
- Neighborhood Collector
- Local Street
- 10th Ave NW Bridge

1 inch = 632 feet

Feet
1250

No warranties of any sort, including accuracy, fitness, or merchantability, accompany this product.

CITY OF SHORELINE

N W E S

Hidden Lake Bridge

Bridge No. 167C

Evaluation Report

May 2014 | Report

kpff Consulting Engineers

Evaluation Report

May 2014

Prepared for:
City of Shoreline – Public Works Department
17500 Midvale Avenue North
Shoreline, WA 98133-4905

Prepared by:
KPFF Consulting Engineers
1601 Fifth Avenue, Suite 1600
Seattle, WA 98101
(206) 622-5822
KPFF No. 113309.20

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Executive Summary

The goal of the Hidden Lake Bridge Evaluation Study was to determine the technical and funding feasibility of bridge repair, rehabilitation or replacement options and to update the live load rating analysis for the existing bridge.

This report is to inform the City of Shoreline of the results of KPFF's research and analysis concerning the Hidden Lake Bridge. Included is a summary of the results from the bridge load rating, bridge classification, sufficiency rating, replacement or rehabilitation funding opportunities, and near-term and longer-term recommendations for repairs and management of the structure.

KPFF's evaluation included visual inspection, review of the available information on the bridge, and new soil borings. In addition, research was completed on funding options for work on the bridge. This information was used to develop options and recommendations for replacement, rehabilitation, retrofit, or repairs of the bridge.

It was determined that the bridge is not structurally deficient and, as a result, is not eligible for funding from the Highway Bridge Program (HBP) or BRAC funds. Additional funding options were considered, but the bridge was not considered competitive for the funding based on grant/loan criteria. The bridge may be eligible for HBP/BRAC funds in the future, as the bridge ages and the condition of the bridge deteriorates. However, it is unknown exactly how long it will be before it deteriorates to the point of being structurally deficient.

Recommended repairs include increased support under the west approach span with CDF, increased support under the east approach span with CDF, replacement of the drop-in slab with a new concrete span, and railing rehabilitation. These repairs are estimated to cost $125,000.

1. Introduction

BRIDGE DESCRIPTION

The Hidden Lake Bridge (No. 167C) is owned by the City of Shoreline (City). It was built in 1931 and spans east to west across a ravine above Hidden Lake on 10th Avenue Northwest. The 11-span bridge consists of a reinforced concrete slab of varying thickness, which is continuous over column bents. The bridge is built into a hillside, and the east and west ends are supported directly on soil. On the east side only, a portion of the slab on soil is a 7-inch slab-on-grade. Between Bents 5 and 6, there is a drop-in span which consists of a 9-inch simply supported slab section. The total bridge length is 312 feet. The bridge roadway width is 20 feet, accommodating one 9-foot 9-inch lane and one 10-foot 3-inch lane.

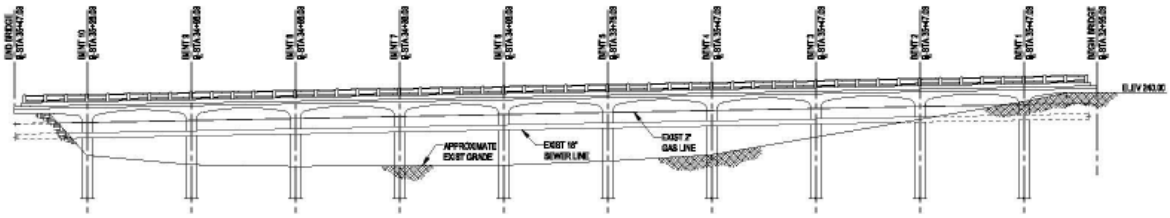

Figure 1-1: Elevation of Hidden Lake Bridge

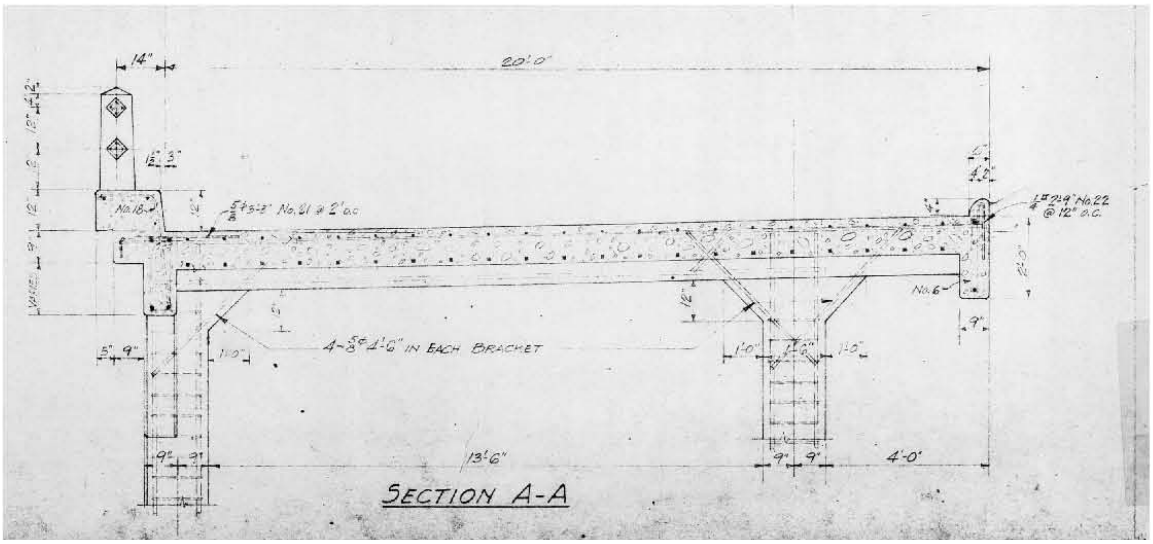

Figure 1-2: Cross-Section of Hidden Lake Bridge

Figure 1-3: Hidden Lake Bridge – Bridge Elevation Looking Southwest

Figure 1-4: Hidden Lake Bridge – Roadway Surface Looking South

Figure 1-5: Hidden Lake Bridge – Bridge Elevation Looking North

Figure 1-6: Hidden Lake Bridge – Substructure Looking North

PREVIOUS WORK COMPLETED

Bridge inspectors from King County have been monitoring the bridge and completing biennial bridge inspections for the City. County inspectors have noted in their inspection reports increased deterioration in the structural elements of the bridge, and recommended that the City (1) update the live load rating analysis for the bridge and (2) begin to program the bridge for repair, rehabilitation, or replacement funding.

Previous repairs and retrofit work on the structure have included:

- The bridge was seismically retrofitted in 1996 by King County. The work included the installation of permanent ground anchors on the uphill slope of the bridge (transverse direction) and installation of longitudinal earthquake restrainers across the drop-in span between Bents 5 and 6.
- The City has completed repairs of multiple “holes” in the sidewalk on the uphill side of the bridge. The sidewalk does not sit on the bridge structure, but instead consists of an asphalt surface sitting on soil. It appears as though the “holes” are a result of soil erosion under the bridge. Also supporting this assumption are multiple repairs that are visible below the bridge deck, including placement of timber lagging and concrete bags that appear to be placed in an attempt to prevent the soils from eroding.
- A sewer trunk line was installed on the downhill side of the bridge in 1962-63 by the City of Seattle. The line is supported on pipe hangers connected to the outside of the bridge girder with steel plates and thru bolts. The hangers were repaired in 2006 by the King County.
- A gas line was installed on the downhill side of the bridge. The date of installation is unknown.

Figure 1-7: Hidden Lake Bridge – Repairs Under Bridge

PROJECT GOALS

KPFF was contracted by the City to determine the technical and funding feasibility of bridge repair, rehabilitation, or replacement options, and to update the live load rating analysis for the existing bridge.

This report is to inform the City of the results of KPFF's research and analysis completed concerning the Hidden Lake Bridge. Included is a summary of the results from the bridge load rating, bridge classification, sufficiency rating, replacement or rehabilitation funding opportunities, and near-term and longer-term recommendations for repairs and management of the structure.

2. Structural Analysis

LOAD RATING

Structural analysis was completed on the bridge to determine rating factors for the American Association of State Highway and Transportation Officials (AASHTO) design truck, legal trucks, and permit (overload) trucks. Rating factors are used to determine the available live (vehicle) load capacity of a bridge and to determine the overall bridge Sufficiency Rating, which is used to determine the overall condition of the bridge. Analysis was completed in accordance with the Washington State Department of Transportation (WSDOT) Bridge Design Manual (BDM) and the AASHTO Manual for Bridge Evaluation (MBE).

Previous Load Rating:

- In 1996, King County completed a load rating using the load rating program BRIDG. The controlling inventory rating factor for the HS-20 design truck was 0.63 (22.7 tons) and was controlled by moment in the drop span. Both end spans were modeled as propped cantilevers in the structure finite element model used for the rating analysis.
- KPFF bridge engineers completed a cursory inspection of the bridge and the 1996 rating analysis was reviewed. During the site visit, advanced erosion was noted under both end spans of the bridge. A finite element model was created to verify the results of the 1996 load rating and to determine the potential impacts of the erosion on the overall capacity of the structure. When all soil support under the end spans was removed from the structure models, the models showed that the bridge was severely overstressed due to only the self weight of the bridge (no vehicles). Therefore, existing limits of soil support were located and soil springs were utilized to model the support from the remaining soil. Current geotechnical borings were not available; however, assumed soil spring values were recommended by Shannon & Wilson Engineering, based on borings completed in 1994 for seismic retrofit of the bridge (additional information on the soil springs is included below). When these changes were made, the analysis results showed that the controlling inventory rating factor for the HS-20 design truck was 0.27 (9.7 tons) and was controlled by negative moment in the western-most cantilever to slab-on-grade end span.

Updated Load Rating Analysis:

Based on the exisiting condition of the bridge and soils supporting the end spans, KPFF bridge engineers assumed that the actual rating factors were in between the two ratings previously described. Therefore, the following items were updated in the analsysis:

- New geotechnical borings were collected to provide more accurate soil springs under the cantilever end spans.
- Locations of soil springs were updated to reflect current erosion (and therefore soil support) conditions under the end spans.

- The 1996 load rating assumed 40 ksi reinforcing steel (rebar). However, regulations in the AASHTO MBE require using 33 ksi for reinforcing steel in bridges constructed prior to 1954; therefore, lower steel strengths were used.

As a result of these changes, the calculated inventory load rating factor for the bridge is 0.46 for the HS-20 design truck, which equates to an Inventory Rating of 16.4 tons, as shown in Appendix A. It is controlled by the positive moment at the drop-in span at the center of the structure. Figure 2-1 shows the summary sheet from the updated load rating. The full load rating report is included in Appendix A.

The bridge was rated using the results from a series of SAP2000 models. Finite element models were created for the end spans of the bridge in order to model the locations where the bridge is supported directly on soil. A 2-D spine model was created for the analysis of the typical spans.

The policy for when and how to post bridges for reduced vehicle loads is the responsibility of the bridge owner. Because the City of Shoreline does not have a bridge load posting policy in place, following the policies of the WSDOT Bridge Office and King County Road Division are recommended (both departments have similar bridge posting policies).

- Bridge posting is based on the operating rating factor when using Load Factor Rating (LFR) methods (LFR was used for the Hidden Lake Bridge). When the operating rating factors for the three AASHTO legal trucks are below 1.0, the posted load restrictions are calculated by multiplying the rating factor by the tonnage for the legal trucks.
- Section 6A.8.1 of the AASHTO MBE also allows a bridge owner not to restrict the loads on concrete bridges even though there is less than one (rating factor) found on one or all of three AASHTO legal trucks, if no distresses were found on concrete elements during multiple years of inspection effort.
- Neither WSDOT nor King County has developed a policy for the NRL/SUV posting yet.

Therefore, based on these policies, posting for load restrictions is not required on the Hidden Lake Bridge. The operating rating factors for both the AASHTO 1 and AASHTO 2 trucks are less than one (0.97); however, they are within typical acceptance criteria tolerance. Additionally, posting is not recommended at this time for the NRL, SU4, SU5, SU6, or SU7 vehicles, since WSDOT does not have a posting policy for these new vehicles. As posting policies are developed for these trucks, posting may be recommended for the Hidden Lake Bridge.

BRIDGE RATING SUMMARY

Bridge Name:	Hidden Lake Bridge
Bridge Number:	167C
Span Types:	Concrete Slab
Bridge Length:	310’
Design Load:	Unknown
Rated By:	Brandon Kotulka
Checked By:	Jennie Stabler
Date:	3/21/14

Truck	INVENTORY RF	INVENTORY (Tons)	OPERATING RF	OPERATING (Tons)	Controlling Point
AASHTO 1	0.58	(14.6)	0.97	(24.4)	positive moment @ typical span
AASHTO 2	0.58	(20.9)	0.97	(34.8)	negative “ @ “ “
AASHTO 3	0.71	(28.4)	1.18	(47.4)	positive “ @ “ “
OL-1	0.26	(12.7)	0.75	(36.1)	negative moment @ 1st support
OL-2	0.20	(20.3)	0.57	(59.2)	“ “ “ “ “
NRL	0.43	(17.1)	0.71	(28.5)	positive moment @ typical span
SU4	0.50	(13.4)	0.83	(22.3)	“ “ “ “ “
SU5	0.47	(14.6)	0.78	(24.3)	“ “ “ “ “
SU6	0.44	(15.4)	0.74	(25.6)	“ “ “ “ “
SU7	0.43	(16.8)	0.72	(28.1)	“ “ “ “ “

NBI Rating	RF	Tons (U.S.)	Controlling Point
Inventory (HS-20)	0.46	16.4	positive moment @ drop-in span
Operating (HS-20)	0.76	27.4	“ “ “ “ “

Remarks:

Posting is not recommended for AASHTO 1 or 2, even though they are less than one since it is within typical acceptance criteria tolerance. Posting is not recommended for NRL, SU4, SU5, SU6, or SU7 since WSDOT does not have a posting policy for these new vehicles.

Figure 2-1: Load Rating Summary Sheet

SOIL SPRINGS

As previously noted, the 1996 load rating analysis assumed that the end spans were propped cantilevers, which in turn assumed that the vertical reaction supporting the ends of the bridge were rigid (no deflection allowed). However, when KPFF completed the field inspection, erosion of the soil under the end spans was noted.

Initially, KPFF completed a load rating analysis of the bridge based on existing soils information. The analysis results were reported to the City in January 2014, and reported a severe reduction of the load carrying capacity of the bridge. The results were significantly influenced by the spring values used to represent the soil support for the bridge spans, particularly at the east and west ends of the bridge (cantilever to slab-on-grade spans). The springs used were compression-only with a typical subgrade reaction of 4 pci (2 pci within 3 feet of the soil edge) and were based on the 1994 borings and the reported blow counts. These borings had relatively low blow counts (suggesting low relative density), and therefore the spring values were also low. However, higher blow counts were expected, given the existing steep slope at the site, which would require stiffer soils, and therefore result in higher spring stiffness values.

On January 16, 2014, KPFF and Shannon & Wilson met with the City of Shoreline to discuss the results at that time. The City determined that additional borings were needed to accurately identify the condition of the bridge. Shannon & Wilson completed new borings and more accurate springs were applied to the structural analysis. Based on the results of the borings, Shannon & Wilson recommended updated soil spring values for the end spans (slabs-on-grade) of 20 pci for greater than 3 feet from the slope crest and 10 pci for less than 3 feet from the slope crest. Calculations show that these stiffer springs raise the inventory rating factor as discussed above.

BRIDGE CLASSIFICATION: STRUCTURALLY DEFICIENT/ FUNCTIONALLY OBSOLETE

The bridge load rating factor, amongst other things, contributes to determining if the bridge is functionally obsolete (unable to properly accommodate traffic due to poor roadway alignment, waterway, insufficient width, low structural evaluation, or inadequate clearances) or structurally deficient (relatively poor condition or has insufficient load carrying capacity for modern design loadings). Based on the 2012 inspection report and the 1996 load rating, the Hidden Lake Bridge was classified as functionally obsolete but not structurally deficient. By updating the load rating analysis with the soil springs from this year's soil borings, the analysis has confirmed that the bridge remains functionally obsolete (and not structurally deficient).

The factors that determine whether or not the bridge is structurally deficient include items from the inspection report, and are listed below. Added to the list are the criteria for determining if the bridge is structurally deficient (as determined by the FHWA), and the values previously used by King County from the 2012 Inspection Report and 1996 Load Rating. KPFF reviewed and confirmed each of the coding values from the 2012 inspection. The final column of the table includes the new value for structural adequacy (Table WB76-57 of the Washington State Bridge Inspection Manual [WSBIM]) which is based on KPFF's review of the structure and the updated

bridge load rating factor. If any one of these values were to meet the respective criterion shown, the bridge would be considered structurally deficient (SD):

WSBIM Category	SD Criteria	From King County 2012 Inspection	From KPFF Review and Analysis
Structural Adequacy	<=2	5	4
Waterway Adequacy	<=2	9	Same as 2012 insp.
Deck Overall	<=4	5	Same as 2012 insp.
Superstructure Overall	<=4	5	Same as 2012 insp.
Substructure Overall	<=4	5	Same as 2012 insp.
Culvert	<=4	9	Same as 2012 insp.

As shown, the Structural Adequacy code has reduced from 5 to 4. This is a result of the updated load rating analysis with current soil spring values and locations; however, none of the criteria for Structural Deficiency are met. Therefore, the classification remains Functionally Obsolete and not Structurally Deficient. Note that the bridge classification is Functionally Obsolete due to the Deck Geometry rating of 3 from the Inspection Report.

SUFFICIENCY RATING

As mentioned above, the reduction of the bridge load rating reduces the structural adequacy, which in turn, negatively affects the sufficiency rating. The HS-20 inventory load rating factor is 0.46 based on the new soil spring values, resulting in a sufficiency rating of 43.7. This is a reduction from the sufficiency rating of 52.0 which results from the values associated with the 2012 Inspection Report and the 1996 load rating. See below for the input used for Sufficiency Rating calculations.

Sufficiency Rating Calculation Summary

		Bridgeworks	FHWA	WSBIS	Structurally	Functionally
CODE		Item No.	Item No.	Number	Deficient?	Obsolete?
4	***STRUCTURAL ADEQUACY***	657	67	WB76-57	no	no
3	***DECK GEOMETRY***	658	68	WB76-58		yes
9	***UNDERCLEARANCE ADEQUACY***	659	69	WB76-59		no
6	***ALIGNMENT ADEQUACY***	661	72	WB76-61		no
9	***WATERWAY ADEQUACY***	662	71	WB76-62	no	no

5	***DECK OVERALL***	663	58	WB76-63	no	
5	***SUPERSTRUCTURE OVERALL***	671	59	WB76-71	no	
5	***SUBSTRUCTURE OVERALL***	676	60	WB76-76	no	
9	***CULVERT***	678	62	WB76-78	no	
0	***BRIDGE RAIL***	684	36A	WB76-84		
0	***TRANSITION***	685	36B	WB76-85		
0	***GUARDRAIL***	686	36C	WB76-86		
0	***TERMINAL***	687	36D	WB76-87		
16.4	***INVENTORY RATING***	555	66	WB75-55		
2	***LANES ON***	352	28A	WB73-52		
20	***CURB TO CURB DECK WIDTH***	356	51	WB73-56		
9999	***MIN. VERT. CLEARANCE OVER DECK***	370	53	WB73-70		
22	***APPROACH ROADWAY WIDTH***	397	32	WB73-97		
722	***ADT ON INVENTORY ROUTE***	445	29	WB74-45		
0	***STRAHNET***	485	100	WB74-85		
1	***DETOUR LENGTH***	4103	19	WB74-103		
1	***MAIN SPAN DESIGN***	533	43B	WB75-33		
43.7	**SUFFICIENCY RATING**					
	Structurally Deficient?	**no**				
	Functionally Obsolete?	**yes**				

3. Funding Assessment

State, Local, and Federal funding options were researched to find opportunities to fund repairs, replacement, or rehabilitaion of the Hidden Lake Bridge. See Appendix B for a list of funding options considered.

The federally-funded Highway Bridge Program (HBP), also known as BRAC funds, are typically used by local agencies to fund similar bridge projects, as many of the other funding options do not specifically address bridges. In 2014, bridges receiving HBP/BRAC funding are required to be structurally deficient. As a result of the Hidden Lake Bridge NOT being considered structurally deficient, the bridge would NOT be eligible for either replacement or rehabilitation funding from the 2014 HBP/BRAC funding program. The bridge may be elegible in the future, as the bridge ages and the condition of the bridge deteriorates. However, it is unknown exactly how long it will be before it deteriorates the point of being structurally deficient.

4. Proposed Alternatives

The original goal of the project was to determine the technical and funding feasibility of bridge repair, rehabilitation, or replacement options, and to update the live load rating analysis for the existing bridge. As a result of the load rating analysis (and the resulting deterimination that the bridge is not structurally deficient), as well as the funding research, it was determined that neither a bridge replacement or rehabilitation project are financially feasible at this time. However, multiple repair options were considered. See below for further details.

REPLACEMENT / REHABILITATION / RETROFIT / REPAIR

Replacement:

Since replacement funding is not currently a possibility for the Hidden Lake Bridge at this time, replacement options were not analyzed in detail.

A replacement structure would require a site-specific solution due to the steep slopes, narrowness of the existing roadway, and the presence of the storm sewer and gas line on the downhill side of the structure. Potential replacement options would include precast or cast-in-place concrete spans sitting on deep foundations (piles or drilled shafts). Most funding options would likely require upgrading of the roadway section to provide wider lanes, shoulders, and sidewalks, unless deviations are accepted.

Construction of new foundations will require full closure of the bridge and either temporary access roads built in the footprint of the existing structure, or large cranes to reach from the existing abutments.

A replacement cost estimate of $550 per square foot of bridge deck is commonly used as a planning-level estimate for many bridge projects in Western Washington. This would result in a

preliminary level cost estimate for a replacement structure with a new bridge of $5.9 million (312 feet in length by 34 feet minimum width). However, replacement costs could increase due to the need for extensive deep foundations on the steep slope and increased bridge width in order to meet current City roadway standards.

Another replacement option could include removal of the bridge structure with a retaining wall. Given the site conditions, wall options will likely require a deep foundation (likely soldier piling or similar) with tiebacks or anchor rods.

Rehabilitation:

The bridge was constructed in the 1930s, and therefore every element of the bridge was sized and designed for loads that are significantly smaller than today's code requirements and today's vehicle weights. Therefore, virtually every element of the bridge would need to be rehabilitated to bring this bridge up to code. Additionally, current HBP/BRAC rehabilitation funding requires the bridge to be structurally deficient. Since the Hidden Lake Bridge is not currently eligible for these funds, rehabilitation options were not analyzed in detail.

Seismic Retrofit:

A seismic retrofit of the bridge was completed in 1996. The retrofit was designed for a 500-year event. The current bridge code requires bridges to have the ability to resist a 1,000-year event. Given that the bridge is situated on a very steep slope, the soil slope does not have the capacity to resist such an event. Therefore, it is was determined not feasible to retrofit the bridge structurally to achieve a higher seismic capacity than it currently has.

Repairs

The Hidden Lake Bridge was built in 1931. Due to the age of the bridge, poor concrete placement on the bottom of the deck slab and erosion under the uphill side of the bridge, repairs are recommended. Repairs considered include:

- Filling the gap under the end spans: The bridge relies on soil support at both the far east and west ends of the bridge. Although these areas do not control the rating factor of the bridge for the legal trucks (only for one of the permit trucks), it is evident that erosion is worsening with time and should be addressed. If further erosion occurs, the load rating will decrease, which means that the low carrying capacity of the bridge decreases and the bridge would need to be posted for reduced loads. It is recommended that both ends of the bridge (including the north side of the east end) be supported by controlled density fill (CDF) to repress erosion of the soil. A non-settling CDF mix should be used, so that the gap won't open up again as the CDF cures.
- Repair of drop-span: The drop-span between Bents 5 and 6, near the center of the bridge, has deteriorated more than other areas of the structure. The transverse joints have failed, and as a result, water is infiltrating through joints and causing oxidation of the rebar and steel embeds. In addition, the concrete under the joints is deteriorating due to the corroding rebar.

It is recommended that the drop panel be replaced and that the joints chosen better prevent water intrusion.

- Railing repair/retrofit: The railing on the south side of the bridge is in poor condition and inadequate for resisting vehicle impact forces. It is recommended that the existing railing be replaced with a more modern railing recognized by the Federal Highway Administration (FHWA) that has the ability to dissipate the energy from an impact force through plastic deformation of the rail and/or the ribbon effect. Replacement of the railing with a more modern design may require extensive strengthening of the deck slab. If the existing slab cannot resist the higher loading, another alternative is to provide a railing retrofit. This would include repairs to the concrete posts and the addition of the guardrail thrie-beam on the front of the posts.
- Erosion/Drainage improvements on the uphill side of the bridge: Ongoing maintenance is required to prevent erosion/sidewalk failures on the uphill side of the bridge. Erosion "holes" have formed in the sidewalk as soil sloughs out from the side to below the bridge. Previous repairs have included adding timber lagging and concrete bags that appear to be placed in an attempt to prevent the soils from eroding. This does not impact the structural integrity of the bridge, but can be a hazard to pedestrians as the holes are forming in the sidewalk. Potential repairs could include:
  - Continuing repairs as erosion/holes form
  - Rebuilding the sidewalk, including installation of a drainage system to prevent further erosion from surface drainage
  - Installation of a gutter or other drainage structure uphill of the existing sidewalk

Repairs on the sidewalk/drainage are not part of this report but it is recommended that if any future sidewalk work is to be performed, past failure and erosion issues should be addressed prior to making any permanent repairs.

- Additional Repairs: Other repairs were considered that could modestly increase the rating factor and life span of the bridge. They include repairing the top of the concrete roadway and the underside of the concrete deck. Both of these repairs are not required to necessarily increase the capacity of the bridge. However, the repairs would improve the condition of the bridge. These conditions are used to determine factors used in the structural analysis.

Modified rating factors and rating tonnages are shown here based on repairing the bridge in the order shown:

Truck:	HS-20	A1	A2	A3	SU4	SU5	SU6	SU7	NRL	OL1	OL2
	Inventory Rating Factor										
No Repairs	0.46	0.58	0.58	0.71	0.50	0.47	0.44	0.43	0.43	0.26	0.20
1) CDF	0.46	0.58	0.58	0.71	0.50	0.47	0.44	0.43	0.43	0.35	0.31
2) Drop-in Slab	0.48	0.58	0.58	0.71	0.50	0.47	0.44	0.43	0.43	0.35	0.31
3) Deck Repairs	0.48	0.58	0.61	0.71	0.50	0.47	0.44	0.43	0.43	0.35	0.31
4) Under Bridge	0.56	0.68	0.69	0.82	0.58	0.55	0.51	0.50	0.50	0.48	0.41
	Operating Rating Factor										
No Repairs	0.76	0.97	0.97	1.18	0.83	0.78	0.74	0.72	0.71	0.75	0.57
1) CDF	0.76	0.97	0.97	1.18	0.83	0.78	0.74	0.72	0.71	0.75	0.57
2) Drop-in Slab	0.80	0.97	0.97	1.18	0.83	0.78	0.74	0.72	0.71	0.75	0.57
3) Deck Repairs	0.80	0.97	1.03	1.18	0.83	0.78	0.74	0.72	0.71	0.75	0.66
4) Under Bridge	0.93	1.13	1.15	1.38	0.96	0.91	0.86	0.84	0.83	0.92	0.68

Truck:	HS-20	A1	A2	A3	SU4	SU5	SU6	SU7	NRL	OL1	OL2
Tonnage:	36	25	36	40	27	31	34.8	38.8	40	48	103.5
	Inventory Tonnage										
No Repairs	16.4	14.6	20.9	28.4	13.4	14.6	15.4	16.8	17.1	12.7	20.3
1) CDF	16.4	14.6	20.9	28.4	13.4	14.6	15.4	16.8	17.1	17.0	32.2
2) Drop-in Slab	17.3	14.6	20.9	28.4	13.4	14.6	15.4	16.8	17.1	17.0	32.2
3) Deck Repairs	17.3	14.6	22.1	28.4	13.4	14.6	15.4	16.8	17.1	17.0	32.2
4) Under Bridge	20.0	16.9	24.9	33.0	15.5	16.9	17.8	19.5	19.8	22.8	42.3
	Operating Tonnage										
No Repairs	27.4	24.4	34.8	47.4	22.3	24.3	25.6	28.1	28.5	36.1	59.2
1) CDF	27.4	24.4	34.8	47.4	22.3	24.3	25.6	28.1	28.5	36.1	59.2
2) Drop-in Slab	28.8	24.4	34.8	47.4	22.3	24.3	25.6	28.1	28.5	36.1	59.2
3) Deck Repairs	28.8	24.4	37.0	47.4	22.3	24.3	25.6	28.1	28.5	36.1	68.3
4) Under Bridge	33.4	28.3	41.5	55.0	25.9	28.3	29.8	32.6	33.1	44.4	70.6

COST ESTIMATE

Construction costs were estimated for the different recommended repairs and are described further below. All costs listed are in 2014 dollars and DO NOT include sales tax, engineering, construction administration, or costs associated with permitting/mitigation. An additional 15 percent has been added to the estimated unit costs for mobilization, and an additional 30 percent has been added for contingency.

If all repairs are completed, the overall costs are estimated at approximately $246,000.

- Increased support under the west approach span with CDF ($6,000)
- Increased support under the east approach span with CDF ($15,000)
- Replacement of the drop-in slab with a new concrete span ($54,000)
- Railing rehabilitation ($50,000)
- Deck repairs ($75,000)
- Concrete repair under the bridge deck ($46,000)

5. Recommendations

LOAD RATING

Rating factors should be updated on the WSDOT Bridgeworks inspection database, along with the signed rating summary sheet. The following values should be used:

- WB75-51 – Operating Method = L
- WB75-52 – Operating Tons = 27 tons
- WB75-54 – Inventory Method = L
- WB75-55 – Inventory Tons = 16 tons

Additionally, if King County is managing the bridge and bridge file on behalf of the City, a full load rating report should be submitted to the County. However, if the City maintains the bridge file, submittal of the information noted above is adequate for the use of King County Bridge Inspectors.

LOAD POSTING

Given the current load rating analysis, it is not required to post the bridge for a reduced load limit at this time. See the previous discussion or the full load rating report for further details.

FUTURE MONITORING RECOMMENDATIONS

Many of the assumptions in the load rating analysis are based on the condition of the structural members and support conditions of the bridge. Routine biennial inspections should continue to monitor for changes to the condition of the structure and should also monitor erosion of the soil under the end spans of the bridge. When the limits of the soil support change, the assumptions of the load rating analysis may need to be checked and revised.

REPAIRS

The following list of recommended repairs is based on the results of the structural analysis, the risk for reductions in structural capacity of the bridge, and improvements with the lowest cost/benefitl ratio.

Primary Repairs: Estimated at a total of $125,000.

- Increased support under the west approach span with CDF ($6,000)
- Increased support under the east approach span with CDF ($15,000)
- Replacement of the drop-in slab with a new concrete span ($54,000)
- Railing Rehabilitation ($50,000)

Secondary Repairs: Estimated at a total of $121,000

- Deck Repairs ($75,000)
- Concrete Repair Under Bridge Deck ($46,000)

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Appendix A

Under Separate Cover

Load Rating Report

- Load Rating Analysis and Results
- 1931 Original Construction Drawings
- 1995 Seismic Retrofit Drawings
- 2012 Inspection Report and Photos
- Load Rating Calculations

kpff Consulting Engineers

MEMO

Appendix B

Funding Research Summary

Funding Source	Grant or Loan	Eligibility	Competition Based On:	Competitive	Administered By	Applications Due	Notes
Highway Bridge Program (HBP/BRAC) –replacement funds	Grant (federal funds): 20% Match by agency	**NO**[1]**:** Eligible for SD bridges with SR <= 40 Hidden Lake= 43[1]	In 2012 highest SR=39.45	**LIKELY NO**[2]**:** Field Inspection shows that the bridge is not overstressed due to high loads. Short detour.	WSDOT H&LP	05/05/2014	Further deterioration will need to occur before the bridge is a better candidate for replacement.
HBP – rehabilitation funds	Same as above	**NO:** Eligible for SD bridges with SR <= 80 Hidden Lake= 43[1]	In 2012 highest SR=24.45	**POSSIBLY**[2]**:** In general, the bridge is in reasonable condition. However, rehabilitation would extend the service life. Competitiveness will depend on other applications.	Same as above	05/05/2014	Bridges must be brought up to "current standards" if rehab. funds are used (e.g. lane, shoulder and sidewalk widths **and railing upgrades**)
HBP – preventative maintenance funds	Grant (federal funds): 10% match; if project is constructed by 2018 are eligible for 0% match	**NO:** Doesn't meet definition of "Preventative Maintenance"	n/a	n/a	Same as above	05/05/2014	Preventative maintenance is defined as steel bridge painting, scour mitigation, seismic retrofit, and deck/joint repair
Transportation Improvement Board (TIB) – Urban Arterial Program (UAP), Arterial Preservation Program (APP) and Urban Sidewalk Program (SP)	Grant (state funds): match dependent on project.	**NO:** 10th Ave NW is not a federally classified arterial street	n/a	n/a	n/a	Est. 08/2014 (annual)	
TIB – Small City Programs	Grant (state funds): match dependant on population size	**NO:** Eligible for Agencies <= 5,000 population	n/a	n/a	n/a	Est. 08/2014 (annual)	Est. Shoreline Population = 54,400
Surface Transportation Program (STP) – Regional Competitive Program	Grant	**YES**	Funds used to improve the transportation system based on regional priorities	**LIKELY NO:** Given the condition of the bridge and the short length of detour, this project would not likely be considered a regional priority.	WSDOT H&LP, projects chosen by PSRC	04/10/2014	
STP – Transportation Enhancement Program	Grant (federal)	**YES**	Funds used to strengthen the local economy, improve quality of life, enhance the travel experience and protect the environment	**LIKELY NO:** Doesn't meet the intentions of the funding.	WSDOT H&LP, projects chosen by PSRC		One option to be more eligible would be if the bridge is considered historic or of historic significance. However, the inspection report says that "the bridge has been reviewed by the State Office of Archeology and Historic Preservation and is NOT eligible for the NRHP, HAER.

Funding Source	Grant or Loan	Eligibility	Competition Based On:	Competitive	Administered By	Applications Due	Notes
Congestion Mitigation and Air Quality (CMAQ) Program			Intended for programs that improve air quality	**NO:** No overall improvements to Air Quality as a result of the project.	WSDOT H&LP, projects chosen by PSRC		
Federal Transit Administration funds			Intended for transit-related projects serving the region's three federal urbanized areas: Seattle-Tacoma-Everett, Bremerton, and Marysville	**NO:** No transit across Hidden Lake Bridge			
National Highway System (NHS)		**NO:** 10th Ave NW is not on the NHS System	n/a	n/a	WSDOT H&LP		
National Highway Improvement Program (HSIP) – Intersections and Corridors Safety Program				**NO:** No recorded history of high accident intersections or corridors	WSDOT H&LP		
Country Road Administration Board (CRAB) Funds		**NO:** Only for County projects	n/a	n/a	n/a		
National Highway Performance Program (NHPP)		**NO:** 10th Ave NW is not on the NHS System	n/a	n/a	n/a		
Emergency Relief (ER) Funding		**NO:** Project not required as a result of a natural disaster or catastrophic failure.	n/a	n/a	n/a		
Department of Health – Drinking Water State Revolving Funds (DWSRF)	Loan (federal funds)	**NO:** Intended for drinking water infrastructure projects	n/a	n/a	n/a	Est. 09/2014	
Department of Ecology – Integrated Water Quality Funding Program	Typically Loan (federally funded)	**NO:** Intended for water quality improvement projects	n/a	n/a	n/a	Est. 12/2014 (annual)	
USDA Rural Development – Water and Environmental Program	Loans and Grants (federal funds)	**NO:** Eligible for Agencies <= 10,000 population	n/a	n/a	n/a		Est. Shoreline Population = 54,400
Community Development Block Grant	Grant (federal funds)	**NO:** Eligible for Agencies <= 50,000	n/a	n/a	n/a		Est. Shoreline Population = 54,400 A minimum of 51% of the population benefitted by the

							project should be low to moderate income.

Funding Source	Grant or Loan	Eligibility	Competition Based On:	Competitive	Administered By	Applications Due	Notes
Public Works Trust Fund	Loan (state funds, 20 yr loan term)	**YES**	Priorities are Health and Safety, Environmental and Economic Growth. Very competitive process.	**LIKELY NO, BUT MAYBE:** Given the condition of the bridge and the short length of detour, this project may not be considered a priority.	Public Works Board	Spring 2014 (awards subject to legislative approval); Money available for use July 2015	Details in Section 7032 of Engrossed Substitute Senate Bill 5035 Application Information Webinar in Mar/April 2014. Will want to contact Senators & Representatives to protect project if it is shortlisted.
Local Option Capital Asset		**NO**	n/a	n/a	n/a		
National Rural Water Association		**NO**	n/a	n/a	n/a		
Qualified Energy Conservation Bonds		**NO**	n/a	n/a	n/a		
Bond Cap Allocation		**NO**	n/a	n/a	n/a		
Rural Community Asst. Corporation		**NO**	n/a	n/a	n/a		
Recreation & Conservation Office		**NO**	n/a	n/a	n/a		
Rural County Two-Lane Roadway Pilot Program		**NO**	n/a	n/a	n/a		
High Risk Rural Roads Program (HRRRP)		**NO**	n/a	n/a	n/a		
Railroad-Highway Grade Crossing Program		**NO**	n/a	n/a	n/a		
Safe Routes to School Program			Program Funds projects within 2 miles of primary and middle schools to enable and encourage children to walk and bicycle to school.	**LIKELY NO:** Highland Terrace Elementary School and Shoreline Community College are both approx. 1.1 miles away from bridge, but there are no sidewalk/trail connections between bridge and schools on NW Innis Arden Way.			

SD = Structurally Deficient

SR = Sufficiency Rating

PSRC = Puget Sound Regional Council

[1] Dependent on assumptions and results from load rating

[2] Because the Hidden Lake Bridge deterioration observed in the field is not consistent with structural analysis (e.g. overstress cracking), this project might get more review than other projects with obvious structural distress.

Hidden Lake Bridge

Bridge No. 167C

Load Rating Report

May 2014 | Report

kpff Consulting Engineers

Load Rating Report

May 2014

Prepared for:
City of Shoreline – Public Works Department
17500 Midvale Avenue North
Shoreline, WA 98133-4905

Prepared by:
KPFF Consulting Engineers
1601 Fifth Avenue, Suite 1600
Seattle, WA 98101
(206) 622-5822
KPFF No. 113309.20

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BRIDGE RATING SUMMARY

Bridge Name:	Hidden Lake Bridge
Bridge Number:	167C
Span Types:	Concrete Slab
Bridge Length:	312'
Design Load:	Unknown
Rated By:	Brandon Kotulka
Checked By:	Jennie Stabler
Date:	3/21/14

Truck	INVENTORY RF	INVENTORY (Tons)	OPERATING RF	OPERATING (Tons)	Controlling Point
AASHTO 1	0.58	(14)	0.97	(24)	Positive moment at typical span
AASHTO 2	0.58	(20)	0.97	(34)	Negative moment at typical span
AASHTO 3	0.71	(28)	1.18	(47)	Positive moment at typical span
OL-1	0.26	(12)	0.75	(36)	Negative moment at 1st support
OL-2	0.20	(20)	0.57	(59)	Negative moment at 1st support
NRL	0.43	(17)	0.71	(28)	Positive moment at typical span
SU4	0.50	(13)	0.83	(22)	Positive moment at typical span
SU5	0.47	(14)	0.78	(24)	Positive moment at typical span
SU6	0.44	(15)	0.74	(25)	Positive moment at typical span
SU7	0.43	(16)	0.72	(28)	Positive moment at typical span

NBI Rating	RF	Tons (US)	Controlling Point
Inventory (HS-20)	0.46	16	Positive moment at drop-in span
Operating (HS-20)	0.76	27	Positive moment at drop-in span

Remarks:

Posting is not required for AASHTO 1 or AASHTO 2 trucks, even though their operating rating factors are slightly less than 1.0 (within typical acceptance criteria tolerance). WSDOT does not have a posting policy for the NRL, SU4, SU5, SU6 and SU7 trucks at this time, therefore posting is not required. If posting policies are established, posting of this bridge will need to be reconsidered.

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1. Introduction

BRIDGE DESCRIPTION

The Hidden Lake Bridge was built in 1931 in Shoreline, WA (see Appendix A for original construction drawings). The bridge spans east to west across a ravine above Hidden Lake on 10th Avenue Northwest. The 11-span bridge consists of a reinforced concrete slab of varying thickness which is continuous over column bents. The bridge is built into a hillside, and the east and west ends are supported directly on soil. On the east side only, the portion of the slab on soil is a 7-inch slab-on-grade. Between bents 5 and 6, there is a drop-in span which consists of a 9-inch simply supported slab section. The total bridge length is 312 feet. The bridge roadway width is 20 feet, accommodating one 9-foot 9-inch lane and one 10-foot 3-inch lane. A seismic retrofit of the structure was performed in 1995. The associated drawings can be found in Appendix B.

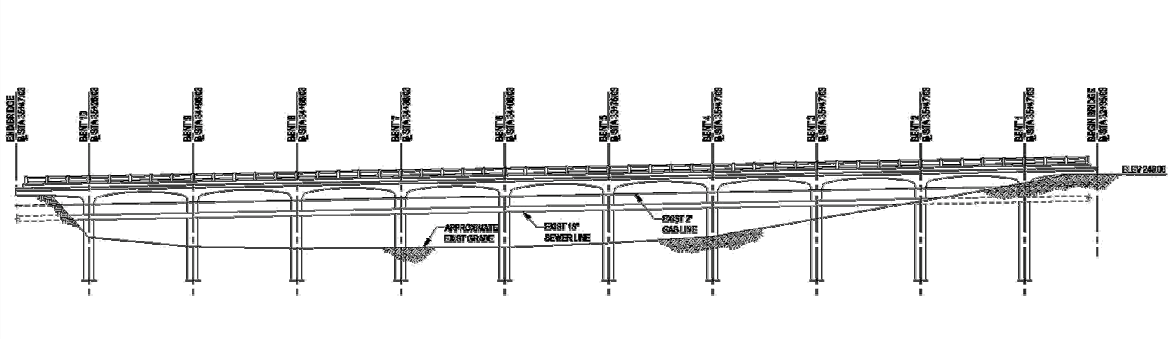

Figure 1-1: Elevation of Hidden Lake Bridge

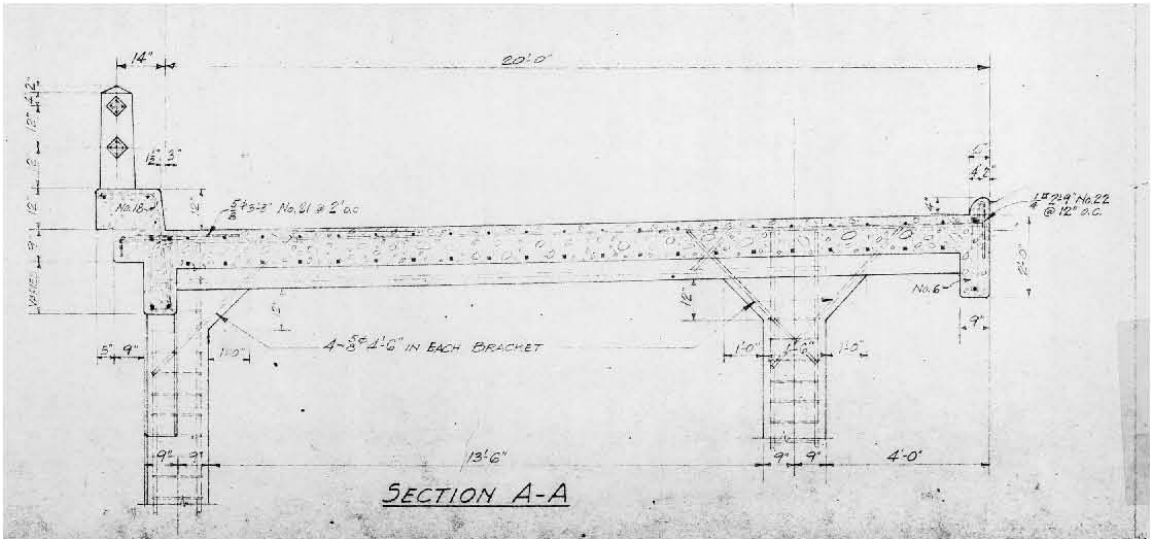

Figure 1-2: Cross-Section of Hidden Lake Bridge

LOAD RATING APPROACH

Bridge load ratings provide a basis for determining the safe load capacity of a bridge. As a result, the information can be used to identify the need for load posting or bridge strengthening and in making overweight vehicle permit decisions. Load rating results are typically presented in the form of rating factors (RFs) for various trucks using different load factors. Rating factors are a measure of the adequacy of the bridge's structural components to carry a specific truck load. For instance, if the rating factor for a specific truck is above 1.0, it means that the bridge can safely handle that specific truck load without being overstressed. Two different types of RFs are presented: inventory and operating. The inventory rating is intended to represent a truck load for which a structure can be safely utilized for an indefinite period of time. The operating rating represents the maximum permissible truck load to which the structure may be subjected.

The Hidden Lake Bridge was assessed using the Load Factor Rating (LFR) Method in accordance with the Manual for Bridge Evaluation, Second Edition (MBE), and Chapter 13 of the Washington State Department of Transportation (WSDOT) Bridge Design Manual (BDM). In addition to the above references, the AASHTO Standard Specifications for Highway Bridges 17th Edition – 2002 (AASHTO Standard Specs) was consulted to obtain live load distribution factors, member capacities, and additional factors for the LFR method.

RFs were determined for the slab at various locations. The lowest RF was used as the overall RF for the entire bridge.

The live loads considered were the HS-20 truck and lane loading, three legal AASHTO trucks, the notional rating load (NRL) truck, and two overload trucks, as defined by the WSDOT BDM. The National Bridge Inventory (NBI) inventory and operating rating factors, based on the LFR Method, considered only the HS-20 truck. Each of these trucks is intended to simulate a different type of vehicle. The three AASHTO legal trucks and the NRL truck represent routine legal commercial traffic. The two overload trucks (OL-1 and OL-2) are intended to simulate permit loads that the bridge may see in its lifetime. The rating factors for these trucks can be used to make overweight vehicle permit decisions. The HS-20 truck is a load that is commonly used in bridge design. The rating factors for this truck are routinely reported to the Federal Highway Administration (FHWA) for the National Bridge Inventory (NBI).

The NRL truck represents a single load that envelopes four different short-wheelbase, multi-axle, specialized hauling vehicles that are becoming increasingly common in the US. For this bridge, the rating factor for the NRL truck was below 1.0; therefore, four additional single-unit specialized hauling vehicle (SHV) loads were evaluated.

Live (truck) loads to be considered for posting a bridge are based on state legal loads, which currently include the three AASHTO trucks and the NRL (or four SHV) trucks. In Washington State, operating rating factors are typically used for posting. Since at least one of the SHV trucks resulted in a rating factor below 1.0 for this bridge, posting of the bridge was considered. However, at the time this report was prepared, WSDOT had not yet developed a policy to post for the SHV vehicles. When a posting policy is determined for the SHV trucks, the bridge would most likely need to be posted for those trucks in the future.

The bridge was rated using the results from a series of SAP2000 models. Finite element models were created for the end spans of the bridge in order to model the locations where the bridge is supported directly on soil. A 2D spine model was created for the analysis of the typical spans.

2. Structural Analysis

ANALYSIS PARAMETERS

The following is a description of the bridge geometry, section properties, and loads.

Geometry

- The Hidden Lake Bridge is a multi-span bridge consisting of a 21-foot 2-inch wide reinforced concrete slab spanning between column bents. The total length of the bridge is 312 feet.
- Deck thickness: Typically varies between 11 inches at midspan and 17 inches over columns. At the drop-in span the slab thickness is 9 inches and at the slab-on-grade it is 7 inches.
- Currently striped for two lanes with no shoulders.
- Traffic barrier system: 2-foot 6-inch concrete posts with a mix of timber and precast concrete rails.
- Width of the roadway: 20 feet.

Materials

- Final cast-in-place concrete strength: f'_c = 3,000 psi (per WSDOT recommendation, see Appendix E)
- Mild steel: f_y = 33 ksi (MBE, Section 6B.6.2.3)

Applied Loads

- Dead loads:
  - Concrete density = 0.155 kips per cubic foot (kcf) (WSDOT BDM, Section 13.2.1)
  - Asphalt overlay is present but very thin and determined to be negligible.
  - Railing weight was ignored and assumed to be carried by the thickened section underneath the railing which includes the curb, concrete deck, and concrete beam.
- Live loads:
  - Design trucks, legal trucks, and overload trucks were used. Descriptions of design trucks, legal trucks, and overload trucks are in Chapter 13 of the WSDOT BDM. Descriptions of SHV trucks are in Chapter 6 of the MBE. Figures representing all of the trucks analyzed are reprinted in this report as Figures 2-1, 2-2, 2-3, and 2-4.

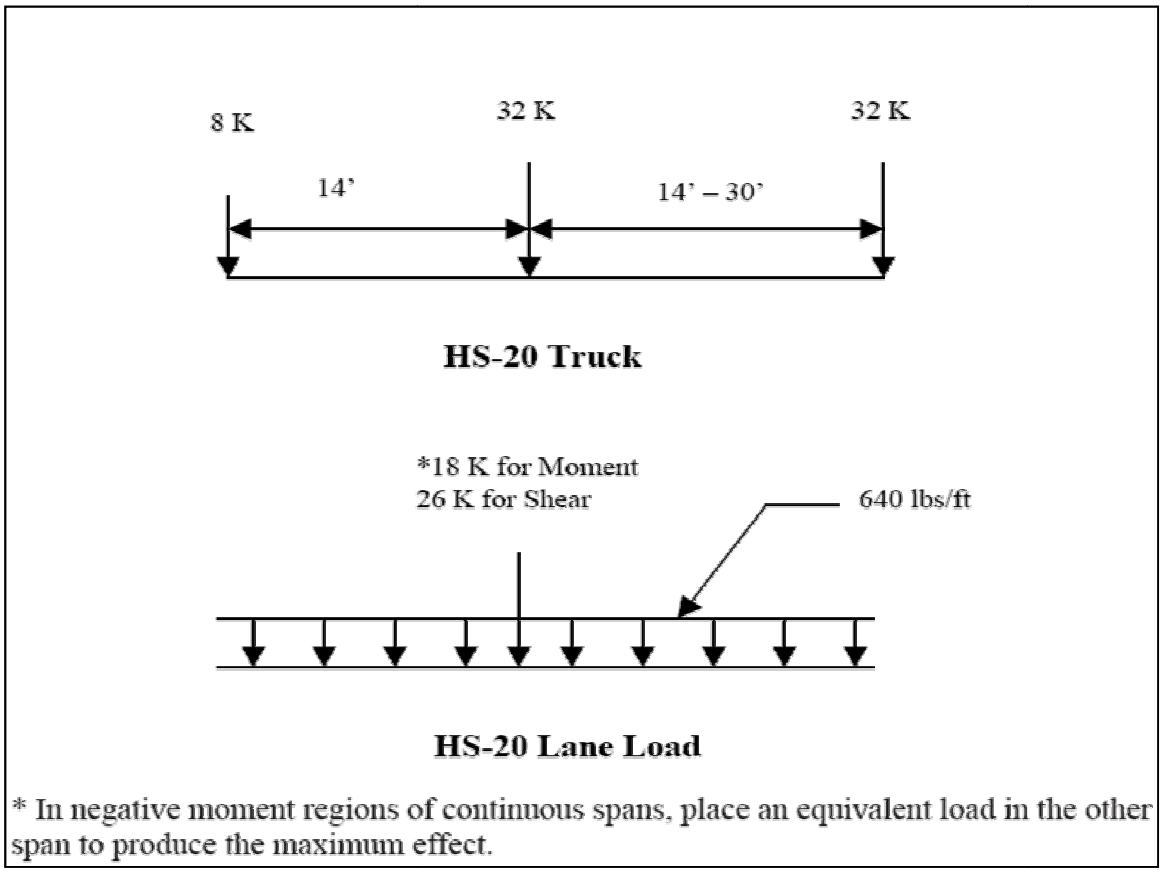

Figure 2-1: Design Truck Loads

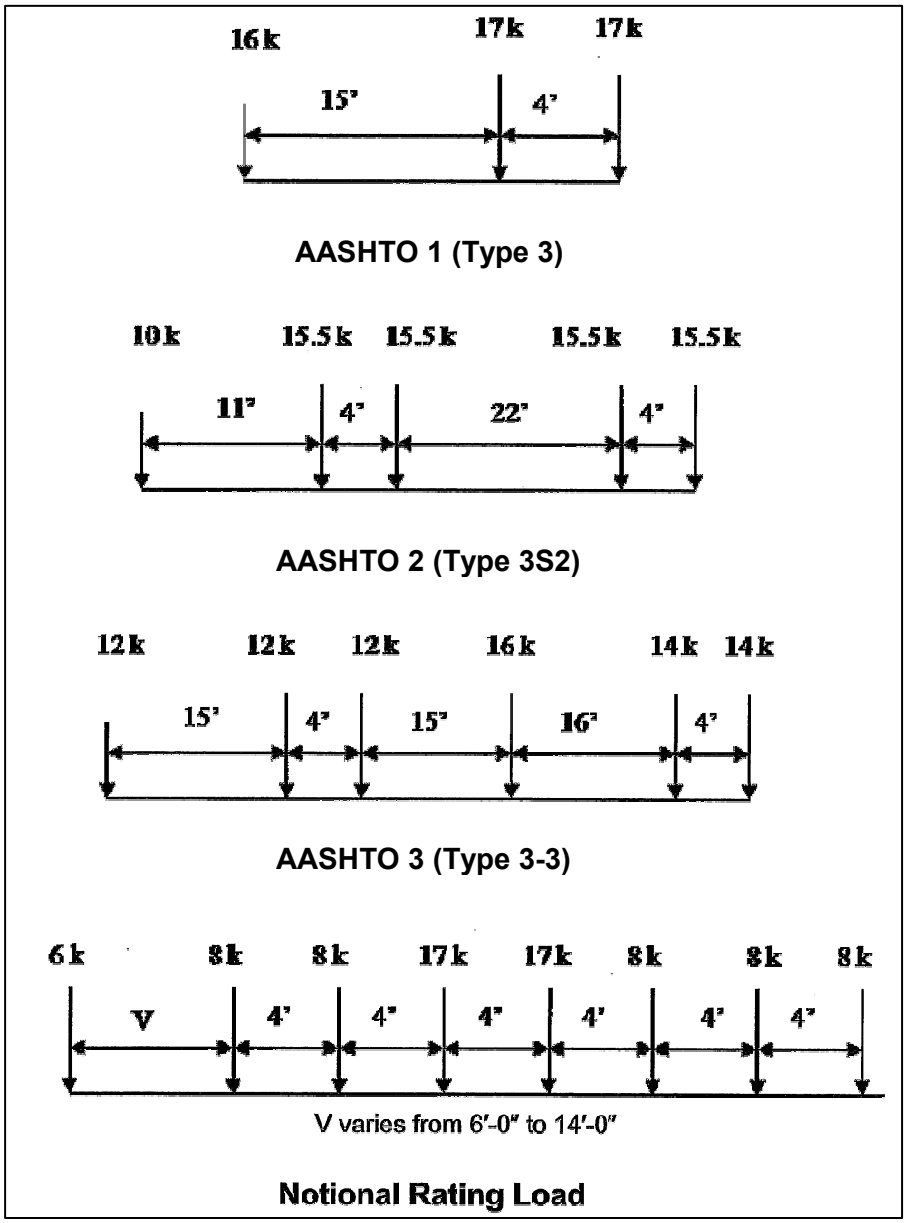

Figure 2-2: Legal Truck Loads

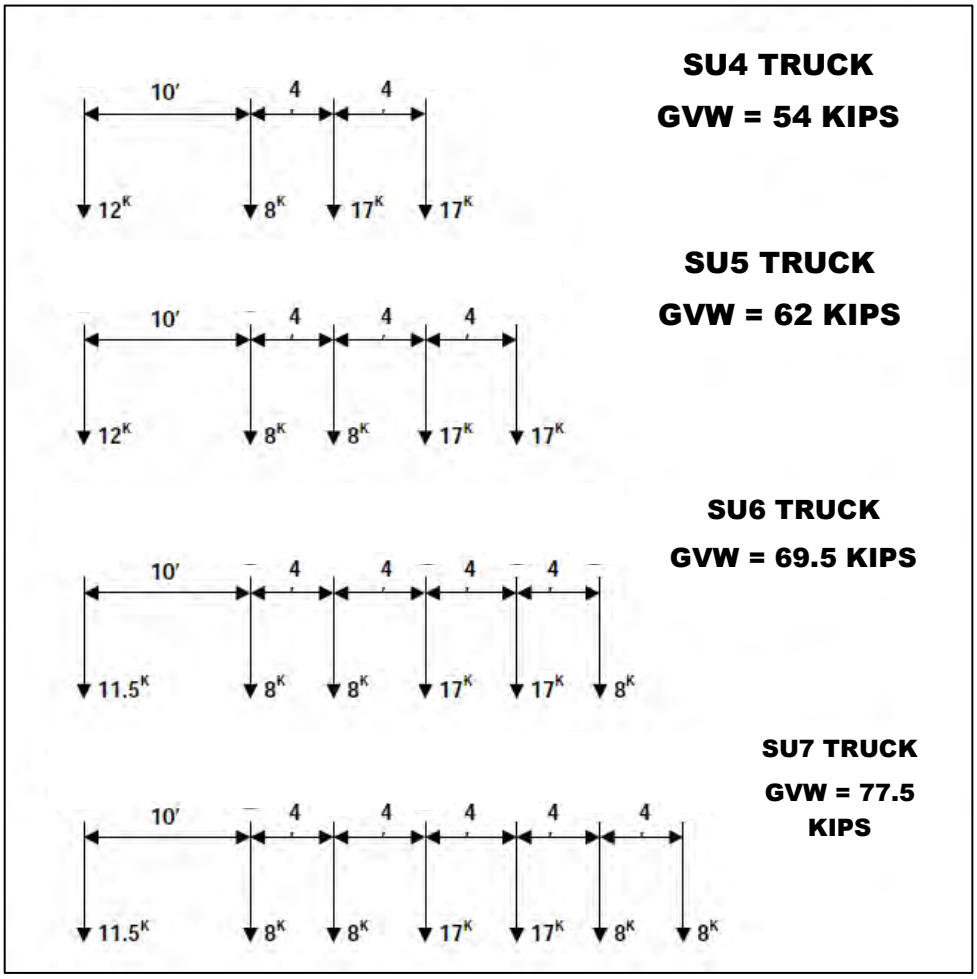

Figure 2-3: Single Unit SHV Loads

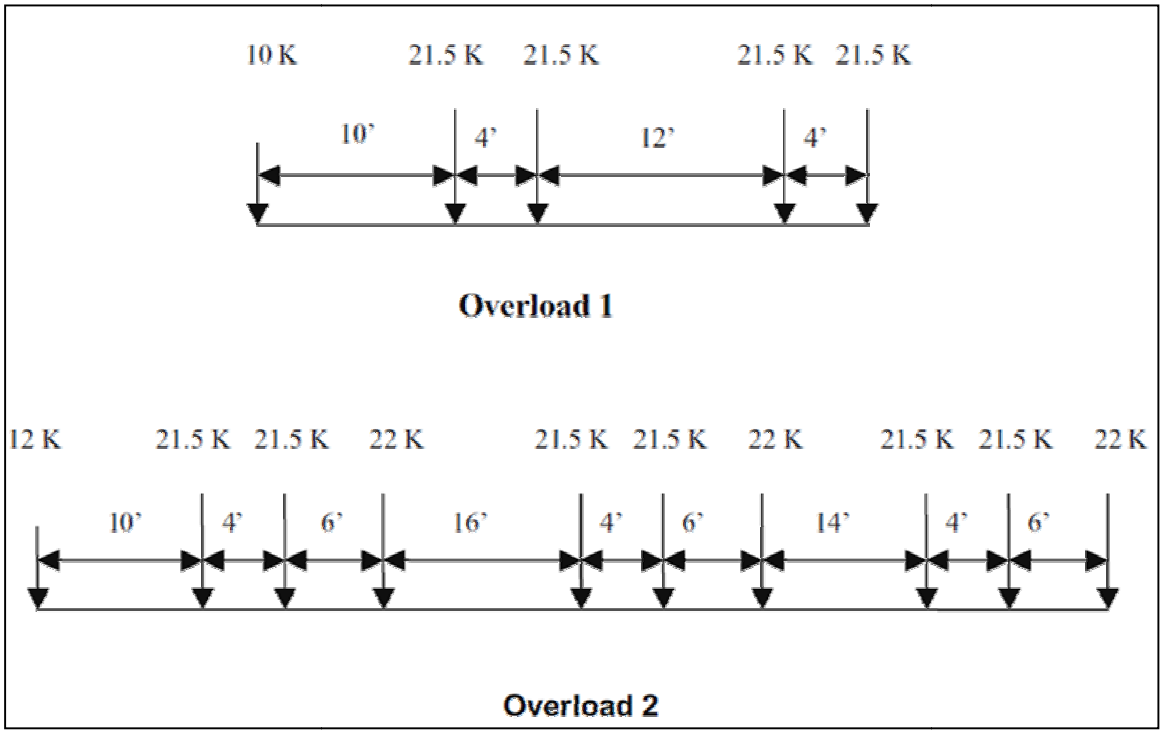

Figure 2-4: Overload Truck Loads

3. Load Rating Procedure

The load rating of the Hidden Lake Bridge was conducted according to the procedures described in Chapter 13 of the WSDOT BDM using the Load Factor Method (LFR).

LOAD RATING EQUATION

- Rating Equation:

$$RF = \frac{\phi C - \gamma_{DL} D \pm S}{\gamma_L LL(1+IM)} \qquad \text{Equation 1}$$

Where:

— RF = Rating factor

— C = Nominal member resistance

— D = Unfactored dead loads

— S = Unfactored prestress secondary moment or shear

— LL = Unfactored live loads

— ϕ = Resistance factor (capacity reduction factor)

— γDL = Dead load factor

— γL = Live load factor

— IM = Impact factor

Equation 1 was used to calculate shear and moment RFs.

LFR METHOD FACTORS

Resistance Factors

- Reinforced Concrete

  The most current inspection report indicates deterioration of the concrete slab and lists a large quantity of the slab in BMS condition state 3. Thus, a 0.10 reduction was applied to the resistance factors resulting in: [WSDOT BDM, section 13.1.2]

  ϕ = 0.80, for flexure

  ϕ = 0.75, for shear

Load Factors

- γ_{DL} = 1.30
- γ_{LL} = 2.17 for inventory rating
- γ_{LL} = 1.30 for operating rating

Impact Factor

- For design and legal loads (inventory and operating):

$$IM = \frac{50}{L+125} = 0.32 \leq 0.30 \qquad \text{Equation 2}$$

- For permit loads: *IM* = 0.20 (no NBI 681 or BMS flag 322 values are included in the 2012 inspection report. However KPFF engineers did observe vehicles experiencing a bump at the drop-in span expansion joints and therefore IM is increased to 0.20)

Live Load Reduction Factors

- One Lane = 1.0
- Two lanes = 1.0
- Three lanes = 0.90
- Four or more lanes = 0.75

BRIDGE RATING ANALYSIS ASSUMPTIONS

The following assumptions were used to conduct the analysis:

- For the spine model of the typical spans, only the south lane was modeled to determine the moment and shear demands.
- Also in the spine model, the tapered slab section was modeled as the average thickness.
- In the finite element models for the end spans, compression-only soil springs were used with a typical modulus of subgrade reaction of 20 pci (10 pci within 3-feet of soil edge).
- In the models, the columns were assumed to be pinned at 6*D below the ground surface.
- The extent of soil support modeled is based on current soil limits documented during KPFF's site visit.
- KPFF's site visit also revealed little to no overlay on bridge. Dead load demands for load rating do not include weight of future overlay replacement.
- Wheel contact area assumed to be 10-inch by 20-inch for punching shear check.
- It was assumed that the beam on the south side of the bridge did not contribute to the strength of the bridge since there are joints at each span.

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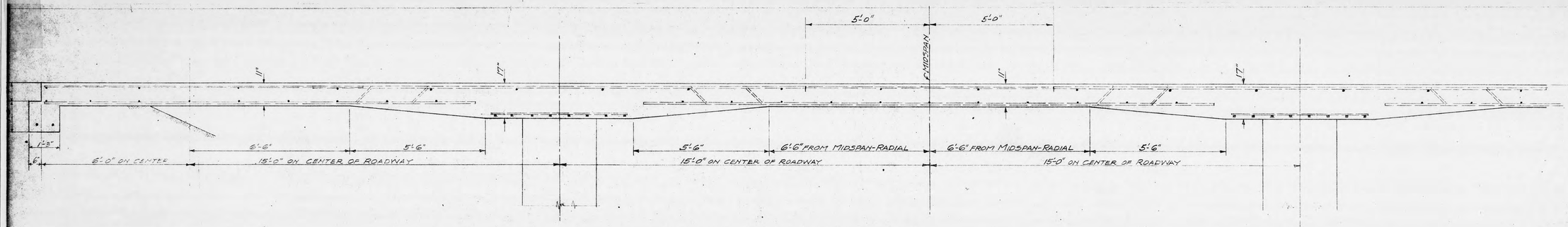
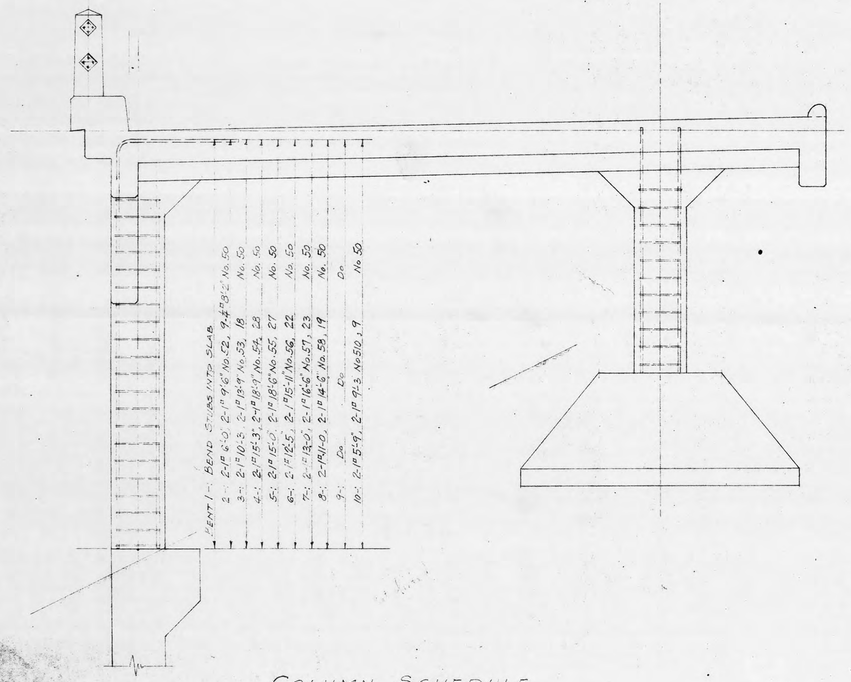
Appendix A

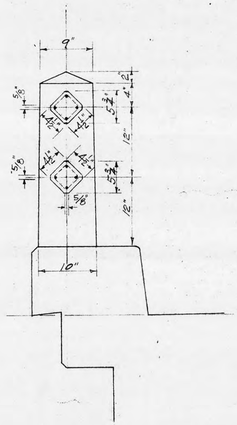
1931 Original Construction Drawings

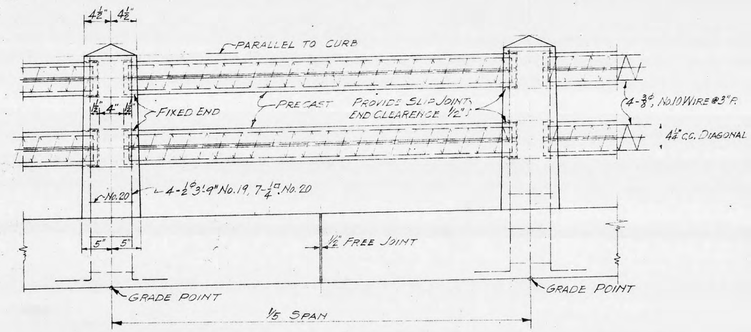


TYPICAL SLAB DETAILS - 1½"=1'0"

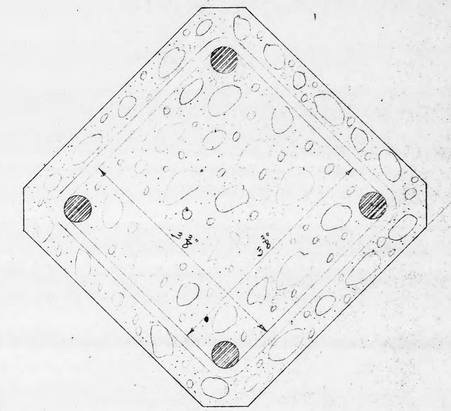


COLUMN SCHEDULE

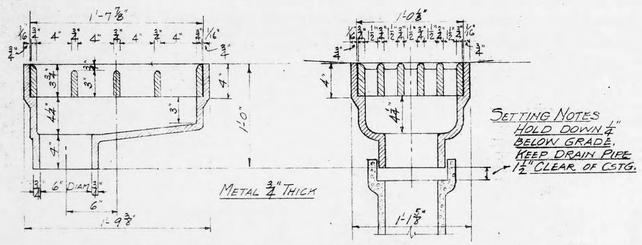




FENCE DETAILS - 1" = 1'-0"



RAIL SECTION - F.S.



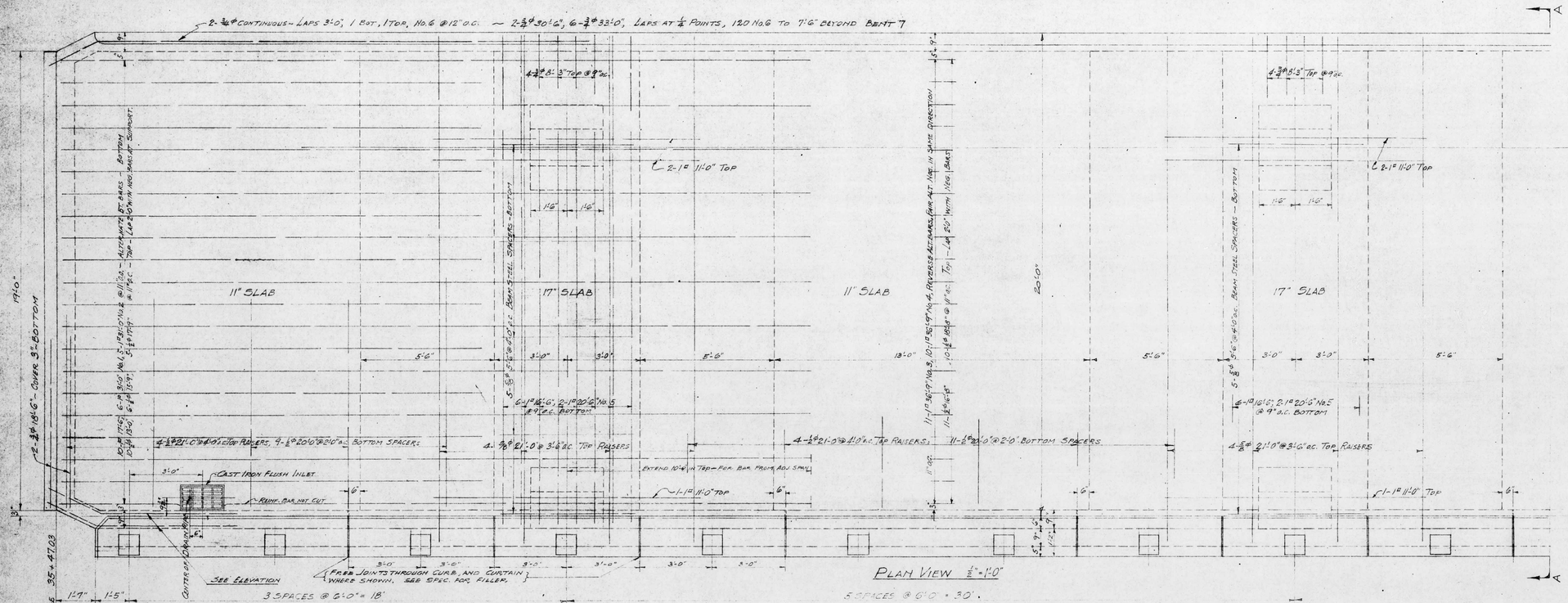
CAST IRON INLET & GRATING - 1½"=1'-0"

2 REQUIRED COMPLETE SERVED WITH 6" DRAIN PIPE TRENCHED TO FOOT OF SLOPE AND CONCRETED 1 C.F. PER LIN.F.

REFERENCES AND SURVEYS
SPECIFICATIONS
ALIGNMENT
TOPOG.
GRADES

VIADUCT
HIDDEN LAKE GAME FARM
CONSTRUCTION DETAILS
5 SHEETS F. SHEET 1

REITZE STOREY & DUFFY INC. ENGINEERS
SEATTLE WASH.
SCALE: AS SHOWN MARCH 1931
DR. BY FDS
CH. BY FDS
3731
101-5

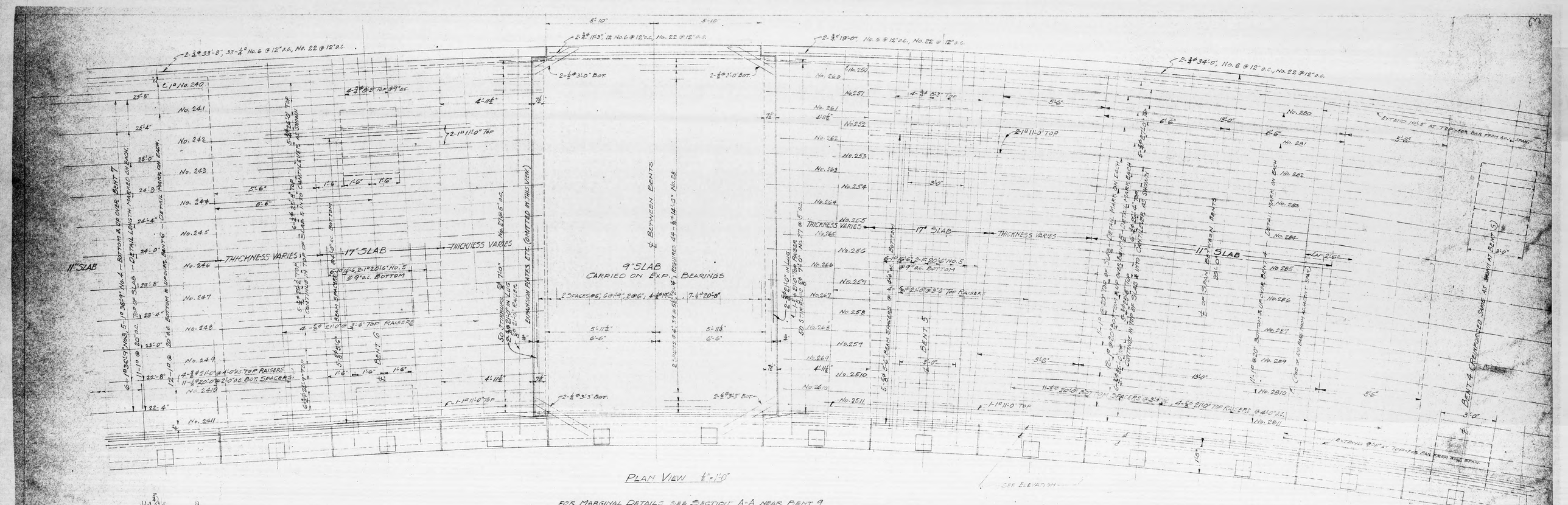


REPEAT SPANS AT 30'-0 TO AND INCLUDING BENT 7 — SEE COL. DETAILS, GRADE SHEET.

REFERENCES AND SURVEYS:
SPECIFICATIONS
ALIGNMENT
TOPOG.
GRADES

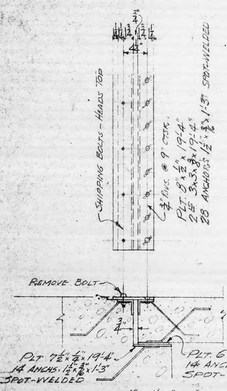
VIADUCT
HIDDEN LAKE GAME FARM
CONSTRUCTION DETAILS
5 SHEETS — SHEET 2
REITZE STOREY & DUFFY INC. ENGINEERS SEATTLE WASH.
SCALE: ½"=1'-0" — MARCH 1931
DR. BY F.D.S. — CK. BY F.D.S. — 3731

101-5 (7996) 101-5



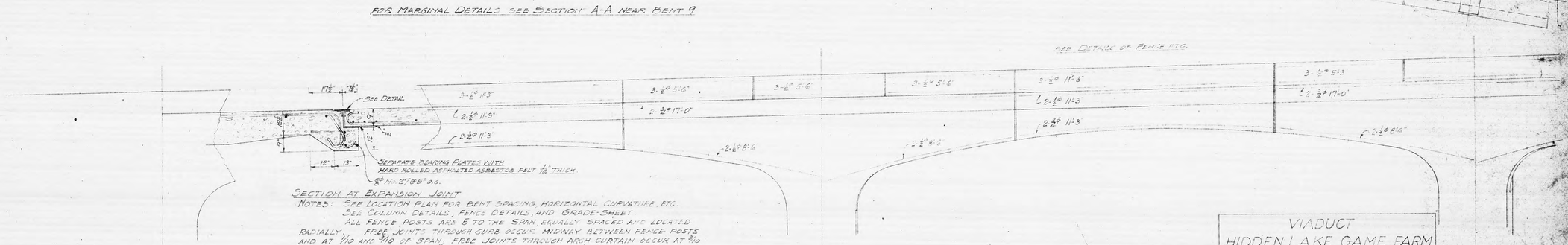
PLAN VIEW ¼"=1'-0"

FOR MARGINAL DETAILS SEE SECTION A-A NEAR BENT 9



1"=1'-0"

EXPANSION JOINT AND BEARING PLATES
2 SETS REQUIRED
PAINT 2 COATS OF VALDURA ON SURFACES TO WEATHER, EXCEPT ROWN



SECTION AT EXPANSION JOINT

NOTES: SEE LOCATION PLAN FOR BENT SPACING, HORIZONTAL CURVATURE, ETC.
SEE COLUMN DETAILS, FENCE DETAILS, AND GRADE SHEET.
ALL FENCE POSTS ARE 5' TO THE SPAN, EQUALLY SPACED AND LOCATED RADIALLY.
FREE JOINTS THROUGH CURB OCCUR MIDWAY BETWEEN FENCE POSTS AND AT 1/10 AND 9/10 OF SPAN. FREE JOINTS THROUGH ARCH CURTAIN OCCUR AT 1/3 OF SPAN WITH MARKER JOINT AT EDGE OF SLAB. ALL JOINTS ABOVE TO BE VERTICAL AND HAVE FILLER MATERIAL AS SPECIFIED.
FACIA DEPTHS ARE TO BE AS SHOWN ON STRAIGHTAWAY ELEVATION BETWEEN BENTS 9 AND 10; ALSO ALL STIRRUPS, TIE BARS, ANCHORS AND POST REINFORCING OCCUR AS SHOWN ON STRAIGHTAWAY AND CORRESPONDINGLY SPACED.

REFERENCES AND SURVEYS
SPECIFICATIONS
ALIGNMENT
TOPOG.
GRADES

VIADUCT
HIDDEN LAKE GAME FARM
CONSTRUCTION DETAILS

5 SHEETS SHEET 3

REITZE STORLY & DUFFY INC. ENGINEERS
SEATTLE WASH.

SCALE: ½"=1'-0" MARCH 1931

DR. BY FDS
CK. BY FDS

101-5

(7998) 101-5

PLAN VIEW 1/2"=1'-0"

FOR MARGINAL DETAILS SEE SECTION A-A NEAR BENT 9

NOTES: SEE LOCATION PLAN FOR BENT SPACING, HORIZONTAL CURVATURE, ETC.
SEE COLUMN DETAILS, FENCE DETAILS, AND GRADE SHEET.
ALL FENCE POSTS ARE 5 TO THE SPAN, EQUALLY SPACED AND LOCATED RADIALLY.
FREE JOINTS THROUGH CURB OCCUR MIDWAY BETWEEN FENCE POSTS AND AT 1/10 AND 9/10 OF SPAN; FREE JOINTS THROUGH ARCH CURTAIN OCCUR AT 3/10 OF SPAN WITH MARKER JOINT AT EDGE OF SLAB: ALL JOINTS ABOVE TO BE VERTICAL AND HAVE FILLER MATERIAL AS SPECIFIED.
FACIA DEPTHS ARE TO BE AS SHOWN ON STRAIGHTAWAY ELEVATION BETWEEN BENTS 9 AND 10; ALSO ALL STIRRUPS, TIE BARS, ANCHORS AND POST REINFORCING OCCUR AS SHOWN ON STRAIGHTAWAY AND CORRESPONDINGLY SPACED.

REFERENCES AND SURVEYS:
SPECIFICATIONS
ALIGNMENT
TOPOG.
GRADES

VIADUCT
HIDDEN LAKE GAME FARM
CONSTRUCTION DETAILS
5 SHEETS — SHEET 4
REITZE STOREY & DUFFY INC. ENGINEERS
SEATTLE WASH.
SCALE: 1/2"=1'-0" — MARCH 1931
DR. BY FDS
CK BY FDS
No. 3731

101-5
(7994) 101-5

PLAN VIEW 1/2" = 1'-0"

FOR MARGINAL DETAILS SEE SECTION A-A NEAR BENT 9

SEE DETAILS OF FENCE ETC.

NOTES: SEE LOCATION PLAN FOR BENT SPACING, HORIZONTAL CURVATURE, ETC.
SEE COLUMN DETAILS, FENCE DETAILS, AND GRADE SHEET.
ALL FENCE POSTS ARE 5' TO THE SPAN, EQUALLY SPACED AND LOCATED RADIALLY.
FREE JOINTS THROUGH CURB OCCUR MIDWAY BETWEEN FENCE POSTS AND AT 1/10 AND 3/10 OF SPAN; FREE JOINTS THROUGH APRON CURTAIN OCCUR AT 5/10 OF SPAN WITH MARKED JOINT AT EDGE OF SLAB: ALL JOINTS ABOVE TO BE VERTICAL AND HAVE FILLER MATERIAL AS SPECIFIED.
FACIA DETAILS AND DEPTHS ARE SHOWN ON ELEVATION BETWEEN BENTS 9 AND 10, AND ON SECTION A-A NEAR BENT 9: ALSO ALL SLAB EDGE ANCHORS, CURB TIES, AND POST REINFORCING OCCUR AS SHOWN ON STRAIGHTAWAY AND CORRESPONDINGLY SPACED.

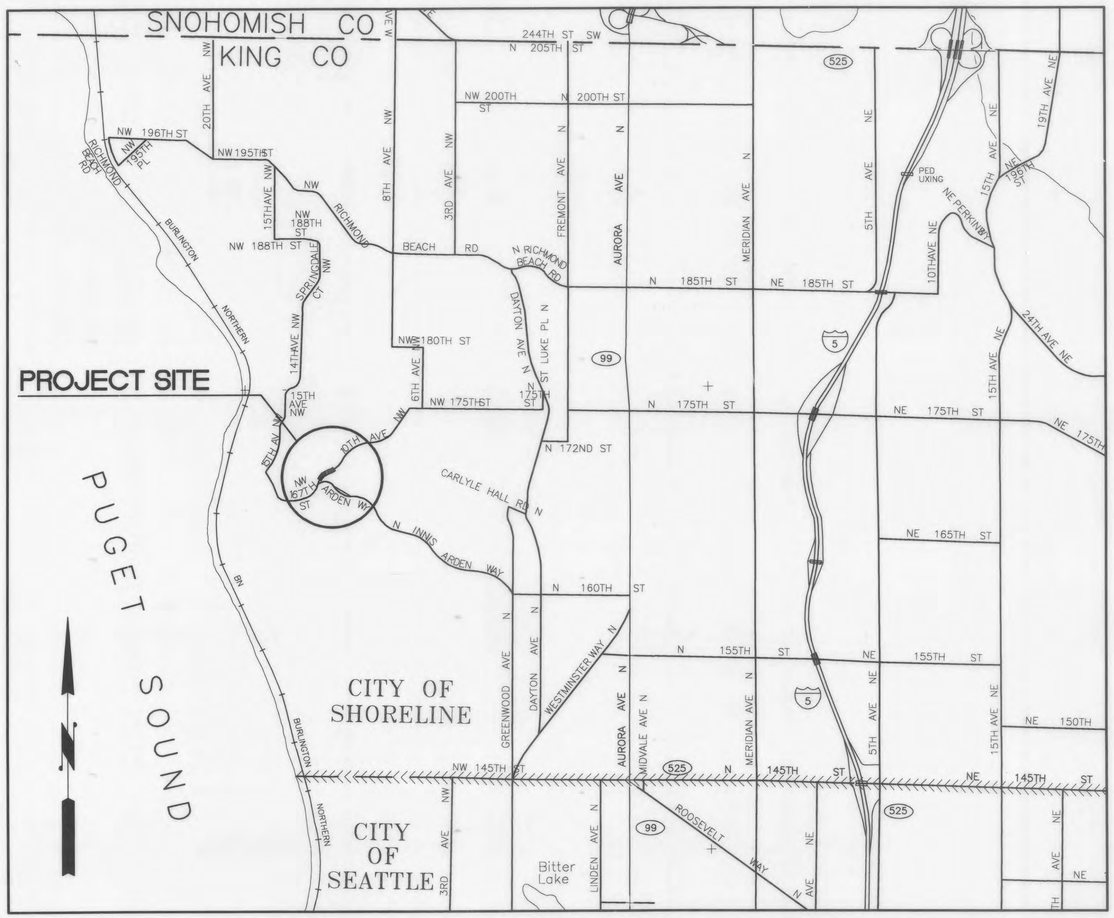
REFERENCES AND SURVEYS
SPECIFICATIONS
ALIGNMENT
TOPOG.
GRADES

VIADUCT
HIDDEN LAKE GAME FARM
CONSTRUCTION DETAILS
5 SHEETS — SHEET 5
REITZE STOREY & DUFFY INC. ENGINEERS
SEATTLE WASH
SCALE: 1/2" = 1'-0" — MARCH 1931
DR. BY F.D.S.
CH. BY F.D.S.
3731

7992 101-5

Appendix B

1995 Seismic Retrofit Drawings



LOCATION MAP

DRAWING INDEX

SHEET #	DESCRIPTION
1	COVER, LOCATION MAP AND DRAWING INDEX
2	GENERAL NOTES AND SUMMARY OF QUANTITIES
3	BRIDGE PLAN AND ELEVATION
4	PERMANENT GROUND ANCHOR DETAILS
5	LONGITUDINAL RESTRAINER DETAILS
6	ROAD CLOSURE/DETOUR PLAN

HIDDEN LAKE BRIDGE NO 167C

(LEVEL 2 SEISMIC RETROFIT)

DRAWINGS OF RECORD

PLANS OF RECORD
ANGELA K. NOLTE 4/30/99
Angela K. Nolte

FIELD BOOK: 23/1433A					
SURVEYED: M. HALL	8-94				
SURVEY BASE MAP: W.O.M.	9-94				
DESIGN ENTERED: M. SPARLING	12-95				
DESIGNED J. McPHERSON	12-95				
CHECKED: J. SZYMECZEK	12-95				
	DATE	REVISION	BY	DATE	

PB PARSONS BRINCKERHOFF

ARTHUR J. BORST — STATE OF WASHINGTON — 22130 — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 8/28/96

FED. AID No. N/A

PROJECT No. 100394

SURVEY No. 12-26-03-69

(City of Shoreline)
MAINTENANCE DIVISION No. 1

JESSE KRAL — STATE OF WASHINGTON — 21340 — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 3/07/98

KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR

HIDDEN LAKE BRIDGE NO. 167C
SEISMIC RETROFIT

COVER, LOCATION MAP AND DRAWING INDEX

SHEET 1 OF 6 SHEETS

310-73 (1)

SCANNED
JUN 22 1999 MICRO. APR 8 1997 MICRO

FILE NAME: I:\HIDLAKE\DWGS\COVER.DWG PLOT DATE: 7-3-96

SUMMARY OF QUANTITIES

PROJECT LIMITS: ON 10th. AVE. NW

LENGTH: 312 FT. (0.06 MI.)

ITEM NO.	PRELIMINARY ~~TOTAL~~ QUANTITY	UNIT	STD. ITEM NO.	ITEM	~~PROJECT NUMBERS~~ ~~100394~~ UNIT PRICE	PRELIMINARY COST	FINAL QUANTITY	FINAL QUANTITY COST	UNDER(-) /OVER (+)	~~AS-BUILT~~ COST UNDER(-) /OVER(+)
				PREPARATION						
1	~~1~~ 7000	L.S.	0001	MOBILIZATION	1	7000.00	7000.00	7000.00	0.00	0.00
2	~~1~~ 1500	L.S.	0035	CLEARING AND GRUBBING	1	1500.00	1500.00	1500.00	0.00	0.00
3	36	S.Y.	0050	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	~~36~~ 20	720.00	36.00	720.00	0.00	0.00
				STRUCTURE						
4	~~1~~ 1900	L.S.	4006	STRUCTURE EXCAVATION CLASS A INCLUDING HAUL	1	1900.00	1900.00	1900.00	0.00	0.00
5	4500	LB.	4151	STEEL REINFORCING BAR	4500.~~70~~ 10	3150.00	4168.00	2917.60	-332.00	-232.40
6	51	C.Y.	4202	CONCRETE CLASS 4000	~~57~~ 90	4590.00	48.15	13963.50	- 2.85	-826.50
7	54	EA.		DRILL AND GROUT REINFORCING BARS IN CONCRETE	~~54~~ 200	10800.00	54.00	10800.00	0.00	0.00
8	18	EA.		PERMANENT GROUND ANCHORS	~~2260~~ 40680.00		18.00	40680.00	0.00	0.00
9	2	EA.		LONGITUDINAL RESTRAINER ASSEMBLY	~~2300~~ 4600.00		2.00	4600.00	0.00	0.00
10	120	S.F.		CONCRETE SPALL REPAIR	~~120~~ 20	2400.00	120.00	2400.00	0.00	0.00
				TRAFFIC						
11	~~1~~ 3500	L.S.	6893	DETOUR SIGNING	1	3500.00	3500.00	3500.00	0.00	0.00
12	4	EA.	6958	TYPE III BARRICADE	~~150~~	600.00	4.00	600.00	0.00	0.00
13	80	HR.	6980	LABOR FOR TRAFFIC CONTROL AT FIXED PRICE	~~80~~ 22	1760.00	12.00	264.00	- 68.00	-1496.00
				OTHER						
14	36	S.Y.	7062	ASPHALT CONCRETE SIDEWALK 2 INCHES THICK	~~36~~ 20	720.00	39.20	784.00	3.20	64.00
15	0.00	F.A.		REMOVE, LOWER, REPLACE ST	1	0.00	4536.88	4536.88	4536.88	4536.88
SUB	18801.00					94120.00		96165.98	4137.23	2045.98
CHANGE ORDER	5200.00									
~~GRAND~~ TOTAL	18801.00					94120.00		96165.98	4137.23	2045.98
SALES TAX	0.00									

NOTE: FOR SPECIAL FEATURES SEE SPECIAL PROVISIONS

GENERAL NOTES

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND DETAILS IN THE FIELD PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
2. THE CONTRACTOR SHALL NOTIFY AND COORDINATE WORK WITH ALL AFFECTED UTILITY COMPANIES
3. PRIOR TO THE INSTALLATION OF THE BRIDGE DOWEL BARS AND PERMANENT GROUND ANCHORS, THE CONTRACTOR SHALL LOCATE ALL UTILITIES AND NOTIFY THE ENGINEER IF ANY UTILITY INTERFERES WITH THE LOCATION OF CONCRETE, REINFORCING STEEL OR PERMANENT GROUND ANCHORS INDICATED ON THESE DRAWINGS.
4. DURING CONSTRUCTION, DAMAGE TO ANY EXISTING REINFORCING STEEL SHALL BE AVOIDED. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING EXISTING REINFORCING STEEL USING NON-DESTRUCTIVE METHODS PRIOR TO DRILLING. FINAL HOLE LOCATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO DRILLING.
5. ORIGINAL CONSTRUCTION REFERENCE PLAN 101-5 IS AVAILABLE AT THE KING COUNTY MAP COUNTER ON THE 9TH FLOOR OF THE KING COUNTY ADMINISTRATION BUILDING AT 500 FOURTH AVE. SEATTLE, WA. 98104
6. NEW RETROFIT MATERIALS UNLESS OTHERWISE NOTED:
   CONCRETE F'c = 4000 PSI
   REINFORCING STEEL - GRADE 60
   STRUCTURAL STEEL - AASHTO M 183
   PERMANENT GROUND ANCHOR - ASTM 722, Fu=150KSI
   RESTRAINER RODS - ASTM A722, Fu=150KSI
   ADHESIVE ANCHORS - HILTI HVA ADHESIVE ANCHOR SYSTEM WITH 1" DIA. HAS-SUPER ALL-THREAD ANCHOR ROD WITH 12 3/8" MIN. EMBEDMENT.
7. THERE IS NO VEHICULAR ACCESS TO THE UNDER SIDE OF THE BRIDGE AND NO VEHICLES ARE ALLOWED ON THE SLOPES AND EMBANKMENTS.
8. EACH PERMANENT GROUND ANCHOR SHALL BE INSTALLED AND STRESSED TO THE ANCHOR DESIGN LOAD OF 50 KIPS PRIOR TO CONNECTION OF ANCHOR BLOCK BARS TO BRIDGE DOWEL BARS.

DESIGN PARAMETERS

THE FOLLOWING ARE INTENDED FOR FUTURE DESIGN AND MAINTENANCE REFERENCE.

1. NEW CONSTRUCTION HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO SPECIFICATIONS FOR HIGHWAY BRIDGES, FIFTEENTH EDITION, WITH INTERIM SPECIFICATIONS.
2. SEISMIC RETROFIT DESIGN CRITERIA:
   IMPORTANCE CLASSIFICATION = I
   ACCELERATION COEFFICIENT = 0.3g
   SEISMIC PERFORMANCE CATEGORY = D
   SOIL TYPE PROFILE = II
3. POST-RETROFIT CAPACITY/DEMAND RATIO.
   THE PERMANENT GROUND ANCHORS ARE DESIGNED TO REDUCE SHEAR AND MOMENT TO THE COLUMNS, TO REINFORCE THE SLOPE AND TO INCREASE THE OVERALL STABILITY OF THE SLOPE.

POST RETROFIT C/D	COMPONENT
1.0	DROP-IN SEAT RESTRAINT
1.5	COLUMN MOMENT
1.5	COLUMN SHEAR

PLANS OF RECORD
ANGELA K. NOLTE
Angela K. Nolte
4/30/99

FIELD BOOK:	23/1433A			
SURVEYED:	M. HALL	8-94		
SURVEY BASE MAP:	W.O.M.	9-94		
DESIGN ENTERED:	MGS/BRW	12-95		
DESIGNED	J. McPHERSON	12-95		
CHECKED:	J. SZYMECZEK	12-95		
	DATE	REVISION	BY	DATE

PB PARSONS BRINCKERHOFF

ARTHUR J. ROSE — STATE OF WASHINGTON — 20130 — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 8/28/98

FED. AID No. N/A

PROJECT No. 100394

SURVEY No. 12-26-03-69

(City of Shoreline)
MAINTENANCE DIVISION No. 1

JESSE KEAT — STATE OF WASHINGTON — 11341 — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 3/07/98 — 7/19/96

KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR

HIDDEN LAKE BRIDGE NO. 167C
SEISMIC RETROFIT

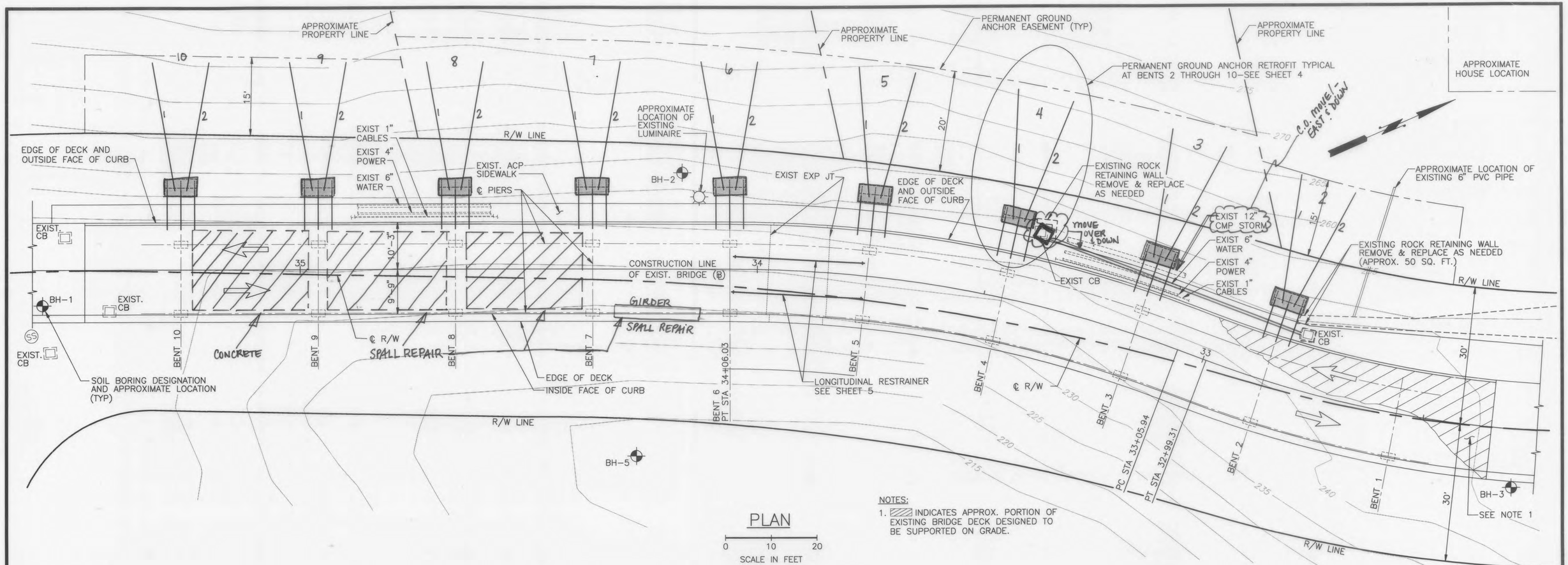
GENERAL NOTES AND SUMMARY OF QUANTITIES

SHEET 2 OF 6 SHEETS

310-73 (2)

FILE NAME: L:\HIDLAKE\DWGS\QUANT.DWG PLOT DATE: 6-10-96

SCANNED JUN 22 1999 MICRO. APR 8 1997 MICRO.



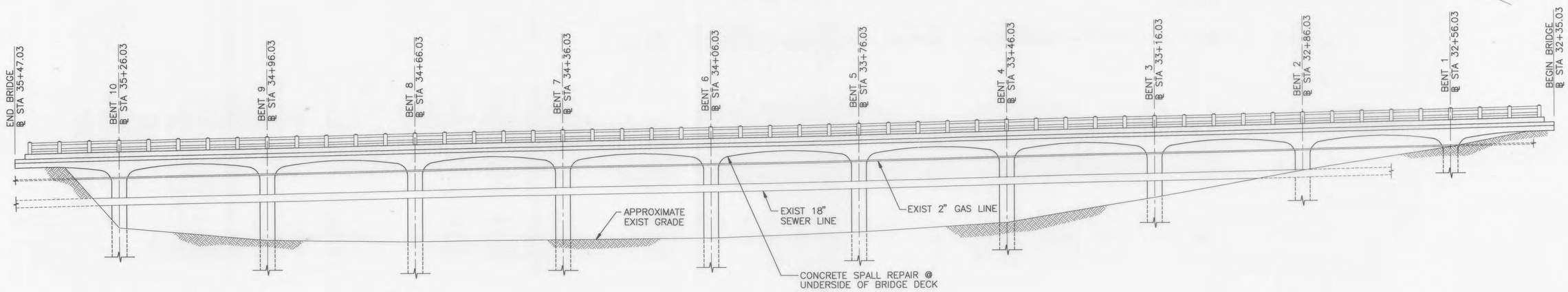
PLAN

0 10 20

SCALE IN FEET

NOTES:

1. ▨ INDICATES APPROX. PORTION OF EXISTING BRIDGE DECK DESIGNED TO BE SUPPORTED ON GRADE.



DATUM ELEVATION 200.0
KCAS '88

ELEVATION

0 10 20

SCALE IN FEET

PLANS OF RECORD
ANGELA K. NOLTE
Angela K. Nolte
4/30/99

CALL 48 HOURS BEFORE YOU DIG
1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE)

FIELD BOOK:	23/1433A				
SURVEYED:	M. HALL	8-94			
SURVEY BASE MAP:	W.O.M.	9-94			
DESIGN ENTERED:	MGS/BRW	12-95			
DESIGNED	Y. YANG	12-95			
CHECKED:	J. McPHERSON	12-95			
	DATE		REVISION	BY	DATE

PB PARSONS BRINCKERHOFF

ARTHUR J. BORST — STATE OF WASHINGTON — 22130 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 8/28/96

FED. AID No. N/A

PROJECT No. 100394

SURVEY No. 12-26-03-69

(City of Shoreline)
MAINTENANCE DIVISION No. 1

JESSE KRAL — STATE OF WASHINGTON — 21340 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 3/07/98

KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR

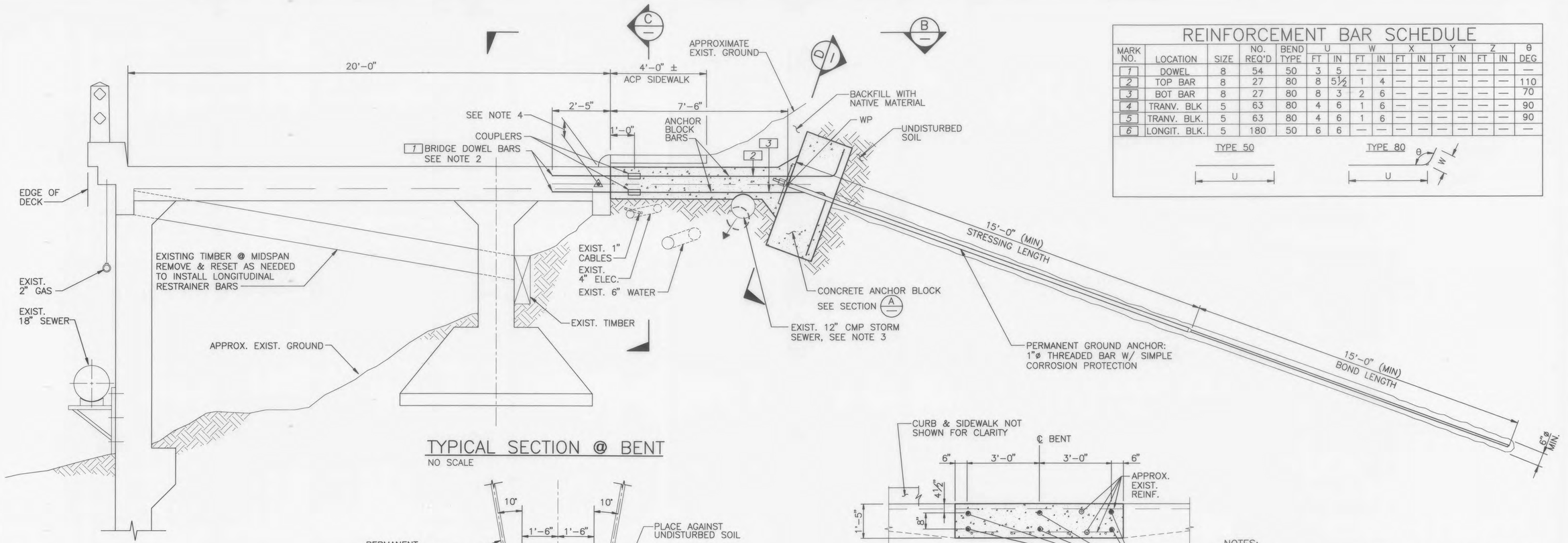
HIDDEN LAKE BRIDGE NO. 167C

SEISMIC RETROFIT

BRIDGE PLAN AND ELEVATION

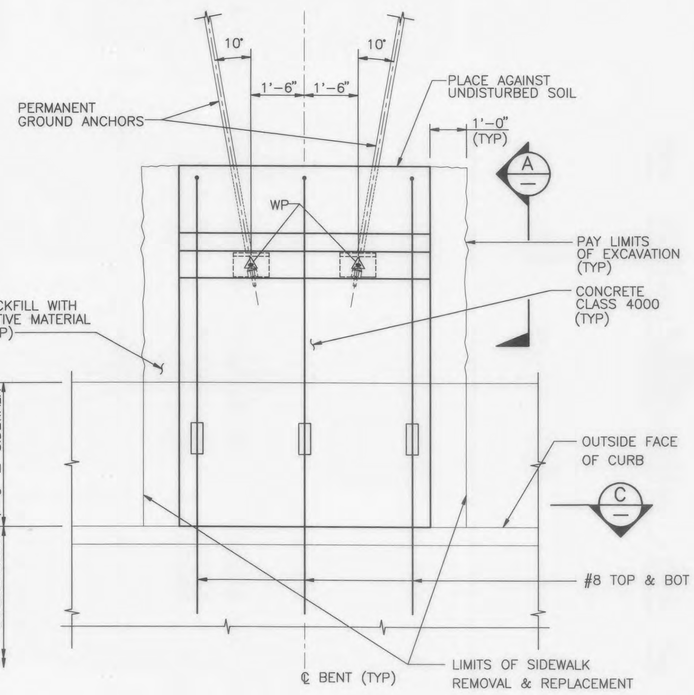
SHEET 3 OF 6 SHEETS

310-73 (3)



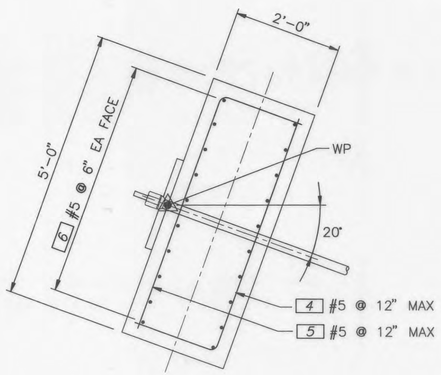
TYPICAL SECTION @ BENT

NO SCALE



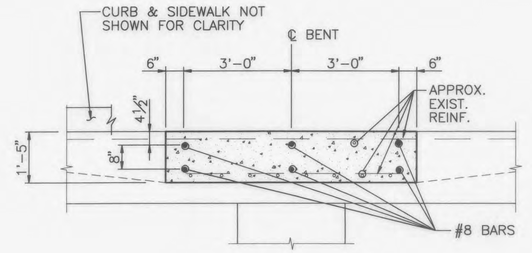
SECTION A

NO SCALE



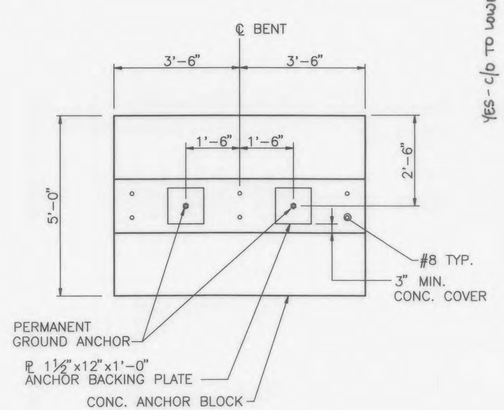
SECTION B

NO SCALE



SECTION C

NO SCALE



SECTION D

NO SCALE

YES - c/o TO LOWER.

REINFORCEMENT BAR SCHEDULE

MARK NO.	LOCATION	SIZE	NO. REQ'D	BEND TYPE	U FT	U IN	W FT	W IN	X FT	X IN	Y FT	Y IN	Z FT	Z IN	θ DEG
1	DOWEL	8	54	50	3	5	—	—	—	—	—	—	—	—	—
2	TOP BAR	8	27	80	8	5½	1	4	—	—	—	—	—	—	110
3	BOT BAR	8	27	80	8	3	2	6	—	—	—	—	—	—	70
4	TRANV. BLK	5	63	80	4	6	1	6	—	—	—	—	—	—	90
5	TRANV. BLK.	5	63	80	4	6	1	6	—	—	—	—	—	—	90
6	LONGIT. BLK.	5	180	50	6	6	—	—	—	—	—	—	—	—	—

TYPE 50

TYPE 80

NOTES:

1. FOR EXISTING UTILITY AND GROUND ANCHOR NOTES, SEE GENERAL NOTES ON SHEET 2.
2. PLACE DOWELS IN 1½"ø DRILLED HOLES WITH EPOXY RESIN USING THE FOLLOWING PROCEDURE:
   A) DRILL HOLE AND BLOW CLEAN USING OIL FREE COMPRESSED AIR.
   B) PLACE EPOXY RESIN BY PRESSURE INJECTION BEFORE INSERTING DOWELS.
   C) POSITION DOWEL IN CENTER OF HOLE WITH TEMPLATE UNTIL EPOXY IS SET.
3. PRIOR TO INSTALLATION OF PERMANENT GROUND ANCHOR AND BRIDGE DOWEL BARS @ BENTS 2 & 3, CONTRACTOR SHALL LOCATE TOP OF EXISTING 12"ø CMP STORM SEWER AND SHALL NOTIFY THE ENGINEER IF THE CLEARANCE BETWEEN THE TOP OF THE CMP AND THE BOTTOM ANCHOR BLOCK BAR 3 IS LESS THAN 2 INCHES.
4. WORK POINT (WP) OF THE PERMANENT GROUND ANCHOR SHALL BE LOCATED 8" BELOW THE TOP OF THE ROADWAY AT THE ℄ OF THE BENT AT THE INSIDE FACE OF CURB.
5. ANY DISTURBED SOIL AROUND CONCRETE ANCHOR BLOCK SHALL BE FILLED WITH CONTROLLED DENSITY BACKFILL.

PLANS OF RECORD
ANGELA K. NOLTE
Angela K. Nolte
4/30/99

CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555
(UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE)

FIELD BOOK:	23/1433A		
SURVEYED:	M. HALL	8-94	
SURVEY BASE MAP:	W.O.M.	9-94	
DESIGN ENTERED:	MGS/BRW	12-95	
DESIGNED	Y. YANG	10-95	
CHECKED:	J. McPHERSON	12-95	
		DATE	

REVISION	BY	DATE

PB PARSONS BRINCKERHOFF

ARTHUR J. BOERS — STATE OF WASHINGTON — 22130 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 8/28/97

FED. AID No. N/A

PROJECT No. 100394

SURVEY No. 12-26-03-69

(City of Shoreline)
MAINTENANCE DIVISION No. 1

JESSE KRAL — STATE OF WASHINGTON — 21340 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 3/07/98

KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR

HIDDEN LAKE BRIDGE NO. 167C

SEISMIC RETROFIT

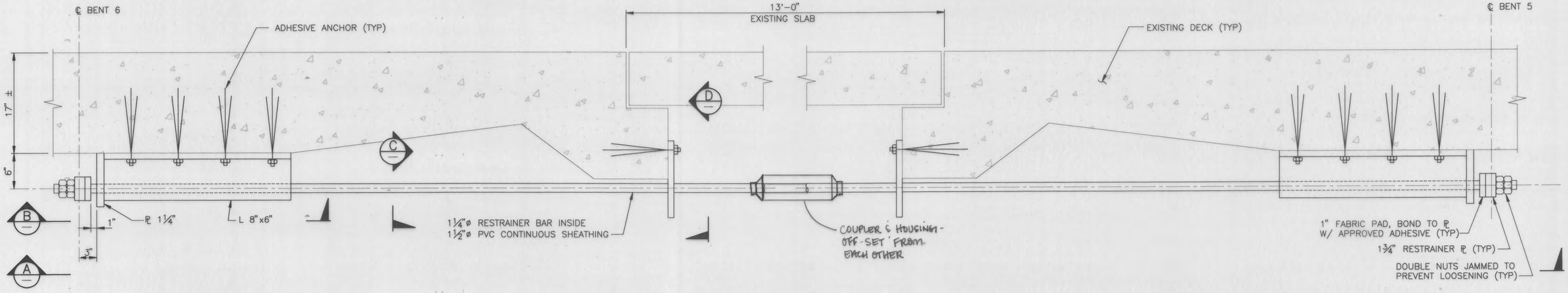
PERMANENT GROUND ANCHOR DETAILS

SHEET 4 OF 6 SHEETS

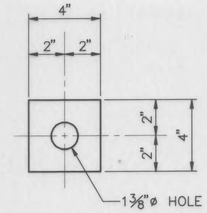
310-73 (4)

SCANNED

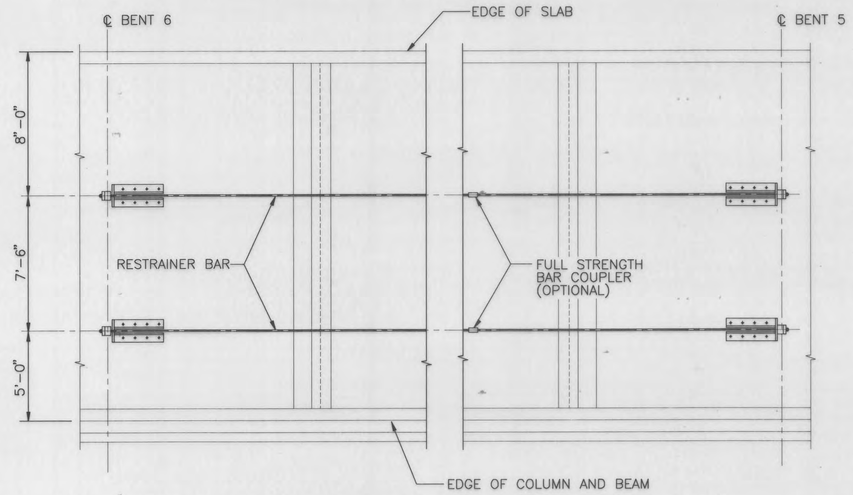
FILE NAME: L:\HIDLAKE\DWGS\SECTDET.DWG PLOT DATE: 7-8-96



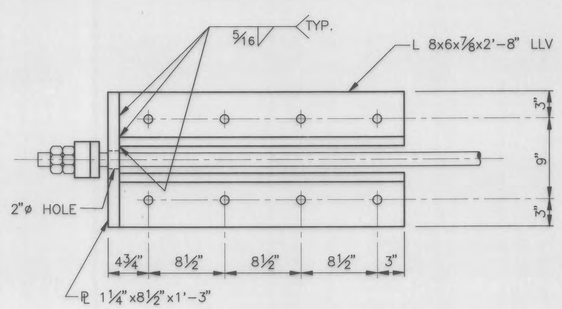
EARTHQUAKE RESTRAINER
SCALE: 1 1/2" = 1'-0"



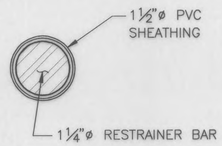
RESTRAINER PLATE AND FABRIC PAD
SCALE: 3" = 1'-0"



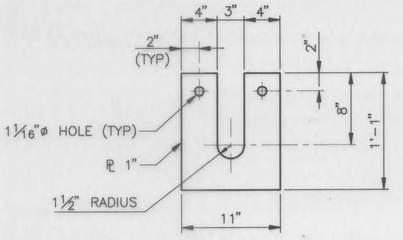
SECTION A
SCALE: ¼" = 1'-0"



SECTION B
SCALE: 1½" = 1'-0"



SECTION C
SCALE: 6" = 1'-0"



SECTION D
SCALE: 1½" = 1'-0"

PLANS OF RECORD
ANGELA K. NOLTE
Angela K. Nolte
4/30/99

RESTRAINER NOTES:

1) FIELD VERIFY EXISTING DIMENSIONS PRIOR TO FABRICATION OF NEW COMPONENTS.
2) ALL STEEL SHALL BE GALVANIZED.
3) ALL BEARING SURFACES TO BE SET IN ¼" ± EPOXY GROUT TO PROVIDE FULL BEARING.

FIELD BOOK:	23/1433A	
SURVEYED:	M. HALL	8-94
SURVEY BASE MAP:	W.O.M.	9-94
DESIGN ENTERED:	JAC	12-95
DESIGNED	YJH	3/96
CHECKED:	DWS	3/96
		DATE

REVISION	BY	DATE

CIVILTECH CORPORATION

STATE OF WASHINGTON — JULIE RUAN — 28546 — REGISTERED PROFESSIONAL ENGINEER — 6/10/96 — EXPIRES 3/27/97

FED. AID No. N/A

PROJECT No. 100394
SURVEY No. 12-26-03-69
(City of Shoreline)
MAINTENANCE DIVISION No. 1

STATE OF WASHINGTON — JESSE KRAIL — 21340 — REGISTERED PROFESSIONAL ENGINEER — 4/10/96 — EXPIRES 3/07/98

KING COUNTY PUBLIC WORKS
PAUL TANAKA, DIRECTOR

HIDDEN LAKE BRIDGE NO. 167
SEISMIC RETROFIT

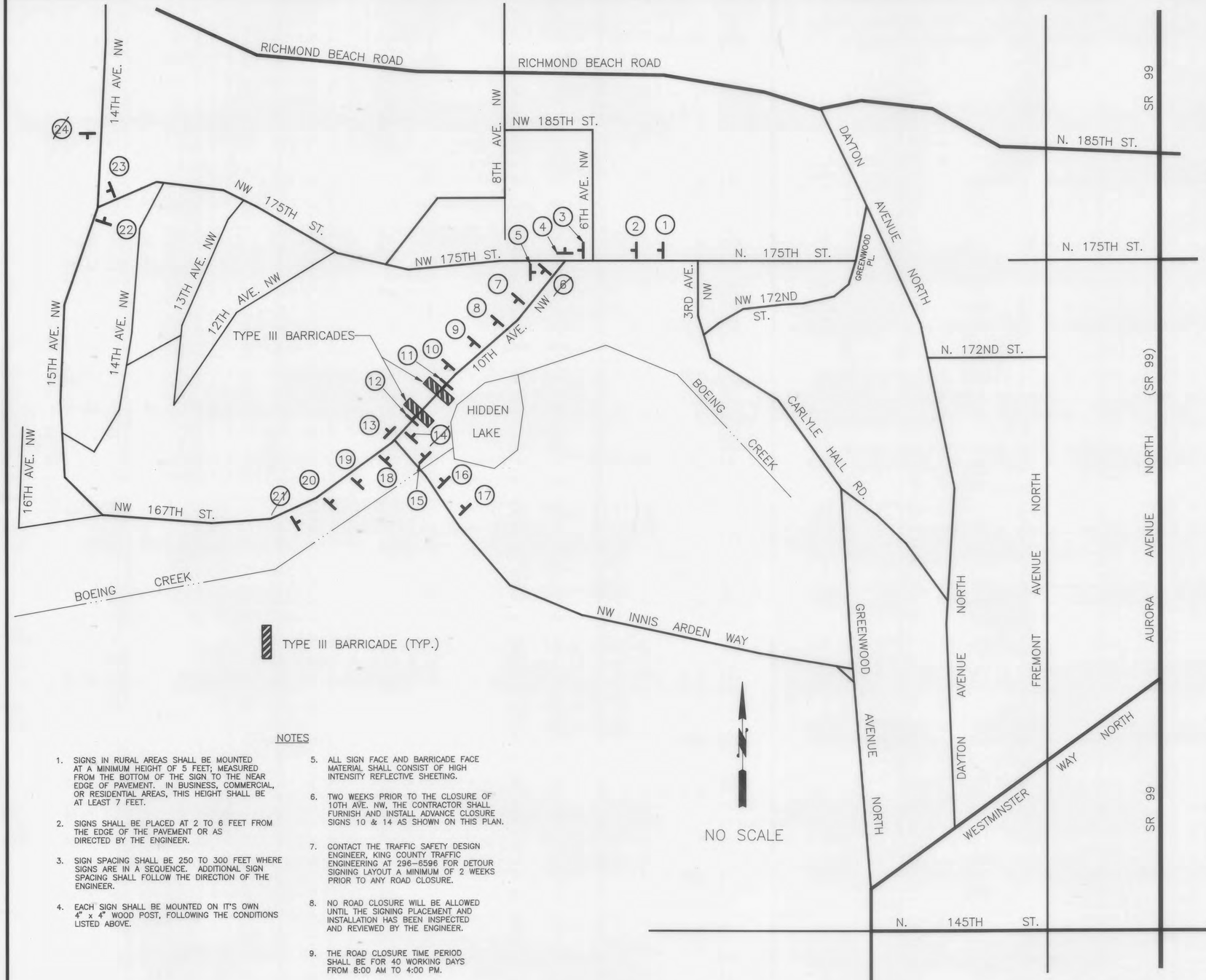
LONGITUDINAL RESTRAINER DETAILS

SHEET 5 OF 6 SHEETS

310-73 (5)

FILE NAME: L:\HIDLAKE\DWGS\SCT-C.DWG PLOT DATE: 6-6-96

SCANNED JUN 22 1999 MICRO. APR 6 1997 MICRO.

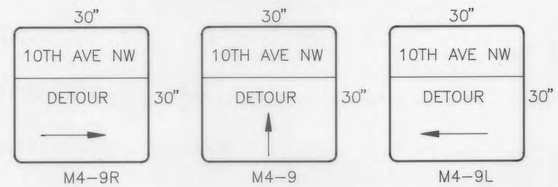


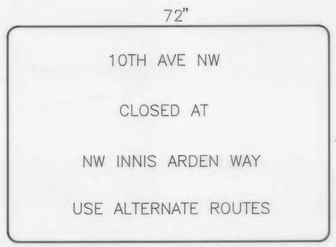
SIGN SCHEDULE

	COLOR	SIGN CODE	SIZE	MESSAGE
1	Black on White	SPECIAL	72"x48"	See Detail Below
2	Black on Orange	W20-2	48"	Detour Ahead
3	Black on Orange	M4-9	30"	Detour Straight Ahead
4	Black on Orange	M4-9L	30"	Detour Left
5	Black on Orange	M4-9R	30"	Detour Right
6	Black on White	R11-3	60"x30"	Road Closed 0.5 Miles Ahead Local Traffic Only
7	Black on Orange	W20-1	48"	Road Construction Ahead
8	Black on Orange	W20-3	48"	Road Closed Ahead
9	Black on Orange	W20-3	48"	Road Closed Ahead
10	Black on White	SPECIAL	60"x48"	See Detail Below
11	Black on White	R11-2	48"x30"	Road Closed
12	Black on White	R11-2	48"x30"	Road Closed
13	Black on Orange	M4-9L	30"	Detour Left
14	Black on White	SPECIAL	60"x48"	See Detail Below
15	Black on Orange	W20-2	48"	Detour Ahead
16	Black on Orange	W20-1	48"	Road Construction Ahead
17	Black on White	SPECIAL	72"x48"	See Detail Below
18	Black on Orange	W20-3	48"	Road Closed Ahead
19	Black on Orange	W20-3	48"	Road Closed Ahead
20	Black on Orange	W20-1	48"	Road Construction Ahead
21	Black on White	SPECIAL	72"x48"	See Detail Below
22	Black on Orange	M4-9R	30"	Detour Right
23	Black on Orange	M4-9L	60"x30"	Detour Left
24	Black on White	SPECIAL	72"x48"	See Detail Below

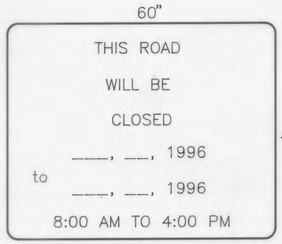
*MOUNT ON TYPE 3 BARRICADES

SPECIAL SIGN DETAILS





SIGN ~~1~~, ~~17~~, ~~21~~, ~~24~~



ADVANCE CLOSURE SIGN
SIGN ~~10~~ AND ~~14~~

NOTES

1. SIGNS IN RURAL AREAS SHALL BE MOUNTED AT A MINIMUM HEIGHT OF 5 FEET; MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF PAVEMENT. IN BUSINESS, COMMERCIAL, OR RESIDENTIAL AREAS, THIS HEIGHT SHALL BE AT LEAST 7 FEET.
2. SIGNS SHALL BE PLACED AT 2 TO 6 FEET FROM THE EDGE OF THE PAVEMENT OR AS DIRECTED BY THE ENGINEER.
3. SIGN SPACING SHALL BE 250 TO 300 FEET WHERE SIGNS ARE IN A SEQUENCE. ADDITIONAL SIGN SPACING SHALL FOLLOW THE DIRECTION OF THE ENGINEER.
4. EACH SIGN SHALL BE MOUNTED ON IT'S OWN 4" x 4" WOOD POST, FOLLOWING THE CONDITIONS LISTED ABOVE.
5. ALL SIGN FACE AND BARRICADE FACE MATERIAL SHALL CONSIST OF HIGH INTENSITY REFLECTIVE SHEETING.
6. TWO WEEKS PRIOR TO THE CLOSURE OF 10TH AVE. NW, THE CONTRACTOR SHALL FURNISH AND INSTALL ADVANCE CLOSURE SIGNS 10 & 14 AS SHOWN ON THIS PLAN.
7. CONTACT THE TRAFFIC SAFETY DESIGN ENGINEER, KING COUNTY TRAFFIC ENGINEERING AT 296-6596 FOR DETOUR SIGNING LAYOUT A MINIMUM OF 2 WEEKS PRIOR TO ANY ROAD CLOSURE.
8. NO ROAD CLOSURE WILL BE ALLOWED UNTIL THE SIGNING PLACEMENT AND INSTALLATION HAS BEEN INSPECTED AND REVIEWED BY THE ENGINEER.
9. THE ROAD CLOSURE TIME PERIOD SHALL BE FOR 40 WORKING DAYS FROM 8:00 AM TO 4:00 PM.

PLANS OF RECORD
ANGELA K. NOLTE 4/30/99
Angela K Nolte

CALL 2 DAYS BEFORE YOU DIG 1-800-424-5555

FIELD BOOK: 23/1433A	8/94			
SURVEYED: M. HALL	8/94			
SURVEY BASE MAP: W.O.M.	9/94			
DESIGN ENTERED: EICHELSDOERFER	2/96			
DESIGNED: EICHELSDOERFER	2/96			
CHECKED: HARWICK	3/96			
	DATE	REVISION	BY	DATE

FED. AID No.

PROJECT No. 100394
SURVEY No. 12-26-03-69

MAINTENANCE DIVISION No. 1

JESSE KRAFT STATE OF WASHINGTON 21340 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 3/7/98
COUNTY ROAD ENGINEER

NORTON J. ROSEY STATE OF WASHINGTON 28163 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 8/16/96

KING COUNTY DEPT. OF TRANSPORTATION
PAUL TOLIVER, DIRECTOR
HIDDEN LAKE BRIDGE No. 167C
SEISMIC RETROFIT
ROAD CLOSURE/DETOUR PLAN

SHEET 6 OF 6 SHEETS
310-73 (6)

SCANNED JUN 22 1999 MICRO. APR 8 1997 MICRO.

Appendix C

2012 Inspection Report and Photos

BRIDGE INSPECTION REPORT

Ver Date: 10/09/2012 Agency: SHORELINE

Status: Released Printed On: 08/16/20 Program Mgr: Roman G. Peralta

Bridge No. 167C Page: 1/3 **Structure Type**

Bridge Name HIDDEN LAKE **Route** 01169 **Location** NW INNIS ARDEN WAY

Structure ID 08137200 **MilePost** 0.44 **Intersecting** SIDE HILL RAVINE

Inspector's Signature JNJ IDent# B1180 Co-Inspector's Signature TTZ

5		Structural Adqcy	(657)	N		Pier/Abut/Protect	(679)	1931		Year Built	(332)
3		Deck Geometry	(658)	N		Scour	(680)	0		Year Rebuilt	(336)
9		Underclearance	(659)	9		Retaining Walls	(682)	38		Oper Rating	(551)
5		Operating Level	(660)	9		Pier Protection	(683)	22		Inv Rating	(554)
6		Alignment Adqcy	(661)	0		Bridge Rails	(684)	A		Open Close	(293)
9		WaterwayAdqcy	(662)	0		Transition	(685)	9999		Vert Over Deck	(360)
5		Deck Overall	(663)	0		Guardrails	(686)	0000		Vert Under	(374)
7		Drains Condition	(664)	0		Terminals	(687)	N		Vert Und Code	(378)
5		Superstructure	(671)	N	Y	Revise Rating	(688)	2.00		Asphalt Depth	
2		Number Utilities	(675)			Photos Flag	(691)	25		Speed Limit	
6	5	Substructure	(676)			Soundings Flag	(693)				
9		Chan/Protection	(677)			Measure Clearance	(694)				
9		Culvert	(678)								

Inspections Performed

IT	NT	HRS	Date	Rep Type
Y	**24**	**1.5**	**06/22/2012**	**Routine**
				Fract Crit
				Underwater
				Special
				Interim
				Equipment
				Damage
				Safety
				Short Span

Total: 1.5

Suff Rating: 51.31 FO 51.31 FO

BMS Elements

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
38	Concrete Slab	6200	SF	3700	0	2500	0
110	Concrete Girder	310	LF	310	0	0	0
205	Concrete Pile/Column	20	EA	10	0	10	0
219	Concrete Cantilevered Span Abutment	44	LF	44	0	0	0
331	Concrete Bridge Railing	310	LF	304	0	0	6
370	Seismic - Longitudinal Restrainer	2	EA	2	0	0	0
407	Steel Angle Header	40	LF	0	0	40	0
800	Asphaltic Concrete (AC) Overlay	6200	SF	6100	0	100	0

Notes

0	Orientation- Beginning of Bridge is west abutment, West most pier = Pier 1.

38	Concrete Slab Slab is thickened at each pier. Numerous cracks in soffit many are leaching some with stalactites measuring 6" or more in length. Transverse cracking along spring line of the arched slab. 3' long longitudinal spall with laminar rust re-bar exposed in span 2. Many patched voids in deck slab from old form work, numerous patched spalls in spans 1 through 3. Scattered rock pockets in soffit all spans. The north side of the deck slab has a curtain wall to control sloughing, has scattered vertical cracks. Soil has sloughed away from north side of deck soffit between piers 9 and 10.
110	Concrete Girder Cast in place girders along south side of bridge. Diagonal hairline cracks in haunched areas at most columns some are leaching.
205	Concrete Columns Several spalls on columns with small sections of exposed rebar. Footing of 2A & 8A is exposed. All north columns have vertical cracks on the south side of the haunches, and horizontal cracks at slab/ haunch and haunch/column interfaces. Horizontal cracking appears to be along cold joints.
219	Concrete Cantilevered Span Cantilevered span at both ends of bridge. Deck was designed to be supported on grade at the northerly half of span 10 and most of the cantilevered span 11.
331	Concrete Bridge Railing Rail is on the south side of the bridge only. Two horizontal rails on the west end have been replaced with timber. The timber rail is rotten and pulled away from the concrete rail post. See Repair #10004. Several spalled posts and rails, some have areas of exposed rebar specifically along west end of the bridge. Rail paint has completely failed. Light moss and algae growth throughout rail.
370	Seismic Longitudinal Restrainer Seismic retrofit installed at span 6 in 1996 Longitudinal restrainers have 2" slack.
407	Expansion Joints Joints are located at each end of drop-in span at center span 6. 2' foot spall along concrete header soffit at east expansion joint. Heavy leaching on the west header south side, rust colored staining throughout.
664	Drains are located at west end of bridge.
671	see notes for 110 and 38
672	Curbs 1' spall on south curb near east expansion joint, map cracking in spots.
676	see notes for 205- Water leaking from the hillside.
686	Guardrail New approach rail with terminal installed at SW end of the bridge.
688	Revisit load rating- supersutructure condtion code is rated at 5.

695	Monitor Flag Measurements for the cracks were taken at the corbel/column interface on upslope columns in 1998 and 2002. See Monitoring in Files.
800	AC Overlay Overlay thin on east end of bridge. Several areas on the east end where asphalt is worn to concrete deck. Edge of pavement along both side of curbs has worn out asphalt and water is ponding. New overlay on west approach. New asphalt patch on east approach at bridge joint.

Repairs

Repair No	Pr	R	Repair Description	Noted	Maint	Verified
10004	1	B		06/22/12		
10010	1	1		06/22/12		
10000	2	B		09/10/02		
10002	2	B		10/18/04		
10011	2	B		06/22/12		

Inspections Performed and Resources Required

Report Type	Date	IT	Frq	Hrs	Insp	CertNo	Coinsp	Note
Routine	06/22/12		24	1.5	JNJ	B1180	TTZ	

Resources	Use	Hour	Min	Req	Max	Notes

Sticky Notes

Creator	Created	Table Reference	Notes
King County/HovdeR	09/27/2012	Report Types	MONITOR: Take new measurements of cracks at tops of columns

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C | Page 1 of 15 | **Structure Type**

Bridge Name HIDDEN LAKE | **Route** 01169 | **Intersecting** SIDE HILL RAVINE

Structure ID 08137200 | **MilePost** 0.44 | **Location** NW INNIS ARDEN WAY

167C #A exd footing looking E 6-15-10 20
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C 06222012 East Expansion Joint of Drop-in Span 6
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10011

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM					Status: Released	

Ver Date: 10/9/2012
Printed on: 8/16/2013

Agency: SHORELINE
Program Mgr: Roman G. Peralta

Bridge No. 167C
Bridge Name HIDDEN LAKE
Structure ID 08137200

Route 01169
MilePost 0.44

Structure Type
Intersecting SIDE HILL RAVINE
Location NW INNIS ARDEN WAY

167C 06222012 Failing Timber Rail @south
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10004

167C 06222012 Spall on Bridge Rail
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10004

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM					Status: Released	

Ver Date: 10/9/2012
Printed on: 8/16/2013

Agency: SHORELINE
Program Mgr: Roman G. Peralta

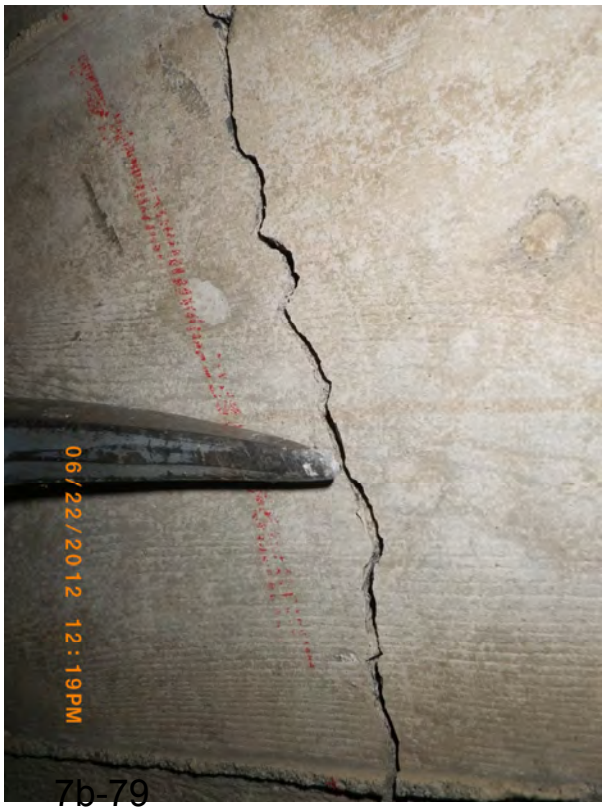
Bridge No. 167C
Bridge Name HIDDEN LAKE
Structure ID 08137200

Route 01169
MilePost 0.44

Structure Type
Intersecting SIDE HILL RAVINE
Location NW INNIS ARDEN WAY

167C 06222012 Timber Rail @Southwest Corner of Bridge
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10004

167C 06222012 Transverse Crack in Soffit @Pier 8
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:



BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No.	167C			**Structure Type**	
Bridge Name	HIDDEN LAKE	**Route**	01169	**Intersecting**	SIDE HILL RAVINE
Structure ID	08137200	**MilePost**	0.44	**Location**	NW INNIS ARDEN WAY

167C 06222012 West Expansion Joint of D
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10011

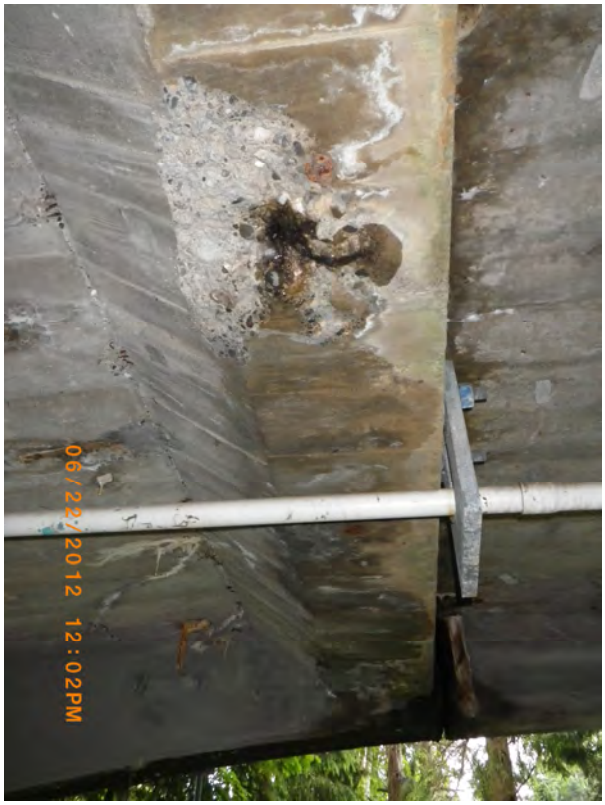
167C 06222012 Asphalt patch Worn Out @
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10011

BRIDGE INSPECTION REPORT

	WO	CC	WE	PD			
BAM					Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
						Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C
Bridge Name HIDDEN LAKE
Structure ID 08137200
Route 01169
MilePost 0.44
Structure Type
Intersecting SIDE HILL RAVINE
Location NW INNIS ARDEN WAY

167C 06222012 East Joint@Span 6 Soffit
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:



167C concrete rail 06 22 2012
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

BRIDGE INSPECTION REPORT

	WO	CC	WE	PD			
BAM					Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
						Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No.	167C			**Structure Type**	
Bridge Name	HIDDEN LAKE	**Route**	01169	**Intersecting**	SIDE HILL RAVINE
Structure ID	08137200	**MilePost**	0.44	**Location**	NW INNIS ARDEN WAY

167C DLCs span 6 s side 6-15-10 18
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167c Exposed rebar on the girders 06 22 2(
Photographs
Photo Type: (none)
Orientation:
Dates: 9/22/2012
Repairs:
Exposed rebar

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012 Printed on: 8/16/2013	Agency: SHORELINE Program Mgr: Roman G. Peralta

Bridge No. 167C | Page 7 of 15 | **Structure Type**

Bridge Name HIDDEN LAKE | **Route** 01169 | **Intersecting** SIDE HILL RAVINE

Structure ID 08137200 | **MilePost** 0.44 | **Location** NW INNIS ARDEN WAY

167C Hidden Lake Looking W at Abut 1 6-1
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C Hidden Lake Looking W at E end dec
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C
Bridge Name HIDDEN LAKE
Structure ID 08137200
Route 01169
MilePost 0.44
Structure Type
Intersecting SIDE HILL RAVINE
Location NW INNIS ARDEN WAY

167C Hidden Lake spalled rail post with tin
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10004

167C LCs span 2 6-15-10 23
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No.	167C			**Structure Type**	
Bridge Name	HIDDEN LAKE	**Route**	01169	**Intersecting**	SIDE HILL RAVINE
Structure ID	08137200	**MilePost**	0.44	**Location**	NW INNIS ARDEN WAY

167C Looking E at soffit patches 6-10-08
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C Looking W at seismic 6-10-08
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C | Page 10 of 15 | **Structure Type**

Bridge Name HIDDEN LAKE | **Route** 01169 | **Intersecting** SIDE HILL RAVINE

Structure ID 08137200 | **MilePost** 0.44 | **Location** NW INNIS ARDEN WAY

167C Moisture dripping from stalactites sp

Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C Pier 2 crack monitor 6-10-08 09

Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs: 10011

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM					Status: Released	Ver Date: 10/9/2012
						Printed on: 8/16/2013

Agency: SHORELINE
Program Mgr: Roman G. Peralta

Bridge No. 167C
Bridge Name HIDDEN LAKE
Structure ID 08137200

Route 01169
MilePost 0.44

Structure Type
Intersecting SIDE HILL RAVINE
Location NW INNIS ARDEN WAY

167C pier 2 looking W 6-15-10 21
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C pier 2 looking west
Photographs
Photo Type: (none)
Orientation: W
Dates: 6/15/2010
Repairs:
Loosing fill from under the span 1

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C
Bridge Name HIDDEN LAKE
Structure ID 08137200
Route 01169
MilePost 0.44
Structure Type
Intersecting SIDE HILL RAVINE
Location NW INNIS ARDEN WAY

167C S elevation looking W 6-15-10 11
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C SE jnt at broken curb 6-15-10 04
Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C | Page 13 of 15 | **Structure Type**

Bridge Name HIDDEN LAKE | **Route** 01169 | **Intersecting** SIDE HILL RAVINE

Structure ID 08137200 | **MilePost** 0.44 | **Location** NW INNIS ARDEN WAY

167C Timber rails and spalled post 6-15-1(

Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

167C typ patches throughout deck soffit 6

Photographs
Photo Type: (none)
Orientation:
Dates:
Repairs:

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C

Bridge Name HIDDEN LAKE

Structure ID 08137200

Route 01169

MilePost 0.44

Structure Type

Intersecting SIDE HILL RAVINE

Location NW INNIS ARDEN WAY

167C 06222012 Looking West
Photographs
Photo Type: (none)
Orientation: W
Dates:
Repairs:
Deck

BRIDGE INSPECTION REPORT

WO	CC	WE	PD			
BAM				Status: Released	Ver Date: 10/9/2012	Agency: SHORELINE
					Printed on: 8/16/2013	Program Mgr: Roman G. Peralta

Bridge No. 167C | Page 15 of 15 | **Structure Type**

Bridge Name HIDDEN LAKE | **Route** 01169 | **Intersecting** SIDE HILL RAVINE

Structure ID 08137200 | **MilePost** 0.44 | **Location** NW INNIS ARDEN WAY

Entry Name	Folder Name	Type	Repairs	Page
167C #A exd footi	Photographs			1
167C 06222012 E	Photographs		10011	1
167C 06222012 F	Photographs		10004	2
167C 06222012 L	Photographs			14
167C 06222012 S	Photographs		10004	2
167C 06222012 T	Photographs		10004	3
167C 06222012 T	Photographs			3
167C 06222012	Photographs		10011	4
167C 06222012 A	Photographs		10011	4
167C 06222012 E	Photographs			5
167C concrete rail	Photographs			5
167C DLCs span	Photographs			6
167c Exposed reb	Photographs			6
167C Hidden Lake	Photographs			7
167C Hidden Lake	Photographs			7
167C Hidden Lake	Photographs		10004	8
167C LCs span 2	Photographs			8
167C Looking E at	Photographs			9
167C Looking W a	Photographs			9
167C Moisture dri	Photographs			10
167C Pier 2 crack	Photographs		10011	10
167C pier 2 lookin	Photographs			11
167C pier 2 lookin	Photographs			11
167C S elevation l	Photographs			12
167C SE jnt at bro	Photographs			12
167C Timber rails	Photographs			13
167C typ patches t	Photographs			13

Appendix D

Load Rating Calculations

Hidden Lake Bridge Load Rating Calculations

Table of Contents

Introduction

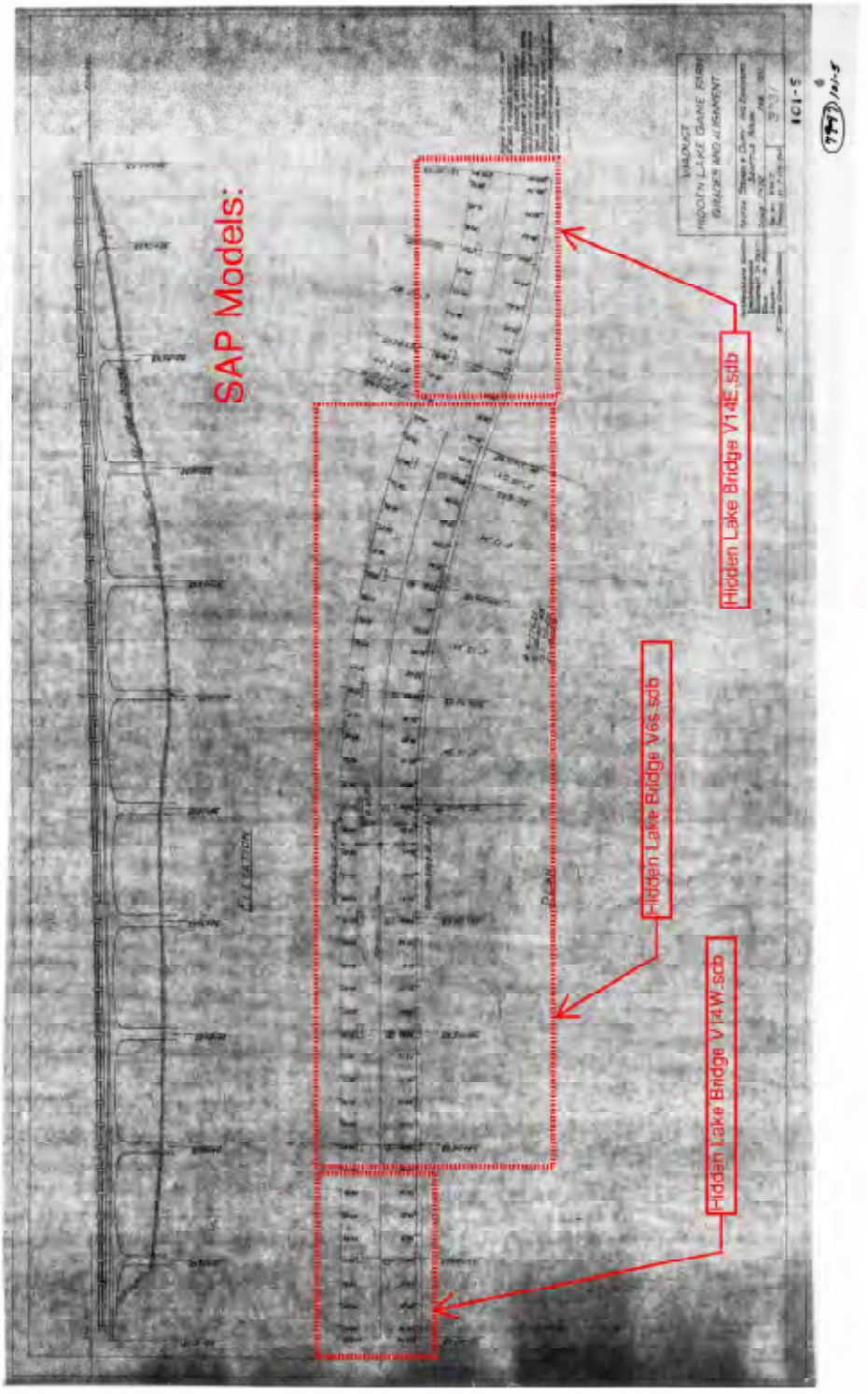
Calculations for the Hidden Lake Bridge are included here and determine the load rating for the bridge. Three different models were analyzed to capture the unique supporting conditions found on site. A simple spine model was used for the typical interior spans of the bridge. This model was insufficient in capturing the end conditions of the bridge and therefore two additional FEM models were created to analyze the end spans that are supported by soil.

Design Criteria

- Washington State Department of Transportation. Bridge Design Manual, M 23-50.12. August 2012. [WSDOT BDM]
- American Association of State Highway and Transportation Officials (AASHTO). AASHTO Standard Specifications for Highway Bridges, 17th Edition. 2002. [AASHTO Standard Specs]
- AASHTO Manual for Bridge Evaluation, 2nd Edition. 2011. [AASHTO MBE]

References

- Hidden Lakes Inspection Report. Agency: Shoreline. October 9, 2012.
- "Hidden Lake Game Farm" Structural Drawings. Reitze Storey & Duffy Inc. Engineers. March 1931.
- "Hidden Lake Bridge No. 167C, Seismic Retrofit" Structural Drawings. Parsons Brinkerhoff. December 1995.


SAP Models:
Hidden Lake Bridge V14E.sdb
Hidden Lake Bridge V6s.sdb
Hidden Lake Bridge V14W.sdb

Section II – Results

kpff Consulting Engineers

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project	Hidden Lake Bridge	by bak	sheet no. 1 of 2
location	Shoreline	date 5/23/14	job no.
client	City of Shoreline		
	Bridge Rating Results		

Summary of Slab Rating

Assumptions and Inputs:

slab is supported at ends by soil (not cantilevered)
moments taken at face of support
impact factor = 0.3 (for legal loads)

Inventory Results:	**Loading:**	**HS-20**	**A1**	**A2**	**A3**	**NRL**
	RF:	0.46	0.58	0.58	0.71	0.43
	GVW:	36	25	36	40	40
	Tonnage Rating:	16	14	20	28	17
Largest negative moment at 1st support		0.66	0.91	0.80	1.00	0.72
Largest shear at first interior support		1.02	1.26	1.37	1.47	1.02
Largest negative moment at typical support		0.55	0.70	0.58	0.72	0.48
Largest shear at typical support		0.94	1.24	1.28	1.50	0.84
Largest positive moment at typical midspan		0.48	0.58	0.61	0.71	0.43
Positive moment at 1st interior span		0.54	0.68	0.73	0.83	0.52
Shear at typical 11" slab		0.76	0.96	1.02	1.17	0.80
Positive moment at drop-in span		0.46	0.63	0.69	0.76	0.56
Shear at drop-in span		0.71	0.79	0.84	0.96	0.57
Max positive at transition span		0.53	0.83	0.78	0.75	0.67
Max negative moment at 11" slab		0.57	0.74	0.73	0.79	0.49
Largest crossbeam moment		0.56	0.77	0.73	0.84	0.50
Largest crossbeam shear		0.55	0.74	0.76	0.84	0.47
Typical crossbeam shear		0.73	0.93	0.96	1.10	0.64
Punching Shear at thin slab		1.64	ok bi	ok bi	ok bi	ok bi
Shear in 7" slab		1.24	1.29	1.41	1.55	1.14
Bending in 7" slab		0.69	0.85	0.89	1.01	0.61

Operating Results						
	RF:	0.77	0.97	0.97	1.18	0.71
	Tonnage Rating:	27	24	34	47	28
Largest negative moment at 1st support		1.11	1.51	1.33	1.66	1.21
Largest shear at first interior support		1.71	2.10	2.29	2.45	1.71
Largest negative moment at typical support		0.91	1.16	0.97	1.20	0.80
Largest shear at typical support		1.57	2.07	2.13	2.50	1.41
Largest positive moment at typical midspan		0.80	0.97	1.03	1.18	0.71
Positive moment at 1st interior span		0.89	1.13	1.22	1.39	0.87
Shear at typical 11" slab		1.27	1.60	1.70	1.95	1.33
Positive moment at drop-in span		0.77	1.05	1.15	1.27	0.93
Shear at drop-in span		1.18	1.32	1.40	1.60	0.95
Max positive at transition span		0.89	1.38	1.30	1.26	1.11
Max negative moment at 11" slab		0.94	1.23	1.23	1.32	0.81
Largest crossbeam moment		0.94	1.29	1.22	1.41	0.84
Largest crossbeam shear		0.91	1.24	1.28	1.40	0.78
Typical crossbeam shear		1.22	1.56	1.60	1.83	1.07
Punching Shear at 7" slab		2.74	ok bi	ok bi	ok bi	ok bi
Shear in 7" slab		2.07	2.15	2.35	2.59	1.90
Bending in 7" slab		1.14	1.43	1.49	1.69	1.01

kpff Consulting Engineers

project	Hidden Lake Bridge	by bak	sheet no. 2 of 2
location	Shoreline	date 5/23/14	
client	City of Shoreline		job no.
	Bridge Rating Results		

Summary of Slab Rating

Assumptions and Inputs:

slab is supported at ends by soil (not cantilevered)
moments taken at face of support
impact factor = 0.3 (for legal loads)
0.20 (for permit loads)

Inventory Results:	**Loading:**	**OL1**	**OL2**	**SU4**	**SU5**	**SU6**	**SU7**
	RF:	0.26	0.20	0.50	0.47	0.44	0.43
	GVW:	48	103.5	27	31	34.8	38.8
	Tonnage Rating:	12	20	13	14	15	16
Largest negative moment at 1st support		0.26	0.20	0.90	0.82	0.75	0.73
Largest shear at first interior support		1.12	1.02	1.21	1.18	1.07	1.02
Largest negative moment at typical support		0.49	0.34	0.60	0.55	0.51	0.48
Largest shear at typical support		0.88	0.81	1.05	0.97	0.91	0.88
Largest positive moment at typical midspan		0.48	0.40	0.50	0.47	0.44	0.43
Positive moment at 1st interior span		0.36	0.31	0.58	0.56	0.52	0.51
Shear at typical 11" slab		0.78	0.69	0.85	0.82	0.82	0.82
Positive moment at drop-in span		0.54	0.51	0.56	0.56	0.56	0.56
Shear at drop-in span		0.65	0.52	0.67	0.62	0.58	0.57
Max positive at transition span		0.71	0.50	0.73	0.70	0.67	0.67
Max negative moment at 11" slab		0.53	0.43	0.61	0.58	0.52	0.50
Largest crossbeam moment		0.36	0.31	0.69	0.61	0.55	0.51
Largest crossbeam shear		0.35	0.31	0.65	0.59	0.54	0.49
Typical crossbeam shear		0.59	0.51	0.82	0.76	0.68	0.63
Punching Shear at 7" slab		ok bi	ok bi	ok bi	ok bi	ok bi	ok bi
Shear in 7" slab		0.60	0.51	1.18	1.17	1.15	1.16
Bending in 7" slab		0.40	0.36	0.76	0.71	0.66	0.62
Operating Results	RF:	0.75	0.57	0.83	0.78	0.74	0.72
	Tonnage Rating:	36	59	22	24	25	28
Largest negative moment at 1st support		1.25	0.86	1.50	1.36	1.26	1.21
Largest shear at first interior support		1.97	1.79	2.01	1.96	1.78	1.70
Largest negative moment at typical support		0.82	0.57	1.00	0.92	0.85	0.80
Largest shear at typical support		1.46	1.35	1.76	1.62	1.52	1.46
Largest positive moment at typical midspan		0.80	0.66	0.83	0.78	0.74	0.72
Positive moment at 1st interior span		0.86	0.75	0.97	0.93	0.87	0.86
Shear at typical 11" slab		1.29	1.15	1.42	1.37	1.37	1.37
Positive moment at drop-in span		0.90	0.85	0.93	0.93	0.93	0.93
Shear at drop-in span		1.09	0.87	1.12	1.03	0.96	0.95
Max positive at transition span		1.18	0.84	1.22	1.18	1.11	1.11
Max negative moment at 11" slab		0.88	0.72	1.02	0.97	0.88	0.83
Largest crossbeam moment		0.80	0.70	1.15	1.03	0.93	0.86
Largest crossbeam shear		0.75	0.66	1.08	0.99	0.89	0.82
Typical crossbeam shear		0.99	0.87	1.37	1.26	1.14	1.05
Punching Shear at 7" slab		ok bi	ok bi	ok bi	ok bi	ok bi	ok bi
Shear in 7" slab		2.47	2.08	1.97	1.95	1.92	1.93
Bending in 7" slab		1.11	1.02	1.27	1.18	1.09	1.03

Section III – Analysis

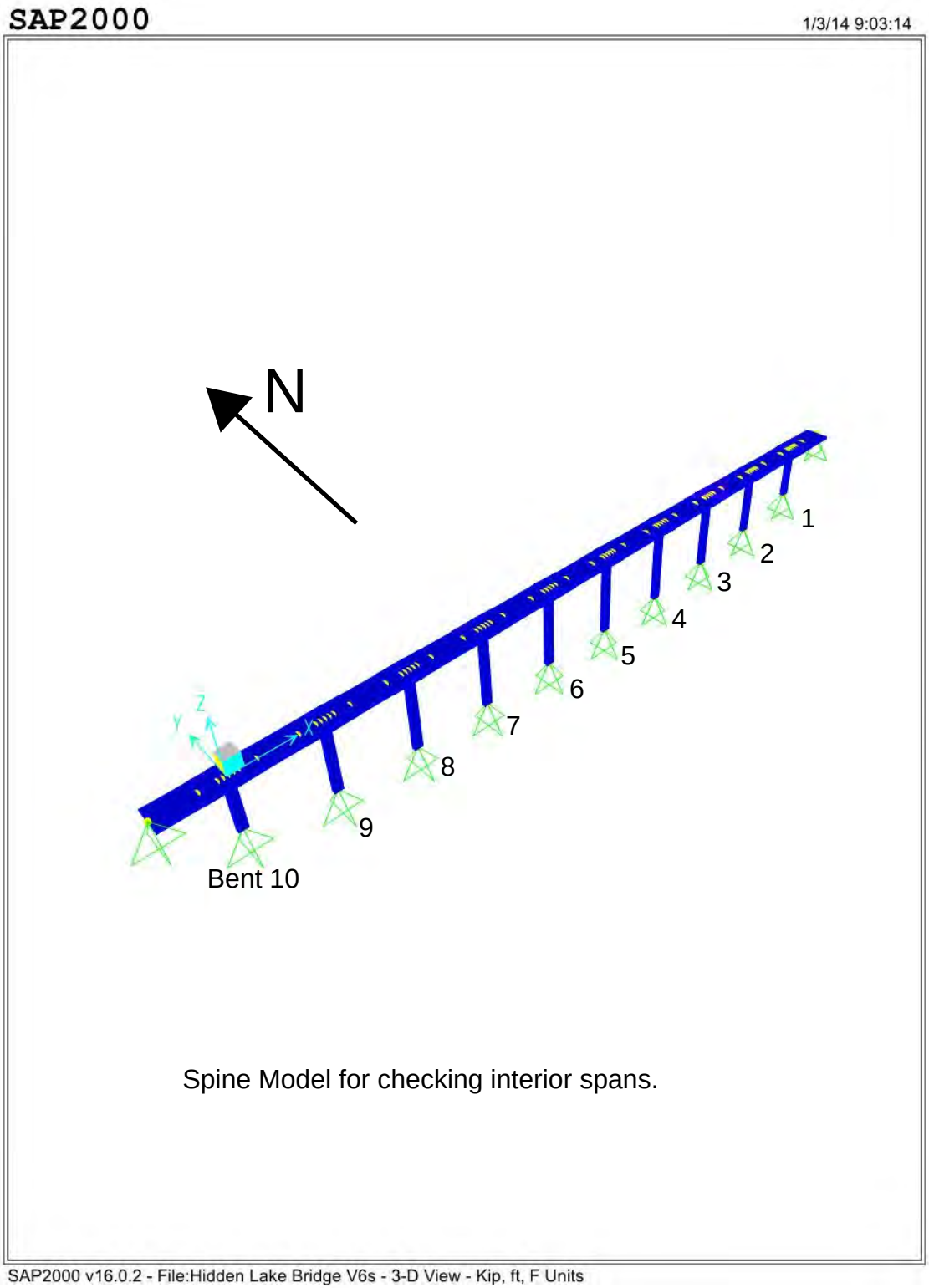
Analysis Assumptions

Spine model assumptions:

- Model created to check interior spans only
- Pinned support at west end and east end
- Only south lane modeled (conservative since columns longer and less stiff)
- Columns pin supported at 6*Diameter depth below surface (based on rule of thumb for column lateral support)
- Tapered section average of thin slab and thick slab
- Moments determined at 1'-6" from bent centerline

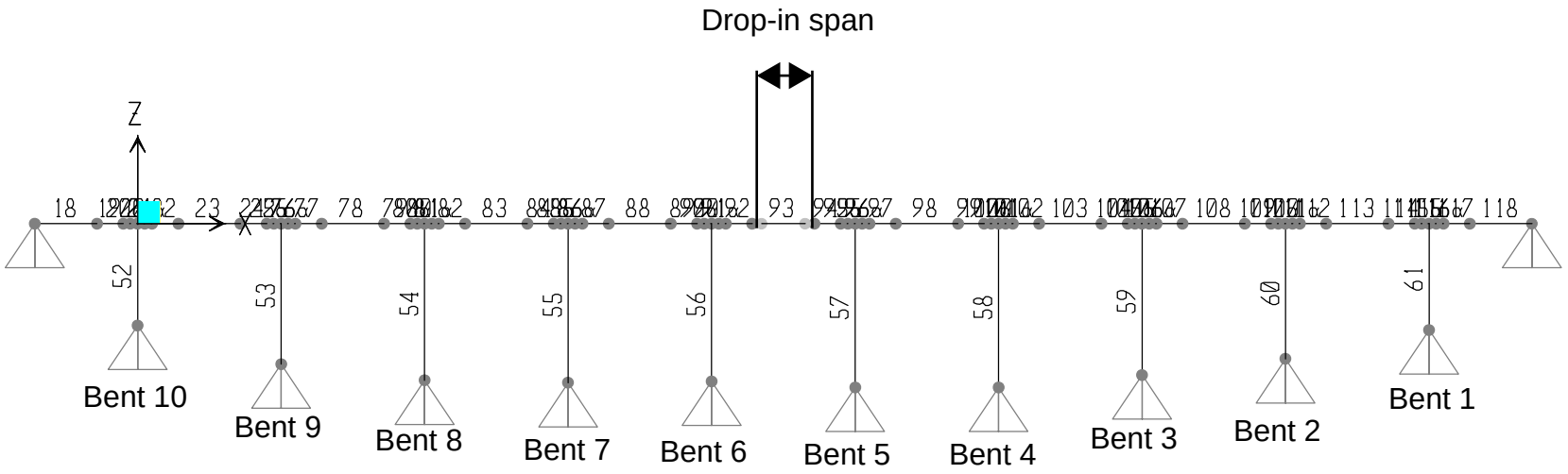
FEM model (west and east end) assumptions:

- New spring support 2883#/in/ft^2 3' from soil edge per geotech recommendations based on new soil borings (see Appendix E)
- Spring support 1441#/in/ft^2 within 3' of soil edge (see Appendix E)
- Only three spans modeled
- 1'x1' mesh
- Beam at outside edge of roadway (below barrier) assumed not to contribute to strength of bridge since full depth clear joints at each span
- Moments determined at 1'-6" from bent centerline
- Design moments and shears averaged over lane width



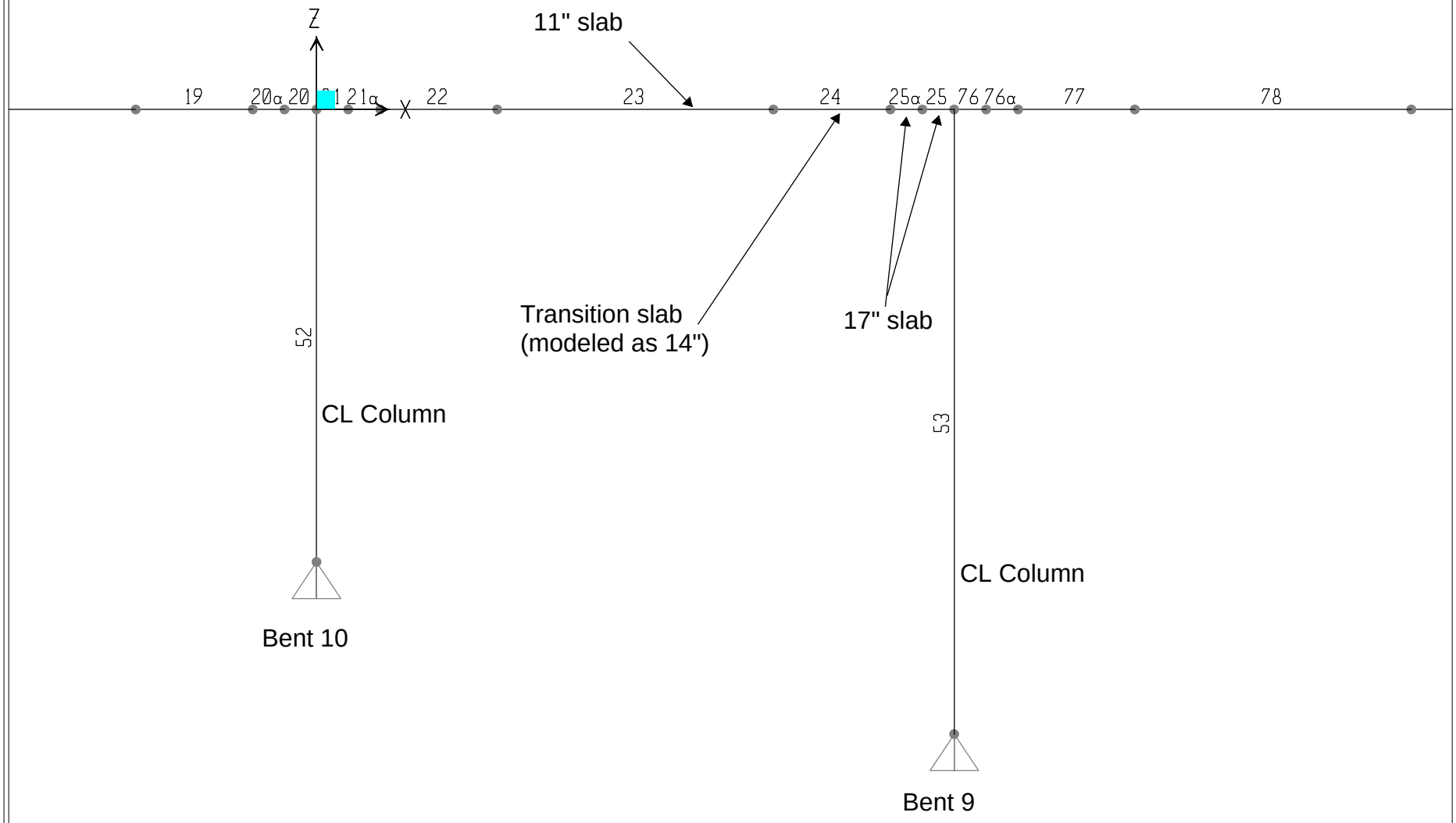
Spine Model for checking interior spans.

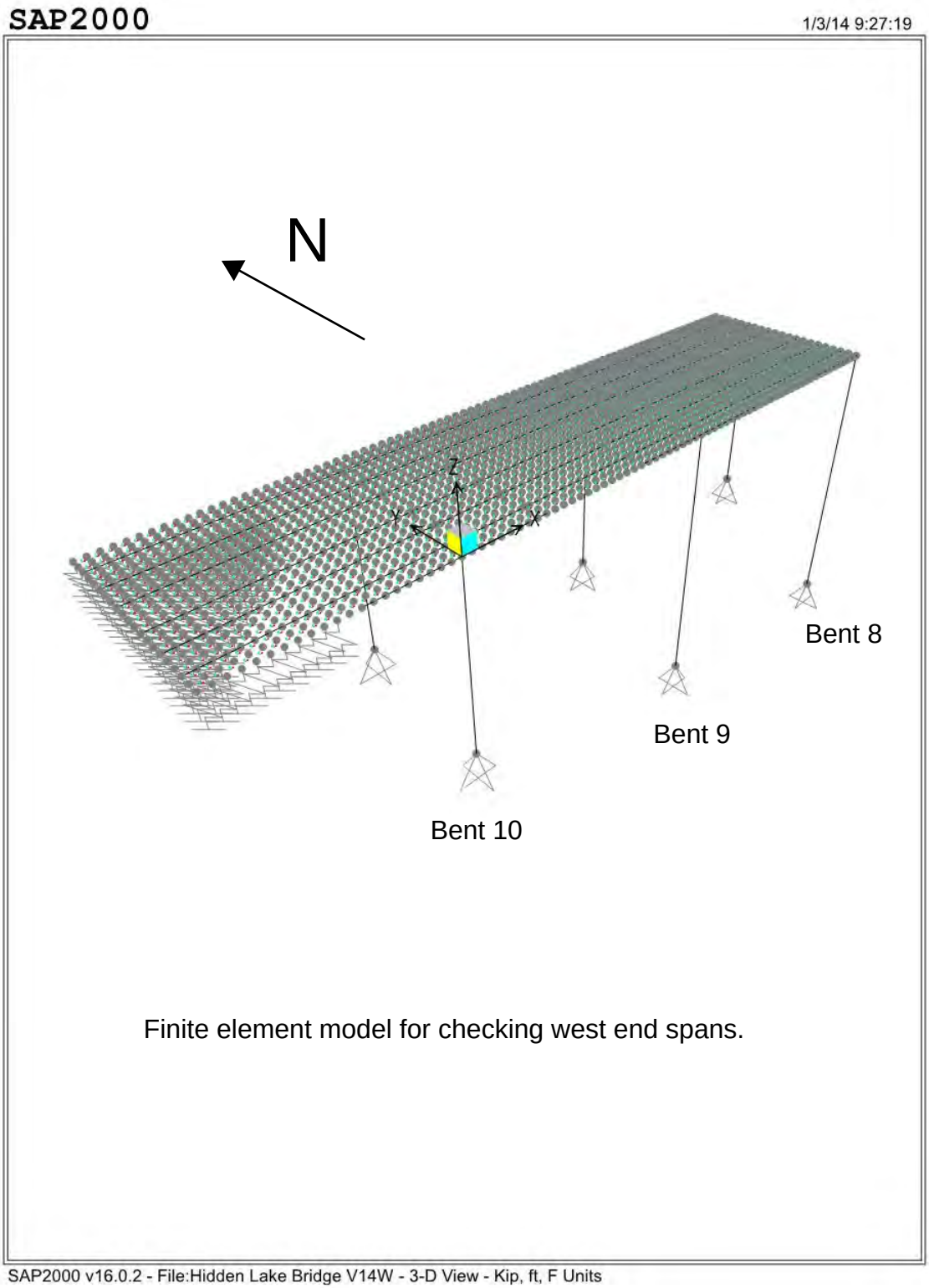
SAP Frame Members for Spine Model



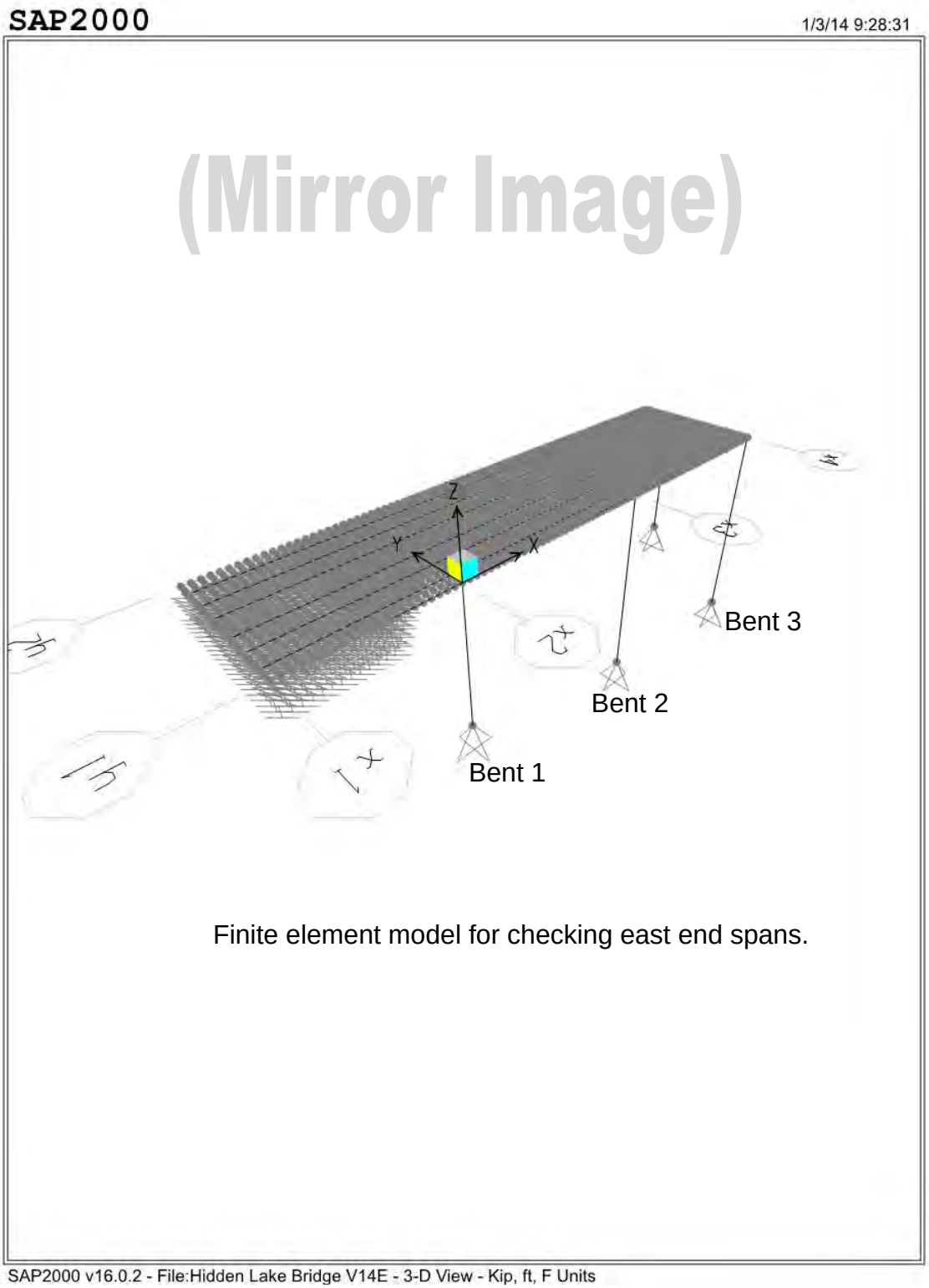
See next page for close-up on member labels

SAP Frame Members for Spine Model - Typical Bay Between Columns





Finite element model for checking west end spans.



Finite element model for checking east end spans.

Section IV – Capacity

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project HIDDEN LAKE BRIDGE | by BAK | sheet no. IV-13
location SHORELINE | date 12/4/13 | job no.
client CITY OF SHORELINE
NEGATIVE MOMENT AT BENT 10 (slab)

OBJECTIVE: DETERMINE NEG MOM CAPACITY AT BENT 10

REFERENCE: STRUCTURAL DRAWINGS
WSDOT BDM
INSPECTION REPORT (10/9/12)
AASHTO STD. SPECS

CALCS:

TOP STEEL IN SOUTH LANE

11 - 1" BARS
2 - #4 BARS

$A_s = 1.19\ in^2/ft$

$d = 17 - 1.5 = 15.5''$

$a = \frac{A_s f_y}{.85 f'_c b} = \frac{1.19(33)}{.85(3)12} = 1.3\ in$ [eq. 8-17 AASHTO STD. SPECS]

$M_n = A_s f_y (d - a/2) = 1.19(33)(15.5 - 1.3/2) = 48.6^{k}/ft$ [eq. 8-16 AASHTO STD. SPECS]

$\phi_b = .8$ (BDM 13.1.2 AND INSPECTION REPORT)

$\phi M_n = .8(48.6) = 38.9^{k}$

SHEAR

$V_c = 2\sqrt{f'_c}\, b_v d$ [eq. 8-48 AASHTO STD. SPECS]

$= 2\sqrt{3000}(12)15.5 = 20.4$

$\phi = .75$ PER BDM & INSPECTION REPORT

$\phi V_c = 15.3^{k}/ft$

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project HIDDEN LAKE BRIDGE | by BAK | sheet no. IV-C
location SHORELINE | date 12/4/13 | job no.
client CITY OF SHORELINE
NEG MOM AT BENT 6 (slab)

OBJECTIVE: DET NEG. MOMENT CAPACITY AT BENT 6

REFERENCE: STR DWGS
WSDOT BDM
AASHTO STD. SPECS
Inspection report (10/9/12)

CALCS:

TOP STEEL IN SOUTH LANE

12- 1" BARS
10- #8 BARS

$A_s = 1.64 \text{ in}^2/\text{ft}$

$d = 17 - 1.5 = 15.5"$

$a = 1.77$

$M_n = 85.9^{k}/\text{ft}$

$\phi = .8$

$\phi M_n = 52.7^{k}/\text{ft}$

SHEAR CALCS

SAME AS ABOVE

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project HIDDEN LAKE BRIDGE | by TBAL | sheet no.
location SHORELINE | date 12/4/13 | IV-D
client CITY OF SHORELINE | job no.
NEGATIVE MOMENT @ BENT 1 (slab)

OBJECTIVE: DETERMINE NEGATIVE MOMENT CAP AT BENT 1

SAME AS BENT 10

Objective: determine negative moment cap at bent 2, 3, 4, 7, 8, and 9:

Same as Bent 10

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1601 5th Avenue, Suite 1600
Seattle, WA 98101
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project HIDDEN LAKE BRIDGE | by BAK | sheet no. IV-E
location SHORELINE | date 12/5/13 | job no.
client CITY OF SHORELINE
PUNCHING SHEAR (slab)

OBJECTIVE: VERIFY PUNCHING SHEAR ON 7" S.P.C.

LOAD: $P_L = 16^k$ (32k axle)

GEOMETRY: 10" x 20" (per AASHTO STD. SPECS section 3.39)

CAPACITY:

$$V_c = \left(2 + \frac{4}{\beta_c}\right)\sqrt{f'_c}\, b_o d \le 4\sqrt{f'_c}\, b_o d \qquad (8\text{-}58,\ 17^{th}\ ed)$$

$\beta_c = 2$

$V_n = 4\sqrt{3000}\,(82")(5.5")$

$d = 5.5"$

$b_o = (10" + 5.5")2 + (20" + 5.5")2 = 82"$

$V_n = 98.8$

$\phi V_n = .75(98.8) = 74.1^k$ ∴ OK ✓

RATING FACTOR:

$$RF = \frac{\phi_c - \gamma_{DL} D \pm S}{\gamma_{LL}(1+IM)}$$

$$= \frac{74.1 - 0 \pm 0}{2.17(16^k)(1+.3)} = 1.64$$

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Seattle, WA 98101
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project HIDDEN LAKE BRIDGE | by BAK | sheet no.
location SHORELINE | date 5/21/14 | N-F
client CITY OF SHORELINE | job no.
POSITIVE MOMENT @ TYPICAL SLAB

OBJECTIVE: DETERMINE + MOM CAPACITY @ TYPICAL SPAN

REFERENCE: STR DWGS
WSDOT BDM
INSPECTION REPORT (10/9/12)
AASHTO STD. SPECS

CALCS: TEST STEEL

2# 1" SQ BARS OVER 20'

$A_s = 1.05 \text{ in}^2$

$d = 11 - 1.5 = 9.5$

$a = \frac{A_s f_y}{.85 f'_c b} = \frac{1.05 \times 33}{.85(3)12} = 1.13$

$M_n = A_s f_y (d - a/2)$

$= 1.05(33)(9.5 - 1.13/2)$

$= 25.8^{\text{tk}}$

$\phi = .8$ (WSDOT BDM AND INSPECTION REPORT)

$\phi M_n = 20.6^{\text{tk}}$

Section V – Rating Factor

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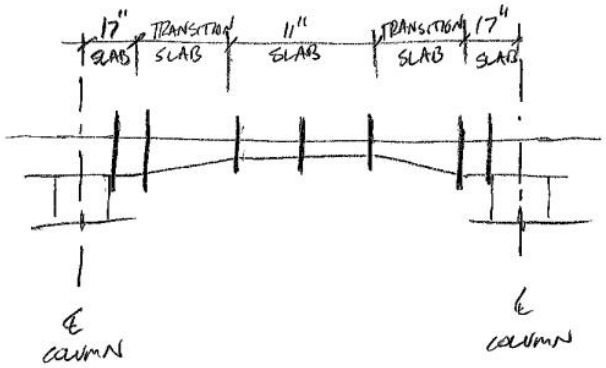
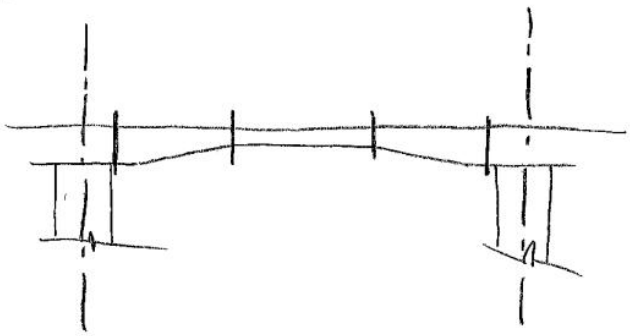
project HIDDEN LAKE BRIDGE | by BAK | sheet no.
location SHORELINE | date 5/22/14
client CITY OF SHORELINE | job no.
MOMENT AT INTERMEDIATE COL

LOCATIONS OF MOMENT CHECKED



LOCATIONS OF SHEAR CHECKED



Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Negative Longitudinal Moments

Member	Analsys Results: Moment ('k/10 ft) Load Case: DEAD	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	Moment Capacity ('k/ft) As	d	a	Mn	ϕ	ϕMn	General Input γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
25a	-105	-150	-123	-144	-117	-174	-187	-265	-136	-148	-163	-174	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
76a	-105	-158	-126	-147	-119	-181	-191	-271	-142	-154	-170	-181	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
80a	-104	-153	-123	-147	-119	-176	-189	-270	-136	-149	-165	-176	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
81a	-104	-155	-124	-148	-119	-178	-190	-272	-139	-151	-167	-178	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
85a	-105	-155	-124	-150	-121	-176	-190	-275	-137	-150	-165	-177	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
86a	-106	-163	-128	-154	-124	-187	-197	-282	-145	-158	-175	-187	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
90a	-101	-180	-128	-153	-123	-164	-219	-291	-130	-144	-159	-171	1.64	15.5	1.77	65.9	0.8	52.7	1.3	2.17	0.30	0.20
91a	-98	-224	-201	-190	-166	-281	-265	-331	-238	-257	-276	-281	1.64	15.5	1.77	65.9	0.8	52.7	1.3	2.17	0.30	0.20
95a	-98	-224	-201	-185	-166	-258	-258	-298	-225	-232	-254	-258	1.64	15.5	1.77	65.9	0.8	52.7	1.3	2.17	0.30	0.20
96a	-101	-181	-124	-154	-122	-160	-209	-283	-121	-139	-157	-169	1.64	15.5	1.77	65.9	0.8	52.7	1.3	2.17	0.30	0.20
100a	-106	-164	-128	-154	-124	-187	-197	-282	-145	-158	-175	-187	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
101a	-105	-155	-123	-149	-121	-175	-189	-274	-136	-149	-164	-175	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
105a	-104	-156	-125	-148	-120	-180	-191	-273	-140	-153	-168	-179	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
106a	-104	-153	-123	-147	-119	-176	-189	-270	-137	-150	-165	-176	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
110a	-105	-158	-126	-147	-119	-182	-192	-271	-142	-154	-170	-181	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
111a	-105	-152	-123	-145	-118	-176	-188	-266	-137	-150	-165	-176	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20

Member	Rating Factor — Inventory: HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	Operating: HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min
25a	0.59	0.7	0.6	0.8	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.99	1.2	1.0	1.3	0.9	0.9	0.6	1.1	1.0	0.9	0.9
76a	0.57	0.7	0.6	0.8	0.5	0.5	0.4	0.6	0.6	0.5	0.5	0.95	1.2	1.0	1.3	0.8	0.8	0.6	1.1	1.0	0.9	0.8
80a	0.59	0.7	0.6	0.8	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.99	1.2	1.0	1.3	0.9	0.9	0.6	1.1	1.0	0.9	0.9
81a	0.58	0.7	0.6	0.8	0.5	0.5	0.4	0.6	0.6	0.5	0.5	0.97	1.2	1.0	1.3	0.8	0.9	0.6	1.1	1.0	0.9	0.8
85a	0.58	0.7	0.6	0.7	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.97	1.2	1.0	1.2	0.8	0.9	0.6	1.1	1.0	0.9	0.8
86a	0.55	0.7	0.6	0.7	0.5	0.5	0.3	0.6	0.6	0.5	0.5	0.91	1.2	1.0	1.2	0.8	0.8	0.6	1.0	0.9	0.8	0.8
90a	0.78	1.1	0.9	1.1	0.9	0.7	0.5	1.1	1.0	0.9	0.8	1.30	1.8	1.5	1.9	1.4	1.2	0.9	1.8	1.6	1.5	1.4
91a	0.63	0.7	0.7	0.9	0.5	0.6	0.5	0.6	0.6	0.5	0.5	1.06	1.2	1.2	1.4	0.8	1.0	0.8	1.0	0.9	0.9	0.8
95a	0.63	0.7	0.8	0.9	0.5	0.6	0.5	0.6	0.6	0.6	0.5	1.06	1.2	1.3	1.4	0.9	1.0	0.9	1.1	1.0	0.9	0.9
96a	0.78	1.1	0.9	1.1	0.9	0.7	0.5	1.2	1.0	0.9	0.8	1.29	1.9	1.5	1.9	1.5	1.2	0.9	1.9	1.7	1.5	1.4
100a	0.55	0.7	0.6	0.7	0.5	0.5	0.3	0.6	0.6	0.5	0.5	0.91	1.2	1.0	1.2	0.8	0.8	0.6	1.0	0.9	0.8	0.8
101a	0.58	0.7	0.6	0.7	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.97	1.2	1.0	1.2	0.9	0.9	0.6	1.1	1.0	0.9	0.9
105a	0.58	0.7	0.6	0.8	0.5	0.5	0.4	0.6	0.6	0.5	0.5	0.96	1.2	1.0	1.3	0.8	0.9	0.6	1.1	1.0	0.9	0.8
106a	0.59	0.7	0.6	0.8	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.99	1.2	1.0	1.3	0.9	0.9	0.6	1.1	1.0	0.9	0.9
110a	0.57	0.7	0.6	0.8	0.5	0.5	0.4	0.6	0.6	0.5	0.5	0.95	1.2	1.0	1.3	0.8	0.8	0.6	1.1	1.0	0.9	0.8
111a	0.59	0.7	0.6	0.8	0.5	0.5	0.4	0.7	0.6	0.5	0.5	0.98	1.2	1.0	1.3	0.8	0.9	0.6	1.1	1.0	0.9	0.8

Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Positive Longitudinal Moment

Member	Analsys Results: Moment ('k/10 ft) Load Case: DEAD	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	Moment Capacity ('k/ft) As	d	a	Mn	ϕ	ϕMn	General Input γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
23	36	110	90	85	74	120	118	142	105	111	117	119	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
78	35	113	92	87	76	124	121	146	108	114	120	122	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
83	35	114	93	88	77	125	122	149	109	115	122	124	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
88	36	118	96	91	79	132	128	154	114	120	127	130	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
98	36	118	97	92	80	132	128	155	114	120	128	130	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
103	35	114	93	88	77	125	122	150	109	115	122	124	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
108	35	112	91	87	75	123	121	146	108	113	120	122	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
113	36	110	90	85	74	120	118	142	105	111	117	119	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20

Member	Rating Factor — Inventory HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min	Operating HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min
23	**0.51**	0.63	0.67	0.76	0.47	0.52	0.43	0.54	0.51	0.48	0.48	**0.9**	1.05	1.12	1.28	0.78	0.87	0.72	0.90	0.85	0.81	0.79
78	**0.51**	0.62	0.66	0.75	0.46	0.51	0.42	0.53	0.50	0.47	0.47	**0.8**	1.04	1.09	1.25	0.77	0.85	0.70	0.88	0.84	0.79	0.78
83	**0.50**	0.62	0.65	0.74	0.45	0.50	0.41	0.52	0.50	0.47	0.46	**0.8**	1.03	1.08	1.23	0.76	0.84	0.69	0.87	0.83	0.78	0.77
88	**0.48**	0.59	0.62	0.71	0.43	0.48	0.40	0.50	0.47	0.45	0.44	**0.8**	0.98	1.03	1.19	0.72	0.80	0.66	0.83	0.79	0.74	0.73
98	**0.48**	0.58	0.61	0.71	0.43	0.48	0.40	0.50	0.47	0.44	0.43	**0.8**	0.97	1.03	1.18	0.71	0.80	0.66	0.83	0.78	0.74	0.72
103	**0.50**	0.62	0.65	0.74	0.45	0.50	0.41	0.52	0.50	0.47	0.46	**0.8**	1.03	1.08	1.23	0.76	0.84	0.69	0.87	0.83	0.78	0.77
108	**0.51**	0.62	0.66	0.75	0.46	0.51	0.42	0.53	0.50	0.48	0.47	**0.8**	1.04	1.10	1.26	0.77	0.85	0.71	0.88	0.84	0.79	0.78
113	**0.51**	0.63	0.67	0.76	0.47	0.52	0.43	0.54	0.51	0.48	0.48	**0.9**	1.05	1.12	1.28	0.78	0.87	0.72	0.90	0.85	0.81	0.79

Model: Spine Model - Hidden Lake Bridge V6s.sdb

Force: Positive Longitudinal Moment at drop-in span

As in drop span = (22) #6

	Analsys Results: Moment ('k/10 ft) Load Case:												Moment Capacity ('k/ft)						General Input			
Member	DEAD	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	As	d	a	Mn	ϕ	ϕMn	γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
93	24.6	104.0	76.5	69.8	63.0	86.6	96.8	102.3	86.5	86.5	86.5	86.5	0.97	7.5	1.05	18.6	0.9	16.7	1.3	2.17	0.30	0.20

note - bottom of drop-in span in good condition, therefore ϕ equals 0.9

	Rating Factor																					
	Inventory											Operating										
Member	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min
93	**0.5**	0.6	0.7	0.8	0.6	0.5	0.5	0.6	0.6	0.6	0.6	**0.8**	1.0	1.1	1.3	0.9	0.9	0.8	0.9	0.9	0.9	0.9

Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Longitudinal Shear at thick slab

Analsys Results:

Shear (k/10 ft)

	Load Case:																				
	DEAD	HS-20 TRUCK	A1	A2	A3	NRL	OL1	OL2	SU4	SU5	SU6	SU7	**Shear Capacity (k/ft)**					**General Input**			
Member		Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	As	d	Vn	ϕ	ϕVn	γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
25	25.9	43.6	33.1	32.2	27.3	45.4	48.7	55.1	38.2	40.6	43.3	43.7		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
76	25.8	44.1	33.5	32.4	27.7	45.9	49.6	55.5	38.6	41.2	43.8	44.2		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
80	25.7	43.8	33.2	32.4	27.5	45.6	49.1	55.4	38.3	40.8	43.5	43.9		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
81	25.7	44.0	33.4	32.4	27.6	45.8	49.4	55.5	38.5	41.0	43.7	44.0		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
85	25.8	44.0	33.3	32.5	27.5	45.7	49.3	55.7	38.4	40.9	43.6	43.9		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
86	25.9	44.8	34.0	32.8	28.1	46.4	50.6	56.3	39.1	41.7	44.3	44.7		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
90	25.6	43.4	32.7	31.0	27.2	50.2	52.3	56.2	38.3	41.5	45.2	48.3		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
91	24.1	32.0	28.7	27.1	23.7	40.1	37.8	47.3	34.0	36.7	39.5	40.1		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
95	24.1	43.1	34.0	33.7	28.0	48.7	47.1	57.4	40.9	44.5	47.3	47.3		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
96	25.6	43.3	32.6	30.9	26.9	45.3	48.6	53.7	37.5	39.9	42.6	43.3		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
100	25.9	44.9	34.0	32.8	28.1	46.4	50.7	56.4	39.1	41.7	44.4	44.7		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
101	25.8	43.9	33.2	32.5	27.5	45.6	49.2	55.7	38.3	40.8	43.5	43.9		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
105	25.7	44.1	33.5	32.5	27.7	45.8	49.6	55.6	38.6	41.1	43.8	44.1		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
106	25.7	43.8	33.3	32.4	27.5	45.6	49.1	55.4	38.3	40.8	43.5	43.9		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
110	25.8	44.2	33.5	32.4	27.7	45.9	49.6	55.5	38.6	41.2	43.8	44.2		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20
111	25.9	43.7	33.2	32.3	27.4	45.5	48.8	55.1	38.2	40.7	43.4	43.8		15.5	20.4	0.75	15.3	1.3	2.17	0.30	0.20

Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Longitudinal Shear
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LFR Method

	Rating Factor																					
	Inventory											Operating										
Member	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min
25	0.97	1.28	1.31	1.54	0.93	0.94	0.83	1.11	1.04	0.97	0.97	1.62	2.13	2.19	2.58	1.55	1.57	1.39	1.85	1.73	1.63	1.61
76	0.96	1.26	1.30	1.53	0.92	0.92	0.82	1.09	1.03	0.96	0.96	1.60	2.10	2.18	2.55	1.54	1.54	1.38	1.83	1.71	1.61	1.60
80	0.96	1.27	1.31	1.54	0.93	0.93	0.83	1.10	1.04	0.97	0.96	1.61	2.12	2.18	2.57	1.55	1.56	1.38	1.84	1.73	1.62	1.61
81	0.96	1.27	1.30	1.53	0.92	0.93	0.82	1.10	1.03	0.97	0.96	1.60	2.11	2.18	2.56	1.54	1.55	1.38	1.83	1.72	1.62	1.60
85	0.96	1.27	1.30	1.53	0.92	0.93	0.82	1.10	1.03	0.97	0.96	1.60	2.12	2.17	2.56	1.54	1.55	1.37	1.84	1.72	1.62	1.60
86	0.94	1.24	1.29	1.50	0.91	0.90	0.81	1.08	1.01	0.95	0.94	1.57	2.07	2.15	2.51	1.52	1.51	1.35	1.80	1.69	1.59	1.58
90	0.98	1.29	1.37	1.55	0.84	0.88	0.82	1.11	1.02	0.94	0.88	1.63	2.16	2.28	2.60	1.41	1.46	1.36	1.84	1.70	1.56	1.46
91	1.35	1.50	1.59	1.82	1.07	1.23	0.98	1.27	1.17	1.09	1.07	2.25	2.50	2.65	3.03	1.79	2.06	1.64	2.11	1.96	1.82	1.79
95	1.00	1.27	1.28	1.54	0.88	0.99	0.81	1.05	0.97	0.91	0.91	1.67	2.11	2.13	2.56	1.48	1.65	1.36	1.76	1.62	1.52	1.52
96	0.98	1.30	1.37	1.57	0.94	0.94	0.85	1.13	1.06	0.99	0.98	1.63	2.17	2.28	2.62	1.56	1.57	1.42	1.89	1.77	1.66	1.63
100	0.94	1.24	1.29	1.50	0.91	0.90	0.81	1.08	1.01	0.95	0.94	1.57	2.07	2.15	2.50	1.52	1.51	1.35	1.80	1.69	1.59	1.57
101	0.96	1.27	1.30	1.54	0.93	0.93	0.82	1.10	1.04	0.97	0.96	1.61	2.12	2.17	2.57	1.55	1.55	1.37	1.84	1.73	1.62	1.61
105	0.96	1.26	1.30	1.53	0.92	0.92	0.82	1.10	1.03	0.97	0.96	1.60	2.11	2.17	2.55	1.54	1.54	1.37	1.83	1.72	1.61	1.60
106	0.96	1.27	1.31	1.54	0.93	0.93	0.83	1.10	1.04	0.97	0.96	1.61	2.12	2.18	2.57	1.55	1.56	1.38	1.84	1.73	1.62	1.61
110	0.96	1.26	1.30	1.52	0.92	0.92	0.82	1.09	1.03	0.96	0.96	1.60	2.10	2.17	2.54	1.54	1.54	1.38	1.82	1.71	1.61	1.60
111	0.97	1.27	1.31	1.54	0.93	0.94	0.83	1.10	1.04	0.97	0.96	1.61	2.12	2.18	2.57	1.55	1.56	1.38	1.84	1.73	1.62	1.61

Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Longitudinal Shear at thin slab

	Analsys Results: Shear (k/10 ft) Load Case:												Shear Capacity (k/ft)					General Input			
Member	DEAD	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	As	d	Vn	ϕ	ϕVn	γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
18	10.1	37.3	29.7	27.9	24.4	35.6	39.8	44.8	33.4	34.8	34.8	34.8		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
23	9.4	32.0	25.0	24.9	20.9	31.3	34.2	41.3	28.6	30.0	30.0	30.5		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
78	9.3	31.7	24.8	25.2	21.1	30.9	34.1	41.8	28.3	29.6	29.6	30.3		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
83	9.3	31.5	24.7	25.3	21.2	30.8	34.1	42.1	28.1	29.4	29.4	30.2		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
88	9.4	32.5	25.2	25.8	21.5	31.8	34.8	42.9	28.9	30.2	30.2	31.0		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
93	7.6	32.0	28.8	27.1	23.7	40.1	37.8	47.3	34.0	36.7	39.5	40.1		7.5	9.9	0.75	7.4	1.3	2.17	0.30	0.20
98	9.4	32.6	25.2	25.8	21.5	31.8	34.9	43.0	29.0	30.3	30.3	31.0		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
103	9.3	31.6	24.8	25.3	21.2	30.9	34.2	42.1	28.2	29.5	29.5	30.3		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
108	9.3	31.7	24.8	25.2	21.1	30.9	34.1	41.8	28.3	29.6	29.6	30.3		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
113	9.4	31.8	24.9	24.9	21.0	31.1	34.2	41.3	28.5	29.8	29.8	30.4		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20
118	10.1	37.3	29.7	28.0	24.4	35.7	39.8	44.9	33.5	34.8	34.8	34.8		9.5	12.5	0.75	9.4	1.3	2.17	0.30	0.20

	Rating Factor																					
	Inventory											Operating										
Member	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Min	SU5 Min	SU6 Min	SU7 Min
18	**0.76**	0.96	1.02	1.17	0.80	0.78	0.69	0.85	0.82	0.82	0.82	**1.28**	1.60	1.70	1.95	1.34	1.30	1.15	1.42	1.37	1.37	1.37
23	**0.90**	1.15	1.16	1.38	0.92	0.91	0.76	1.01	0.96	0.96	0.95	**1.51**	1.92	1.94	2.30	1.54	1.52	1.26	1.68	1.61	1.61	1.58
78	**0.91**	1.17	1.15	1.37	0.93	0.92	0.75	1.02	0.98	0.98	0.95	**1.52**	1.94	1.92	2.28	1.56	1.53	1.25	1.71	1.63	1.63	1.59
83	**0.92**	1.17	1.14	1.36	0.94	0.92	0.74	1.03	0.98	0.98	0.96	**1.53**	1.95	1.91	2.27	1.57	1.53	1.24	1.72	1.64	1.64	1.60
88	**0.89**	1.14	1.12	1.34	0.91	0.90	0.73	1.00	0.95	0.95	0.93	**1.48**	1.91	1.87	2.24	1.52	1.50	1.22	1.66	1.59	1.59	1.55
93	**0.71**	0.79	0.84	0.96	0.57	0.65	0.52	0.67	0.62	0.58	0.57	**1.18**	1.32	1.40	1.60	0.95	1.09	0.87	1.12	1.03	0.96	0.95
98	**0.88**	1.14	1.12	1.34	0.91	0.90	0.73	1.00	0.95	0.95	0.93	**1.48**	1.91	1.87	2.24	1.51	1.50	1.21	1.66	1.59	1.59	1.55
103	**0.91**	1.17	1.14	1.36	0.94	0.92	0.74	1.02	0.98	0.98	0.96	**1.53**	1.95	1.91	2.28	1.56	1.53	1.24	1.71	1.64	1.64	1.59
108	**0.91**	1.16	1.15	1.37	0.93	0.92	0.75	1.02	0.98	0.98	0.95	**1.52**	1.94	1.92	2.28	1.56	1.53	1.25	1.71	1.63	1.63	1.59
113	**0.91**	1.16	1.16	1.38	0.93	0.92	0.76	1.01	0.97	0.97	0.95	**1.51**	1.93	1.93	2.30	1.55	1.53	1.26	1.69	1.61	1.61	1.58
118	**0.76**	0.96	1.02	1.17	0.80	0.78	0.69	0.85	0.82	0.82	0.82	**1.27**	1.60	1.70	1.95	1.33	1.29	1.15	1.42	1.37	1.37	1.37

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project HIDDEN LAKE BRIDGE | by KAL | sheet no.
location SNOHOMISH | date 5/22/14
client CITY OF SNOHOMISH | job no.
MOMENT @ INTERMEDIATE LOCATIONS

POSITIVE MOMENT @ END OF 11" SLAB

PLOT POINT DOESN'T CHANGE ∴ OK BY INSPECTION

PER SHEET 1 OF DWGS

NEGATIVE MOMENT @ END OF THIN SLAB

$A_s = .21 in^2$ @ TYPICAL BENT

$A_s = .55 in^2$ @ BENT NEXT TO DROP-IN SLABS

SEE SPREADSHEET FOR CALCS

POSITIVE MOMENT @ 35' FROM SUPPORT

A_s BOTTOM = 0

PER SHEET 1 OF DWGS

SEE SPREADSHEET FOR CALCS

Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Negative Longitudinal Moments @ end of thin slab (spine model symetric, ok)

Member	Analsys Results: Moment ('k/10 ft) Load Case: DEAD	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	Moment Capacity ('k/ft) As'	d	a	Mn	ϕ	ϕMn	General Input γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
18	0	0	0	0	0	0	0	0	0	0	0	0	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
23	7	-31	-20	-25	-22	-27	-26	-43	-23	-25	-27	-27	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
78	5	-36	-27	-29	-26	-40	-39	-51	-32	-34	-37	-39	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
83	5	-38	-29	-30	-28	-43	-43	-54	-34	-36	-40	-42	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
88	5	-39	-29	-31	-28	-43	-43	-55	-35	-37	-41	-42	0.55	15.5	0.59	23.0	0.8	18.4	1.3	2.17	0.30	0.20
93	0	0	0	0	0	0	0	0	0	0	0	0	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
98	7	-58	-49	-45	-42	-62	-61	-78	-56	-58	-62	-62	0.55	15.5	0.59	23.0	0.8	18.4	1.3	2.17	0.30	0.20
103	5	-41	-31	-31	-29	-47	-47	-57	-37	-40	-44	-46	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
108	5	-37	-29	-30	-27	-43	-43	-54	-34	-37	-40	-42	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
113	5	-36	-27	-28	-26	-41	-40	-51	-32	-34	-38	-40	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20
118	12	-34	-26	-25	-22	-39	-39	-44	-31	-33	-37	-38	0.21	15.5	0.23	8.9	0.8	7.1	1.3	2.17	0.30	0.20

Member	Rating Factor — Inventory: HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	Operating: HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min
18	#DIV/0!	###	###	###	#####	######	######	######	######	######	######	#DIV/0!	######	######	######	######	######	######	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
23	0.70	1.11	0.89	0.98	0.83	0.90	0.55	0.96	0.89	0.83	0.83	1.18	1.86	1.48	1.64	1.38	1.50	0.92	1.61	1.48	1.38	1.38
78	0.63	0.87	0.80	0.87	0.58	0.64	0.49	0.72	0.68	0.61	0.59	1.05	1.45	1.33	1.45	0.97	1.06	0.82	1.21	1.14	1.03	0.99
83	0.60	0.79	0.76	0.82	0.53	0.58	0.46	0.66	0.62	0.56	0.54	1.01	1.33	1.28	1.38	0.89	0.97	0.77	1.11	1.04	0.94	0.90
88	1.61	2.18	2.03	2.21	1.45	1.59	1.24	1.82	1.71	1.55	1.48	2.69	3.64	3.38	3.69	2.43	2.65	2.07	3.04	2.86	2.59	2.48
93	#DIV/0!	###	###	###	#####	######	######	######	######	######	######	#DIV/0!	######	######	######	######	######	######	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
98	1.07	1.28	1.39	1.46	1.00	1.09	0.86	1.11	1.06	1.00	1.00	1.78	2.13	2.31	2.44	1.66	1.82	1.43	1.86	1.77	1.67	1.66
103	0.57	0.74	0.73	0.79	0.49	0.53	0.43	0.61	0.58	0.52	0.50	0.94	1.23	1.23	1.32	0.81	0.88	0.72	1.02	0.97	0.88	0.83
108	0.61	0.79	0.77	0.83	0.53	0.58	0.46	0.66	0.62	0.56	0.54	1.02	1.32	1.29	1.39	0.88	0.96	0.77	1.10	1.04	0.94	0.90
113	0.64	0.85	0.81	0.88	0.56	0.62	0.49	0.71	0.67	0.60	0.58	1.07	1.41	1.35	1.47	0.94	1.03	0.81	1.18	1.11	1.00	0.96
118	0.59	0.76	0.79	0.92	0.51	0.55	0.49	0.63	0.60	0.54	0.52	0.99	1.27	1.31	1.54	0.85	0.92	0.82	1.06	1.00	0.90	0.86

Model: Spine Model - Hidden Lake Bridge V6s.sdb
Force: Positive Longitudinal Moments @ 3.5' from CL supt (spine model symetric, ok)

	Analsys Results: Moment ('k/10 ft) Load Case:												Moment Capacity ('k/ft)						General Input			
Member	DEAD	HS-20 TRUCK max	A1 max	A2 max	A3 max	NRL max	OL1 max	OL2 max	SU4 max	SU5 max	SU6 max	SU7 max	As'	d	a	Mn	ϕ	ϕMn	γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
22	-58	40	24	28	27	33	34	47	28	29	31	33	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
77	-61	43	24	29	28	33	34	50	28	30	32	33	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
82	-60	45	25	30	29	35	35	52	29	30	33	34	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
87	-61	47	34	36	37	42	43	61	39	40	42	42	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
92	-57	0	0	0	0	0	0	0	0	0	0	0	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
97	-58	50	25	30	30	31	33	53	27	28	30	31	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
102	-61	45	23	29	29	32	33	51	27	29	31	32	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
107	-60	43	22	28	28	31	31	48	26	27	29	30	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
112	-61	41	20	25	25	24	27	42	22	23	24	24	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20
117	-50	34	20	20	19	22	25	37	21	21	22	22	0	15.5	0.00	0.0	0.8	0.0	1.3	2.17	0.30	0.20

	Rating Factor																					
	Inventory											Operating										
Member	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min
22	**0.66**	1.13	0.97	0.99	0.81	0.86	0.61	0.96	0.91	0.85	0.82	**1.11**	1.88	1.61	1.65	1.35	1.43	1.02	1.60	1.53	1.41	1.37
77	**0.65**	1.17	0.97	0.98	0.84	0.89	0.61	0.99	0.95	0.88	0.85	**1.08**	1.95	1.63	1.64	1.40	1.49	1.02	1.66	1.58	1.47	1.42
82	**0.62**	1.12	0.93	0.94	0.80	0.85	0.57	0.95	0.91	0.84	0.81	**1.03**	1.88	1.56	1.57	1.33	1.42	0.96	1.59	1.51	1.41	1.36
87	**0.61**	0.83	0.78	0.75	0.67	0.71	0.50	0.73	0.70	0.67	0.67	**1.01**	1.38	1.30	1.26	1.11	1.18	0.84	1.22	1.18	1.11	1.11
92	**#DIV/0!**	###	###	###	#####	######	######	######	######	######	######	**#DIV/0!**	######	######	######	######	######	######	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
97	**0.53**	1.07	0.90	0.87	0.85	0.86	0.55	1.00	0.95	0.89	0.86	**0.89**	1.78	1.49	1.46	1.42	1.44	0.91	1.67	1.59	1.48	1.44
102	**0.62**	1.21	0.98	0.98	0.87	0.93	0.60	1.02	0.98	0.91	0.88	**1.04**	2.01	1.63	1.63	1.45	1.55	1.00	1.71	1.63	1.52	1.47
107	**0.63**	1.24	1.00	1.00	0.90	0.96	0.62	1.06	1.01	0.94	0.91	**1.06**	2.07	1.67	1.67	1.50	1.60	1.03	1.76	1.68	1.56	1.52
112	**0.69**	1.41	1.14	1.13	1.16	1.13	0.73	1.29	1.22	1.16	1.16	**1.15**	2.35	1.91	1.89	1.94	1.88	1.21	2.15	2.04	1.94	1.94
117	**0.67**	1.14	1.16	1.17	1.05	0.97	0.67	1.08	1.07	1.05	1.05	**1.12**	1.89	1.93	1.96	1.75	1.62	1.13	1.80	1.78	1.75	1.75

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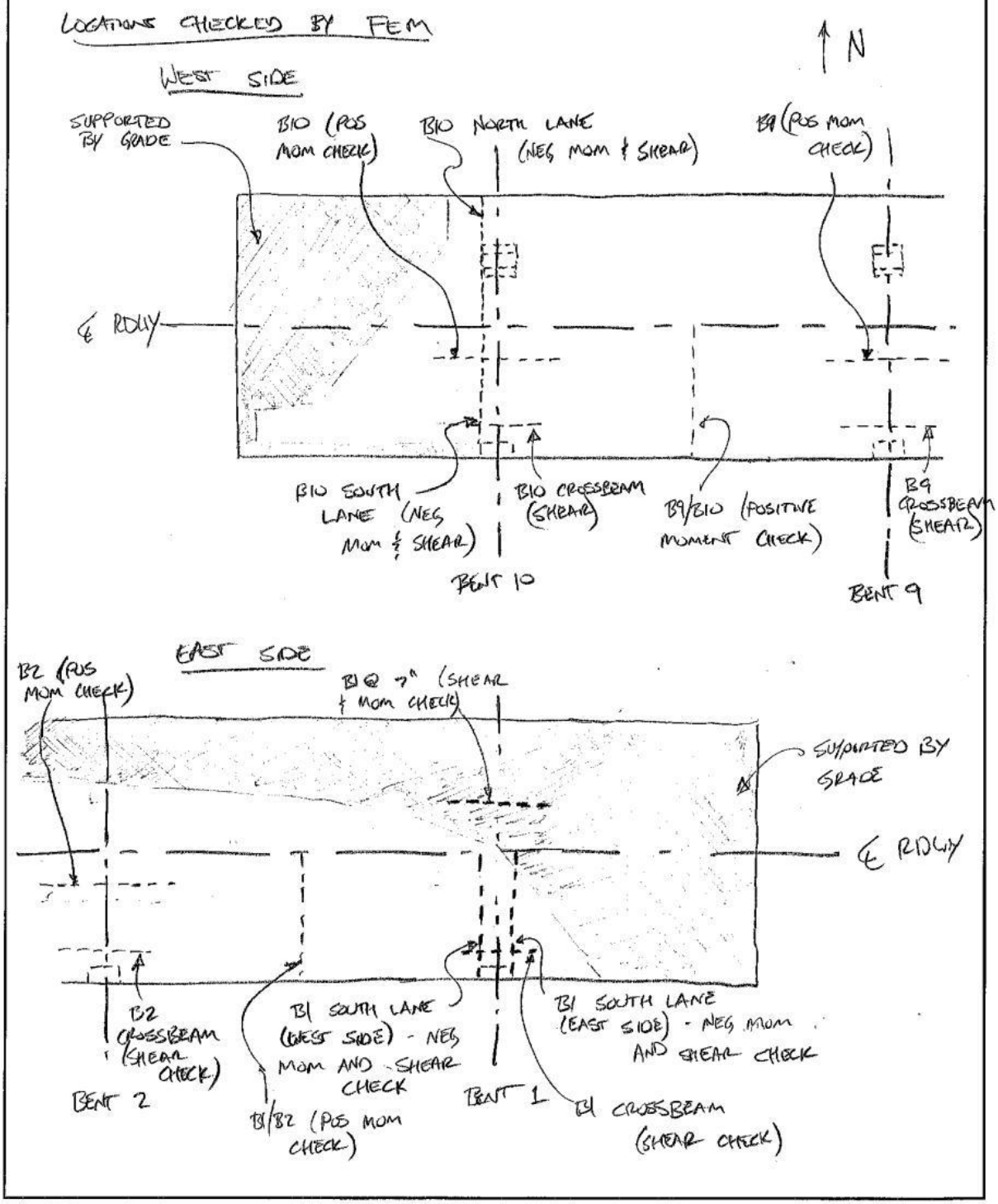
project HIDDEN LAKE BRIDGE | by BAK | sheet no.
location SHORELINE | date 5/22/14 | job no.
client CITY OF SHORELINE
DIAGRAM FOR FEA CHECKS



Model: FEM Models - 2014-02-28 Hidden Lake Bridge V15W.sdb & 2014-03-19 Hidden Lake Bridge V15E h-spt.sdb
Force: Negative Longitudinal Moment

Analsys Results:

Moment ('k/10 ft)

	Load Case:													**Moment Capacity ('k/ft)**						**General Inputs**			
	DEAD	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	env north Min	As	d	a	Mn	ϕ	ϕMn	γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
B10 north lane	83.0	150.0	110.0	125.0	100.0	127.0	49.0	66.0	111.0	122.0	132.0	134.0	95.0	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
B10 south lane	78.0	134.0	100.0	120.0	95.0	129.0	124.0	180.0	103.0	115.0	129.0	135.0	29.0	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
B1 south lane (east side)	27.0	104.0	74.0	93.0	70.0	97.0	95.0	135.0	76.0	85.0	95.0	102.0	25.0	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20
B1 south lane (west side)	75.0	128.0	101.0	113.0	92.0	143.0	114.0	160.0	115.0	123.0	134.0	142.0	33.0	1.19	15.5	1.28	48.6	0.8	38.9	1.3	2.17	0.30	0.20

Rating Factor

	Inventory											**Operating**										
	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min
B10 north lane	0.66	0.91	0.80	1.00	0.78	0.26	0.20	0.90	0.82	0.75	0.74	1.11	1.51	1.33	1.66	1.31	1.74	1.29	1.50	1.36	1.26	1.24
B10 south lane	0.76	1.02	0.85	1.07	0.79	0.66	0.45	0.99	0.89	0.79	0.76	1.27	1.70	1.42	1.79	1.32	1.25	0.86	1.65	1.48	1.32	1.26
B1 south lane (east side)	1.21	1.70	1.35	1.79	1.29	1.17	0.82	1.65	1.48	1.32	1.23	2.01	2.83	2.25	2.99	2.16	2.12	1.50	2.76	2.46	2.20	2.05
B1 south lane (west side)	0.81	1.02	0.91	1.12	0.72	0.69	0.49	0.90	0.84	0.77	0.73	1.35	1.71	1.53	1.87	1.21	1.35	0.96	1.50	1.40	1.29	1.21

Model: FEM Models - 2014-02-28 Hidden Lake Bridge V15W.sdb & 2014-03-19 Hidden Lake Bridge V15E h-spt.sdb
Force: Positive Longitudinal Moment

Analsys Results:

Moment ('k/10 ft)

	Load Case:																					
	DEAD	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	max north Min	**Moment Capacity ('k/ft)** As	d	a	Mn	ϕ	ϕMn	**General Inputs** γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
B9/B10	32.0	109.0	86.0	80.0	70.0	112.0	84.5	97.2	101.0	105.0	112.0	114.0	33.0	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20
B1/B2	28.0	105.0	86.0	80.0	70.0	111.0	85.0	99.0	98.0	102.0	108.0	109.0	27.0	1.05	9.5	1.13	25.8	0.8	20.6	1.3	2.17	0.30	0.20

Rating Factor

	Inventory											**Operating**										
	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min	HS-20 TRUCK Min	A1 Min	A2 Min	A3 Min	NRL Min	OL1 Min	OL2 Min	SU4 Min	SU5 Min	SU6 Min	SU7 Min
B9/B10	**0.54**	0.68	0.73	0.83	0.52	0.36	0.31	0.58	0.56	0.52	0.51	**0.89**	1.13	1.22	1.39	0.87	0.86	0.75	0.97	0.93	0.87	0.86
B1/B2	**0.57**	0.70	0.75	0.86	0.54	0.45	0.39	0.61	0.59	0.56	0.55	**0.96**	1.17	1.26	1.44	0.91	0.96	0.83	1.03	0.99	0.93	0.92

Model: FEM Models - 2014-02-28 Hidden Lake Bridge V15W.sdb & 2014-03-19 Hidden Lake Bridge V15E h-spt.sdb
Force: Longitudinal Shear

Analsys Results:

Shear (k/10 ft)

	Load Case:																				
	DEAD	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	max north Max	Shear Capacity (k/ft) As	d	Vn	ϕ	ϕVn	General Inputs γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
B10 north lane	22.0	43.0	35.0	32.0	30.0	43.0	10.5	11.7	36.5	37.4	41.3	43.3	34.6	15.5		20.4	0.75	15.3	1.3	2.17	0.30	0.20
B10 south lane	16.0	38.0	30.0	28.0	24.0	36.0	36.0	42.5	33.0	29.0	32.5	35.0	3.4	15.5		20.4	0.75	15.3	1.3	2.17	0.30	0.20
B1 south lane (east side)	10.0	30.0	23.6	21.6	20.0	26.5	32.0	36.0	24.0	24.0	26.0	27.0	2.5	15.5		20.4	0.75	15.3	1.3	2.17	0.30	0.20
B1 south lane (west side)	18.0	41.0	32.0	30.0	28.0	40.0	39.0	43.0	36.0	38.0	39.0	39.0	6.0	15.5		20.4	0.75	15.3	1.3	2.17	0.30	0.20

Rating Factor

	Inventory											Operating										
	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max
B10 north lane	1.02	1.26	1.37	1.47	1.02	1.24	1.12	1.21	1.18	1.07	1.02	1.71	2.10	2.29	2.45	1.71	4.28	3.84	2.01	1.96	1.78	1.70
B10 south lane	1.23	1.56	1.67	1.95	1.30	1.31	1.11	1.42	1.61	1.44	1.34	2.05	2.60	2.79	3.25	2.17	2.25	1.91	2.37	2.69	2.40	2.23
B1 south lane (east side)	1.65	2.10	2.29	2.48	1.87	1.60	1.42	2.06	2.06	1.90	1.83	2.76	3.50	3.83	4.13	3.12	2.72	2.42	3.44	3.44	3.18	3.06
B1 south lane (west side)	1.12	1.43	1.53	1.64	1.15	1.12	1.02	1.27	1.21	1.18	1.18	1.87	2.39	2.55	2.73	1.91	1.97	1.79	2.13	2.01	1.96	1.96

Model: FEM Models - 2014-02-28 Hidden Lake Bridge V15W.sdb & 2014-03-19 Hidden Lake Bridge V15E h-spt.sdb

Force: Positive Transverse Moment at Crossbeams

	Analsys Results: Moment ('k/10 ft) Load Case:													Moment Capacity ('k/ft)						General Inputs			
	DEAD	HS-20 TRUCK	A1	A2	A3	NRL	OL1	OL2	SU4	SU5	SU6	SU7	max north							γ_{OL} or			
			Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	A_s	d	a	M_n	ϕ	ϕM_n	γ_{DL}	γ_{IL}	IM_{legal}	IM_{permit}
B10	54.0	89.0	70.0	67.0	60.0	106.0	80.7	88.2	59.8	65.9	73.0	78.4	6.3	0.8	15.5	0.86	33.2	0.8	26.5	1.3	2.17	0.30	0.20
B9	62.0	94.0	73.0	72.0	64.0	112.0	86	98.7	63	69.6	77.3	83.5	6.9	0.8	15.5	0.86	33.2	0.8	26.5	1.3	2.17	0.30	0.20
B1	21.0	32.0	25.7	24.6	21.7	36.2	22.2	24.2	28.8	31.1	33.5	35.5	15	0.8	5.5	0.86	11.2	0.8	8.9	1.3	2.17	0.30	0.20
B2	94.0	110.0	80.6	84.6	73.5	124.0	102.0	116.0	90.0	101.0	112.0	121.0	31.0	0.9	15.5	0.97	37.2	0.8	29.7	1.3	2.17	0.30	0.20

	Rating Factor																						
	Inventory											Operating											
	HS-20 TRUCK	A1	A2	A3	NRL	OL1	OL2	SU4	SU5	SU6	SU7	HS-20 TRUCK	A1	A2	A3	NRL	OL1	OL2	SU4	SU5	SU6	SU7
	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min
B10	0.78	0.99	1.03	1.15	0.65	0.85	0.78	1.16	1.05	0.95	0.88	1.30	1.65	1.72	1.92	1.09	1.47	1.35	1.93	1.75	1.58	1.47
B9	0.70	0.90	0.91	1.02	0.58	0.74	0.65	1.04	0.94	0.85	0.78	1.16	1.50	1.52	1.71	0.98	1.30	1.13	1.73	1.57	1.41	1.31
B1	0.69	0.85	0.89	1.01	0.61	0.40	0.36	0.76	0.71	0.66	0.62	1.14	1.43	1.49	1.69	1.01	1.11	1.02	1.27	1.18	1.09	1.03
B2	0.56	0.77	0.73	0.84	0.50	0.36	0.31	0.69	0.61	0.55	0.51	0.94	1.29	1.22	1.41	0.84	0.80	0.70	1.15	1.03	0.93	0.86

Model: FEM Models - 2014-02-28 Hidden Lake Bridge V15W.sdb & 2014-03-19 Hidden Lake Bridge V15E h-spt.sdb
Force: Transverse Shear at Crossbeams

Analsys Results:

Shear (k/6 ft at west end or k/8' at east end)

	Load Case:																				
	DEAD	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	max north Max	**Shear Capacity (k/ft)** As	d	Vn	ϕ	ϕVn	**General Inputs** γ_{DL}	γ_{LL}	IM_{legal}	IM_{permit}
B10	24.0	35.0	26.5	25.3	22.7	40.1	36.5	41.3	24.6	26.8	29.8	32.4	1.5	15.5	20.4	0.75	15.3		1.3	2.17	0.30	0.20
B9	26.0	28.0	22.0	21.4	18.7	32.1	36.6	41.8	24.9	27.1	30.1	32.7	0.7	15.5	20.4	0.75	15.3		1.3	2.17	0.30	0.20
B2	39.7	45.8	33.8	32.7	29.9	53.4	45.5	51.7	38.5	42.2	46.7	50.7	11.0	15.5	20.4	0.75	15.3		1.3	2.17	0.30	0.20
B1	23.3	35.2	24.6	24.6	22.4	40.9	39.0	41.5	31.0	33.6	36.8	39.1	4.7	15.5	20.4	0.75	15.3		1.3	2.17	0.30	0.20
B1(@7")	3.7	11.0	10.6	9.7	8.8	12.0	5.3	6.3	11.6	11.7	11.9	11.8	11.6	5.5	7.2	0.75	5.4		1.3	2.17	0.30	0.20

Rating Factor

	Inventory											**Operating**										
	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max	HS-20 TRUCK Max	A1 Max	A2 Max	A3 Max	NRL Max	OL1 Max	OL2 Max	SU4 Max	SU5 Max	SU6 Max	SU7 Max
B10	0.61	0.81	0.85	0.94	0.53	0.59	0.53	0.87	0.80	0.72	0.66	1.02	1.35	1.41	1.58	0.89	1.02	0.90	1.45	1.33	1.20	1.10
B9	0.73	0.93	0.96	1.10	0.64	0.59	0.51	0.82	0.76	0.68	0.63	1.22	1.56	1.60	1.83	1.07	0.99	0.87	1.37	1.26	1.14	1.05
B2	0.55	0.74	0.76	0.84	0.47	0.35	0.31	0.65	0.59	0.54	0.49	0.91	1.24	1.28	1.40	0.78	0.75	0.66	1.08	0.99	0.89	0.82
B1	0.93	1.32	1.32	1.45	0.80	0.78	0.74	1.05	0.97	0.88	0.83	1.54	2.21	2.21	2.43	1.33	1.39	1.31	1.75	1.62	1.48	1.39
B1(@7")	1.24	1.29	1.41	1.55	1.14	0.60	0.51	1.18	1.17	1.15	1.16	2.07	2.15	2.35	2.59	1.90	2.47	2.08	1.97	1.95	1.92	1.93

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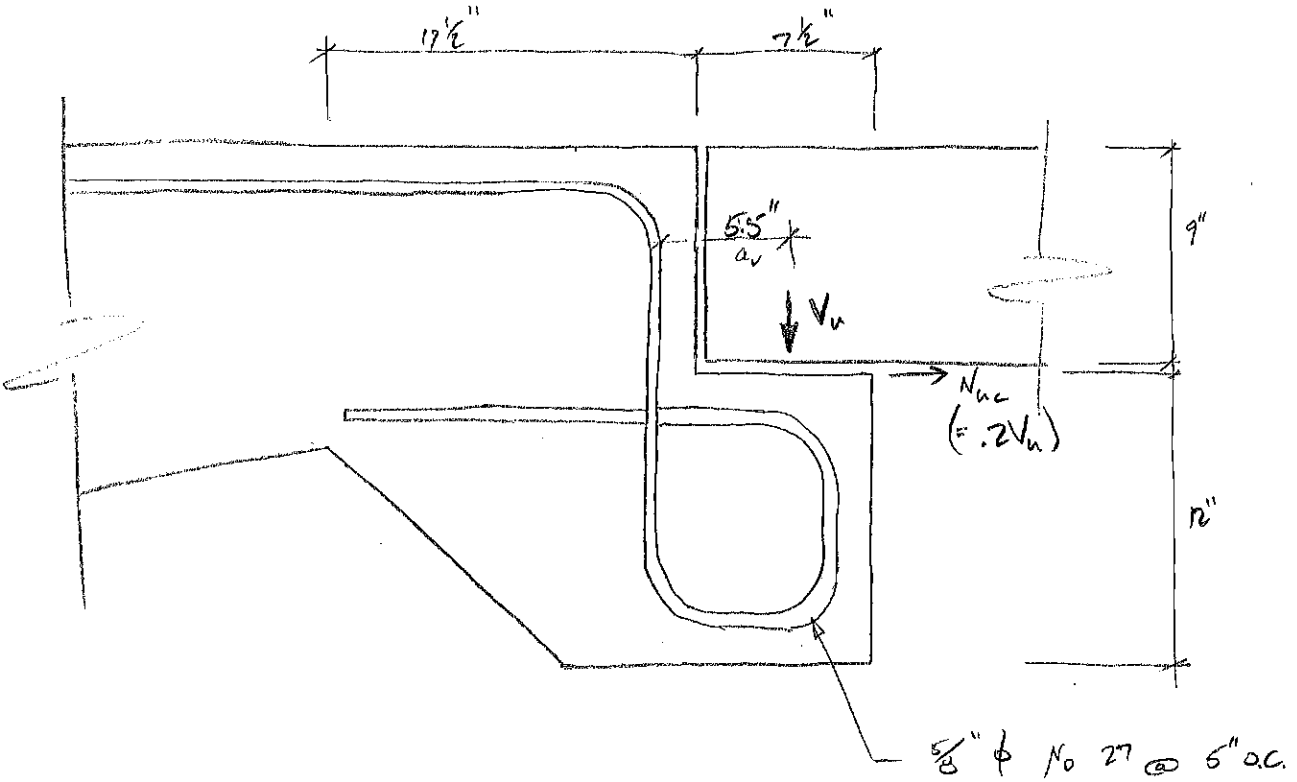
project HIDDEN LAKE BRIDGE	by BAK	sheet no. 1
location SHORELINE	date 5/23/14	
client CITY OF SHORELINE		job no.
HINGE R.F.		

DEMANDS → SEE SPREADSHEET: LONGITUDINAL SHEAR @ THIN SLAB

DETAIL



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project HIDDEN LAKE BRIDGE	by BAK	sheet no. 2
location SHORELINE	date 5/23/14	
client CITY OF SHORELINE		job no.
HINGE R.F.		

CAPACITY (8.16.6.3)

SHEAR CAPACITY (8.16.6.3.3 (b))

$V_n = A_{vf} f_y \mu$ (8-32)

$\phi V_n = \phi A_{vf} f_y \mu$

$\phi = .85$ (8.16.1.2) & (8.16.6.3.3(a))

$A_{vf} = .31 \times \frac{12}{5} = .744 \text{ in}^2/\text{ft}$

$f_y = 33 \text{ ksi}$

$\mu = 1.4 \lambda = 1.4$ (8.16.6.4.4)

$\lambda = 1.0$ (NWC)

$\phi V = .85 (.744)(33) 1.4$

$= 29.2 \text{ k/f}$

CHECK 8.16.6.3.3 (b)

$V_n \le .2 f'_c b_w d = .2 (3^k)(12")(10.\frac{k}{f}) = 75.6 \text{ k/f}$ ✓ ✓

(CONTROLS OVER $800 b_w d$)

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project HIDDEN LAKE BRIDGE	by BAK	sheet no. 3
location SHORELINE	date 5/23/14	
client CITY OF SHORELINE		job no.
HINGE R.F.		

CAPACITY (cont'd)

MOMENT CAPACITY (8.16.6.8.3c)

$$a = \frac{A_s f_y}{.85 f'_c b} = \frac{.744(33)}{.85(3)12} = .80"$$

$$\phi M_n = \phi A_s f_y (d - a/2)$$

$$= .9(.744)(33)(10.5 - .8/2)$$

$$= 18.6^{k}$$

AXIAL CAPACITY

$$\phi A_n f_y = .9(.744)\,33 = 22.1\ k/f$$

COMBINE

IN ORDER TO USE THE R.F. EQUATION, COME UP WITH ONE CAPACITY:

SHEAR CAPACITY DUE TO MOMENT

$$\phi V_{n\_m} = \phi M_n / 5.5" = 40.6^{k}$$

SHEAR CAPACITY DUE TO AXIAL

$$\phi V_{n\_ax} = \frac{\phi A_n f_y}{.2} = 110.5^{k}$$

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project	HIDDEN LAKE BRIDGE	by	BAK	sheet no.
location	SHORELINE	date	5/23/14	4
client	CITY OF SHORELINE			job no.
	HINGE R.F.			

CAPACITY (CON'T)

COMBINE (CON'T)

$$\frac{1}{\phi V_{n\_combined}} = \frac{1}{\phi V_n} + \frac{1}{\phi V_{n\_m}} + \frac{1}{\phi V_{n\_ax}}$$

$\phi V_{n\_combined} = 14.7^k/ft$

R.F.

ϕV_n @ INT SPAN (SEE SPREADSHEET)

$= 9.4^k/ft$

∴ HINGE DOES NOT CONTROL

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project HIDDEN LAKE BRIDGE	by BAK	sheet no. 5
location SHORELINE	date 6/23	
client CITY OF SHORELINE		job no.
KING C.F.		

ADD'L CHECKS

8.16.6.8.4 – ADD'L STIRRUPS

NONE, SAY OK

8.16.6.8.5 –

$$\rho = \frac{A_s}{bd} \geq .04 \frac{f'_c}{f_y}$$

$$\frac{.744}{10.5(12)} \geq .04 \frac{3}{33}$$

$$.006 \geq .004 \quad \checkmark$$

8.16.6.8.6 (b) ✓

8.16.6.8.7 ✓

Spine Model Output

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
18	DEAD	35.8	0.0	8.4	-10.1	10.1
18	HS-20 TRUCK	115.5	0.0	27.7	2.5	27.7
18	HS-20 TRUCK	0.0	-32.9	-6.3	-37.3	37.3
18	HS-20 LANE	111.2	0.0	25.2	2.1	25.2
18	HS-20 LANE	0.0	-27.2	-5.6	-31.3	31.3
18	A1	95.0	0.0	24.5	2.0	24.5
18	A1	0.0	-25.7	-4.7	-29.7	29.7
18	A2	87.2	0.0	23.3	1.9	23.3
18	A2	0.0	-24.8	-4.4	-27.9	27.9
18	A3	79.0	0.0	20.8	1.6	20.8
18	A3	0.0	-21.1	-4.0	-24.4	24.4
18	LEGAL LANE(>200')	65.7	0.0	16.9	1.4	16.9
18	LEGAL LANE(>200')	0.0	-18.4	-3.2	-20.0	20.0
18	NRL	115.9	0.0	27.6	3.0	27.6
18	NRL	0.0	-38.4	-4.9	-35.6	35.6
18	OL1	121.5	0.0	32.2	2.9	32.2
18	OL1	0.0	-38.1	-6.0	-39.8	39.8
18	OL2	137.6	0.0	38.1	3.3	38.1
18	OL2	0.0	-43.0	-6.5	-44.8	44.8
18	LEGAL LANE(<200')	65.8	0.0	16.9	1.4	16.9
18	LEGAL LANE(<200')	0.0	-18.4	-3.2	-20.0	20.0
18	H-20 TRUCK	112.3	0.0	26.1	2.0	26.1
18	H-20 TRUCK	0.0	-25.6	-6.2	-33.3	33.3
18	H-20 LANE	111.2	0.0	25.2	2.1	25.2
18	H-20 LANE	0.0	-27.2	-5.6	-31.3	31.3
19	DEAD	11.5	-61.8	18.3	8.4	18.3
19	HS-20 TRUCK	81.3	26.7	41.3	27.7	41.3
19	HS-20 TRUCK	-32.9	-103.8	-0.4	-6.3	6.3
19	HS-20 LANE	80.2	24.0	34.1	25.2	34.1
19	HS-20 LANE	-27.2	-81.7	-0.3	-5.6	5.6
19	A1	64.1	13.5	31.5	24.5	31.5
19	A1	-25.7	-80.2	-0.3	-4.7	4.7
19	A2	58.5	13.9	31.4	23.3	31.4
19	A2	-24.8	-96.5	-0.3	-4.3	4.3
19	A3	54.2	14.2	26.2	20.8	26.2
19	A3	-21.1	-79.3	-0.3	-4.0	4.0
19	LEGAL LANE(>200')	45.3	11.7	22.5	16.9	22.5
19	LEGAL LANE(>200')	-18.4	-67.9	-0.2	-3.2	3.2
19	NRL	77.7	13.5	44.5	27.6	44.5
19	NRL	-38.4	-91.6	-0.5	-4.8	4.8
19	OL1	81.1	17.0	44.4	32.2	44.4
19	OL1	-38.1	-123.8	-0.5	-6.0	6.0
19	OL2	98.8	27.3	54.1	38.1	54.1
19	OL2	-43.0	-167.2	-0.6	-6.5	6.5
19	LEGAL LANE(<200')	45.3	11.7	22.5	16.9	22.5
19	LEGAL LANE(<200')	-18.4	-68.0	-0.2	-3.2	3.2
19	H-20 TRUCK	80.7	25.4	33.2	26.1	33.2
19	H-20 TRUCK	-25.6	-67.4	-0.3	-6.2	6.2
19	H-20 LANE	80.2	24.0	34.1	25.2	34.1
19	H-20 LANE	-27.2	-81.7	-0.3	-5.6	5.6
20	DEAD	-91.7	-126.5	24.9	21.6	24.9
20	HS-20 TRUCK	9.1	8.5	41.3	41.3	41.3
20	HS-20 TRUCK	-139.2	-180.8	-0.4	-0.4	0.4
20	HS-20 LANE	7.5	7.0	34.1	34.1	34.1
20	HS-20 LANE	-120.6	-165.8	-0.3	-0.3	0.3
20	A1	7.1	6.6	31.5	31.5	31.5
20	A1	-117.0	-153.8	-0.3	-0.3	0.3
20	A2	6.9	6.4	31.4	31.4	31.4
20	A2	-125.7	-159.7	-0.3	-0.3	0.3
20	A3	5.8	5.4	26.2	26.2	26.2
20	A3	-108.4	-139.6	-0.3	-0.3	0.3
20	LEGAL LANE(>200')	5.1	4.7	22.5	22.5	22.5
20	LEGAL LANE(>200')	-93.6	-121.4	-0.2	-0.2	0.2
20	NRL	10.6	9.9	44.5	44.5	44.5
20	NRL	-145.3	-204.5	-0.5	-0.5	0.5

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
20	OL1	10.5	9.8	44.4	44.4	44.4
20	OL1	-172.2	-220.6	-0.5	-0.5	0.5
20	OL2	11.9	11.1	54.1	54.1	54.1
20	OL2	-225.4	-299.2	-0.6	-0.6	0.6
20	LEGAL LANE(<200')	5.1	4.7	22.5	22.5	22.5
20	LEGAL LANE(<200')	-93.7	-121.4	-0.2	-0.2	0.2
20	H-20 TRUCK	7.1	6.6	33.2	33.2	33.2
20	H-20 TRUCK	-106.0	-145.2	-0.3	-0.3	0.3
20	H-20 LANE	7.5	7.0	34.1	34.1	34.1
20	H-20 LANE	-120.6	-165.8	-0.3	-0.3	0.3
21	DEAD	-101.6	-137.6	-22.3	-25.6	25.6
21	HS-20 TRUCK	34.4	29.6	3.3	3.3	3.3
21	HS-20 TRUCK	-164.7	-212.6	-44.4	-44.4	44.4
21	HS-20 LANE	28.3	24.3	2.7	2.7	2.7
21	HS-20 LANE	-142.8	-183.5	-35.2	-35.2	35.2
21	A1	26.8	23.0	2.5	2.5	2.5
21	A1	-129.5	-167.0	-33.8	-33.8	33.8
21	A2	25.9	22.2	2.4	2.4	2.4
21	A2	-143.8	-178.4	-31.9	-31.9	31.9
21	A3	22.0	18.9	2.1	2.1	2.1
21	A3	-111.4	-141.7	-27.9	-27.9	27.9
21	LEGAL LANE(>200')	19.2	16.5	1.8	1.8	1.8
21	LEGAL LANE(>200')	-99.0	-126.5	-24.2	-24.2	24.2
21	NRL	40.1	34.4	3.8	3.8	3.8
21	NRL	-190.2	-254.9	-46.1	-46.1	46.1
21	OL1	39.7	34.1	3.8	3.8	3.8
21	OL1	-194.1	-248.0	-49.9	-49.9	49.9
21	OL2	45.0	38.6	4.3	4.3	4.3
21	OL2	-261.9	-321.8	-54.5	-54.5	54.5
21	LEGAL LANE(<200')	19.2	16.5	1.8	1.8	1.8
21	LEGAL LANE(<200')	-99.0	-126.6	-24.2	-24.2	24.2
21	H-20 TRUCK	26.7	22.9	2.5	2.5	2.5
21	H-20 TRUCK	-120.2	-161.1	-33.9	-33.9	33.9
21	H-20 LANE	28.3	24.3	2.7	2.7	2.7
21	H-20 LANE	-142.8	-183.5	-35.2	-35.2	35.2
22	DEAD	6.9	-70.6	-9.1	-19.0	19.0
22	HS-20 TRUCK	78.0	34.6	8.8	3.3	8.8
22	HS-20 TRUCK	-31.3	-121.6	-32.0	-44.4	44.4
22	HS-20 LANE	71.1	26.7	6.4	2.7	6.4
22	HS-20 LANE	-23.4	-108.5	-26.3	-35.2	35.2
22	A1	55.4	19.2	4.8	2.5	4.8
22	A1	-19.8	-97.3	-25.0	-33.8	33.8
22	A2	53.4	23.9	5.7	2.4	5.7
22	A2	-24.8	-112.3	-24.9	-31.9	31.9
22	A3	49.3	23.8	5.7	2.1	5.7
22	A3	-22.4	-85.1	-20.8	-27.9	27.9
22	LEGAL LANE(>200')	40.7	20.2	4.7	1.8	4.7
22	LEGAL LANE(>200')	-19.1	-74.8	-17.3	-24.2	24.2
22	NRL	63.7	28.7	4.9	3.8	4.9
22	NRL	-26.7	-134.9	-31.3	-46.1	46.1
22	OL1	70.9	28.4	6.5	3.8	6.5
22	OL1	-26.5	-142.8	-34.2	-49.9	49.9
22	OL2	83.4	42.0	9.1	4.3	9.1
22	OL2	-43.5	-202.1	-41.3	-54.5	54.5
22	LEGAL LANE(<200')	40.7	20.2	4.7	1.8	4.7
22	LEGAL LANE(<200')	-19.1	-74.8	-17.3	-24.2	24.2
22	H-20 TRUCK	72.8	23.7	6.3	2.5	6.3
22	H-20 TRUCK	-19.8	-92.1	-27.2	-33.9	33.9
22	H-20 LANE	71.1	26.7	6.4	2.7	6.4
22	H-20 LANE	-23.4	-108.5	-26.3	-35.2	35.2
23	DEAD	36.0	5.1	9.4	-9.1	9.4
23	HS-20 TRUCK	110.2	78.0	30.9	8.8	30.9
23	HS-20 TRUCK	-14.4	-36.0	-8.7	-32.0	32.0
23	HS-20 LANE	109.9	71.1	25.8	6.4	25.8
23	HS-20 LANE	-14.1	-30.4	-6.7	-26.3	26.3

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
23	A1	89.6	55.4	24.5	4.8	24.5
23	A1	-11.2	-27.7	-5.3	-25.0	25.0
23	A2	84.6	53.4	24.9	5.7	24.9
23	A2	-10.8	-28.4	-5.8	-24.9	24.9
23	A3	74.0	49.3	20.9	5.7	20.9
23	A3	-11.7	-26.3	-5.6	-20.8	20.8
23	LEGAL LANE(>200')	62.8	40.7	17.4	4.7	17.4
23	LEGAL LANE(>200')	-10.6	-22.9	-4.6	-17.3	17.3
23	NRL	120.4	63.7	30.2	4.9	30.2
23	NRL	-16.8	-41.4	-5.5	-31.3	31.3
23	OL1	117.9	70.9	33.6	6.5	33.6
23	OL1	-16.7	-41.2	-7.1	-34.2	34.2
23	OL2	141.9	83.4	41.3	9.1	41.3
23	OL2	-32.6	-51.6	-8.6	-41.3	41.3
23	LEGAL LANE(<200')	62.9	40.7	17.4	4.7	17.4
23	LEGAL LANE(<200')	-10.6	-22.9	-4.6	-17.3	17.3
23	H-20 TRUCK	107.1	72.8	26.5	6.3	26.5
23	H-20 TRUCK	-11.2	-27.6	-6.9	-27.2	27.2
23	H-20 LANE	109.9	71.1	25.8	6.4	25.8
23	H-20 LANE	-14.1	-30.4	-6.7	-26.3	26.3
24	DEAD	5.1	-73.8	19.3	9.4	19.3
24	HS-20 TRUCK	80.9	35.1	43.6	30.9	43.6
24	HS-20 TRUCK	-36.0	-122.4	-1.8	-8.6	8.6
24	HS-20 LANE	77.0	29.6	34.9	25.8	34.9
24	HS-20 LANE	-30.4	-102.4	-2.0	-6.7	6.7
24	A1	59.6	14.6	33.1	24.5	33.1
24	A1	-27.7	-89.6	-1.8	-5.3	5.3
24	A2	56.3	19.9	32.2	24.9	32.2
24	A2	-28.5	-113.1	-1.6	-5.8	5.8
24	A3	51.3	21.0	27.3	20.9	27.3
24	A3	-26.4	-90.5	-1.5	-5.6	5.6
24	LEGAL LANE(>200')	42.8	18.0	23.7	17.4	23.7
24	LEGAL LANE(>200')	-22.9	-79.3	-1.3	-4.5	4.5
24	NRL	69.8	17.4	45.4	30.2	45.4
24	NRL	-41.5	-121.1	-2.4	-5.4	5.4
24	OL1	76.0	20.3	48.7	33.6	48.7
24	OL1	-41.2	-136.4	-2.2	-7.0	7.0
24	OL2	93.1	34.6	55.1	41.3	55.1
24	OL2	-51.7	-205.7	-2.9	-8.6	8.6
24	LEGAL LANE(<200')	42.8	18.0	23.7	17.4	23.7
24	LEGAL LANE(<200')	-23.0	-79.4	-1.3	-4.5	4.5
24	H-20 TRUCK	77.7	27.5	33.5	26.5	33.5
24	H-20 TRUCK	-27.6	-82.4	-1.8	-6.9	6.9
24	H-20 LANE	77.0	29.6	34.9	25.8	34.9
24	H-20 LANE	-30.4	-102.4	-2.0	-6.7	6.7
25	DEAD	-105.2	-141.6	25.9	22.6	25.9
25	HS-20 TRUCK	18.5	15.8	43.6	43.6	43.6
25	HS-20 TRUCK	-150.3	-196.7	-1.8	-1.8	1.8
25	HS-20 LANE	22.4	19.3	34.9	34.9	34.9
25	HS-20 LANE	-135.3	-176.2	-2.0	-2.0	2.0
25	A1	18.3	15.6	33.1	33.1	33.1
25	A1	-122.6	-159.3	-1.8	-1.8	1.8
25	A2	16.7	14.3	32.2	32.2	32.2
25	A2	-144.4	-181.0	-1.6	-1.6	1.6
25	A3	15.1	12.9	27.3	27.3	27.3
25	A3	-117.2	-146.4	-1.5	-1.5	1.5
25	LEGAL LANE(>200')	13.7	11.7	23.7	23.7	23.7
25	LEGAL LANE(>200')	-103.7	-130.4	-1.3	-1.3	1.3
25	NRL	24.5	20.9	45.4	45.4	45.4
25	NRL	-174.3	-237.2	-2.4	-2.4	2.4
25	OL1	23.1	19.8	48.7	48.7	48.7
25	OL1	-186.8	-237.9	-2.2	-2.2	2.2
25	OL2	30.3	25.9	55.1	55.1	55.1
25	OL2	-265.4	-325.9	-2.9	-2.9	2.9
25	LEGAL LANE(<200')	13.7	11.7	23.7	23.7	23.7

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
25	LEGAL LANE(<200')	-103.7	-130.5	-1.3	-1.3	1.3
25	H-20 TRUCK	18.2	15.6	33.5	33.5	33.5
25	H-20 TRUCK	-109.4	-149.1	-1.8	-1.8	1.8
25	H-20 LANE	22.4	19.3	34.9	34.9	34.9
25	H-20 LANE	-135.3	-176.2	-2.0	-2.0	2.0
76	DEAD	-104.9	-141.1	-22.5	-25.8	25.8
76	HS-20 TRUCK	34.5	29.5	3.3	3.3	3.3
76	HS-20 TRUCK	-157.5	-205.0	-44.1	-44.1	44.1
76	HS-20 LANE	29.8	25.6	2.8	2.8	2.8
76	HS-20 LANE	-141.3	-181.0	-35.2	-35.2	35.2
76	A1	26.8	22.9	2.6	2.6	2.6
76	A1	-125.6	-162.8	-33.5	-33.5	33.5
76	A2	25.9	22.1	2.5	2.5	2.5
76	A2	-147.4	-183.9	-32.4	-32.4	32.4
76	A3	22.1	18.9	2.1	2.1	2.1
76	A3	-119.0	-147.8	-27.7	-27.7	27.7
76	LEGAL LANE(>200')	19.8	16.9	1.9	1.9	1.9
76	LEGAL LANE(>200')	-105.6	-132.2	-24.1	-24.1	24.1
76	NRL	40.2	34.3	3.9	3.9	3.9
76	NRL	-181.5	-245.5	-45.9	-45.9	45.9
76	OL1	39.7	33.9	3.9	3.9	3.9
76	OL1	-191.5	-242.7	-49.6	-49.6	49.6
76	OL2	45.7	39.1	4.4	4.4	4.4
76	OL2	-270.7	-331.7	-55.5	-55.5	55.5
76	LEGAL LANE(<200')	19.8	16.9	1.9	1.9	1.9
76	LEGAL LANE(<200')	-105.7	-132.2	-24.1	-24.1	24.1
76	H-20 TRUCK	26.7	22.8	2.6	2.6	2.6
76	H-20 TRUCK	-114.0	-153.5	-33.7	-33.7	33.7
76	H-20 LANE	29.8	25.6	2.8	2.8	2.8
76	H-20 LANE	-141.3	-181.0	-35.2	-35.2	35.2
77	DEAD	4.8	-73.6	-9.3	-19.2	19.2
77	HS-20 TRUCK	81.7	37.6	9.2	3.3	9.2
77	HS-20 TRUCK	-36.4	-124.8	-31.7	-44.1	44.1
77	HS-20 LANE	76.2	30.8	6.8	2.8	6.8
77	HS-20 LANE	-29.7	-107.2	-26.3	-35.2	35.2
77	A1	59.1	19.0	5.1	2.6	5.1
77	A1	-26.5	-93.1	-24.8	-33.5	33.5
77	A2	56.8	24.7	6.0	2.5	6.0
77	A2	-28.9	-115.6	-25.2	-32.4	32.4
77	A3	51.9	25.0	6.0	2.1	6.0
77	A3	-26.4	-92.0	-21.1	-27.7	27.7
77	LEGAL LANE(>200')	43.2	21.6	4.9	1.9	4.9
77	LEGAL LANE(>200')	-22.9	-80.9	-17.6	-24.1	24.1
77	NRL	68.6	28.5	5.2	3.9	5.2
77	NRL	-39.5	-127.8	-30.9	-45.9	45.9
77	OL1	75.4	28.1	6.9	3.9	6.9
77	OL1	-39.2	-140.2	-34.1	-49.6	49.6
77	OL2	89.4	44.0	9.6	4.4	9.6
77	OL2	-50.7	-210.0	-41.8	-55.5	55.5
77	LEGAL LANE(<200')	43.2	21.6	4.9	1.9	4.9
77	LEGAL LANE(<200')	-22.9	-80.9	-17.6	-24.1	24.1
77	H-20 TRUCK	77.0	26.9	6.6	2.6	6.6
77	H-20 TRUCK	-26.6	-86.8	-26.9	-33.7	33.7
77	H-20 LANE	76.2	30.8	6.8	2.8	6.8
77	H-20 LANE	-29.7	-107.2	-26.3	-35.2	35.2
78	DEAD	35.1	4.8	9.2	-9.3	9.3
78	HS-20 TRUCK	112.7	81.7	31.3	9.2	31.3
78	HS-20 TRUCK	-15.7	-37.5	-9.2	-31.7	31.7
78	HS-20 LANE	113.0	76.2	26.0	6.8	26.0
78	HS-20 LANE	-16.5	-32.1	-7.0	-26.3	26.3
78	A1	91.8	59.1	24.6	5.1	24.6
78	A1	-12.2	-29.1	-5.3	-24.8	24.8
78	A2	86.9	56.8	25.1	6.0	25.1
78	A2	-11.8	-29.6	-6.1	-25.2	25.2
78	A3	75.8	51.9	21.1	6.0	21.1

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
78	A3	-13.3	-27.6	-6.0	-21.1	21.1
78	LEGAL LANE(>200')	64.6	43.2	17.6	4.9	17.6
78	LEGAL LANE(>200')	-12.3	-24.1	-4.9	-17.6	17.6
78	NRL	124.1	68.6	30.5	5.2	30.5
78	NRL	-18.3	-43.6	-5.4	-30.9	30.9
78	OL1	121.2	75.4	33.9	6.9	33.9
78	OL1	-18.2	-43.3	-7.1	-34.1	34.1
78	OL2	146.3	89.4	41.8	9.6	41.8
78	OL2	-38.6	-54.1	-9.5	-41.8	41.8
78	LEGAL LANE(<200')	64.6	43.2	17.6	4.9	17.6
78	LEGAL LANE(<200')	-12.3	-24.1	-4.9	-17.6	17.6
78	H-20 TRUCK	109.4	77.0	26.6	6.6	26.6
78	H-20 TRUCK	-12.2	-29.0	-6.8	-26.9	26.9
78	H-20 LANE	113.0	76.2	26.0	6.8	26.0
78	H-20 LANE	-16.5	-32.1	-7.0	-26.3	26.3
79	DEAD	5.4	-72.5	19.1	9.2	19.1
79	HS-20 TRUCK	82.9	38.0	43.8	31.3	43.8
79	HS-20 TRUCK	-37.6	-124.9	-3.0	-9.2	9.2
79	HS-20 LANE	78.7	32.4	35.1	26.0	35.1
79	HS-20 LANE	-32.1	-104.5	-2.6	-7.0	7.0
79	A1	60.6	17.0	33.2	24.6	33.2
79	A1	-29.1	-90.2	-2.4	-5.3	5.3
79	A2	58.0	23.5	32.4	25.1	32.4
79	A2	-29.7	-115.3	-2.3	-6.0	6.0
79	A3	52.8	24.2	27.5	21.1	27.5
79	A3	-27.6	-91.9	-1.9	-6.0	6.0
79	LEGAL LANE(>200')	44.1	21.1	23.9	17.6	23.9
79	LEGAL LANE(>200')	-24.1	-80.8	-1.7	-4.9	4.9
79	NRL	71.1	25.2	45.6	30.5	45.6
79	NRL	-43.6	-122.7	-3.5	-5.4	5.4
79	OL1	77.3	24.9	49.1	33.9	49.1
79	OL1	-43.3	-137.9	-3.5	-7.1	7.1
79	OL2	95.6	41.8	55.4	41.8	55.4
79	OL2	-54.2	-209.7	-3.9	-9.5	9.5
79	LEGAL LANE(<200')	44.2	21.1	23.9	17.6	23.9
79	LEGAL LANE(<200')	-24.1	-80.8	-1.7	-4.9	4.9
79	H-20 TRUCK	78.9	28.3	33.5	26.6	33.5
79	H-20 TRUCK	-29.0	-83.3	-2.4	-6.8	6.8
79	H-20 LANE	78.7	32.4	35.1	26.0	35.1
79	H-20 LANE	-32.1	-104.5	-2.6	-7.0	7.0
80	DEAD	-103.7	-139.8	25.7	22.4	25.7
80	HS-20 TRUCK	30.6	26.1	43.8	43.8	43.8
80	HS-20 TRUCK	-152.6	-199.1	-3.0	-3.0	3.0
80	HS-20 LANE	28.3	24.4	35.1	35.1	35.1
80	HS-20 LANE	-138.0	-177.7	-2.6	-2.6	2.6
80	A1	24.0	20.5	33.2	33.2	33.2
80	A1	-123.0	-160.0	-2.4	-2.4	2.4
80	A2	23.2	19.8	32.4	32.4	32.4
80	A2	-147.1	-183.3	-2.3	-2.3	2.3
80	A3	19.7	16.8	27.5	27.5	27.5
80	A3	-118.8	-147.6	-1.9	-1.9	1.9
80	LEGAL LANE(>200')	18.0	15.5	23.9	23.9	23.9
80	LEGAL LANE(>200')	-105.4	-132.0	-1.7	-1.7	1.7
80	NRL	35.7	30.5	45.6	45.6	45.6
80	NRL	-175.6	-239.0	-3.5	-3.5	3.5
80	OL1	35.3	30.1	49.1	49.1	49.1
80	OL1	-188.8	-240.4	-3.5	-3.5	3.5
80	OL2	40.1	34.2	55.4	55.4	55.4
80	OL2	-270.2	-331.3	-3.9	-3.9	3.9
80	LEGAL LANE(<200')	18.1	15.5	23.9	23.9	23.9
80	LEGAL LANE(<200')	-105.5	-132.0	-1.7	-1.7	1.7
80	H-20 TRUCK	24.1	20.5	33.5	33.5	33.5
80	H-20 TRUCK	-109.9	-149.1	-2.4	-2.4	2.4
80	H-20 LANE	28.3	24.4	35.1	35.1	35.1
80	H-20 LANE	-138.0	-177.7	-2.6	-2.6	2.6

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
81	DEAD	-103.9	-140.0	-22.4	-25.7	25.7
81	HS-20 TRUCK	35.9	30.7	3.5	3.5	3.5
81	HS-20 TRUCK	-154.7	-202.1	-44.0	-44.0	44.0
81	HS-20 LANE	31.4	26.9	2.9	2.9	2.9
81	HS-20 LANE	-140.3	-179.7	-35.2	-35.2	35.2
81	A1	27.7	23.6	2.7	2.7	2.7
81	A1	-124.1	-161.2	-33.4	-33.4	33.4
81	A2	26.8	22.8	2.6	2.6	2.6
81	A2	-148.1	-184.3	-32.4	-32.4	32.4
81	A3	22.5	19.2	2.2	2.2	2.2
81	A3	-119.4	-148.1	-27.6	-27.6	27.6
81	LEGAL LANE(>200')	20.5	17.5	2.0	2.0	2.0
81	LEGAL LANE(>200')	-106.2	-132.7	-24.0	-24.0	24.0
81	NRL	41.8	35.7	4.1	4.1	4.1
81	NRL	-178.1	-242.0	-45.8	-45.8	45.8
81	OL1	41.4	35.3	4.1	4.1	4.1
81	OL1	-190.4	-242.0	-49.4	-49.4	49.4
81	OL2	46.5	39.7	4.5	4.5	4.5
81	OL2	-272.0	-333.3	-55.5	-55.5	55.5
81	LEGAL LANE(<200')	20.5	17.5	2.0	2.0	2.0
81	LEGAL LANE(<200')	-106.2	-132.7	-24.0	-24.0	24.0
81	H-20 TRUCK	27.3	23.3	2.7	2.7	2.7
81	H-20 TRUCK	-111.8	-150.7	-33.6	-33.6	33.6
81	H-20 LANE	31.4	26.9	2.9	2.9	2.9
81	H-20 LANE	-140.3	-179.7	-35.2	-35.2	35.2
82	DEAD	5.3	-72.7	-9.2	-19.1	19.1
82	HS-20 TRUCK	83.2	39.0	9.4	3.5	9.4
82	HS-20 TRUCK	-37.7	-125.7	-31.5	-44.0	44.0
82	HS-20 LANE	78.4	32.7	7.0	2.9	7.0
82	HS-20 LANE	-31.8	-106.4	-26.2	-35.2	35.2
82	A1	60.4	19.5	5.2	2.7	5.2
82	A1	-28.7	-91.5	-24.7	-33.4	33.4
82	A2	58.2	25.5	6.1	2.6	6.1
82	A2	-29.8	-116.2	-25.2	-32.4	32.4
82	A3	53.0	25.9	6.2	2.2	6.2
82	A3	-27.6	-92.4	-21.1	-27.6	27.6
82	LEGAL LANE(>200')	44.3	22.5	5.1	2.0	5.1
82	LEGAL LANE(>200')	-24.1	-81.4	-17.6	-24.0	24.0
82	NRL	70.7	29.5	5.3	4.1	5.3
82	NRL	-42.9	-125.0	-30.8	-45.8	45.8
82	OL1	77.1	29.2	7.0	4.1	7.0
82	OL1	-42.6	-139.3	-34.1	-49.4	49.4
82	OL2	94.0	46.1	9.9	4.5	9.9
82	OL2	-53.8	-211.2	-41.9	-55.5	55.5
82	LEGAL LANE(<200')	44.3	22.6	5.1	2.0	5.1
82	LEGAL LANE(<200')	-24.1	-81.4	-17.6	-24.0	24.0
82	H-20 TRUCK	78.6	28.1	6.7	2.7	6.7
82	H-20 TRUCK	-28.6	-84.8	-26.7	-33.6	33.6
82	H-20 LANE	78.4	32.7	7.0	2.9	7.0
82	H-20 LANE	-31.8	-106.4	-26.2	-35.2	35.2
83	DEAD	35.1	4.9	9.3	-9.2	9.3
83	HS-20 TRUCK	113.6	83.2	31.4	9.4	31.4
83	HS-20 TRUCK	-16.8	-39.7	-9.3	-31.5	31.5
83	HS-20 LANE	114.3	78.4	26.1	7.0	26.1
83	HS-20 LANE	-17.5	-33.2	-7.1	-26.2	26.2
83	A1	92.5	60.4	24.7	5.2	24.7
83	A1	-13.0	-30.5	-5.3	-24.7	24.7
83	A2	87.7	58.2	25.3	6.1	25.3
83	A2	-12.5	-30.8	-6.1	-25.2	25.2
83	A3	77.1	53.0	21.2	6.2	21.2
83	A3	-14.1	-28.7	-6.1	-21.1	21.1
83	LEGAL LANE(>200')	65.8	44.3	17.7	5.1	17.7
83	LEGAL LANE(>200')	-13.1	-25.0	-5.1	-17.6	17.6
83	NRL	125.4	70.7	30.7	5.3	30.7
83	NRL	-19.6	-46.2	-5.4	-30.8	30.8

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
83	OL1	122.4	77.1	34.1	7.0	34.1
83	OL1	-19.6	-46.0	-7.1	-34.1	34.1
83	OL2	149.3	94.0	42.1	9.9	42.1
83	OL2	-41.4	-56.6	-9.7	-41.9	41.9
83	LEGAL LANE(<200')	65.8	44.3	17.7	5.1	17.7
83	LEGAL LANE(<200')	-13.1	-25.0	-5.1	-17.6	17.6
83	H-20 TRUCK	110.2	78.6	26.6	6.7	26.6
83	H-20 TRUCK	-12.8	-30.2	-6.8	-26.7	26.7
83	H-20 LANE	114.3	78.4	26.1	7.0	26.1
83	H-20 LANE	-17.5	-33.2	-7.1	-26.2	26.2
84	DEAD	4.9	-73.5	19.2	9.3	19.2
84	HS-20 TRUCK	83.4	38.8	44.0	31.4	44.0
84	HS-20 TRUCK	-39.7	-127.0	-3.2	-9.3	9.3
84	HS-20 LANE	79.4	33.4	35.2	26.1	35.2
84	HS-20 LANE	-33.2	-105.7	-2.8	-7.0	7.0
84	A1	60.9	18.2	33.3	24.7	33.3
84	A1	-30.6	-90.7	-2.5	-5.3	5.3
84	A2	58.5	24.5	32.5	25.3	32.5
84	A2	-30.9	-117.6	-2.4	-6.1	6.1
84	A3	53.2	25.1	27.5	21.2	27.5
84	A3	-28.8	-93.9	-2.1	-6.1	6.1
84	LEGAL LANE(>200')	44.6	22.1	24.0	17.7	24.0
84	LEGAL LANE(>200')	-25.1	-82.6	-1.9	-5.0	5.0
84	NRL	71.5	27.2	45.7	30.7	45.7
84	NRL	-46.2	-123.5	-3.8	-5.4	5.4
84	OL1	77.7	26.8	49.3	34.1	49.3
84	OL1	-46.0	-139.1	-3.8	-7.1	7.1
84	OL2	99.6	43.8	55.7	42.1	55.7
84	OL2	-56.7	-213.8	-4.2	-9.7	9.7
84	LEGAL LANE(<200')	44.6	22.1	24.0	17.7	24.0
84	LEGAL LANE(<200')	-25.1	-82.6	-1.9	-5.0	5.0
84	H-20 TRUCK	79.2	28.5	33.5	26.6	33.5
84	H-20 TRUCK	-30.2	-83.7	-2.5	-6.8	6.8
84	H-20 LANE	79.4	33.4	35.2	26.1	35.2
84	H-20 LANE	-33.2	-105.7	-2.8	-7.0	7.0
85	DEAD	-104.7	-141.0	25.8	22.5	25.8
85	HS-20 TRUCK	33.0	28.2	44.0	44.0	44.0
85	HS-20 TRUCK	-155.0	-200.3	-3.2	-3.2	3.2
85	HS-20 LANE	30.6	26.3	35.2	35.2	35.2
85	HS-20 LANE	-139.4	-178.8	-2.8	-2.8	2.8
85	A1	25.8	22.0	33.3	33.3	33.3
85	A1	-123.6	-160.6	-2.5	-2.5	2.5
85	A2	24.9	21.2	32.5	32.5	32.5
85	A2	-149.6	-186.2	-2.4	-2.4	2.4
85	A3	21.1	18.0	27.5	27.5	27.5
85	A3	-121.1	-149.8	-2.1	-2.1	2.1
85	LEGAL LANE(>200')	19.5	16.7	24.0	24.0	24.0
85	LEGAL LANE(>200')	-107.4	-133.9	-1.9	-1.9	1.9
85	NRL	38.5	32.8	45.7	45.7	45.7
85	NRL	-176.4	-240.1	-3.8	-3.8	3.8
85	OL1	38.1	32.4	49.3	49.3	49.3
85	OL1	-190.2	-242.2	-3.8	-3.8	3.8
85	OL2	43.0	36.7	55.7	55.7	55.7
85	OL2	-274.8	-336.6	-4.2	-4.2	4.2
85	LEGAL LANE(<200')	19.5	16.7	24.0	24.0	24.0
85	LEGAL LANE(<200')	-107.5	-134.0	-1.9	-1.9	1.9
85	H-20 TRUCK	25.7	21.9	33.5	33.5	33.5
85	H-20 TRUCK	-110.5	-149.2	-2.5	-2.5	2.5
85	H-20 LANE	30.6	26.3	35.2	35.2	35.2
85	H-20 LANE	-139.4	-178.8	-2.8	-2.8	2.8
86	DEAD	-105.6	-142.0	-22.6	-25.9	25.9
86	HS-20 TRUCK	48.0	41.0	4.7	4.7	4.7
86	HS-20 TRUCK	-163.4	-212.2	-44.8	-44.8	44.8
86	HS-20 LANE	51.7	44.3	4.9	4.9	4.9
86	HS-20 LANE	-146.0	-183.3	-35.3	-35.3	35.3

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
86	A1	43.1	36.8	4.2	4.2	4.2
86	A1	-128.0	-165.7	-34.0	-34.0	34.0
86	A2	39.3	33.6	3.8	3.8	3.8
86	A2	-153.7	-190.2	-32.8	-32.8	32.8
86	A3	35.5	30.3	3.5	3.5	3.5
86	A3	-123.7	-151.8	-28.1	-28.1	28.1
86	LEGAL LANE(>200')	30.6	26.2	2.9	2.9	2.9
86	LEGAL LANE(>200')	-109.6	-135.7	-24.4	-24.4	24.4
86	NRL	54.5	46.5	5.3	5.3	5.3
86	NRL	-186.8	-252.2	-46.4	-46.4	46.4
86	OL1	54.5	46.5	5.3	5.3	5.3
86	OL1	-196.8	-249.1	-50.6	-50.6	50.6
86	OL2	65.9	56.2	6.4	6.4	6.4
86	OL2	-281.7	-344.4	-56.3	-56.3	56.3
86	LEGAL LANE(<200')	30.6	26.2	2.9	2.9	2.9
86	LEGAL LANE(<200')	-109.6	-135.7	-24.4	-24.4	24.4
86	H-20 TRUCK	47.9	40.9	4.7	4.7	4.7
86	H-20 TRUCK	-117.9	-155.8	-33.9	-33.9	33.9
86	H-20 LANE	51.7	44.3	4.9	4.9	4.9
86	H-20 LANE	-146.0	-183.3	-35.3	-35.3	35.3
87	DEAD	4.9	-74.1	-9.4	-19.3	19.3
87	HS-20 TRUCK	86.3	40.8	11.0	4.7	11.0
87	HS-20 TRUCK	-39.1	-130.3	-32.5	-44.8	44.8
87	HS-20 LANE	78.2	38.4	6.8	4.9	6.8
87	HS-20 LANE	-32.0	-111.1	-26.5	-35.3	35.3
87	A1	60.1	30.5	4.9	4.2	4.9
87	A1	-28.9	-95.8	-25.2	-34.0	34.0
87	A2	59.9	32.9	6.7	3.8	6.7
87	A2	-31.1	-120.8	-25.8	-32.8	32.8
87	A3	54.2	35.0	6.8	3.5	6.8
87	A3	-28.5	-95.9	-21.5	-28.1	28.1
87	LEGAL LANE(>200')	45.3	29.7	5.6	2.9	5.6
87	LEGAL LANE(>200')	-24.8	-84.2	-17.9	-24.4	24.4
87	NRL	70.0	38.5	5.3	5.3	5.3
87	NRL	-43.3	-132.9	-31.8	-46.4	46.4
87	OL1	77.3	38.5	7.0	5.3	7.0
87	OL1	-43.0	-144.6	-34.8	-50.6	50.6
87	OL2	94.3	55.9	10.7	6.4	10.7
87	OL2	-55.0	-219.3	-42.9	-56.3	56.3
87	LEGAL LANE(<200')	45.3	29.7	5.6	2.9	5.6
87	LEGAL LANE(<200')	-24.8	-84.3	-17.9	-24.4	24.4
87	H-20 TRUCK	78.2	33.9	6.4	4.7	6.4
87	H-20 TRUCK	-28.8	-90.0	-27.3	-33.9	33.9
87	H-20 LANE	78.2	38.4	6.8	4.9	6.8
87	H-20 LANE	-32.0	-111.1	-26.5	-35.3	35.3
88	DEAD	35.9	4.9	9.1	-9.4	9.4
88	HS-20 TRUCK	117.7	86.3	30.7	11.0	30.7
88	HS-20 TRUCK	-24.4	-57.2	-10.0	-32.5	32.5
88	HS-20 LANE	117.8	78.2	25.5	6.8	25.5
88	HS-20 LANE	-27.1	-54.6	-7.5	-26.5	26.5
88	A1	96.4	60.1	24.7	4.9	24.7
88	A1	-20.0	-47.3	-5.9	-25.2	25.2
88	A2	91.5	59.9	24.5	6.7	24.5
88	A2	-18.3	-43.6	-6.7	-25.8	25.8
88	A3	79.3	54.2	20.9	6.8	20.9
88	A3	-20.9	-41.5	-6.6	-21.5	21.5
88	LEGAL LANE(>200')	67.6	45.3	17.5	5.6	17.5
88	LEGAL LANE(>200')	-18.4	-34.8	-5.4	-17.9	17.9
88	NRL	131.6	70.0	30.0	5.3	30.0
88	NRL	-25.5	-60.0	-6.1	-31.8	31.8
88	OL1	127.8	77.3	34.7	7.0	34.7
88	OL1	-25.3	-59.9	-7.9	-34.8	34.8
88	OL2	154.1	94.3	42.1	10.7	42.1
88	OL2	-52.7	-75.7	-10.4	-42.9	42.9
88	LEGAL LANE(<200')	67.6	45.3	17.5	5.6	17.5

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
88	LEGAL LANE(<200')	-18.5	-34.8	-5.4	-17.9	17.9
88	H-20 TRUCK	113.9	78.2	25.8	6.4	25.8
88	H-20 TRUCK	-22.3	-52.7	-7.6	-27.3	27.3
88	H-20 LANE	117.8	78.2	25.5	6.8	25.5
88	H-20 LANE	-27.1	-54.6	-7.5	-26.5	26.5
89	DEAD	6.9	-70.4	19.0	9.1	19.0
89	HS-20 TRUCK	90.3	43.2	43.4	30.7	43.4
89	HS-20 TRUCK	-57.3	-149.7	-3.1	-10.0	10.0
89	HS-20 LANE	86.3	34.9	36.5	25.5	36.5
89	HS-20 LANE	-54.6	-100.6	-2.6	-7.5	7.5
89	A1	69.1	18.1	32.7	24.7	32.7
89	A1	-47.4	-89.9	-2.4	-5.9	5.9
89	A2	65.2	24.4	31.0	24.5	31.0
89	A2	-43.7	-126.0	-2.3	-6.6	6.6
89	A3	58.5	26.1	27.2	20.9	27.2
89	A3	-41.5	-94.4	-2.0	-6.5	6.5
89	LEGAL LANE(>200')	48.6	21.8	24.2	17.5	24.2
89	LEGAL LANE(>200')	-34.8	-82.3	-1.7	-5.3	5.3
89	NRL	83.5	23.9	50.2	30.0	50.2
89	NRL	-60.1	-111.2	-3.6	-6.0	6.0
89	OL1	88.1	24.8	52.3	34.7	52.3
89	OL1	-59.9	-151.5	-3.6	-7.9	7.9
89	OL2	103.9	44.9	56.2	42.1	56.2
89	OL2	-75.7	-222.1	-4.1	-10.4	10.4
89	LEGAL LANE(<200')	48.6	21.8	24.2	17.5	24.2
89	LEGAL LANE(<200')	-34.8	-82.3	-1.7	-5.3	5.3
89	H-20 TRUCK	87.7	34.1	33.0	25.8	33.0
89	H-20 TRUCK	-52.7	-79.1	-2.4	-7.5	7.5
89	H-20 LANE	86.3	34.9	36.5	25.5	36.5
89	H-20 LANE	-54.6	-100.6	-2.6	-7.5	7.5
90	DEAD	-101.4	-137.4	25.6	22.3	25.6
90	HS-20 TRUCK	29.9	25.2	43.4	43.4	43.4
90	HS-20 TRUCK	-179.9	-225.3	-3.1	-3.1	3.1
90	HS-20 LANE	24.5	20.7	36.5	36.5	36.5
90	HS-20 LANE	-128.5	-169.0	-2.6	-2.6	2.6
90	A1	23.3	19.6	32.7	32.7	32.7
90	A1	-127.9	-169.1	-2.4	-2.4	2.4
90	A2	22.5	19.0	31.0	31.0	31.0
90	A2	-153.4	-180.8	-2.3	-2.3	2.3
90	A3	19.1	16.1	27.2	27.2	27.2
90	A3	-123.1	-151.7	-2.0	-2.0	2.0
90	LEGAL LANE(>200')	16.7	14.1	24.2	24.2	24.2
90	LEGAL LANE(>200')	-108.9	-136.1	-1.7	-1.7	1.7
90	NRL	34.8	29.4	50.2	50.2	50.2
90	NRL	-164.2	-229.0	-3.6	-3.6	3.6
90	OL1	34.4	29.0	52.3	52.3	52.3
90	OL1	-218.8	-286.8	-3.6	-3.6	3.6
90	OL2	39.0	32.9	56.2	56.2	56.2
90	OL2	-291.2	-360.3	-4.1	-4.1	4.1
90	LEGAL LANE(<200')	16.7	14.1	24.2	24.2	24.2
90	LEGAL LANE(<200')	-108.9	-136.1	-1.7	-1.7	1.7
90	H-20 TRUCK	23.1	19.5	33.0	33.0	33.0
90	H-20 TRUCK	-99.9	-140.8	-2.4	-2.4	2.4
90	H-20 LANE	24.5	20.7	36.5	36.5	36.5
90	H-20 LANE	-128.5	-169.0	-2.6	-2.6	2.6
91	DEAD	-97.6	-131.3	-20.8	-24.1	24.1
91	HS-20 TRUCK	0.0	0.0	0.0	0.0	0.0
91	HS-20 TRUCK	-223.9	-271.8	-32.0	-32.0	32.0
91	HS-20 LANE	0.0	0.0	0.0	0.0	0.0
91	HS-20 LANE	-236.7	-287.5	-33.8	-33.8	33.8
91	A1	0.0	0.0	0.0	0.0	0.0
91	A1	-201.2	-244.4	-28.7	-28.7	28.7
91	A2	0.0	0.0	0.0	0.0	0.0
91	A2	-189.9	-230.6	-27.1	-27.1	27.1
91	A3	0.0	0.0	0.0	0.0	0.0

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
91	A3	-165.7	-201.2	-23.7	-23.7	23.7
91	LEGAL LANE(>200')	0.0	0.0	0.0	0.0	0.0
91	LEGAL LANE(>200')	-141.4	-171.7	-20.2	-20.2	20.2
91	NRL	0.0	0.0	0.0	0.0	0.0
91	NRL	-280.6	-340.8	-40.1	-40.1	40.1
91	OL1	0.0	0.0	0.0	0.0	0.0
91	OL1	-264.7	-321.4	-37.8	-37.8	37.8
91	OL2	0.0	0.0	0.0	0.0	0.0
91	OL2	-331.4	-402.4	-47.3	-47.3	47.3
91	LEGAL LANE(<200')	0.0	0.0	0.0	0.0	0.0
91	LEGAL LANE(<200')	-141.5	-171.8	-20.2	-20.2	20.2
91	H-20 TRUCK	0.0	0.0	0.0	0.0	0.0
91	H-20 TRUCK	-223.9	-271.8	-32.0	-32.0	32.0
91	H-20 LANE	0.0	0.0	0.0	0.0	0.0
91	H-20 LANE	-236.7	-287.5	-33.8	-33.8	33.8
92	DEAD	0.0	-68.9	-7.6	-17.5	17.5
92	HS-20 TRUCK	0.0	0.0	0.0	0.0	0.0
92	HS-20 TRUCK	0.0	-175.9	-32.0	-32.0	32.0
92	HS-20 LANE	0.0	0.0	0.0	0.0	0.0
92	HS-20 LANE	0.0	-186.0	-33.8	-33.8	33.8
92	A1	0.0	0.0	0.0	0.0	0.0
92	A1	0.0	-158.1	-28.7	-28.7	28.7
92	A2	0.0	0.0	0.0	0.0	0.0
92	A2	0.0	-149.2	-27.1	-27.1	27.1
92	A3	0.0	0.0	0.0	0.0	0.0
92	A3	0.0	-130.2	-23.7	-23.7	23.7
92	LEGAL LANE(>200')	0.0	0.0	0.0	0.0	0.0
92	LEGAL LANE(>200')	0.0	-111.1	-20.2	-20.2	20.2
92	NRL	0.0	0.0	0.0	0.0	0.0
92	NRL	0.0	-220.5	-40.1	-40.1	40.1
92	OL1	0.0	0.0	0.0	0.0	0.0
92	OL1	0.0	-208.0	-37.8	-37.8	37.8
92	OL2	0.0	0.0	0.0	0.0	0.0
92	OL2	0.0	-260.4	-47.3	-47.3	47.3
92	LEGAL LANE(<200')	0.0	0.0	0.0	0.0	0.0
92	LEGAL LANE(<200')	0.0	-111.2	-20.2	-20.2	20.2
92	H-20 TRUCK	0.0	0.0	0.0	0.0	0.0
92	H-20 TRUCK	0.0	-175.9	-32.0	-32.0	32.0
92	H-20 LANE	0.0	0.0	0.0	0.0	0.0
92	H-20 LANE	0.0	-186.0	-33.8	-33.8	33.8
93	DEAD	24.6	0.0	7.6	-7.6	7.6
93	HS-20 TRUCK	104.0	0.0	32.0	0.0	32.0
93	HS-20 TRUCK	0.0	0.0	0.0	-32.0	32.0
93	HS-20 LANE	98.0	0.0	30.1	0.0	30.1
93	HS-20 LANE	0.0	0.0	0.0	-33.8	33.8
93	A1	76.5	0.0	28.8	0.0	28.8
93	A1	0.0	0.0	0.0	-28.7	28.7
93	A2	69.8	0.0	26.2	0.0	26.2
93	A2	0.0	0.0	0.0	-27.1	27.1
93	A3	63.0	0.0	23.7	0.0	23.7
93	A3	0.0	0.0	0.0	-23.7	23.7
93	LEGAL LANE(>200')	51.5	0.0	19.1	0.0	19.1
93	LEGAL LANE(>200')	0.0	0.0	0.0	-20.2	20.2
93	NRL	86.6	0.0	32.4	0.0	32.4
93	NRL	0.0	0.0	0.0	-40.1	40.1
93	OL1	96.8	0.0	36.4	0.0	36.4
93	OL1	0.0	0.0	0.0	-37.8	37.8
93	OL2	102.3	0.0	41.4	0.0	41.4
93	OL2	0.0	0.0	0.0	-47.3	47.3
93	LEGAL LANE(<200')	51.5	0.0	19.1	0.0	19.1
93	LEGAL LANE(<200')	0.0	0.0	0.0	-20.2	20.2
93	H-20 TRUCK	104.0	0.0	32.0	0.0	32.0
93	H-20 TRUCK	0.0	0.0	0.0	-32.0	32.0
93	H-20 LANE	98.0	0.0	30.1	0.0	30.1
93	H-20 LANE	0.0	0.0	0.0	-33.8	33.8

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
94	DEAD	0.0	-68.9	17.5	7.6	17.5
94	HS-20 TRUCK	0.0	0.0	43.1	32.0	43.1
94	HS-20 TRUCK	0.0	-176.0	0.0	0.0	0.0
94	HS-20 LANE	0.0	0.0	35.6	30.1	35.6
94	HS-20 LANE	0.0	-175.5	0.0	0.0	0.0
94	A1	0.0	0.0	34.0	28.8	34.0
94	A1	0.0	-158.2	0.0	0.0	0.0
94	A2	0.0	0.0	33.7	26.2	33.7
94	A2	0.0	-144.2	0.0	0.0	0.0
94	A3	0.0	0.0	28.0	23.7	28.0
94	A3	0.0	-130.3	0.0	0.0	0.0
94	LEGAL LANE(>200')	0.0	0.0	24.0	19.1	24.0
94	LEGAL LANE(>200')	0.0	-107.9	0.0	0.0	0.0
94	NRL	0.0	0.0	48.7	32.4	48.7
94	NRL	0.0	-190.5	0.0	0.0	0.0
94	OL1	0.0	0.0	47.1	36.4	47.1
94	OL1	0.0	-200.1	0.0	0.0	0.0
94	OL2	0.0	0.0	57.4	41.4	57.4
94	OL2	0.0	-228.0	0.0	0.0	0.0
94	LEGAL LANE(<200')	0.0	0.0	24.0	19.1	24.0
94	LEGAL LANE(<200')	0.0	-107.9	0.0	0.0	0.0
94	H-20 TRUCK	0.0	0.0	34.8	32.0	34.8
94	H-20 TRUCK	0.0	-175.9	0.0	0.0	0.0
94	H-20 LANE	0.0	0.0	35.6	30.1	35.6
94	H-20 LANE	0.0	-175.5	0.0	0.0	0.0
95	DEAD	-97.6	-131.3	24.1	20.8	24.1
95	HS-20 TRUCK	0.0	0.0	43.1	43.1	43.1
95	HS-20 TRUCK	-224.0	-272.0	0.0	0.0	0.0
95	HS-20 LANE	0.0	0.0	35.6	35.6	35.6
95	HS-20 LANE	-228.9	-282.3	0.0	0.0	0.0
95	A1	0.0	0.0	34.0	34.0	34.0
95	A1	-201.4	-244.5	0.0	0.0	0.0
95	A2	0.0	0.0	33.7	33.7	33.7
95	A2	-184.8	-225.4	0.0	0.0	0.0
95	A3	0.0	0.0	28.0	28.0	28.0
95	A3	-165.8	-201.4	0.0	0.0	0.0
95	LEGAL LANE(>200')	0.0	0.0	24.0	24.0	24.0
95	LEGAL LANE(>200')	-139.1	-170.2	0.0	0.0	0.0
95	NRL	0.0	0.0	48.7	48.7	48.7
95	NRL	-258.2	-325.9	0.0	0.0	0.0
95	OL1	0.0	0.0	47.1	47.1	47.1
95	OL1	-258.5	-316.8	0.0	0.0	0.0
95	OL2	0.0	0.0	57.4	57.4	57.4
95	OL2	-297.9	-380.2	0.0	0.0	0.0
95	LEGAL LANE(<200')	0.0	0.0	24.0	24.0	24.0
95	LEGAL LANE(<200')	-139.1	-170.3	0.0	0.0	0.0
95	H-20 TRUCK	0.0	0.0	34.8	34.8	34.8
95	H-20 TRUCK	-223.9	-271.9	0.0	0.0	0.0
95	H-20 LANE	0.0	0.0	35.6	35.6	35.6
95	H-20 LANE	-228.9	-282.3	0.0	0.0	0.0
96	DEAD	-101.3	-137.3	-22.3	-25.6	25.6
96	HS-20 TRUCK	29.8	25.1	3.1	3.1	3.1
96	HS-20 TRUCK	-180.8	-225.9	-43.3	-43.3	43.3
96	HS-20 LANE	24.5	20.6	2.6	2.6	2.6
96	HS-20 LANE	-125.2	-162.9	-34.7	-34.7	34.7
96	A1	23.2	19.5	2.4	2.4	2.4
96	A1	-123.6	-160.7	-32.6	-32.6	32.6
96	A2	22.4	18.9	2.4	2.4	2.4
96	A2	-154.1	-181.6	-30.9	-30.9	30.9
96	A3	19.0	16.0	2.0	2.0	2.0
96	A3	-122.2	-150.1	-26.9	-26.9	26.9
96	LEGAL LANE(>200')	16.6	14.0	1.7	1.7	1.7
96	LEGAL LANE(>200')	-107.5	-133.3	-23.5	-23.5	23.5
96	NRL	34.7	29.2	3.6	3.6	3.6
96	NRL	-160.4	-222.8	-45.3	-45.3	45.3

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
96	OL1	34.3	28.9	3.6	3.6	3.6
96	OL1	-209.2	-265.4	-48.6	-48.6	48.6
96	OL2	38.8	32.7	4.1	4.1	4.1
96	OL2	-283.4	-344.8	-53.7	-53.7	53.7
96	LEGAL LANE(<200')	16.6	14.0	1.7	1.7	1.7
96	LEGAL LANE(<200')	-107.5	-133.4	-23.5	-23.5	23.5
96	H-20 TRUCK	23.1	19.4	2.4	2.4	2.4
96	H-20 TRUCK	-98.2	-133.8	-33.0	-33.0	33.0
96	H-20 LANE	24.5	20.6	2.6	2.6	2.6
96	H-20 LANE	-125.2	-162.9	-34.7	-34.7	34.7
97	DEAD	7.0	-70.3	-9.1	-19.0	19.0
97	HS-20 TRUCK	91.0	43.7	10.0	3.1	10.0
97	HS-20 TRUCK	-58.2	-150.5	-30.6	-43.3	43.3
97	HS-20 LANE	87.2	35.4	7.6	2.6	7.6
97	HS-20 LANE	-56.1	-102.4	-25.4	-34.7	34.7
97	A1	70.0	18.5	6.0	2.4	6.0
97	A1	-48.6	-91.4	-24.7	-32.6	32.6
97	A2	65.9	24.5	6.7	2.4	6.7
97	A2	-44.8	-126.6	-24.5	-30.9	30.9
97	A3	59.2	26.3	6.6	2.0	6.6
97	A3	-42.3	-95.3	-21.0	-26.9	26.9
97	LEGAL LANE(>200')	49.2	21.9	5.4	1.7	5.4
97	LEGAL LANE(>200')	-35.6	-83.1	-17.5	-23.5	23.5
97	NRL	84.5	23.8	6.1	3.6	6.1
97	NRL	-62.2	-109.8	-29.9	-45.3	45.3
97	OL1	89.3	25.2	7.9	3.6	7.9
97	OL1	-61.4	-153.0	-34.8	-48.6	48.6
97	OL2	105.0	45.2	10.5	4.1	10.5
97	OL2	-78.2	-223.7	-42.2	-53.7	53.7
97	LEGAL LANE(<200')	49.2	21.9	5.4	1.7	5.4
97	LEGAL LANE(<200')	-35.6	-83.1	-17.5	-23.5	23.5
97	H-20 TRUCK	88.6	34.7	7.6	2.4	7.6
97	H-20 TRUCK	-54.0	-80.7	-25.8	-33.0	33.0
97	H-20 LANE	87.2	35.4	7.6	2.6	7.6
97	H-20 LANE	-56.1	-102.4	-25.4	-34.7	34.7
98	DEAD	36.0	4.9	9.4	-9.1	9.4
98	HS-20 TRUCK	118.1	86.9	32.6	10.0	32.6
98	HS-20 TRUCK	-25.0	-58.2	-11.2	-30.6	30.6
98	HS-20 LANE	118.4	78.8	26.6	7.6	26.6
98	HS-20 LANE	-27.9	-56.1	-6.8	-25.4	25.4
98	A1	97.0	60.5	25.2	6.0	25.2
98	A1	-20.6	-48.6	-4.9	-24.7	24.7
98	A2	92.0	60.3	25.8	6.7	25.8
98	A2	-18.8	-44.8	-6.8	-24.5	24.5
98	A3	79.8	54.5	21.5	6.6	21.5
98	A3	-21.4	-42.3	-6.8	-21.0	21.0
98	LEGAL LANE(>200')	68.0	45.5	17.9	5.4	17.9
98	LEGAL LANE(>200')	-18.9	-35.6	-5.6	-17.5	17.5
98	NRL	132.5	70.6	31.8	6.1	31.8
98	NRL	-26.5	-62.2	-5.5	-29.9	29.9
98	OL1	128.5	77.8	34.9	7.9	34.9
98	OL1	-26.1	-61.4	-7.0	-34.8	34.8
98	OL2	155.0	95.1	43.0	10.5	43.0
98	OL2	-54.3	-78.2	-10.9	-42.2	42.2
98	LEGAL LANE(<200')	68.0	45.6	17.9	5.4	17.9
98	LEGAL LANE(<200')	-18.9	-35.6	-5.6	-17.5	17.5
98	H-20 TRUCK	114.4	78.7	27.3	7.6	27.3
98	H-20 TRUCK	-22.9	-54.0	-6.4	-25.8	25.8
98	H-20 LANE	118.4	78.8	26.6	7.6	26.6
98	H-20 LANE	-27.9	-56.1	-6.8	-25.4	25.4
99	DEAD	4.9	-74.1	19.3	9.4	19.3
99	HS-20 TRUCK	86.7	42.2	44.9	32.6	44.9
99	HS-20 TRUCK	-39.3	-130.7	-4.8	-11.1	11.1
99	HS-20 LANE	78.6	39.2	35.4	26.6	35.4
99	HS-20 LANE	-32.3	-111.2	-5.0	-6.8	6.8

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
99	A1	60.4	31.0	34.0	25.2	34.0
99	A1	-29.2	-95.8	-4.3	-4.9	4.9
99	A2	60.3	33.4	32.8	25.8	32.8
99	A2	-31.2	-121.1	-3.9	-6.8	6.8
99	A3	54.5	35.6	28.1	21.5	28.1
99	A3	-28.7	-96.0	-3.5	-6.8	6.8
99	LEGAL LANE(>200')	45.5	30.2	24.4	17.9	24.4
99	LEGAL LANE(>200')	-24.9	-84.3	-3.0	-5.6	5.6
99	NRL	70.5	39.5	46.4	31.8	46.4
99	NRL	-43.7	-133.0	-5.5	-5.5	5.5
99	OL1	77.7	39.3	50.7	34.9	50.7
99	OL1	-43.4	-144.7	-5.4	-7.0	7.0
99	OL2	95.0	57.2	56.4	43.0	56.4
99	OL2	-55.4	-219.7	-6.7	-10.9	10.9
99	LEGAL LANE(<200')	45.5	30.2	24.4	17.9	24.4
99	LEGAL LANE(<200')	-24.9	-84.4	-3.0	-5.6	5.6
99	H-20 TRUCK	78.5	34.5	33.9	27.3	33.9
99	H-20 TRUCK	-29.1	-90.0	-4.8	-6.4	6.4
99	H-20 LANE	78.6	39.2	35.4	26.6	35.4
99	H-20 LANE	-32.3	-111.2	-5.0	-6.8	6.8
100	DEAD	-105.5	-142.0	25.9	22.6	25.9
100	HS-20 TRUCK	48.9	41.7	44.9	44.9	44.9
100	HS-20 TRUCK	-163.5	-212.5	-4.8	-4.8	4.8
100	HS-20 LANE	52.8	45.2	35.4	35.4	35.4
100	HS-20 LANE	-146.2	-183.2	-5.0	-5.0	5.0
100	A1	43.9	37.5	34.0	34.0	34.0
100	A1	-127.9	-165.7	-4.3	-4.3	4.3
100	A2	40.1	34.2	32.8	32.8	32.8
100	A2	-154.1	-190.5	-3.9	-3.9	3.9
100	A3	36.2	30.9	28.1	28.1	28.1
100	A3	-123.8	-151.9	-3.5	-3.5	3.5
100	LEGAL LANE(>200')	31.2	26.7	24.4	24.4	24.4
100	LEGAL LANE(>200')	-109.8	-135.8	-3.0	-3.0	3.0
100	NRL	55.9	47.7	46.4	46.4	46.4
100	NRL	-186.9	-252.3	-5.5	-5.5	5.5
100	OL1	55.6	47.4	50.7	50.7	50.7
100	OL1	-197.1	-249.5	-5.4	-5.4	5.4
100	OL2	67.9	57.9	56.4	56.4	56.4
100	OL2	-282.3	-345.1	-6.7	-6.7	6.7
100	LEGAL LANE(<200')	31.3	26.7	24.4	24.4	24.4
100	LEGAL LANE(<200')	-109.8	-135.8	-3.0	-3.0	3.0
100	H-20 TRUCK	48.9	41.7	33.9	33.9	33.9
100	H-20 TRUCK	-118.0	-155.6	-4.8	-4.8	4.8
100	H-20 LANE	52.8	45.2	35.4	35.4	35.4
100	H-20 LANE	-146.2	-183.2	-5.0	-5.0	5.0
101	DEAD	-104.6	-140.8	-22.5	-25.8	25.8
101	HS-20 TRUCK	32.2	27.5	3.2	3.2	3.2
101	HS-20 TRUCK	-154.9	-198.7	-43.9	-43.9	43.9
101	HS-20 LANE	30.1	25.9	2.8	2.8	2.8
101	HS-20 LANE	-138.5	-177.9	-35.1	-35.1	35.1
101	A1	25.2	21.5	2.5	2.5	2.5
101	A1	-122.9	-159.8	-33.2	-33.2	33.2
101	A2	24.3	20.7	2.4	2.4	2.4
101	A2	-149.4	-185.9	-32.5	-32.5	32.5
101	A3	20.6	17.6	2.0	2.0	2.0
101	A3	-120.9	-149.6	-27.5	-27.5	27.5
101	LEGAL LANE(>200')	19.1	16.4	1.8	1.8	1.8
101	LEGAL LANE(>200')	-107.3	-133.8	-23.9	-23.9	23.9
101	NRL	37.6	32.0	3.7	3.7	3.7
101	NRL	-174.8	-238.3	-45.6	-45.6	45.6
101	OL1	37.1	31.6	3.7	3.7	3.7
101	OL1	-189.5	-241.5	-49.2	-49.2	49.2
101	OL2	42.0	35.8	4.1	4.1	4.1
101	OL2	-274.4	-336.2	-55.7	-55.7	55.7
101	LEGAL LANE(<200')	19.1	16.4	1.8	1.8	1.8

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
101	LEGAL LANE(<200')	-107.3	-133.8	-23.9	-23.9	23.9
101	H-20 TRUCK	25.1	21.4	2.5	2.5	2.5
101	H-20 TRUCK	-109.4	-148.1	-33.5	-33.5	33.5
101	H-20 LANE	30.1	25.9	2.8	2.8	2.8
101	H-20 LANE	-138.5	-177.9	-35.1	-35.1	35.1
102	DEAD	4.9	-73.3	-9.3	-19.2	19.2
102	HS-20 TRUCK	83.7	38.9	9.3	3.2	9.3
102	HS-20 TRUCK	-40.5	-127.0	-31.3	-43.9	43.9
102	HS-20 LANE	80.0	33.8	7.1	2.8	7.1
102	HS-20 LANE	-33.7	-104.9	-26.1	-35.1	35.1
102	A1	61.4	17.7	5.3	2.5	5.3
102	A1	-31.1	-89.9	-24.6	-33.2	33.2
102	A2	58.8	24.3	6.1	2.4	6.1
102	A2	-31.2	-117.4	-25.3	-32.5	32.5
102	A3	53.4	25.0	6.1	2.0	6.1
102	A3	-29.0	-93.7	-21.2	-27.5	27.5
102	LEGAL LANE(>200')	44.8	22.0	5.0	1.8	5.0
102	LEGAL LANE(>200')	-25.3	-82.4	-17.7	-23.9	23.9
102	NRL	72.2	26.5	5.5	3.7	5.5
102	NRL	-47.2	-122.1	-30.6	-45.6	45.6
102	OL1	78.2	26.1	7.1	3.7	7.1
102	OL1	-47.0	-138.4	-34.0	-49.2	49.2
102	OL2	101.0	43.4	9.7	4.1	9.7
102	OL2	-57.5	-213.5	-42.1	-55.7	55.7
102	LEGAL LANE(<200')	44.8	22.0	5.0	1.8	5.0
102	LEGAL LANE(<200')	-25.3	-82.5	-17.7	-23.9	23.9
102	H-20 TRUCK	79.7	28.9	6.9	2.5	6.9
102	H-20 TRUCK	-30.8	-82.7	-26.6	-33.5	33.5
102	H-20 LANE	80.0	33.8	7.1	2.8	7.1
102	H-20 LANE	-33.7	-104.9	-26.1	-35.1	35.1
103	DEAD	35.1	4.9	9.2	-9.3	9.3
103	HS-20 TRUCK	113.6	83.0	31.6	9.3	31.6
103	HS-20 TRUCK	-17.1	-40.5	-9.4	-31.3	31.3
103	HS-20 LANE	114.3	78.0	26.3	7.1	26.3
103	HS-20 LANE	-17.6	-33.7	-7.0	-26.1	26.1
103	A1	92.5	60.1	24.8	5.3	24.8
103	A1	-13.2	-31.1	-5.2	-24.6	24.6
103	A2	87.7	57.9	25.3	6.1	25.3
103	A2	-12.7	-31.2	-6.1	-25.3	25.3
103	A3	77.2	52.8	21.2	6.1	21.2
103	A3	-14.2	-29.0	-6.2	-21.2	21.2
103	LEGAL LANE(>200')	65.9	44.1	17.7	5.0	17.7
103	LEGAL LANE(>200')	-13.2	-25.3	-5.1	-17.7	17.7
103	NRL	125.4	70.2	30.9	5.5	30.9
103	NRL	-20.0	-47.2	-5.3	-30.6	30.6
103	OL1	122.4	76.7	34.2	7.1	34.2
103	OL1	-19.9	-47.0	-7.0	-34.0	34.0
103	OL2	149.5	93.1	42.0	9.7	42.0
103	OL2	-41.4	-57.5	-9.9	-42.1	42.1
103	LEGAL LANE(<200')	65.9	44.1	17.7	5.0	17.7
103	LEGAL LANE(<200')	-13.2	-25.3	-5.1	-17.7	17.7
103	H-20 TRUCK	110.2	78.3	26.8	6.9	26.8
103	H-20 TRUCK	-13.0	-30.8	-6.7	-26.6	26.6
103	H-20 LANE	114.3	78.0	26.3	7.1	26.3
103	H-20 LANE	-17.6	-33.7	-7.0	-26.1	26.1
104	DEAD	5.2	-72.8	19.2	9.2	19.2
104	HS-20 TRUCK	82.8	38.9	44.1	31.6	44.1
104	HS-20 TRUCK	-37.5	-125.9	-3.6	-9.4	9.4
104	HS-20 LANE	77.9	32.5	35.3	26.3	35.3
104	HS-20 LANE	-31.3	-107.3	-3.0	-6.9	6.9
104	A1	60.0	20.0	33.5	24.8	33.5
104	A1	-28.1	-92.3	-2.8	-5.1	5.1
104	A2	57.8	25.8	32.5	25.3	32.5
104	A2	-29.7	-116.4	-2.7	-6.1	6.1
104	A3	52.8	26.1	27.7	21.2	27.7

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
104	A3	-27.4	-92.6	-2.2	-6.2	6.2
104	LEGAL LANE(>200')	44.1	22.7	24.1	17.7	24.1
104	LEGAL LANE(>200')	-23.8	-81.6	-2.0	-5.1	5.1
104	NRL	70.0	30.3	45.8	30.9	45.8
104	NRL	-42.0	-126.5	-4.2	-5.3	5.3
104	OL1	76.6	30.0	49.6	34.2	49.6
104	OL1	-41.7	-140.0	-4.2	-7.0	7.0
104	OL2	92.9	46.6	55.6	42.0	55.6
104	OL2	-53.1	-211.6	-4.7	-9.9	9.9
104	LEGAL LANE(<200')	44.1	22.7	24.1	17.7	24.1
104	LEGAL LANE(<200')	-23.9	-81.7	-2.0	-5.1	5.1
104	H-20 TRUCK	78.1	27.6	33.6	26.8	33.6
104	H-20 TRUCK	-28.1	-85.8	-2.7	-6.7	6.7
104	H-20 LANE	77.9	32.5	35.3	26.3	35.3
104	H-20 LANE	-31.3	-107.3	-3.0	-6.9	6.9
105	DEAD	-104.0	-140.2	25.7	22.5	25.7
105	HS-20 TRUCK	36.9	31.5	44.1	44.1	44.1
105	HS-20 TRUCK	-156.2	-203.7	-3.6	-3.6	3.6
105	HS-20 LANE	32.0	27.5	35.3	35.3	35.3
105	HS-20 LANE	-141.4	-180.8	-3.0	-3.0	3.0
105	A1	28.3	24.2	33.5	33.5	33.5
105	A1	-124.8	-162.0	-2.8	-2.8	2.8
105	A2	27.4	23.4	32.5	32.5	32.5
105	A2	-148.4	-184.8	-2.7	-2.7	2.7
105	A3	23.0	19.7	27.7	27.7	27.7
105	A3	-119.7	-148.4	-2.2	-2.2	2.2
105	LEGAL LANE(>200')	20.9	17.9	24.1	24.1	24.1
105	LEGAL LANE(>200')	-106.5	-133.0	-2.0	-2.0	2.0
105	NRL	42.9	36.6	45.8	45.8	45.8
105	NRL	-179.8	-243.8	-4.2	-4.2	4.2
105	OL1	42.5	36.3	49.6	49.6	49.6
105	OL1	-191.3	-242.8	-4.2	-4.2	4.2
105	OL2	47.7	40.7	55.6	55.6	55.6
105	OL2	-272.5	-333.9	-4.7	-4.7	4.7
105	LEGAL LANE(<200')	20.9	17.9	24.1	24.1	24.1
105	LEGAL LANE(<200')	-106.5	-133.0	-2.0	-2.0	2.0
105	H-20 TRUCK	27.9	23.8	33.6	33.6	33.6
105	H-20 TRUCK	-112.9	-151.9	-2.7	-2.7	2.7
105	H-20 LANE	32.0	27.5	35.3	35.3	35.3
105	H-20 LANE	-141.4	-180.8	-3.0	-3.0	3.0
106	DEAD	-103.7	-139.8	-22.4	-25.7	25.7
106	HS-20 TRUCK	30.3	25.9	3.0	3.0	3.0
106	HS-20 TRUCK	-152.6	-199.5	-43.8	-43.8	43.8
106	HS-20 LANE	28.1	24.2	2.6	2.6	2.6
106	HS-20 LANE	-138.2	-178.2	-35.1	-35.1	35.1
106	A1	23.8	20.3	2.3	2.3	2.3
106	A1	-123.3	-160.3	-33.3	-33.3	33.3
106	A2	23.0	19.6	2.2	2.2	2.2
106	A2	-146.9	-183.3	-32.4	-32.4	32.4
106	A3	19.5	16.6	1.9	1.9	1.9
106	A3	-118.8	-147.8	-27.5	-27.5	27.5
106	LEGAL LANE(>200')	17.9	15.3	1.7	1.7	1.7
106	LEGAL LANE(>200')	-105.5	-132.1	-23.9	-23.9	23.9
106	NRL	35.4	30.2	3.5	3.5	3.5
106	NRL	-176.1	-239.6	-45.6	-45.6	45.6
106	OL1	35.0	29.8	3.4	3.4	3.4
106	OL1	-188.9	-240.4	-49.1	-49.1	49.1
106	OL2	39.7	33.9	3.9	3.9	3.9
106	OL2	-270.0	-331.0	-55.4	-55.4	55.4
106	LEGAL LANE(<200')	17.9	15.3	1.7	1.7	1.7
106	LEGAL LANE(<200')	-105.5	-132.1	-23.9	-23.9	23.9
106	H-20 TRUCK	23.8	20.3	2.3	2.3	2.3
106	H-20 TRUCK	-110.3	-149.6	-33.5	-33.5	33.5
106	H-20 LANE	28.1	24.2	2.6	2.6	2.6
106	H-20 LANE	-138.2	-178.2	-35.1	-35.1	35.1

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
107	DEAD	5.4	-72.5	-9.2	-19.1	19.1
107	HS-20 TRUCK	82.5	37.7	9.1	3.0	9.1
107	HS-20 TRUCK	-37.3	-124.7	-31.2	-43.8	43.8
107	HS-20 LANE	78.3	32.1	6.9	2.6	6.9
107	HS-20 LANE	-31.8	-104.7	-26.0	-35.1	35.1
107	A1	60.3	16.8	5.3	2.3	5.3
107	A1	-28.7	-90.5	-24.6	-33.3	33.3
107	A2	57.7	23.2	6.0	2.2	6.0
107	A2	-29.5	-115.2	-25.1	-32.4	32.4
107	A3	52.5	24.0	5.9	1.9	5.9
107	A3	-27.4	-91.9	-21.1	-27.5	27.5
107	LEGAL LANE(>200')	43.9	20.9	4.9	1.7	4.9
107	LEGAL LANE(>200')	-23.9	-80.8	-17.5	-23.9	23.9
107	NRL	70.6	25.0	5.4	3.5	5.4
107	NRL	-43.1	-123.1	-30.5	-45.6	45.6
107	OL1	76.9	24.7	7.0	3.4	7.0
107	OL1	-42.8	-138.1	-33.9	-49.1	49.1
107	OL2	95.0	41.4	9.4	3.9	9.4
107	OL2	-53.6	-209.5	-41.7	-55.4	55.4
107	LEGAL LANE(<200')	43.9	20.9	4.9	1.7	4.9
107	LEGAL LANE(<200')	-23.9	-80.9	-17.6	-23.9	23.9
107	H-20 TRUCK	78.5	28.0	6.8	2.3	6.8
107	H-20 TRUCK	-28.6	-83.6	-26.6	-33.5	33.5
107	H-20 LANE	78.3	32.1	6.9	2.6	6.9
107	H-20 LANE	-31.8	-104.7	-26.0	-35.1	35.1
108	DEAD	35.1	4.8	9.3	-9.2	9.3
108	HS-20 TRUCK	112.3	81.4	31.7	9.1	31.7
108	HS-20 TRUCK	-15.4	-37.3	-9.1	-31.2	31.2
108	HS-20 LANE	112.5	75.9	26.3	6.9	26.3
108	HS-20 LANE	-16.2	-31.8	-6.8	-26.0	26.0
108	A1	91.4	58.8	24.8	5.3	24.8
108	A1	-12.0	-28.7	-5.1	-24.6	24.6
108	A2	86.5	56.5	25.2	6.0	25.2
108	A2	-11.6	-29.5	-6.0	-25.1	25.1
108	A3	75.5	51.7	21.1	5.9	21.1
108	A3	-13.0	-27.4	-6.0	-21.1	21.1
108	LEGAL LANE(>200')	64.3	43.0	17.6	4.9	17.6
108	LEGAL LANE(>200')	-12.1	-23.9	-4.9	-17.5	17.5
108	NRL	123.5	68.2	30.9	5.4	30.9
108	NRL	-18.0	-43.1	-5.2	-30.5	30.5
108	OL1	120.7	75.1	34.1	7.0	34.1
108	OL1	-17.9	-42.8	-6.9	-33.9	33.9
108	OL2	145.6	88.9	41.8	9.4	41.8
108	OL2	-37.9	-53.6	-9.5	-41.7	41.7
108	LEGAL LANE(<200')	64.3	43.0	17.6	4.9	17.6
108	LEGAL LANE(<200')	-12.1	-23.9	-4.9	-17.6	17.6
108	H-20 TRUCK	109.0	76.8	26.9	6.8	26.9
108	H-20 TRUCK	-11.9	-28.6	-6.6	-26.6	26.6
108	H-20 LANE	112.5	75.9	26.3	6.9	26.3
108	H-20 LANE	-16.2	-31.8	-6.8	-26.0	26.0
109	DEAD	4.8	-73.6	19.2	9.3	19.2
109	HS-20 TRUCK	81.3	37.3	44.2	31.7	44.2
109	HS-20 TRUCK	-36.1	-124.6	-3.3	-9.1	9.1
109	HS-20 LANE	75.7	30.5	35.2	26.3	35.2
109	HS-20 LANE	-29.3	-107.5	-2.8	-6.8	6.8
109	A1	58.7	18.9	33.5	24.8	33.5
109	A1	-26.1	-93.4	-2.6	-5.1	5.1
109	A2	56.4	24.5	32.4	25.2	32.4
109	A2	-28.8	-115.5	-2.5	-6.0	6.0
109	A3	51.6	24.8	27.7	21.1	27.7
109	A3	-26.1	-92.1	-2.1	-6.0	6.0
109	LEGAL LANE(>200')	42.9	21.4	24.1	17.6	24.1
109	LEGAL LANE(>200')	-22.7	-80.9	-1.9	-4.9	4.9
109	NRL	68.0	28.3	45.9	30.9	45.9
109	NRL	-38.9	-128.3	-3.9	-5.2	5.2

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
109	OL1	74.9	28.0	49.6	34.1	49.6
109	OL1	-38.6	-140.5	-3.8	-6.8	6.8
109	OL2	88.8	43.7	55.5	41.8	55.5
109	OL2	-50.3	-209.9	-4.4	-9.5	9.5
109	LEGAL LANE(<200')	43.0	21.4	24.1	17.6	24.1
109	LEGAL LANE(<200')	-22.7	-81.0	-1.9	-4.9	4.9
109	H-20 TRUCK	76.6	26.5	33.7	26.9	33.7
109	H-20 TRUCK	-26.2	-87.2	-2.6	-6.6	6.6
109	H-20 LANE	75.7	30.5	35.2	26.3	35.2
109	H-20 LANE	-29.3	-107.5	-2.8	-6.8	6.8
110	DEAD	-104.9	-141.2	25.8	22.5	25.8
110	HS-20 TRUCK	34.3	29.3	44.2	44.2	44.2
110	HS-20 TRUCK	-158.0	-205.5	-3.3	-3.3	3.3
110	HS-20 LANE	29.7	25.5	35.2	35.2	35.2
110	HS-20 LANE	-141.6	-181.5	-2.8	-2.8	2.8
110	A1	26.6	22.8	33.5	33.5	33.5
110	A1	-125.9	-163.2	-2.6	-2.6	2.6
110	A2	25.7	22.0	32.4	32.4	32.4
110	A2	-147.3	-184.0	-2.5	-2.5	2.5
110	A3	21.9	18.8	27.7	27.7	27.7
110	A3	-119.1	-148.0	-2.1	-2.1	2.1
110	LEGAL LANE(>200')	19.7	16.8	24.1	24.1	24.1
110	LEGAL LANE(>200')	-105.7	-132.3	-1.9	-1.9	1.9
110	NRL	39.9	34.1	45.9	45.9	45.9
110	NRL	-182.2	-246.3	-3.9	-3.9	3.9
110	OL1	39.5	33.8	49.6	49.6	49.6
110	OL1	-191.7	-242.9	-3.8	-3.8	3.8
110	OL2	45.5	38.9	55.5	55.5	55.5
110	OL2	-270.5	-331.5	-4.4	-4.4	4.4
110	LEGAL LANE(<200')	19.7	16.8	24.1	24.1	24.1
110	LEGAL LANE(<200')	-105.7	-132.3	-1.9	-1.9	1.9
110	H-20 TRUCK	26.5	22.6	33.7	33.7	33.7
110	H-20 TRUCK	-114.5	-154.2	-2.6	-2.6	2.6
110	H-20 LANE	29.7	25.5	35.2	35.2	35.2
110	H-20 LANE	-141.6	-181.5	-2.8	-2.8	2.8
111	DEAD	-105.5	-141.9	-22.6	-25.9	25.9
111	HS-20 TRUCK	19.1	16.3	1.9	1.9	1.9
111	HS-20 TRUCK	-152.0	-198.6	-43.7	-43.7	43.7
111	HS-20 LANE	22.9	19.8	2.1	2.1	2.1
111	HS-20 LANE	-136.4	-177.3	-34.9	-34.9	34.9
111	A1	18.9	16.1	1.8	1.8	1.8
111	A1	-123.4	-160.3	-33.2	-33.2	33.2
111	A2	17.2	14.7	1.7	1.7	1.7
111	A2	-144.8	-181.5	-32.3	-32.3	32.3
111	A3	15.5	13.3	1.5	1.5	1.5
111	A3	-117.5	-146.8	-27.4	-27.4	27.4
111	LEGAL LANE(>200')	14.0	12.1	1.3	1.3	1.3
111	LEGAL LANE(>200')	-104.0	-130.8	-23.8	-23.8	23.8
111	NRL	25.2	21.6	2.4	2.4	2.4
111	NRL	-176.2	-239.3	-45.5	-45.5	45.5
111	OL1	23.8	20.4	2.3	2.3	2.3
111	OL1	-187.8	-238.7	-48.8	-48.8	48.8
111	OL2	31.2	26.7	3.0	3.0	3.0
111	OL2	-266.1	-326.6	-55.1	-55.1	55.1
111	LEGAL LANE(<200')	14.0	12.1	1.3	1.3	1.3
111	LEGAL LANE(<200')	-104.0	-130.8	-23.8	-23.8	23.8
111	H-20 TRUCK	18.8	16.1	1.8	1.8	1.8
111	H-20 TRUCK	-110.6	-150.5	-33.5	-33.5	33.5
111	H-20 LANE	22.9	19.8	2.1	2.1	2.1
111	H-20 LANE	-136.4	-177.3	-34.9	-34.9	34.9
112	DEAD	5.0	-74.0	-9.4	-19.3	19.3
112	HS-20 TRUCK	80.5	34.9	8.6	1.9	8.6
112	HS-20 TRUCK	-35.8	-122.6	-31.0	-43.7	43.7
112	HS-20 LANE	76.4	29.2	6.7	2.1	6.7
112	HS-20 LANE	-29.9	-103.3	-25.9	-34.9	34.9

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
112	A1	59.2	14.4	5.2	1.8	5.2
112	A1	-27.1	-90.5	-24.5	-33.2	33.2
112	A2	55.9	20.1	5.7	1.7	5.7
112	A2	-28.4	-113.4	-24.9	-32.3	32.3
112	A3	51.0	21.1	5.6	1.5	5.6
112	A3	-26.1	-90.9	-21.0	-27.4	27.4
112	LEGAL LANE(>200')	42.6	18.1	4.5	1.3	4.5
112	LEGAL LANE(>200')	-22.7	-79.6	-17.4	-23.8	23.8
112	NRL	69.0	17.9	5.4	2.4	5.4
112	NRL	-40.6	-122.7	-30.3	-45.5	45.5
112	OL1	75.4	20.0	7.0	2.3	7.0
112	OL1	-40.3	-137.2	-33.7	-48.8	48.8
112	OL2	91.9	34.8	8.5	3.0	8.5
112	OL2	-50.9	-206.3	-41.3	-55.1	55.1
112	LEGAL LANE(<200')	42.6	18.1	4.5	1.3	4.5
112	LEGAL LANE(<200')	-22.7	-79.6	-17.4	-23.8	23.8
112	H-20 TRUCK	77.2	27.1	6.8	1.8	6.8
112	H-20 TRUCK	-27.0	-83.5	-26.6	-33.5	33.5
112	H-20 LANE	76.4	29.2	6.7	2.1	6.7
112	H-20 LANE	-29.9	-103.3	-25.9	-34.9	34.9
113	DEAD	36.0	5.0	9.1	-9.4	9.4
113	HS-20 TRUCK	110.2	78.6	31.8	8.6	31.8
113	HS-20 TRUCK	-14.1	-35.8	-8.8	-31.0	31.0
113	HS-20 LANE	109.9	71.8	26.2	6.7	26.2
113	HS-20 LANE	-13.9	-29.9	-6.4	-25.9	25.9
113	A1	89.6	56.0	24.9	5.2	24.9
113	A1	-11.0	-27.1	-4.9	-24.5	24.5
113	A2	84.7	53.8	24.8	5.7	24.8
113	A2	-10.6	-28.4	-5.7	-24.9	24.9
113	A3	73.9	49.6	20.7	5.6	20.7
113	A3	-11.6	-26.1	-5.7	-21.0	21.0
113	LEGAL LANE(>200')	62.8	41.0	17.2	4.5	17.2
113	LEGAL LANE(>200')	-10.5	-22.7	-4.7	-17.4	17.4
113	NRL	120.4	64.5	31.1	5.4	31.1
113	NRL	-16.5	-40.6	-5.0	-30.3	30.3
113	OL1	117.9	71.6	34.2	7.0	34.2
113	OL1	-16.4	-40.3	-6.6	-33.7	33.7
113	OL2	141.9	84.2	41.2	8.5	41.2
113	OL2	-32.6	-50.9	-9.1	-41.3	41.3
113	LEGAL LANE(<200')	62.8	41.0	17.2	4.5	17.2
113	LEGAL LANE(<200')	-10.5	-22.7	-4.7	-17.4	17.4
113	H-20 TRUCK	107.1	73.6	27.1	6.8	27.1
113	H-20 TRUCK	-11.0	-27.0	-6.3	-26.6	26.6
113	H-20 LANE	109.9	71.8	26.2	6.7	26.2
113	H-20 LANE	-13.9	-29.9	-6.4	-25.9	25.9
114	DEAD	7.0	-70.3	19.0	9.1	19.0
114	HS-20 TRUCK	78.4	34.8	44.3	31.8	44.3
114	HS-20 TRUCK	-31.4	-121.2	-3.2	-8.8	8.8
114	HS-20 LANE	71.6	27.0	35.1	26.2	35.1
114	HS-20 LANE	-23.8	-107.3	-2.6	-6.4	6.4
114	A1	55.9	18.7	33.7	24.9	33.7
114	A1	-20.3	-96.3	-2.5	-4.8	4.8
114	A2	53.8	23.6	31.8	24.8	31.8
114	A2	-24.8	-111.8	-2.4	-5.7	5.7
114	A3	49.6	23.6	27.9	20.7	27.9
114	A3	-22.6	-84.4	-2.0	-5.7	5.7
114	LEGAL LANE(>200')	40.9	20.0	24.1	17.2	24.1
114	LEGAL LANE(>200')	-19.2	-74.2	-1.8	-4.7	4.7
114	NRL	64.4	27.9	46.1	31.1	46.1
114	NRL	-27.3	-133.2	-3.7	-5.0	5.0
114	OL1	71.5	27.6	49.8	34.2	49.8
114	OL1	-27.0	-141.9	-3.7	-6.5	6.5
114	OL2	84.1	41.6	54.4	41.2	54.4
114	OL2	-43.7	-201.2	-4.1	-9.1	9.1
114	LEGAL LANE(<200')	40.9	20.0	24.1	17.2	24.1

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
114	LEGAL LANE(<200')	-19.2	-74.2	-1.8	-4.7	4.7
114	H-20 TRUCK	73.4	24.1	33.9	27.1	33.9
114	H-20 TRUCK	-20.3	-90.9	-2.5	-6.3	6.3
114	H-20 LANE	71.6	27.0	35.1	26.2	35.1
114	H-20 LANE	-23.8	-107.3	-2.6	-6.4	6.4
115	DEAD	-101.3	-137.3	25.6	22.3	25.6
115	HS-20 TRUCK	33.5	28.7	44.3	44.3	44.3
115	HS-20 TRUCK	-162.9	-210.7	-3.2	-3.2	3.2
115	HS-20 LANE	27.6	23.6	35.1	35.1	35.1
115	HS-20 LANE	-141.4	-182.1	-2.6	-2.6	2.6
115	A1	26.1	22.4	33.7	33.7	33.7
115	A1	-128.6	-166.0	-2.5	-2.5	2.5
115	A2	25.2	21.6	31.8	31.8	31.8
115	A2	-143.2	-177.5	-2.4	-2.4	2.4
115	A3	21.4	18.4	27.9	27.9	27.9
115	A3	-110.7	-141.0	-2.0	-2.0	2.0
115	LEGAL LANE(>200')	18.7	16.1	24.1	24.1	24.1
115	LEGAL LANE(>200')	-98.3	-125.9	-1.8	-1.8	1.8
115	NRL	39.0	33.5	46.1	46.1	46.1
115	NRL	-188.3	-252.7	-3.7	-3.7	3.7
115	OL1	38.6	33.1	49.8	49.8	49.8
115	OL1	-193.1	-245.7	-3.7	-3.7	3.7
115	OL2	43.8	37.6	54.4	54.4	54.4
115	OL2	-260.8	-320.6	-4.1	-4.1	4.1
115	LEGAL LANE(<200')	18.7	16.1	24.1	24.1	24.1
115	LEGAL LANE(<200')	-98.4	-125.9	-1.8	-1.8	1.8
115	H-20 TRUCK	26.0	22.3	33.9	33.9	33.9
115	H-20 TRUCK	-119.0	-159.6	-2.5	-2.5	2.5
115	H-20 LANE	27.6	23.6	35.1	35.1	35.1
115	H-20 LANE	-141.4	-182.1	-2.6	-2.6	2.6
116	DEAD	-91.6	-126.5	-21.6	-24.9	24.9
116	HS-20 TRUCK	9.1	8.5	0.4	0.4	0.4
116	HS-20 TRUCK	-139.2	-180.8	-41.3	-41.3	41.3
116	HS-20 LANE	7.5	7.0	0.3	0.3	0.3
116	HS-20 LANE	-119.8	-165.0	-34.1	-34.1	34.1
116	A1	7.1	6.6	0.3	0.3	0.3
116	A1	-116.4	-153.2	-31.5	-31.5	31.5
116	A2	6.9	6.4	0.3	0.3	0.3
116	A2	-125.7	-159.5	-31.3	-31.3	31.3
116	A3	5.8	5.4	0.3	0.3	0.3
116	A3	-108.1	-139.3	-26.2	-26.2	26.2
116	LEGAL LANE(>200')	5.1	4.8	0.2	0.2	0.2
116	LEGAL LANE(>200')	-93.5	-121.2	-22.5	-22.5	22.5
116	NRL	10.7	9.9	0.5	0.5	0.5
116	NRL	-144.2	-203.3	-44.5	-44.5	44.5
116	OL1	10.5	9.8	0.5	0.5	0.5
116	OL1	-172.0	-220.3	-44.4	-44.4	44.4
116	OL2	12.0	11.1	0.6	0.6	0.6
116	OL2	-225.3	-299.0	-54.1	-54.1	54.1
116	LEGAL LANE(<200')	5.1	4.8	0.2	0.2	0.2
116	LEGAL LANE(<200')	-93.5	-121.2	-22.5	-22.5	22.5
116	H-20 TRUCK	7.1	6.6	0.3	0.3	0.3
116	H-20 TRUCK	-105.3	-144.3	-33.2	-33.2	33.2
116	H-20 LANE	7.5	7.0	0.3	0.3	0.3
116	H-20 LANE	-119.8	-165.0	-34.1	-34.1	34.1
117	DEAD	11.5	-61.7	-8.3	-18.3	18.3
117	HS-20 TRUCK	81.9	27.2	6.3	0.4	6.3
117	HS-20 TRUCK	-33.6	-104.0	-27.7	-41.3	41.3
117	HS-20 LANE	80.8	24.3	5.7	0.3	5.7
117	HS-20 LANE	-27.8	-81.2	-25.2	-34.1	34.1
117	A1	64.7	13.7	4.8	0.3	4.8
117	A1	-26.2	-79.7	-24.5	-31.5	31.5
117	A2	59.0	14.1	4.4	0.3	4.4
117	A2	-25.3	-96.5	-23.3	-31.3	31.3
117	A3	54.7	14.4	4.0	0.3	4.0

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
117	A3	-21.5	-79.1	-20.8	-26.2	26.2
117	LEGAL LANE(>200')	45.7	11.8	3.2	0.2	3.2
117	LEGAL LANE(>200')	-18.8	-67.8	-16.9	-22.5	22.5
117	NRL	78.6	13.7	4.9	0.5	4.9
117	NRL	-39.2	-90.7	-27.5	-44.5	44.5
117	OL1	81.8	17.3	6.0	0.5	6.0
117	OL1	-38.9	-123.6	-32.2	-44.4	44.4
117	OL2	99.7	27.6	6.6	0.6	6.6
117	OL2	-43.9	-167.2	-38.1	-54.1	54.1
117	LEGAL LANE(<200')	45.7	11.8	3.2	0.2	3.2
117	LEGAL LANE(<200')	-18.8	-67.8	-16.9	-22.5	22.5
117	H-20 TRUCK	81.2	25.8	6.3	0.3	6.3
117	H-20 TRUCK	-26.2	-66.7	-26.1	-33.2	33.2
117	H-20 LANE	80.8	24.3	5.7	0.3	5.7
117	H-20 LANE	-27.8	-81.2	-25.2	-34.1	34.1
118	DEAD	35.8	0.0	10.1	-8.3	10.1
118	HS-20 TRUCK	115.8	0.3	37.3	6.3	37.3
118	HS-20 TRUCK	0.0	-33.6	-2.6	-27.7	27.7
118	HS-20 LANE	111.5	0.3	31.3	5.7	31.3
118	HS-20 LANE	0.0	-27.8	-2.1	-25.2	25.2
118	A1	95.3	0.2	29.7	4.8	29.7
118	A1	0.0	-26.2	-2.0	-24.5	24.5
118	A2	87.5	0.2	28.0	4.4	28.0
118	A2	0.0	-25.3	-1.9	-23.3	23.3
118	A3	79.2	0.2	24.4	4.0	24.4
118	A3	0.0	-21.5	-1.7	-20.8	20.8
118	LEGAL LANE(>200')	65.9	0.2	20.0	3.2	20.0
118	LEGAL LANE(>200')	0.0	-18.8	-1.4	-16.9	16.9
118	NRL	116.3	0.3	35.7	4.9	35.7
118	NRL	0.0	-39.2	-3.0	-27.5	27.5
118	OL1	121.9	0.3	39.8	6.0	39.8
118	OL1	0.0	-38.9	-3.0	-32.2	32.2
118	OL2	138.1	0.4	44.9	6.6	44.9
118	OL2	0.0	-43.9	-3.4	-38.1	38.1
118	LEGAL LANE(<200')	66.0	0.2	20.0	3.2	20.0
118	LEGAL LANE(<200')	0.0	-18.8	-1.4	-16.9	16.9
118	H-20 TRUCK	112.6	0.3	33.3	6.3	33.3
118	H-20 TRUCK	0.0	-26.2	-2.0	-26.1	26.1
118	H-20 LANE	111.5	0.3	31.3	5.7	31.3
118	H-20 LANE	0.0	-27.8	-2.1	-25.2	25.2
20a	DEAD	-61.8	-91.7	21.6	18.3	21.6
20a	HS-20 TRUCK	26.7	8.5	41.3	41.3	41.3
20a	HS-20 TRUCK	-103.8	-139.2	-0.4	-0.4	0.4
20a	HS-20 LANE	24.0	7.0	34.1	34.1	34.1
20a	HS-20 LANE	-81.7	-120.6	-0.3	-0.3	0.3
20a	A1	13.5	6.6	31.5	31.5	31.5
20a	A1	-80.2	-117.0	-0.3	-0.3	0.3
20a	A2	13.9	6.4	31.4	31.4	31.4
20a	A2	-96.5	-125.7	-0.3	-0.3	0.3
20a	A3	14.2	5.4	26.2	26.2	26.2
20a	A3	-79.3	-108.4	-0.3	-0.3	0.3
20a	LEGAL LANE(>200')	11.7	4.7	22.5	22.5	22.5
20a	LEGAL LANE(>200')	-67.9	-93.6	-0.2	-0.2	0.2
20a	NRL	13.5	9.9	44.5	44.5	44.5
20a	NRL	-91.6	-145.3	-0.5	-0.5	0.5
20a	OL1	17.0	9.8	44.4	44.4	44.4
20a	OL1	-123.8	-172.2	-0.5	-0.5	0.5
20a	OL2	27.3	11.1	54.1	54.1	54.1
20a	OL2	-167.2	-225.4	-0.6	-0.6	0.6
20a	LEGAL LANE(<200')	11.7	4.7	22.5	22.5	22.5
20a	LEGAL LANE(<200')	-68.0	-93.7	-0.2	-0.2	0.2
20a	H-20 TRUCK	25.4	6.6	33.2	33.2	33.2
20a	H-20 TRUCK	-67.4	-106.0	-0.3	-0.3	0.3
20a	H-20 LANE	24.0	7.0	34.1	34.1	34.1
20a	H-20 LANE	-81.7	-120.6	-0.3	-0.3	0.3

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
21a	DEAD	-70.6	-101.6	-19.0	-22.3	22.3
21a	HS-20 TRUCK	34.6	29.6	3.3	3.3	3.3
21a	HS-20 TRUCK	-121.6	-164.7	-44.4	-44.4	44.4
21a	HS-20 LANE	26.7	24.3	2.7	2.7	2.7
21a	HS-20 LANE	-108.5	-142.8	-35.2	-35.2	35.2
21a	A1	23.0	19.2	2.5	2.5	2.5
21a	A1	-97.3	-129.5	-33.8	-33.8	33.8
21a	A2	23.9	22.2	2.4	2.4	2.4
21a	A2	-112.3	-143.8	-31.9	-31.9	31.9
21a	A3	23.8	18.9	2.1	2.1	2.1
21a	A3	-85.1	-111.4	-27.9	-27.9	27.9
21a	LEGAL LANE(>200')	20.2	16.5	1.8	1.8	1.8
21a	LEGAL LANE(>200')	-74.8	-99.0	-24.2	-24.2	24.2
21a	NRL	34.4	28.7	3.8	3.8	3.8
21a	NRL	-134.9	-190.2	-46.1	-46.1	46.1
21a	OL1	34.1	28.4	3.8	3.8	3.8
21a	OL1	-142.8	-194.1	-49.9	-49.9	49.9
21a	OL2	42.0	38.6	4.3	4.3	4.3
21a	OL2	-202.1	-261.9	-54.5	-54.5	54.5
21a	LEGAL LANE(<200')	20.2	16.5	1.8	1.8	1.8
21a	LEGAL LANE(<200')	-74.8	-99.0	-24.2	-24.2	24.2
21a	H-20 TRUCK	23.7	22.9	2.5	2.5	2.5
21a	H-20 TRUCK	-92.1	-120.2	-33.9	-33.9	33.9
21a	H-20 LANE	26.7	24.3	2.7	2.7	2.7
21a	H-20 LANE	-108.5	-142.8	-35.2	-35.2	35.2
25a	DEAD	-73.8	-105.2	22.6	19.3	22.6
25a	HS-20 TRUCK	35.1	15.8	43.6	43.6	43.6
25a	HS-20 TRUCK	-122.4	-150.3	-1.8	-1.8	1.8
25a	HS-20 LANE	29.6	19.3	34.9	34.9	34.9
25a	HS-20 LANE	-102.4	-135.3	-2.0	-2.0	2.0
25a	A1	15.6	14.6	33.1	33.1	33.1
25a	A1	-89.6	-122.6	-1.8	-1.8	1.8
25a	A2	19.9	14.3	32.2	32.2	32.2
25a	A2	-113.1	-144.4	-1.6	-1.6	1.6
25a	A3	21.0	12.9	27.3	27.3	27.3
25a	A3	-90.5	-117.2	-1.5	-1.5	1.5
25a	LEGAL LANE(>200')	18.0	11.7	23.7	23.7	23.7
25a	LEGAL LANE(>200')	-79.3	-103.7	-1.3	-1.3	1.3
25a	NRL	20.9	17.4	45.4	45.4	45.4
25a	NRL	-121.1	-174.3	-2.4	-2.4	2.4
25a	OL1	20.3	19.8	48.7	48.7	48.7
25a	OL1	-136.4	-186.8	-2.2	-2.2	2.2
25a	OL2	34.6	25.9	55.1	55.1	55.1
25a	OL2	-205.7	-265.4	-2.9	-2.9	2.9
25a	LEGAL LANE(<200')	18.0	11.7	23.7	23.7	23.7
25a	LEGAL LANE(<200')	-79.4	-103.7	-1.3	-1.3	1.3
25a	H-20 TRUCK	27.5	15.6	33.5	33.5	33.5
25a	H-20 TRUCK	-82.4	-109.4	-1.8	-1.8	1.8
25a	H-20 LANE	29.6	19.3	34.9	34.9	34.9
25a	H-20 LANE	-102.4	-135.3	-2.0	-2.0	2.0
76a	DEAD	-73.6	-104.9	-19.2	-22.5	22.5
76a	HS-20 TRUCK	37.6	29.5	3.3	3.3	3.3
76a	HS-20 TRUCK	-124.8	-157.5	-44.1	-44.1	44.1
76a	HS-20 LANE	30.8	25.6	2.8	2.8	2.8
76a	HS-20 LANE	-107.2	-141.3	-35.2	-35.2	35.2
76a	A1	22.9	19.0	2.6	2.6	2.6
76a	A1	-93.1	-125.6	-33.5	-33.5	33.5
76a	A2	24.7	22.1	2.5	2.5	2.5
76a	A2	-115.6	-147.4	-32.4	-32.4	32.4
76a	A3	25.0	18.9	2.1	2.1	2.1
76a	A3	-92.0	-119.0	-27.7	-27.7	27.7
76a	LEGAL LANE(>200')	21.6	16.9	1.9	1.9	1.9
76a	LEGAL LANE(>200')	-80.9	-105.6	-24.1	-24.1	24.1
76a	NRL	34.3	28.5	3.9	3.9	3.9
76a	NRL	-127.8	-181.5	-45.9	-45.9	45.9

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
76a	OL1	33.9	28.1	3.9	3.9	3.9
76a	OL1	-140.2	-191.5	-49.6	-49.6	49.6
76a	OL2	44.0	39.1	4.4	4.4	4.4
76a	OL2	-210.0	-270.7	-55.5	-55.5	55.5
76a	LEGAL LANE(<200')	21.6	16.9	1.9	1.9	1.9
76a	LEGAL LANE(<200')	-80.9	-105.7	-24.1	-24.1	24.1
76a	H-20 TRUCK	26.9	22.8	2.6	2.6	2.6
76a	H-20 TRUCK	-86.8	-114.0	-33.7	-33.7	33.7
76a	H-20 LANE	30.8	25.6	2.8	2.8	2.8
76a	H-20 LANE	-107.2	-141.3	-35.2	-35.2	35.2
80a	DEAD	-72.5	-103.7	22.4	19.1	22.4
80a	HS-20 TRUCK	38.0	26.1	43.8	43.8	43.8
80a	HS-20 TRUCK	-124.9	-152.6	-3.0	-3.0	3.0
80a	HS-20 LANE	32.4	24.4	35.1	35.1	35.1
80a	HS-20 LANE	-104.5	-138.0	-2.6	-2.6	2.6
80a	A1	20.5	17.0	33.2	33.2	33.2
80a	A1	-90.2	-123.0	-2.4	-2.4	2.4
80a	A2	23.5	19.8	32.4	32.4	32.4
80a	A2	-115.3	-147.1	-2.3	-2.3	2.3
80a	A3	24.2	16.8	27.5	27.5	27.5
80a	A3	-91.9	-118.8	-1.9	-1.9	1.9
80a	LEGAL LANE(>200')	21.1	15.5	23.9	23.9	23.9
80a	LEGAL LANE(>200')	-80.8	-105.4	-1.7	-1.7	1.7
80a	NRL	30.5	25.2	45.6	45.6	45.6
80a	NRL	-122.7	-175.6	-3.5	-3.5	3.5
80a	OL1	30.1	24.9	49.1	49.1	49.1
80a	OL1	-137.9	-188.8	-3.5	-3.5	3.5
80a	OL2	41.8	34.2	55.4	55.4	55.4
80a	OL2	-209.7	-270.2	-3.9	-3.9	3.9
80a	LEGAL LANE(<200')	21.1	15.5	23.9	23.9	23.9
80a	LEGAL LANE(<200')	-80.8	-105.5	-1.7	-1.7	1.7
80a	H-20 TRUCK	28.3	20.5	33.5	33.5	33.5
80a	H-20 TRUCK	-83.3	-109.9	-2.4	-2.4	2.4
80a	H-20 LANE	32.4	24.4	35.1	35.1	35.1
80a	H-20 LANE	-104.5	-138.0	-2.6	-2.6	2.6
81a	DEAD	-72.7	-103.9	-19.1	-22.4	22.4
81a	HS-20 TRUCK	39.0	30.7	3.5	3.5	3.5
81a	HS-20 TRUCK	-125.7	-154.7	-44.0	-44.0	44.0
81a	HS-20 LANE	32.7	26.9	2.9	2.9	2.9
81a	HS-20 LANE	-106.4	-140.3	-35.2	-35.2	35.2
81a	A1	23.6	19.5	2.7	2.7	2.7
81a	A1	-91.5	-124.1	-33.4	-33.4	33.4
81a	A2	25.5	22.8	2.6	2.6	2.6
81a	A2	-116.2	-148.1	-32.4	-32.4	32.4
81a	A3	25.9	19.2	2.2	2.2	2.2
81a	A3	-92.4	-119.4	-27.6	-27.6	27.6
81a	LEGAL LANE(>200')	22.5	17.5	2.0	2.0	2.0
81a	LEGAL LANE(>200')	-81.4	-106.2	-24.0	-24.0	24.0
81a	NRL	35.7	29.5	4.1	4.1	4.1
81a	NRL	-125.0	-178.1	-45.8	-45.8	45.8
81a	OL1	35.3	29.2	4.1	4.1	4.1
81a	OL1	-139.3	-190.4	-49.4	-49.4	49.4
81a	OL2	46.1	39.7	4.5	4.5	4.5
81a	OL2	-211.2	-272.0	-55.5	-55.5	55.5
81a	LEGAL LANE(<200')	22.6	17.5	2.0	2.0	2.0
81a	LEGAL LANE(<200')	-81.4	-106.2	-24.0	-24.0	24.0
81a	H-20 TRUCK	28.1	23.3	2.7	2.7	2.7
81a	H-20 TRUCK	-84.8	-111.8	-33.6	-33.6	33.6
81a	H-20 LANE	32.7	26.9	2.9	2.9	2.9
81a	H-20 LANE	-106.4	-140.3	-35.2	-35.2	35.2
85a	DEAD	-73.5	-104.7	22.5	19.2	22.5
85a	HS-20 TRUCK	38.8	28.2	44.0	44.0	44.0
85a	HS-20 TRUCK	-127.0	-155.0	-3.2	-3.2	3.2
85a	HS-20 LANE	33.4	26.3	35.2	35.2	35.2
85a	HS-20 LANE	-105.7	-139.4	-2.8	-2.8	2.8

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
85a	A1	22.0	18.2	33.3	33.3	33.3
85a	A1	-90.7	-123.6	-2.5	-2.5	2.5
85a	A2	24.5	21.2	32.5	32.5	32.5
85a	A2	-117.6	-149.6	-2.4	-2.4	2.4
85a	A3	25.1	18.0	27.5	27.5	27.5
85a	A3	-93.9	-121.1	-2.1	-2.1	2.1
85a	LEGAL LANE(>200')	22.1	16.7	24.0	24.0	24.0
85a	LEGAL LANE(>200')	-82.6	-107.4	-1.9	-1.9	1.9
85a	NRL	32.8	27.2	45.7	45.7	45.7
85a	NRL	-123.5	-176.4	-3.8	-3.8	3.8
85a	OL1	32.4	26.8	49.3	49.3	49.3
85a	OL1	-139.1	-190.2	-3.8	-3.8	3.8
85a	OL2	43.8	36.7	55.7	55.7	55.7
85a	OL2	-213.8	-274.8	-4.2	-4.2	4.2
85a	LEGAL LANE(<200')	22.1	16.7	24.0	24.0	24.0
85a	LEGAL LANE(<200')	-82.6	-107.5	-1.9	-1.9	1.9
85a	H-20 TRUCK	28.5	21.9	33.5	33.5	33.5
85a	H-20 TRUCK	-83.7	-110.5	-2.5	-2.5	2.5
85a	H-20 LANE	33.4	26.3	35.2	35.2	35.2
85a	H-20 LANE	-105.7	-139.4	-2.8	-2.8	2.8
86a	DEAD	-74.1	-105.6	-19.3	-22.6	22.6
86a	HS-20 TRUCK	41.0	40.8	4.7	4.7	4.7
86a	HS-20 TRUCK	-130.3	-163.4	-44.8	-44.8	44.8
86a	HS-20 LANE	44.3	38.4	4.9	4.9	4.9
86a	HS-20 LANE	-111.1	-146.0	-35.3	-35.3	35.3
86a	A1	36.8	30.5	4.2	4.2	4.2
86a	A1	-95.8	-128.0	-34.0	-34.0	34.0
86a	A2	33.6	32.9	3.8	3.8	3.8
86a	A2	-120.8	-153.7	-32.8	-32.8	32.8
86a	A3	35.0	30.3	3.5	3.5	3.5
86a	A3	-95.9	-123.7	-28.1	-28.1	28.1
86a	LEGAL LANE(>200')	29.7	26.2	2.9	2.9	2.9
86a	LEGAL LANE(>200')	-84.2	-109.6	-24.4	-24.4	24.4
86a	NRL	46.5	38.5	5.3	5.3	5.3
86a	NRL	-132.9	-186.8	-46.4	-46.4	46.4
86a	OL1	46.5	38.5	5.3	5.3	5.3
86a	OL1	-144.6	-196.8	-50.6	-50.6	50.6
86a	OL2	56.2	55.9	6.4	6.4	6.4
86a	OL2	-219.3	-281.7	-56.3	-56.3	56.3
86a	LEGAL LANE(<200')	29.7	26.2	2.9	2.9	2.9
86a	LEGAL LANE(<200')	-84.3	-109.6	-24.4	-24.4	24.4
86a	H-20 TRUCK	40.9	33.9	4.7	4.7	4.7
86a	H-20 TRUCK	-90.0	-117.9	-33.9	-33.9	33.9
86a	H-20 LANE	44.3	38.4	4.9	4.9	4.9
86a	H-20 LANE	-111.1	-146.0	-35.3	-35.3	35.3
90a	DEAD	-70.4	-101.4	22.3	19.0	22.3
90a	HS-20 TRUCK	43.2	25.2	43.4	43.4	43.4
90a	HS-20 TRUCK	-149.7	-179.9	-3.1	-3.1	3.1
90a	HS-20 LANE	34.9	20.7	36.5	36.5	36.5
90a	HS-20 LANE	-100.6	-128.5	-2.6	-2.6	2.6
90a	A1	19.6	18.1	32.7	32.7	32.7
90a	A1	-89.9	-127.9	-2.4	-2.4	2.4
90a	A2	24.4	19.0	31.0	31.0	31.0
90a	A2	-126.0	-153.4	-2.3	-2.3	2.3
90a	A3	26.1	16.1	27.2	27.2	27.2
90a	A3	-94.4	-123.1	-2.0	-2.0	2.0
90a	LEGAL LANE(>200')	21.8	14.1	24.2	24.2	24.2
90a	LEGAL LANE(>200')	-82.3	-108.9	-1.7	-1.7	1.7
90a	NRL	29.4	23.9	50.2	50.2	50.2
90a	NRL	-111.2	-164.2	-3.6	-3.6	3.6
90a	OL1	29.0	24.8	52.3	52.3	52.3
90a	OL1	-151.5	-218.8	-3.6	-3.6	3.6
90a	OL2	44.9	32.9	56.2	56.2	56.2
90a	OL2	-222.1	-291.2	-4.1	-4.1	4.1
90a	LEGAL LANE(<200')	21.8	14.1	24.2	24.2	24.2

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
90a	LEGAL LANE(<200')	-82.3	-108.9	-1.7	-1.7	1.7
90a	H-20 TRUCK	34.1	19.5	33.0	33.0	33.0
90a	H-20 TRUCK	-79.1	-99.9	-2.4	-2.4	2.4
90a	H-20 LANE	34.9	20.7	36.5	36.5	36.5
90a	H-20 LANE	-100.6	-128.5	-2.6	-2.6	2.6
91a	DEAD	-68.9	-97.6	-17.5	-20.8	20.8
91a	HS-20 TRUCK	0.0	0.0	0.0	0.0	0.0
91a	HS-20 TRUCK	-175.9	-223.9	-32.0	-32.0	32.0
91a	HS-20 LANE	0.0	0.0	0.0	0.0	0.0
91a	HS-20 LANE	-186.0	-236.7	-33.8	-33.8	33.8
91a	A1	0.0	0.0	0.0	0.0	0.0
91a	A1	-158.1	-201.2	-28.7	-28.7	28.7
91a	A2	0.0	0.0	0.0	0.0	0.0
91a	A2	-149.2	-189.9	-27.1	-27.1	27.1
91a	A3	0.0	0.0	0.0	0.0	0.0
91a	A3	-130.2	-165.7	-23.7	-23.7	23.7
91a	LEGAL LANE(>200')	0.0	0.0	0.0	0.0	0.0
91a	LEGAL LANE(>200')	-111.1	-141.4	-20.2	-20.2	20.2
91a	NRL	0.0	0.0	0.0	0.0	0.0
91a	NRL	-220.5	-280.6	-40.1	-40.1	40.1
91a	OL1	0.0	0.0	0.0	0.0	0.0
91a	OL1	-208.0	-264.7	-37.8	-37.8	37.8
91a	OL2	0.0	0.0	0.0	0.0	0.0
91a	OL2	-260.4	-331.4	-47.3	-47.3	47.3
91a	LEGAL LANE(<200')	0.0	0.0	0.0	0.0	0.0
91a	LEGAL LANE(<200')	-111.2	-141.5	-20.2	-20.2	20.2
91a	H-20 TRUCK	0.0	0.0	0.0	0.0	0.0
91a	H-20 TRUCK	-175.9	-223.9	-32.0	-32.0	32.0
91a	H-20 LANE	0.0	0.0	0.0	0.0	0.0
91a	H-20 LANE	-186.0	-236.7	-33.8	-33.8	33.8
95a	DEAD	-68.9	-97.6	20.8	17.5	20.8
95a	HS-20 TRUCK	0.0	0.0	43.1	43.1	43.1
95a	HS-20 TRUCK	-176.0	-224.0	0.0	0.0	0.0
95a	HS-20 LANE	0.0	0.0	35.6	35.6	35.6
95a	HS-20 LANE	-175.5	-228.9	0.0	0.0	0.0
95a	A1	0.0	0.0	34.0	34.0	34.0
95a	A1	-158.2	-201.4	0.0	0.0	0.0
95a	A2	0.0	0.0	33.7	33.7	33.7
95a	A2	-144.2	-184.8	0.0	0.0	0.0
95a	A3	0.0	0.0	28.0	28.0	28.0
95a	A3	-130.3	-165.8	0.0	0.0	0.0
95a	LEGAL LANE(>200')	0.0	0.0	24.0	24.0	24.0
95a	LEGAL LANE(>200')	-107.9	-139.1	0.0	0.0	0.0
95a	NRL	0.0	0.0	48.7	48.7	48.7
95a	NRL	-190.5	-258.2	0.0	0.0	0.0
95a	OL1	0.0	0.0	47.1	47.1	47.1
95a	OL1	-200.1	-258.5	0.0	0.0	0.0
95a	OL2	0.0	0.0	57.4	57.4	57.4
95a	OL2	-228.0	-297.9	0.0	0.0	0.0
95a	LEGAL LANE(<200')	0.0	0.0	24.0	24.0	24.0
95a	LEGAL LANE(<200')	-107.9	-139.1	0.0	0.0	0.0
95a	H-20 TRUCK	0.0	0.0	34.8	34.8	34.8
95a	H-20 TRUCK	-175.9	-223.9	0.0	0.0	0.0
95a	H-20 LANE	0.0	0.0	35.6	35.6	35.6
95a	H-20 LANE	-175.5	-228.9	0.0	0.0	0.0
96a	DEAD	-70.3	-101.3	-19.0	-22.3	22.3
96a	HS-20 TRUCK	43.7	25.1	3.1	3.1	3.1
96a	HS-20 TRUCK	-150.5	-180.8	-43.3	-43.3	43.3
96a	HS-20 LANE	35.4	20.6	2.6	2.6	2.6
96a	HS-20 LANE	-102.4	-125.2	-34.7	-34.7	34.7
96a	A1	19.5	18.5	2.4	2.4	2.4
96a	A1	-91.4	-123.6	-32.6	-32.6	32.6
96a	A2	24.5	18.9	2.4	2.4	2.4
96a	A2	-126.6	-154.1	-30.9	-30.9	30.9
96a	A3	26.3	16.0	2.0	2.0	2.0

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
96a	A3	-95.3	-122.2	-26.9	-26.9	26.9
96a	LEGAL LANE(>200')	21.9	14.0	1.7	1.7	1.7
96a	LEGAL LANE(>200')	-83.1	-107.5	-23.5	-23.5	23.5
96a	NRL	29.2	23.8	3.6	3.6	3.6
96a	NRL	-109.8	-160.4	-45.3	-45.3	45.3
96a	OL1	28.9	25.2	3.6	3.6	3.6
96a	OL1	-153.0	-209.2	-48.6	-48.6	48.6
96a	OL2	45.2	32.7	4.1	4.1	4.1
96a	OL2	-223.7	-283.4	-53.7	-53.7	53.7
96a	LEGAL LANE(<200')	21.9	14.0	1.7	1.7	1.7
96a	LEGAL LANE(<200')	-83.1	-107.5	-23.5	-23.5	23.5
96a	H-20 TRUCK	34.7	19.4	2.4	2.4	2.4
96a	H-20 TRUCK	-80.7	-98.2	-33.0	-33.0	33.0
96a	H-20 LANE	35.4	20.6	2.6	2.6	2.6
96a	H-20 LANE	-102.4	-125.2	-34.7	-34.7	34.7
100a	DEAD	-74.1	-105.5	22.6	19.3	22.6
100a	HS-20 TRUCK	42.2	41.7	44.9	44.9	44.9
100a	HS-20 TRUCK	-130.7	-163.5	-4.8	-4.8	4.8
100a	HS-20 LANE	45.2	39.2	35.4	35.4	35.4
100a	HS-20 LANE	-111.2	-146.2	-5.0	-5.0	5.0
100a	A1	37.5	31.0	34.0	34.0	34.0
100a	A1	-95.8	-127.9	-4.3	-4.3	4.3
100a	A2	34.2	33.4	32.8	32.8	32.8
100a	A2	-121.1	-154.1	-3.9	-3.9	3.9
100a	A3	35.6	30.9	28.1	28.1	28.1
100a	A3	-96.0	-123.8	-3.5	-3.5	3.5
100a	LEGAL LANE(>200')	30.2	26.7	24.4	24.4	24.4
100a	LEGAL LANE(>200')	-84.3	-109.8	-3.0	-3.0	3.0
100a	NRL	47.7	39.5	46.4	46.4	46.4
100a	NRL	-133.0	-186.9	-5.5	-5.5	5.5
100a	OL1	47.4	39.3	50.7	50.7	50.7
100a	OL1	-144.7	-197.1	-5.4	-5.4	5.4
100a	OL2	57.9	57.2	56.4	56.4	56.4
100a	OL2	-219.7	-282.3	-6.7	-6.7	6.7
100a	LEGAL LANE(<200')	30.2	26.7	24.4	24.4	24.4
100a	LEGAL LANE(<200')	-84.4	-109.8	-3.0	-3.0	3.0
100a	H-20 TRUCK	41.7	34.5	33.9	33.9	33.9
100a	H-20 TRUCK	-90.0	-118.0	-4.8	-4.8	4.8
100a	H-20 LANE	45.2	39.2	35.4	35.4	35.4
100a	H-20 LANE	-111.2	-146.2	-5.0	-5.0	5.0
101a	DEAD	-73.3	-104.6	-19.2	-22.5	22.5
101a	HS-20 TRUCK	38.9	27.5	3.2	3.2	3.2
101a	HS-20 TRUCK	-127.0	-154.9	-43.9	-43.9	43.9
101a	HS-20 LANE	33.8	25.9	2.8	2.8	2.8
101a	HS-20 LANE	-104.9	-138.5	-35.1	-35.1	35.1
101a	A1	21.5	17.7	2.5	2.5	2.5
101a	A1	-89.9	-122.9	-33.2	-33.2	33.2
101a	A2	24.3	20.7	2.4	2.4	2.4
101a	A2	-117.4	-149.4	-32.5	-32.5	32.5
101a	A3	25.0	17.6	2.0	2.0	2.0
101a	A3	-93.7	-120.9	-27.5	-27.5	27.5
101a	LEGAL LANE(>200')	22.0	16.4	1.8	1.8	1.8
101a	LEGAL LANE(>200')	-82.4	-107.3	-23.9	-23.9	23.9
101a	NRL	32.0	26.5	3.7	3.7	3.7
101a	NRL	-122.1	-174.8	-45.6	-45.6	45.6
101a	OL1	31.6	26.1	3.7	3.7	3.7
101a	OL1	-138.4	-189.5	-49.2	-49.2	49.2
101a	OL2	43.4	35.8	4.1	4.1	4.1
101a	OL2	-213.5	-274.4	-55.7	-55.7	55.7
101a	LEGAL LANE(<200')	22.0	16.4	1.8	1.8	1.8
101a	LEGAL LANE(<200')	-82.5	-107.3	-23.9	-23.9	23.9
101a	H-20 TRUCK	28.9	21.4	2.5	2.5	2.5
101a	H-20 TRUCK	-82.7	-109.4	-33.5	-33.5	33.5
101a	H-20 LANE	33.8	25.9	2.8	2.8	2.8
101a	H-20 LANE	-104.9	-138.5	-35.1	-35.1	35.1

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
105a	DEAD	-72.8	-104.0	22.5	19.2	22.5
105a	HS-20 TRUCK	38.9	31.5	44.1	44.1	44.1
105a	HS-20 TRUCK	-125.9	-156.2	-3.6	-3.6	3.6
105a	HS-20 LANE	32.5	27.5	35.3	35.3	35.3
105a	HS-20 LANE	-107.3	-141.4	-3.0	-3.0	3.0
105a	A1	24.2	20.0	33.5	33.5	33.5
105a	A1	-92.3	-124.8	-2.8	-2.8	2.8
105a	A2	25.8	23.4	32.5	32.5	32.5
105a	A2	-116.4	-148.4	-2.7	-2.7	2.7
105a	A3	26.1	19.7	27.7	27.7	27.7
105a	A3	-92.6	-119.7	-2.2	-2.2	2.2
105a	LEGAL LANE(>200')	22.7	17.9	24.1	24.1	24.1
105a	LEGAL LANE(>200')	-81.6	-106.5	-2.0	-2.0	2.0
105a	NRL	36.6	30.3	45.8	45.8	45.8
105a	NRL	-126.5	-179.8	-4.2	-4.2	4.2
105a	OL1	36.3	30.0	49.6	49.6	49.6
105a	OL1	-140.0	-191.3	-4.2	-4.2	4.2
105a	OL2	46.6	40.7	55.6	55.6	55.6
105a	OL2	-211.6	-272.5	-4.7	-4.7	4.7
105a	LEGAL LANE(<200')	22.7	17.9	24.1	24.1	24.1
105a	LEGAL LANE(<200')	-81.7	-106.5	-2.0	-2.0	2.0
105a	H-20 TRUCK	27.6	23.8	33.6	33.6	33.6
105a	H-20 TRUCK	-85.8	-112.9	-2.7	-2.7	2.7
105a	H-20 LANE	32.5	27.5	35.3	35.3	35.3
105a	H-20 LANE	-107.3	-141.4	-3.0	-3.0	3.0
106a	DEAD	-72.5	-103.7	-19.1	-22.4	22.4
106a	HS-20 TRUCK	37.7	25.9	3.0	3.0	3.0
106a	HS-20 TRUCK	-124.7	-152.6	-43.8	-43.8	43.8
106a	HS-20 LANE	32.1	24.2	2.6	2.6	2.6
106a	HS-20 LANE	-104.7	-138.2	-35.1	-35.1	35.1
106a	A1	20.3	16.8	2.3	2.3	2.3
106a	A1	-90.5	-123.3	-33.3	-33.3	33.3
106a	A2	23.2	19.6	2.2	2.2	2.2
106a	A2	-115.2	-146.9	-32.4	-32.4	32.4
106a	A3	24.0	16.6	1.9	1.9	1.9
106a	A3	-91.9	-118.8	-27.5	-27.5	27.5
106a	LEGAL LANE(>200')	20.9	15.3	1.7	1.7	1.7
106a	LEGAL LANE(>200')	-80.8	-105.5	-23.9	-23.9	23.9
106a	NRL	30.2	25.0	3.5	3.5	3.5
106a	NRL	-123.1	-176.1	-45.6	-45.6	45.6
106a	OL1	29.8	24.7	3.4	3.4	3.4
106a	OL1	-138.1	-188.9	-49.1	-49.1	49.1
106a	OL2	41.4	33.9	3.9	3.9	3.9
106a	OL2	-209.5	-270.0	-55.4	-55.4	55.4
106a	LEGAL LANE(<200')	20.9	15.3	1.7	1.7	1.7
106a	LEGAL LANE(<200')	-80.9	-105.5	-23.9	-23.9	23.9
106a	H-20 TRUCK	28.0	20.3	2.3	2.3	2.3
106a	H-20 TRUCK	-83.6	-110.3	-33.5	-33.5	33.5
106a	H-20 LANE	32.1	24.2	2.6	2.6	2.6
106a	H-20 LANE	-104.7	-138.2	-35.1	-35.1	35.1
110a	DEAD	-73.6	-104.9	22.5	19.2	22.5
110a	HS-20 TRUCK	37.3	29.3	44.2	44.2	44.2
110a	HS-20 TRUCK	-124.6	-158.0	-3.3	-3.3	3.3
110a	HS-20 LANE	30.5	25.5	35.2	35.2	35.2
110a	HS-20 LANE	-107.5	-141.6	-2.8	-2.8	2.8
110a	A1	22.8	18.9	33.5	33.5	33.5
110a	A1	-93.4	-125.9	-2.6	-2.6	2.6
110a	A2	24.5	22.0	32.4	32.4	32.4
110a	A2	-115.5	-147.3	-2.5	-2.5	2.5
110a	A3	24.8	18.8	27.7	27.7	27.7
110a	A3	-92.1	-119.1	-2.1	-2.1	2.1
110a	LEGAL LANE(>200')	21.4	16.8	24.1	24.1	24.1
110a	LEGAL LANE(>200')	-80.9	-105.7	-1.9	-1.9	1.9
110a	NRL	34.1	28.3	45.9	45.9	45.9
110a	NRL	-128.3	-182.2	-3.9	-3.9	3.9

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
110a	OL1	33.8	28.0	49.6	49.6	49.6
110a	OL1	-140.5	-191.7	-3.8	-3.8	3.8
110a	OL2	43.7	38.9	55.5	55.5	55.5
110a	OL2	-209.9	-270.5	-4.4	-4.4	4.4
110a	LEGAL LANE(<200')	21.4	16.8	24.1	24.1	24.1
110a	LEGAL LANE(<200')	-81.0	-105.7	-1.9	-1.9	1.9
110a	H-20 TRUCK	26.5	22.6	33.7	33.7	33.7
110a	H-20 TRUCK	-87.2	-114.5	-2.6	-2.6	2.6
110a	H-20 LANE	30.5	25.5	35.2	35.2	35.2
110a	H-20 LANE	-107.5	-141.6	-2.8	-2.8	2.8
111a	DEAD	-74.0	-105.5	-19.3	-22.6	22.6
111a	HS-20 TRUCK	34.9	16.3	1.9	1.9	1.9
111a	HS-20 TRUCK	-122.6	-152.0	-43.7	-43.7	43.7
111a	HS-20 LANE	29.2	19.8	2.1	2.1	2.1
111a	HS-20 LANE	-103.3	-136.4	-34.9	-34.9	34.9
111a	A1	16.1	14.4	1.8	1.8	1.8
111a	A1	-90.5	-123.4	-33.2	-33.2	33.2
111a	A2	20.1	14.7	1.7	1.7	1.7
111a	A2	-113.4	-144.8	-32.3	-32.3	32.3
111a	A3	21.1	13.3	1.5	1.5	1.5
111a	A3	-90.9	-117.5	-27.4	-27.4	27.4
111a	LEGAL LANE(>200')	18.1	12.1	1.3	1.3	1.3
111a	LEGAL LANE(>200')	-79.6	-104.0	-23.8	-23.8	23.8
111a	NRL	21.6	17.9	2.4	2.4	2.4
111a	NRL	-122.7	-176.2	-45.5	-45.5	45.5
111a	OL1	20.4	20.0	2.3	2.3	2.3
111a	OL1	-137.2	-187.8	-48.8	-48.8	48.8
111a	OL2	34.8	26.7	3.0	3.0	3.0
111a	OL2	-206.3	-266.1	-55.1	-55.1	55.1
111a	LEGAL LANE(<200')	18.1	12.1	1.3	1.3	1.3
111a	LEGAL LANE(<200')	-79.6	-104.0	-23.8	-23.8	23.8
111a	H-20 TRUCK	27.1	16.1	1.8	1.8	1.8
111a	H-20 TRUCK	-83.5	-110.6	-33.5	-33.5	33.5
111a	H-20 LANE	29.2	19.8	2.1	2.1	2.1
111a	H-20 LANE	-103.3	-136.4	-34.9	-34.9	34.9
115a	DEAD	-70.3	-101.3	22.3	19.0	22.3
115a	HS-20 TRUCK	34.8	28.7	44.3	44.3	44.3
115a	HS-20 TRUCK	-121.2	-162.9	-3.2	-3.2	3.2
115a	HS-20 LANE	27.0	23.6	35.1	35.1	35.1
115a	HS-20 LANE	-107.3	-141.4	-2.6	-2.6	2.6
115a	A1	22.4	18.7	33.7	33.7	33.7
115a	A1	-96.3	-128.6	-2.5	-2.5	2.5
115a	A2	23.6	21.6	31.8	31.8	31.8
115a	A2	-111.8	-143.2	-2.4	-2.4	2.4
115a	A3	23.6	18.4	27.9	27.9	27.9
115a	A3	-84.4	-110.7	-2.0	-2.0	2.0
115a	LEGAL LANE(>200')	20.0	16.1	24.1	24.1	24.1
115a	LEGAL LANE(>200')	-74.2	-98.3	-1.8	-1.8	1.8
115a	NRL	33.5	27.9	46.1	46.1	46.1
115a	NRL	-133.2	-188.3	-3.7	-3.7	3.7
115a	OL1	33.1	27.6	49.8	49.8	49.8
115a	OL1	-141.9	-193.1	-3.7	-3.7	3.7
115a	OL2	41.6	37.6	54.4	54.4	54.4
115a	OL2	-201.2	-260.8	-4.1	-4.1	4.1
115a	LEGAL LANE(<200')	20.0	16.1	24.1	24.1	24.1
115a	LEGAL LANE(<200')	-74.2	-98.4	-1.8	-1.8	1.8
115a	H-20 TRUCK	24.1	22.3	33.9	33.9	33.9
115a	H-20 TRUCK	-90.9	-119.0	-2.5	-2.5	2.5
115a	H-20 LANE	27.0	23.6	35.1	35.1	35.1
115a	H-20 LANE	-107.3	-141.4	-2.6	-2.6	2.6
116a	DEAD	-61.7	-91.6	-18.3	-21.6	21.6
116a	HS-20 TRUCK	27.2	8.5	0.4	0.4	0.4
116a	HS-20 TRUCK	-104.0	-139.2	-41.3	-41.3	41.3
116a	HS-20 LANE	24.3	7.0	0.3	0.3	0.3
116a	HS-20 LANE	-81.2	-119.8	-34.1	-34.1	34.1

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
116a	A1	13.7	6.6	0.3	0.3	0.3
116a	A1	-79.7	-116.4	-31.5	-31.5	31.5
116a	A2	14.1	6.4	0.3	0.3	0.3
116a	A2	-96.5	-125.7	-31.3	-31.3	31.3
116a	A3	14.4	5.4	0.3	0.3	0.3
116a	A3	-79.1	-108.1	-26.2	-26.2	26.2
116a	LEGAL LANE(>200')	11.8	4.8	0.2	0.2	0.2
116a	LEGAL LANE(>200')	-67.8	-93.5	-22.5	-22.5	22.5
116a	NRL	13.7	9.9	0.5	0.5	0.5
116a	NRL	-90.7	-144.2	-44.5	-44.5	44.5
116a	OL1	17.3	9.8	0.5	0.5	0.5
116a	OL1	-123.6	-172.0	-44.4	-44.4	44.4
116a	OL2	27.6	11.1	0.6	0.6	0.6
116a	OL2	-167.2	-225.3	-54.1	-54.1	54.1
116a	LEGAL LANE(<200')	11.8	4.8	0.2	0.2	0.2
116a	LEGAL LANE(<200')	-67.8	-93.5	-22.5	-22.5	22.5
116a	H-20 TRUCK	25.8	6.6	0.3	0.3	0.3
116a	H-20 TRUCK	-66.7	-105.3	-33.2	-33.2	33.2
116a	H-20 LANE	24.3	7.0	0.3	0.3	0.3
116a	H-20 LANE	-81.2	-119.8	-34.1	-34.1	34.1
18	SU4	105.7	0.0	26.7	2.4	26.7
18	SU4	0.0	-30.7	-4.9	-33.4	33.4
18	SU5	106.7	0.0	27.2	2.5	27.2
18	SU5	0.0	-32.6	-4.9	-34.8	34.8
18	SU6	115.9	0.0	27.3	2.8	27.3
18	SU6	0.0	-36.1	-4.9	-34.8	34.8
18	SU7	115.9	0.0	27.9	2.9	27.9
18	SU7	0.0	-37.6	-4.9	-34.8	34.8
19	SU4	72.9	13.5	36.5	26.7	36.5
19	SU4	-30.7	-84.5	-0.4	-4.8	4.8
19	SU5	74.4	13.5	39.8	27.2	39.8
19	SU5	-32.6	-89.4	-0.4	-4.8	4.8
19	SU6	77.2	13.5	42.5	27.3	42.5
19	SU6	-36.1	-95.5	-0.5	-4.8	4.8
19	SU7	77.7	13.5	43.4	27.9	43.4
19	SU7	-37.7	-95.5	-0.5	-4.8	4.8
20	SU4	8.5	7.9	36.5	36.5	36.5
20	SU4	-124.2	-170.1	-0.4	-0.4	0.4
20	SU5	9.0	8.4	39.8	39.8	39.8
20	SU5	-134.7	-186.9	-0.4	-0.4	0.4
20	SU6	10.0	9.3	42.5	42.5	42.5
20	SU6	-147.9	-206.7	-0.5	-0.5	0.5
20	SU7	10.4	9.7	43.4	43.4	43.4
20	SU7	-151.3	-211.0	-0.5	-0.5	0.5
21	SU4	32.1	27.6	3.0	3.0	3.0
21	SU4	-149.6	-192.6	-39.0	-39.0	39.0
21	SU5	34.1	29.3	3.2	3.2	3.2
21	SU5	-160.5	-209.7	-41.6	-41.6	41.6
21	SU6	37.7	32.3	3.6	3.6	3.6
21	SU6	-177.2	-233.4	-44.2	-44.2	44.2
21	SU7	39.3	33.7	3.7	3.7	3.7
21	SU7	-188.2	-250.0	-44.5	-44.5	44.5
22	SU4	62.3	23.0	4.9	3.0	4.9
22	SU4	-22.9	-107.7	-28.6	-39.0	39.0
22	SU5	62.7	24.5	4.9	3.2	4.9
22	SU5	-24.8	-117.9	-30.0	-41.6	41.6
22	SU6	63.7	27.0	4.9	3.6	4.9
22	SU6	-26.6	-127.6	-30.0	-44.2	44.2
22	SU7	63.7	28.2	4.9	3.7	4.9
22	SU7	-26.6	-135.0	-30.5	-44.5	44.5
23	SU4	105.3	62.3	27.6	4.9	27.6
23	SU4	-13.4	-33.1	-5.5	-28.6	28.6
23	SU5	110.6	62.7	28.9	4.9	28.9
23	SU5	-14.2	-35.2	-5.5	-30.0	30.0
23	SU6	117.0	63.7	28.9	4.9	28.9

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
23	SU6	-15.8	-38.9	-5.5	-30.0	30.0
23	SU7	118.8	63.7	29.7	4.9	29.7
23	SU7	-16.5	-40.6	-5.5	-30.5	30.5
24	SU4	67.8	15.0	38.2	27.6	38.2
24	SU4	-33.1	-95.7	-2.1	-5.4	5.4
24	SU5	68.9	16.2	40.6	28.9	40.6
24	SU5	-35.2	-106.0	-2.2	-5.4	5.4
24	SU6	69.8	17.4	43.3	28.9	43.3
24	SU6	-38.9	-114.3	-2.4	-5.4	5.4
24	SU7	69.8	17.4	43.7	29.7	43.7
24	SU7	-40.6	-122.8	-2.4	-5.4	5.4
25	SU4	21.2	18.1	38.2	38.2	38.2
25	SU4	-135.6	-177.1	-2.1	-2.1	2.1
25	SU5	22.9	19.5	40.6	40.6	40.6
25	SU5	-148.4	-197.3	-2.2	-2.2	2.2
25	SU6	24.5	20.9	43.3	43.3	43.3
25	SU6	-163.0	-219.0	-2.4	-2.4	2.4
25	SU7	24.5	20.9	43.7	43.7	43.7
25	SU7	-174.2	-235.6	-2.4	-2.4	2.4
52	SU4	0.0	0.0	0.0	0.0	0.0
52	SU4	0.0	0.0	0.0	0.0	0.0
52	SU5	0.0	0.0	0.0	0.0	0.0
52	SU5	0.0	0.0	0.0	0.0	0.0
52	SU6	0.0	0.0	0.0	0.0	0.0
52	SU6	0.0	0.0	0.0	0.0	0.0
52	SU7	0.0	0.0	0.0	0.0	0.0
52	SU7	0.0	0.0	0.0	0.0	0.0
53	SU4	0.0	0.0	0.0	0.0	0.0
53	SU4	0.0	0.0	0.0	0.0	0.0
53	SU5	0.0	0.0	0.0	0.0	0.0
53	SU5	0.0	0.0	0.0	0.0	0.0
53	SU6	0.0	0.0	0.0	0.0	0.0
53	SU6	0.0	0.0	0.0	0.0	0.0
53	SU7	0.0	0.0	0.0	0.0	0.0
53	SU7	0.0	0.0	0.0	0.0	0.0
54	SU4	0.0	0.0	0.0	0.0	0.0
54	SU4	0.0	0.0	0.0	0.0	0.0
54	SU5	0.0	0.0	0.0	0.0	0.0
54	SU5	0.0	0.0	0.0	0.0	0.0
54	SU6	0.0	0.0	0.0	0.0	0.0
54	SU6	0.0	0.0	0.0	0.0	0.0
54	SU7	0.0	0.0	0.0	0.0	0.0
54	SU7	0.0	0.0	0.0	0.0	0.0
55	SU4	0.0	0.0	0.0	0.0	0.0
55	SU4	0.0	0.0	0.0	0.0	0.0
55	SU5	0.0	0.0	0.0	0.0	0.0
55	SU5	0.0	0.0	0.0	0.0	0.0
55	SU6	0.0	0.0	0.0	0.0	0.0
55	SU6	0.0	0.0	0.0	0.0	0.0
55	SU7	0.0	0.0	0.0	0.0	0.0
55	SU7	0.0	0.0	0.0	0.0	0.0
56	SU4	0.0	0.0	0.0	0.0	0.0
56	SU4	0.0	0.0	0.0	0.0	0.0
56	SU5	0.0	0.0	0.0	0.0	0.0
56	SU5	0.0	0.0	0.0	0.0	0.0
56	SU6	0.0	0.0	0.0	0.0	0.0
56	SU6	0.0	0.0	0.0	0.0	0.0
56	SU7	0.0	0.0	0.0	0.0	0.0
56	SU7	0.0	0.0	0.0	0.0	0.0
57	SU4	0.0	0.0	0.0	0.0	0.0
57	SU4	0.0	0.0	0.0	0.0	0.0
57	SU5	0.0	0.0	0.0	0.0	0.0
57	SU5	0.0	0.0	0.0	0.0	0.0
57	SU6	0.0	0.0	0.0	0.0	0.0
57	SU6	0.0	0.0	0.0	0.0	0.0

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
57	SU7	0.0	0.0	0.0	0.0	0.0
57	SU7	0.0	0.0	0.0	0.0	0.0
58	SU4	0.0	0.0	0.0	0.0	0.0
58	SU4	0.0	0.0	0.0	0.0	0.0
58	SU5	0.0	0.0	0.0	0.0	0.0
58	SU5	0.0	0.0	0.0	0.0	0.0
58	SU6	0.0	0.0	0.0	0.0	0.0
58	SU6	0.0	0.0	0.0	0.0	0.0
58	SU7	0.0	0.0	0.0	0.0	0.0
58	SU7	0.0	0.0	0.0	0.0	0.0
59	SU4	0.0	0.0	0.0	0.0	0.0
59	SU4	0.0	0.0	0.0	0.0	0.0
59	SU5	0.0	0.0	0.0	0.0	0.0
59	SU5	0.0	0.0	0.0	0.0	0.0
59	SU6	0.0	0.0	0.0	0.0	0.0
59	SU6	0.0	0.0	0.0	0.0	0.0
59	SU7	0.0	0.0	0.0	0.0	0.0
59	SU7	0.0	0.0	0.0	0.0	0.0
60	SU4	0.0	0.0	0.0	0.0	0.0
60	SU4	0.0	0.0	0.0	0.0	0.0
60	SU5	0.0	0.0	0.0	0.0	0.0
60	SU5	0.0	0.0	0.0	0.0	0.0
60	SU6	0.0	0.0	0.0	0.0	0.0
60	SU6	0.0	0.0	0.0	0.0	0.0
60	SU7	0.0	0.0	0.0	0.0	0.0
60	SU7	0.0	0.0	0.0	0.0	0.0
61	SU4	0.0	0.0	0.0	0.0	0.0
61	SU4	0.0	0.0	0.0	0.0	0.0
61	SU5	0.0	0.0	0.0	0.0	0.0
61	SU5	0.0	0.0	0.0	0.0	0.0
61	SU6	0.0	0.0	0.0	0.0	0.0
61	SU6	0.0	0.0	0.0	0.0	0.0
61	SU7	32.1	0.0	3.1	0.0	3.1
61	SU7	32.1	0.0	3.1	0.0	3.1
76	SU4	32.1	27.5	3.1	3.1	3.1
76	SU4	-141.6	-184.0	-38.6	-38.6	38.6
76	SU5	34.2	29.2	3.3	3.3	3.3
76	SU5	-153.8	-202.9	-41.2	-41.2	41.2
76	SU6	37.7	32.2	3.7	3.7	3.7
76	SU6	-169.8	-225.6	-43.8	-43.8	43.8
76	SU7	39.3	33.6	3.8	3.8	3.8
76	SU7	-180.7	-242.5	-44.2	-44.2	44.2
77	SU4	67.0	22.8	5.2	3.1	5.2
77	SU4	-31.7	-101.1	-28.3	-38.6	38.6
77	SU5	67.9	24.2	5.2	3.3	5.2
77	SU5	-33.7	-111.6	-29.6	-41.2	41.2
77	SU6	68.6	26.7	5.2	3.7	5.2
77	SU6	-37.4	-120.8	-29.6	-43.8	43.8
77	SU7	68.6	27.9	5.2	3.8	5.2
77	SU7	-38.8	-128.7	-30.3	-44.2	44.2
78	SU4	108.1	67.0	27.9	5.2	27.9
78	SU4	-14.6	-34.8	-5.4	-28.3	28.3
78	SU5	113.6	67.9	29.2	5.2	29.2
78	SU5	-15.5	-37.0	-5.4	-29.6	29.6
78	SU6	120.4	68.6	29.2	5.2	29.2
78	SU6	-17.2	-40.9	-5.4	-29.6	29.6
78	SU7	122.3	68.6	30.0	5.2	30.0
78	SU7	-17.9	-42.7	-5.4	-30.3	30.3
79	SU4	69.1	20.3	38.3	27.9	38.3
79	SU4	-34.8	-96.6	-2.8	-5.4	5.4
79	SU5	70.2	21.6	40.8	29.2	40.8
79	SU5	-37.0	-107.2	-3.0	-5.4	5.4
79	SU6	71.1	23.9	43.5	29.2	43.5
79	SU6	-40.9	-116.0	-3.3	-5.4	5.4
79	SU7	71.1	24.8	43.9	30.0	43.9

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
79	SU7	-42.7	-124.2	-3.4	-5.4	5.4
80	SU4	28.7	24.5	38.3	38.3	38.3
80	SU4	-136.4	-178.3	-2.8	-2.8	2.8
80	SU5	30.6	26.1	40.8	40.8	40.8
80	SU5	-149.4	-198.3	-3.0	-3.0	3.0
80	SU6	33.8	28.8	43.5	43.5	43.5
80	SU6	-164.6	-220.2	-3.3	-3.3	3.3
80	SU7	35.1	29.9	43.9	43.9	43.9
80	SU7	-175.7	-237.1	-3.4	-3.4	3.4
81	SU4	33.2	28.4	3.3	3.3	3.3
81	SU4	-138.6	-180.8	-38.5	-38.5	38.5
81	SU5	35.3	30.1	3.4	3.4	3.4
81	SU5	-151.3	-200.3	-41.0	-41.0	41.0
81	SU6	38.8	33.1	3.8	3.8	3.8
81	SU6	-167.0	-222.6	-43.7	-43.7	43.7
81	SU7	40.8	34.8	4.0	4.0	4.0
81	SU7	-178.0	-239.6	-44.0	-44.0	44.0
82	SU4	68.8	23.5	5.3	3.3	5.3
82	SU4	-34.3	-98.5	-28.1	-38.5	38.5
82	SU5	69.8	24.9	5.3	3.4	5.3
82	SU5	-36.5	-109.2	-29.4	-41.0	41.0
82	SU6	70.7	27.4	5.3	3.8	5.3
82	SU6	-40.3	-118.3	-29.4	-43.7	43.7
82	SU7	70.7	28.8	5.3	4.0	5.3
82	SU7	-42.0	-126.2	-30.2	-44.0	44.0
83	SU4	109.1	68.8	28.0	5.3	28.0
83	SU4	-15.5	-36.7	-5.4	-28.1	28.1
83	SU5	114.7	69.8	29.3	5.3	29.3
83	SU5	-16.5	-38.9	-5.4	-29.4	29.4
83	SU6	121.6	70.7	29.3	5.3	29.3
83	SU6	-18.2	-42.9	-5.4	-29.4	29.4
83	SU7	123.5	70.7	30.1	5.3	30.1
83	SU7	-19.2	-45.1	-5.4	-30.2	30.2
84	SU4	69.4	21.8	38.4	28.0	38.4
84	SU4	-36.7	-97.1	-3.0	-5.4	5.4
84	SU5	70.5	23.2	40.9	29.3	40.9
84	SU5	-38.9	-107.8	-3.2	-5.4	5.4
84	SU6	71.5	25.5	43.6	29.3	43.6
84	SU6	-42.9	-116.7	-3.6	-5.4	5.4
84	SU7	71.5	26.6	43.9	30.1	43.9
84	SU7	-45.2	-125.0	-3.7	-5.4	5.4
85	SU4	30.9	26.3	38.4	38.4	38.4
85	SU4	-136.9	-178.9	-3.0	-3.0	3.0
85	SU5	32.8	28.0	40.9	40.9	40.9
85	SU5	-150.1	-199.1	-3.2	-3.2	3.2
85	SU6	36.2	30.9	43.6	43.6	43.6
85	SU6	-165.5	-221.1	-3.6	-3.6	3.6
85	SU7	37.8	32.2	43.9	43.9	43.9
85	SU7	-176.7	-238.3	-3.7	-3.7	3.7
86	SU4	49.0	41.8	4.8	4.8	4.8
86	SU4	-145.4	-188.9	-39.1	-39.1	39.1
86	SU5	50.9	43.4	5.0	5.0	5.0
86	SU5	-158.1	-207.3	-41.7	-41.7	41.7
86	SU6	54.5	46.5	5.3	5.3	5.3
86	SU6	-175.3	-231.5	-44.3	-44.3	44.3
86	SU7	54.5	46.5	5.3	5.3	5.3
86	SU7	-186.6	-248.6	-44.7	-44.7	44.7
87	SU4	68.3	34.6	5.1	4.8	5.1
87	SU4	-34.6	-104.5	-28.9	-39.1	39.1
87	SU5	69.1	36.0	5.1	5.0	5.1
87	SU5	-36.7	-115.9	-30.2	-41.7	41.7
87	SU6	69.9	38.5	5.3	5.3	5.3
87	SU6	-40.6	-126.1	-30.2	-44.3	44.3
87	SU7	69.9	38.5	5.3	5.3	5.3
87	SU7	-42.4	-133.5	-31.0	-44.7	44.7

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
88	SU4	113.6	68.3	27.0	5.1	27.0
88	SU4	-22.8	-53.9	-6.1	-28.9	28.9
88	SU5	119.6	69.1	28.2	5.1	28.2
88	SU5	-23.8	-56.2	-6.1	-30.2	30.2
88	SU6	127.2	69.9	28.2	5.3	28.2
88	SU6	-25.4	-60.0	-6.1	-30.2	30.2
88	SU7	129.5	69.9	29.7	5.3	29.7
88	SU7	-25.5	-60.0	-6.1	-31.0	31.0
89	SU4	79.2	19.2	38.3	27.0	38.3
89	SU4	-54.0	-84.5	-2.9	-6.0	6.0
89	SU5	81.1	20.4	41.5	28.2	41.5
89	SU5	-56.2	-99.3	-3.1	-6.0	6.0
89	SU6	83.2	22.5	45.2	28.2	45.2
89	SU6	-60.0	-108.6	-3.4	-6.0	6.0
89	SU7	83.2	23.4	48.3	29.7	48.3
89	SU7	-60.1	-116.5	-3.6	-6.0	6.0
90	SU4	27.9	23.5	38.3	38.3	38.3
90	SU4	-130.0	-178.0	-2.9	-2.9	2.9
90	SU5	29.6	25.0	41.5	41.5	41.5
90	SU5	-144.5	-196.7	-3.1	-3.1	3.1
90	SU6	32.7	27.6	45.2	45.2	45.2
90	SU6	-159.0	-218.4	-3.4	-3.4	3.4
90	SU7	34.1	28.8	48.3	48.3	48.3
90	SU7	-171.3	-233.5	-3.6	-3.6	3.6
91	SU4	0.0	0.0	0.0	0.0	0.0
91	SU4	-237.8	-288.7	-34.0	-34.0	34.0
91	SU5	0.0	0.0	0.0	0.0	0.0
91	SU5	-256.8	-311.8	-36.7	-36.7	36.7
91	SU6	0.0	0.0	0.0	0.0	0.0
91	SU6	-276.4	-335.6	-39.5	-39.5	39.5
91	SU7	0.0	0.0	0.0	0.0	0.0
91	SU7	-280.6	-340.8	-40.1	-40.1	40.1
92	SU4	0.0	0.0	0.0	0.0	0.0
92	SU4	0.0	-186.8	-34.0	-34.0	34.0
92	SU5	0.0	0.0	0.0	0.0	0.0
92	SU5	0.0	-201.8	-36.7	-36.7	36.7
92	SU6	0.0	0.0	0.0	0.0	0.0
92	SU6	0.0	-217.1	-39.5	-39.5	39.5
92	SU7	0.0	0.0	0.0	0.0	0.0
92	SU7	0.0	-220.5	-40.1	-40.1	40.1
93	SU4	86.5	0.0	31.8	0.0	31.8
93	SU4	0.0	0.0	0.0	-34.0	34.0
93	SU5	86.5	0.0	32.4	0.0	32.4
93	SU5	0.0	0.0	0.0	-36.7	36.7
93	SU6	86.5	0.0	32.4	0.0	32.4
93	SU6	0.0	0.0	0.0	-39.5	39.5
93	SU7	86.5	0.0	32.4	0.0	32.4
93	SU7	0.0	0.0	0.0	-40.1	40.1
94	SU4	0.0	0.0	40.9	31.8	40.9
94	SU4	0.0	-175.1	0.0	0.0	0.0
94	SU5	0.0	0.0	44.5	32.4	44.5
94	SU5	0.0	-178.5	0.0	0.0	0.0
94	SU6	0.0	0.0	47.3	32.4	47.3
94	SU6	0.0	-190.5	0.0	0.0	0.0
94	SU7	0.0	0.0	47.3	32.4	47.3
94	SU7	0.0	-190.5	0.0	0.0	0.0
95	SU4	0.0	0.0	40.9	40.9	40.9
95	SU4	-225.3	-280.4	0.0	0.0	0.0
95	SU5	0.0	0.0	44.5	44.5	44.5
95	SU5	-232.4	-294.5	0.0	0.0	0.0
95	SU6	0.0	0.0	47.3	47.3	47.3
95	SU6	-253.9	-320.6	0.0	0.0	0.0
95	SU7	0.0	0.0	47.3	47.3	47.3
95	SU7	-258.2	-325.9	0.0	0.0	0.0
96	SU4	27.8	23.4	2.9	2.9	2.9

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
96	SU4	-121.1	-165.5	-37.5	-37.5	37.5
96	SU5	29.5	24.9	3.1	3.1	3.1
96	SU5	-139.3	-192.8	-39.9	-39.9	39.9
96	SU6	32.6	27.4	3.4	3.4	3.4
96	SU6	-156.6	-214.5	-42.6	-42.6	42.6
96	SU7	34.0	28.6	3.6	3.6	3.6
96	SU7	-168.7	-229.1	-43.3	-43.3	43.3
97	SU4	80.3	19.0	6.1	2.9	6.1
97	SU4	-55.6	-86.9	-26.9	-37.5	37.5
97	SU5	82.3	20.3	6.1	3.1	6.1
97	SU5	-58.3	-101.6	-28.1	-39.9	39.9
97	SU6	84.3	22.3	6.1	3.4	6.1
97	SU6	-61.9	-108.5	-28.1	-42.6	42.6
97	SU7	84.3	23.3	6.1	3.6	6.1
97	SU7	-62.2	-115.6	-29.7	-43.3	43.3
98	SU4	114.3	68.7	29.0	6.1	29.0
98	SU4	-23.6	-55.6	-5.1	-26.9	26.9
98	SU5	120.3	69.6	30.3	6.1	30.3
98	SU5	-24.8	-58.3	-5.2	-28.1	28.1
98	SU6	128.0	70.5	30.3	6.1	30.3
98	SU6	-26.3	-61.9	-5.5	-28.1	28.1
98	SU7	130.4	70.5	31.0	6.1	31.0
98	SU7	-26.5	-62.2	-5.5	-29.7	29.7
99	SU4	68.6	35.5	39.1	29.0	39.1
99	SU4	-34.9	-104.4	-4.9	-5.1	5.1
99	SU5	69.5	37.1	41.7	30.3	41.7
99	SU5	-37.1	-115.9	-5.2	-5.2	5.2
99	SU6	70.4	39.4	44.4	30.3	44.4
99	SU6	-41.0	-126.2	-5.5	-5.5	5.5
99	SU7	70.4	39.5	44.7	31.0	44.7
99	SU7	-42.8	-133.6	-5.5	-5.5	5.5
100	SU4	50.2	42.9	39.1	39.1	39.1
100	SU4	-145.4	-188.9	-4.9	-4.9	4.9
100	SU5	52.5	44.8	41.7	41.7	41.7
100	SU5	-158.1	-207.3	-5.2	-5.2	5.2
100	SU6	55.9	47.7	44.4	44.4	44.4
100	SU6	-175.4	-231.6	-5.5	-5.5	5.5
100	SU7	55.9	47.7	44.7	44.7	44.7
100	SU7	-186.7	-248.8	-5.5	-5.5	5.5
101	SU4	30.1	25.7	3.0	3.0	3.0
101	SU4	-135.5	-177.4	-38.3	-38.3	38.3
101	SU5	32.0	27.3	3.2	3.2	3.2
101	SU5	-148.8	-197.9	-40.8	-40.8	40.8
101	SU6	35.4	30.1	3.5	3.5	3.5
101	SU6	-164.0	-219.8	-43.5	-43.5	43.5
101	SU7	36.8	31.4	3.6	3.6	3.6
101	SU7	-175.3	-236.8	-43.9	-43.9	43.9
102	SU4	69.9	21.2	5.5	3.0	5.5
102	SU4	-37.4	-95.9	-27.9	-38.3	38.3
102	SU5	71.1	22.6	5.5	3.2	5.5
102	SU5	-39.6	-106.6	-29.2	-40.8	40.8
102	SU6	72.2	24.9	5.5	3.5	5.5
102	SU6	-43.7	-115.4	-29.2	-43.5	43.5
102	SU7	72.2	26.0	5.5	3.6	5.5
102	SU7	-46.1	-123.8	-30.0	-43.9	43.9
103	SU4	109.1	68.3	28.2	5.5	28.2
103	SU4	-15.8	-37.4	-5.3	-27.9	27.9
103	SU5	114.7	69.3	29.5	5.5	29.5
103	SU5	-16.7	-39.6	-5.3	-29.2	29.2
103	SU6	121.6	70.2	29.5	5.5	29.5
103	SU6	-18.5	-43.7	-5.3	-29.2	29.2
103	SU7	123.5	70.2	30.3	5.5	30.3
103	SU7	-19.5	-46.1	-5.3	-30.0	30.0
104	SU4	68.2	24.1	38.6	28.2	38.6
104	SU4	-33.6	-99.7	-3.3	-5.3	5.3

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
104	SU5	69.2	25.5	41.1	29.5	41.1
104	SU5	-35.7	-110.4	-3.5	-5.3	5.3
104	SU6	70.0	28.1	43.8	29.5	43.8
104	SU6	-39.6	-119.6	-3.9	-5.3	5.3
104	SU7	70.0	29.6	44.1	30.3	44.1
104	SU7	-41.2	-127.5	-4.1	-5.3	5.3
105	SU4	34.1	29.1	38.6	38.6	38.6
105	SU4	-140.0	-182.4	-3.3	-3.3	3.3
105	SU5	36.1	30.8	41.1	41.1	41.1
105	SU5	-152.6	-201.6	-3.5	-3.5	3.5
105	SU6	39.7	33.9	43.8	43.8	43.8
105	SU6	-168.4	-224.2	-3.9	-3.9	3.9
105	SU7	41.9	35.7	44.1	44.1	44.1
105	SU7	-179.4	-241.1	-4.1	-4.1	4.1
106	SU4	28.5	24.3	2.8	2.8	2.8
106	SU4	-137.0	-178.8	-38.3	-38.3	38.3
106	SU5	30.3	25.9	3.0	3.0	3.0
106	SU5	-149.8	-198.8	-40.8	-40.8	40.8
106	SU6	33.5	28.6	3.3	3.3	3.3
106	SU6	-165.0	-220.7	-43.5	-43.5	43.5
106	SU7	34.8	29.7	3.4	3.4	3.4
106	SU7	-176.1	-237.6	-43.9	-43.9	43.9
107	SU4	68.6	20.1	5.4	2.8	5.4
107	SU4	-34.4	-97.0	-27.9	-38.3	38.3
107	SU5	69.7	21.4	5.4	3.0	5.4
107	SU5	-36.5	-107.6	-29.2	-40.8	40.8
107	SU6	70.6	23.7	5.4	3.3	5.4
107	SU6	-40.4	-116.3	-29.2	-43.5	43.5
107	SU7	70.6	24.6	5.4	3.4	5.4
107	SU7	-42.2	-124.5	-30.0	-43.9	43.9
108	SU4	107.6	66.7	28.3	5.4	28.3
108	SU4	-14.3	-34.4	-5.2	-27.9	27.9
108	SU5	113.1	67.5	29.6	5.4	29.6
108	SU5	-15.2	-36.5	-5.2	-29.2	29.2
108	SU6	119.8	68.2	29.6	5.4	29.6
108	SU6	-16.9	-40.4	-5.2	-29.2	29.2
108	SU7	121.7	68.2	30.3	5.4	30.3
108	SU7	-17.6	-42.2	-5.2	-30.0	30.0
109	SU4	66.5	22.7	38.6	28.3	38.6
109	SU4	-31.2	-101.6	-3.1	-5.2	5.2
109	SU5	67.3	24.1	41.2	29.6	41.2
109	SU5	-33.2	-112.1	-3.3	-5.2	5.2
109	SU6	68.0	26.6	43.8	29.6	43.8
109	SU6	-36.8	-121.3	-3.6	-5.2	5.2
109	SU7	68.0	27.7	44.2	30.3	44.2
109	SU7	-38.2	-129.2	-3.8	-5.2	5.2
110	SU4	31.9	27.3	38.6	38.6	38.6
110	SU4	-142.2	-184.7	-3.1	-3.1	3.1
110	SU5	33.9	29.0	41.2	41.2	41.2
110	SU5	-154.4	-203.4	-3.3	-3.3	3.3
110	SU6	37.4	32.0	43.8	43.8	43.8
110	SU6	-170.4	-226.2	-3.6	-3.6	3.6
110	SU7	39.1	33.4	44.2	44.2	44.2
110	SU7	-181.3	-243.1	-3.8	-3.8	3.8
111	SU4	21.8	18.7	2.1	2.1	2.1
111	SU4	-137.3	-178.9	-38.2	-38.2	38.2
111	SU5	23.6	20.1	2.3	2.3	2.3
111	SU5	-149.8	-198.8	-40.7	-40.7	40.7
111	SU6	25.2	21.6	2.4	2.4	2.4
111	SU6	-164.7	-220.6	-43.4	-43.4	43.4
111	SU7	25.2	21.6	2.4	2.4	2.4
111	SU7	-175.9	-237.4	-43.8	-43.8	43.8
112	SU4	67.2	15.5	5.4	2.1	5.4
112	SU4	-32.4	-97.1	-27.8	-38.2	38.2
112	SU5	68.2	16.7	5.4	2.3	5.4

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
112	SU5	-34.4	-107.4	-29.0	-40.7	40.7
112	SU6	69.0	17.9	5.4	2.4	5.4
112	SU6	-38.1	-115.9	-29.0	-43.4	43.4
112	SU7	69.0	17.9	5.4	2.4	5.4
112	SU7	-39.7	-124.2	-29.8	-43.8	43.8
113	SU4	105.3	63.1	28.5	5.4	28.5
113	SU4	-13.2	-32.4	-5.0	-27.8	27.8
113	SU5	110.6	63.6	29.8	5.4	29.8
113	SU5	-14.0	-34.4	-5.0	-29.0	29.0
113	SU6	117.0	64.5	29.8	5.4	29.8
113	SU6	-15.5	-38.1	-5.0	-29.0	29.0
113	SU7	118.8	64.5	30.4	5.4	30.4
113	SU7	-16.2	-39.7	-5.0	-29.8	29.8
114	SU4	63.0	22.4	38.9	28.5	38.9
114	SU4	-23.5	-106.3	-3.0	-5.0	5.0
114	SU5	63.5	23.8	41.5	29.8	41.5
114	SU5	-25.5	-116.5	-3.1	-5.0	5.0
114	SU6	64.4	26.2	44.1	29.8	44.1
114	SU6	-27.3	-126.0	-3.5	-5.0	5.0
114	SU7	64.4	27.4	44.4	30.4	44.4
114	SU7	-27.3	-133.5	-3.6	-5.0	5.0
115	SU4	31.2	26.8	38.9	38.9	38.9
115	SU4	-147.9	-190.8	-3.0	-3.0	3.0
115	SU5	33.2	28.5	41.5	41.5	41.5
115	SU5	-159.0	-208.1	-3.1	-3.1	3.1
115	SU6	36.7	31.4	44.1	44.1	44.1
115	SU6	-175.4	-231.5	-3.5	-3.5	3.5
115	SU7	38.2	32.8	44.4	44.4	44.4
115	SU7	-186.4	-248.2	-3.6	-3.6	3.6
116	SU4	8.5	7.9	0.4	0.4	0.4
116	SU4	-123.3	-169.2	-36.4	-36.4	36.4
116	SU5	9.1	8.4	0.4	0.4	0.4
116	SU5	-133.8	-186.0	-39.7	-39.7	39.7
116	SU6	10.0	9.3	0.5	0.5	0.5
116	SU6	-147.0	-205.7	-42.4	-42.4	42.4
116	SU7	10.4	9.7	0.5	0.5	0.5
116	SU7	-150.4	-210.0	-43.3	-43.3	43.3
117	SU4	73.5	13.7	4.9	0.4	4.9
117	SU4	-31.4	-83.7	-26.6	-36.4	36.4
117	SU5	75.1	13.7	4.9	0.4	4.9
117	SU5	-33.3	-88.7	-27.2	-39.7	39.7
117	SU6	78.0	13.7	4.9	0.5	4.9
117	SU6	-36.9	-94.7	-27.3	-42.4	42.4
117	SU7	78.6	13.7	4.9	0.5	4.9
117	SU7	-38.4	-94.7	-27.8	-43.3	43.3
118	SU4	106.0	0.3	33.5	4.9	33.5
118	SU4	0.0	-31.4	-2.4	-26.6	26.6
118	SU5	107.0	0.3	34.8	4.9	34.8
118	SU5	0.0	-33.3	-2.6	-27.2	27.2
118	SU6	116.3	0.3	34.8	4.9	34.8
118	SU6	0.0	-36.9	-2.8	-27.3	27.3
118	SU7	116.3	0.3	34.8	4.9	34.8
118	SU7	0.0	-38.4	-3.0	-27.8	27.8
20a	SU4	13.5	7.9	36.5	36.5	36.5
20a	SU4	-84.5	-124.2	-0.4	-0.4	0.4
20a	SU5	13.5	8.4	39.8	39.8	39.8
20a	SU5	-89.4	-134.7	-0.4	-0.4	0.4
20a	SU6	13.5	9.3	42.5	42.5	42.5
20a	SU6	-95.5	-147.9	-0.5	-0.5	0.5
20a	SU7	13.5	9.7	43.4	43.4	43.4
20a	SU7	-95.5	-151.3	-0.5	-0.5	0.5
21a	SU4	27.6	23.0	3.0	3.0	3.0
21a	SU4	-107.7	-149.6	-39.0	-39.0	39.0
21a	SU5	29.3	24.5	3.2	3.2	3.2
21a	SU5	-117.9	-160.5	-41.6	-41.6	41.6

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
21a	SU6	32.3	27.0	3.6	3.6	3.6
21a	SU6	-127.6	-177.2	-44.2	-44.2	44.2
21a	SU7	33.7	28.2	3.7	3.7	3.7
21a	SU7	-135.0	-188.2	-44.5	-44.5	44.5
25a	SU4	18.1	15.0	38.2	38.2	38.2
25a	SU4	-95.7	-135.6	-2.1	-2.1	2.1
25a	SU5	19.5	16.2	40.6	40.6	40.6
25a	SU5	-106.0	-148.4	-2.2	-2.2	2.2
25a	SU6	20.9	17.4	43.3	43.3	43.3
25a	SU6	-114.3	-163.0	-2.4	-2.4	2.4
25a	SU7	20.9	17.4	43.7	43.7	43.7
25a	SU7	-122.8	-174.2	-2.4	-2.4	2.4
76a	SU4	27.5	22.8	3.1	3.1	3.1
76a	SU4	-101.1	-141.6	-38.6	-38.6	38.6
76a	SU5	29.2	24.2	3.3	3.3	3.3
76a	SU5	-111.6	-153.8	-41.2	-41.2	41.2
76a	SU6	32.2	26.7	3.7	3.7	3.7
76a	SU6	-120.8	-169.8	-43.8	-43.8	43.8
76a	SU7	33.6	27.9	3.8	3.8	3.8
76a	SU7	-128.7	-180.7	-44.2	-44.2	44.2
80a	SU4	24.5	20.3	38.3	38.3	38.3
80a	SU4	-96.6	-136.4	-2.8	-2.8	2.8
80a	SU5	26.1	21.6	40.8	40.8	40.8
80a	SU5	-107.2	-149.4	-3.0	-3.0	3.0
80a	SU6	28.8	23.9	43.5	43.5	43.5
80a	SU6	-116.0	-164.6	-3.3	-3.3	3.3
80a	SU7	29.9	24.8	43.9	43.9	43.9
80a	SU7	-124.2	-175.7	-3.4	-3.4	3.4
81a	SU4	28.4	23.5	3.3	3.3	3.3
81a	SU4	-98.5	-138.6	-38.5	-38.5	38.5
81a	SU5	30.1	24.9	3.4	3.4	3.4
81a	SU5	-109.2	-151.3	-41.0	-41.0	41.0
81a	SU6	33.1	27.4	3.8	3.8	3.8
81a	SU6	-118.3	-167.0	-43.7	-43.7	43.7
81a	SU7	34.8	28.8	4.0	4.0	4.0
81a	SU7	-126.2	-178.0	-44.0	-44.0	44.0
85a	SU4	26.3	21.8	38.4	38.4	38.4
85a	SU4	-97.1	-136.9	-3.0	-3.0	3.0
85a	SU5	28.0	23.2	40.9	40.9	40.9
85a	SU5	-107.8	-150.1	-3.2	-3.2	3.2
85a	SU6	30.9	25.5	43.6	43.6	43.6
85a	SU6	-116.7	-165.5	-3.6	-3.6	3.6
85a	SU7	32.2	26.6	43.9	43.9	43.9
85a	SU7	-125.0	-176.7	-3.7	-3.7	3.7
86a	SU4	41.8	34.6	4.8	4.8	4.8
86a	SU4	-104.5	-145.4	-39.1	-39.1	39.1
86a	SU5	43.4	36.0	5.0	5.0	5.0
86a	SU5	-115.9	-158.1	-41.7	-41.7	41.7
86a	SU6	46.5	38.5	5.3	5.3	5.3
86a	SU6	-126.1	-175.3	-44.3	-44.3	44.3
86a	SU7	46.5	38.5	5.3	5.3	5.3
86a	SU7	-133.5	-186.6	-44.7	-44.7	44.7
90a	SU4	23.5	19.2	38.3	38.3	38.3
90a	SU4	-84.5	-130.0	-2.9	-2.9	2.9
90a	SU5	25.0	20.4	41.5	41.5	41.5
90a	SU5	-99.3	-144.5	-3.1	-3.1	3.1
90a	SU6	27.6	22.5	45.2	45.2	45.2
90a	SU6	-108.6	-159.0	-3.4	-3.4	3.4
90a	SU7	28.8	23.4	48.3	48.3	48.3
90a	SU7	-116.5	-171.3	-3.6	-3.6	3.6
91a	SU4	0.0	0.0	0.0	0.0	0.0
91a	SU4	-186.8	-237.8	-34.0	-34.0	34.0
91a	SU5	0.0	0.0	0.0	0.0	0.0
91a	SU5	-201.8	-256.8	-36.7	-36.7	36.7
91a	SU6	0.0	0.0	0.0	0.0	0.0

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
91a	SU6	-217.1	-276.4	-39.5	-39.5	39.5
91a	SU7	0.0	0.0	0.0	0.0	0.0
91a	SU7	-220.5	-280.6	-40.1	-40.1	40.1
95a	SU4	0.0	0.0	40.9	40.9	40.9
95a	SU4	-175.1	-225.3	0.0	0.0	0.0
95a	SU5	0.0	0.0	44.5	44.5	44.5
95a	SU5	-178.5	-232.4	0.0	0.0	0.0
95a	SU6	0.0	0.0	47.3	47.3	47.3
95a	SU6	-190.5	-253.9	0.0	0.0	0.0
95a	SU7	0.0	0.0	47.3	47.3	47.3
95a	SU7	-190.5	-258.2	0.0	0.0	0.0
96a	SU4	23.4	19.0	2.9	2.9	2.9
96a	SU4	-86.9	-121.1	-37.5	-37.5	37.5
96a	SU5	24.9	20.3	3.1	3.1	3.1
96a	SU5	-101.6	-139.3	-39.9	-39.9	39.9
96a	SU6	27.4	22.3	3.4	3.4	3.4
96a	SU6	-108.5	-156.6	-42.6	-42.6	42.6
96a	SU7	28.6	23.3	3.6	3.6	3.6
96a	SU7	-115.6	-168.7	-43.3	-43.3	43.3
100a	SU4	42.9	35.5	39.1	39.1	39.1
100a	SU4	-104.4	-145.4	-4.9	-4.9	4.9
100a	SU5	44.8	37.1	41.7	41.7	41.7
100a	SU5	-115.9	-158.1	-5.2	-5.2	5.2
100a	SU6	47.7	39.4	44.4	44.4	44.4
100a	SU6	-126.2	-175.4	-5.5	-5.5	5.5
100a	SU7	47.7	39.5	44.7	44.7	44.7
100a	SU7	-133.6	-186.7	-5.5	-5.5	5.5
101a	SU4	25.7	21.2	3.0	3.0	3.0
101a	SU4	-95.9	-135.5	-38.3	-38.3	38.3
101a	SU5	27.3	22.6	3.2	3.2	3.2
101a	SU5	-106.6	-148.8	-40.8	-40.8	40.8
101a	SU6	30.1	24.9	3.5	3.5	3.5
101a	SU6	-115.4	-164.0	-43.5	-43.5	43.5
101a	SU7	31.4	26.0	3.6	3.6	3.6
101a	SU7	-123.8	-175.3	-43.9	-43.9	43.9
105a	SU4	29.1	24.1	38.6	38.6	38.6
105a	SU4	-99.7	-140.0	-3.3	-3.3	3.3
105a	SU5	30.8	25.5	41.1	41.1	41.1
105a	SU5	-110.4	-152.6	-3.5	-3.5	3.5
105a	SU6	33.9	28.1	43.8	43.8	43.8
105a	SU6	-119.6	-168.4	-3.9	-3.9	3.9
105a	SU7	35.7	29.6	44.1	44.1	44.1
105a	SU7	-127.5	-179.4	-4.1	-4.1	4.1
106a	SU4	24.3	20.1	2.8	2.8	2.8
106a	SU4	-97.0	-137.0	-38.3	-38.3	38.3
106a	SU5	25.9	21.4	3.0	3.0	3.0
106a	SU5	-107.6	-149.8	-40.8	-40.8	40.8
106a	SU6	28.6	23.7	3.3	3.3	3.3
106a	SU6	-116.3	-165.0	-43.5	-43.5	43.5
106a	SU7	29.7	24.6	3.4	3.4	3.4
106a	SU7	-124.5	-176.1	-43.9	-43.9	43.9
110a	SU4	27.3	22.7	38.6	38.6	38.6
110a	SU4	-101.6	-142.2	-3.1	-3.1	3.1
110a	SU5	29.0	24.1	41.2	41.2	41.2
110a	SU5	-112.1	-154.4	-3.3	-3.3	3.3
110a	SU6	32.0	26.6	43.8	43.8	43.8
110a	SU6	-121.3	-170.4	-3.6	-3.6	3.6
110a	SU7	33.4	27.7	44.2	44.2	44.2
110a	SU7	-129.2	-181.3	-3.8	-3.8	3.8
111a	SU4	18.7	15.5	2.1	2.1	2.1
111a	SU4	-97.1	-137.3	-38.2	-38.2	38.2
111a	SU5	20.1	16.7	2.3	2.3	2.3
111a	SU5	-107.4	-149.8	-40.7	-40.7	40.7
111a	SU6	21.6	17.9	2.4	2.4	2.4
111a	SU6	-115.9	-164.7	-43.4	-43.4	43.4

TABLE: Element Forces - Frame						
Frame	OutputCase	moments		shears		
Text	Text	max	min	max	min	abs max
111a	SU7	21.6	17.9	2.4	2.4	2.4
111a	SU7	-124.2	-175.9	-43.8	-43.8	43.8
115a	SU4	26.8	22.4	38.9	38.9	38.9
115a	SU4	-106.3	-147.9	-3.0	-3.0	3.0
115a	SU5	28.5	23.8	41.5	41.5	41.5
115a	SU5	-116.5	-159.0	-3.1	-3.1	3.1
115a	SU6	31.4	26.2	44.1	44.1	44.1
115a	SU6	-126.0	-175.4	-3.5	-3.5	3.5
115a	SU7	32.8	27.4	44.4	44.4	44.4
115a	SU7	-133.5	-186.4	-3.6	-3.6	3.6
116a	SU4	13.7	7.9	0.4	0.4	0.4
116a	SU4	-83.7	-123.3	-36.4	-36.4	36.4
116a	SU5	13.7	8.4	0.4	0.4	0.4
116a	SU5	-88.7	-133.8	-39.7	-39.7	39.7
116a	SU6	13.7	9.3	0.5	0.5	0.5
116a	SU6	-94.7	-147.0	-42.4	-42.4	42.4
116a	SU7	13.7	9.7	0.5	0.5	0.5
116a	SU7	-94.7	-150.4	-43.3	-43.3	43.3

Appendix E

Backup Correspondence

From: Lowry, Sonia [mailto:LowryS@wsdot.wa.gov]
Sent: Friday, January 03, 2014 7:56 AM
To: Anne Streufert
Subject: RE: concrete strengths for existing bridges

Hi Anne,

[redacted]

As for concrete strength, our policy is to use the MBE if we have no other references (i.e. WSDOT Standard Spec, Bureau of Public Lands, old AASHTO). However, we also consider that concrete strengthens with age. Though we have no official policy, we have increased f'c by as much as 25% when the structure shows no signs of poor strength being an issue. In a few cases, we have done concrete cores for testing. Just FYI, we had a bridge in Aberdeen that was built in 1925 and the cores came back ranging from somewhere around 5 ksi up to around 8 ksi (I don't have the exact values anymore, I think we used 4 in our analysis). Mohamad met with some engineers from CalTrans and was told they have a policy that they increase f'c by 25% if they have shear issues based on the numbers but no problem in reality. I haven't tried to find this in their manuals yet.

I have a copy of 1931 AASHO (pre-AASHTO), and they have a class A concrete with f'c = 3 ksi.

I would recommend that you discuss the value to use with the owner (local agency) and use what they are comfortable with. If you happen to do a coring test, could you let me know the results? It's nice to see the data when its available!

Hope this is helpful!

Sonia

Brandon Kotulka

From: Bob Mitchell [RAM@shanwil.com]
Sent: Tuesday, February 25, 2014 10:52 AM
To: Brandon Kotulka; Anne Streufert
Subject: Hidden Lake Bridge Soil Springs

Brandon-

To follow up on our phone call, based on the new borings the soil springs for slab-on-grade would be 20 pci for greater than 3 feet from the slope crest and 10 pci for less than 3 feet from the slope crest.

Regards,
Bob