Final Structural Evaluation of Phoenix Rio Salado Bridges - Phase II

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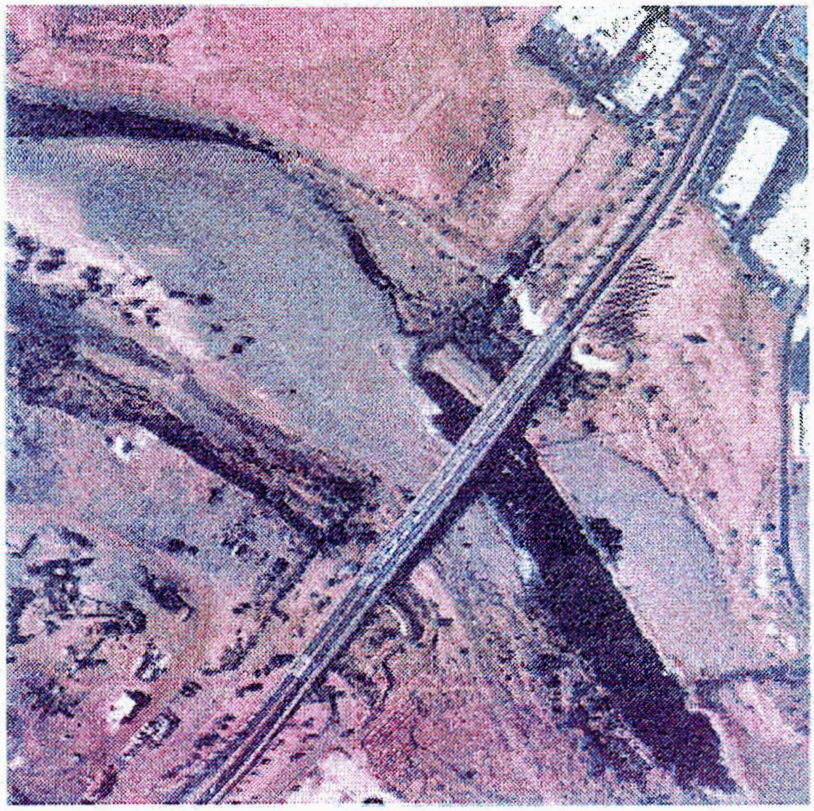
24th Street Bridge



City of Phoenix

U.S. Army Corps Of Engineers
Los Angeles District

WEST CONSULTANTS, INC.

Submitted by: T·Y·LIN INTERNATIONAL

May 2, 2000

Final Structural Evaluation of Phoenix Rio Salado Bridges - Phase II 24th Street Bridge

Prepared for
U.S. Army Corps of Engineers
Los Angeles District

Prepared by
T.Y. Lin International, Inc.
1270 E. Broadway, Suite 122
Tempe, Arizona 85282

Contract:
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T·Y·LIN INTERNATIONAL

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1.0 EXECUTIVE SUMMARY

This structural evaluation of Phoenix Rio Salado Bridges is a summary of the final engineering evaluation performed to determine whether the ***Twenty Fourth Street Bridge*** is compromised by the proposed low flow channel condition on a 100-year event.

The pile foundation for the ***Twenty Fourth Street Bridge*** is **adequate** for the vertical loads but **not adequate** for the lateral bending due to the lowered scour elevation. As a result, retrofit measures needs to be taken.

2.0 INTRODUCTION

West Consultants, Inc. recently conducted a bridge scour analysis for seven bridge structures over the Salt River. These structures are the 24th Street Bridge, the Upstream Conveyor Bridge, the 16th Street Bridge, the 7th Street Bridge, 7th Avenue, the South Central Avenue Bridge, and the Downstream Conveyor Bridge. The bridge scour analysis was performed as a result of a hydraulic and sediment transport analysis for three low flow channel design alternatives for the Phoenix Reach of the Rio Salado Project. A brief description of the three alternatives investigated by West Consultants, Inc. are listed below:

- Alternative 1 is the Corps of Engineers feasibility design concept. This is a trapezoidal channel with a 2H:1V soil cement bank protected side slopes, earth bottom and soil cement grade control structures located within the low flow channel. This concept included a 200-foot bottom width throughout the project with five grade control structures. West Consultants, Inc. made some modifications to this concept after their hydraulic and channel stability analysis showed that the bottom width of the low flow channel was less than the proposed in the feasibility study. Also, three grade control structures were recommended instead of five.

- Alternative 2 is the Value Engineering (VE) M-26 concept. This VE concept was modified to have a 3H:1V vegetated side slopes and soil cement at locations requiring additional protection. For this concept the grade control structures are extended across the full width of the flood control channel and include a notch for the low flood channel.

- Alternative 3 is the same as alternative 2 except for overbank guide dikes added to maintain the alignment of the low channel flow.

West Consultants, Inc. modeled the low flow channel alignment by locating the channel thalweg from 1-foot contour mapping. In the model, the alignment of the low flow

channel was adjusted to avoid major features that were identified by the Corps of Engineers, the City of Phoenix and the County Flood Control District. The low flow channel location and alignment considered the number of bridge piers within the low flow channel and their orientation with respect to the channel flow. The same low flow channel geometry was used for the three alternatives with a 3H:1V side slopes.

Consequently, West Consultants, Inc. performed a bridge scour analysis in the project reach based on the 100-year discharge of 166,000 cfs. Contraction and abutment scours were estimated to be negligible at the seven bridge structures based on the low flow channel results. There is no flow contraction between the bridge approach section and the bridge opening since the flow is confined within the channel banks, and the abutments do not project abruptly into the flow area. West Consultants, Inc. estimated the bridge scour for the seven structures over the Salt River by using the Corps of Engineering, HEC-RAS computer program (Version 2.2, September 1998) per Federal Highway Administration (FHWA) guidelines. The scour computations are based on the data in the HEC-RAS model.

To determine the local pier scour, West Consultants, Inc. used the Colorado State University (CSU) equation. In order to comply with the Arizona Department of Transportation guidelines, West Consultants, Inc. added two feet increase in pier width per side for the top 12 feet to account for debris loading. An angle of attack of 0 degrees was assumed in the computations of the pier scour since the low flow channel alignment was lined up parallel to the piers of all bridges.

All HEC-RAS output and scour computations including flows, scour elevations and water surface elevations included in this report are referenced from a memo provided by West Consultants, Inc. dated on September 16th, 1999. Their values are based on the results of the analysis between 90% to 100% of the Final Report "Low-Flow Channel Design Analysis for Rio Salado (Salt River), Arizona dated on January 11th, 2000. The anticipated scour elevation for the Salt River through downtown Phoenix based on the scour analysis will be lowered as much as twelve feet for a 100-year event. The seven

bridge structures over the Salt River are impacted by the lowered scour elevation. Therefore, there is a need for a detailed and thorough scour investigation of these seven bridge structures over the Salt River in order to avoid catastrophic effects due to excessive scour.

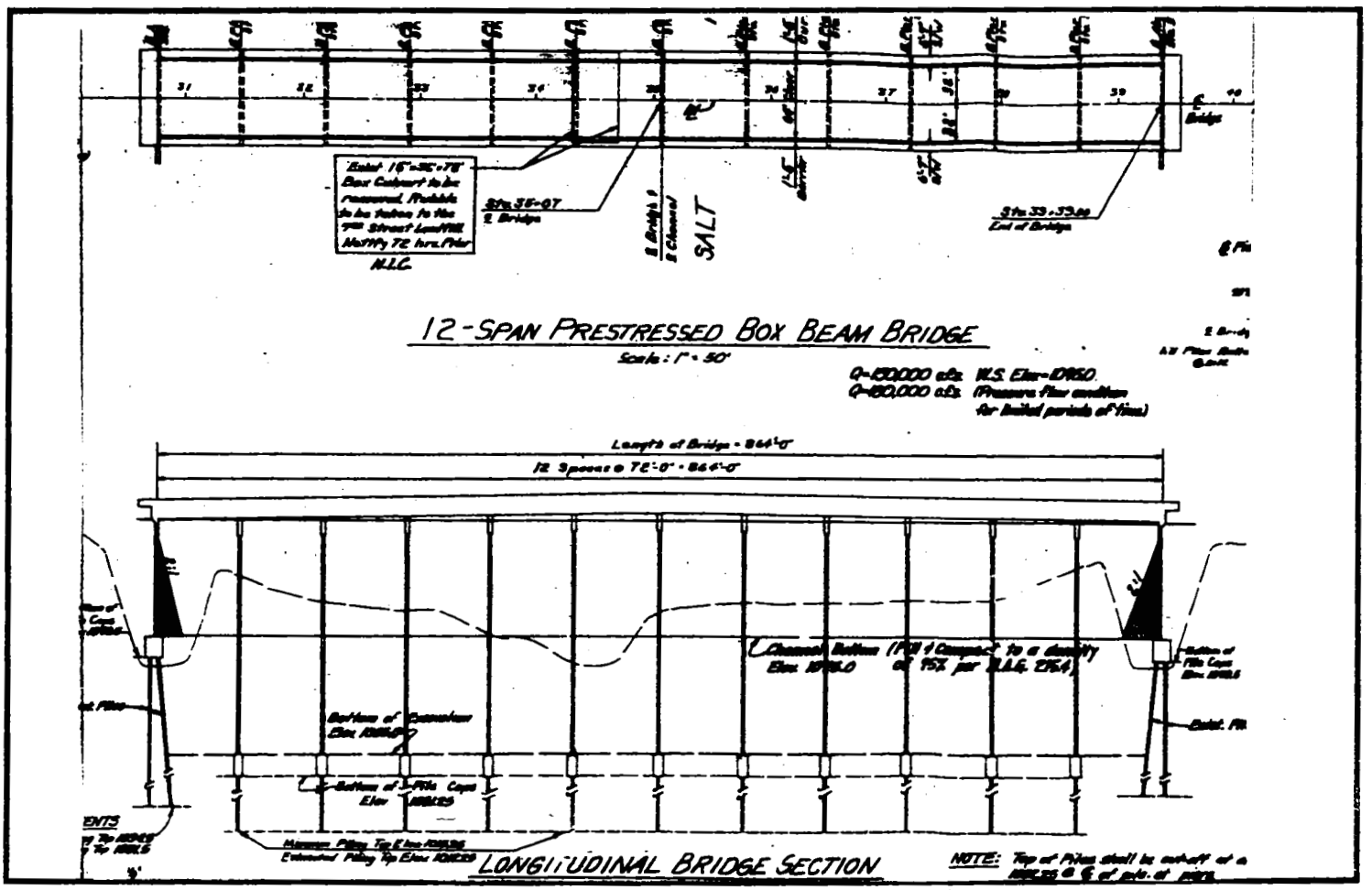
The following report summarizes the impact of the lowered scour elevation on one of the seven structures due to low-flow channel conditions – ***Twenty Fourth Street Bridge***. This report does not examine the existing conditions. Results of the bridge scour analysis with the low-flow channel geometry conducted by West Consultants, Inc. anticipates that the elevation of maximum pier scour for the ***Twenty Fourth Street*** is estimated to be 1037.90 feet. Recommendations will be proposed for retrofit measurement when the increase in scour depth reduces the bridge capacity below Arizona Department of Transportation (ADOT) standards.

3.0 BRIDGE DESCRIPTION

As-built plans for the bridge were obtained and computer model generated based upon the information contained in these documents. Below is a brief description of the structure.

Twenty Fourth Street Bridge

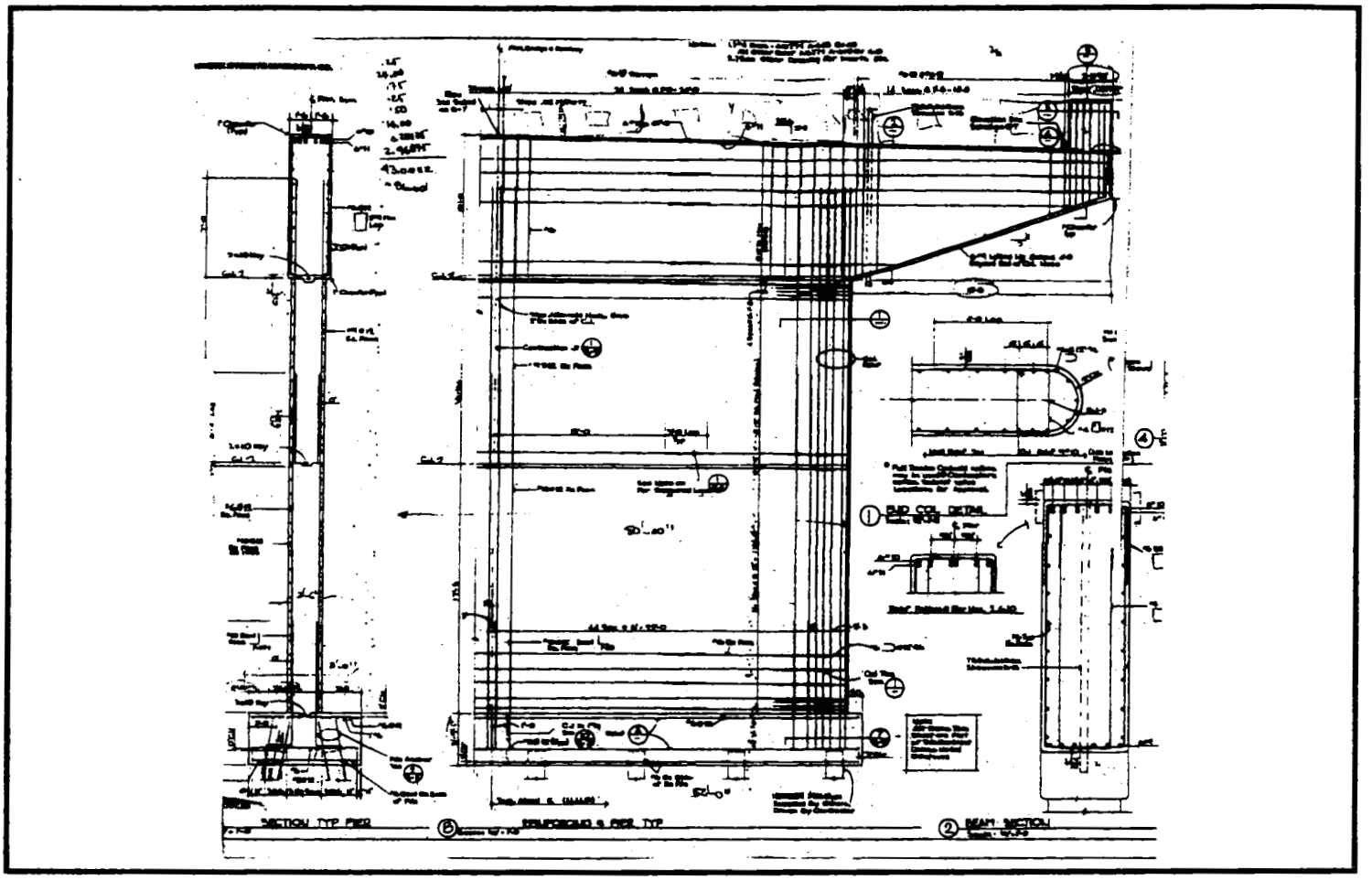
The ***Twenty Fourth Street Bridge*** is a twelve-span structure, approximately 864-feet long and 80-feet wide.



Plan and Elevation – Twenty Fourth Street Bridge

The precast prestressed concrete Box Beam are supported on 2'-6" wide and 50'-0" long round-nosed piers with 3'-0" wide and 86'-0" long pier cap. Both the abutments and the

piers are founded on footings with HP14x89 steel pile extending approximately 39'-0" below the bottom of footing with the estimated pile tip elevation at 1012.25 feet. The scour depth (elevation 1037.9 feet) is about 13.35 feet below the bottom of footing.



Typical Section – Twenty Fourth Street Bridge

For the purposes of comparison, the following table summarizes the hydraulic data shown on the as-built plans in 1982 and the proposed data supplied by West Consultants, Inc. from the bridge scour results.

	Invert Elevation (ft)	Design Flow (cfs)	Water Surface Elevation (ft)
As-Builts	1075.00	200,000	1095.00
Proposed	1053.50	166,000	1088.29

4.0 SUMMARY OF ANALYSIS

The basis for the analysis of the bridge foundations is set by the "Standard Specifications for Highway Bridges," American Association of State Highway and Transportation Officials (AASHTO), 1996 Edition, and approved revisions through 1998. AASHTO has developed standard loading conditions which the bridge components or elements must withstand in order to be considered safe. In general, the bridge structure is analyzed to carry the following loads and forces:

- Dead Load (DL) – AASHTO Art. 3.3

  The dead load on a bridge structure is the aggregate weight of all the elements in the structure. This will include but is not limited to the deck, wearing surface, stay-in-place-forms, sidewalks and railings, parapets, signing and utilities. The first step in any design or analysis of a bridge structure is to compile a list of all the elements, which contribute to dead load. Dead loads are the principal permanent loading condition. AASHTO provides a list of some dead load unit weights that are used in computing the overall weight of the structure (ASSHTO 3.3.6).

- Live Load (LL) – AASHTO Art. 3.7

  The term live load means a load that moves along the length of a bridge span. In most cases, live load represents the major temporary loading condition. The live load force consists of the applied moving load of vehicles, cars and pedestrians. A person

walking along the bridge is considered live load. Obviously, a highway bridge needs to be designed to resist more than pedestrian loading.

AASHTO has developed a hypothetical design vehicle based on a truck loading to give the designers the ability to accurately model the live load on a bridge. AASHTO has issued a loading scheme based on two loading systems, the H loading and the HS loading. To meet the demands of heavier trucks, five truck classes were introduced in 1944.

These classes have the following designations and gross weights:

1. H10-44 (20,000 pounds)
2. H15-44 (30,000 pounds)
3. H20-44 (40,000 pounds)
4. HS15-44 (54,000 pounds)
5. HS20-44 (72,000 pounds)

Today, all but the H10-44 vehicle is still incorporated in the AASHTO Specifications.

AASHTO Figures 3.7.6A & 3.7.7A illustrate these design trucks and their associated geometry. The H loading and HS loading trucks were developed with two and three axles, respectively. These design trucks represent the core standard in use today in the United States. The trains of trucks in the 1935 circa design code are replaced by lane loading configuration, which consists of a uniform distributed load combined with a concentrated load (AASHTO Figure 3.7.6B). The AASHTO design trucks and lane loading are meant to cover 10 feet in width (AASHTO 3.6.1). These loads are then placed in a 12 feet lane, which are spaced across the bridge from curb to curb (AASHTO 3.6.2).

Another form of live loading is known as alternative military loading which was developed by the Federal Highway Administration in 1956. This live loading

consists of two axles separated by 4 feet and each weights 24,000 lbs. This loading is used to represent heavy military vehicles (AASHTO 3.7.4).

A reduction in the live load intensity is permitted for bridges with three or more lanes that have maximum force caused by fully loading each lane. A 90 percent reduction of three lane structures and 75 percent reduction for bridges with four or more lanes are permitted given the rarity of the situation where simultaneously loading in multiple lanes occur (AASHTO 3.12).

- Impact (I) – AASHTO Art. 3.8

An impact factor is used as multiplier for certain structural components, in order to account for the dynamic effect of the sudden loading of a vehicle onto a structure. A load that moves across a member introduces larger stresses than one statically placed on it. AASHTO defines the impact factor in a conservative idealization as follows:

$$I = \frac{50}{L + 125}$$

Where,

I = Impact Factor (not to exceed 30 percent)

L = Length of Span Loaded to Create Maximum Stress, ft

The live load intensity is then multiplied by this factor which increases the live load values. The impact factor is designed to take into account the effects of a vehicle vibrating and striking imperfections in the deck as well as the dynamic effects of impact.

- Longitudinal Forces (LF) – AASHTO Art. 3.9

Longitudinal forces are developed from vehicles braking or accelerating while on a bridge. AASHTO specifies that 5 percent of the appropriate lane load, without impact, along with the concentrated force from moment for all travel lanes going in the same direction be used as the resulting longitudinal force. This longitudinal force is applied 6 feet above the top of deck surface. The longitudinal force affects the substructure elements more significantly than the superstructure elements.

- Wind Loads (W) – AASHTO Art. 3.15

Wind loading offers a complicated set of loading conditions, which must be idealized in order to provide a workable design. AASHTO specifies an assumed wind velocity of 100 miles per hour for the loading on a bridge. Wind forces are applied in the transverse and longitudinal direction at the center of gravity of the exposed region of the superstructure. AASHTO offers a set of wind loading values for different types of superstructure configurations based on the angle of attack (skew angle) of wind forces. Conventional slab-on-girder bridges with spans less than or equal to 125 feet can use the following basic loading (AASHTO 3.15.2.1.3):

1. Wind Load on Superstructure:
   Transverse Loading = 50 lbs/ft^2
   Longitudinal Loading = 12 lbs/ft^2

2. Wind Load on Live Load:
   Transverse Loading = 100 lbs/ft^2
   Longitudinal Loading = 40 lbs/ft^2

3. Wind Load on Substructure - (AASHTO 3.15.2.2):
   Transverse Loading = 40 lbs/ft^2
   Longitudinal Loading = 40 lbs/ft^2

The transverse and longitudinal loads are to be placed simultaneously for all wind loads (AASHTO 3.15.2.1.3).

Another loading consideration is the effect of overturning. AASHTO specifies an upward force of 20 pounds per square foot of the superstructure applied at the quarter point of the transverse superstructure width to account for the effect of overturning (AASHTO 3.15.3).

- Thermal Forces (T) – AASHTO Art. 3.16)

The effects of thermal forces on a structure are caused by fluctuations in temperature. This change in temperature is greatly dependent on the location of the bridge site. As a reference point, the estimated temperature at the time of construction is determined using temperature rise and fall values which are computed from extreme hot and cold temperatures. AASHTO provides recommended temperature ranges for the design of different bridge structures (AASHTO 3.16).

- Channel Forces – (AASHTO Art. 3.18)

Channel forces are those loads imposed on the bridge structure due to water course-related features. These forces include, but are not limited to stream flow, floating ice, and buoyancy. Channel forces principally affect substructure elements.

1. Stream Flow (SF) – AASHTO 3.18.1:

Structures with supports in watercourses are at risk for having those supports slide or overturn due to stream flow forces. An excessive stream flow velocity can lead to adverse scour conditions, which can undermine footings and threaten the integrity of the bridge structure. AASHTO defines the average pressure acting on a bridge pier due to flowing water as:

$$P_{avg} = K * (V_{avg})^2$$

Where,

P_{avg} = Average Stream Pressure (lb/ft)

K = Constant based on Shape of Pier

V_{avg} = Average Velocity of Water (ft/s)

The equation for the pressure due to stream flows uses a constant to describe the geometry of the pier in a water channel. K has three possible values, 1.4 for piers subjected to drift build-up and square ended piers, 0.7 for circular piers and 0.5 for angled ends. The average velocity is computed by dividing the flow rate by the flow area. The flow values are obtained from a hydrologic or hydraulic study for conditions producing maximum velocities. The maximum stream flow pressure P_{max} is equal to twice the average stream pressure P_{avg}. A triangular distribution is assumed with P_{max} located at the top of the water surface and a pressure of zero at the flow line.

2. Buoyancy (B) – AASHTO 3.19:

Bridge structures with elements, which are submerged underwater such as pier footings and piles, can sometimes be impacted from the effects of buoyancy.

$$B = g_{water} * \text{Area}$$

Where,

g_{water} = Density of water (62.40 lb/ft^3)

Area = Area of the cross section subjected to the Stream Flow

The "Bridge Design and Detailing Manual (BD&D)," Arizona Department of Transportation (ADOT), 1994 Edition provides guidelines for the analysis of bridges over waterways for four different streambed ground lines in part 1 – Section 1.2.1.

Case 1 is the as-constructed stream cross section. For this case, the bridge is analyzed to withstand the forces from AASHTO Group I to VII load combinations Table 3.22.1A.

Case 2 corresponds to the long-term dry streambed cross section i.e. the as constructed stream cross section minus the depth of the general scour. The bridge is analyzed to resist the same forces as Case 1 but the analysis for Seismic Forces is based solely on general scour.

Case 3 corresponds to the streambed cross section condition for the most critical design flow. Abutment protection is provided to withstand this event and abutments are protected from scour for this condition. On the other hand, the piers are subjected to the full general and critical flow local scour. For this condition, the bridge is analyzed to withstand the forces from the AASHTO Group I to VI load combinations.

Case 4 corresponds to the streambed cross section conditions for the superflood condition. All bank protection and approach embankments are assumed to have failed for this case. The abutments and piers are analyzed for the superflood scour, which means that all the substructure elements have experienced the maximum scour simultaneously.

The bridge is analyzed to make sure that it can withstand the following force:

$$DL + SF + B + 0.5\,W$$

Where, DL = Dead Load

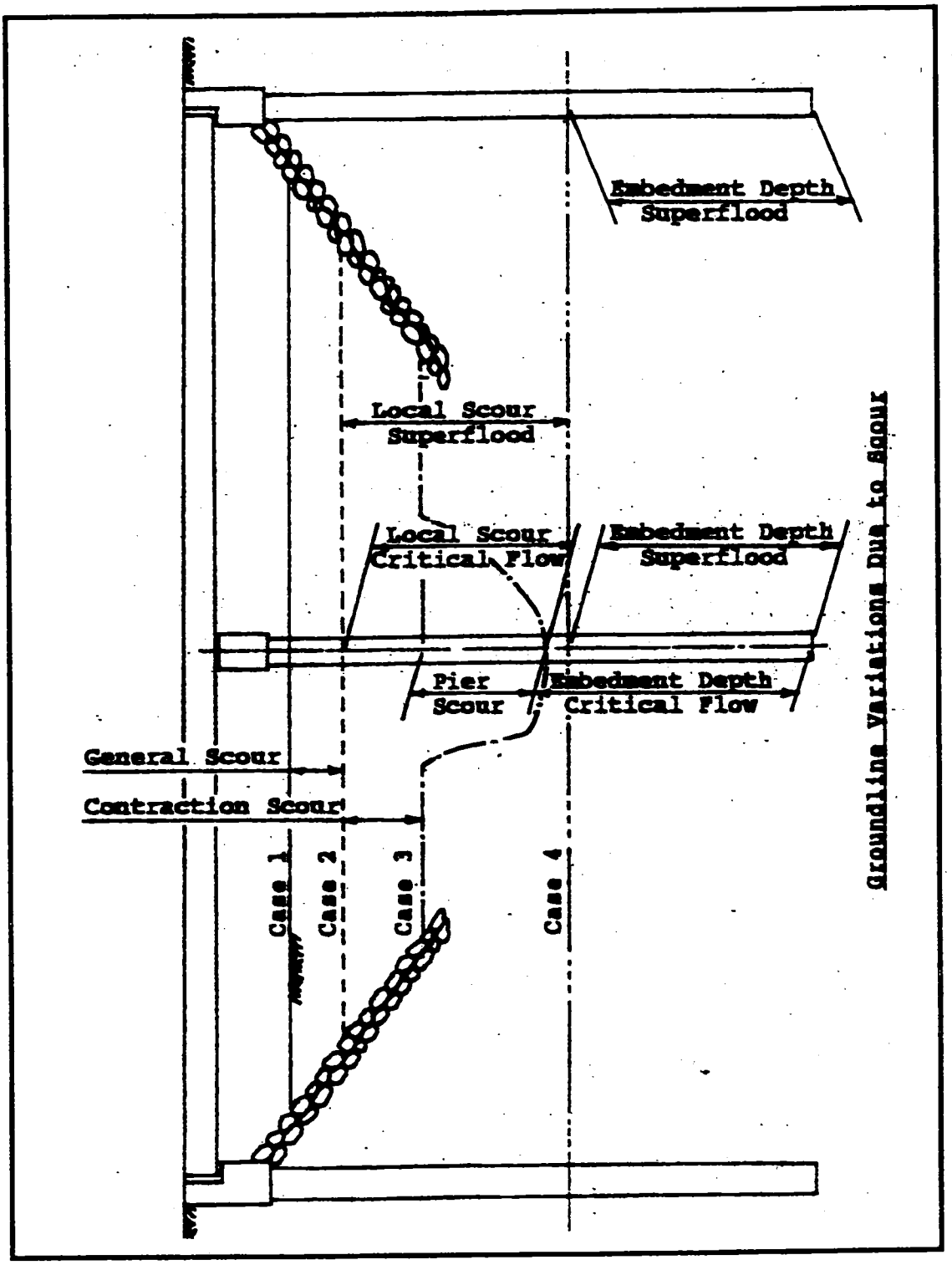
SF = Stream Force

B = Buoyancy

W = Wind on Structure

As previously stated, the bridge scour analysis for the low-flow channel performed by West Consultants, Inc. is based on the 100-year discharge of 166,000 cfs. This discharge

is considered the most critical flow; as a result, the piers are subjected to the critical flow local scour. Based on the results of the low-flow channel, the abutment scour was estimated to be insignificant at the bridge structures. For these conditions, the structural analysis only needs to be executed for Case 3 of the "Bridge Design and Detailing Manual (BD&D)". The bridge structures are verified to withstand the forces from the AASHTO load group combinations I to VI. The following figure provides a detailed illustration of the four different streambed ground lines for bridges over natural waterways.


Embedment Depth
Superflood
Local Scour
Superflood
Local Scour
Critical Flow
Embedment Depth
Superflood
Pier
Scour
Embedment Depth
Critical Flow
General Scour
Contraction Scour
Case 1
Case 2
Case 3
Case 4
Groundline Variations Due to Scour

A three-dimensional, finite-element analysis of the existing bridges were performed using the structural program- SAP. The program has acquired the status of being the most reputable and widely used computer program in the field of structural analysis. Idealized models are used in structural analysis that represent pinned and fixed supports as well as pin-connected and fixed-connected joints. In reality, however, all connections exhibit some stiffness toward joint rotations, owing to friction and material behavior. When selecting a particular model for each support or joint, it is vital to be aware of how the assumptions will affect the actual performance of the member and whether the assumptions are reasonable for the structural design.

The assumptions made on the structural model for the analysis of the ***Twenty Fourth Street Bridge*** is as follows:

- The portion of the bridge between expansion piers 6 and 10 are considered in the structural model of the bridge. The support at the expansion pier is represented as roller.

- Given that long embedded piles support the pier wall and the footing, a point of fixity of 19.24 feet below the scour depth was assumed to model the support conditions at the piers. In addition, soil springs were generated to model the stiffness and support provided at the bridge foundations. The soil springs where included in the structural model in order to approximate the existing conditions in the piers.

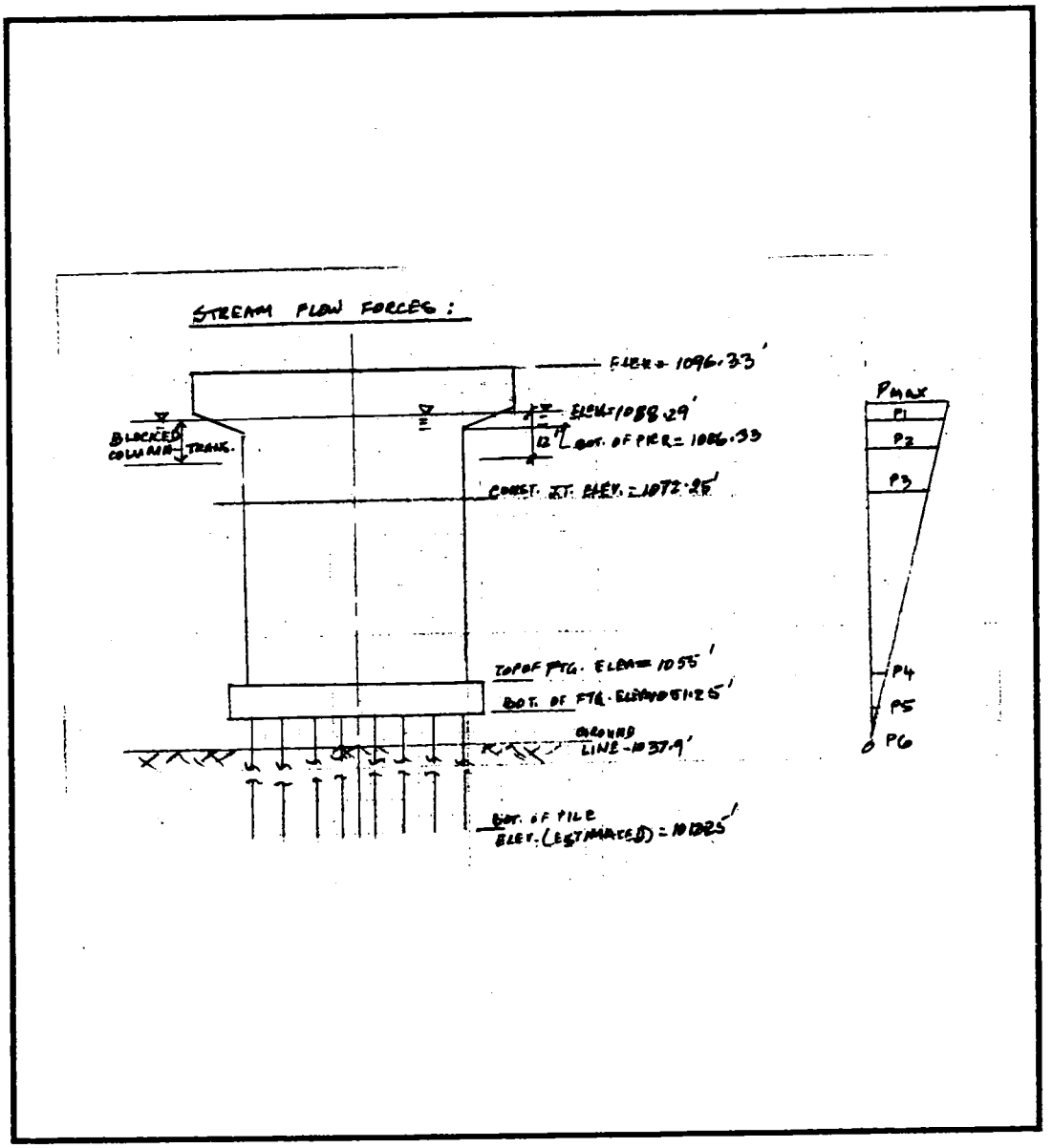
  The soil parameters used to model the soil springs at the piers are based on a preliminary geotechnical report performed by AGRA Earth & Environmental, Inc. on October 14, 1999. A copy of their findings is included in Appendix A. The geotechnical review was based on existing soil borings at ***Twenty Fourth Street Bridge***. AGRA Earth & Environmental, Inc. has provided us with an Effective Unit Weight (g_{soil}) of 140 pcf and a Submerged Unit Weight (g_{sub}) of 77.6 pcf.

- The stream forces for the 100-year peak event were applied to the piers along with other loads for the appropriate load groups as per AASHTO specifications.

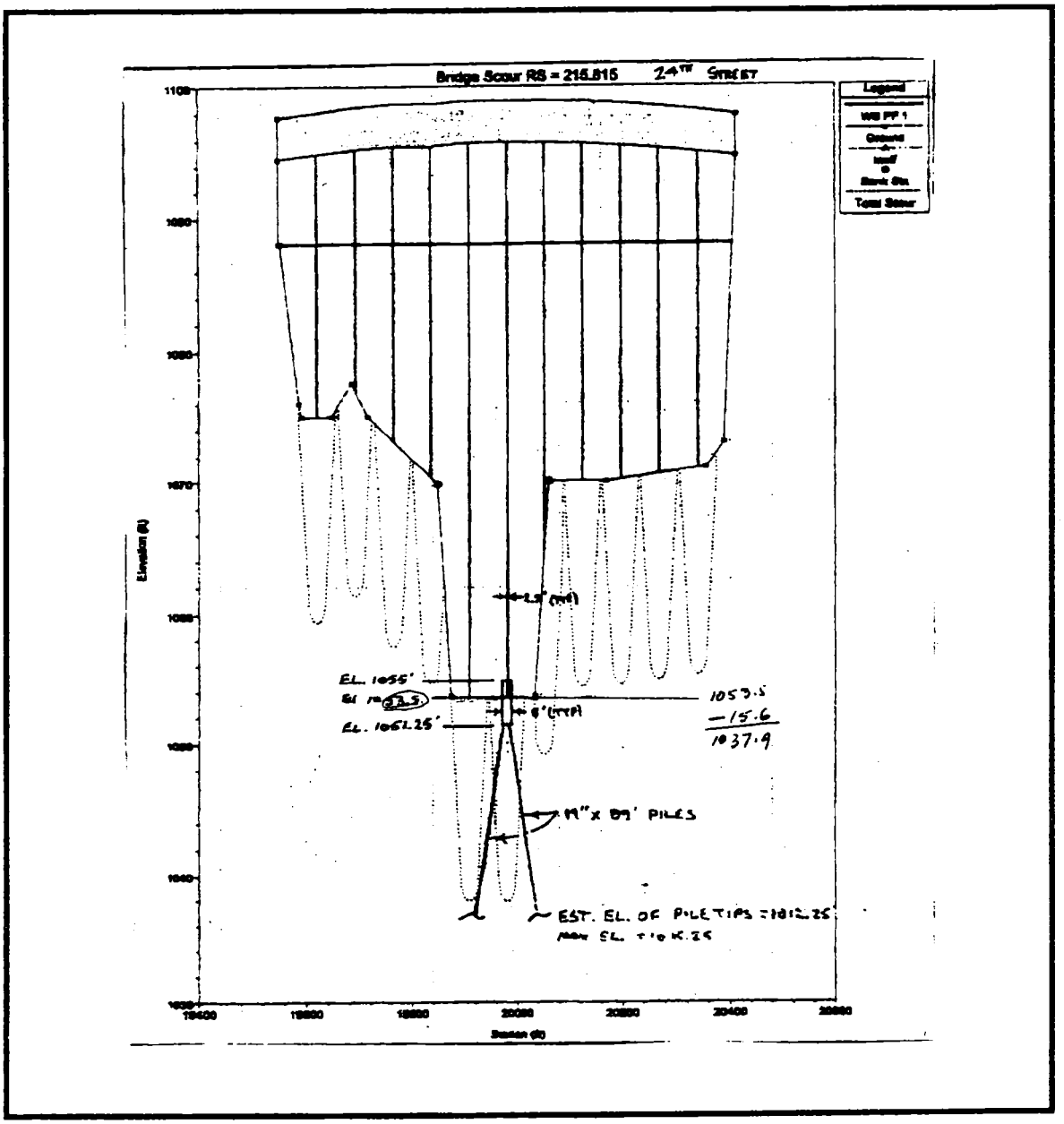
Finally, the demand forces generated by SAP2000 were compared to the pier/pile capacities; where the demand exceeds the capacity, retrofit measures must be taken. Where the demand placed upon the pier/pile is equal to or less than its capacity, retrofit measures need not be taken.

4.1 Twenty Fourth Street Bridge

The ***Twenty Fourth Street Bridge*** foundation consists of footing and piles. The scour depth is about 13 feet below the bottom of footing. The structural program PCFAD was used to generate the axial force on the individual piles due to the axial force and moment on the structure. The shear force was taken from the maximum force as given by the SAP2000 generated member forces at the pier wall base. The two battered piles were considered as taking the major portion of the shear force with the balance of the shear force distributed to the 16-piles. Due to the axial and lateral loading the moment developed in the piles was very high compared to the capacity of the HP14x89. **As a result the *Twenty Fourth Street Bridge* is not adequate for the proposed scour and retrofit measures need to be taken.**



Stream Flow Diagram – Twenty Fourth Street Bridge



Proposed Scour – Twenty Fourth Street Bridge

5.0 RETROFIT MEASURES

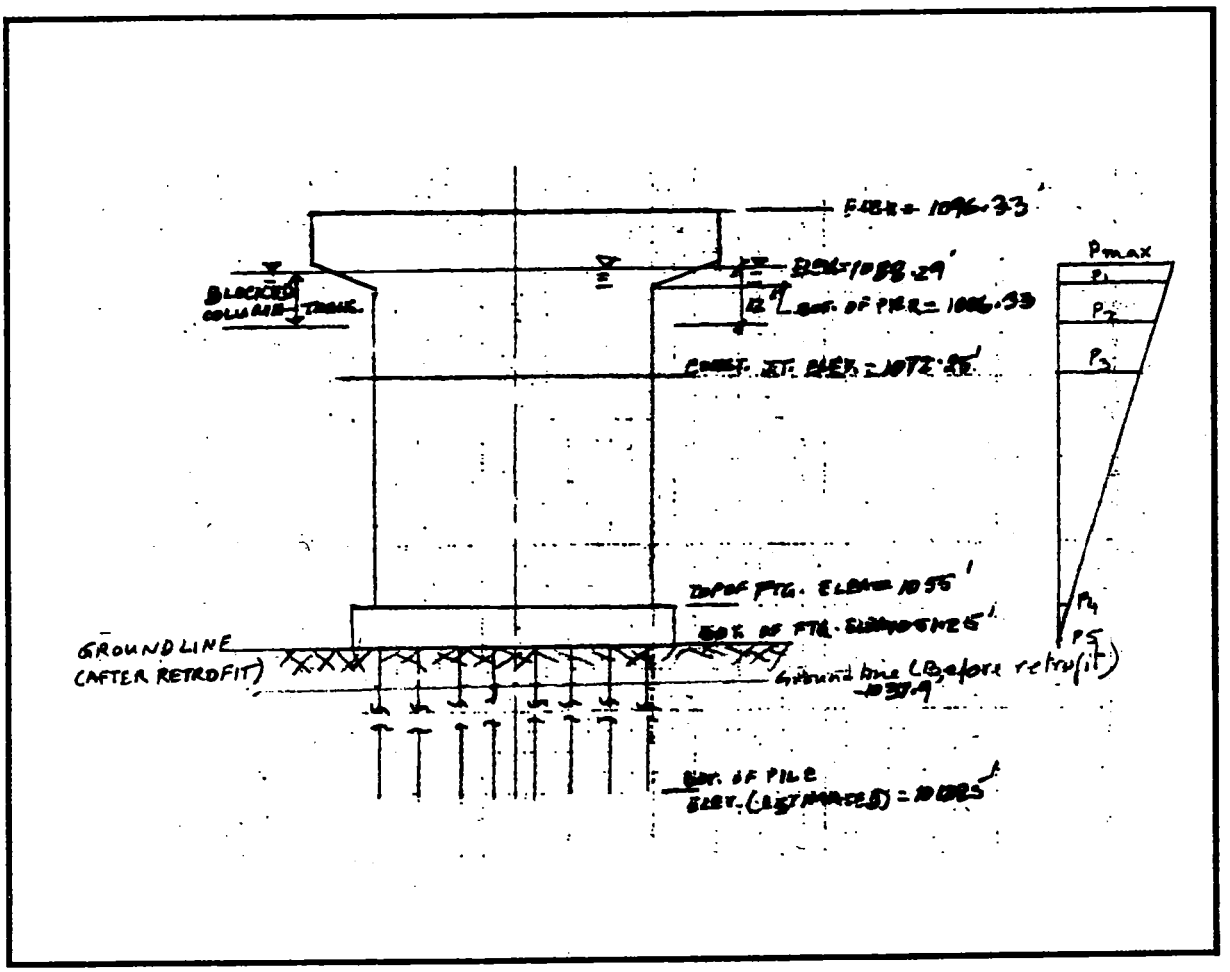
Based on the structural analysis findings, the ***Twenty Fourth Street*** is not adequate to resist the forces due to the proposed low flow channel condition during a 100 year event. Therefore, retrofit measures are required for the bridge.

The retrofit measures can be classified into two categories: 1) scour countermeasures; and 2) structural retrofit element(s).

Scour countermeasures include:

- Grade/scour control structures,
- Gabion mattresses hinged for scour occurrences, and
- Soil cement/concrete aprons with cutoff walls.

For the ***Twenty Fourth Street Bridge*** scour control structures are recommended for use as retrofit measure. After the retrofit measures are implemented the maximum scour depth is considered to be at the elevation of the bottom of footing- 1051.25 feet (see sketch next page). Calculations for the ***Twenty Fourth Street Bridge,*** after the retrofit measure, is attached in Appendix B. The calculations show that the piles are **adequate** in capacity due to raised scour depth.



Section: After Retrofit

APPENDIX A

Twenty Fourth Street Bridge Calculations

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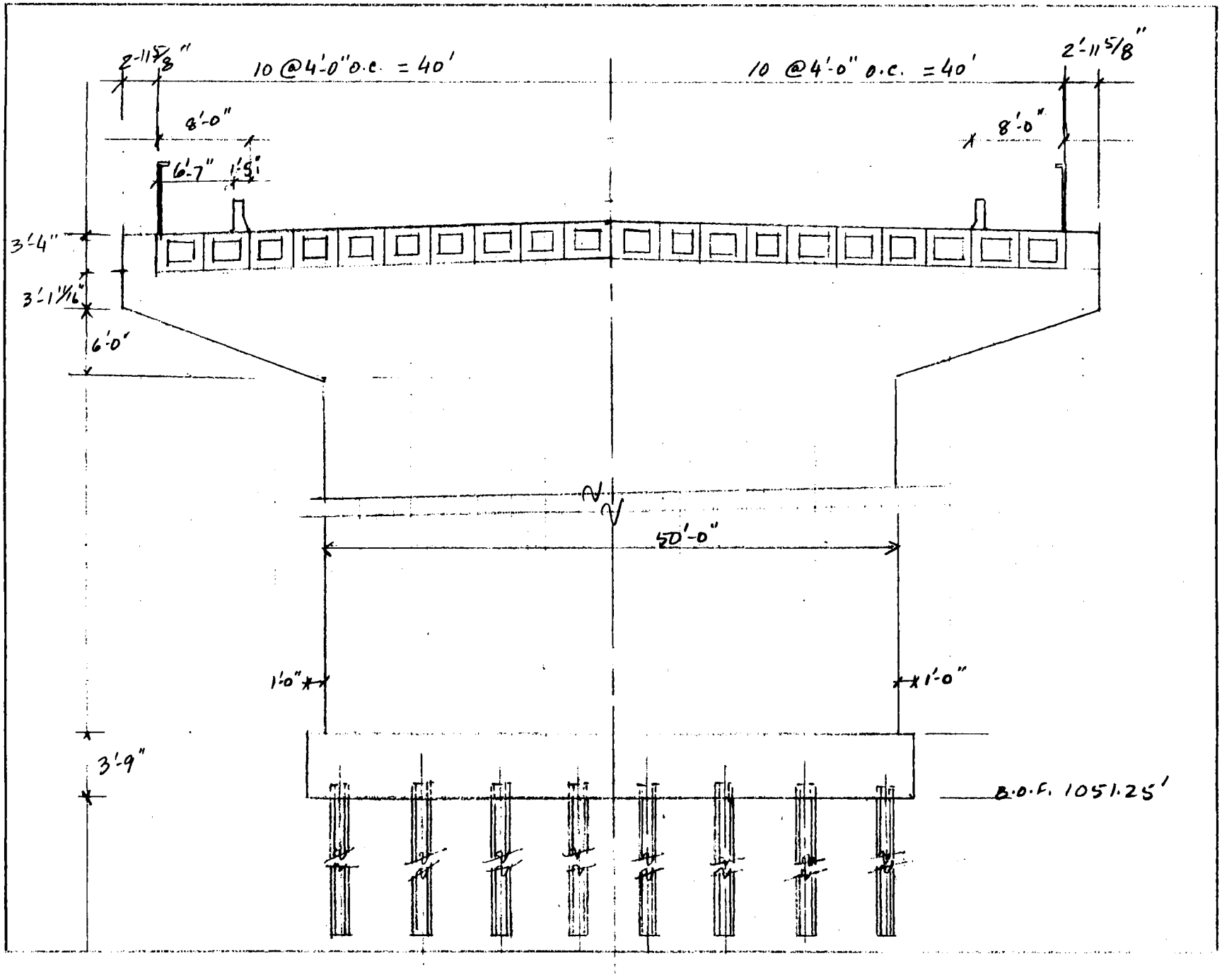
Checker: Date:

Grid: 1/8"



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Projects: Salt River Bridges - Scour	Job No. 1317.00	Sheet:	of
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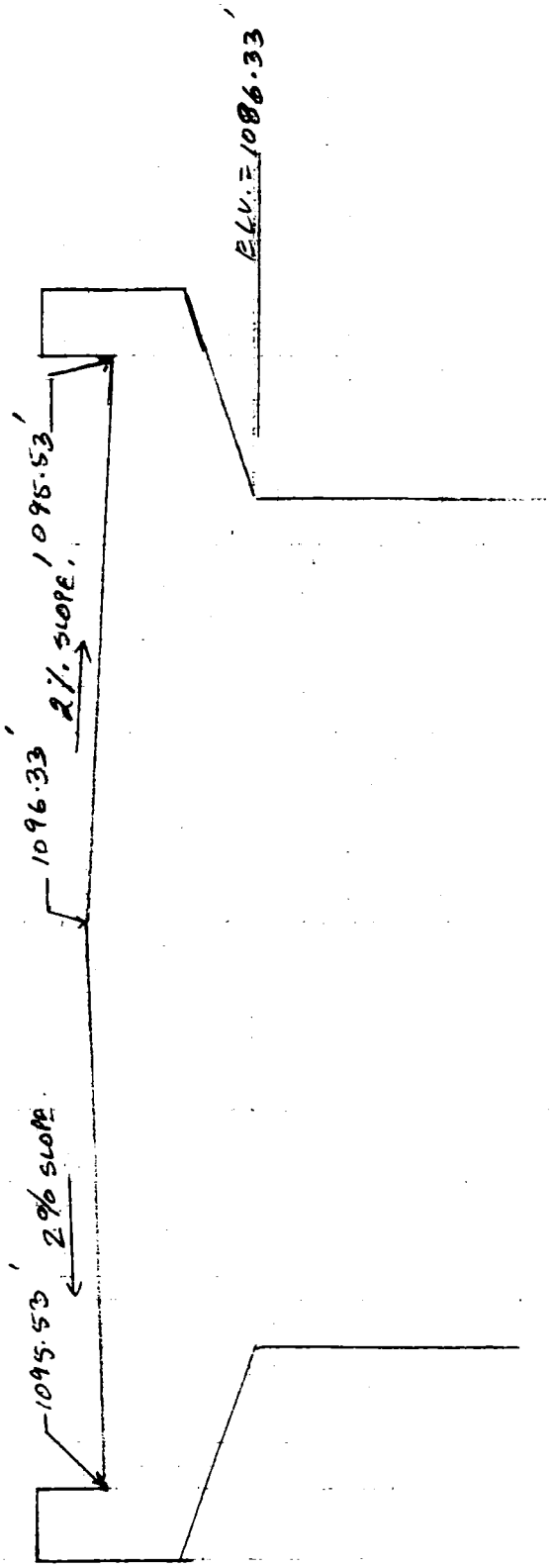
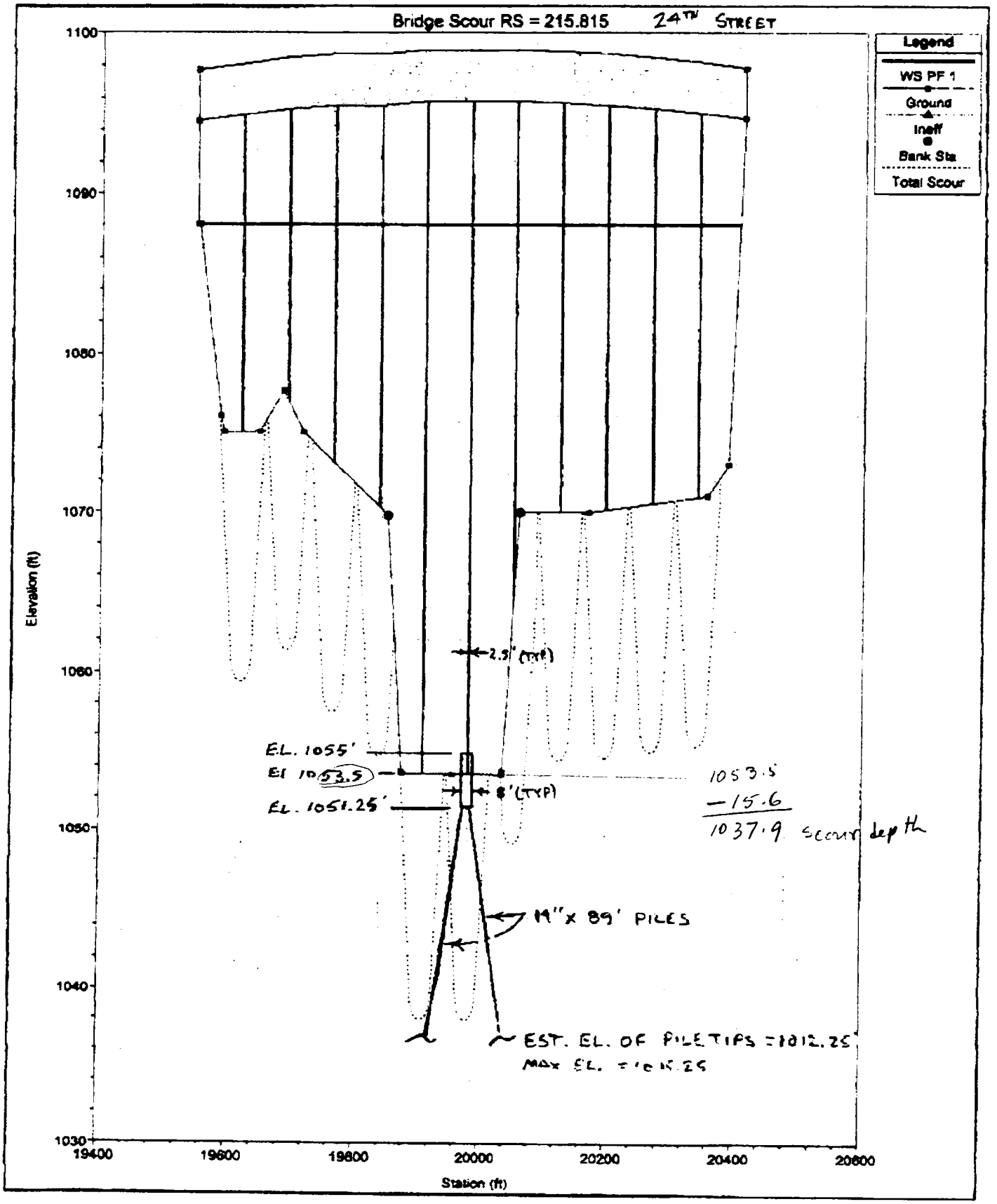
	Checker:	Date:	
		Grid: 1"=8"	




Bridge Scour RS = 215.815
24TH STREET
Legend
WS PF 1
Ground
Ineff
Bank Sta
Total Scour
Elevation (ft)
Station (ft)
1100
1090
1080
1070
1060
1050
1040
1030
19400
19600
19800
20000
20200
20400
20600
2.5' (TYP)
EL. 1055'
El 1053.5
EL. 1051.25'
8' (TYP)
1053.5
-15.6
1037.9 scour depth
14" x 89' PILES
EST. EL. OF PILE TIPS = 1012.25'
MAX EL. = 1015.25

Alternative 1 Bridge Scour With Long Term Degradation, River Station 215.815, 24th Street Bridge

Results Computed Using HEC-RAS Version 2.2 and HEC-18 Guidelines

Hydraulic Design Data

Pier Scour

All piers have the same scour depth

Input Data

Pier Shape:	Round nose
Pier Width (ft):	6.5
Grain Size D50 (ft):	0.0919
Depth Upstream (ft):	34.79 + 1053.5 = 1088.29
Velocity Upstream (ft/s):	19.12
K1 Nose Shape:	1
Pier Angle:	0
Pier Length (ft):	64
K2 Angle Coef:	1
K3 Bed Cond Coef:	1.1
Grain Size D90 (ft):	0.4921
K4 Armouring Coef:	1

Results

Scour Depth Ys (ft):	15.6
Froude #:	0.57
Equation:	CSU equation

Pier Scour Limited to Maximum of Ys = 2.4 * a

Alternative case analysis:

Yf	Y1	Yf/Y >>	Vf/V1	V1	Vf
1.48	34.79	0.0425	0.81	19.12	15.49

Notes: Exposed pile cap is 6.5' wide, which should not be bulked. The near bottom velocity on the unbulked pier will clearly produce less scour, so it is not computed herein.

FUGLEN INTERNATIONAL

Projects: Salt River Bridge - Snow	Job No. 1317.00	Sheet:	of
Item: 24th Street Bridge	Designer: SJ	Date: 02-14-00	
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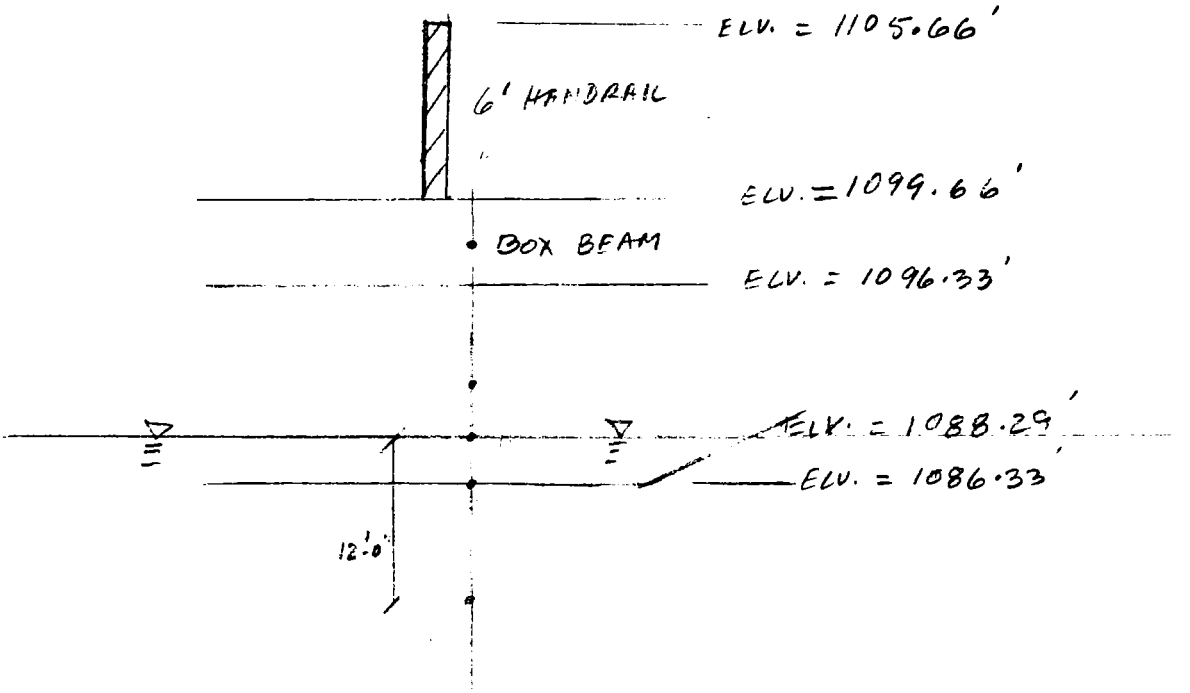
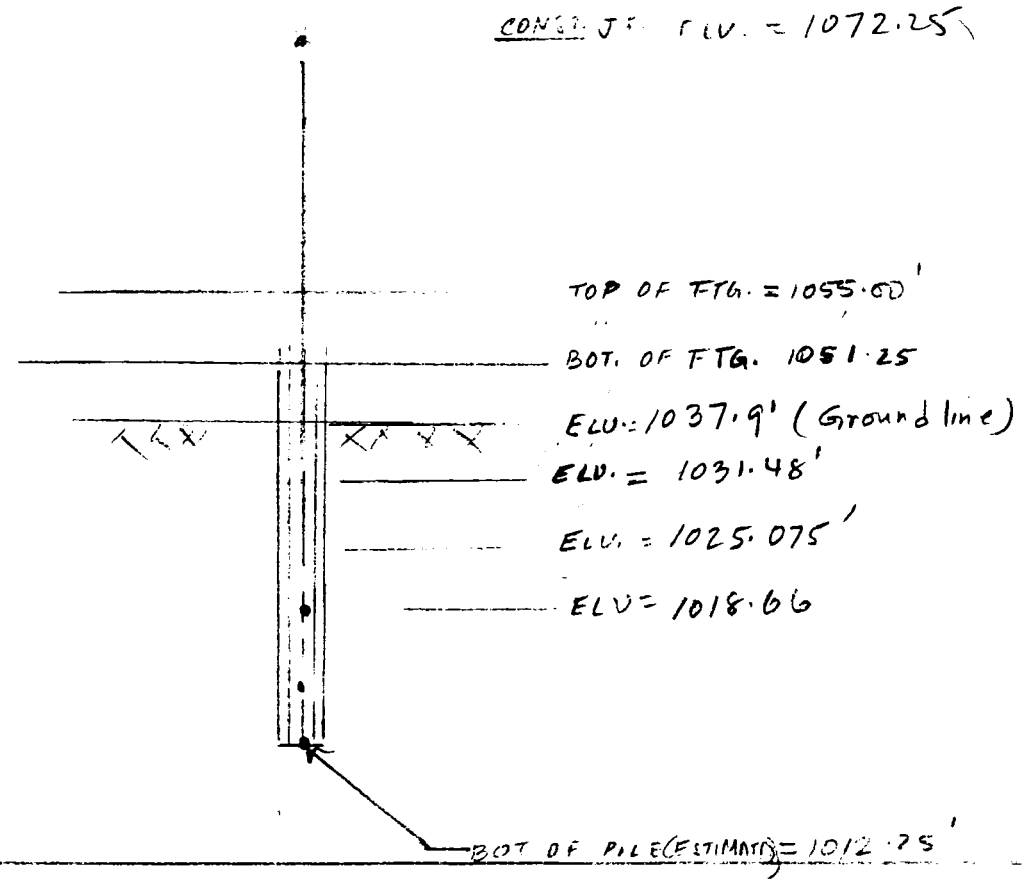




- Design Conditions:
  - Two 4-span interior units and Two 2-span end units. All spans = 72'-0"
  - HS20 Live Load - 5 Lanes
  - 4'-0" wide 20 Box Beams
  - Allow for 25 psf future wearing surface.
  - Consider 4-span unit between pier 6 - pier 10 for scour check calculations

- Material:
  - Concrete: Normal Wt.

    Class S, f'_c = 3000 psi - Barriers and Approach slab.

    Class S, f'_c = 4000 psi - Pier Wall, Pier Cap and Wing Walls (conc2)

  - Reinforcement:

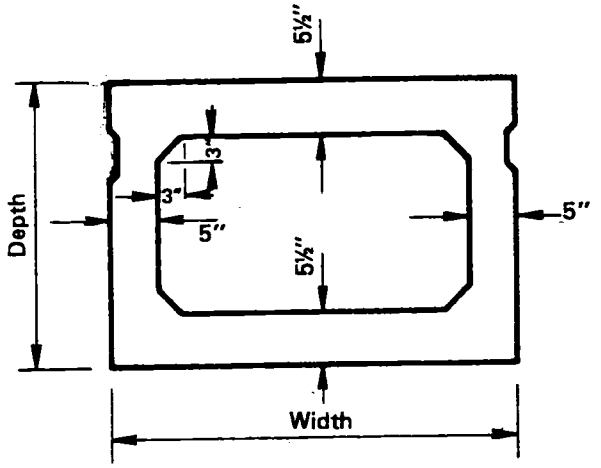
    All Reinforcing bars are A615 Deformed Billet Steel grade 60

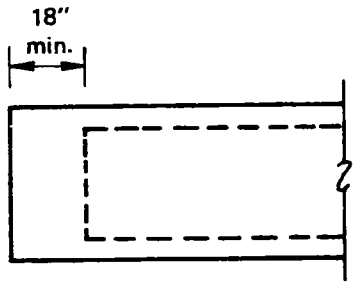
    f'_y min = 60000 psi

    f_s = 24000 psi

Box beams

The box beams shown are the former AASHO-PCI standard sections. They can be used either as adjacent units with or without an added wearing surface or spaced apart in which case the deck slab is cast-in-place using integral precast, prestressed deck panels. Box beams for railway loadings have been standardized by AREA.

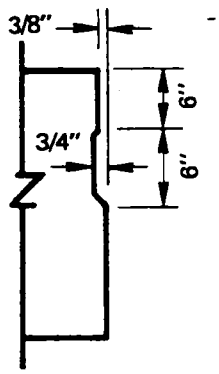




TYPICAL LONGITUDINAL SECTION

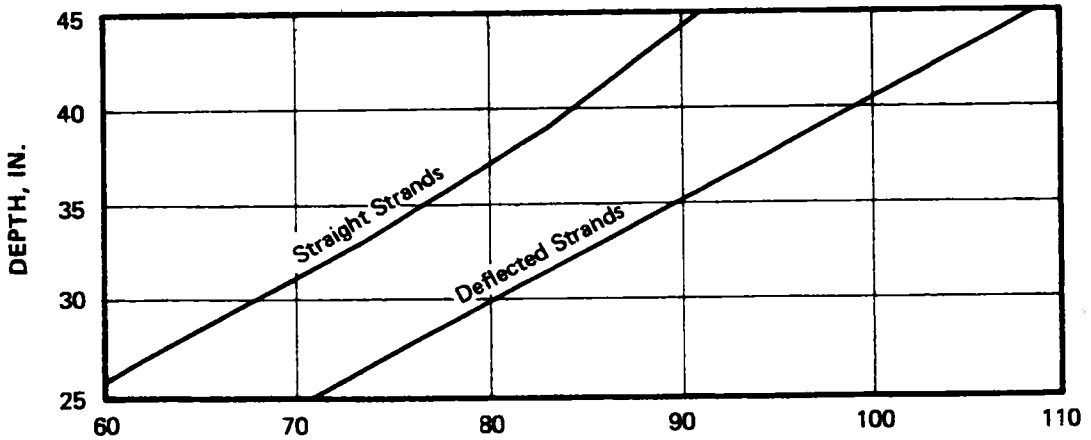
TYPICAL SECTION PROPERTIES

Type	Width ft	Depth in.	Weight lb/ft	Net Area in.^{2}	I_x in.^{4}	y_b in.	S_b in.^{3}	S_t in.^{3}
B I-36	3	27	584	561	50,334	13.35	3770	3687
B II-36	3	33	647	621	85,153	16.29	5227	5096
B III-36	3	39	709	681	131,145	19.25	6813	6640
B IV-36	3	42	740	711	158,644	20.73	7653	7459
B I-48	4	27	722	693	65,941	13.37	4932	4838
B II-48	4	33	784	753	110,499	16.33	6767	6629
B III-48	4	39	847	813	168,367	19.29	8728	8542
B IV-48	4	42	878	843	203,088	20.78	9773	9571



TYPICAL KEYWAY DETAIL

3'-3" + 1" = 3'-4"



APPROXIMATE MAXIMUM SPAN, FEET — HS20 LOADING

$A = 5.645\ ft^2$

$I_{xx} = 168367/(144)^2 = 8.1195\ ft^4$

$y_b = 19.29/12 = 1.6075\ ft$

$S_b = 8728/(12)^3 = 5.051\ ft^3$

$S_t = 8542/(12)^3 = 4.943\ ft^3$

$w_D = 0.847\ k/'$

$$I_{zz} = \frac{2 t t_f (b-t)^2 (d-t_f)^2}{b t + d t_f - t^2 - t_f^2}$$

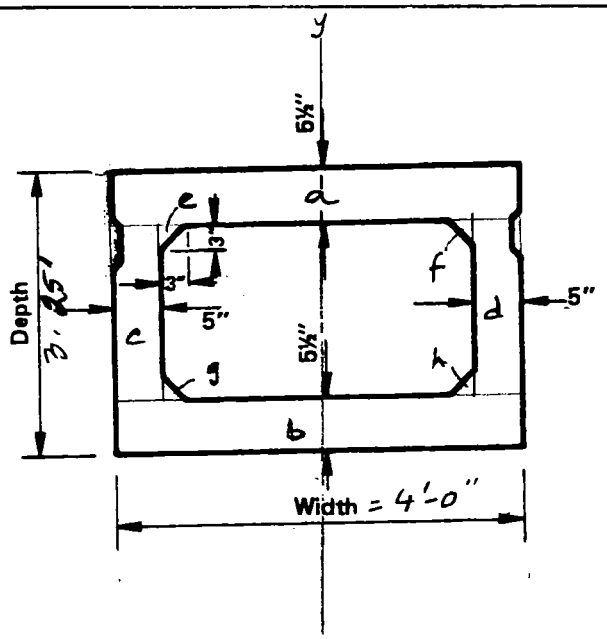
$$= \frac{2(5)(5.5)(4\times12-5)^2(3.25*12-5.5)^2}{(12\times4)(5)+(3.25)(12)(5.5)-5^2-5.5^2}$$

$$= 13.785\ ft^4$$

TYLIN INTERNATIONAL

Projects: Salt River Bridges - Scour	Job No. 1317.00	Sheet:	of
Item: 24th Street Bridge	Designer: SJ	Date: 02-15-00	
	Checker:	Date:	
		Grid: 1/8"	

I_{yy}



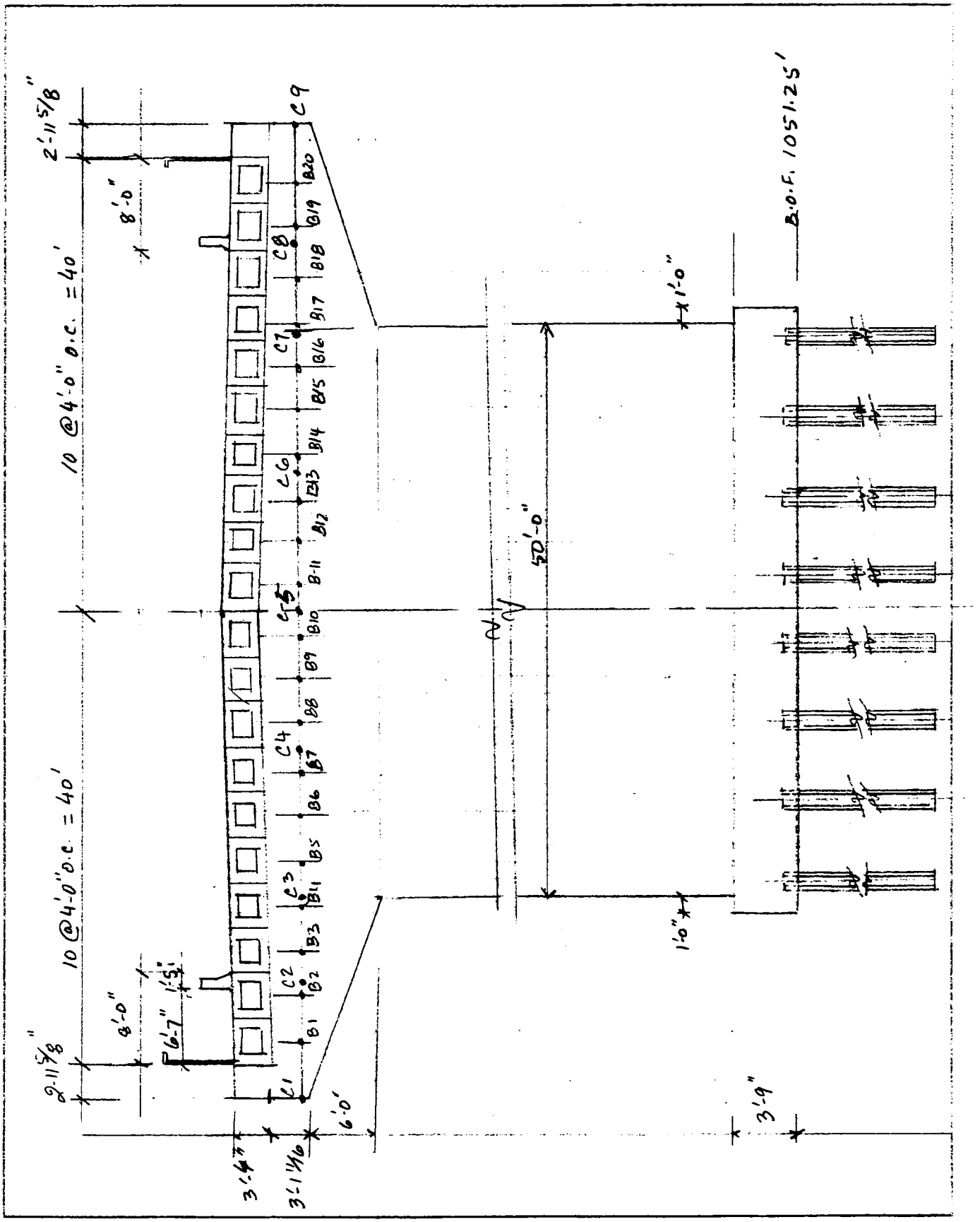
Section	Area A (ft^2)	X_{left} (ft)	$A * X_{left}$ (ft^3)	$A*(\bar{x}-X_{left})^2$ (ft^4)	I_o ft^4
a	1.833	2	3.667	0.0	2.444
b	1.833	2	3.667	0.0	2.444
c	0.972	0.2083	0.2025	3.12	0.014
d	0.972	3.7917	3.6863	3.12	0.014
e	0.0312	0.5	0.015625	0.70	0.0001
f	0.0312	3.5	0.10937	0.70	0.0001
g	0.0312	0.5	0.015625	0.70	0.0001
h	0.0312	3.5	0.10937	0.70	0.0001
	$\Sigma 5.7348 ft^2$		$\Sigma 11.47279$	$\Sigma 9.04$	$\Sigma 4.92 ft^4$

$$\bar{X} = \frac{11.47279}{5.7348} = 2.00'$$

$$I_{yy} = A*(\bar{x}-X_{left})^2 + I_o = 13.956\ ft^4$$

T·Y·LIN INTERNATIONAL

Projects: Salt River Bridges - Scour	Job No.	Sheet:	of
Item: 24th Street Bridge.	Designer:	Date:	
	Checker:	Date:	
		Grid: 1/8"	



Pier Cap:

AT Pier Cap C.G.

Length ≃ 86 ft
width = 3'

$A = 86 \times 3 = 258\ ft^2$

$I_{xx} = 86 \times 3^3/12 = 193.5\ ft^4$

$I_{yy} = 86^3 * 3/12 = 159014\ ft^4$

$I_{zz} = 86 * 3^3/3 = 774\ ft^4$

$Volume = [4 \times 86 + (86+50)/2 * 6] * 3$
$= 2256\ ft^3$

$wt = vol. \times .15\ kcf = 338.4\ k$

$Length \simeq -1091.33 + (1096.33 + 1.6075)$
$= 6.6075'$

$wt = 338.4/6.6075 = 51.21\ k/'$

SEC 2

Avg betn C.G of pier cap and bot. of pier cap:

Avg length ≃ (86 + 50)/2 = 68 ft.
width ≃ 3'-0"

$A = 204\ ft^2$

$I_{xx} = 153\ ft^4$, $I_{yy} = 78608\ ft^4$

$I_{zz} = 612\ ft^4$

$wt = 0\ k/'$

SEC 3

Pier Wall:

$L = 50'$
$width = 2.5'$
$A = 125\ ft^2$
$I_{xx} = 6510\ ft^4$
$I_{yy} = 2.5 \times 50^3/12 = 26041.67\ ft^4$
$I_{zz} = 50 \times 2.5^3/3 = 260.4\ ft^4$
$wt = 150 \times .15\ kcf = 22.5\ k/'$

SEC 4

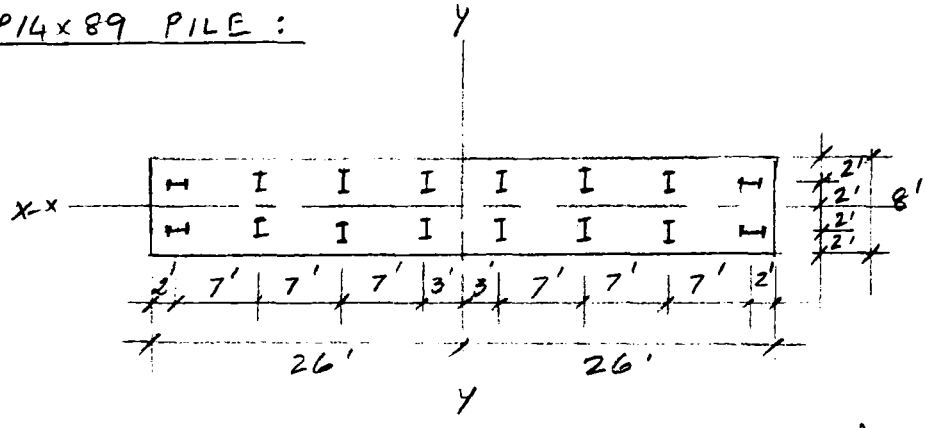
FTG:

$Length = 52'$
$Width = 8'$
$A = 416\ ft^2$
$I_{xx} = 52 \times 8^3/12 = 2218.67\ ft^4$
$I_{yy} = 8 \times 52^3/12 = 93738.67\ ft^4$
$I_{zz} = 52 \times 8^3/3 = 8874.67\ ft^4$
$Vol. = 416 \times 3.75 = 1560\ ft^3$
$Wt \simeq 1560 \times .15\ kcf = 234\ k$
$Length \simeq 3.75'$
$\therefore wt = 234/3.75 = 62.4\ k/'$

SEC 5

SEC 6 (no wt)
SEC 7

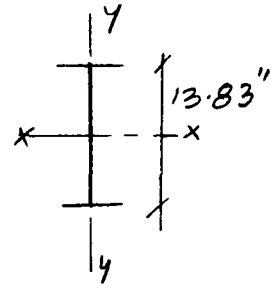
HP14x89 PILE :



HP14x89 : $A = 26.1\ in^2 \simeq 0.18125\ ft^2$

$I_{xx} = 904\ in^4 \simeq 0.0436\ ft^4$

$I_{yy} = 326\ in^4 \simeq 0.01572\ ft^4$



I_{xx}

No. of Piles	AREA ft^2	Ay^2 ft^4	I_o ft^4	$Ay^2 + I_o$ ft	y ft
12	2.175	8.7	.0436	8.7436	2
4	0.725	2.9	.01572	2.916	2
	$\Sigma\ 2.9\ ft^2$			$\Sigma\ 11.66\ ft^4$	

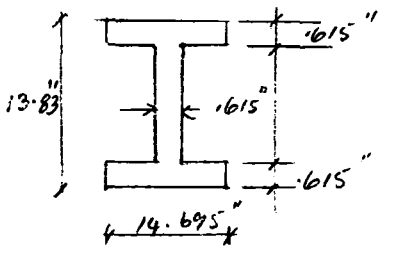
$$I_{yy} = (.01572 \times 12 + .0436 \times 4) + 4 \times (.18125) \times 3^2 + 4(.18125)(10)^2 + 4(.18125)(17)^2 + 4(.18125)(24)^2$$
$$= 706.51\ ft^4$$

$$I_{zz} = .000159(16) + .18(24^2+2^2) \times 4 + .18125(17^2+2^2) \times 4 + .18125(10^2+2^2) + .18125(3^2+2^2) = 654.133\ ft^4$$

TYLIN INTERNATIONAL

Projects: Lower Rio Bridges - Scour	Job No. 1317.00	Sheet:	of
Item: 24th st. Bridge	Designer: SJ	Date: 02-17-00	
	Checker:	Date:	
		Grid: 1/8"	

HP14 x 89



$$I_{zz} = \frac{14.695(.615)^3}{3} * 2 + \frac{(13.833 - .615)(.615)^3}{3}$$

$$= 3.3034 \text{ in}^4 \simeq .000159 \text{ ft}^4$$

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	2/18/00
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Concrete Properties

F'c (slab):	4500 PSI
F'c (girder):	6000 PSI
No.Beams:	20

Left Outside distance:	2.969 ft
Girder Spacing:	4.000 ft
Right outside distance:	2.969 ft

Box Beam Properties:

Area:	5.646 ft^2
Yb:	1.608 ft
Yt:	1.643 ft
H:	3.250 ft^2
Ix:	8.120 ft^4
St:	4.943 ft^3
Sb:	5.051 ft^3

Section Properties for Superstructure:

Area:	112.917 ft^2
Ycb:	1.608 ft^2
Yct:	1.643 ft^2
Hc:	3.250 ft^2
Ixx:	162 ft^4
Iyy:	60351 ft^4
Izz:	91.900 ft^4

Ixx

Location	X ft	Width ft	Thickness ft	E ksf	Area ft^2	y ft	I ft^4	E(I) ksf-ft^4
B1-B20		4.000	3.250	635789	5.65	1.61	8.12	5162320.48
				Total:	112.92		8.12	

ycb= 1.61 ft

Ixx= 162.39 ft^4

Iyy

	Location	X ft	Width ft	Thickness ft	E ksf	Area ft^2	y ft	Area*y ft^3	A(y-ycb)^2 ft^4	I ft^4	(I+Ay^2) ft^4
	B1	-38.000	3.250	4.000	635789	5.65	2.00	11.29	8152.58	13.96	8167
	B2	-34.000	3.250	4.000	635789	5.65	6.00	33.88	6526.58	13.96	6541
	B3	-30.000	3.250	4.000	635789	5.65	10.00	56.46	5081.25	13.96	5095
	B4	-26.000	3.250	4.000	635789	5.65	14.00	79.04	3816.58	13.96	3831
	B5	-22.000	3.250	4.000	635789	5.65	18.00	101.63	2732.58	13.96	2747
Beams	B6	-18.000	3.250	4.000	635789	5.65	22.00	124.21	1829.25	13.96	1843
	B7	-14.000	3.250	4.000	635789	5.65	26.00	146.79	1106.58	13.96	1121
	B8	-10.000	3.250	4.000	635789	5.65	30.00	169.38	564.58	13.96	579
	B9	-6.000	3.250	4.000	635789	5.65	34.00	191.96	203.25	13.96	217
	B10	-2.000	3.250	4.000	635789	5.65	38.00	214.54	22.58	13.96	37
	B11	2.000	3.250	4.000	635789	5.65	42.00	237.13	22.58	13.96	37
	B12	6.000	3.250	4.000	635789	5.65	46.00	259.71	203.25	13.96	217
	B13	10.000	3.250	4.000	635789	5.65	50.00	282.29	564.58	13.96	579
	B14	14.000	3.250	4.000	635789	5.65	54.00	304.88	1106.58	13.96	1121
	B15	18.000	3.250	4.000	635789	5.65	58.00	327.46	1829.25	13.96	1843
	B16	22.000	3.250	4.000	635789	5.65	62.00	350.04	2732.58	13.96	2747
	B17	26.000	3.250	4.000	635789	5.65	66.00	372.63	3816.58	13.96	3831
	B18	30.000	3.250	4.000	635789	5.65	70.00	395.21	5081.25	13.96	5095
	B19	34.000	3.250	4.000	635789	5.65	74.00	417.79	6526.58	13.96	6541
	B20	38.000	3.250	4.000	635789	5.65	78.00	440.38	8152.58	13.96	8167
					Sum:	112.92		4516.67	30035.833		60351

ycb= 40.00 ft

Iyy= 60351.00 ft^4

Izz

	Location	Width ft	Thickness ft	E ksf	E*W*T^3 ksf-ft^4
Beams	B1 to B20	4.000	3.250	635789	175287012
				Sum:	175287012

EI=(E*No. Beams*W1*T1^3)

Izz= 91.900 ft^4

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ADDITIONAL DEAD LOAD ADDED

DIAPHRAGMS

Location	Total Load kips
-	-
PIER 7	0.00
PIER 8	0.00
PIER 9	0.00
-	-
-	-

PIER NOMENCLATURE

Location	Dist - x ft	Dist - y ft
C1	-42.969	0.000
B1	-38.000	0.000
B2	-34.000	0.000
C2	-33.969	0.000
B3	-30.000	0.000
B4	-26.000	0.000
C3	-24.969	0.000
B5	-22.000	0.000
B6	-18.000	0.000
B7	-14.000	0.000
C4	-12.485	0.000
B8	-10.000	0.000
B9	-6.000	0.000
B10	-2.000	0.000
C5	0.000	0.000
B11	2.000	0.000
B12	6.000	0.000
B13	10.000	0.000
C6	12.485	0.000
B14	14.000	0.000
B15	18.000	0.000
B16	22.000	0.000
C7	24.969	0.000
B17	26.000	0.000
B18	30.000	0.000
C8	33.969	0.000
B19	34.000	0.000
B20	38.000	0.000
C9	42.969	0.000

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Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	2/18/00
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COORDINATES & SECTION PROPERTIES (SUPER STRUCTURE)

	Location	Joint No.	X ft	Y ft	Z ft	Area ft^2	Ixx ft^4	Iyy ft^4	Izz ft^4
PIER 6	0.00 L	101	0.00	0.00	1097.94	112.917	162.391	60351	91.900
	0.25 L	102	18.00	0.00	1097.94	112.917	162.391	60351	91.900
	0.50 L	103	36.00	0.00	1097.94	112.917	162.391	60351	91.900
	0.75 L	104	54.00	0.00	1097.94	112.917	162.391	60351	91.900
PIER 7	1.00 L	105	72.00	0.00	1097.94	112.917	162.391	60351	91.900
	1.25 L	106	90.00	0.00	1097.94	112.917	162.391	60351	91.900
	1.50 L	107	108.00	0.00	1097.94	112.917	162.391	60351	91.900
	1.75 L	108	126.00	0.00	1097.94	112.917	162.391	60351	91.900
PIER 8	2.00 L	109	144.00	0.00	1097.94	112.917	162.391	60351	91.900
	2.25 L	110	162.00	0.00	1097.94	112.917	162.391	60351	91.900
	2.50 L	111	180.00	0.00	1097.94	112.917	162.391	60351	91.900
	2.75 L	112	198.00	0.00	1097.94	112.917	162.391	60351	91.900
PIER 9	3.00 L	113	216.00	0.00	1097.94	112.917	162.391	60351	91.900
	3.25L	114	234.00	0.00	1097.94	112.917	162.391	60351	91.900
	3.5L	115	252.00	0.00	1097.94	112.917	162.391	60351	91.900
	3.75L	116	270.00	0.00	1097.94	112.917	162.391	60351	91.900
PIER 10	4.00L	117	288.00	0.00	1097.94	112.917	162.391	60351	91.900
	4.25L	118	306.00	0.00	1097.94	112.917	162.391	60351	91.900
	4.5L	119	324.00	0.00	1097.94	112.917	162.391	60351	91.900
	4.75L	120	342.00	0.00	1097.94	112.917	162.391	60351	91.900

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Project: Salt River Bridges Scour | Job No. 1317.00 | Sheet:

Item: 24th Street Bridge | Designer: SJ | Date: 2/28/00

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COORDINATES & SECTION PROPERTIES

	Item	Location	Joint No.	X ft	Y ft	Z ft	Area ft^2	Ix ft^4	Iy ft^4	Ix ft^4	
PIER 7	PIER CAP	C1	201	72.00	-42.969	1094.33	12.00	16.00	9.00	36.00	SEC 1
		B1		72.00	-38.000	1093.50	16.97	45.24	12.73	50.91	
		B2		72.00	-34.000	1092.84	20.97	85.37	15.73	62.91	
		C2	202	72.00	-33.969	1092.83	21.00	85.75	15.75	63.00	SEC 2
		B3		72.00	-30.000	1092.17	24.97	144.13	18.73	74.91	
		B4		72.00	-26.000	1091.50	28.97	225.09	21.73	86.91	
		C3	203	72.00	-24.969	1091.33	30.000	250.000	22.500	90.000	SEC 3
		B5		72.00	-22.000	1091.33	30.000	250.000	22.500	90.000	
		B6		72.00	-18.000	1091.33	30.000	250.000	22.500	90.000	
		B7		72.00	-14.000	1091.33	30.000	250.000	22.500	90.000	
		C4	204	72.00	-12.485	1091.33	30.000	250.000	22.500	90.000	
		B8		72.00	-10.000	1091.33	30.000	250.000	22.500	90.000	
		B9		72.00	-6.000	1091.33	30.000	250.000	22.500	90.000	
		B10		72.00	-2.000	1091.33	30.000	250.000	22.500	90.000	
		C5	205	72.00	0.000	1091.33	30.000	250.000	22.500	90.000	
		B11		72.00	2.000	1091.33	30.000	250.000	22.500	90.000	
		B12		72.00	6.000	1091.33	30.000	250.000	22.500	90.000	
		B13		72.00	10.000	1091.33	30.000	250.000	22.500	90.000	
		C6	206	72.00	12.485	1091.33	30.000	250.000	22.500	90.000	
		B14		72.00	14.000	1091.33	30.000	250.000	22.500	90.000	
		B15		72.00	18.000	1091.33	30.000	250.000	22.500	90.000	
		B16		72.00	22.000	1091.33	30.000	250.000	22.500	90.000	
		C7	207	72.00	24.969	1091.33	30.000	250.000	22.500	90.000	SEC 3
		B17		72.00	26.000	1091.50	28.97	225.09	21.73	86.91	
		B18		72.00	30.000	1092.17	24.97	144.13	18.73	74.91	
		C8	208	72.00	33.969	1092.83	21.00	85.75	15.75	63.00	SEC. 2
		B19		72.00	34.000	1092.84	20.97	85.37	15.73	62.91	
		B20		72.00	38.000	1093.50	16.97	45.24	12.73	50.91	
		C9	209	72.00	42.969	1094.33	12.00	16.00	9.00	36.00	SEC. 1
	COLUMN	HWL	601	72.00	0.00	1088.29	204.000	153.000	78608.000	612.000	
		Top of col.	602	72.00	0.00	1086.33	125.000	65.100	26041.670	260.400	
		12 ft below	603	72.00	0.00	1076.29	125.000	65.100	26041.670	260.400	
		Const. Jt.	604	72.00	0.00	1072.25	125.000	65.100	26041.670	260.400	
		Top of ftg.	605	72.00	0.00	1055.00	416.000	2218.670	93738.670	8874.670	
		Bot of ftg.	606	72.00	0.00	1051.25	2.900	11.660	706.510	46.640	
		Ground line	607	72.00	0.00	1037.90	2.900	11.660	706.510	46.640	
		6.41' Below	608	72.00	0.00	1031.48	2.900	11.660	706.510	46.640	
		12.8' Below	609	72.00	0.00	1025.08	2.900	11.660	706.510	46.640	
		19.2' Below	610	72.00	0.00	1018.66	2.900	11.660	706.510	46.640	
		25.6' Below	611	72.00	0.00	1012.25	2.900	11.660	706.510	46.640	

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Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	2/28/00
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COORDINATES & SECTION PROPERTIES

	Item	Location	Joint No.	X ft	Y ft	Z ft	Area ft^2	Ix ft^4	Iy ft^4	Iz ft^4
PIER 8	PIER CAP	C1	301	144.00	-42.969	1094.33	12.00	16.00	9.00	36.00
		B1		144.00	-38.000	1093.50	16.97	45.24	12.73	50.91
		B2		144.00	-34.000	1092.84	20.97	85.37	15.73	62.91
		C2	302	144.00	-33.969	1092.83	21.00	85.75	15.75	63.00
		B3		144.00	-30.000	1092.17	24.97	144.13	18.73	74.91
		B4		144.00	-26.000	1091.50	28.97	225.09	21.73	86.91
		C3	303	144.00	-24.969	1091.33	30.000	250.000	22.500	90.000
		B5		144.00	-22.000	1091.33	30.000	250.000	22.500	90.000
		B6		144.00	-18.000	1091.33	30.000	250.000	22.500	90.000
		B7		144.00	-14.000	1091.33	30.000	250.000	22.500	90.000
		C4	304	144.00	-12.485	1091.33	30.000	250.000	22.500	90.000
		B8		144.00	-10.000	1091.33	30.000	250.000	22.500	90.000
		B9		144.00	-6.000	1091.33	30.000	250.000	22.500	90.000
		B10		144.00	-2.000	1091.33	30.000	250.000	22.500	90.000
		C5	305	144.00	0.000	1091.33	30.000	250.000	22.500	90.000
		B11		144.00	2.000	1091.33	30.000	250.000	22.500	90.000
		B12		144.00	6.000	1091.33	30.000	250.000	22.500	90.000
		B13		144.00	10.000	1091.33	30.000	250.000	22.500	90.000
		C6	306	144.00	12.485	1091.33	30.000	250.000	22.500	90.000
		B14		144.00	14.000	1091.33	30.000	250.000	22.500	90.000
		B15		144.00	18.000	1091.33	30.000	250.000	22.500	90.000
		B16		144.00	22.000	1091.33	30.000	250.000	22.500	90.000
		C7	307	144.00	24.969	1091.33	30.000	250.000	22.500	90.000
		B17		144.00	26.000	1091.50	28.97	225.09	21.73	86.91
		B18		144.00	30.000	1092.17	24.97	144.13	18.73	74.91
		C8	308	144.00	33.969	1092.83	21.00	85.75	15.75	63.00
		B19		144.00	34.000	1092.84	20.97	85.37	15.73	62.91
		B20		144.00	38.000	1093.50	16.97	45.24	12.73	50.91
		C9	309	144.00	42.969	1094.33	12.00	16.00	9.00	36.00
	COLUMN	HWL	701	144.00	0.00	1088.29	204.000	153.000	78608.000	612.000
		Top of col.	702	144.00	0.00	1086.33	125.000	65.100	26041.670	260.400
		12 ft below	703	144.00	0.00	1076.29	125.000	65.100	26041.670	260.400
		Const. Jt.	704	144.00	0.00	1072.25	125.000	65.100	26041.670	260.400
		Top of ftg.	705	144.00	0.00	1055.00	416.000	2218.670	93738.670	8874.670
		Bot of ftg.	706	144.00	0.00	1051.25	416.000	2218.670	93738.670	8874.670
		Ground line	707	144.00	0.00	1037.90	2.900	11.660	706.510	46.640
		6.41' Below	708	144.00	0.00	1031.48	2.900	11.660	706.510	46.640
		12.8' Below	709	144.00	0.00	1025.08	2.900	11.660	706.510	46.640
		19.2' Below	710	144.00	0.00	1018.66	2.900	11.660	706.510	46.640
		25.6' Below	711	144.00	0.00	1012.25	2.900	11.660	706.510	46.640

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Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	2/28/00
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COORDINATES & SECTION PROPERTIES

	Item	Location	Joint No.	X ft	Y ft	Z ft	Area ft^2	Ix ft^4	Iy ft^4	Iz ft^4
PIER 9	PIER CAP	C1	301	216.00	-42.969	1094.33	12.00	16.00	9.00	36.00
		B1		216.00	-38.000	1093.50	16.97	45.24	12.73	50.91
		B2		216.00	-34.000	1092.84	20.97	85.37	15.73	62.91
		C2	302	216.00	-33.969	1092.83	21.00	85.75	15.75	63.00
		B3		216.00	-30.000	1092.17	24.97	144.13	18.73	74.91
		B4		216.00	-26.000	1091.50	28.97	225.09	21.73	86.91
		C3	303	216.00	-24.969	1091.33	30.000	250.000	22.500	90.000
		B5		216.00	-22.000	1091.33	30.000	250.000	22.500	90.000
		B6		216.00	-18.000	1091.33	30.000	250.000	22.500	90.000
		B7		216.00	-14.000	1091.33	30.000	250.000	22.500	90.000
		C4	304	216.00	-12.485	1091.33	30.000	250.000	22.500	90.000
		B8		216.00	-10.000	1091.33	30.000	250.000	22.500	90.000
		B9		216.00	-6.000	1091.33	30.000	250.000	22.500	90.000
		B10		216.00	-2.000	1091.33	30.000	250.000	22.500	90.000
		C5	305	216.00	0.000	1091.33	30.000	250.000	22.500	90.000
		B11		216.00	2.000	1091.33	30.000	250.000	22.500	90.000
		B12		216.00	6.000	1091.33	30.000	250.000	22.500	90.000
		B13		216.00	10.000	1091.33	30.000	250.000	22.500	90.000
		C6	306	216.00	12.485	1091.33	30.000	250.000	22.500	90.000
		B14		216.00	14.000	1091.33	30.000	250.000	22.500	90.000
		B15		216.00	18.000	1091.33	30.000	250.000	22.500	90.000
		B16		216.00	22.000	1091.33	30.000	250.000	22.500	90.000
		C7	307	216.00	24.969	1091.33	30.000	250.000	22.500	90.000
		B17		216.00	26.000	1091.50	28.97	225.09	21.73	86.91
		B18		216.00	30.000	1092.17	24.97	144.13	18.73	74.91
		C8	308	216.00	33.969	1092.83	21.00	85.75	15.75	63.00
		B19		216.00	34.000	1092.84	20.97	85.37	15.73	62.91
		B20		216.00	38.000	1093.50	16.97	45.24	12.73	50.91
		C9	309	216.00	42.969	1094.33	12.00	16.00	9.00	36.00
	COLUMN	HWL	801	216.00	0.00	1088.29	204.000	153.000	78608.000	612.000
		Top of col.	802	216.00	0.00	1086.33	125.000	65.100	26041.670	260.400
		12 ft below	803	216.00	0.00	1076.29	125.000	65.100	26041.670	260.400
		Const. Jt.	804	216.00	0.00	1072.25	125.000	65.100	26041.670	260.400
		Top of ftg.	805	216.00	0.00	1055.00	416.000	2218.670	93738.670	8874.670
		Bot of ftg.	806	216.00	0.00	1051.25	416.000	2218.670	93738.670	8874.670
		Ground line	807	216.00	0.00	1037.90	2.900	11.660	706.510	46.640
		6.41' Below	808	216.00	0.00	1031.48	2.900	11.660	706.510	46.640
		12.8' Below	809	216.00	0.00	1025.08	2.900	11.660	706.510	46.640
		19.2' Below	810	216.00	0.00	1018.66	2.900	11.660	706.510	46.640
		25.6' Below	811	216.00	0.00	1012.25	2.900	11.660	706.510	46.640

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		Grid: 1/8"	

- Design Load – Distributed on BOX Beam (KSF)
  - Galvanized Metal Handrail $\simeq \frac{50 \times 2}{1000} / 80' = 0.00125$ ksf.
  - Concrete Barrier $\simeq .372\ k/' \times 2 / 80' = 0.0093$ ksf
  - Future wearing surface $\simeq 25$ psf $\simeq .025$ ksf
  - Self wt of Box Beam $\simeq .847 k/'$
    $\simeq .847/4' = 0.21175$ ksf

$\therefore$ Additional load over Box beam $\simeq .03535 \times 80 = 2.844 k/'$

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		Grid: 1/8"	

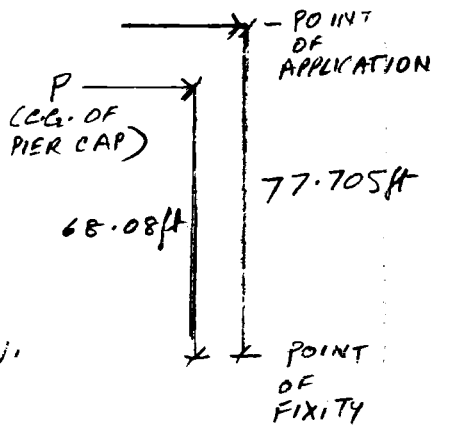
• Wind Loads :

– On Super structure : (AASHTO ART. 3.15.2.1.3)

Wind Load = Wind $_{TRANS}$ / $_{LONG}$ * h_{wind}

h_{wind} = 3.25 ft + 6 ft = 9.25'
↑ handrail

Point of Application = $\frac{9.25\,ft}{2}$ = 4.625 ft



Wind $_{TRANS}$ = 50 #/ft^2
Wind $_{LONG}$ = 12 #/ft^2
] Applied simultaneously.

Wind $_{TRANS}$ = .05 ksf * 9.25 = 0.4625 k/'
Wind $_{LONG}$ = .012 ksf * 9.25 = 0.111 k/'

Transfer factor for transfer of load to C.G. of Pier Cap = $\frac{77.705}{68.08}$ = 1.1414

Transferred Wind Load ≃ w_{Long} = 0.111 x 1.1414 = 0.1267 k/'

w_{TRANS} = .4625 x 1.1414 = 0.5279 k/'
(along length of bridge)

= .5279 x $\frac{72\,ft}{85.94\,ft}$ = 0.4423 k/'
↑ span
↑ pier length

- Wind Loads (cont'd):

- overturning forces (AASHTO 3.15.3)

$F_{wind} = W_{overturning} * (\text{width of Super structure}) * \text{length}$

$W_{overturning} = 20\ \#/ft^2$

Point of Application = 1/4 width - super structure

$F_{wind} = 0.02\,KSF * 80 \times 72 = 115.2\ K / 72 = 1.6\ K/'$

$M_{wind} = 115.2 \times \frac{80}{4} = 2304\ k\text{-}ft$

- on Substructure: (AASHTO 3.15.2.2)

$\text{Wind Load} = \text{Wind}_{\substack{TRANS \\ LONG}} * \text{Width}_{\substack{TRANS \\ LONG}}$

$\text{Wind}_{TRANS} = 40\ lb/ft^2$
$\text{Wind}_{LONG} = 40\ lb/ft^2$
] BOTH FORCES SIMULTANEOUSLY.

FIXED PIER CAP:

$\text{Wind}_{TRANS} = 0.04 * 3 \times 10 / 85.94\ ft = 0.014\ K/'$
↑ pier length

$\text{Wind}_{Long} = .04 * (85.94 \times 4 + (\frac{85.94 + 50}{2}) \times 6)$
$= 30\ K / (1098 - 1091.33)$
$= 30 / 6.665 = 4.5\ K/'$

Wall:

$\text{Wind}_{TRANS} = .04 * 2.5 = 0.1\ K/'$
$\text{Wind}_{LONG} = 0.04 * 50 = 2\ K/'$

- THERMAL FORCES:

$T = -40°F$ (FALL)

- Wind ON LIVE LOAD:

Wind on Live Load $= (W_{LIVE\ LOAD})$ TRANS LONG

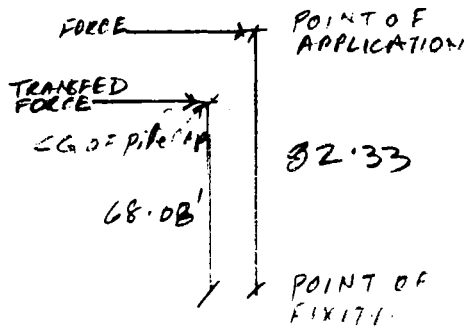
Point of Application = 6' from floor slab

$W_{LL\ (TRANS)} = 100$ PSF
$W_{LL\ (LONG)} = 40$ PSF
] BOTH SIMULTANEOUSLY

Distance to load = 3.25 + 6 = 9.25' (FROM TOP OF Pile Cap)

TRASFER FACTOR $= \frac{82.33}{68.08}$

$= 1.2093$



Equivalent Forces at CG of Pile Cap:

$W_{LL\ TRANS.} = 0.1 * 1.2093 = .12093$ K/' (Along length of bridge)

$W_{LL\ LONG} = .04 \times 1.2093 = .04837$ K/'

$W_{LL\ TRANS.} = .12093 \times \frac{72}{85.94} = 0.1013$ K/'

span

pier length

• Longitudinal Forces From Live Load: [AASHTO 3.9]

$LF_{LIVE\,LOAD}$ = 5% of No. of Lanes (R.F * (.64 * Length + 18 K))

Point of Application = 6' above Floor.

No. of Lanes = 5 (Assume all lanes in same direction)

$LF_{LIVE\,LOAD}$ = .05 [5 * .75 (.64 * 1)]

= 0.12 k/' * 1.2093 = .1451 k/' at pier CG.

AND

$= .05 * 5 * .75 * 18 = \frac{3.375\,K}{10} = .3375K$

distributed to 10 piers

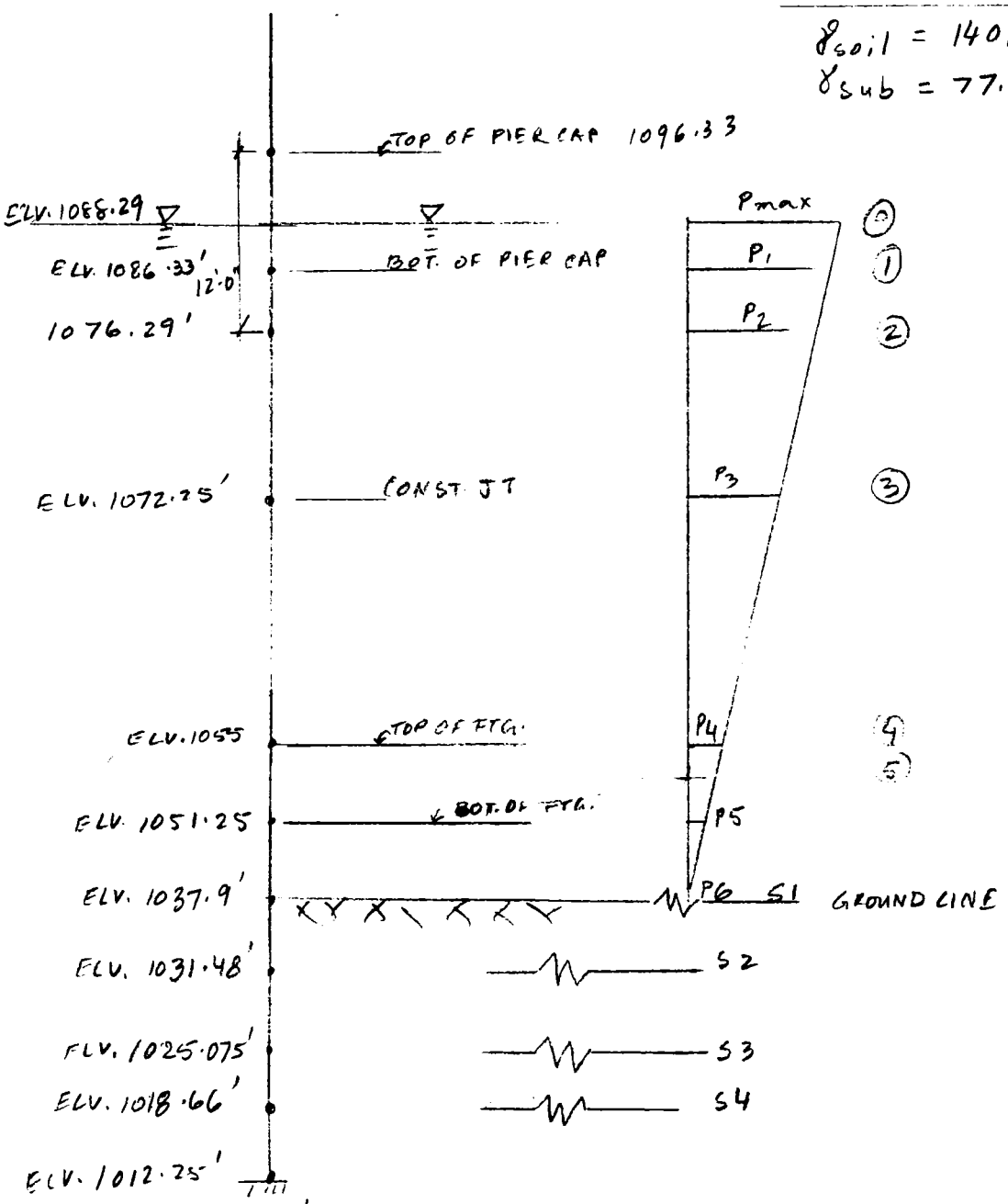
= .3375 x 1.2093 = 0.4081 k per pier

• Soil Springs :

Soil Parameters :

$\gamma_{soil} = 140 pcf$

$\gamma_{sub} = 77.6 pcf$



Pile ≃ HP 14 x 89

Flange width = 14.695"
Depth = 13.833"

14" = 1.1667' approx.
Flange width / Depth

• Soil Springs (cont'd):

LONGITUDINAL:

$$S1 = \frac{6.42}{2} * (16)(1.167)(.0776)12^3 = 8037K$$

(# of Piles)

$$S2 = S3 = S4 = 6.42(16)(1.167)(.0776)12^3 = 16074k$$

Transverse:

$$S1 = 8037K$$

$$S2 = S3 = S4 = 16074k$$

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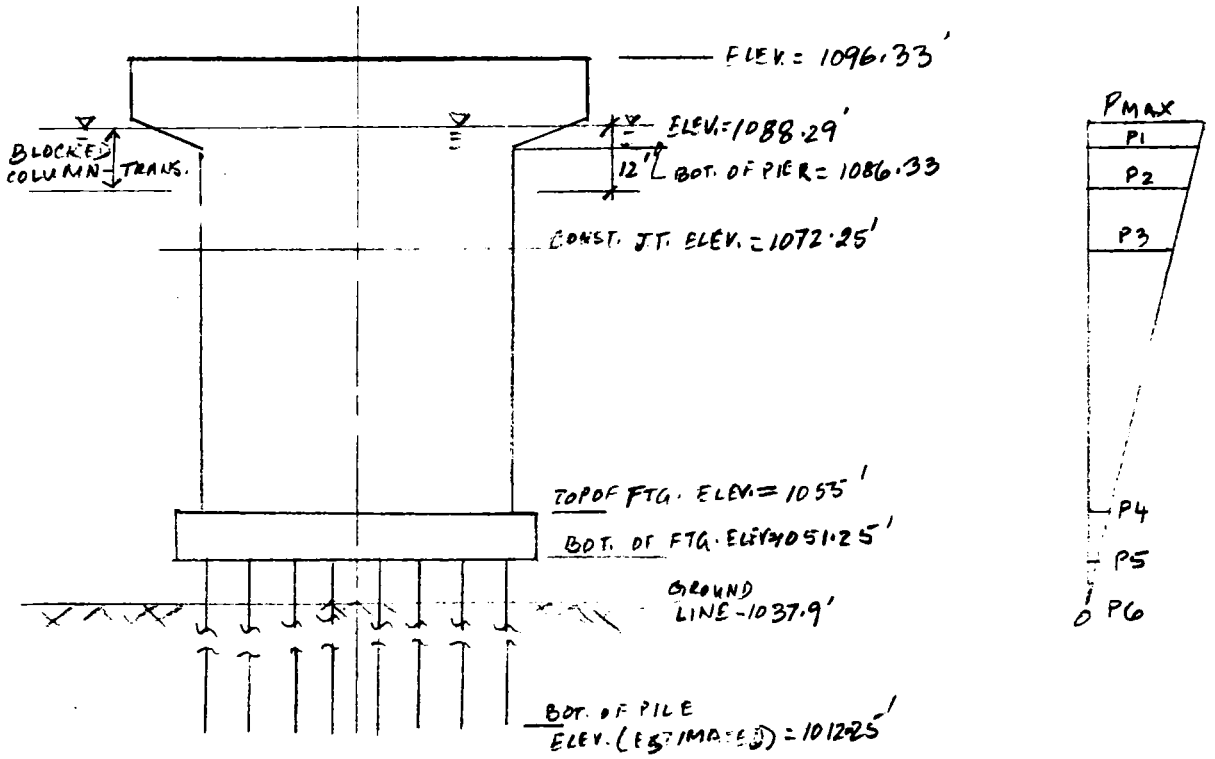
STREAM FLOW FORCES :



- FORCE OF STREAM Current on Piers:

Mean Velocity $V = 19.12$ ft/sec

Angle of Attack $= 15^\circ$

$P_{avg} = k(V_{avg})^2$ (AASHTO EQ. 3-4)

where, P_{avg} = Average Stream Pressure in lb/ft^2

V_{avg} = Average velocity of Water in ft/sec

K = constant, 1.4 for all piers subjected to drift built-up.

$(V_{avg})_{long} = 19.12 \sin 15^\circ = 4.95$ ft/sec

$(V_{avg})_{trans} = 19.12 \cos 15^\circ = 18.468$ ft/sec

$P_{max} = 2K(V_{avg})^2$

$(P_{max})_{long} = 2(1.4)(4.95)^2 = 68.607$ psf.

$(P_{max})_{Trans.} = 2(1.4)(18.468)^2 = 954.987$ psf

$(P_1)_{Long} = \frac{68.607}{50.39}(48.43) = 65.94$ psf.

$(P_1)_{TRANS} = \frac{954.987}{50.39}(48.43) = 917.84$ psf

$(P_2)_{Long} = \frac{68.607}{50.39}(38.39') = 52.27$ psf

$(P_2)_{TRANS} = \frac{954.987}{50.39}(38.39) = 727.56$ psf

- Force of Stream Current on Piers (cont'd)

$(P_3)_{LONG} = \frac{68.607}{50.39}(34.35) = 46.77$ psf

$(P_3)_{TRANS} = \frac{954.987}{50.39}(34.35) = 651.0$ psf.

$(P_4)_{LONG} = \frac{68.607}{50.39}(17.1) = 23.28$ psf

$(P_4)_{TRANS} = \frac{954.987}{50.39}(17.1) = 324.08$ psf

$(P_5)_{LONG} = \frac{68.607}{50.39}(13.35) = 18.18$ psf $(P_5)_{TRANS.} = \frac{954.987}{50.39}(13.35) = 253.0$

Force per Unit Length:

LONGITUDINAL:

Pier Cap:

@ pt 0 : .065607 (68) = 4.665 k/'

@ pt 1 : .06594 (68) = 4.484 k/'

Pier Wall:

@ pt 1 : .06594 (50) = 3.297 k/'

@ pt 2 : .05227 (50) = 2.6135 k/'

@ pt 3 : .04677 (50) = 2.3385 k/'

@ pt 4 : .02328 (50) = 1.164 k/'

FTG:

@ pt. 4 : .02328 (52) = 1.21056 k/'

@ pt. 5 .01818 (52) = 0.94536 k/'

Pile:

@ pt. 5 : .01818 (16 x 1.167) = 0.3394 k/'

@ pt. 6 : 0

• FORCE OF STREAM CURRENT ON PIERS (CONT'D)

TRANSVERSE:

Pier Cap: (BLOCKED)

@ Pt. 0 : 0.955 (3+4) = 6.685 k/'
@ Pt. 1 : 0.9178 (3+4) = 6.4246 k/'

Pier Wall: (BLOCKED)

@ Pt. 1 : 0.9178 (2.5+4) = 5.9657 k/'
@ Pt. 2 : .72752 (2.5+4) = 4.729 k/'

Pier Wall:

@ Pt. 2 : 0.72752 (2.5) = 1.8189 k/'
@ Pt 3 : 0.651 (2.5) = 1.6275 k/'
@ Pt. 4 : 0.3241 (2.5) = 0.810 k/'

FTG:

@ Pt. 4 : 0.3241 (8) = 2.593 k/'
@ Pt. 5 : .253 (8) = 2.024 k/'

Pile:

@ 5 : .253 (16)(1.167) = 4.72 k/'
@ 6 : 0

BUOYANCY:

Pier Cap : 62.4 pcf * 68 x 3 / 1000 = 12.729 k/'

Pier Wall : 0.0624 kcf * 50 x 2.5 = 7.8 k/'

FTG : 0.0624 kcf * 52 * 8 = 25.958 k/'

Pile : .0624 kcf * $16 \times \frac{26.1}{144}$ = .18096 k/'

- <u>Reaction Due to Live Load:</u>

Span Length = 72'-0"

Impact Factor $= I = \dfrac{50}{L_{span} + 125} = 0.2538$

Box Beam Spacing = 4'-0" (next to each other)

Spacing of axle = S_{axle} = 14'-0"

Spacing of wheels = 6'-0"

FRONT AXLE REACTION = R_{FRONT} = 8k

REAR AXLE REACTION = R_{REAR} = 32k

Live Load on pier cap:

No longitudinal Distribution of wheel Load is assumed.

Load fraction on pier cap $= \frac{S}{D}$. [AASHTO 3.23.4.3]

$S =$ Width of precast Member $= 4'\text{-}0''$

$C = K(W/L)$

$K = 1.0$

$W = 80$ ft.

$L =$ span $= 72'$

$C = KW/L = 1.111 < 5$

$\therefore D = (5.75 - 0.5 N_L) + .7 N_L (1 - .2C)^2$

$N_L =$ No of traffic lanes. $= 5$

$D = (5.75 - 0.5(5)) + .7(5)(1 - .2(1.111))^2$

$= 10.367$

$\therefore S/D = \frac{4}{10.367} = 0.386$

Impact Factor $= 1.2538$

FROM AASHTO, APP A FOR 72' span axle load reaction $= 62.68$ K

Reaction per Box Beam $\simeq 62.68 * \frac{1}{2} * 0.386 * 1.2538$

$\simeq 15.1675$ K $= P$

LOADING—HS 20-44 (MS18)

TABLE OF MAXIMUM MOMENTS, SHEARS, AND REACTIONS—SIMPLE SPANS, ONE LANE

Spans in feet; moments in thousands of foot-pounds; shears and reactions in thousands of pounds.

These values are subject to specification reduction for loading of multiple lanes.

Impact not included.

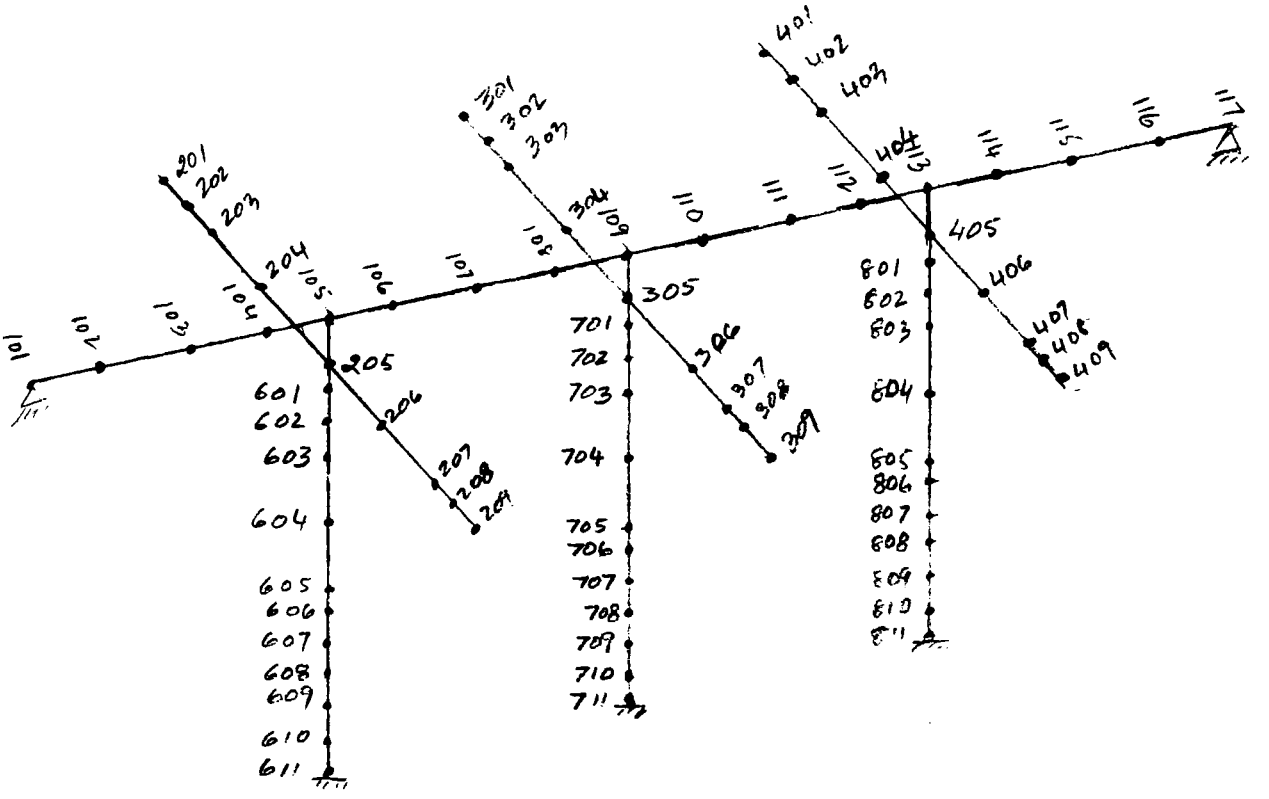
Span	Moment	End shear and end reaction (a)	Span	Moment	End shear and end reaction (a)
1	8.0(b)	32.0(b)	42	485.3(b)	56.0(b)
2	16.0(b)	32.0(b)	44	520.9(b)	56.7(b)
3	24.0(b)	32.0(b)	46	556.5(b)	57.3(b)
4	32.0(b)	32.0(b)	48	592.1(b)	58.0(b)
5	40.0(b)	32.0(b)	50	627.9(b)	58.5(b)
6	48.0(b)	32.0(b)	52	663.6(b)	59.1(b)
7	56.0(b)	32.0(b)	54	699.3(b)	59.6(b)
8	64.0(b)	32.0(b)	56	735.1(b)	60.0(b)
9	72.0(b)	32.0(b)	58	770.8(b)	60.4(b)
10	80.0(b)	32.0(b)	60	806.5(b)	60.8(b)
11	88.0(b)	32.0(b)	62	842.4(b)	61.2(b)
12	96.0(b)	32.0(b)	64	878.1(b)	61.5(b)
13	104.0(b)	32.0(b)	66	914.0(b)	61.9(b)
14	112.0(b)	32.0(b)	68	949.7(b)	62.1(b)
15	120.0(b)	34.1(b)	70	985.6(b)	62.4(b)
16	128.0(b)	36.0(b)	75	1,075.1(b)	63.1(b)
17	136.0(b)	37.7(b)	80	1,164.9(b)	63.6(b)
18	144.0(b)	39.1(b)	85	1,254.7(b)	64.1(b)
19	152.0(b)	40.4(b)	90	1,344.4(b)	64.5(b)
20	160.0(b)	41.6(b)	95	1,434.1(b)	64.9(b)
21	168.0(b)	42.7(b)	100	1,524.0(b)	65.3(b)
22	176.0(b)	43.6(b)	110	1,703.6(b)	65.9(b)
23	184.0(b)	44.5(b)	120	1,883.3(b)	66.4(b)
24	192.7(b)	45.3(b)	130	2,063.1(b)	67.6
25	207.4(b)	46.1(b)	140	2,242.8(b)	70.8
26	222.2(b)	46.8(b)	150	2,475.1	74.0
27	237.0(b)	47.4(b)	160	2,768.0	77.2
28	252.0(b)	48.0(b)	170	3,077.1	80.4
29	267.0(b)	48.8(b)	180	3,402.1	83.6
30	282.1(b)	49.6(b)	190	3,743.1	86.8
31	297.3(b)	50.3(b)	200	4,100.0	90.0
32	312.5(b)	51.0(b)	220	4,862.0	96.4
33	327.8(b)	51.6(b)	240	5,688.0	102.8
34	343.5(b)	52.2(b)	260	6,578.0	109.2
35	361.2(b)	52.8(b)	280	7,532.0	115.6
36	378.9(b)	53.3(b)	300	8,550.0	122.0
37	396.6(b)	53.8(b)			
38	414.3(b)	54.3(b)			
39	432.1(b)	54.8(b)			
40	449.8(b)	55.2(b)			

(a) Concentrated load is considered placed at the support. Loads used are those stipulated for shear.

(b) Maximum value determined by Standard Truck Loading. Otherwise the Standard Lane Loading governs.

TYLIN INTERNATIONAL

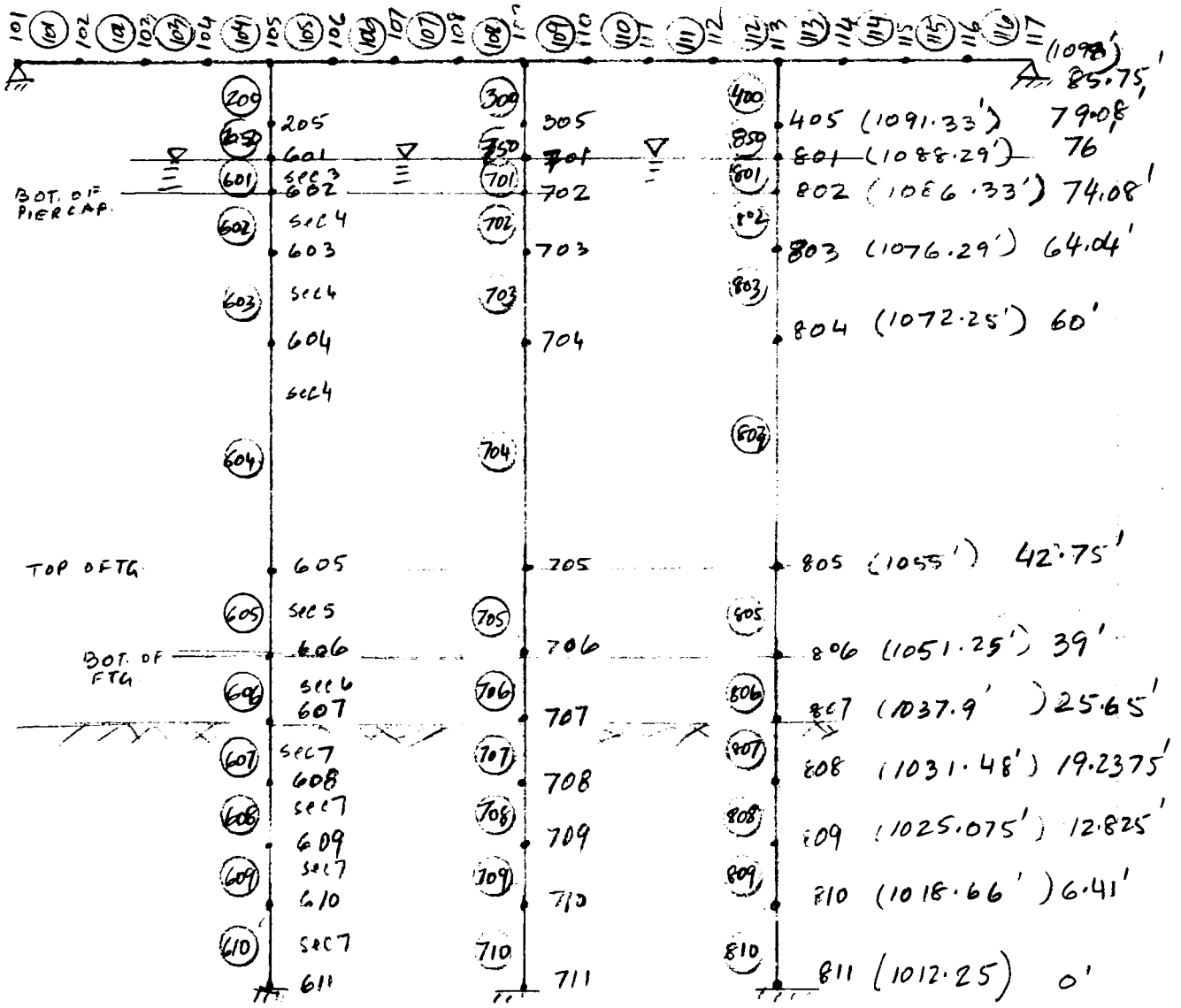
Projects: SALT RIVER BRIDGES - SCOUR	Job No. 1317.00	Sheet:	of
Item: 24th ST. Bridge	Designer: SJ	Date: 02-16-00	
	Checker:	Date:	
		Grid: 1/8"	



PSI INTERNATIONAL

Projects: Salt River Bridges - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge.	Designer: SJ	Date: 02-16-00	
	Checker:	Date:	
		Grid: 1/8"	

LONGITUDINAL :



```
; File C:\Program Files\SAP2000N\24thLong.$2k saved 3/10/00 10:08:41 in Kip-in

SYSTEM
  DOF=UX,UY,UZ,RX,RY,RZ  LENGTH=IN  FORCE=Kip  PAGE=SECTIONS

JOINT
  101  X=0   Y=0   Z=1029
  102  X=216  Y=0   Z=1029
  103  X=432  Y=0   Z=1029
  104  X=648  Y=0   Z=1029
  105  X=864  Y=0   Z=1029
  106  X=1080  Y=0   Z=1029
  107  X=1296  Y=0   Z=1029
  108  X=1512  Y=0   Z=1029
  109  X=1728  Y=0   Z=1029
  110  X=1944  Y=0   Z=1029
  111  X=2160  Y=0   Z=1029
  112  X=2376  Y=0   Z=1029
  113  X=2592  Y=0   Z=1029
  114  X=2808  Y=0   Z=1029
  115  X=3024  Y=0   Z=1029
  116  X=3240  Y=0   Z=1029
  117  X=3456  Y=0   Z=1029
  205  X=864  Y=0   Z=948.96
  305  X=1728  Y=0   Z=948.96
  405  X=2592  Y=0   Z=948.96
  601  X=864  Y=0   Z=912.48
  602  X=864  Y=0   Z=888.96
  603  X=864  Y=0   Z=768.48
  604  X=864  Y=0   Z=720
  605  X=864  Y=0   Z=513
  606  X=864  Y=0   Z=468
  607  X=864  Y=0   Z=307.8
  608  X=864  Y=0   Z=230.85
  609  X=864  Y=0   Z=153.9
  610  X=864  Y=0   Z=76.92
  611  X=864  Y=0   Z=0
  701  X=1728  Y=0   Z=912.48
  702  X=1728  Y=0   Z=888.96
  703  X=1728  Y=0   Z=768.48
  704  X=1728  Y=0   Z=720
  705  X=1728  Y=0   Z=513
  706  X=1728  Y=0   Z=468
  707  X=1728  Y=0   Z=307.8
  708  X=1728  Y=0   Z=230.85
  709  X=1728  Y=0   Z=153.9
  710  X=1728  Y=0   Z=76.92
  711  X=1728  Y=0   Z=0
  801  X=2592  Y=0   Z=912.48
  802  X=2592  Y=0   Z=888.96
  803  X=2592  Y=0   Z=768.48
  804  X=2592  Y=0   Z=720
  805  X=2592  Y=0   Z=513
  806  X=2592  Y=0   Z=468
  807  X=2592  Y=0   Z=307.8
  808  X=2592  Y=0   Z=230.85
  809  X=2592  Y=0   Z=153.9
  810  X=2592  Y=0   Z=76.92
  811  X=2592  Y=0   Z=0

RESTRAINT
  ADD=611  DOF=U1,U2,U3,R1,R2,R3
  ADD=711  DOF=U1,U2,U3,R1,R2,R3
  ADD=811  DOF=U1,U2,U3,R1,R2,R3
```



```
  ADD=101  DOF=U2,U3,R1,R3
  ADD=117  DOF=U2,U3,R1,R3

PATTERN
  NAME=DEFAULT

SPRING
  ADD=607  U1=669.75
  ADD=608  U1=1339.5
  ADD=609  U1=1339.5
  ADD=610  U1=1339.5
  ADD=708  U1=1339.5
  ADD=709  U1=1339.5
  ADD=710  U1=1339.5
  ADD=707  U1=669.75
  ADD=807  U1=669.75
  ADD=808  U1=1339.5
  ADD=809  U1=1339.5
  ADD=810  U1=1339.5

MATERIAL
  NAME=STEEL  IDES=S  M=7.324E-07  W=.000283
    T=0  E=29000  U=.3  A=.0000065  FY=36
  NAME=CONC  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=4415  U=.2  A=.0000055
  NAME=OTHER  IDES=N  M=2.246377E-07  W=.0000868
    T=0  E=3600  U=.2  A=.0000055
  NAME=CONC2  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=3605  U=.2  A=.0000055
  NAME=CONC3  IDES=C
    T=0  E=3602  U=.2  A=.0000055
  NAME=STEEL0  IDES=S  M=7.330247E-07
    T=0  E=29000  U=.3  A=.0000065  FY=36

FRAME SECTION
  NAME=FSEC1 MAT=STEEL SH=R T=18,10 A=180 J=3916.671 I=4860,1500 AS=150,150
  NAME=SEC1 MAT=CONC A=16155.36 J=1554889 I=3367319,1.251438E+09 AS=16155.36,1615
5.36 S=903305.1,2605824 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC2 MAT=CONC2 A=37152 J=1.604966E+07 I=4012416,3.297314E+09 AS=37152,3715
2 S=222912,6394637 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC3 MAT=CONC2 A=29376 J=1.269043E+07 I=3172608,1.630015E+09 AS=29376,2937
6 S=176256,3995136 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC4 MAT=CONC2 A=18000 J=5399655 I=1349914,5.400001E+08 AS=18000,18000 S=8
9994.24,1800006 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC5 MAT=CONC2 A=59904 J=1.840252E+08 I=4.600634E+07,1.943765E+09 AS=59904
,59904 S=958469.8,6190128 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC7 MAT=STEEL A=417.6 J=1.35641E+07 I=241781.8,1.465019E+07 AS=417.6,417.
6 S=10074.24,50868.86 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC6 MAT=STEEL0 A=417.6 J=1.35641E+07 I=241781.8,1.465019E+07 AS=417.6,417
.6 S=10074.24,50868.86 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996

FRAME
  101  J=101,102  SEC=SEC1  NSEG=1  ANG=0
  102  J=102,103  SEC=SEC1  NSEG=1  ANG=0
  103  J=103,104  SEC=SEC1  NSEG=1  ANG=0
  104  J=104,105  SEC=SEC1  NSEG=1  ANG=0
  105  J=105,106  SEC=SEC1  NSEG=1  ANG=0
  106  J=106,107  SEC=SEC1  NSEG=1  ANG=0
  107  J=107,108  SEC=SEC1  NSEG=1  ANG=0
  108  J=108,109  SEC=SEC1  NSEG=1  ANG=0
  109  J=109,110  SEC=SEC1  NSEG=1  ANG=0
  110  J=110,111  SEC=SEC1  NSEG=1  ANG=0
  111  J=111,112  SEC=SEC1  NSEG=1  ANG=0
  112  J=112,113  SEC=SEC1  NSEG=1  ANG=0
  113  J=113,114  SEC=SEC1  NSEG=1  ANG=0
  114  J=114,115  SEC=SEC1  NSEG=1  ANG=0
```

```
  115  J=115,116  SEC=SEC1  NSEG=1  ANG=0
  116  J=116,117  SEC=SEC1  NSEG=1  ANG=0
  200  J=105,205  SEC=SEC2  NSEG=1  ANG=0  IREL=R3
  300  J=109,305  SEC=SEC2  NSEG=1  ANG=0  IREL=R3
  400  J=113,405  SEC=SEC2  NSEG=1  ANG=0  IREL=R3
  601  J=601,602  SEC=SEC3  NSEG=1  ANG=0
  602  J=602,603  SEC=SEC4  NSEG=1  ANG=0
  603  J=603,604  SEC=SEC4  NSEG=1  ANG=0
  604  J=604,605  SEC=SEC4  NSEG=1  ANG=0
  605  J=605,606  SEC=SEC5  NSEG=1  ANG=0
  606  J=606,607  SEC=SEC6  NSEG=1  ANG=0
  607  J=607,608  SEC=SEC7  NSEG=1  ANG=0
  608  J=608,609  SEC=SEC7  NSEG=1  ANG=0
  609  J=609,610  SEC=SEC7  NSEG=1  ANG=0
  610  J=610,611  SEC=SEC7  NSEG=1  ANG=0
  650  J=205,601  SEC=SEC3  NSEG=1  ANG=0
  701  J=701,702  SEC=SEC3  NSEG=1  ANG=0
  702  J=702,703  SEC=SEC4  NSEG=1  ANG=0
  703  J=703,704  SEC=SEC4  NSEG=1  ANG=0
  704  J=704,705  SEC=SEC4  NSEG=1  ANG=0
  705  J=705,706  SEC=SEC5  NSEG=1  ANG=0
  706  J=706,707  SEC=SEC6  NSEG=1  ANG=0
  707  J=707,708  SEC=SEC7  NSEG=1  ANG=0
  708  J=708,709  SEC=SEC7  NSEG=1  ANG=0
  709  J=709,710  SEC=SEC7  NSEG=1  ANG=0
  710  J=710,711  SEC=SEC7  NSEG=1  ANG=0
  750  J=305,701  SEC=SEC3  NSEG=1  ANG=0
  801  J=801,802  SEC=SEC3  NSEG=1  ANG=0
  802  J=802,803  SEC=SEC4  NSEG=1  ANG=0
  803  J=803,804  SEC=SEC4  NSEG=1  ANG=0
  804  J=804,805  SEC=SEC4  NSEG=1  ANG=0
  805  J=805,806  SEC=SEC5  NSEG=1  ANG=0
  806  J=806,807  SEC=SEC6  NSEG=1  ANG=0
  807  J=807,808  SEC=SEC7  NSEG=1  ANG=0
  808  J=808,809  SEC=SEC7  NSEG=1  ANG=0
  809  J=809,810  SEC=SEC7  NSEG=1  ANG=0
  810  J=810,811  SEC=SEC7  NSEG=1  ANG=0
  850  J=405,801  SEC=SEC3  NSEG=1  ANG=0

LOAD
  NAME=DL
    TYPE=GRAVITY  ELEM=FRAME
      ADD=101  UZ=-1
      ADD=102  UZ=-1
      ADD=103  UZ=-1
      ADD=104  UZ=-1
      ADD=105  UZ=-1
      ADD=106  UZ=-1
      ADD=107  UZ=-1
      ADD=108  UZ=-1
      ADD=109  UZ=-1
      ADD=110  UZ=-1
      ADD=111  UZ=-1
      ADD=112  UZ=-1
      ADD=113  UZ=-1
      ADD=114  UZ=-1
      ADD=115  UZ=-1
      ADD=116  UZ=-1
      ADD=200  UZ=-1
      ADD=650  UZ=-1
      ADD=601  UZ=-1
      ADD=602  UZ=-1
      ADD=603  UZ=-1
      ADD=604  UZ=-1
      ADD=605  UZ=-1
      ADD=606  UZ=-1
```



```
      ADD=607  UZ=-1
      ADD=608  UZ=-1
      ADD=609  UZ=-1
      ADD=610  UZ=-1
      ADD=300  UZ=-1
      ADD=750  UZ=-1
      ADD=701  UZ=-1
      ADD=702  UZ=-1
      ADD=703  UZ=-1
      ADD=704  UZ=-1
      ADD=705  UZ=-1
      ADD=706  UZ=-1
      ADD=707  UZ=-1
      ADD=708  UZ=-1
      ADD=709  UZ=-1
      ADD=710  UZ=-1
      ADD=400  UZ=-1
      ADD=850  UZ=-1
      ADD=801  UZ=-1
      ADD=802  UZ=-1
      ADD=803  UZ=-1
      ADD=804  UZ=-1
      ADD=805  UZ=-1
      ADD=806  UZ=-1
      ADD=807  UZ=-1
      ADD=808  UZ=-1
      ADD=809  UZ=-1
      ADD=810  UZ=-1
    TYPE=DISTRIBUTED SPAN
      ADD=101  RD=0,1  UZ=-.237,-.237
      ADD=102  RD=0,1  UZ=-.237,-.237
      ADD=103  RD=0,1  UZ=-.237,-.237
      ADD=104  RD=0,1  UZ=-.237,-.237
      ADD=105  RD=0,1  UZ=-.237,-.237
      ADD=106  RD=0,1  UZ=-.237,-.237
      ADD=107  RD=0,1  UZ=-.237,-.237
      ADD=108  RD=0,1  UZ=-.237,-.237
      ADD=109  RD=0,1  UZ=-.237,-.237
      ADD=110  RD=0,1  UZ=-.237,-.237
      ADD=111  RD=0,1  UZ=-.237,-.237
      ADD=112  RD=0,1  UZ=-.237,-.237
      ADD=113  RD=0,1  UZ=-.237,-.237
      ADD=114  RD=0,1  UZ=-.237,-.237
      ADD=115  RD=0,1  UZ=-.237,-.237
      ADD=116  RD=0,1  UZ=-.237,-.237
  NAME=WIND
    TYPE=DISTRIBUTED SPAN
      ADD=101  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=102  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=103  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=104  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=105  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=106  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=107  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=108  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=109  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=110  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=111  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=112  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=113  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=114  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=115  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=116  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=200  RD=0,1  U2=.375,.375
      ADD=300  RD=0,1  U2=.375,.375
      ADD=400  RD=0,1  U2=.375,.375
```

```
NAME=WINDLIVE
  TYPE=DISTRIBUTED SPAN
    ADD=101  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=102  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=103  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=104  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=105  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=106  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=107  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=108  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=109  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=110  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=111  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=112  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=113  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=114  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=115  RD=0,1  U1=4.033333E-03,4.033333E-03
    ADD=116  RD=0,1  U1=4.033333E-03,4.033333E-03
NAME=LONGFORC
  TYPE=FORCE
    ADD=105  UX=.4081
    ADD=109  UX=.4081
    ADD=113  UX=.4081
  TYPE=DISTRIBUTED SPAN
    ADD=101  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=102  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=103  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=104  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=105  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=106  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=107  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=108  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=109  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=110  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=111  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=112  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=113  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=114  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=115  RD=0,1  U1=1.209167E-02,1.209167E-02
    ADD=116  RD=0,1  U1=1.209167E-02,1.209167E-02
NAME=STREAM
  TYPE=DISTRIBUTED SPAN
    ADD=601  RD=0,1  U2=.38875,.3736667
    ADD=701  RD=0,1  U2=.38875,.3736667
    ADD=801  RD=0,1  U2=.38875,.3736667
    ADD=602  RD=0,1  U2=.27475,.2177917
    ADD=702  RD=0,1  U2=.27475,.2177917
    ADD=802  RD=0,1  U2=.27475,.2177917
    ADD=603  RD=0,1  U2=.2177917,.194875
    ADD=703  RD=0,1  U2=.2177917,.194875
    ADD=803  RD=0,1  U2=.2177917,.194875
    ADD=604  RD=0,1  U2=.194875,.097
    ADD=704  RD=0,1  U2=.194875,.097
    ADD=804  RD=0,1  U2=.194875,.097
    ADD=605  RD=0,1  U2=.10088,.07878
    ADD=705  RD=0,1  U2=.10088,.07878
    ADD=805  RD=0,1  U2=.10088,.07878
    ADD=606  RD=0,1  U2=2.828333E-02,0
    ADD=706  RD=0,1  U2=2.828333E-02,0
    ADD=806  RD=0,1  U2=2.828333E-02,0
NAME=TEMP
  TYPE=TEMPERATURE  ELEM=FRAME
    ADD=101  T=-40
    ADD=102  T=-40
    ADD=103  T=-40
    ADD=104  T=-40
```



```
    ADD=105  T=-40
    ADD=106  T=-40
    ADD=107  T=-40
    ADD=108  T=-40
    ADD=109  T=-40
    ADD=110  T=-40
    ADD=111  T=-40
    ADD=112  T=-40
    ADD=113  T=-40
    ADD=114  T=-40
    ADD=115  T=-40
    ADD=116  T=-40
    ADD=200  T=-40
    ADD=650  T=-40
    ADD=601  T=-40
    ADD=602  T=-40
    ADD=603  T=-40
    ADD=604  T=-40
    ADD=605  T=-40
    ADD=606  T=-40
    ADD=607  T=-40
    ADD=608  T=-40
    ADD=609  T=-40
    ADD=610  T=-40
    ADD=300  T=-40
    ADD=750  T=-40
    ADD=701  T=-40
    ADD=702  T=-40
    ADD=703  T=-40
    ADD=704  T=-40
    ADD=705  T=-40
    ADD=706  T=-40
    ADD=707  T=-40
    ADD=708  T=-40
    ADD=709  T=-40
    ADD=710  T=-40
    ADD=400  T=-40
    ADD=850  T=-40
    ADD=801  T=-40
    ADD=802  T=-40
    ADD=803  T=-40
    ADD=804  T=-40
    ADD=805  T=-40
    ADD=806  T=-40
    ADD=807  T=-40
    ADD=808  T=-40
    ADD=809  T=-40
    ADD=810  T=-40

OUTPUT
; No Output Requested

END

; The following data is used for graphics, design and pushover analysis.
; If changes are made to the analysis data above, then the following data
; should be checked for consistency.
SAP2000 V7.10 SUPPLEMENTAL DATA
  GRID GLOBAL  X "1"  0
  GRID GLOBAL  X "2"  216
  GRID GLOBAL  X "3"  432
  GRID GLOBAL  X "4"  648
  GRID GLOBAL  X "5"  864
  GRID GLOBAL  X "6"  1080
  GRID GLOBAL  X "7"  1296
  GRID GLOBAL  X "8"  1512
```

```
  GRID GLOBAL  X "9"  1728
  GRID GLOBAL  X "10"  1944
  GRID GLOBAL  X "11"  2160
  GRID GLOBAL  X "12"  2376
  GRID GLOBAL  X "13"  2592
  GRID GLOBAL  X "14"  2808
  GRID GLOBAL  X "15"  3024
  GRID GLOBAL  X "16"  3240
  GRID GLOBAL  X "17"  3456
  GRID GLOBAL  Y "18"  0
  GRID GLOBAL  Z "19"  0
  GRID GLOBAL  Z "20"  76.92
  GRID GLOBAL  Z "21"  153.9
  GRID GLOBAL  Z "22"  230.85
  GRID GLOBAL  Z "23"  307.8
  GRID GLOBAL  Z "24"  468
  GRID GLOBAL  Z "25"  513
  GRID GLOBAL  Z "26"  720
  GRID GLOBAL  Z "27"  768.48
  GRID GLOBAL  Z "28"  888.96
  GRID GLOBAL  Z "29"  912.48
  GRID GLOBAL  Z "30"  948.96
  GRID GLOBAL  Z "31"  1029
  MATERIAL STEEL FY 36
  MATERIAL STEEL0 FY 36
  MATERIAL CONC FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC2 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC3 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  STATICLOAD DL TYPE DEAD
  STATICLOAD WIND TYPE WIND
  STATICLOAD WINDLIVE TYPE WIND
  STATICLOAD LONGFORC TYPE OTHER
  STATICLOAD STREAM TYPE OTHER
  STATICLOAD TEMP TYPE OTHER
END SUPPLEMENTAL DATA
```

S A P 2 0 0 0

Structural Analysis Programs

Version 7.10

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C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES

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It is the responsibility of the user to verify all
results produced by this program

7 Mar 2000 14:46:42

C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES PAGE 1
PROGRAM:SAP2000/FILE:\ProgramFiles\SAP2000N\24thLong.EKO

S Y S T E M D A T A

STEADY STATE LOAD FREQUENCY - - - - - - - -	0.0000E+00
LENGTH UNITS - - - - - - - - - - - - - - - - -	IN
FORCE UNITS - - - - - - - - - - - - - - - - -	KIP
UP DIRECTION - - - - - - - - - - - - - - - - -	+Z
GLOBAL DEGREES OF FREEDOM - - - - - - - - - -	ALL
PAGINATION BY - - - - - - - - - - - - - - - -	SECTIONS
NUMBER OF LINES PER PAGE - - - - - - - - - - -	59
INCLUDE WARNING MESSAGES IN OUTPUT FILE - -	Y

C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES PAGE 2
PROGRAM:SAP2000/FILE:\ProgramFiles\SAP2000N\24thLong.EKO

G E N E R A T E D J O I N T C O O R D I N A T E S

JOINT	X	Y	Z
101	0.000	0.000	1029.000
102	216.000	0.000	1029.000
103	432.000	0.000	1029.000
104	648.000	0.000	1029.000
105	864.000	0.000	1029.000
106	1080.000	0.000	1029.000
107	1296.000	0.000	1029.000
108	1512.000	0.000	1029.000
109	1728.000	0.000	1029.000
110	1944.000	0.000	1029.000
111	2160.000	0.000	1029.000
112	2376.000	0.000	1029.000
113	2592.000	0.000	1029.000
114	2808.000	0.000	1029.000
115	3024.000	0.000	1029.000
116	3240.000	0.000	1029.000
117	3456.000	0.000	1029.000
205	864.000	0.000	948.960
305	1728.000	0.000	948.960
405	2592.000	0.000	948.960
601	864.000	0.000	912.480
602	864.000	0.000	888.960
603	864.000	0.000	768.480
604	864.000	0.000	720.000
605	864.000	0.000	513.000
606	864.000	0.000	468.000
607	864.000	0.000	307.800
608	864.000	0.000	230.850
609	864.000	0.000	153.900
610	864.000	0.000	76.920
611	864.000	0.000	0.000
701	1728.000	0.000	912.480
702	1728.000	0.000	888.960
703	1728.000	0.000	768.480
704	1728.000	0.000	720.000
705	1728.000	0.000	513.000
706	1728.000	0.000	468.000
707	1728.000	0.000	307.800
708	1728.000	0.000	230.850
709	1728.000	0.000	153.900
710	1728.000	0.000	76.920
711	1728.000	0.000	0.000
801	2592.000	0.000	912.480
802	2592.000	0.000	888.960
803	2592.000	0.000	768.480
804	2592.000	0.000	720.000
805	2592.000	0.000	513.000
806	2592.000	0.000	468.000
807	2592.000	0.000	307.800
808	2592.000	0.000	230.850
809	2592.000	0.000	153.900
810	2592.000	0.000	76.920
811	2592.000	0.000	0.000

P A T T E R N S

PATTERN	JOINT	VALUE
DEFAULT		

R E S T R A I N T D A T A

JOINT						
101		U2	U3	R1		R3
117		U2	U3	R1		R3
611	U1	U2	U3	R1	R2	R3
711	U1	U2	U3	R1	R2	R3
811	U1	U2	U3	R1	R2	R3

J O I N T S P R I N G S

JOINT		U1	U2	U3	R1	R2	R3
607	U1	0.670E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
608	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
609	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
610	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
707	U1	0.670E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
708	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
709	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
710	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
807	U1	0.670E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
808	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
809	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
810	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

M A T E R I A L P R O P E R T Y D A T A

MAT LABEL	NUMBER TEMPS	WEIGHT PER UNIT VOL	MASS PER UNIT VOL	DESIGN CODE
STEEL	1	0.2830E-03	0.7324E-06	S
CONC	1	0.8681E-04	0.2246E-06	C
OTHER	1	0.8680E-04	0.2246E-06	N
CONC2	1	0.8681E-04	0.2246E-06	C
CONC3	1	0.0000E+00	0.0000E+00	C
STEEL0	1	0.0000E+00	0.7330E-06	S

T E M P E R A T U R E D E P E N D E N T D A T A

MATERIAL PROPERTIES

MAT LABEL	TEMP	MODULUS OF ELASTICITY E1	E2	E3	SHEAR MODULII G12	G13	G23
STEEL	0.00	0.290E+05	0.290E+05	0.290E+05	0.112E+05	0.112E+05	0.112E+05
CONC	0.00	0.442E+04	0.442E+04	0.442E+04	0.184E+04	0.184E+04	0.184E+04
OTHER	0.00	0.360E+04	0.360E+04	0.360E+04	0.150E+04	0.150E+04	0.150E+04
CONC2	0.00	0.361E+04	0.361E+04	0.361E+04	0.150E+04	0.150E+04	0.150E+04
CONC3	0.00	0.360E+04	0.360E+04	0.360E+04	0.150E+04	0.150E+04	0.150E+04
STEEL0	0.00	0.290E+05	0.290E+05	0.290E+05	0.112E+05	0.112E+05	0.112E+05

T E M P E R A T U R E D E P E N D E N T D A T A

THERMAL EXPANSION COEFFICIENTS

MAT LABEL	TEMP	COEFFICIENTS OF THERMAL EXPANSION A1	A2	A3	A12	A13	A23
STEEL	0.00	0.650E-05	0.650E-05	0.650E-05	0.000E+00	0.000E+00	0.000E+00
CONC	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
OTHER	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
CONC2	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
CONC3	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
STEEL0	0.00	0.650E-05	0.650E-05	0.650E-05	0.000E+00	0.000E+00	0.000E+00

T E M P E R A T U R E D E P E N D E N T D A T A

MATERIAL PROPERTIES

MAT LABEL	TEMP	POISSONS RATIO U12	U13	U23	U14	U24	U34	U15	U25	U35	U45	U16	U26	U36	U46	U56
STEEL	0.00	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONC	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONC2	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONC3	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STEEL0	0.00	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MATERIAL PROPERTIES

MAT LABEL	TEMP	YIELD FY
CONC	0.00	36.00
CONC2	0.00	36.00
CONC3	0.00	36.00

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PROGRAM:SAP2000/FILE:\ProgramFiles\SAP2000N\24thLong.EKO

F R A M E S E C T I O N P R O P E R T Y D A T A - P R I S M A T I C

SECTION LABEL	SHAPE TYPE	DEPTH	FLANGE WIDTH TOP	FLANGE THICK TOP	WEB THICK	FLANGE WIDTH BOTTOM	FLANGE THICK BOTTOM
FSEC1	R	18.000	10.000				
SEC1	G						
SEC2	G						
SEC3	G						
SEC4	G						
SEC5	G						
SEC7	G						
SEC6	G						

C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES PAGE 12
PROGRAM:SAP2000/FILE:\ProgramFiles\SAP2000N\24thLong.EKO

F R A M E S E C T I O N P R O P E R T Y D A T A - P R I S M A T I C

SECTION LABEL	AXIAL AREA	TORSIONAL CONSTANT	MOMENTS OF INERTIA I33	I22	SHEAR A2	AREAS A3
FSEC1	0.180E+03	0.392E+04	0.486E+04	0.150E+04	0.150E+03	0.150E+03
SEC1	0.162E+05	0.155E+07	0.337E+07	0.125E+10	0.162E+05	0.162E+05
SEC2	0.372E+05	0.160E+08	0.401E+07	0.330E+10	0.372E+05	0.372E+05
SEC3	0.294E+05	0.127E+08	0.317E+07	0.163E+10	0.294E+05	0.294E+05
SEC4	0.180E+05	0.540E+07	0.135E+07	0.540E+09	0.180E+05	0.180E+05
SEC5	0.599E+05	0.184E+09	0.460E+08	0.194E+10	0.599E+05	0.599E+05
SEC7	0.418E+03	0.136E+08	0.242E+06	0.147E+08	0.418E+03	0.418E+03
SEC6	0.418E+03	0.136E+08	0.242E+06	0.147E+08	0.418E+03	0.418E+03

C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES PAGE 13
PROGRAM:SAP2000/FILE:\ProgramFiles\SAP2000N\24thLong.EKO

F R A M E S E C T I O N P R O P E R T Y D A T A - P R I S M A T I C

SECTION LABEL	MAT LABEL	ADDITIONAL MASS PER LENGTH	ADDITIONAL WEIGHT PER LENGTH
FSEC1	STEEL	0.000E+00	0.000E+00
SEC1	CONC	0.000E+00	0.000E+00
SEC2	CONC2	0.000E+00	0.000E+00
SEC3	CONC2	0.000E+00	0.000E+00
SEC4	CONC2	0.000E+00	0.000E+00
SEC5	CONC2	0.000E+00	0.000E+00
SEC7	STEEL	0.000E+00	0.000E+00
SEC6	STEEL0	0.000E+00	0.000E+00

C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES PAGE 14
PROGRAM:SAP2000/FILE:\ProgramFiles\SAP2000N\24thLong.EKO

F R A M E E L E M E N T D A T A

ELEMENT LABEL	JOINT END-I	JOINT END-J	ELEMENT LENGTH	END-OFFSET-LENGTHS END-I	END-J	RIGID-END FACTOR	NUMBER OF SEGMENTS
101	101	102	216.000	0.000	0.000	0.0000	1
102	102	103	216.000	0.000	0.000	0.0000	1
103	103	104	216.000	0.000	0.000	0.0000	1
104	104	105	216.000	0.000	0.000	0.0000	1
105	105	106	216.000	0.000	0.000	0.0000	1
106	106	107	216.000	0.000	0.000	0.0000	1
107	107	108	216.000	0.000	0.000	0.0000	1
108	108	109	216.000	0.000	0.000	0.0000	1
109	109	110	216.000	0.000	0.000	0.0000	1
110	110	111	216.000	0.000	0.000	0.0000	1
111	111	112	216.000	0.000	0.000	0.0000	1
112	112	113	216.000	0.000	0.000	0.0000	1
113	113	114	216.000	0.000	0.000	0.0000	1
114	114	115	216.000	0.000	0.000	0.0000	1
115	115	116	216.000	0.000	0.000	0.0000	1
116	116	117	216.000	0.000	0.000	0.0000	1
200	105	205	80.040	0.000	0.000	0.0000	1
300	109	305	80.040	0.000	0.000	0.0000	1
400	113	405	80.040	0.000	0.000	0.0000	1
601	601	602	23.520	0.000	0.000	0.0000	1
602	602	603	120.480	0.000	0.000	0.0000	1
603	603	604	48.480	0.000	0.000	0.0000	1
604	604	605	207.000	0.000	0.000	0.0000	1
605	605	606	45.000	0.000	0.000	0.0000	1
606	606	607	160.200	0.000	0.000	0.0000	1
607	607	608	76.950	0.000	0.000	0.0000	1
608	608	609	76.950	0.000	0.000	0.0000	1
609	609	610	76.980	0.000	0.000	0.0000	1
610	610	611	76.920	0.000	0.000	0.0000	1
650	205	601	36.480	0.000	0.000	0.0000	1
701	701	702	23.520	0.000	0.000	0.0000	1
702	702	703	120.480	0.000	0.000	0.0000	1
703	703	704	48.480	0.000	0.000	0.0000	1
704	704	705	207.000	0.000	0.000	0.0000	1
705	705	706	45.000	0.000	0.000	0.0000	1
706	706	707	160.200	0.000	0.000	0.0000	1
707	707	708	76.950	0.000	0.000	0.0000	1
708	708	709	76.950	0.000	0.000	0.0000	1
709	709	710	76.980	0.000	0.000	0.0000	1
710	710	711	76.920	0.000	0.000	0.0000	1
750	305	701	36.480	0.000	0.000	0.0000	1
801	801	802	23.520	0.000	0.000	0.0000	1
802	802	803	120.480	0.000	0.000	0.0000	1
803	803	804	48.480	0.000	0.000	0.0000	1
804	804	805	207.000	0.000	0.000	0.0000	1
805	805	806	45.000	0.000	0.000	0.0000	1
806	806	807	160.200	0.000	0.000	0.0000	1
807	807	808	76.950	0.000	0.000	0.0000	1
808	808	809	76.950	0.000	0.000	0.0000	1
809	809	810	76.980	0.000	0.000	0.0000	1
810	810	811	76.920	0.000	0.000	0.0000	1
850	405	801	36.480	0.000	0.000	0.0000	1

F R A M E E L E M E N T D A T A

ELEMENT LABEL	SECTION LABEL	LOCAL PLANE	COORD SYSTEM	PLN 1ST	PLN 2ND	PLANE JOINTA	PLANE JOINTB	COORD ANGLE
101	SEC1	12	0	+Z	+X	0	0	0.00
102	SEC1	12	0	+Z	+X	0	0	0.00
103	SEC1	12	0	+Z	+X	0	0	0.00
104	SEC1	12	0	+Z	+X	0	0	0.00
105	SEC1	12	0	+Z	+X	0	0	0.00
106	SEC1	12	0	+Z	+X	0	0	0.00
107	SEC1	12	0	+Z	+X	0	0	0.00
108	SEC1	12	0	+Z	+X	0	0	0.00
109	SEC1	12	0	+Z	+X	0	0	0.00
110	SEC1	12	0	+Z	+X	0	0	0.00
111	SEC1	12	0	+Z	+X	0	0	0.00
112	SEC1	12	0	+Z	+X	0	0	0.00
113	SEC1	12	0	+Z	+X	0	0	0.00
114	SEC1	12	0	+Z	+X	0	0	0.00
115	SEC1	12	0	+Z	+X	0	0	0.00
116	SEC1	12	0	+Z	+X	0	0	0.00
200	SEC2	12	0	+Z	+X	0	0	0.00
300	SEC2	12	0	+Z	+X	0	0	0.00
400	SEC2	12	0	+Z	+X	0	0	0.00
601	SEC3	12	0	+Z	+X	0	0	0.00
602	SEC4	12	0	+Z	+X	0	0	0.00
603	SEC4	12	0	+Z	+X	0	0	0.00
604	SEC4	12	0	+Z	+X	0	0	0.00
605	SEC5	12	0	+Z	+X	0	0	0.00
606	SEC6	12	0	+Z	+X	0	0	0.00
607	SEC7	12	0	+Z	+X	0	0	0.00
608	SEC7	12	0	+Z	+X	0	0	0.00
609	SEC7	12	0	+Z	+X	0	0	0.00
610	SEC7	12	0	+Z	+X	0	0	0.00
650	SEC3	12	0	+Z	+X	0	0	0.00
701	SEC3	12	0	+Z	+X	0	0	0.00
702	SEC4	12	0	+Z	+X	0	0	0.00
703	SEC4	12	0	+Z	+X	0	0	0.00
704	SEC4	12	0	+Z	+X	0	0	0.00
705	SEC5	12	0	+Z	+X	0	0	0.00
706	SEC6	12	0	+Z	+X	0	0	0.00
707	SEC7	12	0	+Z	+X	0	0	0.00
708	SEC7	12	0	+Z	+X	0	0	0.00
709	SEC7	12	0	+Z	+X	0	0	0.00
710	SEC7	12	0	+Z	+X	0	0	0.00
750	SEC3	12	0	+Z	+X	0	0	0.00
801	SEC3	12	0	+Z	+X	0	0	0.00
802	SEC4	12	0	+Z	+X	0	0	0.00
803	SEC4	12	0	+Z	+X	0	0	0.00
804	SEC4	12	0	+Z	+X	0	0	0.00
805	SEC5	12	0	+Z	+X	0	0	0.00
806	SEC6	12	0	+Z	+X	0	0	0.00
807	SEC7	12	0	+Z	+X	0	0	0.00
808	SEC7	12	0	+Z	+X	0	0	0.00
809	SEC7	12	0	+Z	+X	0	0	0.00
810	SEC7	12	0	+Z	+X	0	0	0.00
850	SEC3	12	0	+Z	+X	0	0	0.00

F R A M E E L E M E N T D A T A

ELEMENT LABEL	END-I RELEASE CODES	END-J RELEASE CODES
200	R3	
300	R3	
400	R3	

T O T A L W E I G H T S A N D M A S S E S

SECTION LABEL	WEIGHT	MASS
SEC1	4846.8561	12.5401
SEC2	774.4266	2.0036
SEC3	459.0235	1.1876
SEC4	1762.4027	4.5598
SEC5	702.0359	1.8163
SEC7	109.1282	0.2824
SEC6	0.0000	0.1471
TOTAL	8653.8731	22.5370

L O A D C O N D I T I O N DL

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
101	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
102	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
103	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
104	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
105	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
106	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
107	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
108	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
109	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
110	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
111	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
112	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
113	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
114	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
115	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		
116	U2	0.000E+00	0.100E+01	-0.237E+00	-0.237E+00		

GRAVITY MULTIPLIERS FOR FRAME ELEMENTS

ELEMENT LABEL	GLOBAL X	GLOBAL Y	GLOBAL Z
101	0.000E+00	0.000E+00	-0.100E+01
102	0.000E+00	0.000E+00	-0.100E+01
103	0.000E+00	0.000E+00	-0.100E+01
104	0.000E+00	0.000E+00	-0.100E+01
105	0.000E+00	0.000E+00	-0.100E+01
106	0.000E+00	0.000E+00	-0.100E+01
107	0.000E+00	0.000E+00	-0.100E+01
108	0.000E+00	0.000E+00	-0.100E+01
109	0.000E+00	0.000E+00	-0.100E+01
110	0.000E+00	0.000E+00	-0.100E+01
111	0.000E+00	0.000E+00	-0.100E+01
112	0.000E+00	0.000E+00	-0.100E+01
113	0.000E+00	0.000E+00	-0.100E+01
114	0.000E+00	0.000E+00	-0.100E+01
115	0.000E+00	0.000E+00	-0.100E+01
116	0.000E+00	0.000E+00	-0.100E+01
200	0.000E+00	0.000E+00	-0.100E+01
300	0.000E+00	0.000E+00	-0.100E+01
400	0.000E+00	0.000E+00	-0.100E+01
601	0.000E+00	0.000E+00	-0.100E+01
602	0.000E+00	0.000E+00	-0.100E+01
603	0.000E+00	0.000E+00	-0.100E+01
604	0.000E+00	0.000E+00	-0.100E+01
605	0.000E+00	0.000E+00	-0.100E+01
606	0.000E+00	0.000E+00	-0.100E+01
607	0.000E+00	0.000E+00	-0.100E+01
608	0.000E+00	0.000E+00	-0.100E+01
609	0.000E+00	0.000E+00	-0.100E+01
610	0.000E+00	0.000E+00	-0.100E+01
650	0.000E+00	0.000E+00	-0.100E+01
701	0.000E+00	0.000E+00	-0.100E+01

702	0.000E+00	0.000E+00	-0.100E+01
703	0.000E+00	0.000E+00	-0.100E+01
704	0.000E+00	0.000E+00	-0.100E+01
705	0.000E+00	0.000E+00	-0.100E+01
706	0.000E+00	0.000E+00	-0.100E+01
707	0.000E+00	0.000E+00	-0.100E+01
708	0.000E+00	0.000E+00	-0.100E+01
709	0.000E+00	0.000E+00	-0.100E+01
710	0.000E+00	0.000E+00	-0.100E+01
750	0.000E+00	0.000E+00	-0.100E+01
801	0.000E+00	0.000E+00	-0.100E+01
802	0.000E+00	0.000E+00	-0.100E+01
803	0.000E+00	0.000E+00	-0.100E+01
804	0.000E+00	0.000E+00	-0.100E+01
805	0.000E+00	0.000E+00	-0.100E+01
806	0.000E+00	0.000E+00	-0.100E+01
807	0.000E+00	0.000E+00	-0.100E+01
808	0.000E+00	0.000E+00	-0.100E+01
809	0.000E+00	0.000E+00	-0.100E+01
810	0.000E+00	0.000E+00	-0.100E+01
850	0.000E+00	0.000E+00	-0.100E+01

L O A D C O N D I T I O N WIND

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
101	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
102	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
103	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
104	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
105	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
106	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
107	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
108	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
109	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
110	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
111	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
112	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
113	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
114	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
115	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
116	U1	0.000E+00	0.100E+01	0.106E-01	0.106E-01		
200	U2	0.000E+00	0.100E+01	0.375E+00	0.375E+00		
300	U2	0.000E+00	0.100E+01	0.375E+00	0.375E+00		
400	U2	0.000E+00	0.100E+01	0.375E+00	0.375E+00		

L O A D C O N D I T I O N WINDLIVE

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
101	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02		
102	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02		
103	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02		
104	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02		
105	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02		
106	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02		

107	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
108	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
109	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
110	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
111	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
112	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
113	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
114	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
115	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02
116	U1	0.000E+00	0.100E+01	0.403E-02	0.403E-02

L O A D C O N D I T I O N LONGFORC

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

JOINT FORCES IN LOCAL COORDINATES

JOINT LABEL	FORCE 1	FORCE 2	FORCE 3	MOMENT 1	MOMENT 2	MOMENT 3
105	0.408E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
109	0.408E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
113	0.408E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
101	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
102	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
103	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
104	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
105	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
106	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
107	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
108	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
109	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
110	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
111	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
112	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
113	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
114	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
115	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		
116	U1	0.000E+00	0.100E+01	0.121E-01	0.121E-01		

L O A D C O N D I T I O N STREAM

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
601	U2	0.000E+00	0.100E+01	0.389E+00	0.374E+00		
602	U2	0.000E+00	0.100E+01	0.275E+00	0.218E+00		
603	U2	0.000E+00	0.100E+01	0.218E+00	0.195E+00		
604	U2	0.000E+00	0.100E+01	0.195E+00	0.970E-01		
605	U2	0.000E+00	0.100E+01	0.101E+00	0.788E-01		
606	U2	0.000E+00	0.100E+01	0.283E-01	0.000E+00		
701	U2	0.000E+00	0.100E+01	0.389E+00	0.374E+00		
702	U2	0.000E+00	0.100E+01	0.275E+00	0.218E+00		
703	U2	0.000E+00	0.100E+01	0.218E+00	0.195E+00		
704	U2	0.000E+00	0.100E+01	0.195E+00	0.970E-01		
705	U2	0.000E+00	0.100E+01	0.101E+00	0.788E-01		

706	U2	0.000E+00	0.100E+01	0.283E-01	0.000E+00
801	U2	0.000E+00	0.100E+01	0.389E+00	0.374E+00
802	U2	0.000E+00	0.100E+01	0.275E+00	0.218E+00
803	U2	0.000E+00	0.100E+01	0.218E+00	0.195E+00
804	U2	0.000E+00	0.100E+01	0.195E+00	0.970E-01
805	U2	0.000E+00	0.100E+01	0.101E+00	0.788E-01
806	U2	0.000E+00	0.100E+01	0.283E-01	0.000E+00

L O A D C O N D I T I O N TEMP

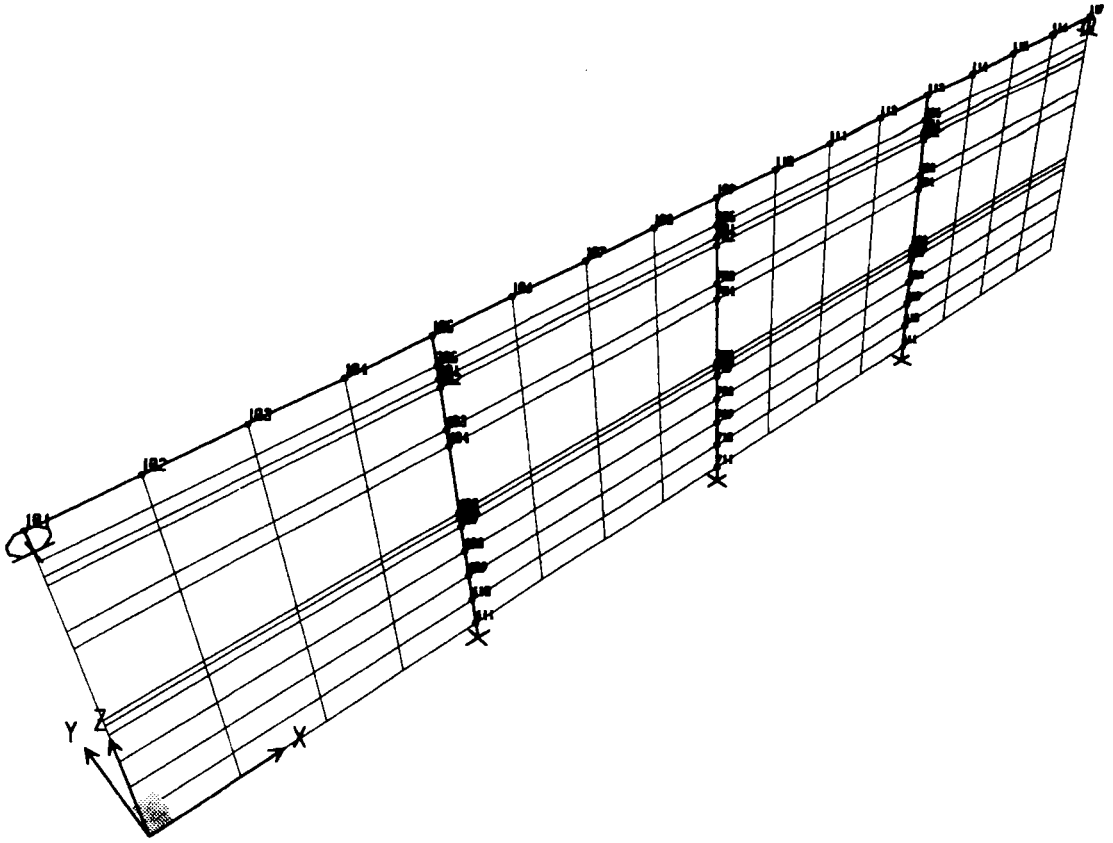
SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

TEMPERATURE OF FRAME ELEMENTS

ELEMENT	TEMPERATURE		GRADIENT LOCAL 2		GRADIENT LOCAL 3	
LABEL	ENDI	ENDJ	ENDI	ENDJ	ENDI	ENDJ
101	-0.4000E+02	-0.4000E+02				
102	-0.4000E+02	-0.4000E+02				
103	-0.4000E+02	-0.4000E+02				
104	-0.4000E+02	-0.4000E+02				
105	-0.4000E+02	-0.4000E+02				
106	-0.4000E+02	-0.4000E+02				
107	-0.4000E+02	-0.4000E+02				
108	-0.4000E+02	-0.4000E+02				
109	-0.4000E+02	-0.4000E+02				
110	-0.4000E+02	-0.4000E+02				
111	-0.4000E+02	-0.4000E+02				
112	-0.4000E+02	-0.4000E+02				
113	-0.4000E+02	-0.4000E+02				
114	-0.4000E+02	-0.4000E+02				
115	-0.4000E+02	-0.4000E+02				
116	-0.4000E+02	-0.4000E+02				
200	-0.4000E+02	-0.4000E+02				
300	-0.4000E+02	-0.4000E+02				
400	-0.4000E+02	-0.4000E+02				
601	-0.4000E+02	-0.4000E+02				
602	-0.4000E+02	-0.4000E+02				
603	-0.4000E+02	-0.4000E+02				
604	-0.4000E+02	-0.4000E+02				
605	-0.4000E+02	-0.4000E+02				
606	-0.4000E+02	-0.4000E+02				
607	-0.4000E+02	-0.4000E+02				
608	-0.4000E+02	-0.4000E+02				
609	-0.4000E+02	-0.4000E+02				
610	-0.4000E+02	-0.4000E+02				
650	-0.4000E+02	-0.4000E+02				
701	-0.4000E+02	-0.4000E+02				
702	-0.4000E+02	-0.4000E+02				
703	-0.4000E+02	-0.4000E+02				
704	-0.4000E+02	-0.4000E+02				
705	-0.4000E+02	-0.4000E+02				
706	-0.4000E+02	-0.4000E+02				
707	-0.4000E+02	-0.4000E+02				
708	-0.4000E+02	-0.4000E+02				
709	-0.4000E+02	-0.4000E+02				
710	-0.4000E+02	-0.4000E+02				
750	-0.4000E+02	-0.4000E+02				
801	-0.4000E+02	-0.4000E+02				
802	-0.4000E+02	-0.4000E+02				
803	-0.4000E+02	-0.4000E+02				
804	-0.4000E+02	-0.4000E+02				
805	-0.4000E+02	-0.4000E+02				
806	-0.4000E+02	-0.4000E+02				
807	-0.4000E+02	-0.4000E+02				
808	-0.4000E+02	-0.4000E+02				

809	-0.4000E+02	-0.4000E+02
810	-0.4000E+02	-0.4000E+02
850	-0.4000E+02	-0.4000E+02

I N P U T C O M P L E T E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F R A M E E L E M E N T F O R C E S

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   FRAME  LOAD    LOC          P          V2          V3          T          M
2          M3

     101  DL
                 0.00       0.00     -562.42        0.00        0.00        0.0
0       0.00
                18.00       0.00     -208.30        0.00        0.00        0.0
0    6936.55
     101  WIND
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00      -2.28        0.00        0.00        0.00        0.0
0       0.00
     101  WINDLIVE
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00  -8.712E-01       0.00        0.00        0.00        0.0
0       0.00
     101  LONGFORC
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00      -2.61        0.00        0.00        0.00        0.0
0       0.00
     101  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0       0.00
     101  TEMP
                 0.00       0.00       -9.47        0.00        0.00        0.0
0       0.00
                18.00       0.00       -9.47        0.00        0.00        0.0
0     170.42

     102  DL
                 0.00       0.00     -208.30        0.00        0.00        0.0
0    6936.55
                18.00       0.00      145.82        0.00        0.00        0.0
0    7498.92
     102  WIND
                 0.00      -2.28        0.00        0.00        0.00        0.0
0       0.00
                18.00      -4.56        0.00        0.00        0.00        0.0
0       0.00
     102  WINDLIVE
                 0.00  -8.712E-01       0.00        0.00        0.00        0.0
0       0.00
                18.00      -1.74        0.00        0.00        0.00        0.0
0       0.00
     102  LONGFORC
                 0.00      -2.61        0.00        0.00        0.00        0.0
0       0.00
                18.00      -5.22        0.00        0.00        0.00        0.0
0       0.00
     102  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0       0.00
     102  TEMP
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                 0.00       0.00       -9.47        0.00        0.00        0.0
0     170.42
                18.00       0.00       -9.47        0.00        0.00        0.0
0     340.84

     103  DL
                 0.00       0.00      145.82        0.00        0.00        0.0
0    7498.92
                18.00       0.00      499.94        0.00        0.00        0.0
0    1687.13
     103  WIND
                 0.00      -4.56        0.00        0.00        0.00        0.0
0       0.00
                18.00      -6.84        0.00        0.00        0.00        0.0
0       0.00
     103  WINDLIVE
                 0.00      -1.74        0.00        0.00        0.00        0.0
0       0.00
                18.00      -2.61        0.00        0.00        0.00        0.0
0       0.00
     103  LONGFORC
                 0.00      -5.22        0.00        0.00        0.00        0.0
0       0.00
                18.00      -7.84        0.00        0.00        0.00        0.0
0       0.00
     103  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0       0.00
     103  TEMP
                 0.00       0.00       -9.47        0.00        0.00        0.0
0     340.84
                18.00       0.00       -9.47        0.00        0.00        0.0
0     511.25

     104  DL
                 0.00       0.00      499.94        0.00        0.00        0.0
0    1687.13
                18.00       0.00      854.06        0.00        0.00        0.0
0   -10498.83
     104  WIND
                 0.00      -6.84        0.00        0.00        0.00        0.0
0       0.00
                18.00      -9.12        0.00        0.00        0.00        0.0
0       0.00
     104  WINDLIVE
                 0.00      -2.61        0.00        0.00        0.00        0.0
0       0.00
                18.00      -3.48        0.00        0.00        0.00        0.0
0       0.00
     104  LONGFORC
                 0.00      -7.84        0.00        0.00        0.00        0.0
0       0.00
                18.00     -10.45        0.00        0.00        0.00        0.0
0       0.00
     104  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0       0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0       0.00
     104  TEMP
                 0.00       0.00       -9.47        0.00        0.00        0.0
0     511.25
                18.00       0.00       -9.47        0.00        0.00        0.0
0     681.67
```

```
      105  DL
                0.00        0.00     -748.98        0.00        0.00        0.0
0   -10498.83
               18.00        0.00     -394.85        0.00        0.00        0.0
0     -204.36
      105  WIND
                0.00        3.04        0.00        0.00        0.00        0.0
0        0.00
               18.00   7.604E-01        0.00        0.00        0.00        0.0
0        0.00
      105  WINDLIVE
                0.00        1.16        0.00        0.00        0.00        0.0
0        0.00
               18.00   2.905E-01        0.00        0.00        0.00        0.0
0        0.00
      105  LONGFORC
                0.00        3.48        0.00        0.00        0.00        0.0
0        0.00
               18.00   8.708E-01        0.00        0.00        0.00        0.0
0        0.00
      105  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      105  TEMP
                0.00        5.20       14.01        0.00        0.00        0.0
0      681.67
               18.00        5.20       14.01        0.00        0.00        0.0
0      429.49

      106  DL
                0.00        0.00     -394.85        0.00        0.00        0.0
0     -204.36
               18.00        0.00      -40.73        0.00        0.00        0.0
0     3715.95
      106  WIND
                0.00   7.604E-01        0.00        0.00        0.00        0.0
0        0.00
               18.00       -1.52        0.00        0.00        0.00        0.0
0        0.00
      106  WINDLIVE
                0.00   2.905E-01        0.00        0.00        0.00        0.0
0        0.00
               18.00  -5.807E-01        0.00        0.00        0.00        0.0
0        0.00
      106  LONGFORC
                0.00   8.708E-01        0.00        0.00        0.00        0.0
0        0.00
               18.00       -1.74        0.00        0.00        0.00        0.0
0        0.00
      106  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      106  TEMP
                0.00        5.20       14.01        0.00        0.00        0.0
0      429.49
               18.00        5.20       14.01        0.00        0.00        0.0
0      177.30

      107  DL
                0.00        0.00      -40.73        0.00        0.00        0.0
0     3715.95
```



```
               18.00        0.00      313.39        0.00        0.00        0.0
0     1262.08
      107  WIND
                0.00       -1.52        0.00        0.00        0.00        0.0
0        0.00
               18.00       -3.80        0.00        0.00        0.00        0.0
0        0.00
      107  WINDLIVE
                0.00  -5.807E-01        0.00        0.00        0.00        0.0
0        0.00
               18.00       -1.45        0.00        0.00        0.00        0.0
0        0.00
      107  LONGFORC
                0.00       -1.74        0.00        0.00        0.00        0.0
0        0.00
               18.00       -4.35        0.00        0.00        0.00        0.0
0        0.00
      107  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      107  TEMP
                0.00        5.20       14.01        0.00        0.00        0.0
0      177.30
               18.00        5.20       14.01        0.00        0.00        0.0
0      -74.88

      108  DL
                0.00        0.00      313.39        0.00        0.00        0.0
0     1262.08
               18.00        0.00      667.51        0.00        0.00        0.0
0    -7565.95
      108  WIND
                0.00       -3.80        0.00        0.00        0.00        0.0
0        0.00
               18.00       -6.08        0.00        0.00        0.00        0.0
0        0.00
      108  WINDLIVE
                0.00       -1.45        0.00        0.00        0.00        0.0
0        0.00
               18.00       -2.32        0.00        0.00        0.00        0.0
0        0.00
      108  LONGFORC
                0.00       -4.35        0.00        0.00        0.00        0.0
0        0.00
               18.00       -6.96        0.00        0.00        0.00        0.0
0        0.00
      108  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      108  TEMP
                0.00        5.20       14.01        0.00        0.00        0.0
0      -74.88
               18.00        5.20       14.01        0.00        0.00        0.0
0     -327.06

      109  DL
                0.00        0.00     -667.51        0.00        0.00        0.0
0    -7565.95
               18.00        0.00     -313.39        0.00        0.00        0.0
0     1262.08
      109  WIND
                0.00        6.08        0.00        0.00        0.00        0.0
```

```
0        0.00
                18.00        3.80        0.00        0.00        0.00        0.0
0        0.00
      109  WINDLIVE
                 0.00        2.32        0.00        0.00        0.00        0.0
0        0.00
                18.00        1.45        0.00        0.00        0.00        0.0
0        0.00
      109  LONGFORC
                 0.00        6.96        0.00        0.00        0.00        0.0
0        0.00
                18.00        4.35        0.00        0.00        0.00        0.0
0        0.00
      109  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      109  TEMP
                 0.00        5.20      -14.01        0.00        0.00        0.0
0     -327.06
                18.00        5.20      -14.01        0.00        0.00        0.0
0      -74.88

      110  DL
                 0.00        0.00     -313.39        0.00        0.00        0.0
0     1262.08
                18.00        0.00       40.73        0.00        0.00        0.0
0     3715.95
      110  WIND
                 0.00        3.80        0.00        0.00        0.00        0.0
0        0.00
                18.00        1.52        0.00        0.00        0.00        0.0
0        0.00
      110  WINDLIVE
                 0.00        1.45        0.00        0.00        0.00        0.0
0        0.00
                18.00   5.807E-01        0.00        0.00        0.00        0.0
0        0.00
      110  LONGFORC
                 0.00        4.35        0.00        0.00        0.00        0.0
0        0.00
                18.00        1.74        0.00        0.00        0.00        0.0
0        0.00
      110  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      110  TEMP
                 0.00        5.20      -14.01        0.00        0.00        0.0
0      -74.88
                18.00        5.20      -14.01        0.00        0.00        0.0
0      177.30

      111  DL
                 0.00        0.00       40.73        0.00        0.00        0.0
0     3715.95
                18.00        0.00      394.85        0.00        0.00        0.0
0     -204.36
      111  WIND
                 0.00        1.52        0.00        0.00        0.00        0.0
0        0.00
                18.00  -7.604E-01        0.00        0.00        0.00        0.0
0        0.00
      111  WINDLIVE
```



```
                 0.00   5.807E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00  -2.905E-01        0.00        0.00        0.00        0.0
0        0.00
      111  LONGFORC
                 0.00        1.74        0.00        0.00        0.00        0.0
0        0.00
                18.00  -8.708E-01        0.00        0.00        0.00        0.0
0        0.00
      111  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      111  TEMP
                 0.00        5.20      -14.01        0.00        0.00        0.0
0      177.30
                18.00        5.20      -14.01        0.00        0.00        0.0
0      429.49

      112  DL
                 0.00        0.00      394.85        0.00        0.00        0.0
0     -204.36
                18.00        0.00      748.98        0.00        0.00        0.0
0   -10498.83
      112  WIND
                 0.00  -7.604E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00       -3.04        0.00        0.00        0.00        0.0
0        0.00
      112  WINDLIVE
                 0.00  -2.905E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00       -1.16        0.00        0.00        0.00        0.0
0        0.00
      112  LONGFORC
                 0.00  -8.708E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00       -3.48        0.00        0.00        0.00        0.0
0        0.00
      112  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      112  TEMP
                 0.00        5.20      -14.01        0.00        0.00        0.0
0      429.49
                18.00        5.20      -14.01        0.00        0.00        0.0
0      681.67

      113  DL
                 0.00        0.00     -854.06        0.00        0.00        0.0
0   -10498.83
                18.00        0.00     -499.94        0.00        0.00        0.0
0     1687.13
      113  WIND
                 0.00        9.12        0.00        0.00        0.00        0.0
0        0.00
                18.00        6.84        0.00        0.00        0.00        0.0
0        0.00
      113  WINDLIVE
                 0.00        3.48        0.00        0.00        0.00        0.0
0        0.00
                18.00        2.61        0.00        0.00        0.00        0.0
0        0.00
```

```
      113  LONGFORC
                0.00       10.45        0.00        0.00        0.00        0.0
0       0.00
               18.00        7.84        0.00        0.00        0.00        0.0
0       0.00
      113  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      113  TEMP
                0.00        0.00        9.47        0.00        0.00        0.0
0     681.67
               18.00        0.00        9.47        0.00        0.00        0.0
0     511.25
      114  DL
                0.00        0.00     -499.94        0.00        0.00        0.0
0    1687.13
               18.00        0.00     -145.82        0.00        0.00        0.0
0    7498.92
      114  WIND
                0.00        6.84        0.00        0.00        0.00        0.0
0       0.00
               18.00        4.56        0.00        0.00        0.00        0.0
0       0.00
      114  WINDLIVE
                0.00        2.61        0.00        0.00        0.00        0.0
0       0.00
               18.00        1.74        0.00        0.00        0.00        0.0
0       0.00
      114  LONGFORC
                0.00        7.84        0.00        0.00        0.00        0.0
0       0.00
               18.00        5.22        0.00        0.00        0.00        0.0
0       0.00
      114  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      114  TEMP
                0.00        0.00        9.47        0.00        0.00        0.0
0     511.25
               18.00        0.00        9.47        0.00        0.00        0.0
0     340.84
      115  DL
                0.00        0.00     -145.82        0.00        0.00        0.0
0    7498.92
               18.00        0.00      208.30        0.00        0.00        0.0
0    6936.55
      115  WIND
                0.00        4.56        0.00        0.00        0.00        0.0
0       0.00
               18.00        2.28        0.00        0.00        0.00        0.0
0       0.00
      115  WINDLIVE
                0.00        1.74        0.00        0.00        0.00        0.0
0       0.00
               18.00    8.712E-01       0.00        0.00        0.00        0.0
0       0.00
      115  LONGFORC
                0.00        5.22        0.00        0.00        0.00        0.0
0       0.00
               18.00        2.61        0.00        0.00        0.00        0.0
```



```
0       0.00
      115  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      115  TEMP
                0.00        0.00        9.47        0.00        0.00        0.0
0     340.84
               18.00        0.00        9.47        0.00        0.00        0.0
0     170.42
      116  DL
                0.00        0.00      208.30        0.00        0.00        0.0
0    6936.55
               18.00        0.00      562.42        0.00        0.00        0.0
0       0.00
      116  WIND
                0.00        2.28        0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      116  WINDLIVE
                0.00    8.712E-01       0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      116  LONGFORC
                0.00        2.61        0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      116  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               18.00        0.00        0.00        0.00        0.00        0.0
0       0.00
      116  TEMP
                0.00        0.00        9.47        0.00        0.00        0.0
0     170.42
               18.00        0.00        9.47        0.00        0.00        0.0
0       0.00
```

LOAD PER BOX BEAM = 8015K ≃ 80K

```
      200  DL
                0.00    -1603.03        0.00        0.00        0.00        0.0
0       0.00
                6.67    -1861.18        0.00        0.00        0.00        0.0
0       0.00
      200  WIND
                0.00        0.00      -12.16        0.00        0.00        0.0
0       0.00
                6.67        0.00      -42.18        0.00        0.00        0.0
0     181.23
      200  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0       0.00
                6.67        0.00       -4.65        0.00        0.00        0.0
0      30.99
      200  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0       0.00
                6.67        0.00      -14.34        0.00        0.00        0.0
0      95.63
      200  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
```

```
                6.67       0.00       0.00       0.00       0.00       0.0
0       0.00
    200  TEMP
                0.00      23.48      -5.20       0.00       0.00       0.0
0       0.00
                6.67      23.48      -5.20       0.00       0.00       0.0
0      34.67
    300  DL
                0.00   -1335.01       0.00       0.00       0.00       0.0
0       0.00
                6.67   -1593.16       0.00       0.00       0.00       0.0
0       0.00
    300  WIND
                0.00       0.00     -12.16       0.00       0.00       0.0
0       0.00
                6.67       0.00     -42.18       0.00       0.00       0.0
0     181.23
    300  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0       0.00
                6.67       0.00      -4.65       0.00       0.00       0.0
0      30.99
    300  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0       0.00
                6.67       0.00     -14.34       0.00       0.00       0.0
0      95.63
    300  STREAM
                0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                6.67       0.00       0.00       0.00       0.00       0.0
0       0.00
    300  TEMP
                0.00     -28.02       0.00       0.00       0.00       0.0
0       0.00
                6.67     -28.02       0.00       0.00       0.00       0.0
0       0.00
    400  DL
                0.00   -1603.03       0.00       0.00       0.00       0.0
0       0.00
                6.67   -1861.18       0.00       0.00       0.00       0.0
0       0.00
    400  WIND
                0.00       0.00     -12.16       0.00       0.00       0.0
0       0.00
                6.67       0.00     -42.18       0.00       0.00       0.0
0     181.23
    400  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0       0.00
                6.67       0.00      -4.65       0.00       0.00       0.0
0      30.99
    400  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0       0.00
                6.67       0.00     -14.34       0.00       0.00       0.0
0      95.63
    400  STREAM
                0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                6.67       0.00       0.00       0.00       0.00       0.0
0       0.00
    400  TEMP
                0.00      23.48       5.20       0.00       0.00       0.0
```



```
0       0.00
                6.67      23.48       5.20       0.00       0.00       0.0
0     -34.67
    601  DL
                0.00   -1954.20       0.00       0.00       0.00       0.0
0       0.00
                1.96   -2014.18       0.00       0.00       0.00       0.0
0       0.00
    601  WIND
                0.00       0.00     -42.18       0.00       0.00       0.0
0     309.45
                1.96       0.00     -42.18       0.00       0.00       0.0
0     392.12
    601  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0      45.12
                1.96       0.00      -4.65       0.00       0.00       0.0
0      54.22
    601  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0     139.22
                1.96       0.00     -14.34       0.00       0.00       0.0
0     167.32
    601  STREAM
                0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                1.96       0.00      -8.97       0.00       0.00       0.0
0       8.84
    601  TEMP
                0.00      23.48      -5.20       0.00       0.00       0.0
0      50.48
                1.96      23.48      -5.20       0.00       0.00       0.0
0      60.67
    602  DL
                0.00   -2014.18       0.00       0.00       0.00       0.0
0       0.00
               10.04   -2202.44       0.00       0.00       0.00       0.0
0       0.00
    602  WIND
                0.00       0.00     -42.18       0.00       0.00       0.0
0     392.12
               10.04       0.00     -42.18       0.00       0.00       0.0
0     815.59
    602  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0      54.22
               10.04       0.00      -4.65       0.00       0.00       0.0
0     100.87
    602  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0     167.32
               10.04       0.00     -14.34       0.00       0.00       0.0
0     311.28
    602  STREAM
                0.00       0.00      -8.97       0.00       0.00       0.0
0       8.84
               10.04       0.00     -38.64       0.00       0.00       0.0
0     253.55
    602  TEMP
                0.00      23.48      -5.20       0.00       0.00       0.0
0      60.67
               10.04      23.48      -5.20       0.00       0.00       0.0
0     112.86
```

```
603  DL
                0.00   -2202.44      0.00      0.00      0.00      0.0
0      0.00
                4.04   -2278.20      0.00      0.00      0.00      0.0
0      0.00
603  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0    815.59
                4.04       0.00    -42.18      0.00      0.00      0.0
0    985.99
603  WINDLIVE
                0.00       0.00     -4.65      0.00      0.00      0.0
0    100.87
                4.04       0.00     -4.65      0.00      0.00      0.0
0    119.65
603  LONGFORC
                0.00       0.00    -14.34      0.00      0.00      0.0
0    311.28
                4.04       0.00    -14.34      0.00      0.00      0.0
0    369.20
603  STREAM
                0.00       0.00    -38.64      0.00      0.00      0.0
0    253.55
                4.04       0.00    -48.64      0.00      0.00      0.0
0    430.22
603  TEMP
                0.00      23.48     -5.20      0.00      0.00      0.0
0    112.86
                4.04      23.48     -5.20      0.00      0.00      0.0
0    133.86

604  DL
                0.00   -2278.20      0.00      0.00      0.00      0.0
0      0.00
               17.25   -2601.65      0.00      0.00      0.00      0.0
0      0.00
604  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0    985.99
               17.25       0.00    -42.18      0.00      0.00      0.0
0   1713.57
604  WINDLIVE
                0.00       0.00     -4.65      0.00      0.00      0.0
0    119.65
               17.25       0.00     -4.65      0.00      0.00      0.0
0    199.80
604  LONGFORC
                0.00       0.00    -14.34      0.00      0.00      0.0
0    369.20
               17.25       0.00    -14.34      0.00      0.00      0.0
0    616.53
604  STREAM
                0.00       0.00    -48.64      0.00      0.00      0.0
0    430.22
               17.25       0.00    -78.85      0.00      0.00      0.0
0   1558.94
604  TEMP
                0.00      23.48     -5.20      0.00      0.00      0.0
0    133.86
               17.25      23.48     -5.20      0.00      0.00      0.0
0    223.53

605  DL
                0.00   -2601.65      0.00      0.00      0.00      0.0
0      0.00
                3.75   -2835.66      0.00      0.00      0.00      0.0
```



```
0      0.00
605  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0   1713.57
                3.75       0.00    -42.18      0.00      0.00      0.0
0   1871.74
605  WINDLIVE
                0.00       0.00     -4.65      0.00      0.00      0.0
0    199.80
                3.75       0.00     -4.65      0.00      0.00      0.0
0    217.22
605  LONGFORC
                0.00       0.00    -14.34      0.00      0.00      0.0
0    616.53
                3.75       0.00    -14.34      0.00      0.00      0.0
0    670.30
605  STREAM
                0.00       0.00    -78.85      0.00      0.00      0.0
0   1558.94
                3.75       0.00    -82.89      0.00      0.00      0.0
0   1862.51
605  TEMP
                0.00      23.48     -5.20      0.00      0.00      0.0
0    223.53
                3.75      23.48     -5.20      0.00      0.00      0.0
0    243.03

606  DL
                0.00   -2835.66      0.00      0.00      0.00      0.0
0      0.00
               13.35   -2835.66      0.00      0.00      0.00      0.0
0      0.00
606  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0   1871.74
               13.35       0.00    -42.18      0.00      0.00      0.0
0   2434.82
606  WINDLIVE
                0.00       0.00     -4.65      0.00      0.00      0.0
0    217.22
               13.35       0.00     -4.65      0.00      0.00      0.0
0    279.25
606  LONGFORC
                0.00       0.00    -14.34      0.00      0.00      0.0
0    670.30
               13.35       0.00    -14.34      0.00      0.00      0.0
0    861.71
606  STREAM
                0.00       0.00    -82.89      0.00      0.00      0.0
0   1862.51
               13.35       0.00    -85.16      0.00      0.00      0.0
0   2989.27
606  TEMP
                0.00      23.48     -5.20      0.00      0.00      0.0
0    243.03
               13.35      23.48     -5.20      0.00      0.00      0.0
0    312.43

607  DL
                0.00   -2835.66      0.00      0.00      0.00      0.0
0      0.00
                6.41   -2844.76      0.00      0.00      0.00      0.0
0      0.00
607  WIND
                0.00       0.00     23.76      0.00      0.00      0.0
0   2434.82
```

```
                6.41        0.00       23.76        0.00        0.00        0.0
0     2282.46
      607  WINDLIVE
                0.00        0.00        2.85        0.00        0.00        0.0
0      279.25
                6.41        0.00        2.85        0.00        0.00        0.0
0      260.97
      607  LONGFORC
                0.00        0.00        8.80        0.00        0.00        0.0
0      861.71
                6.41        0.00        8.80        0.00        0.00        0.0
0      805.28
      607  STREAM
                0.00        0.00        7.05        0.00        0.00        0.0
0     2989.27
                6.41        0.00        7.05        0.00        0.00        0.0
0     2944.03
      607  TEMP
                0.00       23.48        3.19        0.00        0.00        0.0
0      312.43
                6.41       23.48        3.19        0.00        0.00        0.0
0      291.97

      608  DL
                0.00    -2844.76        0.00        0.00        0.00        0.0
0        0.00
                6.41    -2853.85        0.00        0.00        0.00        0.0
0        0.00
      608  WIND
                0.00        0.00       83.45        0.00        0.00        0.0
0     2282.46
                6.41        0.00       83.45        0.00        0.00        0.0
0     1747.35
      608  WINDLIVE
                0.00        0.00        9.62        0.00        0.00        0.0
0      260.97
                6.41        0.00        9.62        0.00        0.00        0.0
0      199.27
      608  LONGFORC
                0.00        0.00       29.69        0.00        0.00        0.0
0      805.28
                6.41        0.00       29.69        0.00        0.00        0.0
0      614.90
      608  STREAM
                0.00        0.00       93.60        0.00        0.00        0.0
0     2944.03
                6.41        0.00       93.60        0.00        0.00        0.0
0     2343.84
      608  TEMP
                0.00       23.48       10.76        0.00        0.00        0.0
0      291.97
                6.41       23.48       10.76        0.00        0.00        0.0
0      222.94

      609  DL
                0.00    -2853.85        0.00        0.00        0.00        0.0
0        0.00
                6.42    -2862.95        0.00        0.00        0.00        0.0
0        0.00
      609  WIND
                0.00        0.00      102.39        0.00        0.00        0.0
0     1747.35
                6.42        0.00      102.39        0.00        0.00        0.0
0     1090.49
      609  WINDLIVE
                0.00        0.00       11.76        0.00        0.00        0.0
```



```
0      199.27
                6.42        0.00       11.76        0.00        0.00        0.0
0      123.83
      609  LONGFORC
                0.00        0.00       36.29        0.00        0.00        0.0
0      614.90
                6.42        0.00       36.29        0.00        0.00        0.0
0      382.11
      609  STREAM
                0.00        0.00      122.88        0.00        0.00        0.0
0     2343.84
                6.42        0.00      122.88        0.00        0.00        0.0
0     1555.54
      609  TEMP
                0.00       23.48       13.16        0.00        0.00        0.0
0      222.94
                6.42       23.48       13.16        0.00        0.00        0.0
0      138.54

      610  DL
                0.00    -2862.95        0.00        0.00        0.00        0.0
0        0.00
                6.41    -2872.04        0.00        0.00        0.00        0.0
0        0.00
      610  WIND
                0.00        0.00      104.45        0.00        0.00        0.0
0     1090.49
                6.41        0.00      104.45        0.00        0.00        0.0
0      420.96
      610  WINDLIVE
                0.00        0.00       11.99        0.00        0.00        0.0
0      123.83
                6.41        0.00       11.99        0.00        0.00        0.0
0       46.99
      610  LONGFORC
                0.00        0.00       36.99        0.00        0.00        0.0
0      382.11
                6.41        0.00       36.99        0.00        0.00        0.0
0      145.01
      610  STREAM
                0.00        0.00      126.95        0.00        0.00        0.0
0     1555.54
                6.41        0.00      126.95        0.00        0.00        0.0
0      741.82
      610  TEMP
                0.00       23.48       13.41        0.00        0.00        0.0
0      138.54
                6.41       23.48       13.41        0.00        0.00        0.0
0       52.58

      650  DL
                0.00    -1861.18        0.00        0.00        0.00        0.0
0        0.00
                3.04    -1954.20        0.00        0.00        0.00        0.0
0        0.00
      650  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0      181.23
                3.04        0.00      -42.18        0.00        0.00        0.0
0      309.45
      650  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0       30.99
                3.04        0.00       -4.65        0.00        0.00        0.0
0       45.12
      650  LONGFORC
```

```
                0.00        0.00      -14.34        0.00        0.00        0.0
0      95.63
                3.04        0.00      -14.34        0.00        0.00        0.0
0     139.22
      650  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0       0.00
      650  TEMP
                0.00       23.48       -5.20        0.00        0.00        0.0
0      34.67
                3.04       23.48       -5.20        0.00        0.00        0.0
0      50.48

      701  DL
                0.00    -1686.18        0.00        0.00        0.00        0.0
0       0.00
                1.96    -1746.16        0.00        0.00        0.00        0.0
0       0.00
      701  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     309.45
                1.96        0.00      -42.18        0.00        0.00        0.0
0     392.12
      701  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      45.12
                1.96        0.00       -4.65        0.00        0.00        0.0
0      54.22
      701  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     139.22
                1.96        0.00      -14.34        0.00        0.00        0.0
0     167.32
      701  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
                1.96        0.00       -8.97        0.00        0.00        0.0
0       8.84
      701  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                1.96      -28.02        0.00        0.00        0.00        0.0
0       0.00

      702  DL
                0.00    -1746.16        0.00        0.00        0.00        0.0
0       0.00
               10.04    -1934.42        0.00        0.00        0.00        0.0
0       0.00
      702  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     392.12
               10.04        0.00      -42.18        0.00        0.00        0.0
0     815.58
      702  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      54.22
               10.04        0.00       -4.65        0.00        0.00        0.0
0     100.87
      702  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     167.32
               10.04        0.00      -14.34        0.00        0.00        0.0
0     311.26
```



```
      702  STREAM
                0.00        0.00       -8.97        0.00        0.00        0.0
0       8.84
               10.04        0.00      -38.64        0.00        0.00        0.0
0     253.55
      702  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
               10.04      -28.02        0.00        0.00        0.00        0.0
0       0.00

      703  DL
                0.00    -1934.42        0.00        0.00        0.00        0.0
0       0.00
                4.04    -2010.18        0.00        0.00        0.00        0.0
0       0.00
      703  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     815.58
                4.04        0.00      -42.18        0.00        0.00        0.0
0     985.98
      703  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0     100.87
                4.04        0.00       -4.65        0.00        0.00        0.0
0     119.64
      703  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     311.26
                4.04        0.00      -14.34        0.00        0.00        0.0
0     369.19
      703  STREAM
                0.00        0.00      -38.64        0.00        0.00        0.0
0     253.55
                4.04        0.00      -48.64        0.00        0.00        0.0
0     430.22
      703  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                4.04      -28.02        0.00        0.00        0.00        0.0
0       0.00

      704  DL
                0.00    -2010.18        0.00        0.00        0.00        0.0
0       0.00
               17.25    -2333.63        0.00        0.00        0.00        0.0
0       0.00
      704  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     985.98
               17.25        0.00      -42.18        0.00        0.00        0.0
0    1713.55
      704  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0     119.64
               17.25        0.00       -4.65        0.00        0.00        0.0
0     199.79
      704  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     369.19
               17.25        0.00      -14.34        0.00        0.00        0.0
0     616.50
      704  STREAM
                0.00        0.00      -48.64        0.00        0.00        0.0
0     430.22
               17.25        0.00      -78.85        0.00        0.00        0.0
```

```
0      1558.94
       704  TEMP
                    0.00      -28.02        0.00        0.00        0.00        0.0
0         0.00
                   17.25      -28.02        0.00        0.00        0.00        0.0
0         0.00

       705  DL
                    0.00    -2333.63        0.00        0.00        0.00        0.0
0         0.00
                    3.75    -2567.64        0.00        0.00        0.00        0.0
0         0.00
       705  WIND
                    0.00        0.00      -42.18        0.00        0.00        0.0
0      1713.55
                    3.75        0.00      -42.18        0.00        0.00        0.0
0      1871.72
       705  WINDLIVE
                    0.00        0.00       -4.65        0.00        0.00        0.0
0       199.79
                    3.75        0.00       -4.65        0.00        0.00        0.0
0       217.21
       705  LONGFORC
                    0.00        0.00      -14.34        0.00        0.00        0.0
0       616.50
                    3.75        0.00      -14.34        0.00        0.00        0.0
0       670.27
       705  STREAM
                    0.00        0.00      -78.85        0.00        0.00        0.0
0      1558.94
                    3.75        0.00      -82.89        0.00        0.00        0.0
0      1862.51
       705  TEMP
                    0.00      -28.02        0.00        0.00        0.00        0.0
0         0.00
                    3.75      -28.02        0.00        0.00        0.00        0.0
0         0.00

       706  DL
                    0.00    -2567.64        0.00        0.00        0.00        0.0
0         0.00
                   13.35    -2567.64        0.00        0.00        0.00        0.0
0         0.00
       706  WIND
                    0.00        0.00      -42.18        0.00        0.00        0.0
0      1871.72
                   13.35        0.00      -42.18        0.00        0.00        0.0
0      2434.79
       706  WINDLIVE
                    0.00        0.00       -4.65        0.00        0.00        0.0
0       217.21
                   13.35        0.00       -4.65        0.00        0.00        0.0
0       279.24
       706  LONGFORC
                    0.00        0.00      -14.34        0.00        0.00        0.0
0       670.27
                   13.35        0.00      -14.34        0.00        0.00        0.0
0       861.67
       706  STREAM
                    0.00        0.00      -82.89        0.00        0.00        0.0
0      1862.51
                   13.35        0.00      -85.16        0.00        0.00        0.0
0      2989.27
       706  TEMP
                    0.00      -28.02        0.00        0.00        0.00        0.0
0         0.00
```



```
                   13.35      -28.02        0.00        0.00        0.00        0.0
0         0.00

       707  DL
                    0.00    -2567.64        0.00        0.00        0.00        0.0
0         0.00
                    6.41    -2576.74        0.00        0.00        0.00        0.0
0         0.00
       707  WIND
                    0.00        0.00       23.76        0.00        0.00        0.0
0      2434.79
                    6.41        0.00       23.76        0.00        0.00        0.0
0      2282.44
       707  WINDLIVE
                    0.00        0.00        2.85        0.00        0.00        0.0
0       279.24
                    6.41        0.00        2.85        0.00        0.00        0.0
0       260.96
       707  LONGFORC
                    0.00        0.00        8.80        0.00        0.00        0.0
0       861.67
                    6.41        0.00        8.80        0.00        0.00        0.0
0       805.25
       707  STREAM
                    0.00        0.00        7.05        0.00        0.00        0.0
0      2989.27
                    6.41        0.00        7.05        0.00        0.00        0.0
0      2944.03
       707  TEMP
                    0.00      -28.02        0.00        0.00        0.00        0.0
0         0.00
                    6.41      -28.02        0.00        0.00        0.00        0.0
0         0.00

       708  DL
                    0.00    -2576.74        0.00        0.00        0.00        0.0
0         0.00
                    6.41    -2585.83        0.00        0.00        0.00        0.0
0         0.00
       708  WIND
                    0.00        0.00       83.45        0.00        0.00        0.0
0      2282.44
                    6.41        0.00       83.45        0.00        0.00        0.0
0      1747.32
       708  WINDLIVE
                    0.00        0.00        9.62        0.00        0.00        0.0
0       260.96
                    6.41        0.00        9.62        0.00        0.00        0.0
0       199.26
       708  LONGFORC
                    0.00        0.00       29.69        0.00        0.00        0.0
0       805.25
                    6.41        0.00       29.69        0.00        0.00        0.0
0       614.87
       708  STREAM
                    0.00        0.00       93.60        0.00        0.00        0.0
0      2944.03
                    6.41        0.00       93.60        0.00        0.00        0.0
0      2343.84
       708  TEMP
                    0.00      -28.02        0.00        0.00        0.00        0.0
0         0.00
                    6.41      -28.02        0.00        0.00        0.00        0.0
0         0.00

       709  DL
```

```
                0.00    -2585.83        0.00        0.00        0.00        0.0
0       0.00
                6.42    -2594.93        0.00        0.00        0.00        0.0
0       0.00
      709  WIND
                0.00        0.00      102.39        0.00        0.00        0.0
0    1747.32
                6.42        0.00      102.39        0.00        0.00        0.0
0    1090.48
      709  WINDLIVE
                0.00        0.00       11.76        0.00        0.00        0.0
0     199.26
                6.42        0.00       11.76        0.00        0.00        0.0
0     123.82
      709  LONGFORC
                0.00        0.00       36.29        0.00        0.00        0.0
0     614.87
                6.42        0.00       36.29        0.00        0.00        0.0
0     382.09
      709  STREAM
                0.00        0.00      122.88        0.00        0.00        0.0
0    2343.84
                6.42        0.00      122.88        0.00        0.00        0.0
0    1555.54
      709  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                6.42      -28.02        0.00        0.00        0.00        0.0
0       0.00

      710  DL
                0.00    -2594.93        0.00        0.00        0.00        0.0
0       0.00
                6.41    -2604.02        0.00        0.00        0.00        0.0
0       0.00
      710  WIND
                0.00        0.00      104.45        0.00        0.00        0.0
0    1090.48
                6.41        0.00      104.45        0.00        0.00        0.0
0     420.95
      710  WINDLIVE
                0.00        0.00       11.99        0.00        0.00        0.0
0     123.82
                6.41        0.00       11.99        0.00        0.00        0.0
0      46.99
      710  LONGFORC
                0.00        0.00       36.99        0.00        0.00        0.0
0     382.09
                6.41        0.00       36.99        0.00        0.00        0.0
0     145.00
      710  STREAM
                0.00        0.00      126.95        0.00        0.00        0.0
0    1555.54
                6.41        0.00      126.95        0.00        0.00        0.0
0     741.82
      710  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                6.41      -28.02        0.00        0.00        0.00        0.0
0       0.00

      750  DL
                0.00    -1593.16        0.00        0.00        0.00        0.0
0       0.00
                3.04    -1686.18        0.00        0.00        0.00        0.0
0       0.00
```



```
      750  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     181.23
                3.04        0.00      -42.18        0.00        0.00        0.0
0     309.45
      750  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      30.99
                3.04        0.00       -4.65        0.00        0.00        0.0
0      45.12
      750  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0      95.63
                3.04        0.00      -14.34        0.00        0.00        0.0
0     139.22
      750  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0       0.00
      750  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                3.04      -28.02        0.00        0.00        0.00        0.0
0       0.00

      801  DL
                0.00    -1954.20        0.00        0.00        0.00        0.0
0       0.00
                1.96    -2014.18        0.00        0.00        0.00        0.0
0       0.00
      801  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     309.45
                1.96        0.00      -42.18        0.00        0.00        0.0
0     392.12
      801  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      45.12
                1.96        0.00       -4.65        0.00        0.00        0.0
0      54.22
      801  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     139.22
                1.96        0.00      -14.34        0.00        0.00        0.0
0     167.32
      801  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
                1.96        0.00       -8.97        0.00        0.00        0.0
0       8.84
      801  TEMP
                0.00       23.48        5.20        0.00        0.00        0.0
0     -50.48
                1.96       23.48        5.20        0.00        0.00        0.0
0     -60.67

      802  DL
                0.00    -2014.18        0.00        0.00        0.00        0.0
0       0.00
               10.04    -2202.44        0.00        0.00        0.00        0.0
0       0.00
      802  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     392.12
               10.04        0.00      -42.18        0.00        0.00        0.0
```

```
0      815.59
       802  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0       54.22
               10.04        0.00       -4.65        0.00        0.00        0.0
0      100.87
       802  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0      167.32
               10.04        0.00      -14.34        0.00        0.00        0.0
0      311.28
       802  STREAM
                0.00        0.00       -8.97        0.00        0.00        0.0
0        8.84
               10.04        0.00      -38.64        0.00        0.00        0.0
0      253.55
       802  TEMP
                0.00       23.48        5.20        0.00        0.00        0.0
0      -60.67
               10.04       23.48        5.20        0.00        0.00        0.0
0     -112.86

       803  DL
                0.00    -2202.44        0.00        0.00        0.00        0.0
0        0.00
                4.04    -2278.20        0.00        0.00        0.00        0.0
0        0.00
       803  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0      815.59
                4.04        0.00      -42.18        0.00        0.00        0.0
0      985.99
       803  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      100.87
                4.04        0.00       -4.65        0.00        0.00        0.0
0      119.65
       803  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0      311.28
                4.04        0.00      -14.34        0.00        0.00        0.0
0      369.20
       803  STREAM
                0.00        0.00      -38.64        0.00        0.00        0.0
0      253.55
                4.04        0.00      -48.64        0.00        0.00        0.0
0      430.22
       803  TEMP
                0.00       23.48        5.20        0.00        0.00        0.0
0     -112.86
                4.04       23.48        5.20        0.00        0.00        0.0
0     -133.86

       804  DL
                0.00    -2278.20        0.00        0.00        0.00        0.0
0        0.00
               17.25    -2601.65        0.00        0.00        0.00        0.0
0        0.00
       804  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0      985.99
               17.25        0.00      -42.18        0.00        0.00        0.0
0     1713.57
       804  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      119.65
```



```
               17.25        0.00       -4.65        0.00        0.00        0.0
0      199.80
       804  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0      369.20
               17.25        0.00      -14.34        0.00        0.00        0.0
0      616.53
       804  STREAM
                0.00        0.00      -48.64        0.00        0.00        0.0
0      430.22
               17.25        0.00      -78.85        0.00        0.00        0.0
0     1558.94
       804  TEMP
                0.00       23.48        5.20        0.00        0.00        0.0
0     -133.86
               17.25       23.48        5.20        0.00        0.00        0.0
0     -223.53

       805  DL
                0.00    -2601.65        0.00        0.00        0.00        0.0
0        0.00
                3.75    -2835.66        0.00        0.00        0.00        0.0
0        0.00
       805  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     1713.57
                3.75        0.00      -42.18        0.00        0.00        0.0
0     1871.74
       805  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      199.80
                3.75        0.00       -4.65        0.00        0.00        0.0
0      217.22
       805  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0      616.53
                3.75        0.00      -14.34        0.00        0.00        0.0
0      670.30
       805  STREAM
                0.00        0.00      -78.85        0.00        0.00        0.0
0     1558.94
                3.75        0.00      -82.89        0.00        0.00        0.0
0     1862.51
       805  TEMP
                0.00       23.48        5.20        0.00        0.00        0.0
0     -223.53
                3.75       23.48        5.20        0.00        0.00        0.0
0     -243.03

       806  DL
                0.00    -2835.66        0.00        0.00        0.00        0.0
0        0.00
               13.35    -2835.66        0.00        0.00        0.00        0.0
0        0.00
       806  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     1871.74
               13.35        0.00      -42.18        0.00        0.00        0.0
0     2434.82
       806  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      217.22
               13.35        0.00       -4.65        0.00        0.00        0.0
0      279.25
       806  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
```

```
0      670.30
                13.35        0.00      -14.34        0.00        0.00        0.0
0      861.71
       806  STREAM
                 0.00        0.00      -82.89        0.00        0.00        0.0
0     1862.51
                13.35        0.00      -85.16        0.00        0.00        0.0
0     2989.27
       806  TEMP
                 0.00       23.48        5.20        0.00        0.00        0.0
0     -243.03
                13.35       23.48        5.20        0.00        0.00        0.0
0     -312.43

       807  DL
                 0.00    -2835.66        0.00        0.00        0.00        0.0
0        0.00
                 6.41    -2844.76        0.00        0.00        0.00        0.0
0        0.00
       807  WIND
                 0.00        0.00       23.76        0.00        0.00        0.0
0     2434.82
                 6.41        0.00       23.76        0.00        0.00        0.0
0     2282.46
       807  WINDLIVE
                 0.00        0.00        2.85        0.00        0.00        0.0
0      279.25
                 6.41        0.00        2.85        0.00        0.00        0.0
0      260.97
       807  LONGFORC
                 0.00        0.00        8.80        0.00        0.00        0.0
0      861.71
                 6.41        0.00        8.80        0.00        0.00        0.0
0      805.28
       807  STREAM
                 0.00        0.00        7.05        0.00        0.00        0.0
0     2989.27
                 6.41        0.00        7.05        0.00        0.00        0.0
0     2944.03
       807  TEMP
                 0.00       23.48       -3.19        0.00        0.00        0.0
0     -312.43
                 6.41       23.48       -3.19        0.00        0.00        0.0
0     -291.97

       808  DL
                 0.00    -2844.76        0.00        0.00        0.00        0.0
0        0.00
                 6.41    -2853.85        0.00        0.00        0.00        0.0
0        0.00
       808  WIND
                 0.00        0.00       83.45        0.00        0.00        0.0
0     2282.46
                 6.41        0.00       83.45        0.00        0.00        0.0
0     1747.35
       808  WINDLIVE
                 0.00        0.00        9.62        0.00        0.00        0.0
0      260.97
                 6.41        0.00        9.62        0.00        0.00        0.0
0      199.27
       808  LONGFORC
                 0.00        0.00       29.69        0.00        0.00        0.0
0      805.28
                 6.41        0.00       29.69        0.00        0.00        0.0
0      614.90
       808  STREAM
```



```
                 0.00        0.00       93.60        0.00        0.00        0.0
0     2944.03
                 6.41        0.00       93.60        0.00        0.00        0.0
0     2343.84
       808  TEMP
                 0.00       23.48      -10.76        0.00        0.00        0.0
0     -291.97
                 6.41       23.48      -10.76        0.00        0.00        0.0
0     -222.94

       809  DL
                 0.00    -2853.85        0.00        0.00        0.00        0.0
0        0.00
                 6.42    -2862.95        0.00        0.00        0.00        0.0
0        0.00
       809  WIND
                 0.00        0.00      102.39        0.00        0.00        0.0
0     1747.35
                 6.42        0.00      102.39        0.00        0.00        0.0
0     1090.49
       809  WINDLIVE
                 0.00        0.00       11.76        0.00        0.00        0.0
0      199.27
                 6.42        0.00       11.76        0.00        0.00        0.0
0      123.83
       809  LONGFORC
                 0.00        0.00       36.29        0.00        0.00        0.0
0      614.90
                 6.42        0.00       36.29        0.00        0.00        0.0
0      382.11
       809  STREAM
                 0.00        0.00      122.88        0.00        0.00        0.0
0     2343.84
                 6.42        0.00      122.88        0.00        0.00        0.0
0     1555.54
       809  TEMP
                 0.00       23.48      -13.16        0.00        0.00        0.0
0     -222.94
                 6.42       23.48      -13.16        0.00        0.00        0.0
0     -138.54

       810  DL
                 0.00    -2862.95        0.00        0.00        0.00        0.0
0        0.00
                 6.41    -2872.04        0.00        0.00        0.00        0.0
0        0.00
       810  WIND
                 0.00        0.00      104.45        0.00        0.00        0.0
0     1090.49
                 6.41        0.00      104.45        0.00        0.00        0.0
0      420.96
       810  WINDLIVE
                 0.00        0.00       11.99        0.00        0.00        0.0
0      123.83
                 6.41        0.00       11.99        0.00        0.00        0.0
0       46.99
       810  LONGFORC
                 0.00        0.00       36.99        0.00        0.00        0.0
0      382.11
                 6.41        0.00       36.99        0.00        0.00        0.0
0      145.01
       810  STREAM
                 0.00        0.00      126.95        0.00        0.00        0.0
0     1555.54
                 6.41        0.00      126.95        0.00        0.00        0.0
0      741.82
```

```
      810  TEMP
                   0.00       23.48      -13.41        0.00        0.00        0.0
0     -138.54
                   6.41       23.48      -13.41        0.00        0.00        0.0
0      -52.58

      850  DL
                   0.00    -1861.18        0.00        0.00        0.00        0.0
0        0.00
                   3.04    -1954.20        0.00        0.00        0.00        0.0
0        0.00
      850  WIND
                   0.00        0.00      -42.18        0.00        0.00        0.0
0      181.23
                   3.04        0.00      -42.18        0.00        0.00        0.0
0      309.45
      850  WINDLIVE
                   0.00        0.00       -4.65        0.00        0.00        0.0
0       30.99
                   3.04        0.00       -4.65        0.00        0.00        0.0
0       45.12
      850  LONGFORC
                   0.00        0.00      -14.34        0.00        0.00        0.0
0       95.63
                   3.04        0.00      -14.34        0.00        0.00        0.0
0      139.22
      850  STREAM
                   0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                   3.04        0.00        0.00        0.00        0.00        0.0
0        0.00
      850  TEMP
                   0.00       23.48        5.20        0.00        0.00        0.0
0      -34.67
                   3.04       23.48        5.20        0.00        0.00        0.0
0      -50.48
```

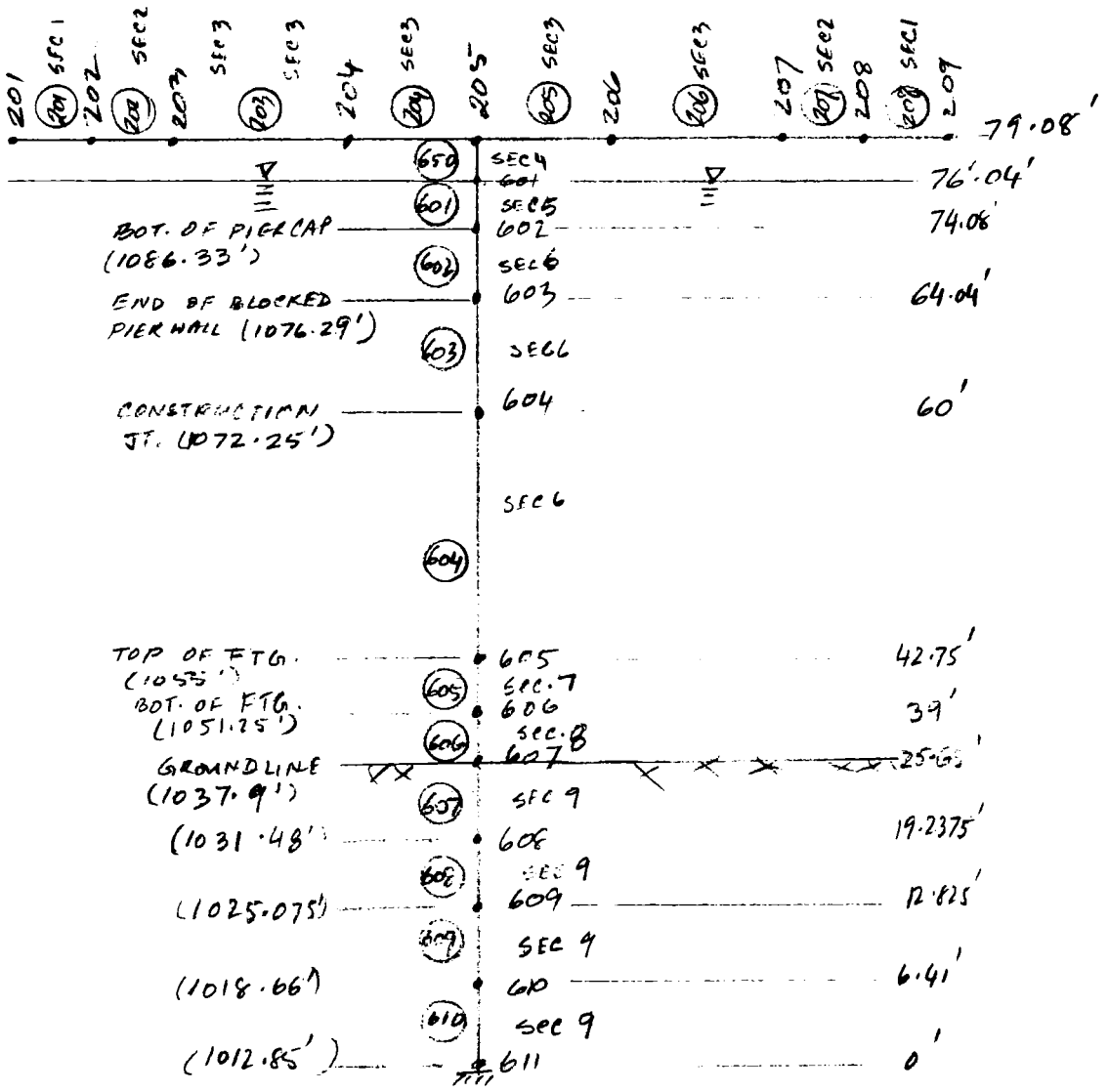
INTERNATIONAL

Projects: Salt River Bridge - Scour Job No. 1317 Sheet: of

Item: 24th St. Bridge Designer: SJ Date: 02-17-00

Checker: Date:

Grid: 1/8"



```
; File C:\Program Files\SAP2000N\24thtran.$2k saved 3/10/00 10:09:05 in Kip-in

SYSTEM
  DOF=UX,UY,UZ,RX,RY,RZ  LENGTH=IN  FORCE=Kip  PAGE=SECTIONS

JOINT
  201  X=-515.628  Y=0  Z=948.96
  202  X=-407.628  Y=0  Z=948.96
  203  X=-299.628  Y=0  Z=948.96
  204  X=-149.82  Y=0  Z=948.96
  205  X=0  Y=0  Z=948.96
  206  X=149.82  Y=0  Z=948.96
  207  X=299.628  Y=0  Z=948.96
  208  X=407.628  Y=0  Z=948.96
  209  X=515.628  Y=0  Z=948.96
  601  X=0  Y=0  Z=912.48
  602  X=0  Y=0  Z=888.96
  603  X=0  Y=0  Z=768.48
  604  X=0  Y=0  Z=720
  605  X=0  Y=0  Z=513
  606  X=0  Y=0  Z=468
  607  X=0  Y=0  Z=307.8
  608  X=0  Y=0  Z=230.85
  609  X=0  Y=0  Z=153.9
  610  X=0  Y=0  Z=76.92
  611  X=0  Y=0  Z=0

RESTRAINT
  ADD=611  DOF=U1,U2,U3,R1,R2,R3

PATTERN
  NAME=DEFAULT

SPRING
  ADD=606  U1=100.5667
  ADD=607  U1=669.75
  ADD=608  U1=1339.5
  ADD=609  U1=1339.5
  ADD=610  U1=1339.5

MATERIAL
  NAME=STEEL  IDES=S  M=7.330247E-07
    T=0  E=29000  U=.3  A=.0000065  FY=36
  NAME=CONC  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=4415  U=.2  A=.0000055
  NAME=OTHER  IDES=N  M=2.246377E-07  W=.0000868
    T=0  E=3600  U=.2  A=.0000055
  NAME=CONC2  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=3605  U=.2  A=.0000055
  NAME=CONC3  IDES=C
    T=0  E=3602  U=.2  A=.0000055
  NAME=STEEL0  IDES=S  M=7.330247E-07
    T=0  E=29000  U=.3  A=.0000065  FY=36

FRAME SECTION
  NAME=FSEC1 MAT=STEEL SH=R T=18,10 A=180 J=3916.671 I=4860,1500 AS=150,150
  NAME=SEC1 MAT=CONC2 A=1728 J=746496 I=331776,186624 AS=1728,1728 S=13824,10368
Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC2 MAT=CONC2 A=3024 J=1306368 I=1778112,326592 AS=3024,3024 S=42336,1814
4 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC3 MAT=CONC2 A=4320 J=1866240 I=5184000,466560 AS=4320,4320 S=86400,2592
0 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC5 MAT=CONC3 A=29376 J=1.269043E+07 I=1.630015E+09,3172608 AS=29376,2937
6 S=3995136,176256 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
```



```
  NAME=SEC6 MAT=CONC2 A=18000 J=5399655 I=5.400001E+08,1349914 AS=18000,18000 S=1
800006,89994.24 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC9 MAT=STEEL A=417.6 J=1.35641E+07 I=1.465019E+07,241781.8 AS=417.6,417.
6 S=50868.86,10074.24 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC7 MAT=CONC2 A=59904 J=1.840252E+08 I=1.943765E+09,4.600634E+07 AS=59904
,59904 S=6230010,958469.8 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC4 MAT=CONC3 A=37152 J=1.604966E+07 I=3.297314E+09,4012416 AS=37152,3715
2 S=6390144,222912 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC8 MAT=STEEL0 A=417.6 J=1.35641E+07 I=1.465019E+07,241781.8 AS=417.6,417
.6 S=50868.86,10074.24 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996

FRAME
  201  J=201,202  SEC=SEC1  NSEG=1  ANG=0
  202  J=202,203  SEC=SEC2  NSEG=1  ANG=0
  203  J=203,204  SEC=SEC3  NSEG=1  ANG=0
  204  J=204,205  SEC=SEC3  NSEG=1  ANG=0
  205  J=205,206  SEC=SEC3  NSEG=1  ANG=0
  206  J=206,207  SEC=SEC3  NSEG=1  ANG=0
  207  J=207,208  SEC=SEC2  NSEG=1  ANG=0
  208  J=208,209  SEC=SEC1  NSEG=1  ANG=0
  601  J=601,602  SEC=SEC5  NSEG=1  ANG=0
  602  J=602,603  SEC=SEC6  NSEG=1  ANG=0
  603  J=603,604  SEC=SEC6  NSEG=1  ANG=0
  604  J=604,605  SEC=SEC6  NSEG=1  ANG=0
  605  J=605,606  SEC=SEC7  NSEG=1  ANG=0
  606  J=606,607  SEC=SEC8  NSEG=1  ANG=0
  607  J=607,608  SEC=SEC9  NSEG=1  ANG=0
  608  J=608,609  SEC=SEC9  NSEG=1  ANG=0
  609  J=609,610  SEC=SEC9  NSEG=1  ANG=0
  610  J=610,611  SEC=SEC9  NSEG=1  ANG=0
  650  J=205,601  SEC=SEC4  NSEG=1  ANG=0

LOAD
  NAME=DL  SW=1
    TYPE=CONCENTRATED SPAN
      ADD=201  RD=.5521111  U2=-80
      ADD=201  RD=.9965556  U2=-80
      ADD=208  RD=3.444444E-03  U2=-80
      ADD=208  RD=.4478889  U2=-80
      ADD=202  RD=.441  U2=-80
      ADD=202  RD=.8854445  U2=-80
      ADD=207  RD=.1178889  U2=-80
      ADD=207  RD=.559  U2=-80
      ADD=203  RD=.2378244  U2=-80
      ADD=203  RD=.5582345  U2=-80
      ADD=206  RD=.1213553  U2=-80
      ADD=206  RD=.4417655  U2=-80
      ADD=206  RD=.7621756  U2=-80
      ADD=204  RD=.1990388  U2=-80
      ADD=204  RD=.5194233  U2=-80
      ADD=205  RD=.1601922  U2=-80
      ADD=205  RD=.4805767  U2=-80
      ADD=205  RD=.8009611  U2=-80
      ADD=203  RD=.8786446  U2=-80
      ADD=204  RD=.8398077  U2=-80
  NAME=WINDSUP
    TYPE=CONCENTRATED SPAN
      ADD=203  RD=.3980295  U2=115.2
    TYPE=DISTRIBUTED SPAN
      ADD=201  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=202  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=203  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=204  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=205  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=206  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=207  RD=0,1  U1=3.685834E-02,3.685834E-02
```

```
      ADD=208  RD=0,1  U1=3.685834E-02,3.685834E-02
  NAME=WINDSUB
    TYPE=DISTRIBUTED SPAN
      ADD=201  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=202  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=203  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=204  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=205  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=206  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=207  RD=0,1  U1=1.166667E-03,1.166667E-03
      ADD=208  RD=0,1  U1=1.166667E-03,1.166667E-03
  NAME=WINDLIVE
    TYPE=DISTRIBUTED SPAN
      ADD=201  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=202  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=203  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=204  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=205  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=206  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=207  RD=0,1  U1=8.441667E-03,8.441667E-03
      ADD=208  RD=0,1  U1=8.441667E-03,8.441667E-03
  NAME=STREAM
    TYPE=DISTRIBUTED SPAN
      ADD=601  RD=0,1  U2=.5570833,.5353833
      ADD=602  RD=0,1  U2=.4971417,.3940833
      ADD=603  RD=0,1  U2=.1515,.135625
      ADD=604  RD=0,1  U2=.1354167,.0675
      ADD=605  RD=0,1  U2=.2160833,.1686667
      ADD=606  RD=0,1  U2=.3933333,0
      ADD=601  RD=0,1  U1=-1.06075,-1.06075
      ADD=602  RD=0,1  U1=-.65,-.65
      ADD=603  RD=0,1  U1=-.65,-.65
      ADD=604  RD=0,1  U1=-.65,-.65
      ADD=605  RD=0,1  U1=-2.163167,-2.163167
      ADD=606  RD=0,1  U1=-.01508,-.01508
  NAME=TEMP
    TYPE=TEMPERATURE  ELEM=FRAME
      ADD=201  T=-40
      ADD=202  T=-40
      ADD=203  T=-40
      ADD=204  T=-40
      ADD=205  T=-40
      ADD=206  T=-40
      ADD=207  T=-40
      ADD=208  T=-40
      ADD=650  T=-40
      ADD=601  T=-40
      ADD=602  T=-40
      ADD=603  T=-40
      ADD=604  T=-40
      ADD=605  T=-40
      ADD=606  T=-40
      ADD=607  T=-40
      ADD=608  T=-40
      ADD=609  T=-40
  NAME=LL2SPAN
    TYPE=CONCENTRATED SPAN
      ADD=201  RD=.5521111  U2=-15.1675
      ADD=201  RD=.9965556  U2=-15.1675
      ADD=202  RD=.441  U2=-15.1675
      ADD=202  RD=.8854445  U2=-15.1675
      ADD=203  RD=.2378244  U2=-15.1675
      ADD=203  RD=.5582345  U2=-15.1675
      ADD=204  RD=.1990388  U2=-15.1675
      ADD=204  RD=.5194233  U2=-15.1675
      ADD=204  RD=.8398077  U2=-15.1675
```



```
      ADD=203  RD=.8786446  U2=-15.1675
  NAME=LL5SPAN
    TYPE=CONCENTRATED SPAN
      ADD=201  RD=.5521111  U2=-15.1675
      ADD=201  RD=.9965556  U2=-15.1675
      ADD=208  RD=3.444444E-03  U2=-15.1675
      ADD=208  RD=.4478889  U2=-15.1675
      ADD=202  RD=.441  U2=-15.1675
      ADD=202  RD=.8854445  U2=-15.1675
      ADD=207  RD=.1145556  U2=-15.1675
      ADD=207  RD=.559  U2=-15.1675
      ADD=203  RD=.2378244  U2=-15.1675
      ADD=203  RD=.5582345  U2=-15.1675
      ADD=203  RD=.8786446  U2=-15.1675
      ADD=206  RD=.1213553  U2=-15.1675
      ADD=206  RD=.4417655  U2=-15.1675
      ADD=206  RD=.7621756  U2=-15.1675
      ADD=204  RD=.1990388  U2=-15.1675
      ADD=204  RD=.5194233  U2=-15.1675
      ADD=204  RD=.8398077  U2=-15.1675
      ADD=205  RD=.1601922  U2=-15.1675
      ADD=205  RD=.4805767  U2=-15.1675
      ADD=205  RD=.8009611  U2=-15.1675

OUTPUT
; No Output Requested

END

; The following data is used for graphics, design and pushover analysis.
; If changes are made to the analysis data above, then the following data
; should be checked for consistency.
SAP2000 V7.10 SUPPLEMENTAL DATA
  GRID GLOBAL  X "1"  -515.628
  GRID GLOBAL  X "2"  -407.628
  GRID GLOBAL  X "3"  -299.628
  GRID GLOBAL  X "4"  -149.82
  GRID GLOBAL  X "5"  0
  GRID GLOBAL  X "6"  149.82
  GRID GLOBAL  X "7"  299.628
  GRID GLOBAL  X "8"  407.628
  GRID GLOBAL  X "9"  515.628
  GRID GLOBAL  Y "10"  0
  GRID GLOBAL  Z "11"  0
  GRID GLOBAL  Z "12"  76.92
  GRID GLOBAL  Z "13"  153.9
  GRID GLOBAL  Z "14"  230.85
  GRID GLOBAL  Z "15"  307.8
  GRID GLOBAL  Z "16"  468
  GRID GLOBAL  Z "17"  513
  GRID GLOBAL  Z "18"  720
  GRID GLOBAL  Z "19"  768.48
  GRID GLOBAL  Z "20"  888.96
  GRID GLOBAL  Z "21"  912.48
  GRID GLOBAL  Z "22"  948.96
  MATERIAL STEEL FY 36
  MATERIAL STEEL0 FY 36
  MATERIAL CONC FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC2 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC3 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  STATICLOAD DL TYPE DEAD
  STATICLOAD WINDSUP TYPE WIND
  STATICLOAD WINDSUB TYPE WIND
  STATICLOAD WINDLIVE TYPE OTHER
  STATICLOAD STREAM TYPE OTHER
  STATICLOAD TEMP TYPE OTHER
```

```
  STATICLOAD LL2SPAN TYPE LIVE
  STATICLOAD LL5SPAN TYPE LIVE
  STEELDESIGN "AISC-ASD89"
END SUPPLEMENTAL DATA
```

S A P 2 0 0 0

Structural Analysis Programs

Version 7.10

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C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES

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It is the responsibility of the user to verify all
results produced by this program

29 Feb 2000 15:02:34

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S Y S T E M D A T A

STEADY STATE LOAD FREQUENCY - - - - - - - -	0.0000E+00
LENGTH UNITS - - - - - - - - - - - - - - - - -	IN
FORCE UNITS - - - - - - - - - - - - - - - - -	KIP
UP DIRECTION - - - - - - - - - - - - - - - - -	+Z
GLOBAL DEGREES OF FREEDOM - - - - - - - - - -	ALL
PAGINATION BY - - - - - - - - - - - - - - - -	SECTIONS
NUMBER OF LINES PER PAGE - - - - - - - - - - -	59
INCLUDE WARNING MESSAGES IN OUTPUT FILE - -	Y

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G E N E R A T E D J O I N T C O O R D I N A T E S

JOINT	X	Y	Z
201	-515.628	0.000	948.960
202	-407.628	0.000	948.960
203	-299.628	0.000	948.960
204	-149.820	0.000	948.960
205	0.000	0.000	948.960
206	149.820	0.000	948.960
207	299.628	0.000	948.960
208	407.628	0.000	948.960
209	515.628	0.000	948.960
601	0.000	0.000	912.480
602	0.000	0.000	888.960
603	0.000	0.000	768.480
604	0.000	0.000	720.000
605	0.000	0.000	513.000
606	0.000	0.000	468.000
607	0.000	0.000	307.800
608	0.000	0.000	230.850
609	0.000	0.000	153.900
610	0.000	0.000	76.920
611	0.000	0.000	0.000

P A T T E R N S

PATTERN	JOINT	VALUE
DEFAULT		

R E S T R A I N T D A T A

JOINT						
611	U1	U2	U3	R1	R2	R3

J O I N T S P R I N G S

JOINT		U1	U2	U3	R1	R2	R3
606	U1	0.101E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
607	U1	0.670E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
608	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
609	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
610	U1	0.134E+04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

M A T E R I A L P R O P E R T Y D A T A

MAT LABEL	NUMBER TEMPS	WEIGHT PER UNIT VOL	MASS PER UNIT VOL	DESIGN CODE
STEEL	1	0.0000E+00	0.7330E-06	S
CONC	1	0.8681E-04	0.2246E-06	C
OTHER	1	0.8680E-04	0.2246E-06	N
CONC2	1	0.8681E-04	0.2246E-06	C
CONC3	1	0.0000E+00	0.0000E+00	C
STEEL0	1	0.0000E+00	0.7330E-06	S

T E M P E R A T U R E D E P E N D E N T D A T A

MATERIAL PROPERTIES

MAT LABEL	TEMP	MODULUS OF ELASTICITY E1	E2	E3	SHEAR MODULII G12	G13	G23
STEEL	0.00	0.290E+05	0.290E+05	0.290E+05	0.112E+05	0.112E+05	0.112E+05
CONC	0.00	0.442E+04	0.442E+04	0.442E+04	0.184E+04	0.184E+04	0.184E+04
OTHER	0.00	0.360E+04	0.360E+04	0.360E+04	0.150E+04	0.150E+04	0.150E+04
CONC2	0.00	0.361E+04	0.361E+04	0.361E+04	0.150E+04	0.150E+04	0.150E+04
CONC3	0.00	0.360E+04	0.360E+04	0.360E+04	0.150E+04	0.150E+04	0.150E+04
STEEL0	0.00	0.290E+05	0.290E+05	0.290E+05	0.112E+05	0.112E+05	0.112E+05

T E M P E R A T U R E D E P E N D E N T D A T A

THERMAL EXPANSION COEFFICIENTS

MAT LABEL	TEMP	COEFFICIENTS OF THERMAL EXPANSION A1	A2	A3	A12	A13	A23
STEEL	0.00	0.650E-05	0.650E-05	0.650E-05	0.000E+00	0.000E+00	0.000E+00
CONC	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
OTHER	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
CONC2	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
CONC3	0.00	0.550E-05	0.550E-05	0.550E-05	0.000E+00	0.000E+00	0.000E+00
STEEL0	0.00	0.650E-05	0.650E-05	0.650E-05	0.000E+00	0.000E+00	0.000E+00

T E M P E R A T U R E D E P E N D E N T D A T A

MATERIAL PROPERTIES

MAT LABEL	TEMP	POISSONS RATIO U12	U13	U23	U14	U24	U34	U15	U25	U35	U45	U16	U26	U36	U46	U56
STEEL	0.00	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONC	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONC2	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONC3	0.00	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STEEL0	0.00	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MATERIAL PROPERTIES

MAT LABEL	TEMP	YIELD FY
CONC	0.00	36.00
CONC2	0.00	36.00
CONC3	0.00	36.00

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F R A M E S E C T I O N P R O P E R T Y D A T A - P R I S M A T I C

SECTION LABEL	SHAPE TYPE	DEPTH	FLANGE WIDTH TOP	FLANGE THICK TOP	WEB THICK	FLANGE WIDTH BOTTOM	FLANGE THICK BOTTOM
FSEC1	R	18.000	10.000				
SEC1	G						
SEC2	G						
SEC3	G						
SEC5	G						
SEC6	G						
SEC9	G						
SEC7	G						
SEC4	G						
SEC8	G						

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F R A M E S E C T I O N P R O P E R T Y D A T A - P R I S M A T I C

SECTION LABEL	AXIAL AREA	TORSIONAL CONSTANT	MOMENTS OF INERTIA I33	I22	SHEAR AREAS A2	A3
FSEC1	0.180E+03	0.392E+04	0.486E+04	0.150E+04	0.150E+03	0.150E+03
SEC1	0.173E+04	0.746E+06	0.332E+06	0.187E+06	0.173E+04	0.173E+04
SEC2	0.302E+04	0.131E+07	0.178E+07	0.327E+06	0.302E+04	0.302E+04
SEC3	0.432E+04	0.187E+07	0.518E+07	0.467E+06	0.432E+04	0.432E+04
SEC5	0.294E+05	0.127E+08	0.163E+10	0.317E+07	0.294E+05	0.294E+05
SEC6	0.180E+05	0.540E+07	0.540E+09	0.135E+07	0.180E+05	0.180E+05
SEC9	0.418E+03	0.136E+08	0.147E+08	0.242E+06	0.418E+03	0.418E+03
SEC7	0.599E+05	0.184E+09	0.194E+10	0.460E+08	0.599E+05	0.599E+05
SEC4	0.372E+05	0.160E+08	0.330E+10	0.401E+07	0.372E+05	0.372E+05
SEC8	0.418E+03	0.136E+08	0.147E+08	0.242E+06	0.418E+03	0.418E+03

F R A M E S E C T I O N P R O P E R T Y D A T A - P R I S M A T I C

SECTION LABEL	MAT LABEL	ADDITIONAL MASS PER LENGTH	ADDITIONAL WEIGHT PER LENGTH
FSEC1	STEEL	0.000E+00	0.000E+00
SEC1	CONC2	0.000E+00	0.000E+00
SEC2	CONC2	0.000E+00	0.000E+00
SEC3	CONC2	0.000E+00	0.000E+00
SEC5	CONC3	0.000E+00	0.000E+00
SEC6	CONC2	0.000E+00	0.000E+00
SEC9	STEEL	0.000E+00	0.000E+00
SEC7	CONC2	0.000E+00	0.000E+00
SEC4	CONC3	0.000E+00	0.000E+00
SEC8	STEEL0	0.000E+00	0.000E+00

F R A M E E L E M E N T D A T A

ELEMENT LABEL	JOINT END-I	JOINT END-J	ELEMENT LENGTH	END-OFFSET-LENGTHS END-I	END-J	RIGID-END FACTOR	NUMBER OF SEGMENTS
201	201	202	108.000	0.000	0.000	0.0000	1
202	202	203	108.000	0.000	0.000	0.0000	1
203	203	204	149.808	0.000	0.000	0.0000	1
204	204	205	149.820	0.000	0.000	0.0000	1
205	205	206	149.820	0.000	0.000	0.0000	1
206	206	207	149.808	0.000	0.000	0.0000	1
207	207	208	108.000	0.000	0.000	0.0000	1
208	208	209	108.000	0.000	0.000	0.0000	1
601	601	602	23.520	0.000	0.000	0.0000	1
602	602	603	120.480	0.000	0.000	0.0000	1
603	603	604	48.480	0.000	0.000	0.0000	1
604	604	605	207.000	0.000	0.000	0.0000	1
605	605	606	45.000	0.000	0.000	0.0000	1
606	606	607	160.200	0.000	0.000	0.0000	1
607	607	608	76.950	0.000	0.000	0.0000	1
608	608	609	76.950	0.000	0.000	0.0000	1
609	609	610	76.980	0.000	0.000	0.0000	1
610	610	611	76.920	0.000	0.000	0.0000	1
650	205	601	36.480	0.000	0.000	0.0000	1

F R A M E E L E M E N T D A T A

ELEMENT LABEL	SECTION LABEL	LOCAL PLANE	COORD SYSTEM	PLN 1ST	PLN 2ND	PLANE JOINTA	PLANE JOINTB	COORD ANGLE
201	SEC1	12	0	+Z	+X	0	0	0.00
202	SEC2	12	0	+Z	+X	0	0	0.00
203	SEC3	12	0	+Z	+X	0	0	0.00
204	SEC3	12	0	+Z	+X	0	0	0.00
205	SEC3	12	0	+Z	+X	0	0	0.00
206	SEC3	12	0	+Z	+X	0	0	0.00
207	SEC2	12	0	+Z	+X	0	0	0.00
208	SEC1	12	0	+Z	+X	0	0	0.00
601	SEC5	12	0	+Z	+X	0	0	0.00
602	SEC6	12	0	+Z	+X	0	0	0.00
603	SEC6	12	0	+Z	+X	0	0	0.00
604	SEC6	12	0	+Z	+X	0	0	0.00
605	SEC7	12	0	+Z	+X	0	0	0.00
606	SEC8	12	0	+Z	+X	0	0	0.00
607	SEC9	12	0	+Z	+X	0	0	0.00
608	SEC9	12	0	+Z	+X	0	0	0.00
609	SEC9	12	0	+Z	+X	0	0	0.00
610	SEC9	12	0	+Z	+X	0	0	0.00
650	SEC4	12	0	+Z	+X	0	0	0.00

T O T A L W E I G H T S A N D M A S S E S

SECTION LABEL	WEIGHT	MASS
SEC1	32.4017	0.0838
SEC2	56.7029	0.1467
SEC3	224.7325	0.5814
SEC6	587.4676	1.5199
SEC9	0.0000	0.0942
SEC7	234.0120	0.6054
SEC8	0.0000	0.0490
TOTAL	1135.3166	3.0806

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L O A D C O N D I T I O N DL

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.1000E+01

CONCENTRATED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE	FORCE	MOMENT
201	U2	0.552E+00	-0.800E+02	
201	U2	0.997E+00	-0.800E+02	
202	U2	0.441E+00	-0.800E+02	
202	U2	0.885E+00	-0.800E+02	
203	U2	0.238E+00	-0.800E+02	
203	U2	0.558E+00	-0.800E+02	
203	U2	0.879E+00	-0.800E+02	
204	U2	0.199E+00	-0.800E+02	
204	U2	0.519E+00	-0.800E+02	
204	U2	0.840E+00	-0.800E+02	
205	U2	0.160E+00	-0.800E+02	
205	U2	0.481E+00	-0.800E+02	
205	U2	0.801E+00	-0.800E+02	
206	U2	0.121E+00	-0.800E+02	
206	U2	0.442E+00	-0.800E+02	
206	U2	0.762E+00	-0.800E+02	
207	U2	0.118E+00	-0.800E+02	
207	U2	0.559E+00	-0.800E+02	
208	U2	0.344E-02	-0.800E+02	
208	U2	0.448E+00	-0.800E+02	

L O A D C O N D I T I O N WINDSUP

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

CONCENTRATED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE	FORCE	MOMENT
203	U2	0.398E+00	0.115E+03	

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
201	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
202	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
203	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
204	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
205	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
206	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
207	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		
208	U1	0.000E+00	0.100E+01	0.369E-01	0.369E-01		

L O A D C O N D I T I O N WINDSUB

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
201	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
202	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
203	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
204	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
205	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
206	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
207	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		
208	U1	0.000E+00	0.100E+01	0.117E-02	0.117E-02		

L O A D C O N D I T I O N WINDLIVE

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
201	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
202	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
203	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
204	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
205	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
206	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
207	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		
208	U1	0.000E+00	0.100E+01	0.844E-02	0.844E-02		

L O A D C O N D I T I O N STREAM

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

DISTRIBUTED SPAN LOADS ON FRAME ELEMENTS

ELEMENT LABEL	LOC DOF	DISTANCE AT START	DISTANCE AT END	FORCE AT START	FORCE AT END	MOMENT AT START	MOMENT AT END
601	U1	0.000E+00	0.100E+01	-0.106E+01	-0.106E+01		
601	U2	0.000E+00	0.100E+01	0.557E+00	0.535E+00		
602	U1	0.000E+00	0.100E+01	-0.650E+00	-0.650E+00		
602	U2	0.000E+00	0.100E+01	0.497E+00	0.394E+00		
603	U1	0.000E+00	0.100E+01	-0.650E+00	-0.650E+00		
603	U2	0.000E+00	0.100E+01	0.152E+00	0.136E+00		
604	U1	0.000E+00	0.100E+01	-0.650E+00	-0.650E+00		
604	U2	0.000E+00	0.100E+01	0.135E+00	0.675E-01		
605	U1	0.000E+00	0.100E+01	-0.216E+01	-0.216E+01		
605	U2	0.000E+00	0.100E+01	0.216E+00	0.169E+00		
606	U1	0.000E+00	0.100E+01	-0.151E-01	-0.151E-01		
606	U2	0.000E+00	0.100E+01	0.393E+00	0.000E+00		

L O A D C O N D I T I O N TEMP

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

TEMPERATURE OF FRAME ELEMENTS

ELEMENT LABEL	TEMPERATURE ENDI	TEMPERATURE ENDJ	GRADIENT LOCAL 2 ENDI	GRADIENT LOCAL 2 ENDJ	GRADIENT LOCAL 3 ENDI	GRADIENT LOCAL 3 ENDJ
201	-0.4000E+02	-0.4000E+02				
202	-0.4000E+02	-0.4000E+02				
203	-0.4000E+02	-0.4000E+02				
204	-0.4000E+02	-0.4000E+02				
205	-0.4000E+02	-0.4000E+02				
206	-0.4000E+02	-0.4000E+02				

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    207 -0.4000E+02 -0.4000E+02
    208 -0.4000E+02 -0.4000E+02
    601 -0.4000E+02 -0.4000E+02
    602 -0.4000E+02 -0.4000E+02
    603 -0.4000E+02 -0.4000E+02
    604 -0.4000E+02 -0.4000E+02
    605 -0.4000E+02 -0.4000E+02
    606 -0.4000E+02 -0.4000E+02
    607 -0.4000E+02 -0.4000E+02
    608 -0.4000E+02 -0.4000E+02
    609 -0.4000E+02 -0.4000E+02
    650 -0.4000E+02 -0.4000E+02

L O A D   C O N D I T I O N   LL2SPAN

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

CONCENTRATED SPAN LOADS ON FRAME ELEMENTS

ELEMENT  LOC   DISTANCE      FORCE     MOMENT
  LABEL  DOF

    201   U2  0.552E+00 -0.152E+02
    201   U2  0.997E+00 -0.152E+02
    202   U2  0.441E+00 -0.152E+02
    202   U2  0.885E+00 -0.152E+02
    203   U2  0.238E+00 -0.152E+02
    203   U2  0.558E+00 -0.152E+02
    203   U2  0.879E+00 -0.152E+02
    204   U2  0.199E+00 -0.152E+02
    204   U2  0.519E+00 -0.152E+02
    204   U2  0.840E+00 -0.152E+02

L O A D   C O N D I T I O N   LL5SPAN

SELF-WEIGHT MULTIPLIER FOR ENTIRE STRUCTURE = 0.0000E+00

CONCENTRATED SPAN LOADS ON FRAME ELEMENTS

ELEMENT  LOC   DISTANCE      FORCE     MOMENT
  LABEL  DOF

    201   U2  0.552E+00 -0.152E+02
    201   U2  0.997E+00 -0.152E+02
    202   U2  0.441E+00 -0.152E+02
    202   U2  0.885E+00 -0.152E+02
    203   U2  0.238E+00 -0.152E+02
    203   U2  0.558E+00 -0.152E+02
    203   U2  0.879E+00 -0.152E+02
    204   U2  0.199E+00 -0.152E+02
    204   U2  0.519E+00 -0.152E+02
    204   U2  0.840E+00 -0.152E+02
    205   U2  0.160E+00 -0.152E+02
    205   U2  0.481E+00 -0.152E+02
    205   U2  0.801E+00 -0.152E+02
    206   U2  0.121E+00 -0.152E+02
    206   U2  0.442E+00 -0.152E+02
    206   U2  0.762E+00 -0.152E+02
    207   U2  0.115E+00 -0.152E+02
    207   U2  0.559E+00 -0.152E+02
    208   U2  0.344E-02 -0.152E+02
    208   U2  0.448E+00 -0.152E+02
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C S I / S A P 2 0 0 0 - FINITE ELEMENT ANALYSIS OF STRUCTURES     PAGE  18
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 I N P U T   C O M P L E T E
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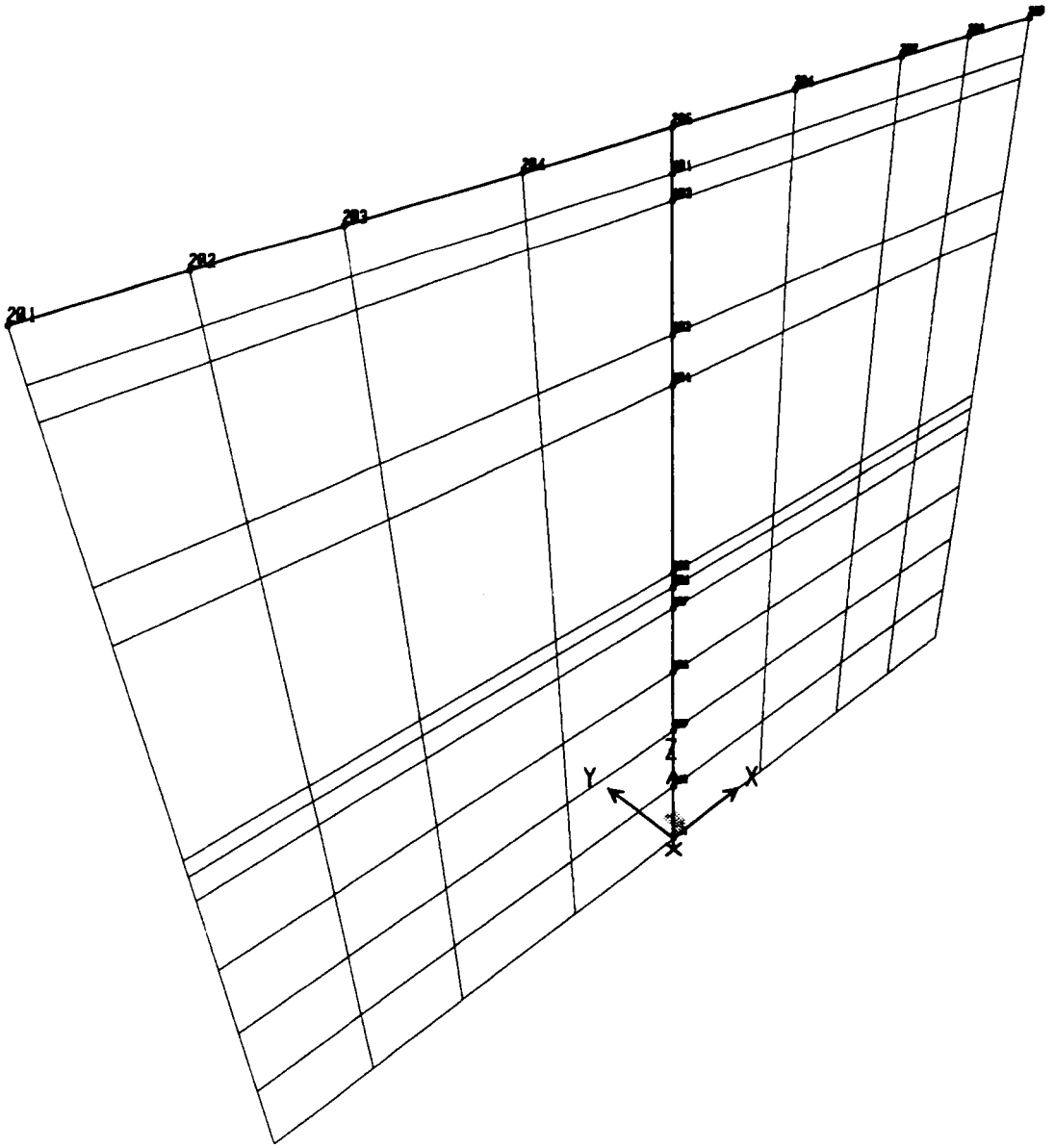
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SAP2000 v7.10 File: 24THTRAN  Kip-ft Units  PAGE 1
2/29/00 15:03:04

F R A M E   E L E M E N T   F O R C E S

   FRAME  LOAD     LOC          P          V2          V3          T          M
2          M3

     201  DL
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00     176.20       0.00       0.00       0.0
0    -397.86
     201  WINDSUP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00      -3.98       0.00       0.00       0.00       0.0
0       0.00
     201  WINDSUB
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00  -1.260E-01       0.00       0.00       0.00       0.0
0       0.00
     201  WINDLIVE
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00  -9.117E-01       0.00       0.00       0.00       0.0
0       0.00
     201  STREAM
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     201  TEMP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     201  LL2SPAN
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00      30.33       0.00       0.00       0.0
0     -61.61
     201  LL5SPAN
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00      30.33       0.00       0.00       0.0
0     -61.61

     202  DL
                 0.00       0.00     176.20       0.00       0.00       0.0
0    -397.86
                 9.00       0.00     364.55       0.00       0.00       0.0
0   -2596.21
     202  WINDSUP
                 0.00      -3.98       0.00       0.00       0.00       0.0
0       0.00
                 9.00      -7.96       0.00       0.00       0.00       0.0
0       0.00
     202  WINDSUB
                 0.00  -1.260E-01       0.00       0.00       0.00       0.0
0       0.00
                 9.00  -2.520E-01       0.00       0.00       0.00       0.0
0       0.00
     202  WINDLIVE
```



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                 0.00  -9.117E-01       0.00       0.00       0.00       0.0
0       0.00
                 9.00      -1.82       0.00       0.00       0.00       0.0
0       0.00
     202  STREAM
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     202  TEMP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     202  LL2SPAN
                 0.00       0.00      30.33       0.00       0.00       0.0
0     -61.61
                 9.00       0.00      60.67       0.00       0.00       0.0
0    -426.57
     202  LL5SPAN
                 0.00       0.00      30.33       0.00       0.00       0.0
0     -61.61
                 9.00       0.00      60.67       0.00       0.00       0.0
0    -426.57

     203  DL
                 0.00       0.00     364.55       0.00       0.00       0.0
0   -2596.21
                12.48       0.00     660.73       0.00       0.00       0.0
0   -8821.56
     203  WINDSUP
                 0.00      -7.96       0.00       0.00       0.00       0.0
0       0.00
                12.48     -13.48    -115.20       0.00       0.00       0.0
0     865.73
     203  WINDSUB
                 0.00  -2.520E-01       0.00       0.00       0.00       0.0
0       0.00
                12.48  -4.268E-01       0.00       0.00       0.00       0.0
0       0.00
     203  WINDLIVE
                 0.00      -1.82       0.00       0.00       0.00       0.0
0       0.00
                12.48      -3.09       0.00       0.00       0.00       0.0
0       0.00
     203  STREAM
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                12.48       0.00       0.00       0.00       0.00       0.0
0       0.00
     203  TEMP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                12.48       0.00       0.00       0.00       0.00       0.0
0       0.00
     203  LL2SPAN
                 0.00       0.00      60.67       0.00       0.00       0.0
0    -426.57
                12.48       0.00     106.17       0.00       0.00       0.0
0   -1434.92
     203  LL5SPAN
                 0.00       0.00      60.67       0.00       0.00       0.0
0    -426.57
                12.48       0.00     106.17       0.00       0.00       0.0
0   -1434.92
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204  DL
                0.00        0.00      660.73        0.00        0.00        0.0
0    -8821.56
               12.49        0.00      956.92        0.00        0.00        0.0
0   -18861.55
204  WINDSUP
                0.00      -13.48     -115.20        0.00        0.00        0.0
0     865.73
               12.49      -19.01     -115.20        0.00        0.00        0.0
0    2304.00
204  WINDSUB
                0.00  -4.268E-01        0.00        0.00        0.00        0.0
0       0.00
               12.49  -6.016E-01        0.00        0.00        0.00        0.0
0       0.00
204  WINDLIVE
                0.00       -3.09        0.00        0.00        0.00        0.0
0       0.00
               12.49       -4.35        0.00        0.00        0.00        0.0
0       0.00
204  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
204  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
204  LL2SPAN
                0.00        0.00      106.17        0.00        0.00        0.0
0   -1434.92
               12.49        0.00      151.68        0.00        0.00        0.0
0   -3033.50
204  LL5SPAN
                0.00        0.00      106.17        0.00        0.00        0.0
0   -1434.92
               12.49        0.00      151.68        0.00        0.00        0.0
0   -3033.50

205  DL
                0.00        0.00     -956.92        0.00        0.00        0.0
0  -18863.95
               12.49        0.00     -660.73        0.00        0.00        0.0
0   -8823.96
205  WINDSUP
                0.00       19.01        0.00        0.00        0.00        0.0
0       0.00
               12.49       13.48        0.00        0.00        0.00        0.0
0       0.00
205  WINDSUB
                0.00   6.016E-01        0.00        0.00        0.00        0.0
0       0.00
               12.49   4.268E-01        0.00        0.00        0.00        0.0
0       0.00
205  WINDLIVE
                0.00        4.35        0.00        0.00        0.00        0.0
0       0.00
               12.49        3.09        0.00        0.00        0.00        0.0
0       0.00
205  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
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205  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
205  LL2SPAN
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
205  LL5SPAN
                0.00        0.00     -151.68        0.00        0.00        0.0
0   -3033.50
               12.49        0.00     -106.17        0.00        0.00        0.0
0   -1434.92

206  DL
                0.00        0.00     -660.73        0.00        0.00        0.0
0   -8823.96
               12.48        0.00     -364.55        0.00        0.00        0.0
0   -2598.61
206  WINDSUP
                0.00       13.48        0.00        0.00        0.00        0.0
0       0.00
               12.48        7.96        0.00        0.00        0.00        0.0
0       0.00
206  WINDSUB
                0.00   4.268E-01        0.00        0.00        0.00        0.0
0       0.00
               12.48   2.520E-01        0.00        0.00        0.00        0.0
0       0.00
206  WINDLIVE
                0.00        3.09        0.00        0.00        0.00        0.0
0       0.00
               12.48        1.82        0.00        0.00        0.00        0.0
0       0.00
206  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.48        0.00        0.00        0.00        0.00        0.0
0       0.00
206  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.48        0.00        0.00        0.00        0.00        0.0
0       0.00
206  LL2SPAN
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.48        0.00        0.00        0.00        0.00        0.0
0       0.00
206  LL5SPAN
                0.00        0.00     -106.17        0.00        0.00        0.0
0   -1434.92
               12.48        0.00      -60.67        0.00        0.00        0.0
0    -426.57

207  DL
                0.00        0.00     -364.55        0.00        0.00        0.0
0   -2598.61
                9.00        0.00     -176.20        0.00        0.00        0.0
0    -397.86
207  WINDSUP
                0.00        7.96        0.00        0.00        0.00        0.0
0       0.00
                9.00        3.98        0.00        0.00        0.00        0.0
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0        0.00
     207  WINDSUB
                0.00   2.520E-01        0.00        0.00        0.00        0.0
0        0.00
                9.00   1.260E-01        0.00        0.00        0.00        0.0
0        0.00
     207  WINDLIVE
                0.00        1.82        0.00        0.00        0.00        0.0
0        0.00
                9.00   9.117E-01        0.00        0.00        0.00        0.0
0        0.00
     207  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     207  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     207  LL2SPAN
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     207  LL5SPAN
                0.00        0.00      -60.67        0.00        0.00        0.0
0     -426.57
                9.00        0.00      -30.33        0.00        0.00        0.0
0      -61.61

     208  DL
                0.00        0.00     -176.20        0.00        0.00        0.0
0     -397.86
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  WINDSUP
                0.00        3.98        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  WINDSUB
                0.00   1.260E-01        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  WINDLIVE
                0.00   9.117E-01        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  LL2SPAN
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                9.00        0.00        0.00        0.00        0.00        0.0
```



```
0        0.00
     208  LL5SPAN
                0.00        0.00      -30.33        0.00        0.00        0.0
0      -61.61
                9.00        0.00        0.00        0.00        0.00        0.0
0        0.00

     601  DL
                0.00    -1913.84        0.00        0.00        0.00        0.0
0        2.40
                1.96    -1913.84        0.00        0.00        0.00        0.0
0        2.40
     601  WINDSUP
                0.00      115.20      -38.01        0.00        0.00        0.0
0     2419.55
                1.96      115.20      -38.01        0.00        0.00        0.0
0     2494.05
     601  WINDSUB
                0.00        0.00       -1.20        0.00        0.00        0.0
0        3.66
                1.96        0.00       -1.20        0.00        0.00        0.0
0        6.02
     601  WINDLIVE
                0.00        0.00       -8.71        0.00        0.00        0.0
0       26.46
                1.96        0.00       -8.71        0.00        0.00        0.0
0       43.53
     601  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                1.96       24.95      -12.85        0.00        0.00        0.0
0       12.67
     601  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                1.96        0.00        0.00        0.00        0.00        0.0
0        0.00
     601  LL2SPAN
                0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                1.96     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
     601  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                1.96     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05

     602  DL
                0.00    -1913.84        0.00        0.00        0.00        0.0
0        2.40
               10.04    -2102.10        0.00        0.00        0.00        0.0
0        2.40
     602  WINDSUP
                0.00      115.20      -38.01        0.00        0.00        0.0
0     2494.05
               10.04      115.20      -38.01        0.00        0.00        0.0
0     2875.68
     602  WINDSUB
                0.00        0.00       -1.20        0.00        0.00        0.0
0        6.02
               10.04        0.00       -1.20        0.00        0.00        0.0
0       18.10
     602  WINDLIVE
                0.00        0.00       -8.71        0.00        0.00        0.0
0       43.53
```

```
                10.04      0.00     -8.71      0.00      0.00      0.0
0     130.93
      602  STREAM
                 0.00     24.95    -12.85      0.00      0.00      0.0
0      12.67
                10.04    103.26    -66.53      0.00      0.00      0.0
0     421.56
      602  TEMP
                 0.00      0.00      0.00      0.00      0.00      0.0
0       0.00
                10.04      0.00      0.00      0.00      0.00      0.0
0       0.00
      602  LL2SPAN
                 0.00   -151.68      0.00      0.00      0.00      0.0
0   -3033.50
                10.04   -151.68      0.00      0.00      0.00      0.0
0   -3033.50
      602  LL5SPAN
                 0.00   -303.35      0.00      0.00      0.00      0.0
0  -3.715E-05
                10.04   -303.35      0.00      0.00      0.00      0.0
0  -3.715E-05

      603  DL
                 0.00  -2102.10      0.00      0.00      0.00      0.0
0       2.40
                 4.04  -2177.85      0.00      0.00      0.00      0.0
0       2.40
      603  WINDSUP
                 0.00    115.20    -38.01      0.00      0.00      0.0
0    2875.68
                 4.04    115.20    -38.01      0.00      0.00      0.0
0    3029.24
      603  WINDSUB
                 0.00      0.00     -1.20      0.00      0.00      0.0
0      18.10
                 4.04      0.00     -1.20      0.00      0.00      0.0
0      22.96
      603  WINDLIVE
                 0.00      0.00     -8.71      0.00      0.00      0.0
0     130.93
                 4.04      0.00     -8.71      0.00      0.00      0.0
0     166.10
      603  STREAM
                 0.00    103.26    -66.53      0.00      0.00      0.0
0     421.56
                 4.04    134.77    -73.49      0.00      0.00      0.0
0     704.68
      603  TEMP
                 0.00      0.00      0.00      0.00      0.00      0.0
0       0.00
                 4.04      0.00      0.00      0.00      0.00      0.0
0       0.00
      603  LL2SPAN
                 0.00   -151.68      0.00      0.00      0.00      0.0
0   -3033.50
                 4.04   -151.68      0.00      0.00      0.00      0.0
0   -3033.50
      603  LL5SPAN
                 0.00   -303.35      0.00      0.00      0.00      0.0
0  -3.715E-05
                 4.04   -303.35      0.00      0.00      0.00      0.0
0  -3.715E-05

      604  DL
                 0.00  -2177.85      0.00      0.00      0.00      0.0
```



```
0       2.40
                17.25  -2501.30      0.00      0.00      0.00      0.0
0       2.40
      604  WINDSUP
                 0.00    115.20    -38.01      0.00      0.00      0.0
0    3029.24
                17.25    115.20    -38.01      0.00      0.00      0.0
0    3684.92
      604  WINDSUB
                 0.00      0.00     -1.20      0.00      0.00      0.0
0      22.96
                17.25      0.00     -1.20      0.00      0.00      0.0
0      43.71
      604  WINDLIVE
                 0.00      0.00     -8.71      0.00      0.00      0.0
0     166.10
                17.25      0.00     -8.71      0.00      0.00      0.0
0     316.27
      604  STREAM
                 0.00    134.77    -73.49      0.00      0.00      0.0
0     704.68
                17.25    269.32    -94.50      0.00      0.00      0.0
0    2173.81
      604  TEMP
                 0.00      0.00      0.00      0.00      0.00      0.0
0       0.00
                17.25      0.00      0.00      0.00      0.00      0.0
0       0.00
      604  LL2SPAN
                 0.00   -151.68      0.00      0.00      0.00      0.0
0   -3033.50
                17.25   -151.68      0.00      0.00      0.00      0.0
0   -3033.50
      604  LL5SPAN
                 0.00   -303.35      0.00      0.00      0.00      0.0
0  -3.715E-05
                17.25   -303.35      0.00      0.00      0.00      0.0
0  -3.715E-05

      605  DL
                 0.00  -2501.30      0.00      0.00      0.00      0.0
0       2.40
                 3.75  -2735.32      0.00      0.00      0.00      0.0
0       2.40
      605  WINDSUP
                 0.00    115.20    -38.01      0.00      0.00      0.0
0    3684.92
                 3.75    115.20    -38.01      0.00      0.00      0.0
0    3827.46
      605  WINDSUB
                 0.00      0.00     -1.20      0.00      0.00      0.0
0      43.71
                 3.75      0.00     -1.20      0.00      0.00      0.0
0      48.22
      605  WINDLIVE
                 0.00      0.00     -8.71      0.00      0.00      0.0
0     316.27
                 3.75      0.00     -8.71      0.00      0.00      0.0
0     348.92
      605  STREAM
                 0.00    269.32    -94.50      0.00      0.00      0.0
0    2173.81
                 3.75    366.67   -103.15      0.00      0.00      0.0
0    2545.07
      605  TEMP
                 0.00      0.00      0.00      0.00      0.00      0.0
```

```
0        0.00
                3.75        0.00        0.00        0.00        0.00        0.0
0        0.00
      605  LL2SPAN
                0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                3.75     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
      605  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                3.75     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05

      606  DL
                0.00    -2735.32   6.950E-04        0.00        0.00        0.0
0        2.40
               13.35    -2735.32   6.950E-04        0.00        0.00        0.0
0        2.39
      606  WINDSUP
                0.00      115.20      -36.28        0.00        0.00        0.0
0     3827.46
               13.35      115.20      -36.28        0.00        0.00        0.0
0     4311.80
      606  WINDSUB
                0.00        0.00       -1.17        0.00        0.00        0.0
0       48.22
               13.35        0.00       -1.17        0.00        0.00        0.0
0       63.83
      606  WINDLIVE
                0.00        0.00       -8.46        0.00        0.00        0.0
0      348.92
               13.35        0.00       -8.46        0.00        0.00        0.0
0      461.89
      606  STREAM
                0.00      366.67     -100.29        0.00        0.00        0.0
0     2545.07
               13.35      369.08     -131.80        0.00        0.00        0.0
0     4164.34
      606  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
               13.35        0.00        0.00        0.00        0.00        0.0
0        0.00
      606  LL2SPAN
                0.00     -151.68  -8.786E-01        0.00        0.00        0.0
0    -3033.50
               13.35     -151.68  -8.786E-01        0.00        0.00        0.0
0    -3021.77
      606  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
               13.35     -303.35        0.00        0.00        0.00        0.0
0  -3.701E-05

      607  DL
                0.00    -2735.32   2.576E-03        0.00        0.00        0.0
0        2.39
                6.41    -2735.32   2.576E-03        0.00        0.00        0.0
0        2.37
      607  WINDSUP
                0.00      115.20      -30.94        0.00        0.00        0.0
0     4311.80
                6.41      115.20      -30.94        0.00        0.00        0.0
0     4510.20
      607  WINDSUB
```



```
                0.00        0.00       -1.06        0.00        0.00        0.0
0       63.83
                6.41        0.00       -1.06        0.00        0.00        0.0
0       70.62
      607  WINDLIVE
                0.00        0.00       -7.65        0.00        0.00        0.0
0      461.89
                6.41        0.00       -7.65        0.00        0.00        0.0
0      510.96
      607  STREAM
                0.00      369.08     -121.61        0.00        0.00        0.0
0     4164.34
                6.41      369.08     -121.61        0.00        0.00        0.0
0     4944.20
      607  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.41        0.00        0.00        0.00        0.00        0.0
0        0.00
      607  LL2SPAN
                0.00     -151.68       -3.26        0.00        0.00        0.0
0    -3021.77
                6.41     -151.68       -3.26        0.00        0.00        0.0
0    -3000.89
      607  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.701E-05
                6.41     -303.35        0.00        0.00        0.00        0.0
0  -3.675E-05

      608  DL
                0.00    -2735.32   4.563E-03        0.00        0.00        0.0
0        2.37
                6.41    -2735.32   4.563E-03        0.00        0.00        0.0
0        2.34
      608  WINDSUP
                0.00      115.20      -24.62        0.00        0.00        0.0
0     4510.20
                6.41      115.20      -24.62        0.00        0.00        0.0
0     4668.09
      608  WINDSUB
                0.00        0.00  -9.180E-01        0.00        0.00        0.0
0       70.62
                6.41        0.00  -9.180E-01        0.00        0.00        0.0
0       76.50
      608  WINDLIVE
                0.00        0.00       -6.64        0.00        0.00        0.0
0      510.96
                6.41        0.00       -6.64        0.00        0.00        0.0
0      553.55
      608  STREAM
                0.00      369.08     -108.47        0.00        0.00        0.0
0     4944.20
                6.41      369.08     -108.47        0.00        0.00        0.0
0     5639.76
      608  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.41        0.00        0.00        0.00        0.00        0.0
0        0.00
      608  LL2SPAN
                0.00     -151.68       -5.77        0.00        0.00        0.0
0    -3000.89
                6.41     -151.68       -5.77        0.00        0.00        0.0
0    -2963.90
      608  LL5SPAN
```

```
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.675E-05
                6.41     -303.35        0.00        0.00        0.00        0.0
0  -3.630E-05

     609  DL
                0.00    -2735.32    5.353E-03        0.00        0.00        0.0
0        2.34
                6.42    -2735.32    5.353E-03        0.00        0.00        0.0
0        2.31
     609  WINDSUP
                0.00      115.20      -21.52        0.00        0.00        0.0
0     4668.09
                6.42      115.20      -21.52        0.00        0.00        0.0
0     4806.13
     609  WINDSUB
                0.00        0.00   -8.438E-01        0.00        0.00        0.0
0       76.50
                6.42        0.00   -8.438E-01        0.00        0.00        0.0
0       81.92
     609  WINDLIVE
                0.00        0.00       -6.11        0.00        0.00        0.0
0      553.55
                6.42        0.00       -6.11        0.00        0.00        0.0
0      592.72
     609  STREAM
                0.00      369.08     -101.15        0.00        0.00        0.0
0     5639.76
                6.42      369.08     -101.15        0.00        0.00        0.0
0     6288.63
     609  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.42        0.00        0.00        0.00        0.00        0.0
0        0.00
     609  LL2SPAN
                0.00     -151.68       -6.77        0.00        0.00        0.0
0    -2963.90
                6.42     -151.68       -6.77        0.00        0.00        0.0
0    -2920.49
     609  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.630E-05
                6.42     -303.35        0.00        0.00        0.00        0.0
0  -3.577E-05

     610  DL
                0.00    -2735.32    5.488E-03        0.00        0.00        0.0
0        2.31
                6.41    -2735.32    5.488E-03        0.00        0.00        0.0
0        2.28
     610  WINDSUP
                0.00      115.20      -20.52        0.00        0.00        0.0
0     4806.13
                6.41      115.20      -20.52        0.00        0.00        0.0
0     4937.65
     610  WINDSUB
                0.00        0.00   -8.162E-01        0.00        0.00        0.0
0       81.92
                6.41        0.00   -8.162E-01        0.00        0.00        0.0
0       87.15
     610  WINDLIVE
                0.00        0.00       -5.91        0.00        0.00        0.0
0      592.72
                6.41        0.00       -5.91        0.00        0.00        0.0
0      630.58
```



```
     610  STREAM
                0.00      369.08      -98.22        0.00        0.00        0.0
0     6288.63
                6.41      369.08      -98.22        0.00        0.00        0.0
0     6918.24
     610  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.41        0.00        0.00        0.00        0.00        0.0
0        0.00
     610  LL2SPAN
                0.00     -151.68       -6.94        0.00        0.00        0.0
0    -2920.49
                6.41     -151.68       -6.94        0.00        0.00        0.0
0    -2876.03
     610  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.577E-05
                6.41     -303.35        0.00        0.00        0.00        0.0
0  -3.522E-05

     650  DL
                0.00    -1913.84        0.00        0.00        0.00        0.0
0        2.40
                3.04    -1913.84        0.00        0.00        0.00        0.0
0        2.40
     650  WINDSUP
                0.00      115.20      -38.01        0.00        0.00        0.0
0     2304.00
                3.04      115.20      -38.01        0.00        0.00        0.0
0     2419.55
     650  WINDSUB
                0.00        0.00       -1.20        0.00        0.00        0.0
0        0.00
                3.04        0.00       -1.20        0.00        0.00        0.0
0        3.66
     650  WINDLIVE
                0.00        0.00       -8.71        0.00        0.00        0.0
0        0.00
                3.04        0.00       -8.71        0.00        0.00        0.0
0       26.46
     650  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0        0.00
     650  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0        0.00
     650  LL2SPAN
                0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                3.04     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
     650  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                3.04     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
```

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	3/7/00
D:\My Documents\Projects\1317 Salt River Bridges\24th street (rev.)\excel\[COL_BOT.xls]S		Checker:		Date:	

LOADS AT TOP OF COLUMN

LOAD FACTOR DESIGN:

GROUP-I = 1.30 [.75 DL + 1.67 LL+I + 1.0 SF]
GROUP-II = 1.30 [.75 DL + 1.0 SF + 1.0 W]
GROUP-III = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF]
GROUP-IV = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 1.0 RST]
GROUP-V = 1.25 [.75 DL + 1.0 SF + 1.0 W + 1.0 RST]
GROUP-VI = 1.25 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF + 1.0 RST]

CASE - 3 VERTICAL LOAD

	DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
Col 1	1,914	303	(115)	0	0	(25)	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Pu	2,492	1,684	2,183	2,228	1,619	2,099

CASE - 3 SHEAR

		DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
long	Col 1 - Vy	0	0	42	5	14	9	5
trans	Col 1 - Vx	0	0	39	9	0	13	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Col 1 - Vy	12	66	53	18	70	57
Col 1 - Vx	17	68	43	17	65	42

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	3/7/00
D:\My Documents\Projects\1317 Salt River Bridges\24th street (rev.)\excel\[COL_BOT.xls]		Checker:		Date:	

LOADS AT TOP OF COLUMN *(Cont.)*

CASE - 3 MOMENT

		DL (K-FT)	LL+I (K-FT)	WIND (K-FT)	WL (K-FT)	LF (K-FT)	SF (K-FT)	RST (K-FT)
trans	Col 1 - My	2	3,034	2,500	44	0	13	0
long	Col 1 - Mx	0	0	392	54	167	9	61

	GRP-I (K-FT)	GRP-II (K-FT)	GRP-III (K-FT)	GRP-IV (K-FT)	GRP-V (K-FT)	GRP-VI (K-FT)
Col 1 - My	6,604	3,269	4,994	3,962	3,143	4,802
Col 1 - Mx	11	521	452	90	577	511

FOOTING LOAD

DRILLED SHAFT DIAMETER = 7 FT WT = 5.77 K/FT

LENGTH TO 100-YR FLOOD SCOUR = 61.18 FT WT = 353.2 KIPS

I = 0.25

	COL -1 (100-YR)
LL+I =	303.35
LL =	242
DL =	2,501
SF+B =	(269)
DL+LL-B =	2,474

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th street (rev.)\excel\[COL_BOT.xls]S		Checker:		Date:	

LOADS AT BOT OF PIER

LOAD FACTOR DESIGN:

GROUP-I = 1.30 [.75 DL + 1.67 LL+I + 1.0 SF]
GROUP-II = 1.30 [.75 DL + 1.0 SF + 1.0 W]
GROUP-III = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF]
GROUP-IV = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 1.0 RST]
GROUP-V = 1.25 [.75 DL + 1.0 SF + 1.0 W + 1.0 RST]
GROUP-VI = 1.25 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF + 1.0 RST]

CASE - 3 VERTICAL LOAD

	DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
Col 1	2,732	303	115	0	0	367	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Pu	3,799	3,290	3,580	3,535	3,164	3,442

CASE - 3 SHEAR

		DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
long	Col 1 - Vy	0	0	42	5	14	83	5
trans	Col 1 - Vx	0	0	39	9	0	103	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Col 1 - Vy	108	163	149	115	163	150
Col 1 - Vx	134	185	161	134	178	155

TYLIN INTERNATIONAL

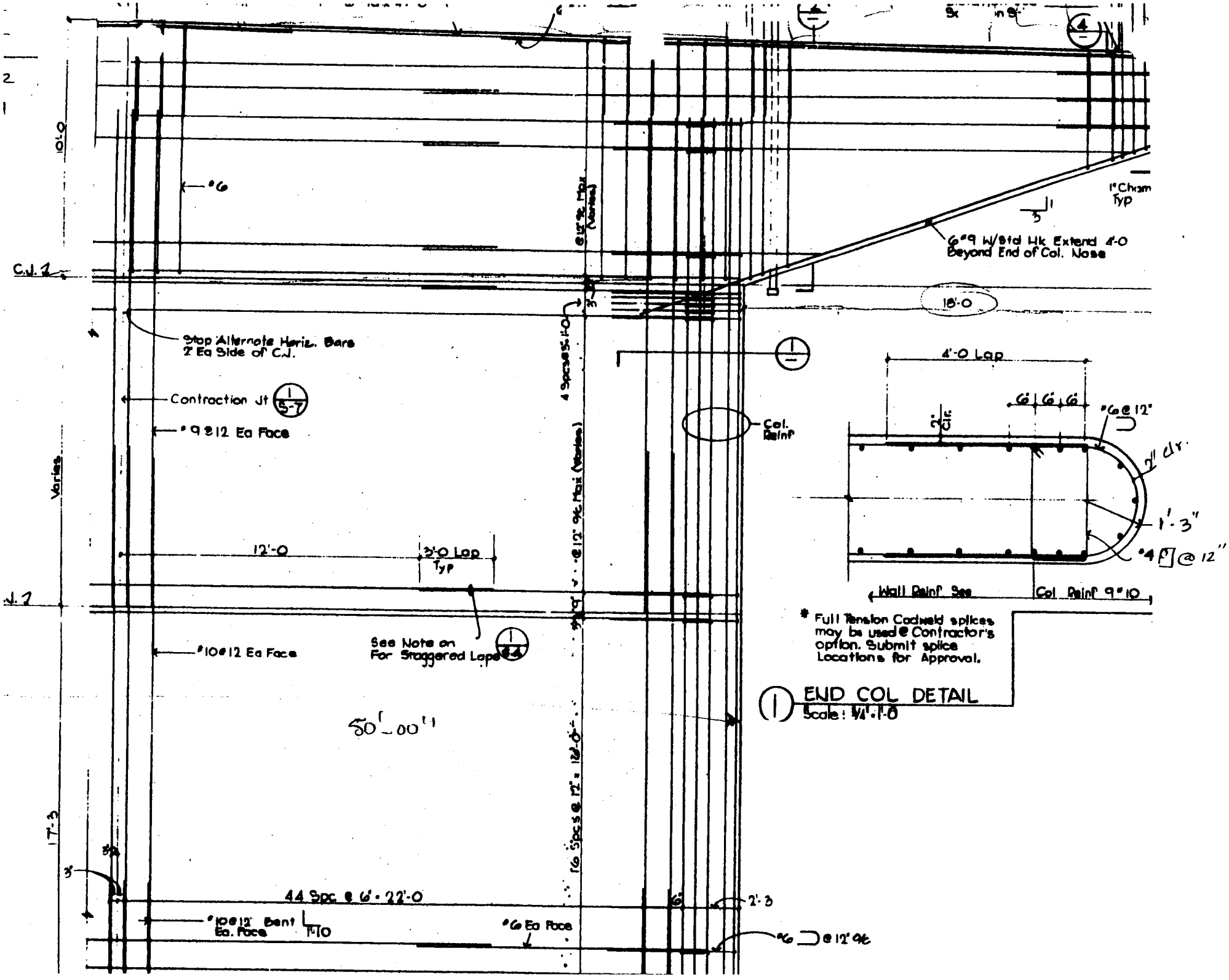
Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th street (rev.)\excel\[COL_BOT.xls]S		Checker:		Date:	

LOADS AT BOT OF PIER

CASE - 3 MOMENT

		DL (K-FT)	LL+I (K-FT)	WIND (K-FT)	WL (K-FT)	LF (K-FT)	SF (K-FT)	RST (K-FT)
trans	Col 1 - My	2	3,034	3,921	349	0	2,545	0
long	Col 1 - Mx	0	0	1,872	217	670	1,863	243

	GRP-I (K-FT)	GRP-II (K-FT)	GRP-III (K-FT)	GRP-IV (K-FT)	GRP-V (K-FT)	GRP-VI (K-FT)
Col 1 - My	9,897	8,409	9,237	7,254	8,085	8,882
Col 1 - Mx	2,421	4,855	4,305	2,737	4,972	4,443


10'-0
#6
C.J. 2
Stop Alternate Horiz. Bars 2' Ea Side of C.J.
Contraction Jt
#9 @ 12 Ea Face
Varies
12'-0
3'-0 Lap Typ
See Note on For Staggered Laps
#10 @ 12 Ea Face
50'-00"
17'-3
3'
44 Spc. @ 6" = 22'-0
#10 @ 12 Bent Ea. Face
#6 Ea Face
4 Spcs @ 3'-0
16 Spcs @ 12" = 16'-0
Col. Reinf
6"#9 W/Std Hk Extend 4'-0 Beyond End of Col. Nose
1" Cham Typ
18'-0
2'-3
#6 @ 12" Ok
4'-0 Lap
6" 6" 6"
#6 @ 12"
2" Clr.
2" clr.
1'-3"
#4 @ 12"
Wall Reinf See
Col Reinf 9"#10
* Full Tension Cadweld splices may be used @ Contractor's option. Submit splice Locations for Approval.
END COL DETAIL
Scale: 1/4" = 1'-0

```
OOOOOOO    OOOOO    OOOOO    OOOOO    OOOOO    OO
OO    OO   OO  OO   OO  OO   OO  OO   OO  OO   OO
OO    OO   OO  OO   OO  OO   OO  OO   OO  OO   OO
OO    OO   OO       OO  OO   OO       OO  OO   OO
OO    OO   OO       OOOOOOO  OO       OO  OO   OO
OOOOOOO    OO  OO   OO  OO   OO  OO   OO  OO   OO
OO         OO  OO   OO  OO   OO  OO   OO  OO   OO
OO          OOOOO   OO  OO    OOOOO    OOOOO    OOOOO  (TM)
```

==========
Computer program for the Strength Design of Reinforced Concrete Sections
==========

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General Information:
==========

File Name: D:\MYDOCU~1\PERSONAL\PCA\24TH.COL
Project: Salt River Bridges-Scou Code: ACI 318-89
Column: 24th Units: US in-lbs
Engineer: SJ Date: 03/01/00 Time: 15:24:57

Run Option: Investigation Slender column
Run Axis: Biaxial Column Type: Structural

Material Properties:
==========

f'c = 4 ksi fy = 60 ksi
Ec = 3834.25 ksi Es = 29000 ksi
fc = 3.4 ksi erup = 0 in/in
eu = 0.003 in/in
Stress Profile: Parabolic

Geometry:
==========

Rectangular: Width = 600 in Depth = 30 in

Gross section area, Ag = 18000 in^2
Ix = 1.35e+006 in^4 Xo = 0 in
Iy = 5.4e+008 in^4 Yo = 0 in

Reinforcement:
==========

Rebar Database: ASTM

Size	Diam	Area	Size	Diam	Area	Size	Diam	Area
3	0.38	0.11	4	0.50	0.20	5	0.63	0.31
6	0.75	0.44	7	0.88	0.60	8	1.00	0.79
9	1.13	1.00	10	1.27	1.27	11	1.41	1.56
14	1.69	2.25	18	2.26	4.00			

Confinement: Tied; phi(c) = 0.7, phi(b) = 0.9, a = 0.8
#6 ties with #10 bars, #4 with larger bars.

Layout: Rectangular
Pattern: Sides Different [Cover to transverse reinforcement (ties)]

Total steel area, As = 137.16 in^2 at 0.76%

	Top	Bottom	Left	Right
Bars	50 -#10	50 -#10	4 -#10	4 -#10
Cover(in)	3	3	3	3

Slenderness:
==========

Sway-Criteria:
X-axis: Unbraced against sidesway -- Not hinged at either end.
Y-axis: Unbraced against sidesway -- Not hinged at either end.

Columns:

Col.	Axis	Height (ft)	Width (in)	Depth (in)	I (in^4)	f'c (ksi)	Ec (ksi)
Design	X	32	600	30	1.35e+006	4	3834.25
	Y	32			5.4e+008		
Above	X	(NO COLUMN SPECIFIED...)					
	Y	(NO COLUMN SPECIFIED...)					
Below	X	3.75	52	8	2218.67	4	3834.25
	Y	3.75			93738.7		

Beams:

X-Beams Location	Length (ft)	Width (in)	Depth (in)	I (in^4)	f'c (ksi)	Ec (ksi)
Above Left	(NO BEAM SPECIFIED...)					
Above Right	(NO BEAM SPECIFIED...)					
Below Left	(NO BEAM SPECIFIED...)					
Below Right	(NO BEAM SPECIFIED...)					

Y-Beams Location	Length (ft)	Width (in)	Depth (in)	I (in^4)	f'c (ksi)	Ec (ksi)
Above Left	72	600	24	691200	4	3834.25
Above Right	72	600	24	691200	4	3834.25
Below Left	(NO BEAM SPECIFIED...)					
Below Right	(NO BEAM SPECIFIED...)					

Effective Length Factors:

Axis	Psi(top)	Psi(bot)	k(Braced)	k(Sway)	klu/r
X	0.000	0.000	1.000	1.200	53.2
Y	878.906	0.000	0.850	18.888	41.9

Moment Magnification Factors:

Beta(d) load case factors: Dead = 1.4, Live = 1.7
Strength reduction factor = 0.7
Sum of Pc = 1.00*Pc; Sum of Pu = 1.00*Pu

Load Comb	Braced (X-axis) Pc (kip)	Betad	EI (k-in^2)	Cm	Delta	Sway (X-axis) Pc (kip)	EI (k-in^2)	Delta
1 U1	53032	0.839	7.92e+008	0.535	1.000	67717	1.46e+009	N/A
U2				0.535	1.000			1.057
U3				0.535	1.000			1.048
U4				0.535	1.000			1.042

Load Comb	Braced (Y-axis) Pc (kip)	Betad	EI (k-in^2)	Cm	Delta	Sway (Y-axis) Pc (kip)	EI (k-in^2)	Delta
1 U1	27786024	0.839	3.00e+011	0.400	1.000	103468	5.52e+011	N/A
U2				0.400	1.000			1.037
U3				0.400	1.000			1.031
U4				0.400	1.000			1.027

Load Combinations:

U1 = 1.400*Dead + 1.700*Live + 0.000*Lateral
U2 = 1.050*Dead + 1.275*Live + 1.275*Lateral
U3 = 1.050*Dead + 0.000*Live + 1.275*Lateral
U4 = 0.900*Dead + 0.000*Live + 1.300*Lateral

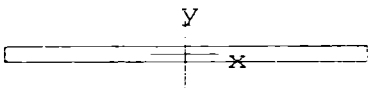
Service Loads:

No.	Load Case	Axial Load (kip)	Moments about X-axis @ Top (ft-k)	Moments about X-axis @ Bot (ft-k)	Moments about Y-axis @ Top (ft-k)	Moments about Y-axis @ Bot (ft-k)
1	Dead	1914	594	96	2	2
	Live	303	0	0	3034	3034
	Latl	140	3067	863	2557	6219

NOTE: Each loading combination includes the following cases:
First line - moment at column top.
Second line - moment at column bottom.
Third line - moment due to minimum X-Eccentricity.
Fourth line - moment due to minimum Y-Eccentricity.

		Applied Loads			Computed Strength			Computed/
Pt.	Load Comb	P (kips)	Mx (ft-k)	My (ft-k)	P (kips)	Mx (ft-k)	My (ft-k)	Applied Ray length
1	1 U1	3195	832	5161	35946	9716	60175	11.551
2			-134	-5161	38619	-1684	-63038	13.373
3			399	0	38619	4842	-1	12.108
4			0	4952	38619	0	59499	13.353
5	1 U2	2575	4759	7251	6255	11869	18026	2.484
6			-1264	-12092	25318	-12741	-123655	10.208
7			964	0	32765	12692	-2	12.782
8			0	8008	38619	-0	121578	15.976
9	1 U3	2188	4723	3364	5120	11316	8046	2.388
10			-1254	-8178	24544	-14061	-91613	11.203
11			910	0	31372	13458	-2	14.403
12			0	3499	38619	-0	61634	19.541
13	1 U4	1905	4689	3416	4313	10838	7873	2.305
14			-1255	-8305	21839	-14380	-95275	11.472
15			783	0	31553	13363	-2	16.641
16			0	3034	38619	-0	61356	22.445

Program completed as requested!



600.0 x 30.0 inch

f'c = 4.0 ksi

fy = 60.0 ksi

Confinement: Tied

clr cover = 3.75 in

spacing = 2.97 in

108-#10 at 0.76%

As = 137 in^2

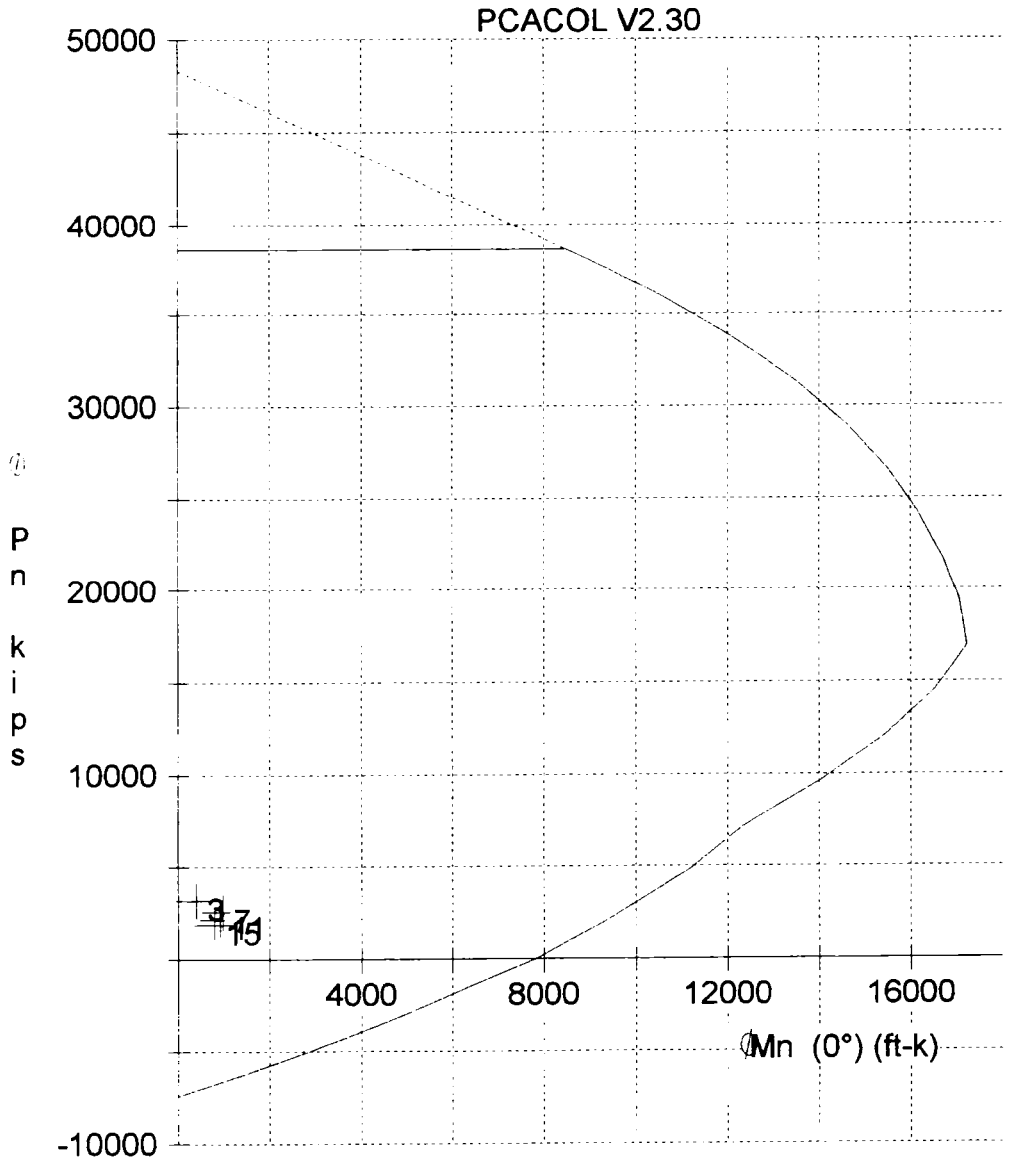
Ix = 1350000 in^4

Iy = 540000000 in^4

Xo = 0.00 in

Yo = 0.00 in

© 1993 PCA



Licensed To: Licensee name not yet specified.

File name: D:\MYDOCU~1\PERSONAL\PCA\24TH.COL

Project: Salt River Bridges-Scou

Column Id: 24th

Engineer: SJ

Date: 03/01/00 Time: 15:24:57

Code: ACI 318-89

Material Properties:

Ec = 3834 ksi eu = 0.003 in/in

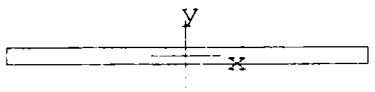
fc = 3.40 ksi Es = 29000 ksi

Stress Profile: Parabolic

phi(c) = 0.70, phi(b) = 0.90

X-axis slenderness is considered; k(b) = 1.00 k(s) = 1.20

Y-axis slenderness is considered; k(b) = 0.85 k(s) = 18.89



600.0 x 30.0 inch

f'c = 4.0 ksi

fy = 60.0 ksi

Confinement: Tied

clr cover = 3.75 in

spacing = 2.97 in

108-#10 at 0.76%

As = 137 in^2

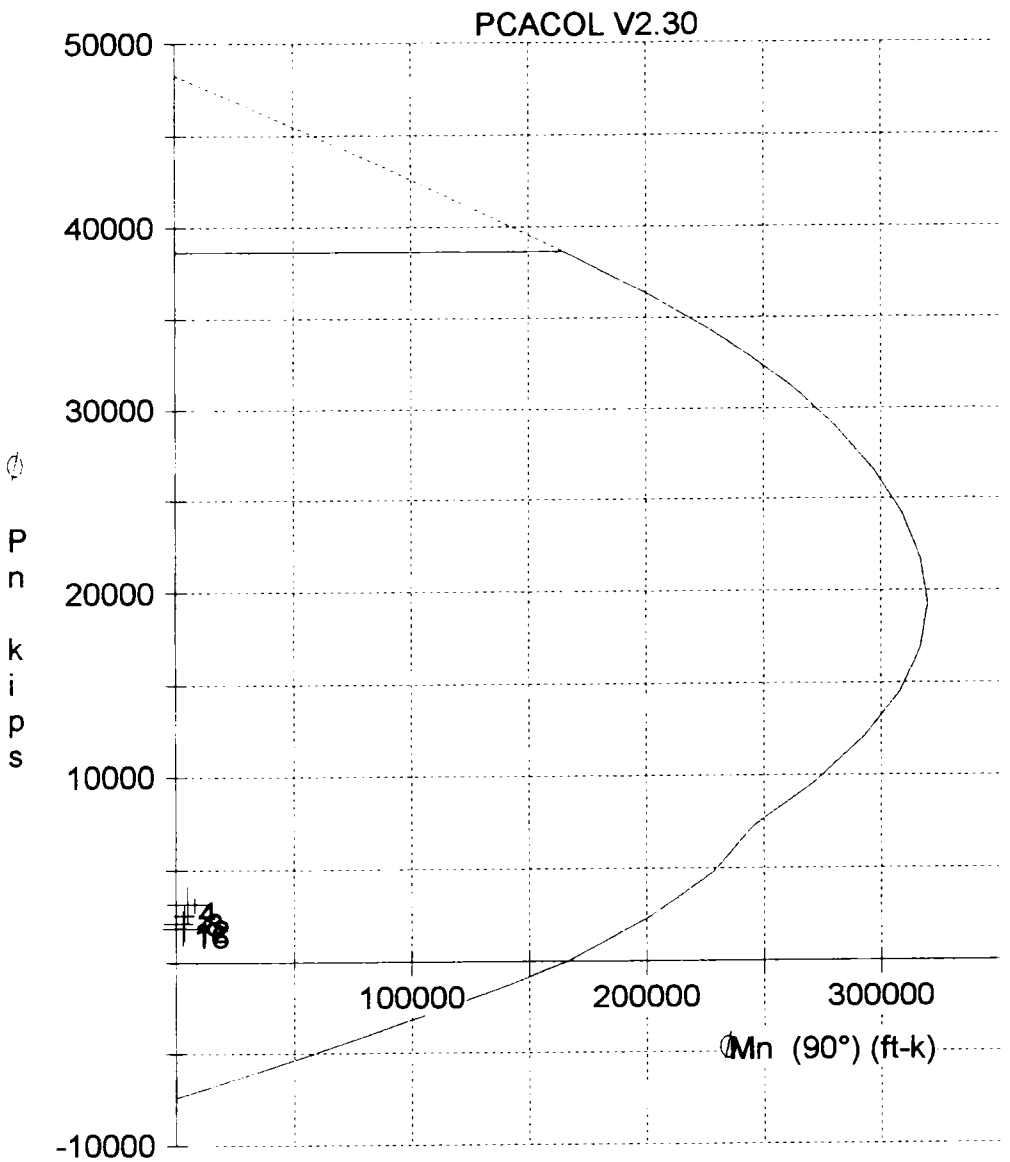
Ix = 1350000 in^4

Iy = 540000000 in^4

Xo = 0.00 in

Yo = 0.00 in

© 1993 PCA



Licensed To: Licensee name not yet specified.

File name: D:\MYDOCU~1\PERSONAL\PCA\24TH.COL

Project: Salt River Bridges-Scou

Column Id: 24th

Engineer: SJ

Date: 03/01/00 Time: 15:24:57

Code: ACI 318-89

Material Properties:

Ec = 3834 ksi eu = 0.003 in/in

fc = 3.40 ksi Es = 29000 ksi

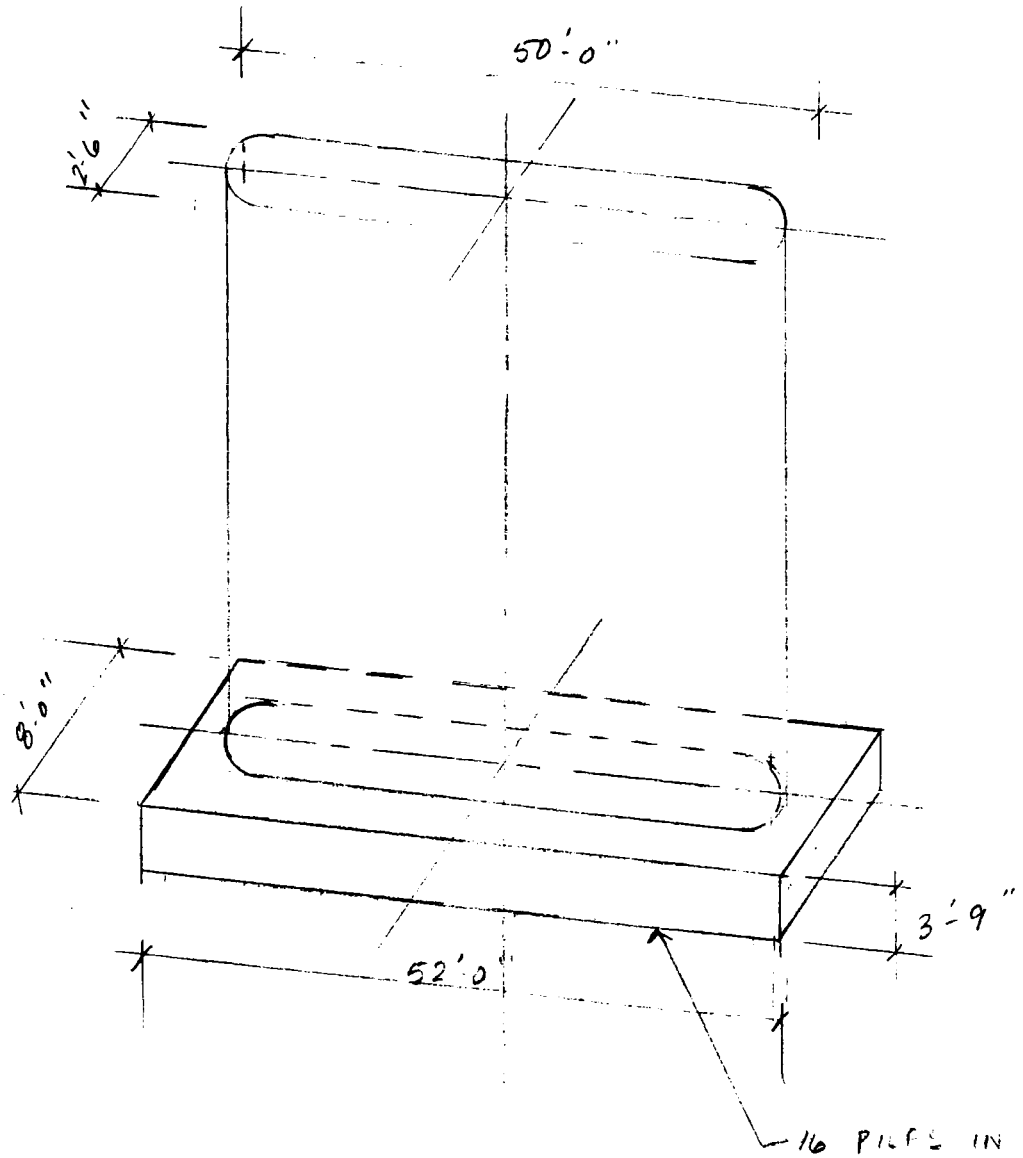
Stress Profile: Parabolic

phi(c) = 0.70, phi(b) = 0.90

X-axis slenderness is considered; k(b) = 1.00 k(s) = 1.20

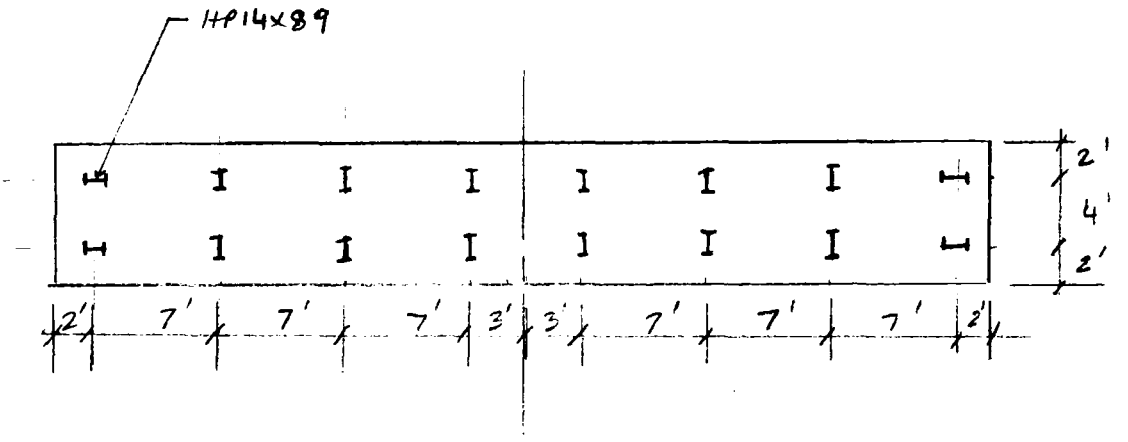
Y-axis slenderness is considered; k(b) = 0.85 k(s) = 18.89

BOTTOM OF WALL COLUMN:



16 PILES IN TWO ROWS BELOW FTG. IS NOT SHOWN. SEE NEXT PAGE.

PILE LAYOUT:



HP14x89 → DEPTH = 13.83"
FLANGE WIDTH = 14.695"

FOR FTG CHECK CONSIDERED 14" DIA pile. The Program uses this value to determine the proportion of the pile reaction that produces shear at a critical section.

```
  SALT RIVER BRIDGES SCOUR - 24TH STREET    VERSION 2.1    06.26.89
     50.00      2.50    125.00     25.00  FIX  FIX         1
    DESIGN     52.00      8.00      3.75      PILE      3.75
     3000.    60000.     150.0
        12        51         6         6      3.00         X
        12        51         6         8     12.00         X
         5     12.00     12.00
      0.00    120.00    170.00      0.00
      0.00      0.00      0.00      0.00      0.00      0.00
        16         2      14.0     150.0       YES      39.0
         8       2.0       7.0
         8      -2.0       7.0
LOAD AT BOTTOM                    AGS    B         1
      2       0   3034       0       0   3921   349     0     0     0  2545
      0       0      0       0       0   1872   217   670     0   243  1863
   2501       0    303       0       0    115     0     0     0     0   367
                     0       0       0                           0
                     0       0       0                           0
                     0       0       0                           0
         0         0         0         0         0         0
         0         0         0         0         0         0
         0         0         0         0         0         0
        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        1.
        1.        1.        1.        1.        1.        1.        1.
```

```
DATE          :  04/18/:0          TIME : 16:33:26

PROJECT TITLE :    SALT RIVER BRIDGES SCOUR - 24TH STREET      PAGE :   1

****************** Licensed to: T.Y. Lin International ******************
*                                                                       *
*    ( F A D )   PILE AND SPREAD FOOTING DESIGN PROGRAM                 *
*                  IMBSEN AND ASSOCIATES INCORPORATED                   *
*                     VERSION  2    Dec 1989                            *
*                                                                       *
*************************************************************************


***************
* COLUMN DATA *
*************************************************************************

COLUMN WIDTH X-DIR (TRANS)     =  50.00 FT
COLUMN DEPTH Y-DIR  (LONG)     =   2.50 FT
COLUMN AREA                    = 125.00 FT**2
EQUIVALENT WIDTH X-DIR (TRANS) =  50.00 FT
EQUIVALENT DEPTH Y-DIR  (LONG) =   2.50 FT
LIVE LOAD PERCENT IMPACT       =  25.00 PERCENT
END CONDITION ABOUT X-AXIS     =    FIX
END CONDITION ABOUT Y-AXIS     =    FIX
NUMBER OF COLUMNS IN BENT      =      1 COLUMNS


****************
* FOOTING DATA *
*************************************************************************

TYPE OF FOOTING ANALYSIS     = DESIGN
FOOTING LENGTH X-DIR (TRAN)  =  52.00 FT
FOOTING WIDTH  Y-DIR (LONG)  =   8.00 FT
MIN FOOTING DEPTH CONSIDERED =   3.75 FT
MAX FOOTING DEPTH CONSIDERED =   3.75 FT
TYPE OF FOOTING              =   PILE


*******************************
* FOOTING MATERIAL PROPERTIES *
*************************************************************************

ULTIMATE CONCRETE COMPRESSIVE STRESS (FC) =  3000.0 PSI
YIELD STRESS OF STEEL REINFORCEMENT  (FY) = 60000.0 PSI
UNIT WEIGHT OF CONCRETE                   =   150.0 PCF
MODULAR RATIO (ES/EC)                (N) =     9.3
```

DATE : 04/18/:0 TIME : 16:33:26

PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 2

```
***********************************
* TOP FLEXURE REINFORCEMENT DATA *
***********************************

BAR SIZE IN X-DIR (TRAN)     =   6
BAR SIZE IN Y-DIR (LONG)     =   6
TOP BAR CLEARANCE            =   3.00 INCHES
DIRECTION OF TOP BARS        =   X DIRECTION

***************************************
* BOTTOM FLEXURE REINFORCEMENT DATA *
***************************************

BAR SIZE IN X-DIR (TRAN)     =   6
BAR SIZE IN Y-DIR (LONG)     =   8
BOTTOM BAR CLEARANCE         =  12.00 INCHES
DIRECTION OF BOTTOM BARS     =   X DIRECTION

****************************
* SHEAR REINFORCEMENT DATA *
****************************

STIRRUP BAR SIZE             =   5
STIRRUP SPACING X-DIR (TRAN) =  12.00 INCHES
STIRRUP SPACING Y-DIR (LONG) =  12.00 INCHES

*************
* SOIL DATA *
*************

DEPTH OF EARTH COVER            =   0.00 FT
UNIT WEIGHT OF COVER            = 120.00 PCF
ENVIRONMENTAL FACTOR (Z)        = 170.00 K/IN

**************************
* PILE FOOTING COST DATA *
**************************

CONTRACT ITEM                          PRICE UNIT

STRUCTURE EXCAVATION (BRIDGE)      =   0.00 $/CY
STRUCTURE BACKFILL   (BRIDGE)      =   0.00 $/CY
STRUCTURAL CONCRETE BRIDGE FOOTING =   0.00 $/CY
BAR REINFORCEMENT (BRIDGE)         =   0.00 $/LB
FURNISH PILING                     =   0.00 $/FT
DRIVE PILES                        =   0.00 $ EA
```


DATE : 04/18/:0 TIME : 16:33:26

PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 3

```
*************
* PILE DATA *
*************

TOTAL NUMBER OF PILES      =  16
TOTAL NUMBER OF ROWS       =   2
DIAMETER OF PILE           =  14.0 INCHES
CAPACITY OF PILE (SERVICE) = 150.0 TONS
CONSIDER TENSION IN PILES? =   YES (YES OR NO)
LENGTH OF ONE PILE         =  39.0 FEET

********************
* PILE LAYOUT DATA *
********************
```

ROW NO	NO OF PILES	Y-COORD (FT)	X-SPACING (FT)
1	8	2.00	7.00
2	8	-2.00	7.00

```
***********************************
* MOMENT OF INERTIA OF PILE GROUP *
***********************************

IXX =     64.00 PILE-FT**2
IYY =   4116.00 PILE-FT**2
```

DATE : 04/18/:0 TIME : 16:33:26

PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 4

****
* PILE COORDINATES (FEET) *
****

PILE	X-COORD	Y-COORD
1	-24.50	2.00
2	-17.50	2.00
3	-10.50	2.00
4	-3.50	2.00
5	3.50	2.00
6	10.50	2.00
7	17.50	2.00
8	24.50	2.00
9	-24.50	-2.00
10	-17.50	-2.00
11	-10.50	-2.00
12	-3.50	-2.00
13	3.50	-2.00
14	10.50	-2.00
15	17.50	-2.00
16	24.50	-2.00

DATE : 04/18/:0 TIME : 16:33:26

PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 5

****
* FOOTING LOAD DATA (K-FT) *
****

SEISMIC ANALYSIS SPECIFICATIONS:

DESIGN CRITERIA (SDC)	PERFORMANCE CATEGORY (SPC)	MODIFICATION FACTOR (R)
AGS	B	1.000

LOAD AT BOTTOM

	DEAD LOAD	PRE STRESS	:---- LL+IMPACT ---: CASE 1 TRANS MY-MAX	CASE 2 LONG MX-MAX	CASE 3 AXIAL N-MAX	WIND	WL	LF	CF-MY	TEMP	SF& BY
MY	2	0	3034	0	0	3921	349	0	0	0	25 45
MX	0	0	0	0	0	1872	217	670	0	243	18 63
P	2501	0	303	0	0	115	0	0	0	0	3 67
PMY			0	0	0				0		
PMX			0	0	0				0		
P			0	0	0				0		

(ARS)	UNREDUCED SEISMIC CASE 1 MAX TRAN	CASE 2 MAX LONG	ARBITRARY LOADS SERVICE AL1	SERVICE AL2	ARBITRARY LOADS FACTORED AL1	FACTORED AL2
MY TRAN	0.	0.	0.	0.	0.	0.
MX LONG	0.	0.	0.	0.	0.	0.
P AXIAL	0.	0.	0.	0.	0.	0.

PROBABLE PLASTIC (PB) LOADS (1.3 X NOMINAL MOMENT) (K-FT)

	PB1 MAX TRAN	PB2 75-DEGREE	PB3 60-DEGREE	PB4 45-DEGREE	PB5 30-DEGREE	PB6 15-DEGREE	PB7 MAX LONG
MY	0.	0.	0.	0.	0.	0.	0.
MX	0.	0.	0.	0.	0.	0.	1.
P	1.	1.	1.	1.	1.	1.	1.

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****
* SERVICE LOADS (SER) FOR FOOTING DESIGN (K-FT) *
****

NOTE: RATIO = CAPACITY (COMP OR UPLIFT) / (MAX OR MIN) PILE LOAD

CAP UPLIFT -120. CAP COMP 300.

LOADING GRP	CA	APPLIED LOADS TRAN MY	LONG MX	COMB M	AXIAL P	MIN PILE LOAD	RATIO	MAX PILE LOAD	RATIO	
IH	1	4974.	1863.	5312.	3344.	121.		297.	1.01	OK
IH	2	2547.	1863.	3156.	3102.	120.		267.	1.12	OK
IH	3	2547.	1863.	3156.	3102.	120.		267.	1.12	OK
II		5174.	2988.	5975.	2620.	40.		288.	1.04	OK
III	1	5200.	2649.	5836.	2750.	58.		286.	1.05	OK
III	2	3258.	2649.	4199.	2556.	58.		262.	1.15	OK
III	3	3258.	2649.	4199.	2556.	58.		262.	1.15	OK
IV	1	3979.	1685.	4321.	2722.	94.		246.	1.22	OK
IV	2	2038.	1685.	2644.	2528.	93.		223.	1.35	OK
IV	3	2038.	1685.	2644.	2528.	93.		223.	1.35	OK
V		4620.	2841.	5424.	2365.	32.		264.	1.14	OK
VI	1	4643.	2539.	5291.	2480.	48.		262.	1.15	OK
VI	2	2909.	2539.	3861.	2307.	48.		241.	1.25	OK
VI	3	2909.	2539.	3861.	2307.	48.		241.	1.25	OK

THE FOLLOWING ARE INCLUDED IN THE APPLIED LOADS ABOVE:

WEIGHT OF COVER = 0. KIPS
WEIGHT OF FOOTING = 234. KIPS
TOTAL = 234. KIPS

FOR GROUP IH CASE 1 THE PILE LOADS AT EACH CORNER ARE:

238. 297.

121. 180.

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****
* FACTORED LOADS (FAC) FOR FOOTING DESIGN (K-FT) *
****

NOTE: RATIO = CAPACITY (COMP OR UPLIFT) / (MAX OR MIN) PILE LOAD

PHI = .75

CAP UPLIFT -180. CAP COMP 450.

LOADING GRP	CA	APPLIED LOADS TRAN MY	LONG MX	COMB M	AXIAL P	MIN PILE LOAD	RATIO	MAX PILE LOAD	RATIO	
IH	1	8570.	2422.	8906.	4558.	158.		412.	1.09	OK
IH	2	3311.	2422.	4102.	4033.	157.		347.	1.30	OK
IH	3	3311.	2422.	4102.	4033.	157.		347.	1.30	OK
IP	1	3311.	2422.	4102.	4033.	157.		347.	1.30	OK
IP	2	3311.	2422.	4102.	4033.	157.		347.	1.30	OK
IP	3	3311.	2422.	4102.	4033.	157.		347.	1.30	OK
II		8408.	4855.	9710.	4182.	60.		463.	0.97	NG**
III	1	8449.	4305.	9483.	4393.	90.		459.	0.98	NG**
III	2	5294.	4305.	6823.	4077.	89.		421.	1.07	OK
III	3	5294.	4305.	6823.	4077.	89.		421.	1.07	OK
IV	1	6466.	2738.	7022.	4348.	148.		396.	1.14	OK
IV	2	3311.	2738.	4296.	4033.	147.		357.	1.26	OK
IV	3	3311.	2738.	4296.	4033.	147.		357.	1.26	OK
V		8085.	4973.	9492.	4033.	49.		456.	0.99	NG**
VI	1	8124.	4443.	9260.	4235.	78.		452.	1.00	NG**
VI	2	5090.	4443.	6757.	3932.	77.		415.	1.08	OK
VI	3	5090.	4443.	6757.	3932.	77.		415.	1.08	OK

THE FOLLOWING ARE INCLUDED IN THE APPLIED LOADS ABOVE:

WEIGHT OF COVER = 0. KIPS
WEIGHT OF FOOTING = 304. KIPS
TOTAL = 304. KIPS

FOR GROUP II CASE THE PILE LOADS AT EACH CORNER ARE:

363. 463.

60. 160.

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 8

****
* EARTHQUAKE LOADS (EQ) FOR FOOTING DESIGN (K-FT) *
****

NOTE: RATIO = CAPACITY (COMP OR UPLIFT) / (MAX OR MIN) PILE LOAD

ARS UNREDUCED SEISMIC (VII) & PROBABLE PLASTIC (PB)

PHI = 1.00

CAP UPLIFT	CAP COMP
-300.	600.

:---------- APPLIED LOADS ----------:									
LOADING GRP	CA	TRAN MY	LONG MX	COMB M	AXIAL P	MIN PILE LOAD	RATIO	MAX PILE LOAD	RATIO
PB1	1	0.	0.	0.	235.	15.		15.	40.85 OK
PB2	1	0.	0.	0.	235.	15.		15.	40.85 OK
PB3	1	0.	0.	0.	235.	15.		15.	40.85 OK
PB4	1	0.	0.	0.	235.	15.		15.	40.85 OK
PB5	1	0.	0.	0.	235.	15.		15.	40.85 OK
PB6	1	0.	0.	0.	235.	15.		15.	40.85 OK
PB7	1	0.	1.	1.	235.	15.		15.	40.76 OK

THE FOLLOWING ARE INCLUDED IN THE APPLIED LOADS ABOVE:

WEIGHT OF COVER = 0. KIPS
WEIGHT OF FOOTING = 234. KIPS
TOTAL = 234. KIPS

FOR GROUP PB7 CASE 1 THE PILE LOADS AT EACH CORNER ARE:

15. 15.

15. 15.

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****
* DESIGN OF BOTTOM FLEXURAL REINFORCEMENT *
****

NOTE: AREA OF STEEL IN THE SHORT DIRECTION FOR FACTORED AND EARTHQUAKE LOADS HAS BEEN INCREASED BY 1.73 (ART 4.4.6.3.2)

KEY TO TYPES OF LOADS:

SER = SERVICE LOADS
FAC = FACTORED LOADS PHI = 0.90
EQ = EARTHQUAKE LOADS PHI = 1.00
MIN1 = MINIMUM REINFORCEMENT (ART 8.17.1.1)
BASED ON 1.2 X THE CRACKING MOMENT
MIN2 = WAIVER OF MINIMUM REINFORCEMENT (ART 8.17.1.2)
BASED ON STEEL AREA ONE THIRD GREATER THAN REQUIRED BY ANALYSIS
MAX = MAXIMUM REINFORCEMENT (ART 8.16.3.1)
BASED ON .75 X BALANCED STEEL RATIO

FOOTING DEPTH = 3.75 FT

BAR SIZE	BAR DIR	LOAD TYPE	CONTROL GRP	CA	DEPTH EFFECTIVE (INCHES)	APPLIED MOMENT (K-FT)	REQUIRED STEEL AREA (SQ IN)	NO BARS
6	X	SER			32.56	0.	0.00	0
8	Y	SER	IH	1	31.56	1493.	24.82	32
6	X	FAC			32.56	0.	0.00	0
8	Y	FAC	II		31.56	2335.	28.79	37
6	X	EQ			32.56	0.	0.00	0
8	Y	EQ	PB7	1	31.56	-22.	-0.24	1
6	X	MIN1			32.56	1331.	9.42	22
8	Y	MIN1			31.56	8651.	63.32	81
6	X	MIN2			32.56	0.	0.00	0
8	Y	MIN2			31.56	1990.	33.09	42
6	X	MAX			32.56	5958.	50.12	114
8	Y	MAX			31.56	36376.	315.74	400

********** CONTROL **********

6	X	MIN1			32.56	1331.	9.42	22
8	Y	MIN2			31.56	1990.	33.09	42

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 10

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****************************************
* DESIGN OF TOP FLEXURAL REINFORCEMENT *
****************************************
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NOTE: AREA OF STEEL IN THE SHORT DIRECTION FOR FACTORED AND EARTHQUAKE LOADS HAS BEEN INCREASED BY 1.73 (ART 4.4.6.3.2)

KEY TO TYPES OF LOADS:

SER = SERVICE LOADS
FAC = FACTORED LOADS PHI = 0.90
EQ = EARTHQUAKE LOADS PHI = 1.00
MIN1 = MINIMUM REINFORCEMENT (ART 8.17.1.1)
BASED ON 1.2 X THE CRACKING MOMENT
MIN2 = WAIVER OF MINIMUM REINFORCEMENT (ART 8.17.1.2)
BASED ON STEEL AREA ONE THIRD GREATER THAN REQUIRED BY ANALYSIS
MAX = MAXIMUM REINFORCEMENT (ART 8.16.3.1)
BASED ON .75 X BALANCED STEEL RATIO
MIN3 = MINIUMUM REINFORCEMENT (TEMPERATURE) (ART 8.20)
BASED ON 18" MAXIMUM BAR SPACING

FOOTING DEPTH = 3.75 FT

BAR SIZE	BAR DIR	LOAD TYPE	CONTROL GRP	CA	DEPTH EFFECTIVE (INCHES)	APPLIED MOMENT (K-FT)	REQUIRED STEEL AREA (SQ IN)	NO BARS
6	X	SER			41.56	0.	0.00	0
6	Y	SER			40.68	0.	0.00	0
6	X	FAC			41.56	0.	0.00	0
6	Y	FAC			40.68	0.	0.00	0
6	X	EQ			41.56	0.	0.00	0
6	Y	EQ			40.68	0.	0.00	0
6	X	MIN1			41.56	1331.	7.27	17
6	Y	MIN1			40.68	8651.	48.34	110
6	X	MIN2			41.56	0.	0.00	0
6	Y	MIN2			40.68	0.	0.00	0
6	X	MAX			41.56	9708.	63.98	146
6	Y	MAX			40.68	60456.	407.04	926
6	X	MIN3			41.56	490.	2.64	6
6	Y	MIN3			40.68	2878.	15.84	36

********** CONTROL **********

6	X	MIN3			41.56	490.	2.64	6
6	Y	MIN3			40.68	2878.	15.84	36

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```
************************************
* FINAL RESULTS FOR FOOTING DESIGN *
************************************
```

FOOTING LENGTH = 52.00 FT
FOOTING WIDTH = 8.00 FT
INPUT DEPTH = 3.75 FT
FOOTING DEPTH REQUIRED FOR SHEAR = 3.75 FT
FOOTING DEPTH REQUIRED FOR MOMENT = 3.75 FT

```
**********************
* PILE LOAD RESULTS *
**********************
```

LOAD TYPE	CONTROL GRP	CA	MIN PILE LOAD (K)	CAPACITY UPLIFT (K)		CONTROL GRP	CA	MAX PILE LOAD (K)	CAPACITY COMP (K)	
SER	V		32.	-120.	OK	IH	1	297.	300.	OK
FAC	V		49.	-180.	OK	II		463.	450.	NG*
EQ	PB7	1	15.	-300.	OK	PB7	1	15.	600.	OK

** NOTE: THE SHEAR PLANES AT A DISTANCE "D" FROM THE FACE OF THE COLUMN ARE OUTSIDE THE PILE LOCATIONS. THEREFORE, NO SHEAR CALCULATIONS ARE MADE.

```
************************************
* TOP AND BOTTOM FLEXURE RESULTS *
************************************
```

FOOTING DEPTH = 3.75 FT

BAR SIZE	BAR DIR	LOAD TYPE	CONTROL GRP	CA	EFF DEPTH (IN)	APPLIED MOMENT (K-FT)	BAR SPACE (IN)	AREA REQ (SI)	BARS REQ	ERROR CODE
TOP										
6	X	MIN3			41.56	490.	17.82	2.64	6	4
6	Y	MIN3			40.68	2878.	17.63	15.84	36	
BOTTOM										
6	X	MIN1			32.56	1331.	4.24	9.42	22	4
8	Y	MIN2			31.56	1990.	15.05	33.09	42	

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****
* BOTTOM FLEXURAL REINFORCEMENT *
****

(AREA OF STEEL REQUIRED FOR DIFFERENT BAR SIZES)

BAR SIZE	BAR DIR	LOAD TYPE	APPLIED STRESS (PSI)	ALLOWABLE STRESS (PSI)	EFF DEPTH (IN)	BAR SPACE (IN)	REQ STEEL (SQ IN)	NO BARS	FOOT DEPTH (FT)	ERROR CODE
5	X	MIN1	0.	24000.	32.66	2.98	9.39	31	3.75	24
5	Y	MIN2	18018.	24000.	31.97	5.88	32.65	106		
6	X	MIN1	0.	24000.	32.56	4.24	9.42	22	3.75	4
6	Y	MIN2	18109.	24000.	31.68	8.34	32.96	75		
7	X	MIN1	0.	24000.	32.50	5.93	9.44	16	3.75	4
7	Y	MIN2	17899.	24000.	31.50	11.22	33.15	56		
8	X	MIN1	0.	24000.	32.44	8.08	9.46	12	3.75	4
8	Y	MIN2	17822.	24000.	31.31	14.69	33.37	43		
9	X	MIN1	0.	24000.	32.38	9.86	9.48	10	3.75	4
9	Y	MIN2	17912.	24000.	31.13	18.69	33.57	34		34
10	X	MIN1	0.	24000.	32.28	12.65	9.51	8	3.75	4
10	Y	MIN2	17933.	24000.	30.84	23.71	33.90	27		34
11	X	MIN1	0.	24000.	32.19	14.73	9.54	7	3.75	4
11	Y	MIN2	18090.	24000.	30.56	29.35	34.23	22		34
14	X	MIN1	0.	24000.	32.06	22.03	9.58	5	3.75	34
14	Y	MIN2	17488.	24000.	30.18	41.07	34.68	16		34
18	X	MIN1	0.	24000.	31.75	43.75	9.68	3	3.75	34
18	Y	MIN2	18060.	24000.	29.25	76.94	35.83	9		34

NOTE: THE DESIGNER MUST CHECK THE ERROR CODE FOR ADEQUATE
DEVELOPMENT LENGTH AND BAR SPACING.

*** ERROR CODES:

1 = BAR SPACING LESS THAN THE AASHTO MINIMUM. (CODE 8.21.1)
2 = BAR SPACING LESS THAN THE PREFERRED CALTRANS MINIMUM. (BR. DES. DET.)
3 = BAR SPACING MORE THAN THE AASHTO MAXIMUM (18"). (CODE 8.20)
4 = INADEQUATE DEVELOPMENT LENGTH. (CODE 8.25)

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****
* TOP FLEXURAL REINFORCEMENT *
****

(AREA OF STEEL REQUIRED FOR DIFFERENT BAR SIZES)

BAR SIZE	BAR DIR	LOAD TYPE	APPLIED STRESS (PSI)	ALLOWABLE STRESS (PSI)	EFF DEPTH (IN)	BAR SPACE (IN)	REQ STEEL (SQ IN)	NO BARS	FOOT DEPTH (FT)	ERROR CODE
4	X	MIN3	0.	24000.	41.72	17.89	1.20	6	3.75	4
4	Y	MIN3	0.	24000.	41.16	17.64	7.20	36		

NOTE: THE DESIGNER MUST CHECK THE ERROR CODE FOR ADEQUATE
DEVELOPMENT LENGTH AND BAR SPACING.

*** ERROR CODES:

1 = BAR SPACING LESS THAN THE AASHTO MINIMUM. (CODE 8.21.1)
2 = BAR SPACING LESS THAN THE PREFERRED CALTRANS MINIMUM. (BR. DES. DET.)
3 = BAR SPACING MORE THAN THE AASHTO MAXIMUM (18"). (CODE 8.20)
4 = INADEQUATE DEVELOPMENT LENGTH. (CODE 8.25)

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****
* MINIMUM, PREFERRED BAR SPACING & DEVELOPMENT LENGTH *
****

UNITS INCHES

THE CLEAR DISTANCE BETWEEN PARALLEL BARS SHALL NOT BE LESS THAN
1.5 BAR DIAMETERS (NOMINAL), 1.5 TIMES THE MAXIMUM SIZE COURSE AGGREGATE,
NOR 1.5 INCHES. (CODE 8.21.1))

PREFERRED CENTER TO CENTER SPACING BASED ON BRIDGE DESIGN DETAILS P 13-20

BAR SIZE	BAR AREA	NOMINAL DIAMETER	MIN CLEAR DISTANCE	DEFORMED DIAMETER	MINIMUM C. TO C. SPACING	PREFERRED C. TO C. SPACING	DEVELOPMENT LENGTH SPC<6"	DEVELOPMENT LENGTH SPC>=6"
4	.20	.500	2.250	.563	2.813	3.250	12	12
5	.31	.625	2.250	.688	2.938	3.500	15	12
6	.44	.750	2.250	.875	3.125	3.750	19	15
7	.60	.875	2.250	1.000	3.250	4.000	26	20
8	.79	1.000	2.250	1.125	3.375	4.250	34	27
9	1.00	1.128	2.250	1.250	3.500	4.500	42	34
10	1.27	1.270	2.250	1.438	3.688	4.750	54	43
11	1.56	1.410	2.250	1.625	3.875	5.000	66	53
14	2.25	1.693	2.539	1.875	4.414	5.500	90	72
18	4.00	2.257	3.386	2.500	5.886	6.000	116	93

*** ERROR CODES:

1 = BAR SPACING LESS THAN THE AASHTO MINIMUM. (CODE 8.21.1)
2 = BAR SPACING LESS THAN THE PREFERRED CALTRANS MINIMUM. (BR. DES. DET.)
3 = BAR SPACING MORE THAN THE AASHTO MAXIMUM (18"). (CODE 8.20)
4 = INADEQUATE DEVELOPMENT LENGTH. (CODE 8.25)

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****
* BAR REINFORCING STEEL *
****

BAR TYPE	BAR SIZE	NO BAR	LENGTH (FT)	WEIGHT (LB/FT)	WEIGHT (LBS)
TOP					
X-BAR	6	6	51.5	1.502	464.
Y-BAR	6	36	7.5	1.502	406.
BOTTOM					
X-BAR	6	22	51.5	1.502	1702.
Y-BAR	8	42	7.5	2.670	841.
STIRRUP	5	464	3.8	1.043	1855.

NOTE: STIRRUPS ARE REQUIRED IN A BAND EXTENDING 6 INCHES
MAXIMUM FROM THE COLUMN REINFORCEMENT TO
31 INCHES FROM THE FACE OF THE COLUMN IN THE "X" DIRECTION AND
29 INCHES FROM THE FACE OF THE COLUMN IN THE "Y" DIRECTION.

****
* QUANTITIES AND ESTIMATED COST - PILE FOOTING *
****

CONTRACT ITEM	UNIT	QUANTITY	PRICE	AMOUNT
STRUCTURE EXCAVATION (BR)	CY	75.	0.00	0.
STRUCTURE BACKFILL (BR)	CY	17.	0.00	0.
STRUCTURE CONCRETE, BR FTG	CY	58.	0.00	0.
BAR REINFORCEMENT (BR)	LB	5268.	0.00	0.
FURNISH PILING	LF	624.	0.00	0.
DRIVE PILES	EA	16	0.00	0.
TOTAL COST				0.

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TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th street (rev.)\excel\[PILE_TOP.xls]		Checker:		Date:	

LOADS AT TOP OF PILE

LOAD FACTOR DESIGN:

GROUP-I = 1.30 [.75 DL + 1.67 LL+I + 1.0 SF]
GROUP-II = 1.30 [.75 DL + 1.0 SF + 1.0 W]
GROUP-III = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF]
GROUP-IV = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 1.0 RST]
GROUP-V = 1.25 [.75 DL + 1.0 SF + 1.0 W + 1.0 RST]
GROUP-VI = 1.25 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF + 1.0 RST]

CASE - 3 VERTICAL LOAD

	DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
Col 1	2,735	303	115	0	0	367	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Pu	3,802	3,293	3,583	3,538	3,167	3,445

CASE - 3 SHEAR

		DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
long	Col 1 - Vy	0	0	42	5	14	83	5 ← Max shear = 149k
trans	Col 1 - Vx	0	1	37	8	0	100	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Col 1 - Vy	108	163	149	115	163	150
Col 1 - Vx	132	179	157	132	172	151

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th street (rev.)\excel\[PILE_TOP.xls]		Checker:		Date:	

LOADS AT TOP OF PILE

CASE - 3 MOMENT

		DL (K-FT)	LL+I (K-FT)	WIND (K-FT)	WL (K-FT)	LF (K-FT)	SF (K-FT)	RST (K-FT)
trans	Col 1 - My	2	3,034	3,876	349	0	2,545	0
long	Col 1 - Mx	0	0	1,872	217	670	1,863	243

	GRP-I (K-FT)	GRP-II (K-FT)	GRP-III (K-FT)	GRP-IV (K-FT)	GRP-V (K-FT)	GRP-VI (K-FT)
Col 1 - My	9,897	8,349	9,220	7,254	8,028	8,865
Col 1 - Mx	2,421	4,855	4,305	2,737	4,972	4,443

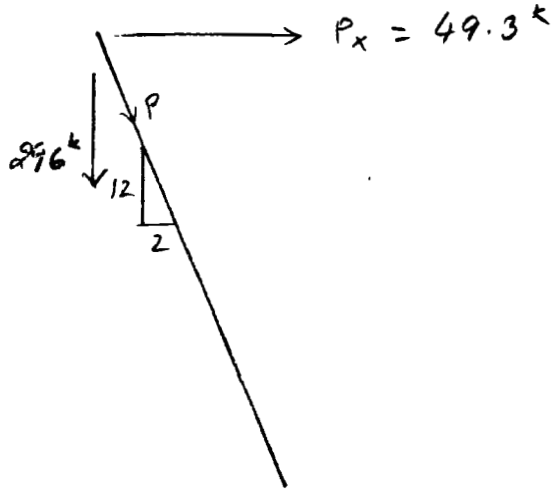
TYLIN INTERNATIONAL

Projects: 24th street	Job No. 1317.0	Sheet:	of
Item:	Designer: SJ	Date: 03-10-00	
	Checker:	Date:	
		Grid: 1/8"	

BATTERED PILE:

Capacity ≈ 300 ton (ultimate)

∴ Service P = 300 K



∴ Total Transverse shear = 149K

Shear Resisted by 2 battered pile (TRANS. DIR.) ≈ 49.3 k × 2

= 98.6 k

∴ Shear per Pile ≈ (149 - 98.6)/16

= 3.15 K

Max vertical load on pile ≈ 297 k

```
Pile: HP14x89
1 1 0 0 0
100     2       160.2   468     0
0       14.685039       326     26.1    29000000
468     14.685039       326     26.1    29000000
1       2       2       0       0
4       160.2   468     500
160.2   0.045
468     0.045
160.2   0       42      0
468     0       42      0
0       1       1
1
1       3150    0       297000
0
1       1       0
100     1E-5    100
```

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T.Y. LIN INTERNATIONAL

PROGRAM LPILE plus Version 3.0
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Pile: HP14x89

UNITS--ENGLISH UNITS

INPUT INFORMATION

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 468.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	14.685	.326E+03	.261E+02	.290E+08
468.00	14.685	.326E+03	.261E+02	.290E+08

SOILS INFORMATION

X AT THE GROUND SURFACE = 160.20 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

1 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER = 160.20 IN
X AT THE BOTTOM OF THE LAYER = 468.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
2 POINTS

X,IN	WEIGHT,LBS/IN**3
160.20	.45E-01
468.00	.45E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
2 POINTS

X,IN	C,LBS/IN**2	PHI,DEGREES	E50
160.20	.000E+00	.420E+02	-----
468.00	.000E+00	.420E+02	-----

BOUNDARY AND LOADING CONDITIONS

LOADING NUMBER 1

BOUNDARY-CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .315E+04 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .297E+06 LBS

FINITE-DIFFERENCE PARAMETERS
NUMBER OF PILE INCREMENTS = 100
DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE = .100E-04 IN
MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
MAXIMUM ALLOWABLE DEFLECTION = .10E+03 IN

OUTPUT CODES
KOUTPT = 1
KPYOP = 0
INC = 1

OUTPUT INFORMATION

****
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING *
****

LOADING NUMBER 1

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .315E+04 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .297E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.103E+02	-.184E-04	.315E+04	-.624E-01	.114E+05	.945E+10	.000E+00
4.7	.100E+02	.101E+06	.315E+04	-.624E-01	.137E+05	.945E+10	.000E+00
9.4	.973E+01	.203E+06	.315E+04	-.623E-01	.159E+05	.945E+10	.000E+00

14.0	.944E+01	.304E+06	.315E+04	-.622E-01	.182E+05	.945E+10	.000E+00
18.7	.915E+01	.405E+06	.315E+04	-.620E-01	.205E+05	.945E+10	.000E+00
23.4	.886E+01	.506E+06	.315E+04	-.618E-01	.228E+05	.945E+10	.000E+00
28.1	.857E+01	.606E+06	.315E+04	-.615E-01	.250E+05	.945E+10	.000E+00
32.8	.829E+01	.706E+06	.315E+04	-.612E-01	.273E+05	.945E+10	.000E+00
37.4	.800E+01	.806E+06	.315E+04	-.608E-01	.295E+05	.945E+10	.000E+00
42.1	.772E+01	.905E+06	.315E+04	-.604E-01	.318E+05	.945E+10	.000E+00
46.8	.744E+01	.100E+07	.315E+04	-.599E-01	.340E+05	.945E+10	.000E+00
51.5	.716E+01	.110E+07	.315E+04	-.594E-01	.362E+05	.945E+10	.000E+00
56.2	.688E+01	.120E+07	.315E+04	-.588E-01	.384E+05	.945E+10	.000E+00
60.8	.661E+01	.129E+07	.315E+04	-.582E-01	.405E+05	.945E+10	.000E+00
65.5	.633E+01	.139E+07	.315E+04	-.575E-01	.427E+05	.945E+10	.000E+00
70.2	.607E+01	.148E+07	.315E+04	-.568E-01	.448E+05	.945E+10	.000E+00
74.9	.580E+01	.158E+07	.315E+04	-.561E-01	.469E+05	.945E+10	.000E+00
79.6	.554E+01	.167E+07	.315E+04	-.553E-01	.490E+05	.945E+10	.000E+00
84.2	.529E+01	.176E+07	.315E+04	-.544E-01	.510E+05	.945E+10	.000E+00
88.9	.503E+01	.185E+07	.315E+04	-.535E-01	.530E+05	.945E+10	.000E+00
93.6	.478E+01	.194E+07	.315E+04	-.526E-01	.550E+05	.945E+10	.000E+00
98.3	.454E+01	.203E+07	.315E+04	-.516E-01	.570E+05	.945E+10	.000E+00
103.0	.430E+01	.211E+07	.315E+04	-.506E-01	.589E+05	.945E+10	.000E+00
107.6	.407E+01	.220E+07	.315E+04	-.495E-01	.608E+05	.945E+10	.000E+00
112.3	.384E+01	.228E+07	.315E+04	-.484E-01	.627E+05	.945E+10	.000E+00
117.0	.361E+01	.236E+07	.315E+04	-.473E-01	.645E+05	.945E+10	.000E+00
121.7	.340E+01	.244E+07	.315E+04	-.461E-01	.663E+05	.945E+10	.000E+00
126.4	.318E+01	.252E+07	.315E+04	-.448E-01	.681E+05	.945E+10	.000E+00
131.0	.298E+01	.259E+07	.315E+04	-.436E-01	.698E+05	.945E+10	.000E+00
135.7	.278E+01	.267E+07	.315E+04	-.423E-01	.715E+05	.945E+10	.000E+00
140.4	.258E+01	.274E+07	.315E+04	-.409E-01	.731E+05	.945E+10	.000E+00
145.1	.239E+01	.281E+07	.315E+04	-.396E-01	.747E+05	.945E+10	.000E+00
149.8	.221E+01	.288E+07	.315E+04	-.382E-01	.762E+05	.945E+10	.000E+00
154.4	.203E+01	.295E+07	.315E+04	-.367E-01	.777E+05	.945E+10	.000E+00
159.1	.187E+01	.301E+07	.315E+04	-.352E-01	.792E+05	.945E+10	.000E+00
163.8	.170E+01	.307E+07	.306E+04	-.337E-01	.806E+05	.945E+10	-.392E+02
168.5	.155E+01	.313E+07	.272E+04	-.322E-01	.820E+05	.945E+10	-.106E+03
173.2	.140E+01	.319E+07	.204E+04	-.306E-01	.832E+05	.945E+10	-.183E+03
177.8	.126E+01	.324E+07	.996E+03	-.290E-01	.843E+05	.945E+10	-.264E+03
182.5	.113E+01	.328E+07	-.422E+03	-.274E-01	.852E+05	.945E+10	-.342E+03
187.2	.101E+01	.331E+07	-.221E+04	-.258E-01	.859E+05	.945E+10	-.421E+03
191.9	.890E+00	.333E+07	-.434E+04	-.242E-01	.864E+05	.945E+10	-.492E+03
196.6	.781E+00	.334E+07	-.679E+04	-.225E-01	.865E+05	.945E+10	-.554E+03
201.2	.679E+00	.333E+07	-.954E+04	-.209E-01	.864E+05	.945E+10	-.622E+03
205.9	.586E+00	.331E+07	-.126E+05	-.192E-01	.858E+05	.945E+10	-.695E+03
210.6	.500E+00	.326E+07	-.160E+05	-.176E-01	.849E+05	.945E+10	-.739E+03
215.3	.421E+00	.320E+07	-.194E+05	-.160E-01	.836E+05	.945E+10	-.732E+03
220.0	.350E+00	.313E+07	-.228E+05	-.144E-01	.818E+05	.945E+10	-.708E+03
224.6	.286E+00	.303E+07	-.261E+05	-.129E-01	.797E+05	.945E+10	-.706E+03
229.3	.229E+00	.292E+07	-.294E+05	-.114E-01	.771E+05	.945E+10	-.691E+03
234.0	.179E+00	.279E+07	-.325E+05	-.100E-01	.742E+05	.945E+10	-.659E+03
238.7	.136E+00	.264E+07	-.355E+05	-.867E-02	.709E+05	.945E+10	-.623E+03
243.4	.980E-01	.248E+07	-.383E+05	-.740E-02	.672E+05	.945E+10	-.570E+03
248.0	.663E-01	.230E+07	-.408E+05	-.622E-02	.633E+05	.945E+10	-.498E+03
252.7	.399E-01	.211E+07	-.429E+05	-.512E-02	.590E+05	.945E+10	-.403E+03
257.4	.183E-01	.192E+07	-.445E+05	-.412E-02	.545E+05	.945E+10	-.276E+03
262.1	.126E-02	.171E+07	-.453E+05	-.323E-02	.499E+05	.945E+10	-.591E+02
266.8	-.119E-01	.150E+07	-.449E+05	-.243E-02	.452E+05	.945E+10	.252E+03
271.4	-.215E-01	.130E+07	-.433E+05	-.174E-02	.406E+05	.945E+10	.392E+03
276.1	-.281E-01	.110E+07	-.413E+05	-.115E-02	.362E+05	.945E+10	.499E+03
280.8	-.322E-01	.914E+06	-.387E+05	-.648E-03	.320E+05	.945E+10	.584E+03
285.5	-.342E-01	.739E+06	-.358E+05	-.239E-03	.280E+05	.945E+10	.652E+03
290.2	-.345E-01	.579E+06	-.327E+05	.872E-04	.244E+05	.945E+10	.702E+03
294.8	-.334E-01	.433E+06	-.293E+05	.338E-03	.211E+05	.945E+10	.737E+03
299.5	-.313E-01	.304E+06	-.258E+05	.520E-03	.182E+05	.945E+10	.756E+03
304.2	-.285E-01	.190E+06	-.223E+05	.642E-03	.157E+05	.945E+10	.761E+03
308.9	-.253E-01	.935E+05	-.187E+05	.713E-03	.135E+05	.945E+10	.753E+03
313.6	-.219E-01	.132E+05	-.152E+05	.739E-03	.117E+05	.945E+10	.731E+03
318.2	-.184E-01	-.511E+05	-.119E+05	.730E-03	.125E+05	.945E+10	.697E+03

322.9	-.150E-01	-.100E+06	-.874E+04	.692E-03	.136E+05	.945E+10	.652E+03
327.6	-.119E-01	-.135E+06	-.582E+04	.634E-03	.144E+05	.945E+10	.598E+03
332.3	-.909E-02	-.156E+06	-.316E+04	.562E-03	.149E+05	.945E+10	.535E+03
337.0	-.664E-02	-.166E+06	-.821E+03	.482E-03	.151E+05	.945E+10	.466E+03
341.6	-.458E-02	-.165E+06	.118E+04	.400E-03	.151E+05	.945E+10	.391E+03
346.3	-.290E-02	-.156E+06	.273E+04	.320E-03	.149E+05	.945E+10	.270E+03
351.0	-.158E-02	-.141E+06	.371E+04	.247E-03	.145E+05	.945E+10	.151E+03
355.7	-.587E-03	-.122E+06	.420E+04	.182E-03	.141E+05	.945E+10	.574E+02
360.4	.123E-03	-.102E+06	.431E+04	.127E-03	.137E+05	.945E+10	-.123E+02
365.0	.597E-03	-.821E+05	.413E+04	.810E-04	.132E+05	.945E+10	-.612E+02
369.7	.881E-03	-.635E+05	.377E+04	.449E-04	.128E+05	.945E+10	-.923E+02
374.4	.102E-02	-.469E+05	.330E+04	.176E-04	.124E+05	.945E+10	-.109E+03
379.1	.105E-02	-.326E+05	.278E+04	-.206E-05	.121E+05	.945E+10	-.114E+03
383.8	.998E-03	-.208E+05	.225E+04	-.153E-04	.118E+05	.945E+10	-.112E+03
388.4	.903E-03	-.115E+05	.175E+04	-.233E-04	.116E+05	.945E+10	-.103E+03
393.1	.780E-03	-.440E+04	.130E+04	-.272E-04	.115E+05	.945E+10	-.909E+02
397.8	.648E-03	.710E+03	.903E+03	-.281E-04	.114E+05	.945E+10	-.769E+02
402.5	.517E-03	.413E+04	.577E+03	-.269E-04	.115E+05	.945E+10	-.626E+02
407.2	.395E-03	.618E+04	.316E+03	-.244E-04	.115E+05	.945E+10	-.488E+02
411.8	.288E-03	.716E+04	.117E+03	-.211E-04	.115E+05	.945E+10	-.363E+02
416.5	.198E-03	.734E+04	-.275E+02	-.175E-04	.115E+05	.945E+10	-.254E+02
421.2	.125E-03	.695E+04	-.125E+03	-.140E-04	.115E+05	.945E+10	-.163E+02
425.9	.673E-04	.621E+04	-.184E+03	-.107E-04	.115E+05	.945E+10	-.894E+01
430.6	.244E-04	.526E+04	-.213E+03	-.787E-05	.115E+05	.945E+10	-.330E+01
435.2	-.636E-05	.424E+04	-.218E+03	-.552E-05	.115E+05	.945E+10	.875E+00
439.9	-.273E-04	.323E+04	-.207E+03	-.367E-05	.115E+05	.945E+10	.382E+01
444.6	-.407E-04	.231E+04	-.185E+03	-.230E-05	.114E+05	.945E+10	.579E+01
449.3	-.488E-04	.151E+04	-.155E+03	-.136E-05	.114E+05	.945E+10	.706E+01
454.0	-.534E-04	.864E+03	-.120E+03	-.769E-06	.114E+05	.945E+10	.785E+01
458.6	-.560E-04	.390E+03	-.818E+02	-.459E-06	.114E+05	.945E+10	.836E+01
463.3	-.577E-04	.994E+02	-.418E+02	-.338E-06	.114E+05	.945E+10	.875E+01
468.0	-.592E-04	.000E+00	.000E+00	-.313E-06	.114E+05	.945E+10	.911E+01

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.130E-04 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .150E-05 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .103E+02 IN
COMPUTED SLOPE AT PILE HEAD = -.624E-01
MAXIMUM BENDING MOMENT = .334E+07 LBS-IN
MAXIMUM SHEAR FORCE = -.453E+05 LBS
NO. OF ITERATIONS = 69
NO. OF ZERO DEFLECTION POINTS = 3

S U M M A R Y T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.3150E+04	.0000E+00	.2970E+06	.1032E+02	.3337E+07	-.4530E+05

M = 278 k-ft
V = 45.3k

$F_b = .6\,F_y = 21.6$ ksi

$f_b = \frac{My}{I} = M/S = \frac{M}{44.1}$

$M_{allowable} = 21.6 \times 44.1$

$= 952.56$ k-in

$= 79.38$ k-ft. $< M_{actual} \rightarrow$ NG.

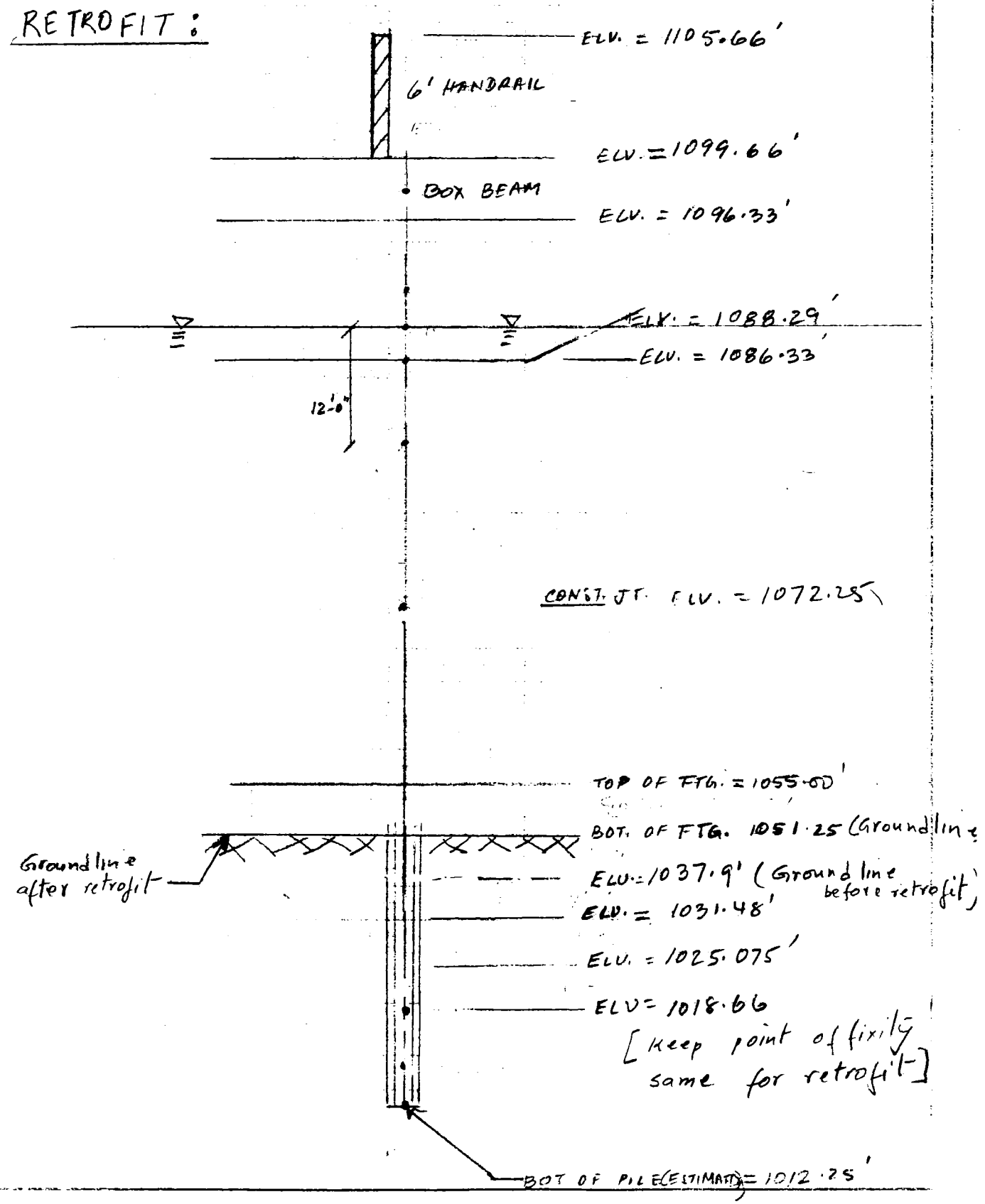
APPENDIX B

Twenty Fourth Street Bridge Calculations After Retrofit Measures

T·Y·LIN INTERNATIONAL

Projects: Salt River Bridge - Scour	Job No. 1317.00	Sheet:	of
Item: 24th Street Bridge Retrofit.	Designer: SJ	Date: 02-14-00	
	Checker:	Date:	
		Grid: 1/8"	

RETROFIT:



T·Y·LIN INTERNATIONAL

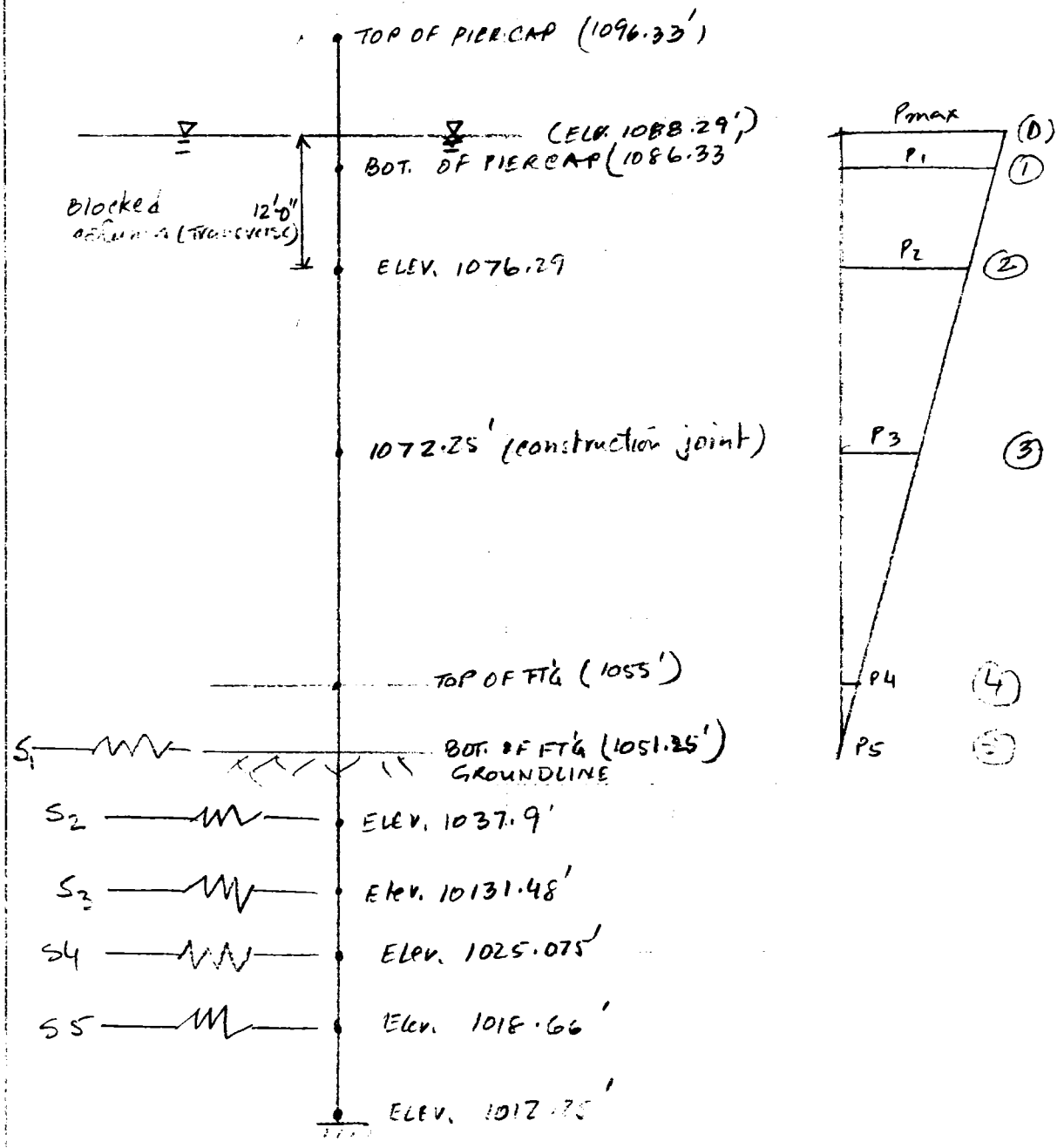
Projects: Salt River Bridge - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge - Retrofit	Designer: SJ	Date: 04-18-00	
	Checker:	Date:	
		Grid: 1/10"	

• SOIL SPRINGS:

soil Parameters:

$\gamma_{soil} = 140$ pcf

$\gamma_{sub} = 77.6$ pcf



Pile ≃ HP 14 x 89 ; Flange width = 14.695"] ≃ 14" = 1.1667' approx
Depth = 13.833"

T·Y·LIN INTERNATIONAL

Projects: Salt River Bridge - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge Retrofit.	Designer: SJ	Date: 04-18-00	
	Checker:	Date:	
		Grid: 1/10"	

- SOIL SPRINGS (cont'd):

Longitudinal:

$$S_1 = \frac{13.35}{2}(\overset{\#\text{ of piles}}{16})(1.167)(.0776)12^3 = 16712.7\,k.$$

$$S_2 = \left(\frac{13.35}{2} + \frac{6.42}{2}\right)(16)(1.167)(.0776)12^3 = 24750\,k$$

$$S_3 = S_4 = S_5 = 6.42(16)(1.167)(.0776)12^3 = 16074\,k.$$

Transverse:

$$S_1 = 16712.7\,k$$

$$S_2 = 24750\,k$$

$$S_3 = S_4 = S_5 = 16074\,k$$

• FORCE OF STREAM CURRENT ON PIERS:

Mean Velocity $V = 19.12$ ft/sec

Angle of attack $= 15^\circ$, $K = 1.4$

$P_{avg} = k(V_{avg})^2$ [AASHTO EQ 3.4)

$(V_{avg.})_{long} = 19.12 \sin 15^\circ = 4.95$ ft/sec

$(V_{avg.})_{trans} = 19.12 \cos 15^\circ = 18.468$ ft/sec

$P_{max} = 2K(V_{avg})^2$

$(P_{max})_{long} = 2(1.4)(4.95)^2 = 68.607$ psf

$(P_{max})_{trans} = 2(1.4)(18.468)^2 = 954.987$ psf

$(P_1)_{long} = \frac{68.607}{37.04}(35.08) = 64.976$ psf

$(P_1)_{trans.} = \frac{954.987}{37.04}(35.08) = 904.453$ psf

$(P_2)_{long} = \frac{68.607}{37.04} \times (25.04) = 46.38$ psf

$(P_2)_{trans} = \frac{954.987}{37.04} \times (25.04) = 645.34$ psf

$(P_3)_{long} = \frac{68.607}{37.04}(21.0) = 38.9$ psf

$(P_3)_{trans.} = \frac{954.987}{37.04}(21.0) = 541.43$ psf

• Force of Stream Current on Piers (Cont'd):

$$(P_4)_{long} = \frac{68.607}{37.04}(3.75) = 6.945 \text{ psf}$$

$$(P_4)_{trans.} = \frac{954.987}{37.04}(3.75) = 96.685 \text{ psf}$$

FORCE PER UNIT LENGTH:

Longitudinal:

Pier Cap.:

@ pt 0: .068607 (68) = 4.665 k/'

@ pt 1: .064976 (68) = 4.418 k/'

Pier Wall:

@ pt 1: .064976 (50) = 3.249 k/'

@ pt 2: .04638 (50) = 2.319 k/'

@ pt 3: .0389 (50) = 1.945 k/'

@ pt 4: .006945 (50) = 0.3473 k/'

Ftg:

@ pt 4: .006945 (52) = 0.36114 k/'

@ pt 5: 0 (52) = 0

T·Y·LIN INTERNATIONAL

Projects:	Salt River Bridges - Scour	Job No.	1317.00	Sheet:	of
Item:	24th St. Bridge Retrofit	Designer:	SJ	Date:	04-18-00
		Checker:		Date:	
				Grid:	1/10"

Force of Stream Current on Piers (cont'd):

TRANSVERSE:

Pier Cap: (Blocked)

@ pt. 0: .955 (3+4) = 6.685 k/'

@ pt. 1: .9044 (3+4) = 6.331 k/'

Pier Wall: (Blocked)

@ pt 1: .9044 (2.5+4) = 5.879 k/'

@ pt 2: .64534 (2.5+4) = 4.195 k/'

Pier wall:

@ pt 2: .64534 (2.5) = 1.613 k/'

@ pt 3: .54143 (2.5) = 1.3535 k/'

@ pt 4: .096685 (2.5) = 0.2417 k/'

Ftg:

@ pt 4: .096685 (8) = 0.7735 k/'

@ pt. 5: 0 (8) = 0

T·Y·LIN INTERNATIONAL

Projects: Salt River Bridges - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge Retrofit	Designer: SJ	Date: 04-18-00	
	Checker:	Date:	
		Grid: 1/10"	

BUOYANCY:

Pier Cap : 62.4 pcf x 68 x 3/1000 = 12.729 k/'

Pier Wall : 0.0624 kcf x 50 x 2.5 = 7.8 k/'

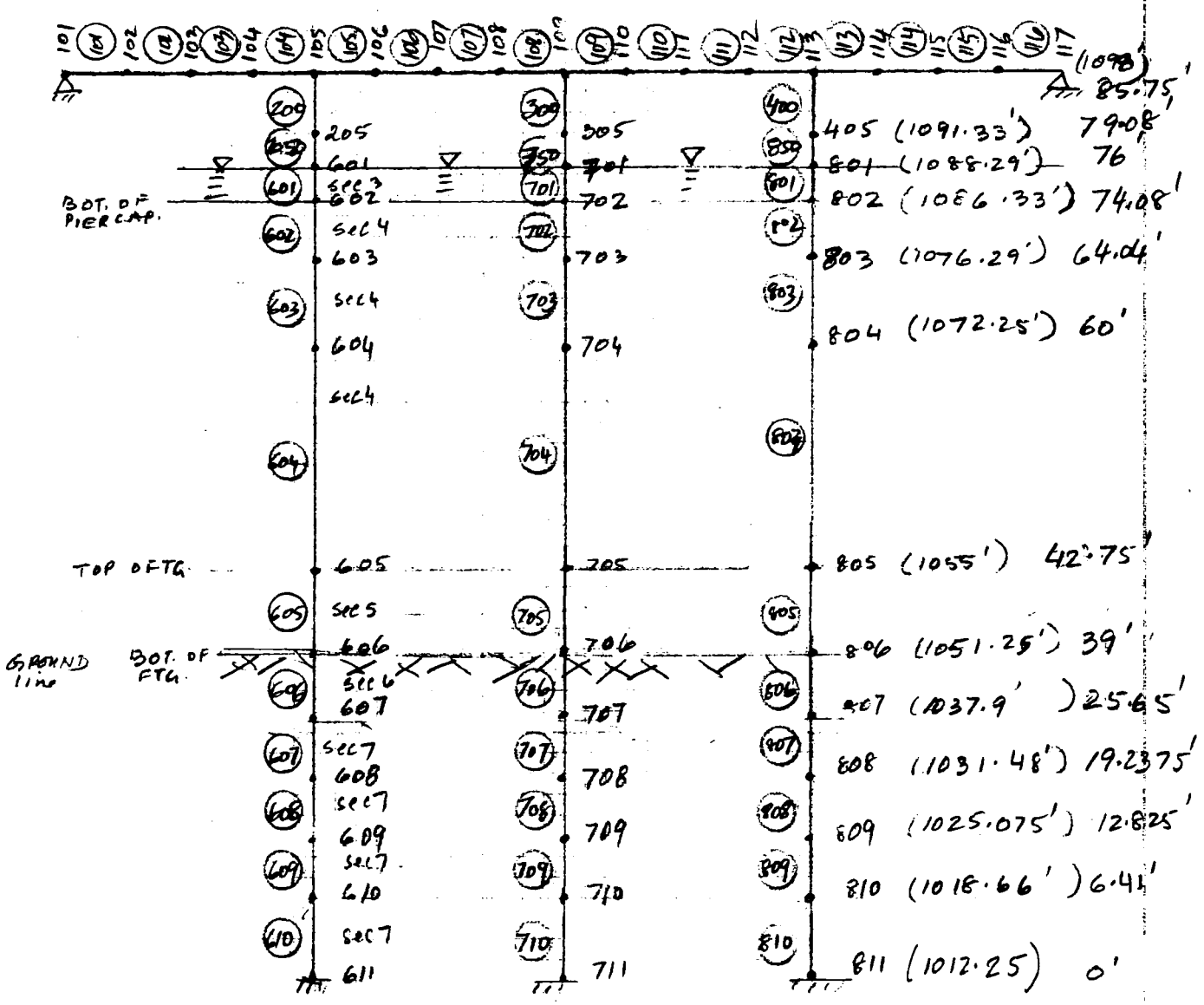
Ftg : 0.0624 kcf x 52 x 8 = 25.958 k/'

* Applied on transverse model.

TYLIN INTERNATIONAL

Projects: Salt River Bridges - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge.	Designer: SJ	Date: 02-16-00	
	Checker:	Date:	
		Grid: 1/8"	

LONGITUDINAL :



```
; File C:\Program Files\SAP2000N\24thLong.$2k saved 4/18/00 11:19:32 in Kip-in

SYSTEM
  DOF=UX,UY,UZ,RX,RY,RZ  LENGTH=IN  FORCE=Kip  PAGE=SECTIONS

JOINT
  101  X=0   Y=0   Z=1029
  102  X=216  Y=0   Z=1029
  103  X=432  Y=0   Z=1029
  104  X=648  Y=0   Z=1029
  105  X=864  Y=0   Z=1029
  106  X=1080  Y=0   Z=1029
  107  X=1296  Y=0   Z=1029
  108  X=1512  Y=0   Z=1029
  109  X=1728  Y=0   Z=1029
  110  X=1944  Y=0   Z=1029
  111  X=2160  Y=0   Z=1029
  112  X=2376  Y=0   Z=1029
  113  X=2592  Y=0   Z=1029
  114  X=2808  Y=0   Z=1029
  115  X=3024  Y=0   Z=1029
  116  X=3240  Y=0   Z=1029
  117  X=3456  Y=0   Z=1029
  205  X=864  Y=0  Z=948.96
  305  X=1728  Y=0  Z=948.96
  405  X=2592  Y=0  Z=948.96
  601  X=864  Y=0  Z=912.48
  602  X=864  Y=0  Z=888.96
  603  X=864  Y=0  Z=768.48
  604  X=864  Y=0  Z=720
  605  X=864  Y=0  Z=513
  606  X=864  Y=0  Z=468
  607  X=864  Y=0  Z=307.8
  608  X=864  Y=0  Z=230.85
  609  X=864  Y=0  Z=153.9
  610  X=864  Y=0  Z=76.92
  611  X=864  Y=0  Z=0
  701  X=1728  Y=0  Z=912.48
  702  X=1728  Y=0  Z=888.96
  703  X=1728  Y=0  Z=768.48
  704  X=1728  Y=0  Z=720
  705  X=1728  Y=0  Z=513
  706  X=1728  Y=0  Z=468
  707  X=1728  Y=0  Z=307.8
  708  X=1728  Y=0  Z=230.85
  709  X=1728  Y=0  Z=153.9
  710  X=1728  Y=0  Z=76.92
  711  X=1728  Y=0  Z=0
  801  X=2592  Y=0  Z=912.48
  802  X=2592  Y=0  Z=888.96
  803  X=2592  Y=0  Z=768.48
  804  X=2592  Y=0  Z=720
  805  X=2592  Y=0  Z=513
  806  X=2592  Y=0  Z=468
  807  X=2592  Y=0  Z=307.8
  808  X=2592  Y=0  Z=230.85
  809  X=2592  Y=0  Z=153.9
  810  X=2592  Y=0  Z=76.92
  811  X=2592  Y=0  Z=0

RESTRAINT
  ADD=611  DOF=U1,U2,U3,R1,R2,R3
  ADD=711  DOF=U1,U2,U3,R1,R2,R3
  ADD=811  DOF=U1,U2,U3,R1,R2,R3
```



```
  ADD=101  DOF=U2,U3,R1,R3
  ADD=117  DOF=U2,U3,R1,R3

PATTERN
  NAME=DEFAULT

SPRING
  ADD=607  U1=2062.5
  ADD=608  U1=1339.5
  ADD=609  U1=1339.5
  ADD=610  U1=1339.5
  ADD=708  U1=1339.5
  ADD=709  U1=1339.5
  ADD=710  U1=1339.5
  ADD=707  U1=2062.5
  ADD=807  U1=2062.5
  ADD=808  U1=1339.5
  ADD=809  U1=1339.5
  ADD=810  U1=1339.5
  ADD=606  U1=1392.725
  ADD=706  U1=1392.725
  ADD=806  U1=1392.725

MATERIAL
  NAME=STEEL  IDES=S  M=7.324E-07  W=.000283
    T=0  E=29000  U=.3  A=.0000065  FY=36
  NAME=CONC  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=4415  U=.2  A=.0000055
  NAME=OTHER  IDES=N  M=2.246377E-07  W=.0000868
    T=0  E=3600  U=.2  A=.0000055
  NAME=CONC2  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=3605  U=.2  A=.0000055
  NAME=CONC3  IDES=C
    T=0  E=3602  U=.2  A=.0000055
  NAME=STEEL0  IDES=S  M=7.330247E-07
    T=0  E=29000  U=.3  A=.0000065  FY=36

FRAME SECTION
  NAME=FSEC1 MAT=STEEL SH=R T=18,10 A=180 J=3916.671 I=4860,1500 AS=150,150
  NAME=SEC1 MAT=CONC A=16155.36 J=1554889 I=3367319,1.251438E+09 AS=16155.36,1615
5.36 S=903305.1,2605824 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC2 MAT=CONC2 A=37152 J=1.604966E+07 I=4012416,3.297314E+09 AS=37152,3715
2 S=222912,6394637 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC3 MAT=CONC2 A=29376 J=1.269043E+07 I=3172608,1.630015E+09 AS=29376,2937
6 S=176256,3995136 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC4 MAT=CONC2 A=18000 J=5399655 I=1349914,5.400001E+08 AS=18000,18000 S=8
9994.24,1800006 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC5 MAT=CONC2 A=59904 J=1.840252E+08 I=4.600634E+07,1.943765E+09 AS=59904
,59904 S=958469.8,6190128 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC7 MAT=STEEL A=417.6 J=1.35641E+07 I=241781.8,1.465019E+07 AS=417.6,417.
6 S=10074.24,50868.86 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC6 MAT=STEEL0 A=417.6 J=1.35641E+07 I=241781.8,1.465019E+07 AS=417.6,417
.6 S=10074.24,50868.86 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996

FRAME
  101  J=101,102  SEC=SEC1  NSEG=1  ANG=0
  102  J=102,103  SEC=SEC1  NSEG=1  ANG=0
  103  J=103,104  SEC=SEC1  NSEG=1  ANG=0
  104  J=104,105  SEC=SEC1  NSEG=1  ANG=0
  105  J=105,106  SEC=SEC1  NSEG=1  ANG=0
  106  J=106,107  SEC=SEC1  NSEG=1  ANG=0
  107  J=107,108  SEC=SEC1  NSEG=1  ANG=0
  108  J=108,109  SEC=SEC1  NSEG=1  ANG=0
  109  J=109,110  SEC=SEC1  NSEG=1  ANG=0
  110  J=110,111  SEC=SEC1  NSEG=1  ANG=0
  111  J=111,112  SEC=SEC1  NSEG=1  ANG=0
```

```
 112  J=112,113  SEC=SEC1  NSEG=1  ANG=0
 113  J=113,114  SEC=SEC1  NSEG=1  ANG=0
 114  J=114,115  SEC=SEC1  NSEG=1  ANG=0
 115  J=115,116  SEC=SEC1  NSEG=1  ANG=0
 116  J=116,117  SEC=SEC1  NSEG=1  ANG=0
 200  J=105,205  SEC=SEC2  NSEG=1  ANG=0  IREL=R3
 300  J=109,305  SEC=SEC2  NSEG=1  ANG=0  IREL=R3
 400  J=113,405  SEC=SEC2  NSEG=1  ANG=0  IREL=R3
 601  J=601,602  SEC=SEC3  NSEG=1  ANG=0
 602  J=602,603  SEC=SEC4  NSEG=1  ANG=0
 603  J=603,604  SEC=SEC4  NSEG=1  ANG=0
 604  J=604,605  SEC=SEC4  NSEG=1  ANG=0
 605  J=605,606  SEC=SEC5  NSEG=1  ANG=0
 606  J=606,607  SEC=SEC6  NSEG=1  ANG=0
 607  J=607,608  SEC=SEC7  NSEG=1  ANG=0
 608  J=608,609  SEC=SEC7  NSEG=1  ANG=0
 609  J=609,610  SEC=SEC7  NSEG=1  ANG=0
 610  J=610,611  SEC=SEC7  NSEG=1  ANG=0
 650  J=205,601  SEC=SEC3  NSEG=1  ANG=0
 701  J=701,702  SEC=SEC3  NSEG=1  ANG=0
 702  J=702,703  SEC=SEC4  NSEG=1  ANG=0
 703  J=703,704  SEC=SEC4  NSEG=1  ANG=0
 704  J=704,705  SEC=SEC4  NSEG=1  ANG=0
 705  J=705,706  SEC=SEC5  NSEG=1  ANG=0
 706  J=706,707  SEC=SEC6  NSEG=1  ANG=0
 707  J=707,708  SEC=SEC7  NSEG=1  ANG=0
 708  J=708,709  SEC=SEC7  NSEG=1  ANG=0
 709  J=709,710  SEC=SEC7  NSEG=1  ANG=0
 710  J=710,711  SEC=SEC7  NSEG=1  ANG=0
 750  J=305,701  SEC=SEC3  NSEG=1  ANG=0
 801  J=801,802  SEC=SEC3  NSEG=1  ANG=0
 802  J=802,803  SEC=SEC4  NSEG=1  ANG=0
 803  J=803,804  SEC=SEC4  NSEG=1  ANG=0
 804  J=804,805  SEC=SEC4  NSEG=1  ANG=0
 805  J=805,806  SEC=SEC5  NSEG=1  ANG=0
 806  J=806,807  SEC=SEC6  NSEG=1  ANG=0
 807  J=807,808  SEC=SEC7  NSEG=1  ANG=0
 808  J=808,809  SEC=SEC7  NSEG=1  ANG=0
 809  J=809,810  SEC=SEC7  NSEG=1  ANG=0
 810  J=810,811  SEC=SEC7  NSEG=1  ANG=0
 850  J=405,801  SEC=SEC3  NSEG=1  ANG=0

LOAD
  NAME=DL
    TYPE=GRAVITY  ELEM=FRAME
      ADD=101  UZ=-1
      ADD=102  UZ=-1
      ADD=103  UZ=-1
      ADD=104  UZ=-1
      ADD=105  UZ=-1
      ADD=106  UZ=-1
      ADD=107  UZ=-1
      ADD=108  UZ=-1
      ADD=109  UZ=-1
      ADD=110  UZ=-1
      ADD=111  UZ=-1
      ADD=112  UZ=-1
      ADD=113  UZ=-1
      ADD=114  UZ=-1
      ADD=115  UZ=-1
      ADD=116  UZ=-1
      ADD=200  UZ=-1
      ADD=650  UZ=-1
      ADD=601  UZ=-1
      ADD=602  UZ=-1
      ADD=603  UZ=-1
```



```
      ADD=604  UZ=-1
      ADD=605  UZ=-1
      ADD=606  UZ=-1
      ADD=607  UZ=-1
      ADD=608  UZ=-1
      ADD=609  UZ=-1
      ADD=610  UZ=-1
      ADD=300  UZ=-1
      ADD=750  UZ=-1
      ADD=701  UZ=-1
      ADD=702  UZ=-1
      ADD=703  UZ=-1
      ADD=704  UZ=-1
      ADD=705  UZ=-1
      ADD=706  UZ=-1
      ADD=707  UZ=-1
      ADD=708  UZ=-1
      ADD=709  UZ=-1
      ADD=710  UZ=-1
      ADD=400  UZ=-1
      ADD=850  UZ=-1
      ADD=801  UZ=-1
      ADD=802  UZ=-1
      ADD=803  UZ=-1
      ADD=804  UZ=-1
      ADD=805  UZ=-1
      ADD=806  UZ=-1
      ADD=807  UZ=-1
      ADD=808  UZ=-1
      ADD=809  UZ=-1
      ADD=810  UZ=-1
    TYPE=DISTRIBUTED SPAN
      ADD=101  RD=0,1  UZ=-.237,-.237
      ADD=102  RD=0,1  UZ=-.237,-.237
      ADD=103  RD=0,1  UZ=-.237,-.237
      ADD=104  RD=0,1  UZ=-.237,-.237
      ADD=105  RD=0,1  UZ=-.237,-.237
      ADD=106  RD=0,1  UZ=-.237,-.237
      ADD=107  RD=0,1  UZ=-.237,-.237
      ADD=108  RD=0,1  UZ=-.237,-.237
      ADD=109  RD=0,1  UZ=-.237,-.237
      ADD=110  RD=0,1  UZ=-.237,-.237
      ADD=111  RD=0,1  UZ=-.237,-.237
      ADD=112  RD=0,1  UZ=-.237,-.237
      ADD=113  RD=0,1  UZ=-.237,-.237
      ADD=114  RD=0,1  UZ=-.237,-.237
      ADD=115  RD=0,1  UZ=-.237,-.237
      ADD=116  RD=0,1  UZ=-.237,-.237
  NAME=WIND
    TYPE=DISTRIBUTED SPAN
      ADD=101  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=102  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=103  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=104  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=105  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=106  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=107  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=108  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=109  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=110  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=111  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=112  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=113  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=114  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=115  RD=0,1  U1=1.055833E-02,1.055833E-02
      ADD=116  RD=0,1  U1=1.055833E-02,1.055833E-02
```

```
      ADD=200  RD=0,1  U2=.375,.375
      ADD=300  RD=0,1  U2=.375,.375
      ADD=400  RD=0,1  U2=.375,.375
 NAME=WINDLIVE
   TYPE=DISTRIBUTED SPAN
      ADD=101  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=102  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=103  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=104  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=105  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=106  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=107  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=108  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=109  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=110  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=111  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=112  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=113  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=114  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=115  RD=0,1  U1=4.033333E-03,4.033333E-03
      ADD=116  RD=0,1  U1=4.033333E-03,4.033333E-03
 NAME=LONGFORC
   TYPE=FORCE
      ADD=105  UX=.4081
      ADD=109  UX=.4081
      ADD=113  UX=.4081
   TYPE=DISTRIBUTED SPAN
      ADD=101  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=102  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=103  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=104  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=105  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=106  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=107  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=108  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=109  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=110  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=111  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=112  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=113  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=114  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=115  RD=0,1  U1=1.209167E-02,1.209167E-02
      ADD=116  RD=0,1  U1=1.209167E-02,1.209167E-02
 NAME=STREAM
   TYPE=DISTRIBUTED SPAN
      ADD=601  RD=0,1  U2=.38875,.3681667
      ADD=701  RD=0,1  U2=.38875,.3681667
      ADD=801  RD=0,1  U2=.38875,.3681667
      ADD=602  RD=0,1  U2=.27075,.19325
      ADD=702  RD=0,1  U2=.27075,.19325
      ADD=802  RD=0,1  U2=.27075,.19325
      ADD=603  RD=0,1  U2=.19325,.1620833
      ADD=703  RD=0,1  U2=.19325,.1620833
      ADD=803  RD=0,1  U2=.19325,.1620833
      ADD=604  RD=0,1  U2=.1620833,2.894167E-02
      ADD=704  RD=0,1  U2=.1620833,2.894167E-02
      ADD=804  RD=0,1  U2=.1620833,2.894167E-02
      ADD=605  RD=0,1  U2=.030095,0
      ADD=705  RD=0,1  U2=.030095,0
      ADD=805  RD=0,1  U2=.030095,0
 NAME=TEMP
   TYPE=TEMPERATURE  ELEM=FRAME
      ADD=101  T=-40
      ADD=102  T=-40
      ADD=103  T=-40
      ADD=104  T=-40
```



```
      ADD=105  T=-40
      ADD=106  T=-40
      ADD=107  T=-40
      ADD=108  T=-40
      ADD=109  T=-40
      ADD=110  T=-40
      ADD=111  T=-40
      ADD=112  T=-40
      ADD=113  T=-40
      ADD=114  T=-40
      ADD=115  T=-40
      ADD=116  T=-40
      ADD=200  T=-40
      ADD=650  T=-40
      ADD=601  T=-40
      ADD=602  T=-40
      ADD=603  T=-40
      ADD=604  T=-40
      ADD=605  T=-40
      ADD=606  T=-40
      ADD=607  T=-40
      ADD=608  T=-40
      ADD=609  T=-40
      ADD=610  T=-40
      ADD=300  T=-40
      ADD=750  T=-40
      ADD=701  T=-40
      ADD=702  T=-40
      ADD=703  T=-40
      ADD=704  T=-40
      ADD=705  T=-40
      ADD=706  T=-40
      ADD=707  T=-40
      ADD=708  T=-40
      ADD=709  T=-40
      ADD=710  T=-40
      ADD=400  T=-40
      ADD=850  T=-40
      ADD=801  T=-40
      ADD=802  T=-40
      ADD=803  T=-40
      ADD=804  T=-40
      ADD=805  T=-40
      ADD=806  T=-40
      ADD=807  T=-40
      ADD=808  T=-40
      ADD=809  T=-40
      ADD=810  T=-40

 OUTPUT
 ; No Output Requested

 END

 ; The following data is used for graphics, design and pushover analysis.
 ; If changes are made to the analysis data above, then the following data
 ; should be checked for consistency.
 SAP2000 V7.10 SUPPLEMENTAL DATA
   GRID GLOBAL  X "1"  0
   GRID GLOBAL  X "2"  216
   GRID GLOBAL  X "3"  432
   GRID GLOBAL  X "4"  648
   GRID GLOBAL  X "5"  864
   GRID GLOBAL  X "6"  1080
   GRID GLOBAL  X "7"  1296
   GRID GLOBAL  X "8"  1512
```

```
  GRID GLOBAL  X "9"  1728
  GRID GLOBAL  X "10"  1944
  GRID GLOBAL  X "11"  2160
  GRID GLOBAL  X "12"  2376
  GRID GLOBAL  X "13"  2592
  GRID GLOBAL  X "14"  2808
  GRID GLOBAL  X "15"  3024
  GRID GLOBAL  X "16"  3240
  GRID GLOBAL  X "17"  3456
  GRID GLOBAL  Y "18"  0
  GRID GLOBAL  Z "19"  0
  GRID GLOBAL  Z "20"  76.92
  GRID GLOBAL  Z "21"  153.9
  GRID GLOBAL  Z "22"  230.85
  GRID GLOBAL  Z "23"  307.8
  GRID GLOBAL  Z "24"  468
  GRID GLOBAL  Z "25"  513
  GRID GLOBAL  Z "26"  720
  GRID GLOBAL  Z "27"  768.48
  GRID GLOBAL  Z "28"  888.96
  GRID GLOBAL  Z "29"  912.48
  GRID GLOBAL  Z "30"  948.96
  GRID GLOBAL  Z "31"  1029
  MATERIAL STEEL FY 36
  MATERIAL STEEL0 FY 36
  MATERIAL CONC FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC2 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC3 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  STATICLOAD DL TYPE DEAD
  STATICLOAD WIND TYPE WIND
  STATICLOAD WINDLIVE TYPE WIND
  STATICLOAD LONGFORC TYPE OTHER
  STATICLOAD STREAM TYPE OTHER
  STATICLOAD TEMP TYPE OTHER
END SUPPLEMENTAL DATA
```

```
SAP2000 v7.10 File: 24THLONG  Kip-ft Units  PAGE 1
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F R A M E   E L E M E N T   F O R C E S

    FRAME  LOAD    LOC          P          V2          V3          T          M
2          M3

      101  DL
                 0.00       0.00     -562.42        0.00        0.00        0.0
0        0.00
                18.00       0.00     -208.30        0.00        0.00        0.0
0     6936.55
      101  WIND
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00      -2.28        0.00        0.00        0.00        0.0
0        0.00
      101  WINDLIVE
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00  -8.712E-01       0.00        0.00        0.00        0.0
0        0.00
      101  LONGFORC
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00      -2.61        0.00        0.00        0.00        0.0
0        0.00
      101  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0        0.00
      101  TEMP
                 0.00       0.00       -9.47        0.00        0.00        0.0
0        0.00
                18.00       0.00       -9.47        0.00        0.00        0.0
0      170.42

      102  DL
                 0.00       0.00     -208.30        0.00        0.00        0.0
0     6936.55
                18.00       0.00      145.82        0.00        0.00        0.0
0     7498.92
      102  WIND
                 0.00      -2.28        0.00        0.00        0.00        0.0
0        0.00
                18.00      -4.56        0.00        0.00        0.00        0.0
0        0.00
      102  WINDLIVE
                 0.00  -8.712E-01       0.00        0.00        0.00        0.0
0        0.00
                18.00      -1.74        0.00        0.00        0.00        0.0
0        0.00
      102  LONGFORC
                 0.00      -2.61        0.00        0.00        0.00        0.0
0        0.00
                18.00      -5.22        0.00        0.00        0.00        0.0
0        0.00
      102  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0        0.00
      102  TEMP
```



```
                 0.00       0.00       -9.47        0.00        0.00        0.0
0      170.42
                18.00       0.00       -9.47        0.00        0.00        0.0
0      340.84

      103  DL
                 0.00       0.00      145.82        0.00        0.00        0.0
0     7498.92
                18.00       0.00      499.94        0.00        0.00        0.0
0     1687.13
      103  WIND
                 0.00      -4.56        0.00        0.00        0.00        0.0
0        0.00
                18.00      -6.84        0.00        0.00        0.00        0.0
0        0.00
      103  WINDLIVE
                 0.00      -1.74        0.00        0.00        0.00        0.0
0        0.00
                18.00      -2.61        0.00        0.00        0.00        0.0
0        0.00
      103  LONGFORC
                 0.00      -5.22        0.00        0.00        0.00        0.0
0        0.00
                18.00      -7.84        0.00        0.00        0.00        0.0
0        0.00
      103  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0        0.00
      103  TEMP
                 0.00       0.00       -9.47        0.00        0.00        0.0
0      340.84
                18.00       0.00       -9.47        0.00        0.00        0.0
0      511.25

      104  DL
                 0.00       0.00      499.94        0.00        0.00        0.0
0     1687.13
                18.00       0.00      854.06        0.00        0.00        0.0
0   -10498.83
      104  WIND
                 0.00      -6.84        0.00        0.00        0.00        0.0
0        0.00
                18.00      -9.12        0.00        0.00        0.00        0.0
0        0.00
      104  WINDLIVE
                 0.00      -2.61        0.00        0.00        0.00        0.0
0        0.00
                18.00      -3.48        0.00        0.00        0.00        0.0
0        0.00
      104  LONGFORC
                 0.00      -7.84        0.00        0.00        0.00        0.0
0        0.00
                18.00     -10.45        0.00        0.00        0.00        0.0
0        0.00
      104  STREAM
                 0.00       0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00       0.00        0.00        0.00        0.00        0.0
0        0.00
      104  TEMP
                 0.00       0.00       -9.47        0.00        0.00        0.0
0      511.25
                18.00       0.00       -9.47        0.00        0.00        0.0
0      681.67
```

```
      105  DL
                    0.00        0.00     -748.98        0.00        0.00        0.0
0   -10498.83
                   18.00        0.00     -394.85        0.00        0.00        0.0
0     -204.36
      105  WIND
                    0.00        3.04        0.00        0.00        0.00        0.0
0        0.00
                   18.00   7.605E-01        0.00        0.00        0.00        0.0
0        0.00
      105  WINDLIVE
                    0.00        1.16        0.00        0.00        0.00        0.0
0        0.00
                   18.00   2.905E-01        0.00        0.00        0.00        0.0
0        0.00
      105  LONGFORC
                    0.00        3.48        0.00        0.00        0.00        0.0
0        0.00
                   18.00   8.710E-01        0.00        0.00        0.00        0.0
0        0.00
      105  STREAM
                    0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                   18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      105  TEMP
                    0.00        9.66       14.01        0.00        0.00        0.0
0      681.67
                   18.00        9.66       14.01        0.00        0.00        0.0
0      429.49

      106  DL
                    0.00        0.00     -394.85        0.00        0.00        0.0
0     -204.36
                   18.00        0.00      -40.73        0.00        0.00        0.0
0     3715.95
      106  WIND
                    0.00   7.605E-01        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -1.52        0.00        0.00        0.00        0.0
0        0.00
      106  WINDLIVE
                    0.00   2.905E-01        0.00        0.00        0.00        0.0
0        0.00
                   18.00  -5.807E-01        0.00        0.00        0.00        0.0
0        0.00
      106  LONGFORC
                    0.00   8.710E-01        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -1.74        0.00        0.00        0.00        0.0
0        0.00
      106  STREAM
                    0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                   18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      106  TEMP
                    0.00        9.66       14.01        0.00        0.00        0.0
0      429.49
                   18.00        9.66       14.01        0.00        0.00        0.0
0      177.30

      107  DL
                    0.00        0.00      -40.73        0.00        0.00        0.0
0     3715.95
```



```
                   18.00        0.00      313.39        0.00        0.00        0.0
0     1262.08
      107  WIND
                    0.00       -1.52        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -3.80        0.00        0.00        0.00        0.0
0        0.00
      107  WINDLIVE
                    0.00  -5.807E-01        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -1.45        0.00        0.00        0.00        0.0
0        0.00
      107  LONGFORC
                    0.00       -1.74        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -4.35        0.00        0.00        0.00        0.0
0        0.00
      107  STREAM
                    0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                   18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      107  TEMP
                    0.00        9.66       14.01        0.00        0.00        0.0
0      177.30
                   18.00        9.66       14.01        0.00        0.00        0.0
0      -74.88

      108  DL
                    0.00        0.00      313.39        0.00        0.00        0.0
0     1262.08
                   18.00        0.00      667.51        0.00        0.00        0.0
0    -7565.95
      108  WIND
                    0.00       -3.80        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -6.08        0.00        0.00        0.00        0.0
0        0.00
      108  WINDLIVE
                    0.00       -1.45        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -2.32        0.00        0.00        0.00        0.0
0        0.00
      108  LONGFORC
                    0.00       -4.35        0.00        0.00        0.00        0.0
0        0.00
                   18.00       -6.96        0.00        0.00        0.00        0.0
0        0.00
      108  STREAM
                    0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                   18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      108  TEMP
                    0.00        9.66       14.01        0.00        0.00        0.0
0      -74.88
                   18.00        9.66       14.01        0.00        0.00        0.0
0     -327.06

      109  DL
                    0.00        0.00     -667.51        0.00        0.00        0.0
0    -7565.95
                   18.00        0.00     -313.39        0.00        0.00        0.0
0     1262.08
      109  WIND
                    0.00        6.08        0.00        0.00        0.00        0.0
```

```
0        0.00
                18.00        3.80        0.00        0.00        0.00        0.0
0        0.00
      109  WINDLIVE
                 0.00        2.32        0.00        0.00        0.00        0.0
0        0.00
                18.00        1.45        0.00        0.00        0.00        0.0
0        0.00
      109  LONGFORC
                 0.00        6.96        0.00        0.00        0.00        0.0
0        0.00
                18.00        4.35        0.00        0.00        0.00        0.0
0        0.00
      109  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      109  TEMP
                 0.00        9.66      -14.01        0.00        0.00        0.0
0     -327.06
                18.00        9.66      -14.01        0.00        0.00        0.0
0      -74.88

      110  DL
                 0.00        0.00     -313.39        0.00        0.00        0.0
0     1262.08
                18.00        0.00       40.73        0.00        0.00        0.0
0     3715.95
      110  WIND
                 0.00        3.80        0.00        0.00        0.00        0.0
0        0.00
                18.00        1.52        0.00        0.00        0.00        0.0
0        0.00
      110  WINDLIVE
                 0.00        1.45        0.00        0.00        0.00        0.0
0        0.00
                18.00   5.807E-01        0.00        0.00        0.00        0.0
0        0.00
      110  LONGFORC
                 0.00        4.35        0.00        0.00        0.00        0.0
0        0.00
                18.00        1.74        0.00        0.00        0.00        0.0
0        0.00
      110  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      110  TEMP
                 0.00        9.66      -14.01        0.00        0.00        0.0
0      -74.88
                18.00        9.66      -14.01        0.00        0.00        0.0
0      177.30

      111  DL
                 0.00        0.00       40.73        0.00        0.00        0.0
0     3715.95
                18.00        0.00      394.85        0.00        0.00        0.0
0     -204.36
      111  WIND
                 0.00        1.52        0.00        0.00        0.00        0.0
0        0.00
                18.00  -7.605E-01        0.00        0.00        0.00        0.0
0        0.00
      111  WINDLIVE
```



```
                 0.00   5.807E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00  -2.905E-01        0.00        0.00        0.00        0.0
0        0.00
      111  LONGFORC
                 0.00        1.74        0.00        0.00        0.00        0.0
0        0.00
                18.00  -8.710E-01        0.00        0.00        0.00        0.0
0        0.00
      111  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      111  TEMP
                 0.00        9.66      -14.01        0.00        0.00        0.0
0      177.30
                18.00        9.66      -14.01        0.00        0.00        0.0
0      429.49

      112  DL
                 0.00        0.00      394.85        0.00        0.00        0.0
0     -204.36
                18.00        0.00      748.98        0.00        0.00        0.0
0   -10498.83
      112  WIND
                 0.00  -7.605E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00       -3.04        0.00        0.00        0.00        0.0
0        0.00
      112  WINDLIVE
                 0.00  -2.905E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00       -1.16        0.00        0.00        0.00        0.0
0        0.00
      112  LONGFORC
                 0.00  -8.710E-01        0.00        0.00        0.00        0.0
0        0.00
                18.00       -3.48        0.00        0.00        0.00        0.0
0        0.00
      112  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                18.00        0.00        0.00        0.00        0.00        0.0
0        0.00
      112  TEMP
                 0.00        9.66      -14.01        0.00        0.00        0.0
0      429.49
                18.00        9.66      -14.01        0.00        0.00        0.0
0      681.67

      113  DL
                 0.00        0.00     -854.06        0.00        0.00        0.0
0   -10498.83
                18.00        0.00     -499.94        0.00        0.00        0.0
0     1687.13
      113  WIND
                 0.00        9.12        0.00        0.00        0.00        0.0
0        0.00
                18.00        6.84        0.00        0.00        0.00        0.0
0        0.00
      113  WINDLIVE
                 0.00        3.48        0.00        0.00        0.00        0.0
0        0.00
                18.00        2.61        0.00        0.00        0.00        0.0
0        0.00
```

```
113  LONGFORC
              0.00        10.45         0.00         0.00         0.00         0.0
0        0.00
             18.00         7.84         0.00         0.00         0.00         0.0
0        0.00
113  STREAM
              0.00         0.00         0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
113  TEMP
              0.00         0.00         9.47         0.00         0.00         0.0
0      681.67
             18.00         0.00         9.47         0.00         0.00         0.0
0      511.25

114  DL
              0.00         0.00      -499.94         0.00         0.00         0.0
0     1687.13
             18.00         0.00      -145.82         0.00         0.00         0.0
0     7498.92
114  WIND
              0.00         6.84         0.00         0.00         0.00         0.0
0        0.00
             18.00         4.56         0.00         0.00         0.00         0.0
0        0.00
114  WINDLIVE
              0.00         2.61         0.00         0.00         0.00         0.0
0        0.00
             18.00         1.74         0.00         0.00         0.00         0.0
0        0.00
114  LONGFORC
              0.00         7.84         0.00         0.00         0.00         0.0
0        0.00
             18.00         5.22         0.00         0.00         0.00         0.0
0        0.00
114  STREAM
              0.00         0.00         0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
114  TEMP
              0.00         0.00         9.47         0.00         0.00         0.0
0      511.25
             18.00         0.00         9.47         0.00         0.00         0.0
0      340.84

115  DL
              0.00         0.00      -145.82         0.00         0.00         0.0
0     7498.92
             18.00         0.00       208.30         0.00         0.00         0.0
0     6936.55
115  WIND
              0.00         4.56         0.00         0.00         0.00         0.0
0        0.00
             18.00         2.28         0.00         0.00         0.00         0.0
0        0.00
115  WINDLIVE
              0.00         1.74         0.00         0.00         0.00         0.0
0        0.00
             18.00     8.712E-01        0.00         0.00         0.00         0.0
0        0.00
115  LONGFORC
              0.00         5.22         0.00         0.00         0.00         0.0
0        0.00
             18.00         2.61         0.00         0.00         0.00         0.0
```



```
0        0.00
115  STREAM
              0.00         0.00         0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
115  TEMP
              0.00         0.00         9.47         0.00         0.00         0.0
0      340.84
             18.00         0.00         9.47         0.00         0.00         0.0
0      170.42

116  DL
              0.00         0.00       208.30         0.00         0.00         0.0
0     6936.55
             18.00         0.00       562.42         0.00         0.00         0.0
0        0.00
116  WIND
              0.00         2.28         0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
116  WINDLIVE
              0.00     8.712E-01        0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
116  LONGFORC
              0.00         2.61         0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
116  STREAM
              0.00         0.00         0.00         0.00         0.00         0.0
0        0.00
             18.00         0.00         0.00         0.00         0.00         0.0
0        0.00
116  TEMP
              0.00         0.00         9.47         0.00         0.00         0.0
0      170.42
             18.00         0.00         9.47         0.00         0.00         0.0
0        0.00

200  DL
              0.00     -1603.03         0.00         0.00         0.00         0.0
0        0.00
              6.67     -1861.18         0.00         0.00         0.00         0.0
0        0.00
200  WIND
              0.00         0.00       -12.16         0.00         0.00         0.0
0        0.00
              6.67         0.00       -42.18         0.00         0.00         0.0
0      181.23
200  WINDLIVE
              0.00         0.00        -4.65         0.00         0.00         0.0
0        0.00
              6.67         0.00        -4.65         0.00         0.00         0.0
0       30.99
200  LONGFORC
              0.00         0.00       -14.34         0.00         0.00         0.0
0        0.00
              6.67         0.00       -14.34         0.00         0.00         0.0
0       95.63
200  STREAM
              0.00         0.00         0.00         0.00         0.00         0.0
0        0.00
```

```
                6.67       0.00       0.00       0.00       0.00       0.0
0       0.00
      200  TEMP
                0.00      23.48      -9.66       0.00       0.00       0.0
0       0.00
                6.67      23.48      -9.66       0.00       0.00       0.0
0      64.43

      300  DL
                0.00   -1335.01       0.00       0.00       0.00       0.0
0       0.00
                6.67   -1593.16       0.00       0.00       0.00       0.0
0       0.00
      300  WIND
                0.00       0.00     -12.16       0.00       0.00       0.0
0       0.00
                6.67       0.00     -42.18       0.00       0.00       0.0
0     181.22
      300  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0       0.00
                6.67       0.00      -4.65       0.00       0.00       0.0
0      30.99
      300  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0       0.00
                6.67       0.00     -14.34       0.00       0.00       0.0
0      95.63
      300  STREAM
                0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                6.67       0.00       0.00       0.00       0.00       0.0
0       0.00
      300  TEMP
                0.00     -28.02       0.00       0.00       0.00       0.0
0       0.00
                6.67     -28.02       0.00       0.00       0.00       0.0
0       0.00

      400  DL
                0.00   -1603.03       0.00       0.00       0.00       0.0
0       0.00
                6.67   -1861.18       0.00       0.00       0.00       0.0
0       0.00
      400  WIND
                0.00       0.00     -12.16       0.00       0.00       0.0
0       0.00
                6.67       0.00     -42.18       0.00       0.00       0.0
0     181.23
      400  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0       0.00
                6.67       0.00      -4.65       0.00       0.00       0.0
0      30.99
      400  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0       0.00
                6.67       0.00     -14.34       0.00       0.00       0.0
0      95.63
      400  STREAM
                0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                6.67       0.00       0.00       0.00       0.00       0.0
0       0.00
      400  TEMP
                0.00      23.48       9.66       0.00       0.00       0.0
```



```
0       0.00
                6.67      23.48       9.66       0.00       0.00       0.0
0     -64.43

      601  DL
                0.00   -1954.20       0.00       0.00       0.00       0.0
0       0.00
                1.96   -2014.18       0.00       0.00       0.00       0.0
0       0.00
      601  WIND
                0.00       0.00     -42.18       0.00       0.00       0.0
0     309.45
                1.96       0.00     -42.18       0.00       0.00       0.0
0     392.12
      601  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0      45.12
                1.96       0.00      -4.65       0.00       0.00       0.0
0      54.22
      601  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0     139.22
                1.96       0.00     -14.34       0.00       0.00       0.0
0     167.33
      601  STREAM
                0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                1.96       0.00      -8.90       0.00       0.00       0.0
0       8.80
      601  TEMP
                0.00      23.48      -9.66       0.00       0.00       0.0
0      93.80
                1.96      23.48      -9.66       0.00       0.00       0.0
0     112.73

      602  DL
                0.00   -2014.18       0.00       0.00       0.00       0.0
0       0.00
               10.04   -2202.44       0.00       0.00       0.00       0.0
0       0.00
      602  WIND
                0.00       0.00     -42.18       0.00       0.00       0.0
0     392.12
               10.04       0.00     -42.18       0.00       0.00       0.0
0     815.60
      602  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0      54.22
               10.04       0.00      -4.65       0.00       0.00       0.0
0     100.88
      602  LONGFORC
                0.00       0.00     -14.34       0.00       0.00       0.0
0     167.33
               10.04       0.00     -14.34       0.00       0.00       0.0
0     311.28
      602  STREAM
                0.00       0.00      -8.90       0.00       0.00       0.0
0       8.80
               10.04       0.00     -36.85       0.00       0.00       0.0
0     246.30
      602  TEMP
                0.00      23.48      -9.66       0.00       0.00       0.0
0     112.73
               10.04      23.48      -9.66       0.00       0.00       0.0
0     209.71
```

```
603  DL
                0.00     -2202.44      0.00      0.00      0.00      0.0
0      0.00
                4.04     -2278.20      0.00      0.00      0.00      0.0
0      0.00
603  WIND
                0.00         0.00    -42.18      0.00      0.00      0.0
0    815.60
                4.04         0.00    -42.18      0.00      0.00      0.0
0    986.00
603  WINDLIVE
                0.00         0.00     -4.65      0.00      0.00      0.0
0    100.88
                4.04         0.00     -4.65      0.00      0.00      0.0
0    119.65
603  LONGFORC
                0.00         0.00    -14.34      0.00      0.00      0.0
0    311.28
                4.04         0.00    -14.34      0.00      0.00      0.0
0    369.21
603  STREAM
                0.00         0.00    -36.85      0.00      0.00      0.0
0    246.30
                4.04         0.00    -45.47      0.00      0.00      0.0
0    413.09
603  TEMP
                0.00        23.48     -9.66      0.00      0.00      0.0
0    209.71
                4.04        23.48     -9.66      0.00      0.00      0.0
0    248.74

604  DL
                0.00     -2278.20      0.00      0.00      0.00      0.0
0      0.00
               17.25     -2601.65      0.00      0.00      0.00      0.0
0      0.00
604  WIND
                0.00         0.00    -42.18      0.00      0.00      0.0
0    986.00
               17.25         0.00    -42.18      0.00      0.00      0.0
0   1713.58
604  WINDLIVE
                0.00         0.00     -4.65      0.00      0.00      0.0
0    119.65
               17.25         0.00     -4.65      0.00      0.00      0.0
0    199.80
604  LONGFORC
                0.00         0.00    -14.34      0.00      0.00      0.0
0    369.21
               17.25         0.00    -14.34      0.00      0.00      0.0
0    616.54
604  STREAM
                0.00         0.00    -45.47      0.00      0.00      0.0
0    413.09
               17.25         0.00    -65.24      0.00      0.00      0.0
0   1407.52
604  TEMP
                0.00        23.48     -9.66      0.00      0.00      0.0
0    248.74
               17.25        23.48     -9.66      0.00      0.00      0.0
0    415.37

605  DL
                0.00     -2601.65      0.00      0.00      0.00      0.0
0      0.00
                3.75     -2835.66      0.00      0.00      0.00      0.0
```



```
0      0.00
605  WIND
                0.00         0.00    -42.18      0.00      0.00      0.0
0   1713.58
                3.75         0.00    -42.18      0.00      0.00      0.0
0   1871.75
605  WINDLIVE
                0.00         0.00     -4.65      0.00      0.00      0.0
0    199.80
                3.75         0.00     -4.65      0.00      0.00      0.0
0    217.22
605  LONGFORC
                0.00         0.00    -14.34      0.00      0.00      0.0
0    616.54
                3.75         0.00    -14.34      0.00      0.00      0.0
0    670.30
605  STREAM
                0.00         0.00    -65.24      0.00      0.00      0.0
0   1407.52
                3.75         0.00    -65.91      0.00      0.00      0.0
0   1653.86
605  TEMP
                0.00        23.48     -9.66      0.00      0.00      0.0
0    415.37
                3.75        23.48     -9.66      0.00      0.00      0.0
0    451.60

606  DL
                0.00     -2835.66      0.00      0.00      0.00      0.0
0      0.00
               13.35     -2835.66      0.00      0.00      0.00      0.0
0      0.00
606  WIND
                0.00         0.00     52.17      0.00      0.00      0.0
0   1871.75
               13.35         0.00     52.17      0.00      0.00      0.0
0   1175.24
606  WINDLIVE
                0.00         0.00      6.13      0.00      0.00      0.0
0    217.22
               13.35         0.00      6.13      0.00      0.00      0.0
0    135.34
606  LONGFORC
                0.00         0.00     18.93      0.00      0.00      0.0
0    670.30
               13.35         0.00     18.93      0.00      0.00      0.0
0    417.61
606  STREAM
                0.00         0.00     36.98      0.00      0.00      0.0
0   1653.86
               13.35         0.00     36.98      0.00      0.00      0.0
0   1160.23
606  TEMP
                0.00        23.48     12.75      0.00      0.00      0.0
0    451.60
               13.35        23.48     12.75      0.00      0.00      0.0
0    281.35

607  DL
                0.00     -2835.66      0.00      0.00      0.00      0.0
0      0.00
                6.41     -2844.76      0.00      0.00      0.00      0.0
0      0.00
607  WIND
                0.00         0.00     65.49      0.00      0.00      0.0
0   1175.24
```

```
                6.41       0.00      65.49       0.00       0.00       0.0
0      755.30
      607  WINDLIVE
                0.00       0.00       7.59       0.00       0.00       0.0
0      135.34
                6.41       0.00       7.59       0.00       0.00       0.0
0       86.66
      607  LONGFORC
                0.00       0.00      23.42       0.00       0.00       0.0
0      417.61
                6.41       0.00      23.42       0.00       0.00       0.0
0      267.42
      607  STREAM
                0.00       0.00      58.99       0.00       0.00       0.0
0     1160.23
                6.41       0.00      58.99       0.00       0.00       0.0
0      781.94
      607  TEMP
                0.00      23.48      15.78       0.00       0.00       0.0
0      281.35
                6.41      23.48      15.78       0.00       0.00       0.0
0      180.17

      608  DL
                0.00   -2844.76       0.00       0.00       0.00       0.0
0        0.00
                6.41   -2853.85       0.00       0.00       0.00       0.0
0        0.00
      608  WIND
                0.00       0.00      61.91       0.00       0.00       0.0
0      755.30
                6.41       0.00      61.91       0.00       0.00       0.0
0      358.31
      608  WINDLIVE
                0.00       0.00       7.15       0.00       0.00       0.0
0       86.66
                6.41       0.00       7.15       0.00       0.00       0.0
0       40.82
      608  LONGFORC
                0.00       0.00      22.06       0.00       0.00       0.0
0      267.42
                6.41       0.00      22.06       0.00       0.00       0.0
0      125.96
      608  STREAM
                0.00       0.00      58.85       0.00       0.00       0.0
0      781.94
                6.41       0.00      58.85       0.00       0.00       0.0
0      404.55
      608  TEMP
                0.00      23.48      14.86       0.00       0.00       0.0
0      180.17
                6.41      23.48      14.86       0.00       0.00       0.0
0       84.86

      609  DL
                0.00   -2853.85       0.00       0.00       0.00       0.0
0        0.00
                6.42   -2862.95       0.00       0.00       0.00       0.0
0        0.00
      609  WIND
                0.00       0.00      56.33       0.00       0.00       0.0
0      358.31
                6.42       0.00      56.33       0.00       0.00       0.0
0       -3.05
      609  WINDLIVE
                0.00       0.00       6.49       0.00       0.00       0.0
```



```
0       40.82
                6.42       0.00       6.49       0.00       0.00       0.0
0  -8.320E-01
      609  LONGFORC
                0.00       0.00      20.04       0.00       0.00       0.0
0      125.96
                6.42       0.00      20.04       0.00       0.00       0.0
0       -2.57
      609  STREAM
                0.00       0.00      54.89       0.00       0.00       0.0
0      404.55
                6.42       0.00      54.89       0.00       0.00       0.0
0       52.45
      609  TEMP
                0.00      23.48      13.50       0.00       0.00       0.0
0       84.86
                6.42      23.48      13.50       0.00       0.00       0.0
0       -1.73

      610  DL
                0.00   -2862.95       0.00       0.00       0.00       0.0
0        0.00
                6.41   -2872.04       0.00       0.00       0.00       0.0
0        0.00
      610  WIND
                0.00       0.00      53.57       0.00       0.00       0.0
0       -3.05
                6.41       0.00      53.57       0.00       0.00       0.0
0     -346.44
      610  WINDLIVE
                0.00       0.00       6.17       0.00       0.00       0.0
0  -8.320E-01
                6.41       0.00       6.17       0.00       0.00       0.0
0      -40.39
      610  LONGFORC
                0.00       0.00      19.05       0.00       0.00       0.0
0       -2.57
                6.41       0.00      19.05       0.00       0.00       0.0
0     -124.65
      610  STREAM
                0.00       0.00      52.56       0.00       0.00       0.0
0       52.45
                6.41       0.00      52.56       0.00       0.00       0.0
0     -284.44
      610  TEMP
                0.00      23.48      12.83       0.00       0.00       0.0
0       -1.73
                6.41      23.48      12.83       0.00       0.00       0.0
0      -83.98

      650  DL
                0.00   -1861.18       0.00       0.00       0.00       0.0
0        0.00
                3.04   -1954.20       0.00       0.00       0.00       0.0
0        0.00
      650  WIND
                0.00       0.00     -42.18       0.00       0.00       0.0
0      181.23
                3.04       0.00     -42.18       0.00       0.00       0.0
0      309.45
      650  WINDLIVE
                0.00       0.00      -4.65       0.00       0.00       0.0
0       30.99
                3.04       0.00      -4.65       0.00       0.00       0.0
0       45.12
      650  LONGFORC
```

```
                0.00        0.00      -14.34        0.00        0.00        0.0
0      95.63
                3.04        0.00      -14.34        0.00        0.00        0.0
0     139.22
      650  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0       0.00
      650  TEMP
                0.00       23.48       -9.66        0.00        0.00        0.0
0      64.43
                3.04       23.48       -9.66        0.00        0.00        0.0
0      93.80

      701  DL
                0.00    -1686.18        0.00        0.00        0.00        0.0
0       0.00
                1.96    -1746.16        0.00        0.00        0.00        0.0
0       0.00
      701  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     309.44
                1.96        0.00      -42.18        0.00        0.00        0.0
0     392.11
      701  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      45.11
                1.96        0.00       -4.65        0.00        0.00        0.0
0      54.22
      701  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     139.21
                1.96        0.00      -14.34        0.00        0.00        0.0
0     167.31
      701  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
                1.96        0.00       -8.90        0.00        0.00        0.0
0       8.80
      701  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                1.96      -28.02        0.00        0.00        0.00        0.0
0       0.00

      702  DL
                0.00    -1746.16        0.00        0.00        0.00        0.0
0       0.00
               10.04    -1934.42        0.00        0.00        0.00        0.0
0       0.00
      702  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     392.11
               10.04        0.00      -42.18        0.00        0.00        0.0
0     815.58
      702  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0      54.22
               10.04        0.00       -4.65        0.00        0.00        0.0
0     100.87
      702  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     167.31
               10.04        0.00      -14.34        0.00        0.00        0.0
0     311.26
```



```
      702  STREAM
                0.00        0.00       -8.90        0.00        0.00        0.0
0       8.80
               10.04        0.00      -36.85        0.00        0.00        0.0
0     246.30
      702  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
               10.04      -28.02        0.00        0.00        0.00        0.0
0       0.00

      703  DL
                0.00    -1934.42        0.00        0.00        0.00        0.0
0       0.00
                4.04    -2010.18        0.00        0.00        0.00        0.0
0       0.00
      703  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     815.58
                4.04        0.00      -42.18        0.00        0.00        0.0
0     985.97
      703  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0     100.87
                4.04        0.00       -4.65        0.00        0.00        0.0
0     119.64
      703  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     311.26
                4.04        0.00      -14.34        0.00        0.00        0.0
0     369.18
      703  STREAM
                0.00        0.00      -36.85        0.00        0.00        0.0
0     246.30
                4.04        0.00      -45.47        0.00        0.00        0.0
0     413.09
      703  TEMP
                0.00      -28.02        0.00        0.00        0.00        0.0
0       0.00
                4.04      -28.02        0.00        0.00        0.00        0.0
0       0.00

      704  DL
                0.00    -2010.18        0.00        0.00        0.00        0.0
0       0.00
               17.25    -2333.63        0.00        0.00        0.00        0.0
0       0.00
      704  WIND
                0.00        0.00      -42.18        0.00        0.00        0.0
0     985.97
               17.25        0.00      -42.18        0.00        0.00        0.0
0    1713.54
      704  WINDLIVE
                0.00        0.00       -4.65        0.00        0.00        0.0
0     119.64
               17.25        0.00       -4.65        0.00        0.00        0.0
0     199.78
      704  LONGFORC
                0.00        0.00      -14.34        0.00        0.00        0.0
0     369.18
               17.25        0.00      -14.34        0.00        0.00        0.0
0     616.49
      704  STREAM
                0.00        0.00      -45.47        0.00        0.00        0.0
0     413.09
               17.25        0.00      -65.24        0.00        0.00        0.0
```

```
0      1407.52
       704  TEMP
                 0.00      -28.02       0.00       0.00       0.00       0.0
0         0.00
                17.25      -28.02       0.00       0.00       0.00       0.0
0         0.00

       705  DL
                 0.00    -2333.63       0.00       0.00       0.00       0.0
0         0.00
                 3.75    -2567.64       0.00       0.00       0.00       0.0
0         0.00
       705  WIND
                 0.00        0.00     -42.18       0.00       0.00       0.0
0      1713.54
                 3.75        0.00     -42.18       0.00       0.00       0.0
0      1871.70
       705  WINDLIVE
                 0.00        0.00      -4.65       0.00       0.00       0.0
0       199.78
                 3.75        0.00      -4.65       0.00       0.00       0.0
0       217.21
       705  LONGFORC
                 0.00        0.00     -14.34       0.00       0.00       0.0
0       616.49
                 3.75        0.00     -14.34       0.00       0.00       0.0
0       670.25
       705  STREAM
                 0.00        0.00     -65.24       0.00       0.00       0.0
0      1407.52
                 3.75        0.00     -65.91       0.00       0.00       0.0
0      1653.86
       705  TEMP
                 0.00      -28.02       0.00       0.00       0.00       0.0
0         0.00
                 3.75      -28.02       0.00       0.00       0.00       0.0
0         0.00

       706  DL
                 0.00    -2567.64       0.00       0.00       0.00       0.0
0         0.00
                13.35    -2567.64       0.00       0.00       0.00       0.0
0         0.00
       706  WIND
                 0.00        0.00      52.17       0.00       0.00       0.0
0      1871.70
                13.35        0.00      52.17       0.00       0.00       0.0
0      1175.21
       706  WINDLIVE
                 0.00        0.00       6.13       0.00       0.00       0.0
0       217.21
                13.35        0.00       6.13       0.00       0.00       0.0
0       135.33
       706  LONGFORC
                 0.00        0.00      18.93       0.00       0.00       0.0
0       670.25
                13.35        0.00      18.93       0.00       0.00       0.0
0       417.58
       706  STREAM
                 0.00        0.00      36.98       0.00       0.00       0.0
0      1653.86
                13.35        0.00      36.98       0.00       0.00       0.0
0      1160.23
       706  TEMP
                 0.00      -28.02       0.00       0.00       0.00       0.0
0         0.00
```



```
                13.35      -28.02       0.00       0.00       0.00       0.0
0         0.00

       707  DL
                 0.00    -2567.64       0.00       0.00       0.00       0.0
0         0.00
                 6.41    -2576.74       0.00       0.00       0.00       0.0
0         0.00
       707  WIND
                 0.00        0.00      65.49       0.00       0.00       0.0
0      1175.21
                 6.41        0.00      65.49       0.00       0.00       0.0
0       755.28
       707  WINDLIVE
                 0.00        0.00       7.59       0.00       0.00       0.0
0       135.33
                 6.41        0.00       7.59       0.00       0.00       0.0
0        86.66
       707  LONGFORC
                 0.00        0.00      23.42       0.00       0.00       0.0
0       417.58
                 6.41        0.00      23.42       0.00       0.00       0.0
0       267.40
       707  STREAM
                 0.00        0.00      58.99       0.00       0.00       0.0
0      1160.23
                 6.41        0.00      58.99       0.00       0.00       0.0
0       781.94
       707  TEMP
                 0.00      -28.02       0.00       0.00       0.00       0.0
0         0.00
                 6.41      -28.02       0.00       0.00       0.00       0.0
0         0.00

       708  DL
                 0.00    -2576.74       0.00       0.00       0.00       0.0
0         0.00
                 6.41    -2585.83       0.00       0.00       0.00       0.0
0         0.00
       708  WIND
                 0.00        0.00      61.91       0.00       0.00       0.0
0       755.28
                 6.41        0.00      61.91       0.00       0.00       0.0
0       358.30
       708  WINDLIVE
                 0.00        0.00       7.15       0.00       0.00       0.0
0        86.66
                 6.41        0.00       7.15       0.00       0.00       0.0
0        40.82
       708  LONGFORC
                 0.00        0.00      22.06       0.00       0.00       0.0
0       267.40
                 6.41        0.00      22.06       0.00       0.00       0.0
0       125.95
       708  STREAM
                 0.00        0.00      58.85       0.00       0.00       0.0
0       781.94
                 6.41        0.00      58.85       0.00       0.00       0.0
0       404.55
       708  TEMP
                 0.00      -28.02       0.00       0.00       0.00       0.0
0         0.00
                 6.41      -28.02       0.00       0.00       0.00       0.0
0         0.00

       709  DL
```

```
                0.00   -2585.83      0.00      0.00      0.00      0.0
0       0.00
                6.42   -2594.93      0.00      0.00      0.00      0.0
0       0.00
      709  WIND
                0.00       0.00     56.33      0.00      0.00      0.0
0     358.30
                6.42       0.00     56.33      0.00      0.00      0.0
0      -3.05
      709  WINDLIVE
                0.00       0.00      6.49      0.00      0.00      0.0
0      40.82
                6.42       0.00      6.49      0.00      0.00      0.0
0  -8.319E-01
      709  LONGFORC
                0.00       0.00     20.03      0.00      0.00      0.0
0     125.95
                6.42       0.00     20.03      0.00      0.00      0.0
0      -2.57
      709  STREAM
                0.00       0.00     54.89      0.00      0.00      0.0
0     404.55
                6.42       0.00     54.89      0.00      0.00      0.0
0      52.45
      709  TEMP
                0.00     -28.02      0.00      0.00      0.00      0.0
0       0.00
                6.42     -28.02      0.00      0.00      0.00      0.0
0       0.00

      710  DL
                0.00   -2594.93      0.00      0.00      0.00      0.0
0       0.00
                6.41   -2604.02      0.00      0.00      0.00      0.0
0       0.00
      710  WIND
                0.00       0.00     53.57      0.00      0.00      0.0
0      -3.05
                6.41       0.00     53.57      0.00      0.00      0.0
0    -346.43
      710  WINDLIVE
                0.00       0.00      6.17      0.00      0.00      0.0
0  -8.319E-01
                6.41       0.00      6.17      0.00      0.00      0.0
0     -40.39
      710  LONGFORC
                0.00       0.00     19.04      0.00      0.00      0.0
0      -2.57
                6.41       0.00     19.04      0.00      0.00      0.0
0    -124.64
      710  STREAM
                0.00       0.00     52.56      0.00      0.00      0.0
0      52.45
                6.41       0.00     52.56      0.00      0.00      0.0
0    -284.44
      710  TEMP
                0.00     -28.02      0.00      0.00      0.00      0.0
0       0.00
                6.41     -28.02      0.00      0.00      0.00      0.0
0       0.00

      750  DL
                0.00   -1593.16      0.00      0.00      0.00      0.0
0       0.00
                3.04   -1686.18      0.00      0.00      0.00      0.0
0       0.00
```



```
      750  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0     181.22
                3.04       0.00    -42.18      0.00      0.00      0.0
0     309.44
      750  WINDLIVE
                0.00       0.00     -4.65      0.00      0.00      0.0
0      30.99
                3.04       0.00     -4.65      0.00      0.00      0.0
0      45.11
      750  LONGFORC
                0.00       0.00    -14.34      0.00      0.00      0.0
0      95.63
                3.04       0.00    -14.34      0.00      0.00      0.0
0     139.21
      750  STREAM
                0.00       0.00      0.00      0.00      0.00      0.0
0       0.00
                3.04       0.00      0.00      0.00      0.00      0.0
0       0.00
      750  TEMP
                0.00     -28.02      0.00      0.00      0.00      0.0
0       0.00
                3.04     -28.02      0.00      0.00      0.00      0.0
0       0.00

      801  DL
                0.00   -1954.20      0.00      0.00      0.00      0.0
0       0.00
                1.96   -2014.18      0.00      0.00      0.00      0.0
0       0.00
      801  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0     309.45
                1.96       0.00    -42.18      0.00      0.00      0.0
0     392.12
      801  WINDLIVE
                0.00       0.00     -4.65      0.00      0.00      0.0
0      45.12
                1.96       0.00     -4.65      0.00      0.00      0.0
0      54.22
      801  LONGFORC
                0.00       0.00    -14.34      0.00      0.00      0.0
0     139.22
                1.96       0.00    -14.34      0.00      0.00      0.0
0     167.33
      801  STREAM
                0.00       0.00      0.00      0.00      0.00      0.0
0       0.00
                1.96       0.00     -8.90      0.00      0.00      0.0
0       8.80
      801  TEMP
                0.00      23.48      9.66      0.00      0.00      0.0
0     -93.80
                1.96      23.48      9.66      0.00      0.00      0.0
0    -112.73

      802  DL
                0.00   -2014.18      0.00      0.00      0.00      0.0
0       0.00
               10.04   -2202.44      0.00      0.00      0.00      0.0
0       0.00
      802  WIND
                0.00       0.00    -42.18      0.00      0.00      0.0
0     392.12
               10.04       0.00    -42.18      0.00      0.00      0.0
```

```
0      815.60
       802  WINDLIVE
                  0.00        0.00       -4.65        0.00        0.00        0.0
0       54.22
                 10.04        0.00       -4.65        0.00        0.00        0.0
0      100.88
       802  LONGFORC
                  0.00        0.00      -14.34        0.00        0.00        0.0
0      167.33
                 10.04        0.00      -14.34        0.00        0.00        0.0
0      311.28
       802  STREAM
                  0.00        0.00       -8.90        0.00        0.00        0.0
0        8.80
                 10.04        0.00      -36.85        0.00        0.00        0.0
0      246.30
       802  TEMP
                  0.00       23.48        9.66        0.00        0.00        0.0
0     -112.73
                 10.04       23.48        9.66        0.00        0.00        0.0
0     -209.71

       803  DL
                  0.00    -2202.44        0.00        0.00        0.00        0.0
0        0.00
                  4.04    -2278.20        0.00        0.00        0.00        0.0
0        0.00
       803  WIND
                  0.00        0.00      -42.18        0.00        0.00        0.0
0      815.60
                  4.04        0.00      -42.18        0.00        0.00        0.0
0      986.00
       803  WINDLIVE
                  0.00        0.00       -4.65        0.00        0.00        0.0
0      100.88
                  4.04        0.00       -4.65        0.00        0.00        0.0
0      119.65
       803  LONGFORC
                  0.00        0.00      -14.34        0.00        0.00        0.0
0      311.28
                  4.04        0.00      -14.34        0.00        0.00        0.0
0      369.21
       803  STREAM
                  0.00        0.00      -36.85        0.00        0.00        0.0
0      246.30
                  4.04        0.00      -45.47        0.00        0.00        0.0
0      413.09
       803  TEMP
                  0.00       23.48        9.66        0.00        0.00        0.0
0     -209.71
                  4.04       23.48        9.66        0.00        0.00        0.0
0     -248.74

       804  DL
                  0.00    -2278.20        0.00        0.00        0.00        0.0
0        0.00
                 17.25    -2601.65        0.00        0.00        0.00        0.0
0        0.00
       804  WIND
                  0.00        0.00      -42.18        0.00        0.00        0.0
0      986.00
                 17.25        0.00      -42.18        0.00        0.00        0.0
0     1713.58
       804  WINDLIVE
                  0.00        0.00       -4.65        0.00        0.00        0.0
0      119.65
```



```
                 17.25        0.00       -4.65        0.00        0.00        0.0
0      199.80
       804  LONGFORC
                  0.00        0.00      -14.34        0.00        0.00        0.0
0      369.21
                 17.25        0.00      -14.34        0.00        0.00        0.0
0      616.54
       804  STREAM
                  0.00        0.00      -45.47        0.00        0.00        0.0
0      413.09
                 17.25        0.00      -65.24        0.00        0.00        0.0
0     1407.52
       804  TEMP
                  0.00       23.48        9.66        0.00        0.00        0.0
0     -248.74
                 17.25       23.48        9.66        0.00        0.00        0.0
0     -415.37

       805  DL
                  0.00    -2601.65        0.00        0.00        0.00        0.0
0        0.00
                  3.75    -2835.66        0.00        0.00        0.00        0.0
0        0.00
       805  WIND
                  0.00        0.00      -42.18        0.00        0.00        0.0
0     1713.58
                  3.75        0.00      -42.18        0.00        0.00        0.0
0     1871.75
       805  WINDLIVE
                  0.00        0.00       -4.65        0.00        0.00        0.0
0      199.80
                  3.75        0.00       -4.65        0.00        0.00        0.0
0      217.22
       805  LONGFORC
                  0.00        0.00      -14.34        0.00        0.00        0.0
0      616.54
                  3.75        0.00      -14.34        0.00        0.00        0.0
0      670.30
       805  STREAM
                  0.00        0.00      -65.24        0.00        0.00        0.0
0     1407.52
                  3.75        0.00      -65.91        0.00        0.00        0.0
0     1653.86
       805  TEMP
                  0.00       23.48        9.66        0.00        0.00        0.0
0     -415.37
                  3.75       23.48        9.66        0.00        0.00        0.0
0     -451.60

       806  DL
                  0.00    -2835.66        0.00        0.00        0.00        0.0
0        0.00
                 13.35    -2835.66        0.00        0.00        0.00        0.0
0        0.00
       806  WIND
                  0.00        0.00       52.17        0.00        0.00        0.0
0     1871.75
                 13.35        0.00       52.17        0.00        0.00        0.0
0     1175.24
       806  WINDLIVE
                  0.00        0.00        6.13        0.00        0.00        0.0
0      217.22
                 13.35        0.00        6.13        0.00        0.00        0.0
0      135.34
       806  LONGFORC
                  0.00        0.00       18.93        0.00        0.00        0.0
```

```
0      670.30
                13.35        0.00       18.93        0.00        0.00        0.0
0      417.61
       806  STREAM
                 0.00        0.00       36.98        0.00        0.00        0.0
0     1653.86
                13.35        0.00       36.98        0.00        0.00        0.0
0     1160.23
       806  TEMP
                 0.00       23.48      -12.75        0.00        0.00        0.0
0     -451.60
                13.35       23.48      -12.75        0.00        0.00        0.0
0     -281.35

       807  DL
                 0.00    -2835.66        0.00        0.00        0.00        0.0
0        0.00
                 6.41    -2844.76        0.00        0.00        0.00        0.0
0        0.00
       807  WIND
                 0.00        0.00       65.49        0.00        0.00        0.0
0     1175.24
                 6.41        0.00       65.49        0.00        0.00        0.0
0      755.30
       807  WINDLIVE
                 0.00        0.00        7.59        0.00        0.00        0.0
0      135.34
                 6.41        0.00        7.59        0.00        0.00        0.0
0       86.66
       807  LONGFORC
                 0.00        0.00       23.42        0.00        0.00        0.0
0      417.61
                 6.41        0.00       23.42        0.00        0.00        0.0
0      267.42
       807  STREAM
                 0.00        0.00       58.99        0.00        0.00        0.0
0     1160.23
                 6.41        0.00       58.99        0.00        0.00        0.0
0      781.94
       807  TEMP
                 0.00       23.48      -15.78        0.00        0.00        0.0
0     -281.35
                 6.41       23.48      -15.78        0.00        0.00        0.0
0     -180.17

       808  DL
                 0.00    -2844.76        0.00        0.00        0.00        0.0
0        0.00
                 6.41    -2853.85        0.00        0.00        0.00        0.0
0        0.00
       808  WIND
                 0.00        0.00       61.91        0.00        0.00        0.0
0      755.30
                 6.41        0.00       61.91        0.00        0.00        0.0
0      358.31
       808  WINDLIVE
                 0.00        0.00        7.15        0.00        0.00        0.0
0       86.66
                 6.41        0.00        7.15        0.00        0.00        0.0
0       40.82
       808  LONGFORC
                 0.00        0.00       22.06        0.00        0.00        0.0
0      267.42
                 6.41        0.00       22.06        0.00        0.00        0.0
0      125.96
       808  STREAM
```



```
                 0.00        0.00       58.85        0.00        0.00        0.0
0      781.94
                 6.41        0.00       58.85        0.00        0.00        0.0
0      404.55
       808  TEMP
                 0.00       23.48      -14.86        0.00        0.00        0.0
0     -180.17
                 6.41       23.48      -14.86        0.00        0.00        0.0
0      -84.86

       809  DL
                 0.00    -2853.85        0.00        0.00        0.00        0.0
0        0.00
                 6.42    -2862.95        0.00        0.00        0.00        0.0
0        0.00
       809  WIND
                 0.00        0.00       56.33        0.00        0.00        0.0
0      358.31
                 6.42        0.00       56.33        0.00        0.00        0.0
0       -3.05
       809  WINDLIVE
                 0.00        0.00        6.49        0.00        0.00        0.0
0       40.82
                 6.42        0.00        6.49        0.00        0.00        0.0
0  -8.320E-01
       809  LONGFORC
                 0.00        0.00       20.04        0.00        0.00        0.0
0      125.96
                 6.42        0.00       20.04        0.00        0.00        0.0
0       -2.57
       809  STREAM
                 0.00        0.00       54.89        0.00        0.00        0.0
0      404.55
                 6.42        0.00       54.89        0.00        0.00        0.0
0       52.45
       809  TEMP
                 0.00       23.48      -13.50        0.00        0.00        0.0
0      -84.86
                 6.42       23.48      -13.50        0.00        0.00        0.0
0        1.73

       810  DL
                 0.00    -2862.95        0.00        0.00        0.00        0.0
0        0.00
                 6.41    -2872.04        0.00        0.00        0.00        0.0
0        0.00
       810  WIND
                 0.00        0.00       53.57        0.00        0.00        0.0
0       -3.05
                 6.41        0.00       53.57        0.00        0.00        0.0
0     -346.44
       810  WINDLIVE
                 0.00        0.00        6.17        0.00        0.00        0.0
0  -8.320E-01
                 6.41        0.00        6.17        0.00        0.00        0.0
0      -40.39
       810  LONGFORC
                 0.00        0.00       19.05        0.00        0.00        0.0
0       -2.57
                 6.41        0.00       19.05        0.00        0.00        0.0
0     -124.65
       810  STREAM
                 0.00        0.00       52.56        0.00        0.00        0.0
0       52.45
                 6.41        0.00       52.56        0.00        0.00        0.0
0     -284.44
```

```
      810  TEMP
                   0.00       23.48      -12.83        0.00        0.00        0.0
0        1.73
                   6.41       23.48      -12.83        0.00        0.00        0.0
0       83.98

      850  DL
                   0.00    -1861.18        0.00        0.00        0.00        0.0
0        0.00
                   3.04    -1954.20        0.00        0.00        0.00        0.0
0        0.00
      850  WIND
                   0.00        0.00      -42.18        0.00        0.00        0.0
0      181.23
                   3.04        0.00      -42.18        0.00        0.00        0.0
0      309.45
      850  WINDLIVE
                   0.00        0.00       -4.65        0.00        0.00        0.0
0       30.99
                   3.04        0.00       -4.65        0.00        0.00        0.0
0       45.12
      850  LONGFORC
                   0.00        0.00      -14.34        0.00        0.00        0.0
0       95.63
                   3.04        0.00      -14.34        0.00        0.00        0.0
0      139.22
      850  STREAM
                   0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                   3.04        0.00        0.00        0.00        0.00        0.0
0        0.00
      850  TEMP
                   0.00       23.48        9.66        0.00        0.00        0.0
0      -64.43
                   3.04       23.48        9.66        0.00        0.00        0.0
0      -93.80
```

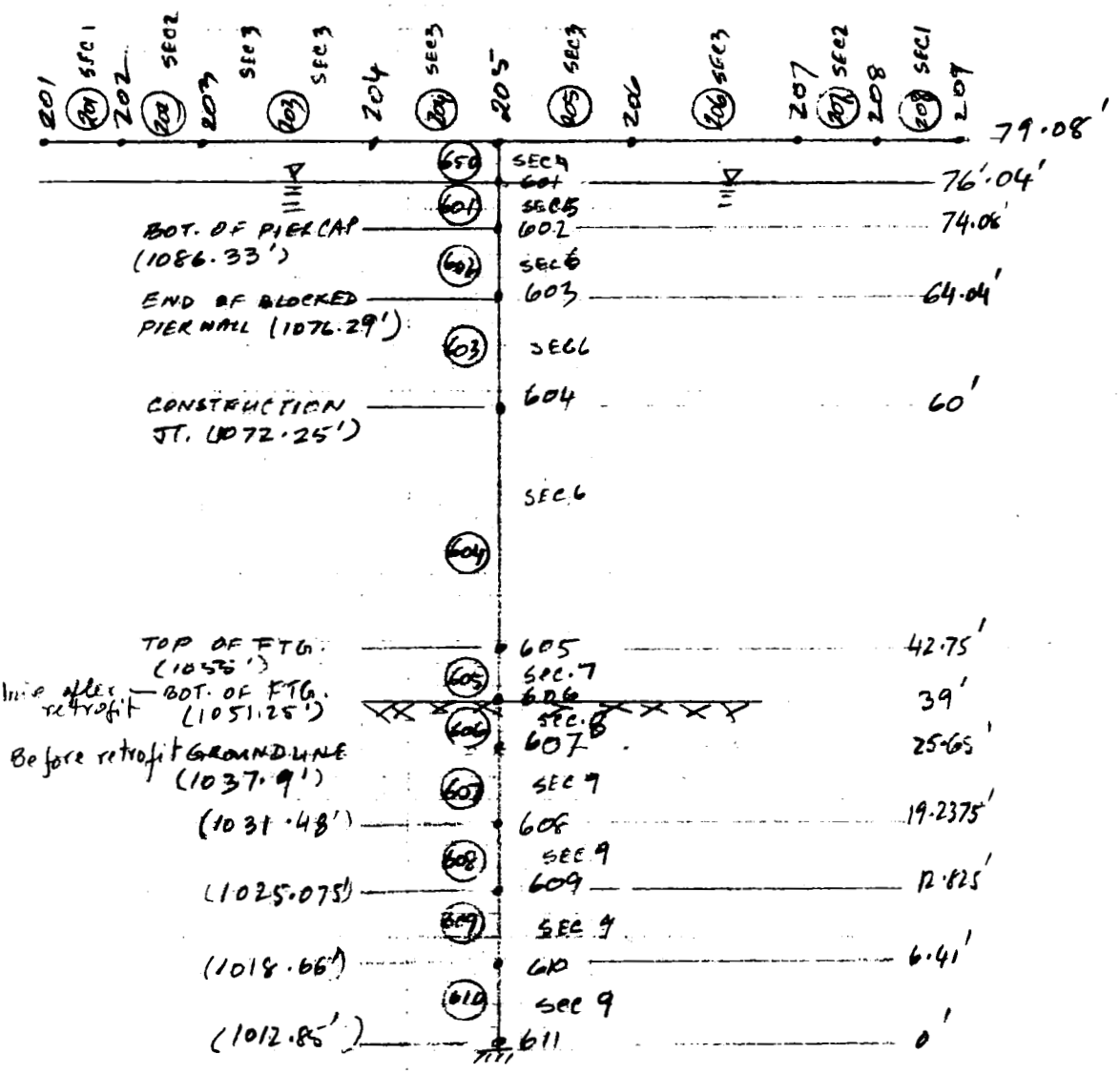
TYLIN INTERNATIONAL

Projects: Salt River Bridge - Scour Job No. 1317 Sheet: of

Item: 24th St. Bridge Designer: SJ Date: 02-17-00

Checker: Date:

Grid: 1/8"



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JOINT
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  202  X=-407.628  Y=0  Z=948.96
  203  X=-299.628  Y=0  Z=948.96
  204  X=-149.82  Y=0  Z=948.96
  205  X=0  Y=0  Z=948.96
  206  X=149.82  Y=0  Z=948.96
  207  X=299.628  Y=0  Z=948.96
  208  X=407.628  Y=0  Z=948.96
  209  X=515.628  Y=0  Z=948.96
  601  X=0  Y=0  Z=912.48
  602  X=0  Y=0  Z=888.96
  603  X=0  Y=0  Z=768.48
  604  X=0  Y=0  Z=720
  605  X=0  Y=0  Z=513
  606  X=0  Y=0  Z=468
  607  X=0  Y=0  Z=307.8
  608  X=0  Y=0  Z=230.85
  609  X=0  Y=0  Z=153.9
  610  X=0  Y=0  Z=76.92
  611  X=0  Y=0  Z=0

RESTRAINT
  ADD=611  DOF=U1,U2,U3,R1,R2,R3

PATTERN
  NAME=DEFAULT

SPRING
  ADD=606  U1=1392.725
  ADD=607  U1=2062.5
  ADD=608  U1=1339.5
  ADD=609  U1=1339.5
  ADD=610  U1=1339.5

MATERIAL
  NAME=STEEL  IDES=S  M=7.330247E-07
    T=0  E=29000  U=.3  A=.0000065  FY=36
  NAME=CONC  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=4415  U=.2  A=.0000055
  NAME=OTHER  IDES=N  M=2.246377E-07  W=.0000868
    T=0  E=3600  U=.2  A=.0000055
  NAME=CONC2  IDES=C  M=2.246E-07  W=8.681E-05
    T=0  E=3605  U=.2  A=.0000055
  NAME=CONC3  IDES=C
    T=0  E=3602  U=.2  A=.0000055
  NAME=STEEL0  IDES=S  M=7.330247E-07
    T=0  E=29000  U=.3  A=.0000065  FY=36

FRAME SECTION
  NAME=FSEC1 MAT=STEEL SH=R T=18,10 A=180 J=3916.671 I=4860,1500 AS=150,150
  NAME=SEC1 MAT=CONC2 A=1728 J=746496 I=331776,186624 AS=1728,1728 S=13824,10368
Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC2 MAT=CONC2 A=3024 J=1306368 I=1778112,326592 AS=3024,3024 S=42336,1814
4 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC3 MAT=CONC2 A=4320 J=1866240 I=5184000,466560 AS=4320,4320 S=86400,2592
0 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC5 MAT=CONC3 A=29376 J=1.269043E+07 I=1.630015E+09,3172608 AS=29376,2937
6 S=3995136,176256 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
```



```
  NAME=SEC6 MAT=CONC2 A=18000 J=5399655 I=5.400001E+08,1349914 AS=18000,18000 S=1
800006,89994.24 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC9 MAT=STEEL A=417.6 J=1.35641E+07 I=1.465019E+07,241781.8 AS=417.6,417.
6 S=50868.86,10074.24 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC7 MAT=CONC2 A=59904 J=1.840252E+08 I=1.943765E+09,4.600634E+07 AS=59904
,59904 S=6230010,958469.8 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC4 MAT=CONC3 A=37152 J=1.604966E+07 I=3.297314E+09,4012416 AS=37152,3715
2 S=6390144,222912 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996
  NAME=SEC8 MAT=STEEL0 A=417.6 J=1.35641E+07 I=1.465019E+07,241781.8 AS=417.6,417
.6 S=50868.86,10074.24 Z=.9999936,.9999936 R=.9996,.9996 T=18,9.9996

FRAME
  201  J=201,202  SEC=SEC1  NSEG=1  ANG=0
  202  J=202,203  SEC=SEC2  NSEG=1  ANG=0
  203  J=203,204  SEC=SEC3  NSEG=1  ANG=0
  204  J=204,205  SEC=SEC3  NSEG=1  ANG=0
  205  J=205,206  SEC=SEC3  NSEG=1  ANG=0
  206  J=206,207  SEC=SEC3  NSEG=1  ANG=0
  207  J=207,208  SEC=SEC2  NSEG=1  ANG=0
  208  J=208,209  SEC=SEC1  NSEG=1  ANG=0
  601  J=601,602  SEC=SEC5  NSEG=1  ANG=0
  602  J=602,603  SEC=SEC6  NSEG=1  ANG=0
  603  J=603,604  SEC=SEC6  NSEG=1  ANG=0
  604  J=604,605  SEC=SEC6  NSEG=1  ANG=0
  605  J=605,606  SEC=SEC7  NSEG=1  ANG=0
  606  J=606,607  SEC=SEC8  NSEG=1  ANG=0
  607  J=607,608  SEC=SEC9  NSEG=1  ANG=0
  608  J=608,609  SEC=SEC9  NSEG=1  ANG=0
  609  J=609,610  SEC=SEC9  NSEG=1  ANG=0
  610  J=610,611  SEC=SEC9  NSEG=1  ANG=0
  650  J=205,601  SEC=SEC4  NSEG=1  ANG=0

LOAD
  NAME=DL  SW=1
    TYPE=CONCENTRATED SPAN
      ADD=201  RD=.5521111  U2=-80
      ADD=201  RD=.9965556  U2=-80
      ADD=208  RD=3.444444E-03  U2=-80
      ADD=208  RD=.4478889  U2=-80
      ADD=202  RD=.441  U2=-80
      ADD=202  RD=.8854445  U2=-80
      ADD=207  RD=.1178889  U2=-80
      ADD=207  RD=.559  U2=-80
      ADD=203  RD=.2378244  U2=-80
      ADD=203  RD=.5582345  U2=-80
      ADD=206  RD=.1213553  U2=-80
      ADD=206  RD=.4417655  U2=-80
      ADD=206  RD=.7621756  U2=-80
      ADD=204  RD=.1990388  U2=-80
      ADD=204  RD=.5194233  U2=-80
      ADD=205  RD=.1601922  U2=-80
      ADD=205  RD=.4805767  U2=-80
      ADD=205  RD=.8009611  U2=-80
      ADD=203  RD=.8786446  U2=-80
      ADD=204  RD=.8398077  U2=-80
  NAME=WINDSUP
    TYPE=CONCENTRATED SPAN
      ADD=203  RD=.3980295  U2=115.2
    TYPE=DISTRIBUTED SPAN
      ADD=201  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=202  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=203  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=204  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=205  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=206  RD=0,1  U1=3.685834E-02,3.685834E-02
      ADD=207  RD=0,1  U1=3.685834E-02,3.685834E-02
```

```
    ADD=208  RD=0,1  U1=3.685834E-02,3.685834E-02
NAME=WINDSUB
  TYPE=DISTRIBUTED SPAN
    ADD=201  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=202  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=203  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=204  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=205  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=206  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=207  RD=0,1  U1=1.166667E-03,1.166667E-03
    ADD=208  RD=0,1  U1=1.166667E-03,1.166667E-03
NAME=WINDLIVE
  TYPE=DISTRIBUTED SPAN
    ADD=201  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=202  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=203  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=204  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=205  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=206  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=207  RD=0,1  U1=8.441667E-03,8.441667E-03
    ADD=208  RD=0,1  U1=8.441667E-03,8.441667E-03
NAME=STREAM
  TYPE=DISTRIBUTED SPAN
    ADD=601  RD=0,1  U2=.5570833,.5275834
    ADD=602  RD=0,1  U2=.4899167,.3495833
    ADD=603  RD=0,1  U2=.1344167,.1127917
    ADD=604  RD=0,1  U2=.1127917,2.014167E-02
    ADD=605  RD=0,1  U2=6.445833E-02,0
    ADD=601  RD=0,1  U1=-1.06075,-1.06075
    ADD=602  RD=0,1  U1=-.65,-.65
    ADD=603  RD=0,1  U1=-.65,-.65
    ADD=604  RD=0,1  U1=-.65,-.65
    ADD=605  RD=0,1  U1=-2.163167,-2.163167
NAME=TEMP
  TYPE=TEMPERATURE  ELEM=FRAME
    ADD=201  T=-40
    ADD=202  T=-40
    ADD=203  T=-40
    ADD=204  T=-40
    ADD=205  T=-40
    ADD=206  T=-40
    ADD=207  T=-40
    ADD=208  T=-40
    ADD=650  T=-40
    ADD=601  T=-40
    ADD=602  T=-40
    ADD=603  T=-40
    ADD=604  T=-40
    ADD=605  T=-40
    ADD=606  T=-40
    ADD=607  T=-40
    ADD=608  T=-40
    ADD=609  T=-40
NAME=LL2SPAN
  TYPE=CONCENTRATED SPAN
    ADD=201  RD=.5521111  U2=-15.1675
    ADD=201  RD=.9965556  U2=-15.1675
    ADD=202  RD=.441  U2=-15.1675
    ADD=202  RD=.8854445  U2=-15.1675
    ADD=203  RD=.2378244  U2=-15.1675
    ADD=203  RD=.5582345  U2=-15.1675
    ADD=204  RD=.1990388  U2=-15.1675
    ADD=204  RD=.5194233  U2=-15.1675
    ADD=204  RD=.8398077  U2=-15.1675
    ADD=203  RD=.8786446  U2=-15.1675
NAME=LL5SPAN
```



```
  TYPE=CONCENTRATED SPAN
    ADD=201  RD=.5521111  U2=-15.1675
    ADD=201  RD=.9965556  U2=-15.1675
    ADD=208  RD=3.444444E-03  U2=-15.1675
    ADD=208  RD=.4478889  U2=-15.1675
    ADD=202  RD=.441  U2=-15.1675
    ADD=202  RD=.8854445  U2=-15.1675
    ADD=207  RD=.1145556  U2=-15.1675
    ADD=207  RD=.559  U2=-15.1675
    ADD=203  RD=.2378244  U2=-15.1675
    ADD=203  RD=.5582345  U2=-15.1675
    ADD=203  RD=.8786446  U2=-15.1675
    ADD=206  RD=.1213553  U2=-15.1675
    ADD=206  RD=.4417655  U2=-15.1675
    ADD=206  RD=.7621756  U2=-15.1675
    ADD=204  RD=.1990388  U2=-15.1675
    ADD=204  RD=.5194233  U2=-15.1675
    ADD=204  RD=.8398077  U2=-15.1675
    ADD=205  RD=.1601922  U2=-15.1675
    ADD=205  RD=.4805767  U2=-15.1675
    ADD=205  RD=.8009611  U2=-15.1675

OUTPUT
; No Output Requested

END

; The following data is used for graphics, design and pushover analysis.
; If changes are made to the analysis data above, then the following data
; should be checked for consistency.
SAP2000 V7.10 SUPPLEMENTAL DATA
  GRID GLOBAL  X "1"  -515.628
  GRID GLOBAL  X "2"  -407.628
  GRID GLOBAL  X "3"  -299.628
  GRID GLOBAL  X "4"  -149.82
  GRID GLOBAL  X "5"  0
  GRID GLOBAL  X "6"  149.82
  GRID GLOBAL  X "7"  299.628
  GRID GLOBAL  X "8"  407.628
  GRID GLOBAL  X "9"  515.628
  GRID GLOBAL  Y "10"  0
  GRID GLOBAL  Z "11"  0
  GRID GLOBAL  Z "12"  76.92
  GRID GLOBAL  Z "13"  153.9
  GRID GLOBAL  Z "14"  230.85
  GRID GLOBAL  Z "15"  307.8
  GRID GLOBAL  Z "16"  468
  GRID GLOBAL  Z "17"  513
  GRID GLOBAL  Z "18"  720
  GRID GLOBAL  Z "19"  768.48
  GRID GLOBAL  Z "20"  888.96
  GRID GLOBAL  Z "21"  912.48
  GRID GLOBAL  Z "22"  948.96
  MATERIAL STEEL FY 36
  MATERIAL STEEL0 FY 36
  MATERIAL CONC FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC2 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  MATERIAL CONC3 FYREBAR 60 FYSHEAR 40 FC 4 FCSHEAR 4
  STATICLOAD DL TYPE DEAD
  STATICLOAD WINDSUP TYPE WIND
  STATICLOAD WINDSUB TYPE WIND
  STATICLOAD WINDLIVE TYPE OTHER
  STATICLOAD STREAM TYPE OTHER
  STATICLOAD TEMP TYPE OTHER
  STATICLOAD LL2SPAN TYPE LIVE
  STATICLOAD LL5SPAN TYPE LIVE
```

```
  STEELDESIGN "AISC-ASD89"
END SUPPLEMENTAL DATA
```

```
SAP2000 v7.10 File: 24THTRAN  Kip-ft Units  PAGE 1
4/18/00 13:37:05

F R A M E   E L E M E N T   F O R C E S

   FRAME  LOAD     LOC          P          V2          V3          T          M
2          M3
     201  DL
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00     176.20       0.00       0.00       0.0
0    -397.86
     201  WINDSUP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00      -3.98       0.00       0.00       0.00       0.0
0       0.00
     201  WINDSUB
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00  -1.260E-01       0.00       0.00       0.00       0.0
0       0.00
     201  WINDLIVE
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00  -9.117E-01       0.00       0.00       0.00       0.0
0       0.00
     201  STREAM
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     201  TEMP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     201  LL2SPAN
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00      30.33       0.00       0.00       0.0
0     -61.61
     201  LL5SPAN
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00      30.33       0.00       0.00       0.0
0     -61.61

     202  DL
                 0.00       0.00     176.20       0.00       0.00       0.0
0    -397.86
                 9.00       0.00     364.55       0.00       0.00       0.0
0   -2596.21
     202  WINDSUP
                 0.00      -3.98       0.00       0.00       0.00       0.0
0       0.00
                 9.00      -7.96       0.00       0.00       0.00       0.0
0       0.00
     202  WINDSUB
                 0.00  -1.260E-01       0.00       0.00       0.00       0.0
0       0.00
                 9.00  -2.520E-01       0.00       0.00       0.00       0.0
0       0.00
     202  WINDLIVE
```



```
                 0.00  -9.117E-01       0.00       0.00       0.00       0.0
0       0.00
                 9.00      -1.82       0.00       0.00       0.00       0.0
0       0.00
     202  STREAM
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     202  TEMP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                 9.00       0.00       0.00       0.00       0.00       0.0
0       0.00
     202  LL2SPAN
                 0.00       0.00      30.33       0.00       0.00       0.0
0     -61.61
                 9.00       0.00      60.67       0.00       0.00       0.0
0    -426.57
     202  LL5SPAN
                 0.00       0.00      30.33       0.00       0.00       0.0
0     -61.61
                 9.00       0.00      60.67       0.00       0.00       0.0
0    -426.57

     203  DL
                 0.00       0.00     364.55       0.00       0.00       0.0
0   -2596.21
                12.48       0.00     660.73       0.00       0.00       0.0
0   -8821.56
     203  WINDSUP
                 0.00      -7.96       0.00       0.00       0.00       0.0
0       0.00
                12.48     -13.48    -115.20       0.00       0.00       0.0
0     865.73
     203  WINDSUB
                 0.00  -2.520E-01       0.00       0.00       0.00       0.0
0       0.00
                12.48  -4.268E-01       0.00       0.00       0.00       0.0
0       0.00
     203  WINDLIVE
                 0.00      -1.82       0.00       0.00       0.00       0.0
0       0.00
                12.48      -3.09       0.00       0.00       0.00       0.0
0       0.00
     203  STREAM
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                12.48       0.00       0.00       0.00       0.00       0.0
0       0.00
     203  TEMP
                 0.00       0.00       0.00       0.00       0.00       0.0
0       0.00
                12.48       0.00       0.00       0.00       0.00       0.0
0       0.00
     203  LL2SPAN
                 0.00       0.00      60.67       0.00       0.00       0.0
0    -426.57
                12.48       0.00     106.17       0.00       0.00       0.0
0   -1434.92
     203  LL5SPAN
                 0.00       0.00      60.67       0.00       0.00       0.0
0    -426.57
                12.48       0.00     106.17       0.00       0.00       0.0
0   -1434.92
```

```
      204  DL
                0.00        0.00      660.73        0.00        0.00        0.0
0    -8821.56
               12.49        0.00      956.92        0.00        0.00        0.0
0   -18861.55
      204  WINDSUP
                0.00      -13.48     -115.20        0.00        0.00        0.0
0     865.73
               12.49      -19.01     -115.20        0.00        0.00        0.0
0    2304.00
      204  WINDSUB
                0.00  -4.268E-01        0.00        0.00        0.00        0.0
0       0.00
               12.49  -6.016E-01        0.00        0.00        0.00        0.0
0       0.00
      204  WINDLIVE
                0.00       -3.09        0.00        0.00        0.00        0.0
0       0.00
               12.49       -4.35        0.00        0.00        0.00        0.0
0       0.00
      204  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
      204  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
      204  LL2SPAN
                0.00        0.00      106.17        0.00        0.00        0.0
0   -1434.92
               12.49        0.00      151.68        0.00        0.00        0.0
0   -3033.50
      204  LL5SPAN
                0.00        0.00      106.17        0.00        0.00        0.0
0   -1434.92
               12.49        0.00      151.68        0.00        0.00        0.0
0   -3033.50

      205  DL
                0.00        0.00     -956.92        0.00        0.00        0.0
0  -18863.95
               12.49        0.00     -660.73        0.00        0.00        0.0
0   -8823.96
      205  WINDSUP
                0.00       19.01        0.00        0.00        0.00        0.0
0       0.00
               12.49       13.48        0.00        0.00        0.00        0.0
0       0.00
      205  WINDSUB
                0.00   6.016E-01        0.00        0.00        0.00        0.0
0       0.00
               12.49   4.268E-01        0.00        0.00        0.00        0.0
0       0.00
      205  WINDLIVE
                0.00        4.35        0.00        0.00        0.00        0.0
0       0.00
               12.49        3.09        0.00        0.00        0.00        0.0
0       0.00
      205  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
```



```
      205  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
      205  LL2SPAN
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.49        0.00        0.00        0.00        0.00        0.0
0       0.00
      205  LL5SPAN
                0.00        0.00     -151.68        0.00        0.00        0.0
0   -3033.50
               12.49        0.00     -106.17        0.00        0.00        0.0
0   -1434.92

      206  DL
                0.00        0.00     -660.73        0.00        0.00        0.0
0   -8823.96
               12.48        0.00     -364.55        0.00        0.00        0.0
0   -2598.61
      206  WINDSUP
                0.00       13.48        0.00        0.00        0.00        0.0
0       0.00
               12.48        7.96        0.00        0.00        0.00        0.0
0       0.00
      206  WINDSUB
                0.00   4.268E-01        0.00        0.00        0.00        0.0
0       0.00
               12.48   2.520E-01        0.00        0.00        0.00        0.0
0       0.00
      206  WINDLIVE
                0.00        3.09        0.00        0.00        0.00        0.0
0       0.00
               12.48        1.82        0.00        0.00        0.00        0.0
0       0.00
      206  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.48        0.00        0.00        0.00        0.00        0.0
0       0.00
      206  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.48        0.00        0.00        0.00        0.00        0.0
0       0.00
      206  LL2SPAN
                0.00        0.00        0.00        0.00        0.00        0.0
0       0.00
               12.48        0.00        0.00        0.00        0.00        0.0
0       0.00
      206  LL5SPAN
                0.00        0.00     -106.17        0.00        0.00        0.0
0   -1434.92
               12.48        0.00      -60.67        0.00        0.00        0.0
0    -426.57

      207  DL
                0.00        0.00     -364.55        0.00        0.00        0.0
0   -2598.61
                9.00        0.00     -176.20        0.00        0.00        0.0
0    -397.86
      207  WINDSUP
                0.00        7.96        0.00        0.00        0.00        0.0
0       0.00
                9.00        3.98        0.00        0.00        0.00        0.0
```

```
0        0.00
     207  WINDSUB
                 0.00   2.520E-01        0.00        0.00        0.00        0.0
0        0.00
                 9.00   1.260E-01        0.00        0.00        0.00        0.0
0        0.00
     207  WINDLIVE
                 0.00        1.82        0.00        0.00        0.00        0.0
0        0.00
                 9.00   9.117E-01        0.00        0.00        0.00        0.0
0        0.00
     207  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     207  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     207  LL2SPAN
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     207  LL5SPAN
                 0.00        0.00      -60.67        0.00        0.00        0.0
0     -426.57
                 9.00        0.00      -30.33        0.00        0.00        0.0
0      -61.61

     208  DL
                 0.00        0.00     -176.20        0.00        0.00        0.0
0     -397.86
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  WINDSUP
                 0.00        3.98        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  WINDSUB
                 0.00   1.260E-01        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  WINDLIVE
                 0.00   9.117E-01        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00
     208  LL2SPAN
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 9.00        0.00        0.00        0.00        0.00        0.0
```



```
0        0.00
     208  LL5SPAN
                 0.00        0.00      -30.33        0.00        0.00        0.0
0      -61.61
                 9.00        0.00        0.00        0.00        0.00        0.0
0        0.00

     601  DL
                 0.00    -1913.84        0.00        0.00        0.00        0.0
0        2.40
                 1.96    -1913.84        0.00        0.00        0.00        0.0
0        2.40
     601  WINDSUP
                 0.00      115.20      -38.01        0.00        0.00        0.0
0     2419.55
                 1.96      115.20      -38.01        0.00        0.00        0.0
0     2494.05
     601  WINDSUB
                 0.00        0.00       -1.20        0.00        0.00        0.0
0        3.66
                 1.96        0.00       -1.20        0.00        0.00        0.0
0        6.02
     601  WINDLIVE
                 0.00        0.00       -8.71        0.00        0.00        0.0
0       26.46
                 1.96        0.00       -8.71        0.00        0.00        0.0
0       43.53
     601  STREAM
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 1.96       24.95      -12.76        0.00        0.00        0.0
0       12.61
     601  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 1.96        0.00        0.00        0.00        0.00        0.0
0        0.00
     601  LL2SPAN
                 0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                 1.96     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
     601  LL5SPAN
                 0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                 1.96     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05

     602  DL
                 0.00    -1913.84        0.00        0.00        0.00        0.0
0        2.40
                10.04    -2102.10        0.00        0.00        0.00        0.0
0        2.40
     602  WINDSUP
                 0.00      115.20      -38.01        0.00        0.00        0.0
0     2494.05
                10.04      115.20      -38.01        0.00        0.00        0.0
0     2875.68
     602  WINDSUB
                 0.00        0.00       -1.20        0.00        0.00        0.0
0        6.02
                10.04        0.00       -1.20        0.00        0.00        0.0
0       18.10
     602  WINDLIVE
                 0.00        0.00       -8.71        0.00        0.00        0.0
0       43.53
```

```
                10.04        0.00       -8.71        0.00        0.00        0.0
0      130.93
       602  STREAM
                 0.00       24.95      -12.76        0.00        0.00        0.0
0       12.61
                10.04      103.26      -63.33        0.00        0.00        0.0
0      408.70
       602  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                10.04        0.00        0.00        0.00        0.00        0.0
0        0.00
       602  LL2SPAN
                 0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                10.04     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
       602  LL5SPAN
                 0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                10.04     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
       603  DL
                 0.00    -2102.10        0.00        0.00        0.00        0.0
0        2.40
                 4.04    -2177.85        0.00        0.00        0.00        0.0
0        2.40
       603  WINDSUP
                 0.00      115.20      -38.01        0.00        0.00        0.0
0     2875.68
                 4.04      115.20      -38.01        0.00        0.00        0.0
0     3029.24
       603  WINDSUB
                 0.00        0.00       -1.20        0.00        0.00        0.0
0       18.10
                 4.04        0.00       -1.20        0.00        0.00        0.0
0       22.96
       603  WINDLIVE
                 0.00        0.00       -8.71        0.00        0.00        0.0
0      130.93
                 4.04        0.00       -8.71        0.00        0.00        0.0
0      166.10
       603  STREAM
                 0.00      103.26      -63.33        0.00        0.00        0.0
0      408.70
                 4.04      134.77      -69.32        0.00        0.00        0.0
0      676.99
       603  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                 4.04        0.00        0.00        0.00        0.00        0.0
0        0.00
       603  LL2SPAN
                 0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                 4.04     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
       603  LL5SPAN
                 0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                 4.04     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
       604  DL
                 0.00    -2177.85        0.00        0.00        0.00        0.0
```

2R


```
0        2.40
                17.25    -2501.30        0.00        0.00        0.00        0.0
0        2.40
       604  WINDSUP
                 0.00      115.20      -38.01        0.00        0.00        0.0
0     3029.24
                17.25      115.20      -38.01        0.00        0.00        0.0
0     3684.92
       604  WINDSUB
                 0.00        0.00       -1.20        0.00        0.00        0.0
0       22.96
                17.25        0.00       -1.20        0.00        0.00        0.0
0       43.71
       604  WINDLIVE
                 0.00        0.00       -8.71        0.00        0.00        0.0
0      166.10
                17.25        0.00       -8.71        0.00        0.00        0.0
0      316.27
       604  STREAM
                 0.00      134.77      -69.32        0.00        0.00        0.0
0      676.99
                17.25      269.32      -83.08        0.00        0.00        0.0
0     2018.99
       604  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                17.25        0.00        0.00        0.00        0.00        0.0
0        0.00
       604  LL2SPAN
                 0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                17.25     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
       604  LL5SPAN
                 0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                17.25     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
       605  DL
                 0.00    -2501.30        0.00        0.00        0.00        0.0
0        2.40
                 3.75    -2735.32        0.00        0.00        0.00        0.0
0        2.40
       605  WINDSUP
                 0.00      115.20      -38.01        0.00        0.00        0.0
0     3684.92
                 3.75      115.20      -38.01        0.00        0.00        0.0
0     3827.46
       605  WINDSUB
                 0.00        0.00       -1.20        0.00        0.00        0.0
0       43.71
                 3.75        0.00       -1.20        0.00        0.00        0.0
0       48.22
       605  WINDLIVE
                 0.00        0.00       -8.71        0.00        0.00        0.0
0      316.27
                 3.75        0.00       -8.71        0.00        0.00        0.0
0      348.92
       605  STREAM
                 0.00      269.32      -83.08        0.00        0.00        0.0
0     2018.99
                 3.75      366.67      -84.53        0.00        0.00        0.0
0     2334.16
       605  TEMP
                 0.00        0.00        0.00        0.00        0.00        0.0
```

```
0        0.00
                3.75        0.00        0.00        0.00        0.00        0.0
0        0.00
     605  LL2SPAN
                0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                3.75     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
     605  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                3.75     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05

     606  DL
                0.00    -2735.32    7.667E-03        0.00        0.00        0.0
0        2.40
               13.35    -2735.32    7.667E-03        0.00        0.00        0.0
0        2.30
     606  WINDSUP
                0.00      115.20      -19.06        0.00        0.00        0.0
0     3827.46
               13.35      115.20      -19.06        0.00        0.00        0.0
0     4081.86
     606  WINDSUB
                0.00        0.00   -8.362E-01        0.00        0.00        0.0
0       48.22
               13.35        0.00   -8.362E-01        0.00        0.00        0.0
0       59.38
     606  WINDLIVE
                0.00        0.00       -6.05        0.00        0.00        0.0
0      348.92
               13.35        0.00       -6.05        0.00        0.00        0.0
0      429.69
     606  STREAM
                0.00      366.67      -62.11        0.00        0.00        0.0
0     2334.16
               13.35      366.67      -62.11        0.00        0.00        0.0
0     3163.38
     606  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
               13.35        0.00        0.00        0.00        0.00        0.0
0        0.00
     606  LL2SPAN
                0.00     -151.68       -9.69        0.00        0.00        0.0
0    -3033.50
               13.35     -151.68       -9.69        0.00        0.00        0.0
0    -2904.12
     606  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
               13.35     -303.35        0.00        0.00        0.00        0.0
0  -3.557E-05

     607  DL
                0.00    -2735.32    1.168E-02        0.00        0.00        0.0
0        2.30
                6.41    -2735.32    1.168E-02        0.00        0.00        0.0
0        2.22
     607  WINDSUP
                0.00      115.20       -7.21        0.00        0.00        0.0
0     4081.86
                6.41      115.20       -7.21        0.00        0.00        0.0
0     4128.10
     607  WINDSUB
```



```
                0.00        0.00   -5.832E-01        0.00        0.00        0.0
0       59.38
                6.41        0.00   -5.832E-01        0.00        0.00        0.0
0       63.12
     607  WINDLIVE
                0.00        0.00       -4.22        0.00        0.00        0.0
0      429.69
                6.41        0.00       -4.22        0.00        0.00        0.0
0      456.75
     607  STREAM
                0.00      366.67      -46.10        0.00        0.00        0.0
0     3163.38
                6.41      366.67      -46.10        0.00        0.00        0.0
0     3459.01
     607  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.41        0.00        0.00        0.00        0.00        0.0
0        0.00
     607  LL2SPAN
                0.00     -151.68      -14.76        0.00        0.00        0.0
0    -2904.12
                6.41     -151.68      -14.76        0.00        0.00        0.0
0    -2809.44
     607  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.557E-05
                6.41     -303.35        0.00        0.00        0.00        0.0
0  -3.441E-05

     608  DL
                0.00    -2735.32    1.288E-02        0.00        0.00        0.0
0        2.22
                6.41    -2735.32    1.288E-02        0.00        0.00        0.0
0        2.14
     608  WINDSUP
                0.00      115.20       -2.93        0.00        0.00        0.0
0     4128.10
                6.41      115.20       -2.93        0.00        0.00        0.0
0     4146.86
     608  WINDSUB
                0.00        0.00   -4.841E-01        0.00        0.00        0.0
0       63.12
                6.41        0.00   -4.841E-01        0.00        0.00        0.0
0       66.23
     608  WINDLIVE
                0.00        0.00       -3.50        0.00        0.00        0.0
0      456.75
                6.41        0.00       -3.50        0.00        0.00        0.0
0      479.21
     608  STREAM
                0.00      366.67      -39.67        0.00        0.00        0.0
0     3459.01
                6.41      366.67      -39.67        0.00        0.00        0.0
0     3713.40
     608  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.41        0.00        0.00        0.00        0.00        0.0
0        0.00
     608  LL2SPAN
                0.00     -151.68      -16.29        0.00        0.00        0.0
0    -2809.44
                6.41     -151.68      -16.29        0.00        0.00        0.0
0    -2705.01
     608  LL5SPAN
```

```
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.441E-05
                6.41     -303.35        0.00        0.00        0.00        0.0
0  -3.313E-05

     609  DL
                0.00    -2735.32    1.321E-02        0.00        0.00        0.0
0        2.14
                6.42    -2735.32    1.321E-02        0.00        0.00        0.0
0        2.06
     609  WINDSUP
                0.00      115.20       -1.03        0.00        0.00        0.0
0     4146.86
                6.42      115.20       -1.03        0.00        0.00        0.0
0     4153.46
     609  WINDSUB
                0.00        0.00   -4.340E-01        0.00        0.00        0.0
0       66.23
                6.42        0.00   -4.340E-01        0.00        0.00        0.0
0       69.01
     609  WINDLIVE
                0.00        0.00       -3.14        0.00        0.00        0.0
0      479.21
                6.42        0.00       -3.14        0.00        0.00        0.0
0      499.36
     609  STREAM
                0.00      366.67      -36.29        0.00        0.00        0.0
0     3713.40
                6.42      366.67      -36.29        0.00        0.00        0.0
0     3946.20
     609  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.42        0.00        0.00        0.00        0.00        0.0
0        0.00
     609  LL2SPAN
                0.00     -151.68      -16.70        0.00        0.00        0.0
0    -2705.01
                6.42     -151.68      -16.70        0.00        0.00        0.0
0    -2597.89
     609  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.313E-05
                6.42     -303.35        0.00        0.00        0.00        0.0
0  -3.182E-05

     610  DL
                0.00    -2735.32    1.314E-02        0.00        0.00        0.0
0        2.06
                6.41    -2735.32    1.314E-02        0.00        0.00        0.0
0        1.97
     610  WINDSUP
                0.00      115.20   -5.515E-01        0.00        0.00        0.0
0     4153.46
                6.41      115.20   -5.515E-01        0.00        0.00        0.0
0     4156.99
     610  WINDSUB
                0.00        0.00   -4.168E-01        0.00        0.00        0.0
0       69.01
                6.41        0.00   -4.168E-01        0.00        0.00        0.0
0       71.68
     610  WINDLIVE
                0.00        0.00       -3.02        0.00        0.00        0.0
0      499.36
                6.41        0.00       -3.02        0.00        0.00        0.0
0      518.69
```



```
     610  STREAM
                0.00      366.67      -35.06        0.00        0.00        0.0
0     3946.20
                6.41      366.67      -35.06        0.00        0.00        0.0
0     4170.91
     610  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                6.41        0.00        0.00        0.00        0.00        0.0
0        0.00
     610  LL2SPAN
                0.00     -151.68      -16.61        0.00        0.00        0.0
0    -2597.89
                6.41     -151.68      -16.61        0.00        0.00        0.0
0    -2491.41
     610  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.182E-05
                6.41     -303.35        0.00        0.00        0.00        0.0
0  -3.051E-05

     650  DL
                0.00    -1913.84        0.00        0.00        0.00        0.0
0        2.40
                3.04    -1913.84        0.00        0.00        0.00        0.0
0        2.40
     650  WINDSUP
                0.00      115.20       -38.01        0.00        0.00        0.0
0     2304.00
                3.04      115.20       -38.01        0.00        0.00        0.0
0     2419.55
     650  WINDSUB
                0.00        0.00       -1.20        0.00        0.00        0.0
0        0.00
                3.04        0.00       -1.20        0.00        0.00        0.0
0        3.66
     650  WINDLIVE
                0.00        0.00       -8.71        0.00        0.00        0.0
0        0.00
                3.04        0.00       -8.71        0.00        0.00        0.0
0       26.46
     650  STREAM
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0        0.00
     650  TEMP
                0.00        0.00        0.00        0.00        0.00        0.0
0        0.00
                3.04        0.00        0.00        0.00        0.00        0.0
0        0.00
     650  LL2SPAN
                0.00     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
                3.04     -151.68        0.00        0.00        0.00        0.0
0    -3033.50
     650  LL5SPAN
                0.00     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
                3.04     -303.35        0.00        0.00        0.00        0.0
0  -3.715E-05
```

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th st.-retrofit\excel\[col_top.xls]Shee		Checker:		Date:	

LOADS AT TOP OF COLUMN (retrofit)

LOAD FACTOR DESIGN:

GROUP-I = 1.30 [.75 DL + 1.67 LL+I + 1.0 SF]
GROUP-II = 1.30 [.75 DL + 1.0 SF + 1.0 W]
GROUP-III = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF]
GROUP-IV = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 1.0 RST]
GROUP-V = 1.25 [.75 DL + 1.0 SF + 1.0 W + 1.0 RST]
GROUP-VI = 1.25 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF + 1.0 RST]

CASE - 3 VERTICAL LOAD

	DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
Col 1	1,914	303	(115)	0	0	(25)	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Pu	2,492	1,684	2,183	2,228	1,619	2,099

CASE - 3 SHEAR

		DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
long	Col 1 - Vy	0	0	42	5	14	9	10
trans	Col 1 - Vx	0	0	39	9	0	13	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Col 1 - Vy	12	66	53	24	76	63
Col 1 - Vx	17	68	43	17	65	42

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th st.-retrofit\excel\[col_top.xls]Shee		Checker:		Date:	

LOADS AT TOP OF COLUMN *(Cont.)*

CASE - 3 MOMENT

		DL (K-FT)	LL+I (K-FT)	WIND (K-FT)	WL (K-FT)	LF (K-FT)	SF (K-FT)	RST (K-FT)
trans	Col 1 - My	2	3,034	2,500	44	0	13	0
long	Col 1 - Mx	0	0	392	54	167	9	113

	GRP-I (K-FT)	GRP-II (K-FT)	GRP-III (K-FT)	GRP-IV (K-FT)	GRP-V (K-FT)	GRP-VI (K-FT)
Col 1 - My	6,604	3,269	4,994	3,962	3,143	4,802
Col 1 - Mx	11	521	452	158	642	576

FOOTING LOAD

DRILLED SHAFT DIAMETER = 7 FT WT = 5.77 K/FT

LENGTH TO 100-YR FLOOD SCOUR = 61.18 FT WT = 353.2 KIPS

			COL -1 (100-YR)
I =	0.25	LL+I =	303.35
		LL =	242
		DL =	2,501
		SF+B =	(269)
		DL+LL-B =	2,474

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge (retrofit)	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th st.-retrofit\excel\[COL_BOT.xls]Sh		Checker:		Date:	

LOADS AT BOT OF PIER (retrofit)

LOAD FACTOR DESIGN:

GROUP-I = 1.30 [.75 DL + 1.67 LL+I + 1.0 SF]
GROUP-II = 1.30 [.75 DL + 1.0 SF + 1.0 W]
GROUP-III = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF]
GROUP-IV = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 1.0 RST]
GROUP-V = 1.25 [.75 DL + 1.0 SF + 1.0 W + 1.0 RST]
GROUP-VI = 1.25 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF + 1.0 RST]

CASE - 3 VERTICAL LOAD

	DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
Col 1	2,735	303	(115)	0	0	367	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Pu	3,802	2,994	3,493	3,538	2,879	3,359

CASE - 3 SHEAR

		DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
long	Col 1 - Vy	0	0	42	5	14	65	10
trans	Col 1 - Vx	0	0	39	9	0	85	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Col 1 - Vy	85	140	126	97	146	133
Col 1 - Vx	110	161	137	110	155	131

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge (retrofit)	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th st.-retrofit\excel\[COL_BOT.xls]Sh		Checker:		Date:	

LOADS AT BOT OF PIER (retrofit)

CASE - 3 MOMENT

		DL (K-FT)	LL+I (K-FT)	WIND (K-FT)	WL (K-FT)	LF (K-FT)	SF (K-FT)	RST (K-FT)
trans	Col 1 - My	2	3,034	3,876	349	0	2,334	0
long	Col 1 - Mx	0	0	1,872	217	670	1,654	451

	GRP-I (K-FT)	GRP-II (K-FT)	GRP-III (K-FT)	GRP-IV (K-FT)	GRP-V (K-FT)	GRP-VI (K-FT)
Col 1 - My	9,622	8,075	8,945	6,980	7,765	8,601
Col 1 - Mx	2,150	4,583	4,034	2,737	4,971	4,443

```
  SALT RIVER BRIDGES SCOUR - 24TH STREET    VERSION 2.1    06.26.89
     50.00      2.50    125.00     25.00  FIX  FIX         1
    DESIGN     52.00      8.00      3.75      PILE      3.75
     3000.    60000.     150.0
        12        51         6         6      3.00         X
        12        51         6         8     12.00         X
         5     12.00     12.00
      0.00    120.00    170.00      0.00
      0.00      0.00      0.00      0.00      0.00      0.00
        16         2      14.0     150.0       YES      39.0
         8       2.0       7.0
         8      -2.0       7.0
LOAD AT BOTTOM                    AGS    B         1
     2       0   3034       0       0   3876   349     0     0     0  2334
     0       0      0       0       0   1872   217   670     0   451  1654
  2501       0    303       0       0    115     0     0     0     0   367
                    0       0       0                           0
                    0       0       0                           0
                    0       0       0                           0
         0         0         0         0         0         0
         0         0         0         0         0         0
         0         0         0         0         0         0
        0.        0.        0.        0.        0.        0.        0.
        0.        0.        0.        0.        0.        0.        1.
        1.        1.        1.        1.        1.        1.        1.
```

```
DATE          :  04/18/:0          TIME : 15:30:38

PROJECT TITLE :    SALT RIVER BRIDGES SCOUR - 24TH STREET      PAGE :   1

****************** Licensed to: T.Y. Lin International ******************
*                                                                       *
*    ( F A D )   PILE AND SPREAD FOOTING DESIGN PROGRAM                 *
*                  IMBSEN AND ASSOCIATES INCORPORATED                   *
*                     VERSION  2    Dec 1989                            *
*                                                                       *
*************************************************************************


****************
* COLUMN DATA *
*************************************************************************

COLUMN WIDTH X-DIR (TRANS)     =  50.00 FT
COLUMN DEPTH Y-DIR  (LONG)     =   2.50 FT
COLUMN AREA                    = 125.00 FT**2
EQUIVALENT WIDTH X-DIR (TRANS) =  50.00 FT
EQUIVALENT DEPTH Y-DIR  (LONG) =   2.50 FT
LIVE LOAD PERCENT IMPACT       =  25.00 PERCENT
END CONDITION ABOUT X-AXIS     =    FIX
END CONDITION ABOUT Y-AXIS     =    FIX
NUMBER OF COLUMNS IN BENT      =      1 COLUMNS


****************
* FOOTING DATA *
*************************************************************************

TYPE OF FOOTING ANALYSIS     = DESIGN
FOOTING LENGTH X-DIR (TRAN)  =  52.00 FT
FOOTING WIDTH  Y-DIR (LONG)  =   8.00 FT
MIN FOOTING DEPTH CONSIDERED =   3.75 FT
MAX FOOTING DEPTH CONSIDERED =   3.75 FT
TYPE OF FOOTING              =   PILE


*******************************
* FOOTING MATERIAL PROPERTIES *
*************************************************************************

ULTIMATE CONCRETE COMPRESSIVE STRESS (FC) =  3000.0 PSI
YIELD STRESS OF STEEL REINFORCEMENT  (FY) = 60000.0 PSI
UNIT WEIGHT OF CONCRETE                   =   150.0 PCF
MODULAR RATIO (ES/EC)                (N) =     9.3
```

```
DATE          :  04/18/:0          TIME : 15:30:38

PROJECT TITLE :    SALT RIVER BRIDGES SCOUR - 24TH STREET      PAGE :   2

***********************************
* TOP FLEXURE REINFORCEMENT DATA *
***********************************************************************

BAR SIZE IN X-DIR (TRAN)     =   6
BAR SIZE IN Y-DIR (LONG)     =   6
TOP BAR CLEARANCE            =   3.00 INCHES
DIRECTION OF TOP BARS        =   X DIRECTION

**************************************
* BOTTOM FLEXURE REINFORCEMENT DATA *
***********************************************************************

BAR SIZE IN X-DIR (TRAN)     =   6
BAR SIZE IN Y-DIR (LONG)     =   8
BOTTOM BAR CLEARANCE         =  12.00 INCHES
DIRECTION OF BOTTOM BARS     =   X DIRECTION

****************************
* SHEAR REINFORCEMENT DATA *
***********************************************************************

STIRRUP BAR SIZE             =   5
STIRRUP SPACING X-DIR (TRAN) =  12.00 INCHES
STIRRUP SPACING Y-DIR (LONG) =  12.00 INCHES

*************
* SOIL DATA *
***********************************************************************

DEPTH OF EARTH COVER            =   0.00 FT
UNIT WEIGHT OF COVER            = 120.00 PCF
ENVIRONMENTAL FACTOR (Z)        = 170.00 K/IN

***************************
* PILE FOOTING COST DATA *
***********************************************************************

CONTRACT ITEM                          PRICE UNIT

STRUCTURE EXCAVATION (BRIDGE)      =   0.00 $/CY
STRUCTURE BACKFILL   (BRIDGE)      =   0.00 $/CY
STRUCTURAL CONCRETE BRIDGE FOOTING =   0.00 $/CY
BAR REINFORCEMENT (BRIDGE)         =   0.00 $/LB
FURNISH PILING                     =   0.00 $/FT
DRIVE PILES                        =   0.00 $ EA
```



```
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PROJECT TITLE :    SALT RIVER BRIDGES SCOUR - 24TH STREET      PAGE :   3


*************
* PILE DATA *
***********************************************************************

TOTAL NUMBER OF PILES      =  16
TOTAL NUMBER OF ROWS       =   2
DIAMETER OF PILE           =  14.0 INCHES
CAPACITY OF PILE (SERVICE) = 150.0 TONS
CONSIDER TENSION IN PILES? =   YES (YES OR NO)
LENGTH OF ONE PILE         =  39.0 FEET


********************
* PILE LAYOUT DATA *
***********************************************************************

  ROW   NO OF   Y-COORD   X-SPACING
   NO   PILES     (FT)       (FT)

    1      8     2.00       7.00
    2      8    -2.00       7.00


**********************************
* MOMENT OF INERTIA OF PILE GROUP *
***********************************************************************

IXX =     64.00 PILE-FT**2
IYY =   4116.00 PILE-FT**2
```

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 4

****
* PILE COORDINATES (FEET) *
****

PILE	X-COORD	Y-COORD
1	-24.50	2.00
2	-17.50	2.00
3	-10.50	2.00
4	-3.50	2.00
5	3.50	2.00
6	10.50	2.00
7	17.50	2.00
8	24.50	2.00
9	-24.50	-2.00
10	-17.50	-2.00
11	-10.50	-2.00
12	-3.50	-2.00
13	3.50	-2.00
14	10.50	-2.00
15	17.50	-2.00
16	24.50	-2.00

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 5

****
* FOOTING LOAD DATA (K-FT) *
****

SEISMIC ANALYSIS SPECIFICATIONS:

DESIGN CRITERIA (SDC)	PERFORMANCE CATEGORY (SPC)	MODIFICATION FACTOR (R)
AGS	B	1.000

LOAD AT BOTTOM

	DEAD LOAD	PRE STRESS	:---- LL+IMPACT ---: CASE 1 TRANS MY-MAX	CASE 2 LONG MX-MAX	CASE 3 AXIAL N-MAX	WIND	WL	LF	CF-MY	TEMP	SF& BY
MY	2	0	3034	0	0	3876	349	0	0	0	23 34
MX	0	0	0	0	0	1872	217	670	0	451	16 54
P	2501	0	303	0	0	115	0	0	0	0	3 67
PMY			0	0	0				0		
PMX			0	0	0				0		
P			0	0	0				0		

(ARS)	UNREDUCED SEISMIC CASE 1 MAX TRAN	CASE 2 MAX LONG	ARBITRARY LOADS SERVICE AL1	SERVICE AL2	ARBITRARY LOADS FACTORED AL1	FACTORED AL2
MY TRAN	0.	0.	0.	0.	0.	0.
MX LONG	0.	0.	0.	0.	0.	0.
P AXIAL	0.	0.	0.	0.	0.	0.

PROBABLE PLASTIC (PB) LOADS (1.3 X NOMINAL MOMENT) (K-FT)

	PB1 MAX TRAN	PB2 75-DEGREE	PB3 60-DEGREE	PB4 45-DEGREE	PB5 30-DEGREE	PB6 15-DEGREE	PB7 MAX LONG
MY	0.	0.	0.	0.	0.	0.	0.
MX	0.	0.	0.	0.	0.	0.	1.
P	1.	1.	1.	1.	1.	1.	1.

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 6

****
* SERVICE LOADS (SER) FOR FOOTING DESIGN (K-FT) *
****

NOTE: RATIO = CAPACITY (COMP OR UPLIFT) / (MAX OR MIN) PILE LOAD

CAP UPLIFT -120. CAP COMP 300.

:---------- APPLIED LOADS ----------:						MIN PILE		MAX PILE	
LOADING GRP	CA	TRAN MY	LONG MX	COMB M	AXIAL P	LOAD	RATIO	LOAD	RATIO
IH	1	4763.	1654.	5042.	3344.	129.		289.	1.04 OK
IH	2	2336.	1654.	2862.	3102.	128.		259.	1.16 OK
IH	3	2336.	1654.	2862.	3102.	128.		259.	1.16 OK
II		4970.	2821.	5714.	2620.	46.		281.	1.07 OK
III	1	5020.	2482.	5600.	2750.	64.		279.	1.07 OK
III	2	3078.	2482.	3954.	2556.	64.		256.	1.17 OK
III	3	3078.	2482.	3954.	2556.	64.		256.	1.17 OK
IV	1	3811.	1684.	4166.	2722.	95.		245.	1.22 OK
IV	2	1869.	1684.	2516.	2528.	94.		222.	1.35 OK
IV	3	1869.	1684.	2516.	2528.	94.		222.	1.35 OK
V		4437.	2841.	5269.	2365.	33.		263.	1.14 OK
VI	1	4482.	2538.	5151.	2480.	49.		261.	1.15 OK
VI	2	2748.	2538.	3741.	2307.	49.		240.	1.25 OK
VI	3	2748.	2538.	3741.	2307.	49.		240.	1.25 OK

THE FOLLOWING ARE INCLUDED IN THE APPLIED LOADS ABOVE:

WEIGHT OF COVER = 0. KIPS
WEIGHT OF FOOTING = 234. KIPS
TOTAL = 234. KIPS

FOR GROUP IH CASE 1 THE PILE LOADS AT EACH CORNER ARE:

232. 289.

129. 186.

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 7

****
* FACTORED LOADS (FAC) FOR FOOTING DESIGN (K-FT) *
****

NOTE: RATIO = CAPACITY (COMP OR UPLIFT) / (MAX OR MIN) PILE LOAD

PHI = .75

CAP UPLIFT -180. CAP COMP 450.

:---------- APPLIED LOADS ----------:						MIN PILE		MAX PILE	
LOADING GRP	CA	TRAN MY	LONG MX	COMB M	AXIAL P	LOAD	RATIO	LOAD	RATIO
IH	1	8296.	2150.	8570.	4558.	168.		401.	1.12 OK
IH	2	3037.	2150.	3721.	4033.	167.		337.	1.33 OK
IH	3	3037.	2150.	3721.	4033.	167.		337.	1.33 OK
IP	1	3037.	2150.	3721.	4033.	167.		337.	1.33 OK
IP	2	3037.	2150.	3721.	4033.	167.		337.	1.33 OK
IP	3	3037.	2150.	3721.	4033.	167.		337.	1.33 OK
II		8076.	4584.	9286.	4182.	70.		453.	0.99 NG**
III	1	8157.	4033.	9100.	4393.	100.		449.	1.00 OK
III	2	5002.	4033.	6426.	4077.	99.		411.	1.10 OK
III	3	5002.	4033.	6426.	4077.	99.		411.	1.10 OK
IV	1	6192.	2736.	6770.	4348.	149.		394.	1.14 OK
IV	2	3037.	2736.	4088.	4033.	148.		356.	1.27 OK
IV	3	3037.	2736.	4088.	4033.	148.		356.	1.27 OK
V		7765.	4971.	9220.	4033.	50.		454.	0.99 NG**
VI	1	7844.	4442.	9014.	4235.	79.		450.	1.00 NG**
VI	2	4810.	4442.	6547.	3932.	78.		413.	1.09 OK
VI	3	4810.	4442.	6547.	3932.	78.		413.	1.09 OK

THE FOLLOWING ARE INCLUDED IN THE APPLIED LOADS ABOVE:

WEIGHT OF COVER = 0. KIPS
WEIGHT OF FOOTING = 304. KIPS
TOTAL = 304. KIPS

FOR GROUP V CASE THE PILE LOADS AT EACH CORNER ARE:

361. 454.

50. 143.

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PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 8

****
* EARTHQUAKE LOADS (EQ) FOR FOOTING DESIGN (K-FT) *
****

NOTE: RATIO = CAPACITY (COMP OR UPLIFT) / (MAX OR MIN) PILE LOAD

ARS UNREDUCED SEISMIC (VII) & PROBABLE PLASTIC (PB)

PHI = 1.00

							CAP UPLIFT -300.	CAP COMP 600.	
:---------- APPLIED LOADS ----------:							MIN PILE LOAD	MAX PILE LOAD	RATIO
LOADING GRP	CA	TRAN MY	LONG MX	COMB M	AXIAL P				
PB1	1	0.	0.	0.	235.		15.	15.	40.85 OK
PB2	1	0.	0.	0.	235.		15.	15.	40.85 OK
PB3	1	0.	0.	0.	235.		15.	15.	40.85 OK
PB4	1	0.	0.	0.	235.		15.	15.	40.85 OK
PB5	1	0.	0.	0.	235.		15.	15.	40.85 OK
PB6	1	0.	0.	0.	235.		15.	15.	40.85 OK
PB7	1	0.	1.	1.	235.		15.	15.	40.76 OK

THE FOLLOWING ARE INCLUDED IN THE APPLIED LOADS ABOVE:

WEIGHT OF COVER = 0. KIPS
WEIGHT OF FOOTING = 234. KIPS
TOTAL = 234. KIPS

FOR GROUP PB7 CASE 1 THE PILE LOADS AT EACH CORNER ARE:

15. 15.

15. 15.

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****
* DESIGN OF BOTTOM FLEXURAL REINFORCEMENT *
****

NOTE: AREA OF STEEL IN THE SHORT DIRECTION FOR FACTORED AND EARTHQUAKE LOADS HAS BEEN INCREASED BY 1.73 (ART 4.4.6.3.2)

KEY TO TYPES OF LOADS:

SER = SERVICE LOADS
FAC = FACTORED LOADS PHI = 0.90
EQ = EARTHQUAKE LOADS PHI = 1.00
MIN1 = MINIMUM REINFORCEMENT (ART 8.17.1.1)
BASED ON 1.2 X THE CRACKING MOMENT
MIN2 = WAIVER OF MINIMUM REINFORCEMENT (ART 8.17.1.2)
BASED ON STEEL AREA ONE THIRD GREATER THAN REQUIRED BY ANALYSIS
MAX = MAXIMUM REINFORCEMENT (ART 8.16.3.1)
BASED ON .75 X BALANCED STEEL RATIO

FOOTING DEPTH = 3.75 FT

BAR SIZE	BAR DIR	LOAD TYPE	CONTROL GRP	CA	DEPTH EFFECTIVE (INCHES)	APPLIED MOMENT (K-FT)	REQUIRED STEEL AREA (SQ IN)	NO BARS
6	X	SER			32.56	0.	0.00	0
8	Y	SER	IH	1	31.56	1454.	24.15	31
6	X	FAC			32.56	0.	0.00	0
8	Y	FAC	V		31.56	2301.	28.36	36
6	X	EQ			32.56	0.	0.00	0
8	Y	EQ	PB7	1	31.56	-22.	-0.24	1
6	X	MIN1			32.56	1331.	9.42	22
8	Y	MIN1			31.56	8651.	63.32	81
6	X	MIN2			32.56	0.	0.00	0
8	Y	MIN2			31.56	1938.	32.20	41
6	X	MAX			32.56	5958.	50.12	114
8	Y	MAX			31.56	36376.	315.74	400

********** CONTROL **********

6	X	MIN1			32.56	1331.	9.42	22
8	Y	MIN2			31.56	1938.	32.20	41

DATE : 04/18/:0 TIME : 15:30:38

PROJECT TITLE : SALT RIVER BRIDGES SCOUR - 24TH STREET PAGE : 10

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****************************************
* DESIGN OF TOP FLEXURAL REINFORCEMENT *
****************************************
```

NOTE: AREA OF STEEL IN THE SHORT DIRECTION FOR FACTORED AND EARTHQUAKE LOADS HAS BEEN INCREASED BY 1.73 (ART 4.4.6.3.2)

KEY TO TYPES OF LOADS:

SER = SERVICE LOADS
FAC = FACTORED LOADS PHI = 0.90
EQ = EARTHQUAKE LOADS PHI = 1.00
MIN1 = MINIMUM REINFORCEMENT (ART 8.17.1.1)
BASED ON 1.2 X THE CRACKING MOMENT
MIN2 = WAIVER OF MINIMUM REINFORCEMENT (ART 8.17.1.2)
BASED ON STEEL AREA ONE THIRD GREATER THAN REQUIRED BY ANALYSIS
MAX = MAXIMUM REINFORCEMENT (ART 8.16.3.1)
BASED ON .75 X BALANCED STEEL RATIO
MIN3 = MINIUMUM REINFORCEMENT (TEMPERATURE) (ART 8.20)
BASED ON 18" MAXIMUM BAR SPACING

FOOTING DEPTH = 3.75 FT

BAR SIZE	BAR DIR	LOAD TYPE	CONTROL GRP	CA	DEPTH EFFECTIVE (INCHES)	APPLIED MOMENT (K-FT)	REQUIRED STEEL AREA (SQ IN)	NO BARS
6	X	SER			41.56	0.	0.00	0
6	Y	SER			40.68	0.	0.00	0
6	X	FAC			41.56	0.	0.00	0
6	Y	FAC			40.68	0.	0.00	0
6	X	EQ			41.56	0.	0.00	0
6	Y	EQ			40.68	0.	0.00	0
6	X	MIN1			41.56	1331.	7.27	17
6	Y	MIN1			40.68	8651.	48.34	110
6	X	MIN2			41.56	0.	0.00	0
6	Y	MIN2			40.68	0.	0.00	0
6	X	MAX			41.56	9708.	63.98	146
6	Y	MAX			40.68	60456.	407.04	926
6	X	MIN3			41.56	490.	2.64	6
6	Y	MIN3			40.68	2878.	15.84	36

********** CONTROL **********

6	X	MIN3			41.56	490.	2.64	6
6	Y	MIN3			40.68	2878.	15.84	36

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```
************************************
* FINAL RESULTS FOR FOOTING DESIGN *
************************************
```

FOOTING LENGTH = 52.00 FT
FOOTING WIDTH = 8.00 FT
INPUT DEPTH = 3.75 FT
FOOTING DEPTH REQUIRED FOR SHEAR = 3.75 FT
FOOTING DEPTH REQUIRED FOR MOMENT = 3.75 FT

```
*********************
* PILE LOAD RESULTS *
*********************
```

LOAD TYPE	CONTROL GRP	CA	MIN PILE LOAD (K)	CAPACITY UPLIFT (K)		CONTROL GRP	CA	MAX PILE LOAD (K)	CAPACITY COMP (K)	
SER	V		33.	-120.	OK	IH	1	289.	300.	OK
FAC	V		50.	-180.	OK	V		454.	450.	NG*
EQ	PB7	1	15.	-300.	OK	PB7	1	15.	600.	OK

** NOTE: THE SHEAR PLANES AT A DISTANCE "D" FROM THE FACE OF THE COLUMN ARE OUTSIDE THE PILE LOCATIONS. THEREFORE, NO SHEAR CALCULATIONS ARE MADE.

```
************************************
* TOP AND BOTTOM FLEXURE RESULTS *
************************************
```

FOOTING DEPTH = 3.75 FT

BAR SIZE	BAR DIR	LOAD TYPE	CONTROL GRP	CA	EFF DEPTH (IN)	APPLIED MOMENT (K-FT)	BAR SPACE (IN)	AREA REQ (SI)	BARS REQ	ERROR CODE
TOP										
6	X	MIN3			41.56	490.	17.82	2.64	6	4
6	Y	MIN3			40.68	2878.	17.63	15.84	36	
BOTTOM										
6	X	MIN1			32.56	1331.	4.24	9.42	22	4
8	Y	MIN2			31.56	1938.	15.42	32.20	41	

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****
* BOTTOM FLEXURAL REINFORCEMENT *
****

(AREA OF STEEL REQUIRED FOR DIFFERENT BAR SIZES)

BAR SIZE	BAR DIR	LOAD TYPE	APPLIED STRESS (PSI)	ALLOWABLE STRESS (PSI)	EFF DEPTH (IN)	BAR SPACE (IN)	REQ STEEL (SQ IN)	NO BARS	FOOT DEPTH (FT)	ERROR CODE
5	X	MIN1	0.	24000.	32.66	2.98	9.39	31	3.75	24
5	Y	MIN2	18043.	24000.	31.97	6.05	31.77	103		
6	X	MIN1	0.	24000.	32.56	4.24	9.42	22	3.75	4
6	Y	MIN2	18104.	24000.	31.68	8.57	32.07	73		
7	X	MIN1	0.	24000.	32.50	5.93	9.44	16	3.75	4
7	Y	MIN2	18057.	24000.	31.50	11.64	32.26	54		
8	X	MIN1	0.	24000.	32.44	8.08	9.46	12	3.75	4
8	Y	MIN2	17756.	24000.	31.31	15.05	32.47	42		
9	X	MIN1	0.	24000.	32.38	9.86	9.48	10	3.75	4
9	Y	MIN2	17957.	24000.	31.13	19.27	32.67	33		34
10	X	MIN1	0.	24000.	32.28	12.65	9.51	8	3.75	4
10	Y	MIN2	18116.	24000.	30.84	24.66	32.99	26		34
11	X	MIN1	0.	24000.	32.19	14.73	9.54	7	3.75	4
11	Y	MIN2	17615.	24000.	30.56	29.35	33.31	22		34
14	X	MIN1	0.	24000.	32.06	22.03	9.58	5	3.75	34
14	Y	MIN2	18133.	24000.	30.18	44.01	33.74	15		34
18	X	MIN1	0.	24000.	31.75	43.75	9.68	3	3.75	34
18	Y	MIN2	17586.	24000.	29.25	76.94	34.87	9		34

NOTE: THE DESIGNER MUST CHECK THE ERROR CODE FOR ADEQUATE DEVELOPMENT LENGTH AND BAR SPACING.

*** ERROR CODES:

1 = BAR SPACING LESS THAN THE AASHTO MINIMUM. (CODE 8.21.1)
2 = BAR SPACING LESS THAN THE PREFERRED CALTRANS MINIMUM. (BR. DES. DET.)
3 = BAR SPACING MORE THAN THE AASHTO MAXIMUM (18"). (CODE 8.20)
4 = INADEQUATE DEVELOPMENT LENGTH. (CODE 8.25)

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****
* TOP FLEXURAL REINFORCEMENT *
****

(AREA OF STEEL REQUIRED FOR DIFFERENT BAR SIZES)

BAR SIZE	BAR DIR	LOAD TYPE	APPLIED STRESS (PSI)	ALLOWABLE STRESS (PSI)	EFF DEPTH (IN)	BAR SPACE (IN)	REQ STEEL (SQ IN)	NO BARS	FOOT DEPTH (FT)	ERROR CODE
4	X	MIN3	0.	24000.	41.72	17.89	1.20	6	3.75	4
4	Y	MIN3	0.	24000.	41.16	17.64	7.20	36		

NOTE: THE DESIGNER MUST CHECK THE ERROR CODE FOR ADEQUATE DEVELOPMENT LENGTH AND BAR SPACING.

*** ERROR CODES:

1 = BAR SPACING LESS THAN THE AASHTO MINIMUM. (CODE 8.21.1)
2 = BAR SPACING LESS THAN THE PREFERRED CALTRANS MINIMUM. (BR. DES. DET.)
3 = BAR SPACING MORE THAN THE AASHTO MAXIMUM (18"). (CODE 8.20)
4 = INADEQUATE DEVELOPMENT LENGTH. (CODE 8.25)

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****
* MINIMUM, PREFERRED BAR SPACING & DEVELOPMENT LENGTH *
****

UNITS INCHES

THE CLEAR DISTANCE BETWEEN PARALLEL BARS SHALL NOT BE LESS THAN
1.5 BAR DIAMETERS (NOMINAL), 1.5 TIMES THE MAXIMUM SIZE COURSE AGGREGATE,
NOR 1.5 INCHES. (CODE 8.21.1))

PREFERRED CENTER TO CENTER SPACING BASED ON BRIDGE DESIGN DETAILS P 13-20

BAR SIZE	BAR AREA	NOMINAL DIAMETER	MIN CLEAR DISTANCE	DEFORMED DIAMETER	MINIMUM C. TO C. SPACING	PREFERRED C. TO C. SPACING	DEVELOPMENT LENGTH SPC<6"	DEVELOPMENT LENGTH SPC>=6"
4	.20	.500	2.250	.563	2.813	3.250	12	12
5	.31	.625	2.250	.688	2.938	3.500	15	12
6	.44	.750	2.250	.875	3.125	3.750	19	15
7	.60	.875	2.250	1.000	3.250	4.000	26	20
8	.79	1.000	2.250	1.125	3.375	4.250	34	27
9	1.00	1.128	2.250	1.250	3.500	4.500	42	34
10	1.27	1.270	2.250	1.438	3.688	4.750	54	43
11	1.56	1.410	2.250	1.625	3.875	5.000	66	53
14	2.25	1.693	2.539	1.875	4.414	5.500	90	72
18	4.00	2.257	3.386	2.500	5.886	6.000	116	93

*** ERROR CODES:

1 = BAR SPACING LESS THAN THE AASHTO MINIMUM. (CODE 8.21.1)
2 = BAR SPACING LESS THAN THE PREFERRED CALTRANS MINIMUM. (BR. DES. DET.)
3 = BAR SPACING MORE THAN THE AASHTO MAXIMUM (18"). (CODE 8.20)
4 = INADEQUATE DEVELOPMENT LENGTH. (CODE 8.25)

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****
* BAR REINFORCING STEEL *
****

BAR TYPE	BAR SIZE	NO BAR	LENGTH (FT)	WEIGHT (LB/FT)	WEIGHT (LBS)
TOP					
X-BAR	6	6	51.5	1.502	464.
Y-BAR	6	36	7.5	1.502	406.
BOTTOM					
X-BAR	6	22	51.5	1.502	1702.
Y-BAR	8	41	7.5	2.670	821.
STIRRUP	5	464	3.8	1.043	1855.

NOTE: STIRRUPS ARE REQUIRED IN A BAND EXTENDING 6 INCHES
MAXIMUM FROM THE COLUMN REINFORCEMENT TO
31 INCHES FROM THE FACE OF THE COLUMN IN THE "X" DIRECTION AND
29 INCHES FROM THE FACE OF THE COLUMN IN THE "Y" DIRECTION.

****
* QUANTITIES AND ESTIMATED COST - PILE FOOTING *
****

CONTRACT ITEM	UNIT	QUANTITY	PRICE	AMOUNT
STRUCTURE EXCAVATION (BR)	CY	75.	0.00	0.
STRUCTURE BACKFILL (BR)	CY	17.	0.00	0.
STRUCTURE CONCRETE, BR FTG	CY	58.	0.00	0.
BAR REINFORCEMENT (BR)	LB	5248.	0.00	0.
FURNISH PILING	LF	624.	0.00	0.
DRIVE PILES	EA	16	0.00	0.
TOTAL COST				0.

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TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th st.-retrofit\excel\[PILE_TOP.xls]Sh		Checker:		Date:	

LOADS AT TOP OF PILE (retrofit)

LOAD FACTOR DESIGN:

GROUP-I = 1.30 [.75 DL + 1.67 LL+I + 1.0 SF]
GROUP-II = 1.30 [.75 DL + 1.0 SF + 1.0 W]
GROUP-III = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF]
GROUP-IV = 1.30 [.75 DL + 1.0 LL+I + 1.0 SF + 1.0 RST]
GROUP-V = 1.25 [.75 DL + 1.0 SF + 1.0 W + 1.0 RST]
GROUP-VI = 1.25 [.75 DL + 1.0 LL+I + 1.0 SF + 0.3 W + 1.0 WL + 1.0 LF + 1.0 RST]

CASE - 3 VERTICAL LOAD

	DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
Col 1	2,735	303	115	0	0	367	0

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Pu	3,803	3,294	3,583	3,538	3,167	3,446

CASE - 3 SHEAR

		DL (KIPS)	LL+I (KIPS)	WIND (KIPS)	WL (KIPS)	LF (KIPS)	SF (KIPS)	RST (KIPS)
long	Col 1 - Vy	0	0	52	6	19	37	13
trans	Col 1 - Vx	0	10	20	6	0	62	0

Max long Shear = 127k

	GRP-I (KIPS)	GRP-II (KIPS)	GRP-III (KIPS)	GRP-IV (KIPS)	GRP-V (KIPS)	GRP-VI (KIPS)
Col 1 - Vy	48	116	101	65	127	113
Col 1 - Vx	102	107	109	93	103	105

TYLIN INTERNATIONAL

Project:	Salt River Bridges Scour	Job No.	1317.00	Sheet:	
Item:	24th Street Bridge	Designer:	SJ	Date:	4/18/00
D:\My Documents\Projects\1317 Salt River Bridges\24th st.-retrofit\excel\[PILE_TOP.xls]Sh		Checker:		Date:	

LOADS AT TOP OF PILE (retrofit)

CASE - 3 MOMENT

		DL (K-FT)	LL+I (K-FT)	WIND (K-FT)	WL (K-FT)	LF (K-FT)	SF (K-FT)	RST (K-FT)
trans	Col 1 - My	2	3,034	3,876	349	0	2,334	0
long	Col 1 - Mx	0	0	1,872	217	670	1,654	452

	GRP-I (K-FT)	GRP-II (K-FT)	GRP-III (K-FT)	GRP-IV (K-FT)	GRP-V (K-FT)	GRP-VI (K-FT)
Col 1 - My	9,622	8,075	8,945	6,980	7,765	8,601
Col 1 - Mx	2,150	4,583	4,034	2,737	4,972	4,443

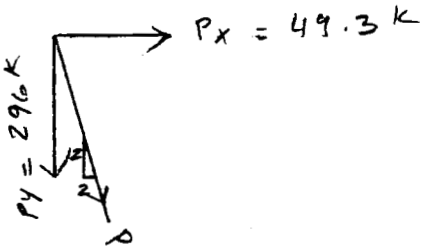
T·Y·LIN INTERNATIONAL

Projects: Salt River Bridge - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge Retrofit	Designer: SJ	Date: 04-18-00	
	Checker:	Date:	
		Grid: 1/10"	

BATTERED PILE:

Capacity ≃ 300 ton (ultimate)

∴ Service P = 300 k



Total transverse Shear = 127k

Shear Resisted by 2 - battered piles ≃ 49.3 × 2
= 98.6k

∴ Shear per pile = (127 - 98.6)/16
= 1.775 k

Max. Vertical load on pile = 289 k

```
Pile: HP14x89
1 1 0 0 0
100     2       0       468     0
0       14.685039       326     26.1    29000000
468     14.685039       326     26.1    29000000
1       2       2       0       0
4       0       468     500
0       0.045
468     0.045
0       0       42      0
468     0       42      0
0       1       1
1
1       1775    0       289000
0
1       1       0
100     1E-5    100
```

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PROGRAM LPILE plus Version 3.0
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Pile: HP14x89

UNITS--ENGLISH UNITS

INPUT INFORMATION

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 468.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	14.685	.326E+03	.261E+02	.290E+08
468.00	14.685	.326E+03	.261E+02	.290E+08

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

1 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 468.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
2 POINTS

X,IN	WEIGHT,LBS/IN**3
.00	.45E-01
468.00	.45E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
2 POINTS

X,IN	C,LBS/IN**2	PHI,DEGREES	E50
.00	.000E+00	.420E+02	-----
468.00	.000E+00	.420E+02	-----

BOUNDARY AND LOADING CONDITIONS

LOADING NUMBER 1

BOUNDARY-CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .178E+04 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .289E+06 LBS

FINITE-DIFFERENCE PARAMETERS

NUMBER OF PILE INCREMENTS = 100
DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE = .100E-04 IN
MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
MAXIMUM ALLOWABLE DEFLECTION = .10E+03 IN

OUTPUT CODES
KOUTPT = 1
KPYOP = 0
INC = 1

OUTPUT INFORMATION

****
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING *
****

LOADING NUMBER 1

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .178E+04 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .289E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.114E-01	-.300E-08	.178E+04	-.265E-03	.111E+05	.945E+10	.000E+00
4.7	.101E-01	.867E+04	.174E+04	-.263E-03	.113E+05	.945E+10	-.166E+02
9.4	.889E-02	.170E+05	.162E+04	-.257E-03	.115E+05	.945E+10	-.350E+02

14.0	.771E-02	.245E+05	.141E+04	-.247E-03	.116E+05	.945E+10	-.531E+02
18.7	.658E-02	.308E+05	.114E+04	-.233E-03	.118E+05	.945E+10	-.616E+02
23.4	.553E-02	.358E+05	.845E+03	-.217E-03	.119E+05	.945E+10	-.646E+02
28.1	.455E-02	.393E+05	.544E+03	-.198E-03	.120E+05	.945E+10	-.639E+02
32.8	.367E-02	.414E+05	.254E+03	-.178E-03	.120E+05	.945E+10	-.601E+02
37.4	.289E-02	.422E+05	-.134E+02	-.157E-03	.120E+05	.945E+10	-.540E+02
42.1	.220E-02	.417E+05	-.248E+03	-.137E-03	.120E+05	.945E+10	-.463E+02
46.8	.161E-02	.402E+05	-.445E+03	-.116E-03	.120E+05	.945E+10	-.376E+02
51.5	.111E-02	.379E+05	-.600E+03	-.969E-04	.119E+05	.945E+10	-.286E+02
56.2	.702E-03	.349E+05	-.713E+03	-.789E-04	.119E+05	.945E+10	-.197E+02
60.8	.373E-03	.314E+05	-.786E+03	-.625E-04	.118E+05	.945E+10	-.113E+02
65.5	.117E-03	.277E+05	-.821E+03	-.479E-04	.117E+05	.945E+10	-.382E+01
70.2	-.755E-04	.238E+05	-.824E+03	-.352E-04	.116E+05	.945E+10	.265E+01
74.9	-.212E-03	.201E+05	-.799E+03	-.243E-04	.115E+05	.945E+10	.795E+01
79.6	-.303E-03	.164E+05	-.752E+03	-.153E-04	.114E+05	.945E+10	.120E+02
84.2	-.355E-03	.131E+05	-.689E+03	-.797E-05	.114E+05	.945E+10	.150E+02
88.9	-.378E-03	.100E+05	-.615E+03	-.226E-05	.113E+05	.945E+10	.168E+02
93.6	-.377E-03	.731E+04	-.534E+03	.202E-05	.112E+05	.945E+10	.176E+02
98.3	-.359E-03	.499E+04	-.452E+03	.507E-05	.112E+05	.945E+10	.176E+02
103.0	-.329E-03	.306E+04	-.371E+03	.706E-05	.111E+05	.945E+10	.169E+02
107.6	-.293E-03	.150E+04	-.295E+03	.819E-05	.111E+05	.945E+10	.157E+02
112.3	-.252E-03	.284E+03	-.225E+03	.863E-05	.111E+05	.945E+10	.142E+02
117.0	-.212E-03	-.624E+03	-.162E+03	.855E-05	.111E+05	.945E+10	.124E+02
121.7	-.172E-03	-.126E+04	-.109E+03	.808E-05	.111E+05	.945E+10	.105E+02
126.4	-.136E-03	-.166E+04	-.642E+02	.736E-05	.111E+05	.945E+10	.859E+01
131.0	-.104E-03	-.188E+04	-.283E+02	.648E-05	.111E+05	.945E+10	.678E+01
135.7	-.754E-04	-.195E+04	-.413E+00	.553E-05	.111E+05	.945E+10	.511E+01
140.4	-.517E-04	-.190E+04	.201E+02	.458E-05	.111E+05	.945E+10	.363E+01
145.1	-.325E-04	-.177E+04	.341E+02	.367E-05	.111E+05	.945E+10	.235E+01
149.8	-.173E-04	-.159E+04	.426E+02	.284E-05	.111E+05	.945E+10	.130E+01
154.4	-.589E-05	-.138E+04	.467E+02	.211E-05	.111E+05	.945E+10	.454E+00
159.1	.236E-05	-.116E+04	.473E+02	.148E-05	.111E+05	.945E+10	-.188E+00
163.8	.794E-05	-.941E+03	.454E+02	.958E-06	.111E+05	.945E+10	-.650E+00
168.5	.113E-04	-.737E+03	.416E+02	.542E-06	.111E+05	.945E+10	-.954E+00
173.2	.130E-04	-.553E+03	.368E+02	.223E-06	.111E+05	.945E+10	-.113E+01
177.8	.134E-04	-.393E+03	.313E+02	-.112E-07	.111E+05	.945E+10	-.119E+01
182.5	.129E-04	-.260E+03	.258E+02	-.173E-06	.111E+05	.945E+10	-.118E+01
187.2	.118E-04	-.151E+03	.204E+02	-.275E-06	.111E+05	.945E+10	-.110E+01
191.9	.103E-04	-.674E+02	.155E+02	-.329E-06	.111E+05	.945E+10	-.991E+00
196.6	.872E-05	-.510E+01	.112E+02	-.347E-06	.111E+05	.945E+10	-.857E+00
201.2	.709E-05	.385E+02	.754E+01	-.338E-06	.111E+05	.945E+10	-.713E+00
205.9	.555E-05	.664E+02	.453E+01	-.312E-06	.111E+05	.945E+10	-.571E+00
210.6	.417E-05	.817E+02	.217E+01	-.276E-06	.111E+05	.945E+10	-.439E+00
215.3	.297E-05	.874E+02	.392E+00	-.234E-06	.111E+05	.945E+10	-.320E+00
220.0	.198E-05	.861E+02	-.866E+00	-.191E-06	.111E+05	.945E+10	-.217E+00
224.6	.118E-05	.798E+02	-.169E+01	-.150E-06	.111E+05	.945E+10	-.133E+00
229.3	.576E-06	.707E+02	-.215E+01	-.113E-06	.111E+05	.945E+10	-.659E-01
234.0	.130E-06	.600E+02	-.234E+01	-.803E-07	.111E+05	.945E+10	-.152E-01
238.7	-.176E-06	.490E+02	-.233E+01	-.533E-07	.111E+05	.945E+10	.210E-01
243.4	-.369E-06	.384E+02	-.217E+01	-.317E-07	.111E+05	.945E+10	.449E-01
248.0	-.473E-06	.287E+02	-.193E+01	-.151E-07	.111E+05	.945E+10	.586E-01
252.7	-.510E-06	.203E+02	-.164E+01	-.299E-08	.111E+05	.945E+10	.645E-01
257.4	-.501E-06	.133E+02	-.134E+01	.533E-08	.111E+05	.945E+10	.644E-01
262.1	-.460E-06	.772E+01	-.105E+01	.105E-07	.111E+05	.945E+10	.603E-01
266.8	-.402E-06	.345E+01	-.784E+00	.133E-07	.111E+05	.945E+10	.536E-01
271.4	-.336E-06	.347E+00	-.552E+00	.142E-07	.111E+05	.945E+10	.456E-01
276.1	-.269E-06	-.176E+01	-.358E+00	.139E-07	.111E+05	.945E+10	.371E-01
280.8	-.206E-06	-.304E+01	-.204E+00	.127E-07	.111E+05	.945E+10	.289E-01
285.5	-.150E-06	-.370E+01	-.857E-01	.110E-07	.111E+05	.945E+10	.214E-01
290.2	-.103E-06	-.388E+01	-.719E-03	.916E-08	.111E+05	.945E+10	.149E-01
294.8	-.644E-07	-.373E+01	.564E-01	.728E-08	.111E+05	.945E+10	.949E-02
299.5	-.347E-07	-.337E+01	.907E-01	.552E-08	.111E+05	.945E+10	.519E-02
304.2	-.127E-07	-.289E+01	.107E+00	.397E-08	.111E+05	.945E+10	.193E-02
308.9	.251E-08	-.237E+01	.111E+00	.267E-08	.111E+05	.945E+10	-.388E-03
313.6	.122E-07	-.186E+01	.106E+00	.162E-08	.111E+05	.945E+10	-.192E-02
318.2	.177E-07	-.139E+01	.946E-01	.816E-09	.111E+05	.945E+10	-.281E-02

322.9	.199E-07	-.977E+00	.805E-01	.231E-09	.111E+05	.945E+10	-.321E-02
327.6	.198E-07	-.636E+00	.654E-01	-.168E-09	.111E+05	.945E+10	-.325E-02
332.3	.183E-07	-.365E+00	.506E-01	-.416E-09	.111E+05	.945E+10	-.304E-02
337.0	.159E-07	-.161E+00	.372E-01	-.546E-09	.111E+05	.945E+10	-.268E-02
341.6	.132E-07	-.151E-01	.257E-01	-.590E-09	.111E+05	.945E+10	-.225E-02
346.3	.104E-07	.811E-01	.162E-01	-.574E-09	.111E+05	.945E+10	-.180E-02
351.0	.783E-08	.138E+00	.873E-02	-.519E-09	.111E+05	.945E+10	-.137E-02
355.7	.556E-08	.164E+00	.321E-02	-.445E-09	.111E+05	.945E+10	-.988E-03
360.4	.367E-08	.169E+00	-.654E-03	-.362E-09	.111E+05	.945E+10	-.660E-03
365.0	.217E-08	.159E+00	-.313E-02	-.281E-09	.111E+05	.945E+10	-.396E-03
369.7	.104E-08	.140E+00	-.450E-02	-.207E-09	.111E+05	.945E+10	-.192E-03
374.4	.234E-09	.118E+00	-.505E-02	-.143E-09	.111E+05	.945E+10	-.436E-04
379.1	-.299E-09	.936E-01	-.502E-02	-.906E-10	.111E+05	.945E+10	.567E-04
383.8	-.615E-09	.708E-01	-.461E-02	-.500E-10	.111E+05	.945E+10	.118E-03
388.4	-.767E-09	.505E-01	-.399E-02	-.199E-10	.111E+05	.945E+10	.149E-03
393.1	-.801E-09	.335E-01	-.327E-02	.834E-12	.111E+05	.945E+10	.157E-03
397.8	-.759E-09	.199E-01	-.255E-02	.140E-10	.111E+05	.945E+10	.151E-03
402.5	-.670E-09	.955E-02	-.188E-02	.213E-10	.111E+05	.945E+10	.135E-03
407.2	-.559E-09	.218E-02	-.130E-02	.242E-10	.111E+05	.945E+10	.114E-03
411.8	-.443E-09	-.270E-02	-.821E-03	.241E-10	.111E+05	.945E+10	.913E-04
416.5	-.334E-09	-.557E-02	-.444E-03	.220E-10	.111E+05	.945E+10	.695E-04
421.2	-.237E-09	-.691E-02	-.165E-03	.189E-10	.111E+05	.945E+10	.499E-04
425.9	-.157E-09	-.716E-02	.302E-04	.155E-10	.111E+05	.945E+10	.333E-04
430.6	-.924E-10	-.667E-02	.155E-03	.120E-10	.111E+05	.945E+10	.199E-04
435.2	-.438E-10	-.575E-02	.224E-03	.897E-11	.111E+05	.945E+10	.953E-05
439.9	-.851E-11	-.460E-02	.250E-03	.641E-11	.111E+05	.945E+10	.187E-05
444.6	.161E-10	-.342E-02	.246E-03	.442E-11	.111E+05	.945E+10	-.359E-05
449.3	.329E-10	-.231E-02	.221E-03	.300E-11	.111E+05	.945E+10	-.738E-05
454.0	.442E-10	-.136E-02	.180E-03	.209E-11	.111E+05	.945E+10	-.100E-04
458.6	.525E-10	-.633E-03	.128E-03	.160E-11	.111E+05	.945E+10	-.120E-04
463.3	.592E-10	-.166E-03	.680E-04	.140E-11	.111E+05	.945E+10	-.137E-04
468.0	.656E-10	.000E+00	.000E+00	.136E-11	.111E+05	.945E+10	-.153E-04

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.487E-08 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .550E-09 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .114E-01 IN
COMPUTED SLOPE AT PILE HEAD = -.265E-03
MAXIMUM BENDING MOMENT = .422E+05 LBS-IN
MAXIMUM SHEAR FORCE = .178E+04 LBS
NO. OF ITERATIONS = 5
NO. OF ZERO DEFLECTION POINTS = 6

S U M M A R Y T A B L E
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BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.1775E+04	.0000E+00	.2890E+06	.1136E-01	.4217E+05	.1775E+04

M = 3.514 k-ft
V = 1.775 K
P = 289 K.

T·Y·LIN INTERNATIONAL

Projects: Salt River Bridge - Scour	Job No. 1317.00	Sheet:	of
Item: 24th St. Bridge Retrofit.	Designer: SJ	Date: 04-18-00	
	Checker:	Date:	
		Grid: 1/10"	

STEEL PILE:

HP14 x 89

$P = 289\ K$

$V = 1.775\ K$

$M = 3.514\ k\text{-}ft$

$$f_a = \frac{P}{A} = \frac{289}{26.1} = 11.07\ ksi$$

$$f_b = \frac{My}{I} = \frac{3.514 \times 12 \times 7}{326}$$

$$= .905\ ksi$$

$F_a = 21.56\ ksi$

$F_b = .6F_y = 21.6\ ksi$

$$\frac{f_a}{F_a} + \frac{f_b}{F_b} = 0.554 < 1 \quad OK.$$