Letter of Transmittal

Date: November 17, 2014

To: Professor Heather Sustersic

had132@psu.edu

From: Mary Julia Haverty

mjh5532@psu.edu

Enclosed: AE 481W- Senior Thesis: Structural Technical Report 4

Dear Professor Sustersic,

This report was completed to fulfill the requirement for Technical Report 4 for AE 481W- Senior Thesis.

Technical Report 4 includes a complete lateral analysis of the Corporate Headquarters. The analysis was completed using 3D computer modeling and critical member spot checks. This analysis was done to determine if the building's existing lateral systems meets the strength and serviceability requirements under the previously calculated wind and seismic loads.

I appreciate you taking the time to review this report and I look forward to discussing it with you in the future.

Sincerely,

M. Julia Haverty

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CORPORATE HEADQUARTERS

Great Lakes Region, U.S.A.

TECHNICAL REPORT 4

M. JULIA HAVERTY
STRUCTURAL OPTION
ADVISOR: H. SUSTERSIC
17 NOVEMBER 2014

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Executive Summary

The Corporate Headquarters, located in the Great Lakes Region of the United States, is a new 5 story office and retail space designed to serve as new home base for an established and successful US based company. The building's architecture was designed to mirror its surrounding buildings, namely, the newer retail area situated directly to the north of the building. It aims to mirror those buildings through its façade, which changes materials in order to break up the large building. In keeping with that architectural style, the Corporate Headquarters features a façade of glass and face brick, construction crews broke ground on the roughly 660,000 SF building in August 2014 with a projected completion date of Spring 2016.

A challenge in the design of the Corporate Headquarters is the poor existing soil conditions on part of the site. To remedy this problem, aggregate piers will be pushed down below foundation level to support the column spread footings and piers. Grade beams are also utilized in the foundation system.

The floor system in floors 2-5 is a composite floor framing consisting of metal deck on top of steel wide flange members. Average bays are rectangular with typical sizes around 38’-0” x 40’-0”. The primary lateral system of the building is HSS braced frames near the building’s core.

The primary loading conditions considered in the design of this structure were live loads, dead loads, snow loads, wind loads, seismic loads, and soil loads. To consider these loading conditions, the 2011 Ohio Building Code was set as primary design criteria. 2011 Ohio Building Code adopts IBC 2009, which references ASCE 7-05.

Due to security reasons, detailed location maps are not permitted for this report.

Site Plan and Location

Building Location: Great Lakes Region, U.S.A.

-exact location map not permitted

Site Map

Corporate Headquarters

Great Lakes Region, U.S.A.

General Information

Building Height: 83'
Number of Stories: 5
Size: 659, 554 SF
Cost: Withheld at the request of Owner
Dates of Construction: August 2014-Spring 2016
Project Delivery Type: Design-Bid-Build

Project Team

RTKL Ohio Corp	Architect, Structural Engineer, Mechanical Engineer, Electrical Engineer, Plumbing, Telecommunications
Mark G. Anderson Constultants, Inc	Project Management
Bialosky + Partners Architects	Supporting Architect
Neff and Associates	Civil Engineer
Mahan Rykiel Associates, Inc	Landscape Architect
Code Consultants, Inc	Fire Protection and Code Consultant
Michael Blades and Associates, LTD	Elevator Consultant
Keith Davis Group, LLC	Roof and Waterproofing Consultant

Architecture

The Corporate Headquarters was designed to mimic the architecture of the existing outdoor mall directly to the North of the site. The building's façade is broken up into several segments in order to mimic the classic storefront look of the outdoor mall. With its large windows, curtain wall, and brick façade, the Corporate Headquarters strives to serve as a model of Classic Modern American Architecture.

Sustainability

The building's primary sustainability feature is the central courtyard, which begins on the third floor. It features an intensive green roof, a seating area for building occupants, and trees to help provide shade.

Structural

Foundation: spread footings and grade beams, some of which are supported by aggregate piers

Framing: steel framing, featuring w shapes for most beams, girders, and columns

Lateral: 8 braced frames near the core of the building

Lighting/Electrical

Integrated Power Center: housed on first floor of building
More Information and Electrical Drawings Requested from Architect.

Mechanical

Variable Air Volume system
14 Rooftop Air Handling Units providing up to 37,500 CFM
CRAC and Split Systems utilized in other areas of building.

Renderings Courtesy RTKL

M. Julia Haverty | Structural Option | Advisor Heather Sustersic

Documents Used to Create Report

The following documents were used during the creation of Technical Report 4.

- **Ohio Building Code 2011**

  -incorporates IBC 2009

- **American Society of Civil Engineers**

  -ASCE 7-05: Minimum Design Loads for Buildings

- **American Institute of Steel Construction**

  -Steel Construction Manual

- **Corporate Headquarters**

  -Construction Documents

  -Technical Specifications

Load Summary

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Load Summary

* Loads taken from Technical Report 2 calculations provided in appendix

Gravity

Floor DL = 62 psf
Floor LL = 65 (structural dwgs), 100 psf used (assembly area)
Cavity wall DL = 848 plf
Roof DL = 92 psf
Roof LL = 25 psf
Snow load p_f = 17 psf

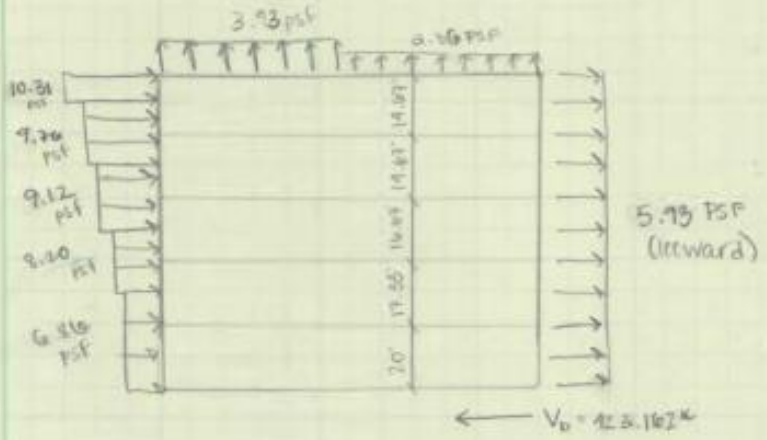
Wind Loads

Occupancy II
V = 90 mph
I = 1.00

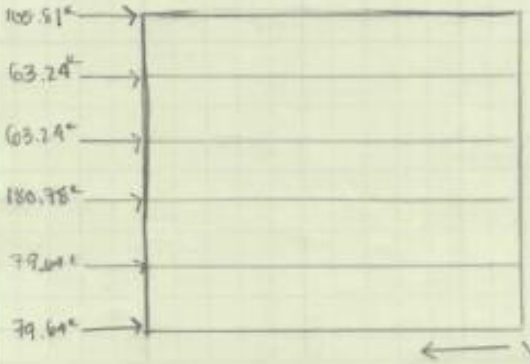
K_d = 0.85
Exposure B
K_{zt} = 1.0

building enclosed

Wind Pressure Diagram (E-W)



Vertical Distribution of Seismic Forces



572.35k > 423.162k

Seismic Controls

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WIND LOAD CALCULATIONS

- calculated using ASCE 7-05

1) Occupancy Category – II from drawings

confirmed in table 1-1

2) Wind Load Importance Factor

From drawings, V=90 mph, Category II
I=1.00, From drawing, I= 1.00 → match

3) Basic Wind Speed, from Figure 6-1, confirmed on dwgs

V=90 mph

4) Wind Load Parameters

a. Wind Directionality Factor, K_d, from Table 6-4, confirmed on dwgs

$K_d = 0.85$

b. Exposure Category (§6.5.6.3)

Exposure B → confirmed in drawings (case 2, not low rise building)

c. Topographic Factor, K_{zt} (§6.4.2.1 & §6.5.7, Table 6-4)

$K_{zt} = 1.0$ → confirmed on dwgs → $K_{zt} = 1.0$ (2-dimensional, no hill)

d. Gust Effect factor (§6.5.8)

From commentary

$n_1 = 100/H$ → average value = 100/83 = 1.20

$n_1 = 75/H$ → lower bound = 75/83 = .90 ← use this value to be conservative

exposure B factors (from Table 6-2)

$\alpha = 7.0$
$z_g(ft) = 1200$
$\hat{a} = 1/7$
$\hat{b} = 0.84$
$\overline{\alpha} = 1/4.0$
$\overline{b} = 0.45$
$c = 0.30$
$\ell(ft) = 320$
$\overline{\epsilon} = 1/3.0$
$z_{min}(ft) = 30$

$\overline{z}$ = equivalent height of structure = .6h = .6(83) = 49.8'

For buildings without concrete shear walls, a simplified procedure can be used

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$N_1 = \frac{n_1 L_z}{V_z} = \frac{.90(367.05)}{71.80}$ $N_1 = 4.417$

$L_z = \ell\left(\frac{\bar{z}}{33}\right)^{\varepsilon} = 320\left(\frac{49.8}{33}\right)^{1/5} = 367.05$ ft

$\bar{V}_z = \bar{b}\left(\frac{\bar{z}}{33}\right)^{\alpha} V\left(\frac{88}{60}\right) = 0.45\left(\frac{49.8}{33}\right)^{1/4} 90\left(\frac{88}{60}\right) = 65.84$ ft/s

$Q = \sqrt{\frac{1}{1+0.63\left(\frac{B+h}{L_z}\right)^{0.63}}}$

h = mean roof height = 85'
B = horizontal dimension of building normal to wind direction
BNS = 326'
BEW = 394'

$Q_{NS} = \sqrt{\frac{1}{1+.63\left(\frac{326+85}{367.05}\right)}} = .77$

$Q_{EW} = \sqrt{\frac{1}{1+.63\left(\frac{394+85}{367.05}\right)}} = .74$

$G = 0.925\left(\frac{1+1.7 g_Q I_z Q}{1+1.7 g_v I_z}\right)$ From §6.5.8.1, g_Q & $g_v = 3.4$

$I_z = c\left(\frac{33}{\bar{z}}\right)^{1/6} = .30\left(\frac{33}{49.8}\right)^{1/6} = .28$

$G_{NS} = 0.925\left(\frac{1+1.7(3.4)(.28)(.77)}{1+1.7(3.4)(.28)}\right)$ $G_{NS} = .79$

$G_{EW} = 0.925\left(\frac{1+1.7(3.4)(.28)(.74)}{1+1.7(3.4)(.28)}\right)$ $G_{EW} = .78$

e. Enclosure Classification (§6.5.9 & §6.2)

- Building is enclosed as it does not meet "open" and "partially enclosed" conditions

f. Internal Pressure Coefficient Figure 6-5

$GC_{pi} = \pm 0.18$ for enclosed buildings

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CP Values (Figure 6-6)

- Wind typically blows Southwest in the area the Corporate Headquarters is located. It tends to hit more vertically than horizontally, so for this reason, the north side of the building will be considered windward and the south side will be considered leeward.

L = horizontal dimension of building parallel to wind direction
B = horizontal dimension of building normal to wind direction

Wall C_p Values

Windward wall: $C_p = 0.8$ use with q_z

Leeward wall: B = 326' L = 394' $L/B = 394/326 = 1.21$

- need to interpolate to find C_p

$$x = \frac{(1.21-1)(-0.3+0.5)}{(2-1)} + -0.5$$

L/B	C_p
0-1	-0.5
1.21	x
2	-0.8

$C_p = -0.46$ use with q_h

Side wall: $C_p = -0.7$, use with q_h

Roof C_p Values

Roof has 0° slope
- horizontal distance from windward edge = 394' h = 83'
394 > 2h
$C_p = -0.3, -0.18$

Find Wind Pressures

$K_z = 2.01 (z/z_g)^{2/\alpha}$ z = height of floor above ground

$q_z = 0.00256 K_z K_{zt} K_d V^2 I$

$p = q G_f C_p$

Floor #	z (ft)	K_z	q_z (psf)
2	20	0.62	11.0
3	37.33	0.75	13.14
4	54	0.83	14.61
5	68.67	0.89	15.64
roof	83.33	0.94	16.53

Excel Equations: $p = qCP_i$ $G_{NS} = .79$ $G_{EW} = .78$ $q_h \sim 16.5$'

Building width NS = 326' Building width EW = 394'

* See excel sheet for values

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Wind Pressure for Roof

$P = q_h G C_p$

$q_h = 0.00256\left[2.01\left(\frac{85.39}{1200}\right)^{2/7}\right](1.0)(.85)(90^2)(1.0) = 16.78 \text{ psf}$

N-S direction

windward: $p = 16.78(.79)(-0.3) = -3.98$ psf

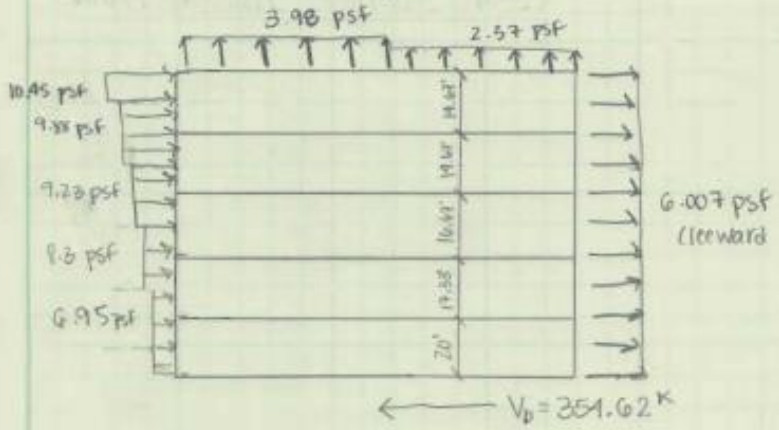
leeward: $p = 16.78(.79)(-0.18) = -2.37$ psf

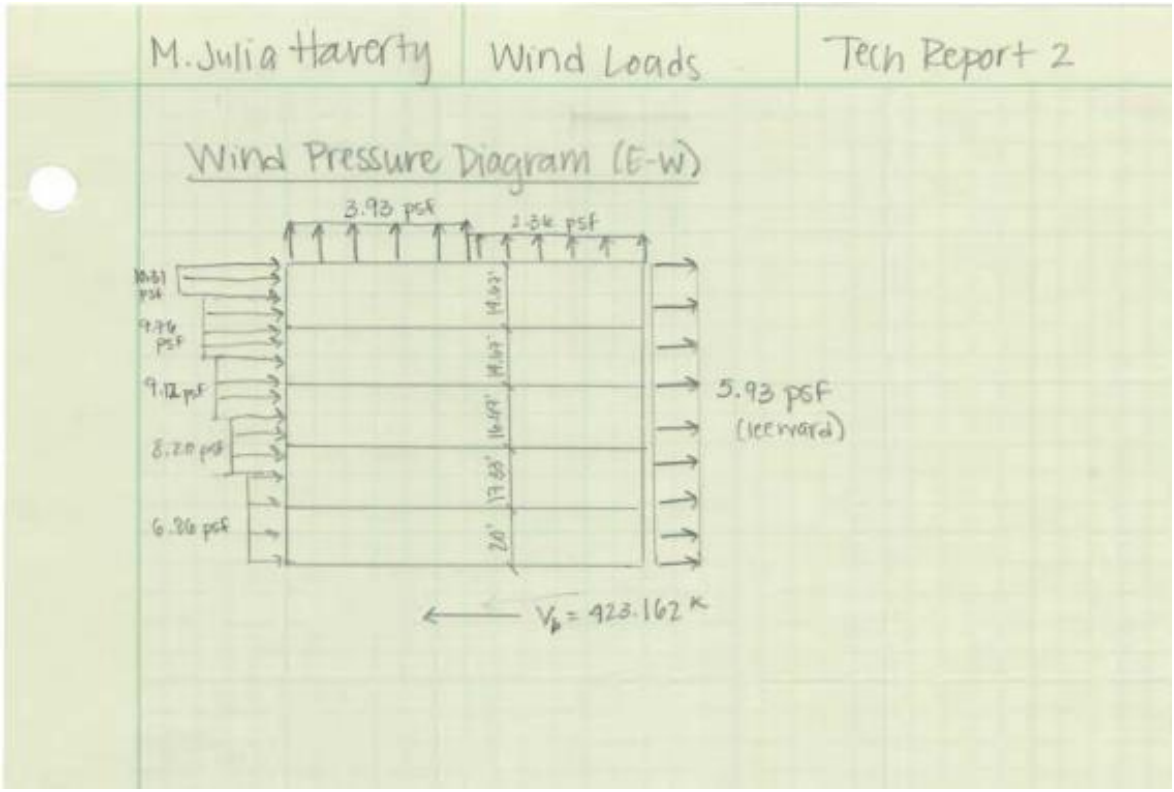
E-W direction

windward: $p = 16.78(.78)(-0.3) = -3.93$ psf

leeward: $p = 16.78(.78)(-0.18) = -2.36$ psf

Wind Pressure Diagram (N-S)





Wind Pressure (North-South Direction)						
Floor	**z (ft)**	**qz (PSF)**	**Windward Pressure (PSF)**	**Leeward Pressure (PSF)**	**Tributary Area**	**Force (K)**
2	20	11	6.952	-6.007	6096	78.998
3	37.33	13.14	8.304	-6.007	5542	79.314
4	54	14.61	9.234	-6.007	5314	80.988
5	68.67	15.64	9.884	-6.007	4782	75.993
roof	83.33	16.53	10.447	-6.007	2390	39.325
					Base Shear=	354.618

Wind Pressure (East-West Direction)						
Floor	**z (ft)**	**qz (PSF)**	**Windward Pressure (PSF)**	**Leeward Pressure (PSF)**	**Tributary Area**	**Force (K)**
2	20	11	6.864	-5.931	7368	94.273
3	37.33	13.14	8.199	-5.931	6698	94.645
4	54	14.61	9.117	-5.931	6422	96.636
5	68.67	15.64	9.759	-5.931	5780	90.690
roof	83.33	16.53	10.315	-5.931	2888	46.918
					Base Shear=	423.162

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SEISMIC LOAD CALCULATIONS

1) Building not exempt (§11.1.2)

2) Design Spectral Response Acceleration (§11.4)

a) Site Classification: C

b) Acceleration Parameters

$S_S = 0.175$ g

$S_1 = 0.051$ g

c) Site Class Effects (§11.4.3)

$F_a = 1.2$

$F_v = 1.7$

$S_{MS} = F_a S_S = 1.2(0.175) = 0.21$ g $\qquad S_{M_S} = 0.21$ g

$S_{M_1} = F_v S_1 = 1.7(0.051) = 0.0867$ g $\qquad S_{M_1} = 0.0867$ g

d) Determine Spectral Acceleration Parameters (§11.4.4)

$S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3}(0.21)$ $\qquad S_{DS} = 0.14$

$S_{D_1} = \frac{2}{3} S_{M_1} = \frac{2}{3}(0.0867)$ $\qquad S_{D_1} = 0.0578$

3) Find Seismic Design Category

Occupancy Category II

Importance factor = 1.0

$S_{DS} < 0.167 \longrightarrow$ Category A

- matches category given in drawings $\longrightarrow$ SDC A

4) Analysis Procedure Selection

§11.7 - "Buildings and other structures assigned to Seismic Design Category A need only comply with the requirements of Section 11.7."

§11.7.1 - Seismic loads shall be taken as "E" and combined with other load combinations from Sections 2.3 and 2.4

§1.4 - Eqn 1.4-1 $\qquad F_x = 0.01 w_x$

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5-9) Skip due to SDC A

10) Calculate effective total seismic weight (W)

Roof: DL + 20% SL

W_{RF} = (Roof area)[DL + 20% SL]

Roof area = (326×394) − (174×152) = 101996 SF ~ 102000 SF

1/3 Roof area (R-2) = 34000 SF

W_{RF} = (102000 − 34000)[92 + .2(17)] + (34000)[117 + .2(17)]

W_{RF} = 10581 K

Floor: DL

Floor area (Floors 1-2) = 128444 SF

Floor area (Floors 3-5) = 102000 SF

W_F = (128444)(62) + 102000(62)(3) = 34900 K

Courtyard: Assumed to be handled as roof area

W_C = DL + 20% SL

Courtyard area = 174×152 = 26448 SF

W_C = 26448 (44 + .2(17)) = 11754 K

Total Building Load = $W_{RF} + W_F + W_C$ = 57235 K = W

11) Calculate Seismic Base Shear (V)

$V = C_S W$ $V = 0.01(57235)$ $V = 572.35^K$

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12) Vertical Distribution of Seismic Forces

SDCA, Sd $F_x = 0.01 W_x$

Base shear = 572.35^k

F 1st floor (ground level) = $0.01(128444 \times 62) = 79.69^k$

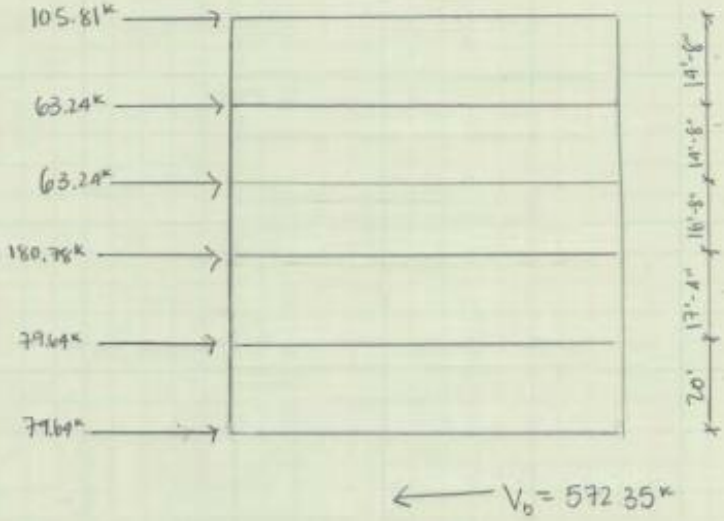
$F_{level\ 2} = 0.01(128444 \times 62) = 79.69^k$

$F_{level\ 3} = 0.01[(102000 \times 62)/1000 + 11754] = 180.78^k$
* includes courtyard

$F_{level\ 4} = 0.01[102000 \times 62] = 63.24^k$

$F_{level\ 5} = 0.01[102000 \times 62] = 63.24^k$

$F_{Roof} = 0.01[10581] = 105.81^k$



Assumptions and Modeling Process

Assumptions

Prior to the start of the modeling process, a few general assumptions were made.

-rigid diaphragms are assumed due to the concrete slabs on each floor

-the base of each braced frame is pinned

Modeling Process

ETABS 2013 was used to model the lateral system of the Corporate Headquarters. Each of the eight braced frames was modeled.

Load cases were calculated for the lateral system and then applied to the model. The controlling load cases and their reactions were recorded.

Possible Areas of Error

In addition to the eight braced frames in the building, the penthouse roof also has two mini braced frames, so they were initially included in the model. The mini braced frames seemed to cause a lot of error within the model. Since the two mini braces transmit all their load into one single column, there was a lot of movement and drift. Due to this unrealistic display, it was decided that the mini braced frames would be omitted from the model. Had the model included all gravity loads, the mini braces would have been included.

Lateral Analysis

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Braced Frame Stiffnesses Sample Calculation

BF-A1

		A (in²)	I_x (in⁴)
Columns:	W14 x 132	38.8	1530
	W14 x 61	17.9	690
	W14 x 176	51.8	2140
	W14 x 74	21.8	795
Braces:	HSS 12 x 12 x 5/16	13.4	
	HSS 8 x 12 x 3/8	16.0	
	HSS 10 x 10 x 1/4	8.96	
	HSS 8 x 8 x 1/4	7.10	

Above 1st Floor

$$K_{col} = \frac{3E(I_1+I_2)}{h^3} = \frac{3(29000)(1530+2140)}{(20\times12)^3} = 23.1 \text{ k/in}$$

$$K_{brace} = \frac{AE}{L} = \frac{13.4(29000)}{24.036\times12} + \frac{16.0(29000)}{24.036\times12} = 2956$$

$K_{frame} = 2979.08$ k/in

Above 2nd Floor

$$K_{col} = \frac{3(29000)(1530+2140)}{(17.33\times12)^3} = 35.5 \text{ k/in}$$

$$K_{brace} = \frac{8.96(29000)}{21.81\times12}(2) = 1985.63 \text{ k/in}$$

$K_{frame} = 2021.13$ k/in

Above 3rd Floor

$$K_{col} = \frac{3(29000)(640+795)}{(16.67\times12)^3} = 15.60 \text{ k/in}$$

$$K_{brace} = \frac{7.10(29000)}{20.69\times12}(2) = 1658.61 \text{ k/in}$$

$K_{frame} = 1674.21$ k/in

Above 4th Floor

$$K_{col} = \frac{3(29000)(640+795)}{(14.67\times12)^3} = 22.88 \text{ k/in}$$

$$K_{brace} = \frac{7.10(29000)}{17.90\times12}(2) = 1917.13 \text{ k/in}$$

$K_{frame} = 1940.01$ k/in

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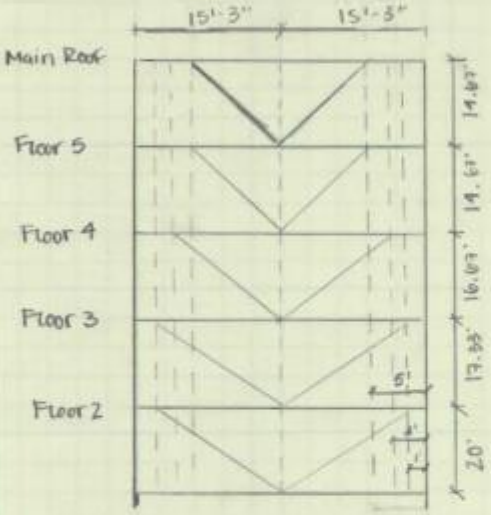
Above 5th Floor

$$K_{col} = \frac{3(29000)(640+795)}{(19.67\times12)^3} = 22.88 \text{ k/in}$$

$$K_{brace} = \frac{7.10(29000)}{17.90\times12}(2) = 1917.13 \text{ k/in}$$

$$K_{frame} = 1940.01 \text{ k/in}$$



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COR calculation - 3rd Floor

$\bar{x} = \frac{\Sigma R_y x}{\Sigma R_y}$ $\bar{y} = \frac{\Sigma R_x y}{\Sigma R_x}$

Rigidity Calculations

Braced Frames

A1 : 1674.21 = K frame

A2: $K_{col} = \frac{3(29000)(999+795)}{(16.67\times12)^3} = 19.49$ k/in

$K_{brace} = \frac{13.4(29000)}{34.3\times12} = 944.12$ k/in

K frame = 963.62 k/in

B1: $K_{col} = \frac{3(29000)(999+881)}{(16.67\times12)^3} = 20.93$ k/in

$K_{brace} = \frac{24.6(29000)}{38.77\times12} = 1533.40$ k/in

K frame = 1553.83 k/in

B2: $K_{col} = \frac{3(29000)(999+795)}{(16.67\times12)^3} = 19.5$ k/in

$K_{brace} = \frac{20.9(29000)}{29.63\times12} + \frac{13.4(2900)}{21.45\times12} = 3214.35$

K frame = 3233 k/in

C1: $K_{col} = \frac{3(29000)(999+999)}{(16.67\times12)^3} = 21.72$ k/in

$K_{brace} = \frac{16(29000)}{58.77\times12} = 997.33$

K frame = 1019.05 k/in

C2: $K_{col} = \frac{3(29000)(999+999)}{(16.67\times12)^3} = 21.72$ k/in

$K_{brace} = \frac{15.67(29000)}{(36.97\times12)} = 1024.32$ k/in

K frame = 1046.04 k/in

D_1: $K_{col} = \frac{3(29000)(999+881)}{(16.67\times12)^3} = 20.93$ k/in

$K_{brace} = \frac{7.10(29000)}{20.54\times12}(2) = 1670.73$ k/in

K frame = 1691.15 k/in

D_2: $K_{col} = \frac{3(29000)(999+999)}{(16.67\times12)^3} = 21.72$ k/in

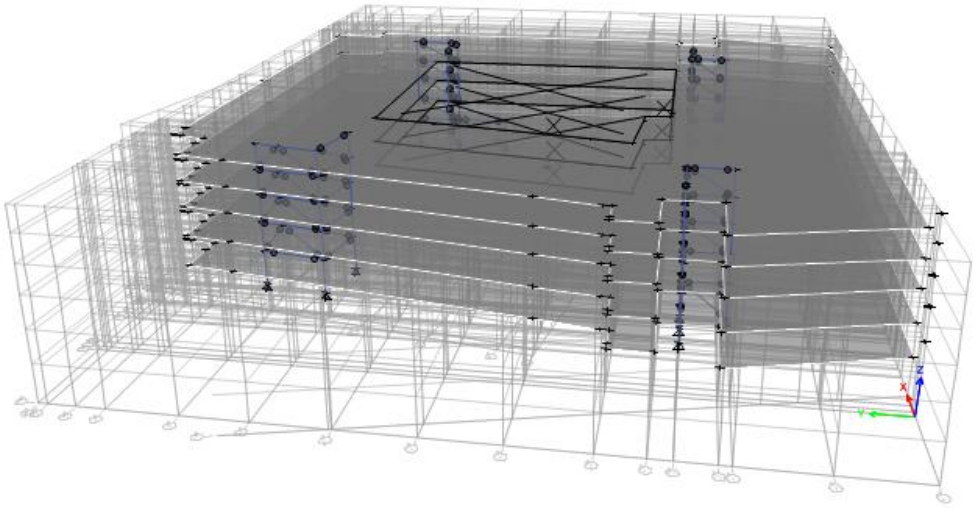
$K_{brace} = \frac{18.7(29000)}{34.32(12)} = 1316.77$ k/in

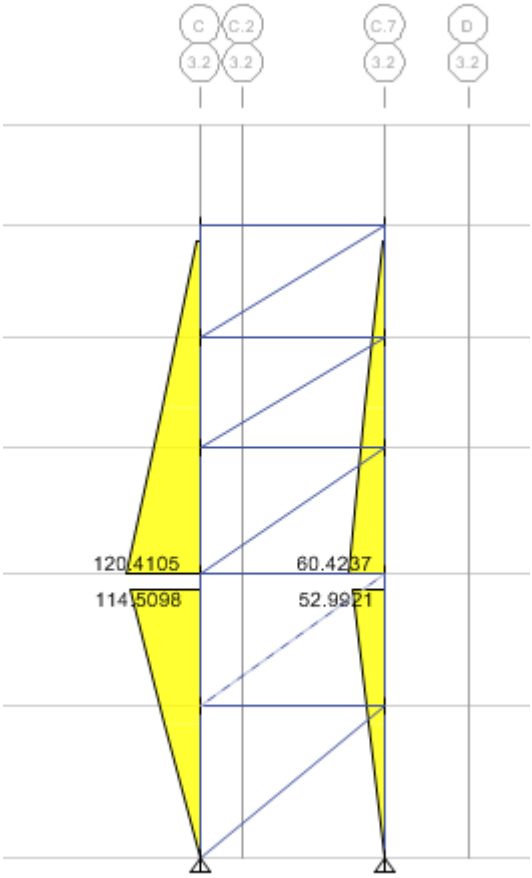
K frame = 1338.43 k/in

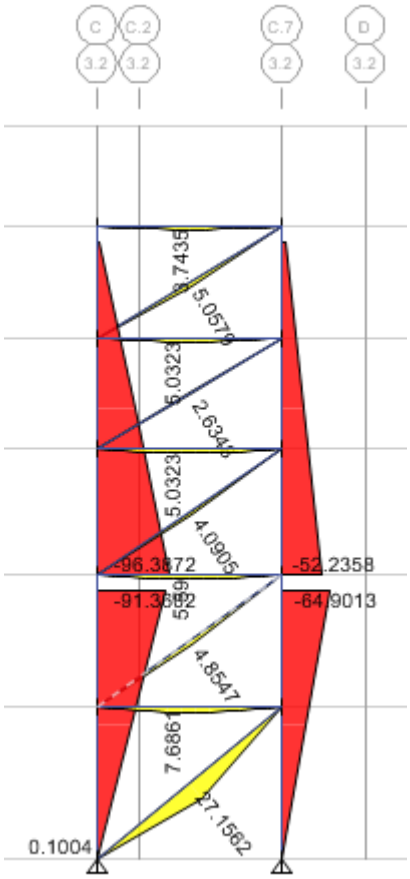
Center of Rigidity								
Level 3	Name	Direction	Rx	Ry	X-Dist	Y-Dist	Ry*X	Rx*Y
	A1	X	1674.21	0	53.5	105.333	0	176349.6
	A2	Y	0	963.62	84	105.333	80944.08	0
	B1	X	1553.83	0	81.533	105.333	0	163669.6
	B2	Y	0	3233.35	81.533	105.333	263624.7	0
	C1	X	1019.05	0	333.5	105.333	0	107339.6
	C2	Y	0	14046.04	368.5	105.333	5175966	0
	D1	X	1691.15	0	338.5	105.333	0	178133.9
	D2	Y	0	1338.43	338.5	105.333	453058.6	0
Total			5938.24	19581.44			5973593	625492.6

Results		
Level 3	Caculated	ETABS
X bar	305.064035	275.752
Y bar	105.333	46.782

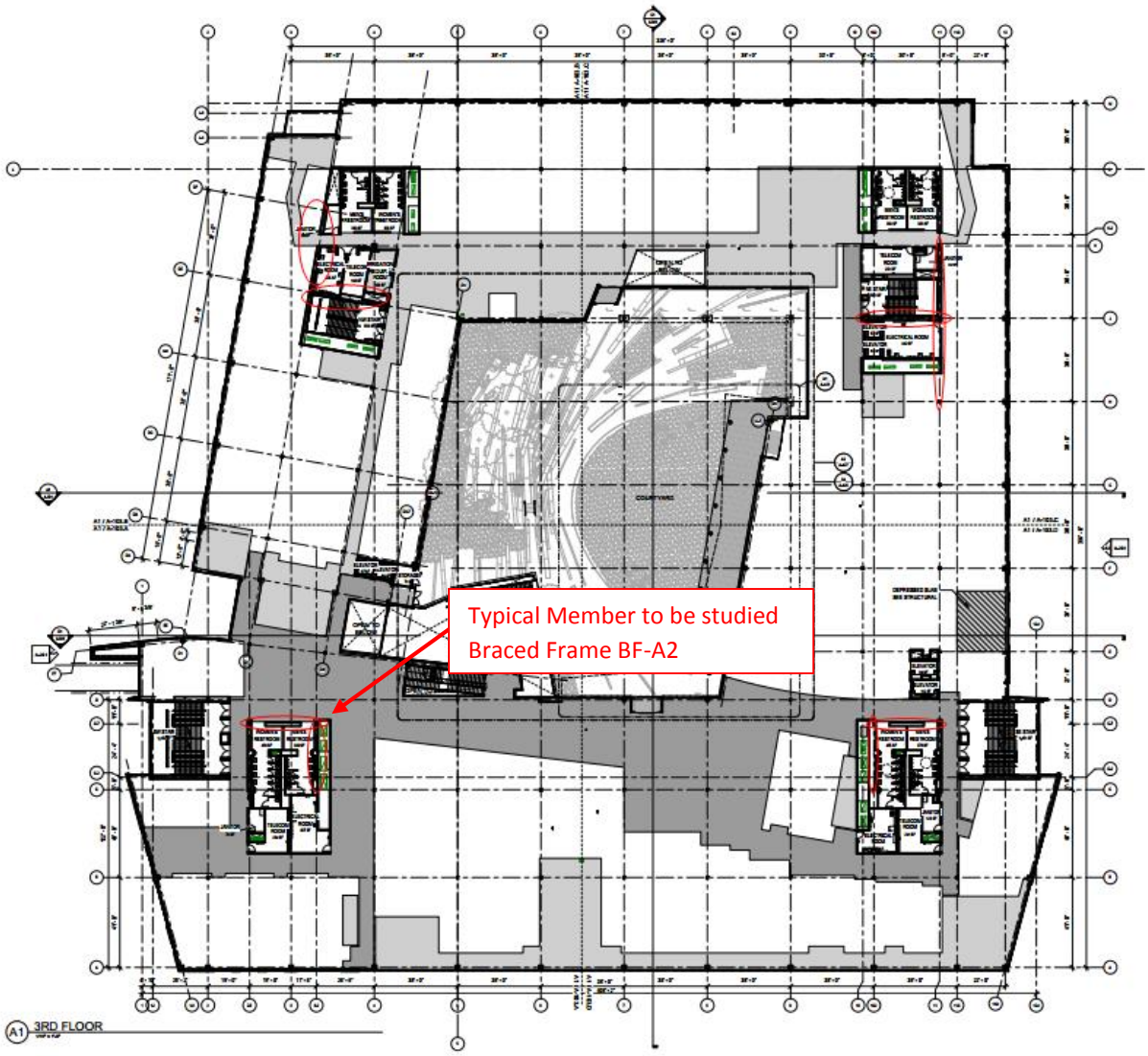
ETABS 2013 Model




C
C.2
C.7
D
3.2
120.4105
60.4237
114.5098
52.9921


C
C.2
C.7
D
3.2
-96.3872
-52.2358
-91.3692
-64.9013
0.1004

Results



Braced Frame Locations

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Strength Checks

Critical brace frame A2: column

Axial

$A_T = 20'(\frac{1}{2})(30' + 40') = 700\ ft^2 > 400\ ft^2$ ∴ reduce

From Tech 2, L_o = 65 psf

Interior Column, $K_{LL} = 4$

$$L = 65\left(.25 + \frac{15}{\sqrt{700 \cdot 4}}\right) = 34.67\ psf$$

Snow = 17 psf

$DL_{GWB} = 62$ psf

$L_{roof} = 25$ psf

$DL_{roof} = 92$ psf

Controlling Load Case 1.2D+1.6L +0.5S

$DL = (62)(4\ floors)(700) + 92(1)(700) = 238^k$

$LL = 34.67(4)(700) + 25(1)(700) = 114.58^k$

$S = 17(700) = 11.9^k$

$P_u = 1.2(238) + 1.6(114.58) + (.5)(11.9) = 474.9^k$

Flexure + Compression

W14×90 column (C 3.2)

$L_b = 16.67'$ (story height for this column @ level 3)

K=1.5 assumed

$K_L = 1.5(16.67) = 25.005 \rightarrow 25'$

using Steel manual Table 6-1

$p = 1.375 \times 10^{-3}$ $b_x = 1.77 \times 10^{-3}$ $b_y = 3.26 \times 10^{-3}$

1 value interpolated (K_L=25')

From ETABS: $M_{rx} = 120.41^{tk}$

$M_{ry} = -96.39^{tk}$

Interaction Equation: $pP_r = (1.375 \times 10^{-3})(474.9) = .652 > 0.2$

$$pP_r + b_x M_{rx} + b_y M_{ry} \leq 1.0$$

$$.652 + 1.77 \times 10^{-3}(120.41) + 3.26 \times 10^{-3}(-96.39) = .55 \leq 1.0 \checkmark$$

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Critical Braced Frame A2: brace

HSS14x14x5/16
L = 34.65'
K = 1.0 pin-pin
$K_L \rightarrow 35'$
P_u = 318.034k (ETABS)

compression: ϕP_n = 432k (value interpolated)

tension: ϕP_n = 650k

318.034 < 432 OK ✓
$P_u < \phi P_n$

Braced Frame A2 meets strength

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Drift Check

$\Delta_{max} = 1.402"$

$h_{wind} = 83.33'$ (to main roof)

$\frac{\ell}{400} = 2.4999"$

$\frac{\ell}{600} = 1.666"$

$1.402" < 1.666"$

CONCLUSION: structure is acceptable

Model Outputs

Story Max/Avg Displacements					
Story	**Load Case/Combo**	**Direction**	**Maximum**	**Average**	**Ratio**
			in	**in**	
Penthouse Roof	Dead	Y	0	0	
Main Roof	Dead	Y	1.402054	0.731639	1.916319
Story5	Dead	Y	0.76925	0.442618	1.737954
Story4	Dead	Y	0.046939	0.039535	1.187277
Story3	Dead	Y	0.037612	0.037365	1.00662
Story2	Dead	X	0.087236	0.059156	1.474665
Story1	Dead	Y	0	0	
Penthouse Roof	Wind 1	Y	0	0	
Main Roof	Wind 1	X	8.083388	5.373352	1.504347
Story5	Wind 1	X	5.815389	4.227601	1.375577
Story4	Wind 1	X	2.878947	2.40232	1.198403
Story3	Wind 1	X	2.575093	2.037222	1.264022
Story2	Wind 1	X	2.291879	1.802651	1.271394
Story1	Wind 1	Y	0	0	
Penthouse Roof	Wind 2	Y	0	0	
Main Roof	Wind 2	Y	9.903184	5.689791	1.740518
Story5	Wind 2	Y	6.842298	4.345075	1.574725
Story4	Wind 2	Y	1.061184	0.848945	1.250002
Story3	Wind 2	Y	0.975409	0.661354	1.474867
Story2	Wind 2	X	0.890283	0.603776	1.474525
Story1	Wind 2	Y	0	0	
Penthouse Roof	Wind 3	Y	0	0	
Main Roof	Wind 3	X	3.791154	2.968273	1.277226
Story5	Wind 3	X	2.828	2.419668	1.168756

Story4	Wind 3	X	1.745772	1.569877	1.112044
Story3	Wind 3	X	1.576521	1.322876	1.191737
Story2	Wind 3	X	1.401141	1.138435	1.230761
Story1	Wind 3	Y	0	0	
Penthouse Roof	Wind 4	Y	0	0	
Main Roof	Wind 4	X	8.333927	5.091755	1.636749
Story5	Wind 4	X	5.895083	3.921733	1.503183
Story4	Wind 4	X	2.572648	2.033603	1.265069
Story3	Wind 4	X	2.286119	1.732957	1.319202
Story2	Wind 4	X	2.036677	1.565542	1.300941
Story1	Wind 4	Y	0	0	
Penthouse Roof	Wind 5	Y	0	0	
Main Roof	Wind 5	Y	10.557975	5.617609	1.879443
Story5	Wind 5	Y	7.272501	4.241318	1.71468
Story4	Wind 5	Y	0.681698	0.571937	1.191912
Story3	Wind 5	Y	0.398165	0.383238	1.038949
Story2	Wind 5	X	0.283382	0.194553	1.456583
Story1	Wind 5	Y	0	0	
Penthouse Roof	Wind 6	Y	0	0	
Main Roof	Wind 6	Y	4.296801	2.917078	1.472981
Story5	Wind 6	Y	2.990946	2.276295	1.313954
Story4	Wind 6	Y	1.1296	0.701481	1.610306
Story3	Wind 6	X	0.992343	0.617913	1.605959
Story2	Wind 6	X	1.052042	0.711111	1.479433
Story1	Wind 6	Y	0	0	
Penthouse Roof	Wind 7	Y	0	0	
Main Roof	Wind 7	X	10.667345	6.078385	1.754964
Story5	Wind 7	X	6.990185	4.292654	1.628406
Story4	Wind 7	X	1.664119	1.434434	1.160123
Story3	Wind 7	X	1.377093	1.163927	1.183143
Story2	Wind 7	X	1.061816	0.906374	1.171499
Story1	Wind 7	Y	0	0	

Penthouse Roof	Wind 8	Y	0	0	
Main Roof	Wind 8	Y	3.157857	2.511324	1.257447
Story5	Wind 8	Y	2.647707	2.25596	1.17365
Story4	Wind 8	X	2.69684	2.203706	1.223775
Story3	Wind 8	X	2.525512	1.922295	1.3138
Story2	Wind 8	X	2.414281	1.826564	1.321761
Story1	Wind 8	Y	0	0	
Penthouse Roof	Wind 9	Y	0	0	
Main Roof	Wind 9	X	4.273075	2.817159	1.516803
Story5	Wind 9	X	2.725896	1.987527	1.371501
Story4	Wind 9	X	0.821682	0.695559	1.181326
Story3	Wind 9	X	0.622813	0.5366	1.160665
Story2	Wind 9	X	0.383927	0.329266	1.166008
Story1	Wind 9	Y	0	0	
Penthouse Roof	Wind 10	Y	0	0	
Main Roof	Wind 10	X	11.742166	6.308524	1.861318
Story5	Wind 10	Y	8.546868	4.489767	1.903633
Story4	Wind 10	X	1.928961	1.458004	1.323015
Story3	Wind 10	X	1.617088	1.210843	1.335506
Story2	Wind 10	X	1.319535	1.031503	1.279235
Story1	Wind 10	Y	0	0	
Penthouse Roof	Wind 11	Y	0	0	
Main Roof	Wind 11	Y	6.694874	3.750331	1.785142
Story5	Wind 11	Y	4.944667	3.050647	1.620858
Story4	Wind 11	X	1.333908	1.266954	1.052847
Story3	Wind 11	X	1.303161	1.100489	1.184165
Story2	Wind 11	X	1.281434	1.014371	1.263279
Story1	Wind 11	Y	0	0	
Penthouse Roof	Wind 12	Y	0	0	
Main Roof	Wind 12	X	4.903863	3.283626	1.49343
Story5	Wind 12	X	3.882212	2.816317	1.378471

Story4	Wind 12	X	2.714948	2.041543	1.32985
Story3	Wind 12	X	2.488475	1.785516	1.3937
Story2	Wind 12	X	2.343207	1.72791	1.356094
Story1	Wind 12	Y	0	0	
Penthouse Roof	Seismic 1	Y	0	0	
Main Roof	Seismic 1	X	9.463251	6.170689	1.533581
Story5	Seismic 1	X	6.332794	4.541569	1.394407
Story4	Seismic 1	X	2.515326	2.141911	1.174338
Story3	Seismic 1	X	2.157945	1.726725	1.249732
Story2	Seismic 1	X	1.86066	1.47254	1.263572
Story1	Seismic 1	Y	0	0	
Penthouse Roof	Seismic 2	Y	0	0	
Main Roof	Seismic 2	Y	13.571811	7.42475	1.827915
Story5	Seismic 2	Y	9.122031	5.48189	1.66403
Story4	Seismic 2	Y	0.798457	0.732879	1.08948
Story3	Seismic 2	Y	0.686269	0.506671	1.354467
Story2	Seismic 2	X	0.570803	0.380031	1.501991
Story1	Seismic 2	Y	0	0	
Penthouse Roof	Seismic 3	Y	0	0	
Main Roof	Seismic 3	X	10.828587	6.801867	1.592002
Story5	Seismic 3	X	7.209032	4.960778	1.453206
Story4	Seismic 3	X	2.686969	2.234649	1.202412
Story3	Seismic 3	X	2.296321	1.805811	1.271629
Story2	Seismic 3	X	1.978048	1.55232	1.274252
Story1	Seismic 3	Y	0	0	
Penthouse Roof	Seismic 4	Y	0	0	
Main Roof	Seismic 4	Y	15.357266	8.234414	1.86501
Story5	Seismic 4	Y	10.313199	6.062177	1.701237
Story4	Seismic 4	Y	0.757123	0.717235	1.055614
Story3	Seismic 4	Y	0.570973	0.47018	1.214371
Story2	Seismic 4	X	0.442733	0.29299	1.511085
Story1	Seismic 4	Y	0	0	

Penthouse Roof	Seismic 5	Y	0	0	
Main Roof	Seismic 5	X	8.097914	5.539511	1.461846
Story5	Seismic 5	X	5.456556	4.122361	1.323648
Story4	Seismic 5	X	2.343684	2.049173	1.143722
Story3	Seismic 5	X	2.019569	1.64764	1.225734
Story2	Seismic 5	X	1.743272	1.392759	1.251668
Story1	Seismic 5	Y	0	0	
Penthouse Roof	Seismic 6	Y	0	0	
Main Roof	Seismic 6	Y	11.786355	6.615086	1.781739
Story5	Seismic 6	Y	7.930862	4.901602	1.618014
Story4	Seismic 6	Y	0.919568	0.748524	1.228508
Story3	Seismic 6	Y	0.801564	0.543161	1.47574
Story2	Seismic 6	X	0.698873	0.467071	1.496287
Story1	Seismic 6	Y	0	0	
Penthouse Roof	Drift 1	Y	0	0	
Main Roof	Drift 1	X	9.946527	6.459582	1.53981
Story5	Drift 1	X	6.593802	4.711083	1.399636
Story4	Drift 1	X	2.543172	2.167426	1.173361
Story3	Drift 1	X	2.171458	1.738057	1.249359
Story2	Drift 1	X	1.869177	1.479323	1.263536
Story1	Drift 1	Y	0	0	
Penthouse Roof	Drift 2	Y	0	0	
Main Roof	Drift 2	Y	14.449343	7.879271	1.833843
Story5	Drift 2	Y	9.670136	5.790022	1.670138
Story4	Drift 2	Y	0.802549	0.744085	1.078571
Story3	Drift 2	Y	0.685092	0.508316	1.347769
Story2	Drift 2	X	0.563014	0.374009	1.505349
Story1	Drift 2	Y	0	0	
Penthouse Roof	Drift 3	Y	0	0	
Main Roof	Drift 3	X	11.393267	7.12832	1.59831
Story5	Drift 3	X	7.516371	5.15187	1.45896

Story4	Drift 3	X	2.717626	2.261474	1.201706
Story3	Drift 3	X	2.31108	1.817858	1.27132
Story2	Drift 3	X	1.98734	1.559715	1.274169
Story1	Drift 3	Y	0	0	
Penthouse Roof	Drift 4	Y	0	0	
Main Roof	Drift 4	Y	16.347918	8.743783	1.869662
Story5	Drift 4	Y	10.931594	6.407514	1.706058
Story4	Drift 4	Y	0.777894	0.728883	1.06724
Story3	Drift 4	Y	0.568925	0.471658	1.206224
Story2	Drift 4	X	0.434099	0.286301	1.51623
Story1	Drift 4	Y	0	0	
Penthouse Roof	Drift 5	Y	0	0	
Main Roof	Drift 5	X	8.499788	5.790843	1.467798
Story5	Drift 5	X	5.671234	4.270296	1.328066
Story4	Drift 5	X	2.368717	2.073378	1.142444
Story3	Drift 5	X	2.031836	1.658256	1.225285
Story2	Drift 5	X	1.751014	1.398931	1.25168
Story1	Drift 5	Y	0	0	
Penthouse Roof	Drift 6	Y	0	0	
Main Roof	Drift 6	Y	12.550768	7.014759	1.789194
Story5	Drift 6	Y	8.408677	5.172529	1.625641
Story4	Drift 6	Y	0.925225	0.759287	1.218544
Story3	Drift 6	Y	0.801259	0.544973	1.470273
Story2	Drift 6	X	0.69193	0.461717	1.498602
Story1	Drift 6	Y	0	0	

Base Reactions								
Story	**Joint Label**	**Load Case/Combo**	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**

			kip	kip	kip	kip-ft	kip-ft	kip-ft
Story1	1	Dead	1.448	0.061	34.843	0	0	0
Story1	1	Wind 1	-13.738	-3.646	-191.39	0	0	0
Story1	1	Wind 2	-9.282	-1.308	-171.812	0	0	0
Story1	1	Wind 3	-8.614	-2.159	-63.985	0	0	0
Story1	1	Wind 4	-11.993	-3.311	-223.101	0	0	0
Story1	1	Wind 5	-4.917	-0.284	-32.734	0	0	0
Story1	1	Wind 6	-9.005	-1.677	-224.984	0	0	0
Story1	1	Wind 7	-3.451	-1.77	-16.645	0	0	0
Story1	1	Wind 8	-17.433	-3.759	-274.563	0	0	0
Story1	1	Wind 9	0.187	-0.382	118.311	0	0	0
Story1	1	Wind 10	-5.368	-2.276	-143.302	0	0	0
Story1	1	Wind 11	-10.263	-1.86	-73.325	0	0	0
Story1	1	Wind 12	-15.91	-3.784	-338.886	0	0	0
Story1	1	Seismic 1	-10.13	-3.027	-225.132	0	0	0
Story1	1	Seismic 2	-7.488	-0.579	-142.797	0	0	0
Story1	1	Seismic 3	-10.604	-3.242	-269.44	0	0	0
Story1	1	Seismic 4	-6.971	-0.345	-94.458	0	0	0
Story1	1	Seismic 5	-9.656	-2.813	-180.824	0	0	0
Story1	1	Seismic 6	-8.005	-0.813	-191.137	0	0	0
Story1	1	Drift 1	-10.082	-3.047	-235.598	0	0	0
Story1	1	Drift 2	-7.566	-0.544	-144.905	0	0	0
Story1	1	Drift 3	-10.544	-3.264	-281.952	0	0	0
Story1	1	Drift 4	-7.062	-0.308	-94.333	0	0	0
Story1	1	Drift 5	-9.619	-2.831	-189.244	0	0	0
Story1	1	Drift 6	-8.071	-0.78	-195.477	0	0	0
Story1	24	Dead	1.29	0.008	36.3	0	0	0
Story1	24	Wind 1	-11.741	-2.793	50.169	0	0	0
Story1	24	Wind 2	-8.391	-1.037	224.61	0	0	0

Story1	24	Wind 3	-7.402	-1.658	-29.005	0	0	0
Story1	24	Wind 4	-10.209	-2.532	104.258	0	0	0
Story1	24	Wind 5	-4.594	-0.25	87.95	0	0	0
Story1	24	Wind 6	-7.992	-1.306	248.966	0	0	0
Story1	24	Wind 7	-2.61	-1.33	-128.287	0	0	0
Story1	24	Wind 8	-15.242	-2.906	206.64	0	0	0
Story1	24	Wind 9	0.349	-0.28	-205.855	0	0	0
Story1	24	Wind 10	-4.268	-1.716	13.253	0	0	0
Story1	24	Wind 11	-9.095	-1.452	43.909	0	0	0
Story1	24	Wind 12	-13.789	-2.911	266.326	0	0	0
Story1	24	Seismic 1	-8.614	-2.312	58.84	0	0	0
Story1	24	Seismic 2	-6.888	-0.483	209.139	0	0	0
Story1	24	Seismic 3	-8.981	-2.473	95.85	0	0	0
Story1	24	Seismic 4	-6.487	-0.308	168.761	0	0	0
Story1	24	Seismic 5	-8.246	-2.152	21.83	0	0	0
Story1	24	Seismic 6	-7.288	-0.658	249.517	0	0	0
Story1	24	Drift 1	-8.566	-2.326	63.11	0	0	0
Story1	24	Drift 2	-6.972	-0.459	214.611	0	0	0
Story1	24	Drift 3	-8.921	-2.488	101.825	0	0	0
Story1	24	Drift 4	-6.585	-0.283	172.374	0	0	0
Story1	24	Drift 5	-8.211	-2.165	24.396	0	0	0
Story1	24	Drift 6	-7.359	-0.635	256.849	0	0	0
Story1	25	Dead	0.373	-0.014	17.281	0	0	0
Story1	25	Wind 1	0.731	-0.265	141.222	0	0	0
Story1	25	Wind 2	-2.665	0.071	-52.798	0	0	0
Story1	25	Wind 3	0.069	-0.131	92.991	0	0	0
Story1	25	Wind 4	1.028	-0.266	118.842	0	0	0
Story1	25	Wind 5	-2.578	0.135	-55.216	0	0	0
Story1	25	Wind 6	-1.42	-0.028	-23.982	0	0	0
Story1	25	Wind 7	2.518	-0.252	144.933	0	0	0
Story1	25	Wind 8	-1.443	-0.148	67.924	0	0	0
Story1	25	Wind 9	1.101	-0.078	87.544	0	0	0
Story1	25	Wind 10	2.679	-0.3	130.048	0	0	0
Story1	25	Wind 11	-1.883	0.001	29.416	0	0	0
Story1	25	Wind 12	-0.283	-0.224	72.56	0	0	0
Story1	25	Seismic 1	1.56	-0.264	166.292	0	0	0
Story1	25	Seismic 2	-3.463	0.184	-66.341	0	0	0
Story1	25	Seismic 3	1.907	-0.298	173.589	0	0	0
Story1	25	Seismic 4	-3.841	0.221	-74.303	0	0	0

Story1	25	Seismic 5	1.214	-0.23	158.994	0	0	0
Story1	25	Seismic 6	-3.086	0.147	-58.38	0	0	0
Story1	25	Drift 1	1.718	-0.273	172.488	0	0	0
Story1	25	Drift 2	-3.681	0.202	-69.706	0	0	0
Story1	25	Drift 3	2.091	-0.309	180.128	0	0	0
Story1	25	Drift 4	-4.087	0.241	-78.04	0	0	0
Story1	25	Drift 5	1.346	-0.237	164.849	0	0	0
Story1	25	Drift 6	-3.274	0.163	-61.371	0	0	0
Story1	26	Dead	-16.701	-0.181	39.657	0	0	0
Story1	26	Wind 1	0.703	-0.764	0	0	0	0
Story1	26	Wind 2	-2.543	1.325	0	0	0	0
Story1	26	Wind 3	0.07	-0.226	0	0	0	0
Story1	26	Wind 4	0.985	-0.92	0	0	0	0
Story1	26	Wind 5	-2.46	1.413	0	0	0	0
Story1	26	Wind 6	-1.355	0.574	0	0	0	0
Story1	26	Wind 7	2.406	-1.553	0	0	0	0
Story1	26	Wind 8	-1.373	0.412	0	0	0	0
Story1	26	Wind 9	1.054	-0.595	0	0	0	0
Story1	26	Wind 10	2.559	-1.736	0	0	0	0
Story1	26	Wind 11	-1.794	0.889	0	0	0	0
Story1	26	Wind 12	-0.267	-0.27	0	0	0	0
Story1	26	Seismic 1	1.501	-1.023	0	0	0	0
Story1	26	Seismic 2	-3.307	1.864	0	0	0	0
Story1	26	Seismic 3	1.831	-1.248	0	0	0	0
Story1	26	Seismic 4	-3.668	2.109	0	0	0	0
Story1	26	Seismic 5	1.171	-0.798	0	0	0	0
Story1	26	Seismic 6	-2.947	1.618	0	0	0	0
Story1	26	Drift 1	1.653	-1.092	0	0	0	0
Story1	26	Drift 2	-3.515	1.99	0	0	0	0
Story1	26	Drift 3	2.008	-1.332	0	0	0	0
Story1	26	Drift 4	-3.903	2.251	0	0	0	0
Story1	26	Drift 5	1.298	-0.853	0	0	0	0
Story1	26	Drift 6	-3.128	1.728	0	0	0	0
Story1	27	Dead	0.497	-0.224	43.694	0	0	0
Story1	27	Wind 1	0.921	-0.93	-71.589	0	0	0
Story1	27	Wind 2	-3.333	1.538	-100.568	0	0	0
Story1	27	Wind 3	0.091	-0.285	-66.149	0	0	0
Story1	27	Wind 4	1.291	-1.11	-41.235	0	0	0
Story1	27	Wind 5	-3.224	1.651	-90.455	0	0	0
Story1	27	Wind 6	-1.776	0.655	-60.397	0	0	0

Story1	27	Wind 7	3.154	-1.834	20.642	0	0	0
Story1	27	Wind 8	-1.8	0.445	-129.99	0	0	0
Story1	27	Wind 9	1.381	-0.698	-4.987	0	0	0
Story1	27	Wind 10	3.354	-2.055	35.976	0	0	0
Story1	27	Wind 11	-2.351	1.023	-118.339	0	0	0
Story1	27	Wind 12	-0.351	-0.354	-76.819	0	0	0
Story1	27	Seismic 1	1.967	-1.228	-49.461	0	0	0
Story1	27	Seismic 2	-4.335	2.179	-142.101	0	0	0
Story1	27	Seismic 3	2.4	-1.494	-37.853	0	0	0
Story1	27	Seismic 4	-4.807	2.468	-154.766	0	0	0
Story1	27	Seismic 5	1.534	-0.963	-61.069	0	0	0
Story1	27	Seismic 6	-3.862	1.889	-129.437	0	0	0
Story1	27	Drift 1	2.166	-1.31	-46.602	0	0	0
Story1	27	Drift 2	-4.607	2.327	-152.448	0	0	0
Story1	27	Drift 3	2.632	-1.593	-33.854	0	0	0
Story1	27	Drift 4	-5.115	2.636	-166.356	0	0	0
Story1	27	Drift 5	1.701	-1.027	-59.35	0	0	0
Story1	27	Drift 6	-4.099	2.018	-138.54	0	0	0
Story1	28	Dead	0.01	36.902	28.519	0	0	0
Story1	28	Wind 1	-0.016	226.246	119.077	0	0	0
Story1	28	Wind 2	-0.065	-214.218	-112.746	0	0	0
Story1	28	Wind 3	-0.018	100.67	52.984	0	0	0
Story1	28	Wind 4	-0.006	238.699	125.631	0	0	0
Story1	28	Wind 5	-0.056	-244.097	-128.472	0	0	0
Story1	28	Wind 6	-0.042	-77.23	-40.648	0	0	0
Story1	28	Wind 7	0.036	327.884	172.571	0	0	0
Story1	28	Wind 8	-0.061	11.681	6.148	0	0	0
Story1	28	Wind 9	0.017	132.661	69.821	0	0	0
Story1	28	Wind 10	0.037	359.603	189.265	0	0	0
Story1	28	Wind 11	-0.056	-106.48	-56.042	0	0	0
Story1	28	Wind 12	-0.036	124.018	65.272	0	0	0
Story1	28	Seismic 1	0.006	204.154	107.45	0	0	0
Story1	28	Seismic 2	-0.076	-200.761	-105.664	0	0	0
Story1	28	Seismic 3	0.012	233.341	122.811	0	0	0

Story1	28	Seismic 4	-0.082	-232.604	-122.423	0	0	0
Story1	28	Seismic 5	0.001	174.968	92.088	0	0	0
Story1	28	Seismic 6	-0.07	-168.918	-88.904	0	0	0
Story1	28	Drift 1	0.009	206.597	108.735	0	0	0
Story1	28	Drift 2	-0.08	-203.142	-106.917	0	0	0
Story1	28	Drift 3	0.015	236.096	124.261	0	0	0
Story1	28	Drift 4	-0.087	-235.325	-123.855	0	0	0
Story1	28	Drift 5	0.003	177.099	93.21	0	0	0
Story1	28	Drift 6	-0.074	-170.959	-89.978	0	0	0
Story1	29	Dead	0.475	-0.231	-8.909	0	0	0
Story1	29	Wind 1	0.959	-0.872	-47.488	0	0	0
Story1	29	Wind 2	-3.262	1.511	213.314	0	0	0
Story1	29	Wind 3	0.113	-0.258	13.164	0	0	0
Story1	29	Wind 4	1.325	-1.05	-84.396	0	0	0
Story1	29	Wind 5	-3.179	1.612	218.927	0	0	0
Story1	29	Wind 6	-1.715	0.655	101.044	0	0	0
Story1	29	Wind 7	3.13	-1.771	-193.212	0	0	0
Story1	29	Wind 8	-1.718	0.47	123.841	0	0	0
Story1	29	Wind 9	1.353	-0.678	-64.835	0	0	0
Story1	29	Wind 10	3.346	-1.981	-225.241	0	0	0
Story1	29	Wind 11	-2.3	1.013	174.381	0	0	0
Story1	29	Wind 12	-0.279	-0.308	11.546	0	0	0
Story1	29	Seismic 1	1.932	-1.167	-57.988	0	0	0
Story1	29	Seismic 2	-4.261	2.126	247.765	0	0	0
Story1	29	Seismic 3	2.365	-1.423	-84.958	0	0	0
Story1	29	Seismic 4	-4.734	2.406	277.189	0	0	0
Story1	29	Seismic 5	1.498	-0.91	-31.019	0	0	0
Story1	29	Seismic 6	-3.787	1.846	218.341	0	0	0
Story1	29	Drift 1	2.121	-1.246	-62.134	0	0	0
Story1	29	Drift 2	-4.529	2.269	259.365	0	0	0
Story1	29	Drift 3	2.587	-1.52	-90.407	0	0	0
Story1	29	Drift 4	-5.037	2.568	290.211	0	0	0
Story1	29	Drift 5	1.655	-0.973	-33.86	0	0	0
Story1	29	Drift 6	-4.021	1.971	228.519	0	0	0
Story1	48	Dead	0.02	11.216	29.437	0	0	0

Story1	48	Wind 1	-0.283	-142.104	-105.053	0	0	0
Story1	48	Wind 2	0.067	-309.359	-264.397	0	0	0
Story1	48	Wind 3	-0.1	-21.874	-5.407	0	0	0
Story1	48	Wind 4	-0.325	-191.282	-152.173	0	0	0
Story1	48	Wind 5	0.186	-129.572	-109.547	0	0	0
Story1	48	Wind 6	-0.085	-334.466	-287.049	0	0	0
Story1	48	Wind 7	-0.262	121.759	116.366	0	0	0
Story1	48	Wind 8	-0.166	-340.316	-278.368	0	0	0
Story1	48	Wind 9	-0.012	230.668	208.007	0	0	0
Story1	48	Wind 10	-0.381	-47.868	-33.303	0	0	0
Story1	48	Wind 11	0.063	-113.951	-86.367	0	0	0
Story1	48	Wind 12	-0.312	-396.976	-331.556	0	0	0
Story1	48	Seismic 1	-0.006	-104.095	-70.573	0	0	0
Story1	48	Seismic 2	0.174	-211.91	-183.428	0	0	0
Story1	48	Seismic 3	-0.067	-134.955	-97.808	0	0	0
Story1	48	Seismic 4	0.24	-178.242	-153.715	0	0	0
Story1	48	Seismic 5	0.055	-73.235	-43.339	0	0	0
Story1	48	Seismic 6	0.107	-245.579	-213.14	0	0	0
Story1	48	Drift 1	0.025	-104.381	-70.267	0	0	0
Story1	48	Drift 2	0.187	-211.367	-183.25	0	0	0
Story1	48	Drift 3	-0.039	-135.314	-97.617	0	0	0
Story1	48	Drift 4	0.257	-177.619	-153.41	0	0	0
Story1	48	Drift 5	0.089	-73.447	-42.917	0	0	0
Story1	48	Drift 6	0.118	-245.115	-213.089	0	0	0
Story1	49	Dead	0.105	-0.02	33.019	0	0	0
Story1	49	Wind 1	-0.757	-0.148	130.225	0	0	0
Story1	49	Wind 2	-0.315	0.019	-74.256	0	0	0

Story1	49	Wind 3	-0.767	-0.075	96.787	0	0	0
Story1	49	Wind 4	-0.369	-0.146	98.551	0	0	0
Story1	49	Wind 5	-0.476	0.057	-56.743	0	0	0
Story1	49	Wind 6	0.004	-0.029	-54.641	0	0	0
Story1	49	Wind 7	-0.335	-0.125	152.535	0	0	0
Story1	49	Wind 8	-0.814	-0.098	43.463	0	0	0
Story1	49	Wind 9	-0.578	-0.035	113.053	0	0	0
Story1	49	Wind 10	0.075	-0.152	115.953	0	0	0
Story1	49	Wind 11	-0.942	-0.015	31.174	0	0	0
Story1	49	Wind 12	-0.279	-0.133	34.078	0	0	0
Story1	49	Seismic 1	-0.291	-0.146	155.787	0	0	0
Story1	49	Seismic 2	-0.565	0.077	-90.577	0	0	0
Story1	49	Seismic 3	-0.184	-0.163	159.201	0	0	0
Story1	49	Seismic 4	-0.682	0.095	-94.301	0	0	0
Story1	49	Seismic 5	-0.398	-0.129	152.373	0	0	0
Story1	49	Seismic 6	-0.449	0.058	-86.853	0	0	0
Story1	49	Drift 1	-0.221	-0.15	162.68	0	0	0
Story1	49	Drift 2	-0.618	0.085	-96.071	0	0	0
Story1	49	Drift 3	-0.109	-0.168	166.606	0	0	0
Story1	49	Drift 4	-0.74	0.105	-100.354	0	0	0
Story1	49	Drift 5	-0.333	-0.133	158.755	0	0	0
Story1	49	Drift 6	-0.495	0.066	-91.788	0	0	0
Story1	30	Dead	0.022	-37.123	-10.009	0	0	0
Story1	30	Wind 1	-0.309	-73.661	-103.422	0	0	0
Story1	30	Wind 2	0.087	-89.976	-213.01	0	0	0
Story1	30	Wind 3	-0.099	-73.759	-127.318	0	0	0
Story1	30	Wind 4	-0.364	-36.733	-27.815	0	0	0
Story1	30	Wind 5	0.226	-89.907	-219.913	0	0	0
Story1	30	Wind 6	-0.095	-45.058	-99.601	0	0	0
Story1	30	Wind 7	-0.296	11.09	79.697	0	0	0
Story1	30	Wind 8	-0.17	-123.548	-238.494	0	0	0
Story1	30	Wind 9	-0.004	-22.114	-21.974	0	0	0
Story1	30	Wind 10	-0.44	38.763	141.626	0	0	0
Story1	30	Wind 11	0.094	-123.719	-262.124	0	0	0
Story1	30	Wind 12	-0.349	-61.767	-95.934	0	0	0
Story1	30	Seismic 1	0.021	-89.341	-126.91	0	0	0

Story1	30	Seismic 2	0.215	-41.668	-195.062	0	0	0
Story1	30	Seismic 3	-0.052	-86.111	-105.144	0	0	0
Story1	30	Seismic 4	0.294	-45.193	-218.808	0	0	0
Story1	30	Seismic 5	0.093	-92.571	-148.676	0	0	0
Story1	30	Seismic 6	0.136	-38.144	-171.315	0	0	0
Story1	30	Drift 1	0.057	-91.141	-129.826	0	0	0
Story1	30	Drift 2	0.232	-40.51	-200.231	0	0	0
Story1	30	Drift 3	-0.018	-88.075	-107.433	0	0	0
Story1	30	Drift 4	0.315	-43.855	-224.662	0	0	0
Story1	30	Drift 5	0.133	-94.207	-152.22	0	0	0
Story1	30	Drift 6	0.15	-37.165	-175.8	0	0	0
Story1	31	Dead	0.511	-0.585	49.625	0	0	0
Story1	31	Wind 1	-14.759	-0.688	-517.579	0	0	0
Story1	31	Wind 2	-4.934	2.321	113.781	0	0	0
Story1	31	Wind 3	-9.262	-0.163	-322.124	0	0	0
Story1	31	Wind 4	-12.876	-0.87	-454.245	0	0	0
Story1	31	Wind 5	-1.515	2.167	165.223	0	0	0
Story1	31	Wind 6	-5.885	1.314	5.448	0	0	0
Story1	31	Wind 7	-7.428	-2.231	-472.24	0	0	0
Story1	31	Wind 8	-14.948	1.217	-309.003	0	0	0
Story1	31	Wind 9	-2.605	-1.094	-245.88	0	0	0
Story1	31	Wind 10	-8.547	-2.256	-463.109	0	0	0
Story1	31	Wind 11	-8.203	1.503	-121.607	0	0	0
Story1	31	Wind 12	-14.239	0.324	-342.309	0	0	0
Story1	31	Seismic 1	-11.526	-0.987	-481.861	0	0	0
Story1	31	Seismic 2	-3.064	2.769	145.876	0	0	0
Story1	31	Seismic 3	-12.242	-1.232	-509.205	0	0	0

Story1	31	Seismic 4	-2.282	3.036	175.709	0	0	0
Story1	31	Seismic 5	-10.81	-0.741	-454.517	0	0	0
Story1	31	Seismic 6	-3.845	2.501	116.044	0	0	0
Story1	31	Drift 1	-11.537	-1.036	-493.09	0	0	0
Story1	31	Drift 2	-3.009	2.88	154.684	0	0	0
Story1	31	Drift 3	-12.263	-1.294	-521.158	0	0	0
Story1	31	Drift 4	-2.218	3.162	185.306	0	0	0
Story1	31	Drift 5	-10.812	-0.777	-465.022	0	0	0
Story1	31	Drift 6	-3.801	2.598	124.062	0	0	0
Story1	5	Dead	0.129	0.004	3.638	0	0	0
Story1	5	Wind 1	-0.781	-0.306	-156.772	0	0	0
Story1	5	Wind 2	-0.684	-0.135	44.312	0	0	0
Story1	5	Wind 3	-0.625	-0.18	-109.415	0	0	0
Story1	5	Wind 4	-0.547	-0.28	-125.743	0	0	0
Story1	5	Wind 5	-0.56	-0.041	43.095	0	0	0
Story1	5	Wind 6	-0.466	-0.162	23.373	0	0	0
Story1	5	Wind 7	-0.08	-0.13	-150.348	0	0	0
Story1	5	Wind 8	-1.109	-0.335	-86.145	0	0	0
Story1	5	Wind 9	-0.124	-0.015	-99.439	0	0	0
Story1	5	Wind 10	0.004	-0.18	-126.284	0	0	0
Story1	5	Wind 11	-0.897	-0.168	-51.045	0	0	0
Story1	5	Wind 12	-0.767	-0.335	-78.288	0	0	0
Story1	5	Seismic 1	-0.199	-0.264	-180.356	0	0	0
Story1	5	Seismic 2	-0.77	-0.049	71.814	0	0	0
Story1	5	Seismic 3	-0.157	-0.28	-185.997	0	0	0
Story1	5	Seismic 4	-0.816	-0.031	77.967	0	0	0
Story1	5	Seismic 5	-0.241	-0.248	-174.716	0	0	0
Story1	5	Seismic 6	-0.724	-0.066	65.66	0	0	0
Story1	5	Drift 1	-0.121	-0.268	-187.719	0	0	0
Story1	5	Drift 2	-0.816	-0.042	77.574	0	0	0
Story1	5	Drift 3	-0.074	-0.284	-193.832	0	0	0

Story1	5	Drift 4	-0.866	-0.025	84.244	0	0	0
Story1	5	Drift 5	-0.167	-0.252	-181.606	0	0	0
Story1	5	Drift 6	-0.765	-0.06	70.905	0	0	0
Story1	4	Dead	-2.592	0	0.482	0	0	0
Story1	4	Wind 1	88.875	0	131.6	0	0	0
Story1	4	Wind 2	193.903	0	294.341	0	0	0
Story1	4	Wind 3	13.615	0	18.035	0	0	0
Story1	4	Wind 4	119.698	0	179.365	0	0	0
Story1	4	Wind 5	81.275	0	123.195	0	0	0
Story1	4	Wind 6	209.579	0	318.317	0	0	0
Story1	4	Wind 7	-76.463	0	-118.554	0	0	0
Story1	4	Wind 8	213.159	0	321.05	0	0	0
Story1	4	Wind 9	-144.607	0	-221.621	0	0	0
Story1	4	Wind 10	29.811	0	43.633	0	0	0
Story1	4	Wind 11	71.396	0	106.238	0	0	0
Story1	4	Wind 12	248.626	0	375.765	0	0	0
Story1	4	Seismic 1	65.057	0	95.142	0	0	0
Story1	4	Seismic 2	132.902	0	202.191	0	0	0
Story1	4	Seismic 3	84.376	0	124.604	0	0	0
Story1	4	Seismic 4	111.825	0	170.049	0	0	0
Story1	4	Seismic 5	45.738	0	65.681	0	0	0
Story1	4	Seismic 6	153.98	0	234.333	0	0	0
Story1	4	Drift 1	65.23	0	95.306	0	0	0
Story1	4	Drift 2	132.573	0	201.746	0	0	0
Story1	4	Drift 3	84.595	0	124.844	0	0	0
Story1	4	Drift 4	111.446	0	169.52	0	0	0
Story1	4	Drift 5	45.866	0	65.768	0	0	0
Story1	4	Drift 6	153.699	0	233.972	0	0	0
Story1	10	Dead	0.433	-0.383	17.737	0	0	0
Story1	10	Wind 1	-10.862	-0.068	585.791	0	0	0
Story1	10	Wind 2	-3.439	1.539	77.978	0	0	0
Story1	10	Wind 3	-6.793	0.097	420.189	0	0	0
Story1	10	Wind 4	-9.499	-0.2	458.497	0	0	0
Story1	10	Wind 5	-0.943	1.333	35.313	0	0	0
Story1	10	Wind 6	-4.216	0.975	81.653	0	0	0
Story1	10	Wind 7	-5.608	-1.188	381.823	0	0	0
Story1	10	Wind 8	-10.858	1.103	504.737	0	0	0
Story1	10	Wind 9	-1.985	-0.648	255.13	0	0	0
Story1	10	Wind 10	-6.434	-1.136	318.113	0	0	0

Story1	10	Wind 11	-5.891	1.075	346.883	0	0	0
Story1	10	Wind 12	-10.411	0.58	410.895	0	0	0
Story1	10	Seismic 1	-8.445	-0.301	573.226	0	0	0
Story1	10	Seismic 2	-2.078	1.72	31.27	0	0	0
Story1	10	Seismic 3	-8.984	-0.423	580.168	0	0	0
Story1	10	Seismic 4	-1.49	1.853	23.697	0	0	0
Story1	10	Seismic 5	-7.907	-0.179	566.285	0	0	0
Story1	10	Seismic 6	-2.665	1.587	38.843	0	0	0
Story1	10	Drift 1	-8.448	-0.326	586.638	0	0	0
Story1	10	Drift 2	-2.033	1.778	27.35	0	0	0
Story1	10	Drift 3	-8.994	-0.455	593.723	0	0	0
Story1	10	Drift 4	-1.438	1.919	19.621	0	0	0
Story1	10	Drift 5	-7.902	-0.196	579.553	0	0	0
Story1	10	Drift 6	-2.629	1.637	35.08	0	0	0
Story1	12	Dead	13.98	0	7.717	0	0	0
Story1	12	Wind 1	-587.127	0	35.21	0	0	0
Story1	12	Wind 2	-155.145	0	21.251	0	0	0
Story1	12	Wind 3	-391.415	0	29.253	0	0	0
Story1	12	Wind 4	-489.275	0	23.563	0	0	0
Story1	12	Wind 5	-57.185	0	19.377	0	0	0
Story1	12	Wind 6	-175.532	0	12.5	0	0	0
Story1	12	Wind 7	-325.848	0	10.72	0	0	0
Story1	12	Wind 8	-563.79	0	42.759	0	0	0
Story1	12	Wind 9	-164.154	0	12.724	0	0	0
Story1	12	Wind 10	-325.052	0	3.37	0	0	0
Story1	12	Wind 11	-341.481	0	36.848	0	0	0
Story1	12	Wind 12	-504.956	0	27.348	0	0	0
Story1	12	Seismic 1	-477.365	0	35.545	0	0	0
Story1	12	Seismic 2	-96.997	0	17.915	0	0	0
Story1	12	Seismic 3	-496.153	0	34.182	0	0	0
Story1	12	Seismic 4	-76.499	0	19.403	0	0	0

Story1	12	Seismic 5	-458.578	0	36.908	0	0	0
Story1	12	Seismic 6	-117.494	0	16.428	0	0	0
Story1	12	Drift 1	-478.539	0	36.279	0	0	0
Story1	12	Drift 2	-95.566	0	18.197	0	0	0
Story1	12	Drift 3	-497.5	0	34.869	0	0	0
Story1	12	Drift 4	-74.88	0	19.735	0	0	0
Story1	12	Drift 5	-459.579	0	37.689	0	0	0
Story1	12	Drift 6	-116.252	0	16.658	0	0	0