APEX
ENGINEERS, INC.

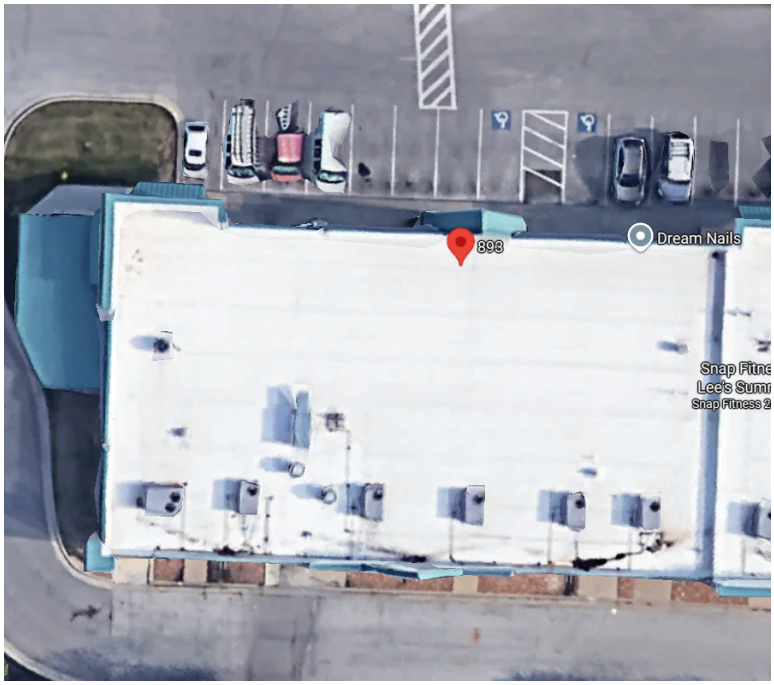
Monday, September 22, 2025

Estrella Segura
Dev893
893 SW Lemans Ln
Lee's Summit, MO 64082

RE: RTU – Structural Assessment
893 SW Lemans LN
Lee's Summit, MO 64082

Apex Engineers Inc. has been asked to review the RTU replacement for the building located at the above stated address.

- (2) new RTUs will be installed on the existing roof, weighing approximately 200 lbs each replacing existing RTUs.
- After review of the existing bar joist capacities, and the total load on the bar joists including the new RTU, the following are adequate for supporting the applied loads at the proposed location:
  - 20K9 bar joists at 5'-0" on center running North-South, spanning approximately 35'-0".
- Waterproofing, curb, and flashing shall be the responsibility of the contractor.



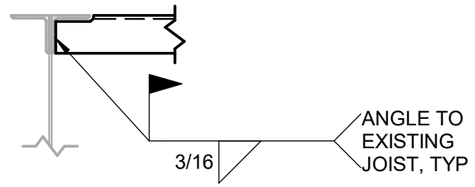
Dimensions, weight, and layout for the proposed mechanical unit as shown on the attached plans have been provided by Dev893. Apex Engineers, Inc. shall be consulted on any location, weight and/or dimension alterations prior to installation of the unit.

LIMITATIONS

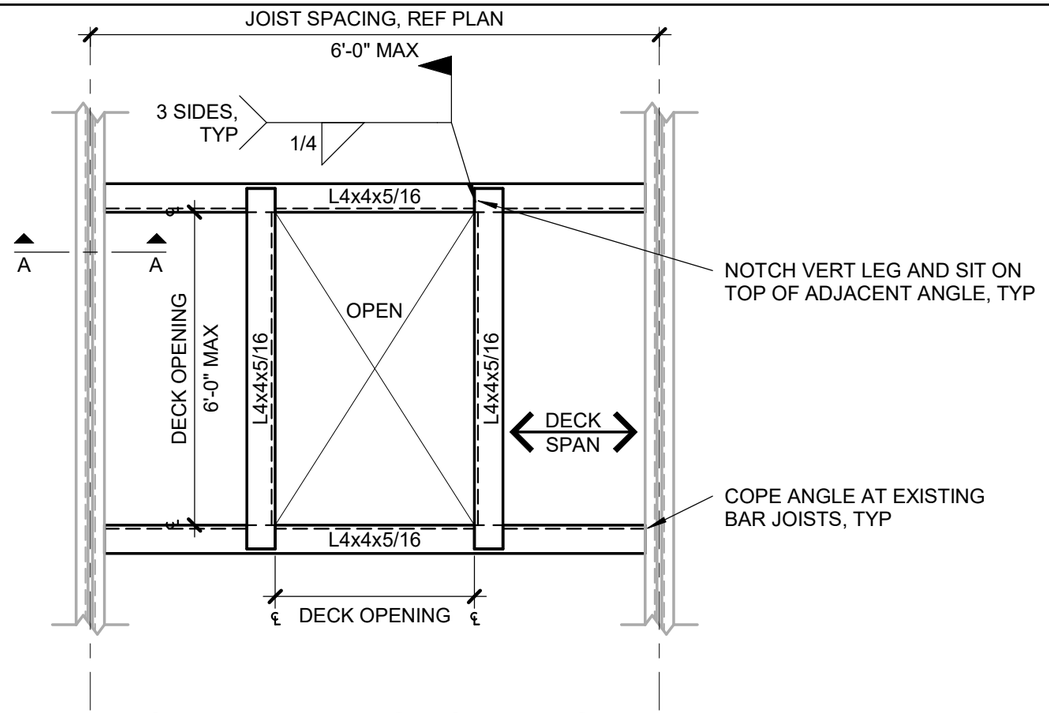
The scope of our services includes only those items specifically addressed herein. All other items are outside the scope of this report; including any environmental assessment (such as, but not limited to mold, mildew, or presence of any other toxic substance or environmental risks).
In addition, the scope our services does not include any evaluation of the building or site for job-site safety and/or hazardous conditions. All construction shall be performed in compliance with IBC and OSHA standards at all times. Our firm has not been retained to examine the site or building for any of these conditions. In addition, the contractor shall retain sole responsibility for the quality of work, for adhering to plans, specifications, appropriate codes, and, for repairing defects, deficiencies or omission, regardless of when they are found. By the use of this report it is understood the above conditions are agreed to. Please call if Apex Engineers, Inc. can be of further assistance.

Best Regards,
Apex Engineers, Inc.

Logan K. Chamberlin, P.E.
Associate Principal



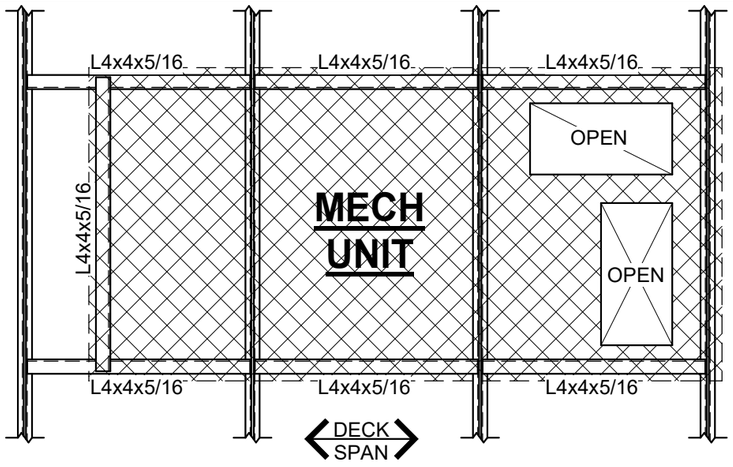
TYP SECTION A-A



2 TYPICAL METAL DECK OPENING AT EXISTING JOISTS

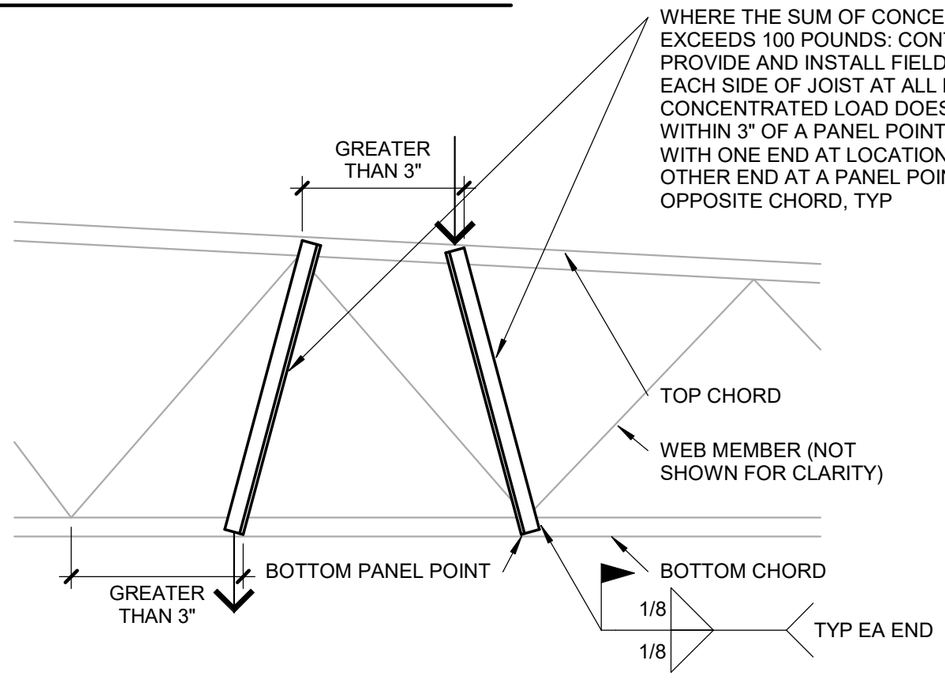
SXX 3/4" = 1'-0"

PROVIDE ANGLES AS SHOWN WHERE UNIT CURB DOES NOT SIT DIRECTLY OVER JOIST, CONTRACTOR SHALL COORDINATE LOCATIONS WITH MEP.



3 TYPICAL MECHANICAL SUPPORT ON METAL DECK ROOF

SXX 3/8" = 1'-0"



1 TYPICAL JOIST REINFORCEMENT DETAIL

SXX 3/4" = 1'-0"

APEX
ENGINEERS, INC.
1625 LOCUST ST
KANSAS CITY, MISSOURI
816.421.3222
www.apex-engineers.com

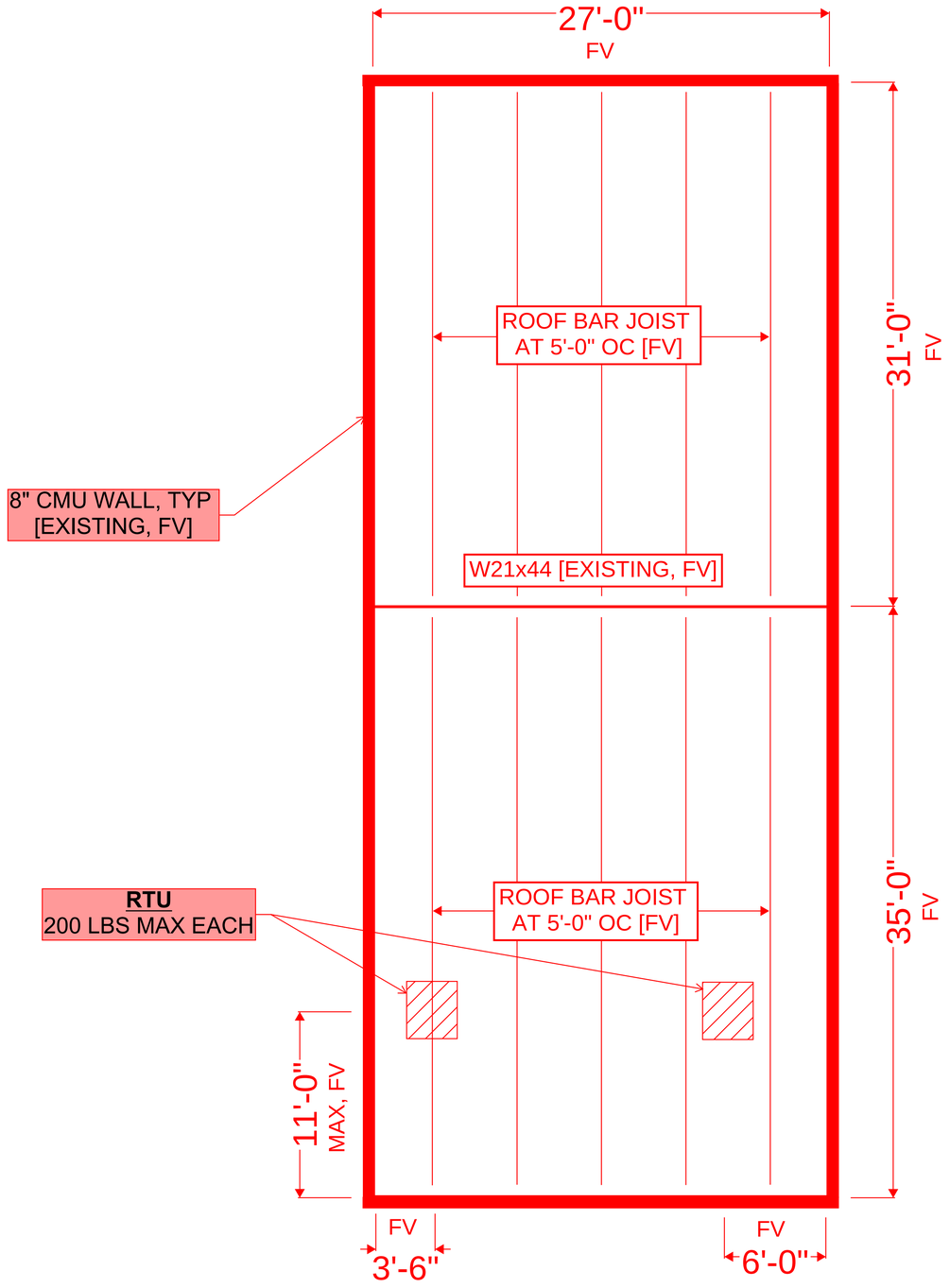
STATE OF MISSOURI
LOGAN K [illegible]
NUMBER
PE-2023000069
9/22/25
PROFESSIONAL ENGINEER

PROJECT: RTU STRUCTURAL ASSESSMENT
ADDRESS: 893 SW Lemans Ln
Lee's Summit, MO 64082

PROJECT #:	25-1969
DESIGNED BY:	JMB
REVIEWED BY:	LKC
SUBMITTAL DATE:	2025.09.18

#	DATE	COMMENTS

DETAILS
SXX



BUILDING PLAN

SCALE: 1/4" = 1'-0"

N

Project:	893 SW Lemans Lane
Client:	Dev893
Engineer:	LKC
Date:	9/22/2025
Description:	Roof Joist Assessment

RTU SPECIFICATIONS

RTU Label	RTU
RTU Weight	200 lb

BAR JOIST SPECIFICATIONS

Existing Bar Joist Label	20K9
Bar Joist Spacing - *t*	5.00 ft
Bar Joist Length - *L*	35.00 ft

BAR JOIST LOADING W/O RTU

Roof Live Load - *LL*	20 psf	*(from Structural Drawings)*
Roof Dead Load - *DL*	15 psf	*(from Structural Drawings)*
TL Distributed Load - $w_{existing}$	175.0 plf	$w_{existing} = (LL+DL) \times t$

BAR JOIST ALLOWABLE LOADS

SJI Joist Catalog

TL Distributed Load - $w_{allowed}$	329 plf	*(from Bar Joist span chart)*
Allowed Shear - $V_{allowed}$	5.76 k	$V_{allowed} = w_{allowed} \times L \times (0.5/1000)$

BAR JOIST NEW LOADS

Max Moment - M_{max}	28 k-ft	*(from ENERCALC)*
Max Shear - V_{max}	3.20 k	*(from ENERCALC)*

EQUIVALENT DISTRIBUTED LOAD

$w_{equivalent}$	182.204 plf	$w_{equivalent} = (8 \times M_{max}) / L^2$

CALCULATION CHECK

Bar Joist Moment Check	**0.55 : 1**	**OK**
Bar Joist Shear Check	**0.56 : 1**	**OK**

Apex Engineers, Inc.
1625 Locust
Kansas City
www.apex-engineers.com

Project Title: RTU Assessment
Engineer: JMB
Project ID: Lee's Summit, MO
Project Descr: Structural

General Beam Analysis

Project File: 25-1969_RTU Assessment.ec6

LIC# : KW-06014638, Build:20.25.09.04 APEX ENGINEERS INC

DESCRIPTION: Existing RTU

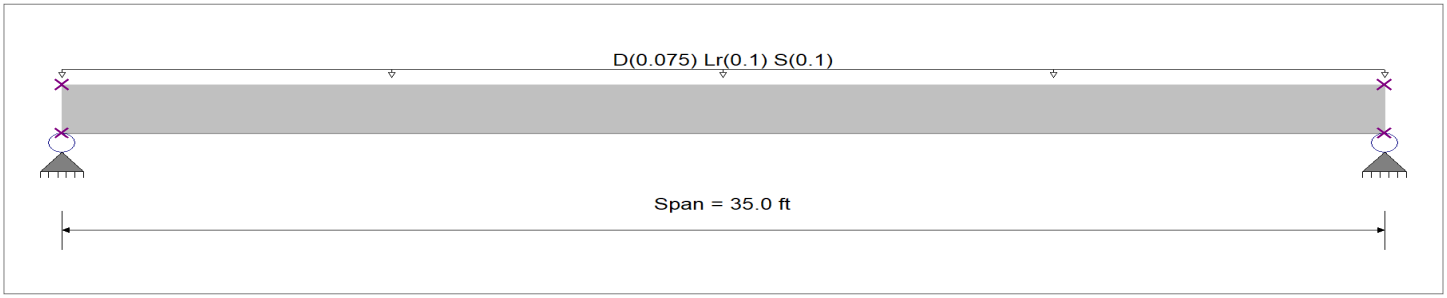
Code References

Governing Code : IBC 2018, CBC 2019
Load Combinations Used : IBC 2018

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 35.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0150, Lr = 0.020, S = 0.020 ksf, Tributary Width = 5.0 ft, (Roof Load)

DESIGN SUMMARY

Maximum Bending =	26.797 k-ft	Maximum Shear =	3.063 k
Load Combination	+D+Lr	Load Combination	+D+Lr
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	17.500 ft	Location of maximum on span	0.000 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	1.174 in	357	Span #1	Lr Only
Max Upward Transient Deflection	0.000 in	0	N/A	
Max Downward Total Deflection	2.054 in	204	Span #1	+D+Lr
Max Upward Total Deflection	0.000 in	0	N/A	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 35.00 ft	1			26.80		26.80					3.06		
D Only													
Dsgn. L = 35.00 ft	1			11.48		11.48					1.31		
+D+Lr													
Dsgn. L = 35.00 ft	1			26.80		26.80					3.06		
+D+S													
Dsgn. L = 35.00 ft	1			26.80		26.80					3.06		
+D+0.750Lr													
Dsgn. L = 35.00 ft	1			22.97		22.97					2.63		
+D+0.750S													
Dsgn. L = 35.00 ft	1			22.97		22.97					2.63		
+0.60D													
Dsgn. L = 35.00 ft	1			6.89		6.89					0.79		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	2.0538	17.675		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.063	3.063
Overall MINimum		
D Only	1.313	1.313
+D+Lr	3.063	3.063
+D+S	3.063	3.063
+D+0.750Lr	2.625	2.625
+D+0.750S	2.625	2.625

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Kansas City
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Project Title: RTU Assessment
Engineer: JMB
Project ID: Lee's Summit, MO
Project Descr: Structural

General Beam Analysis

Project File: 25-1969_RTU Assessment.ec6

DESCRIPTION: Existing RTU

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+0.60D	0.788	0.788
Lr Only	1.750	1.750
S Only	1.750	1.750

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Kansas City
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Project Descr: Structural

General Beam Analysis

Project File: 25-1969_RTU Assessment.ec6

LIC# : KW-06014638, Build:20.25.09.04 APEX ENGINEERS INC

DESCRIPTION: Existing RTU (With RTU Load)

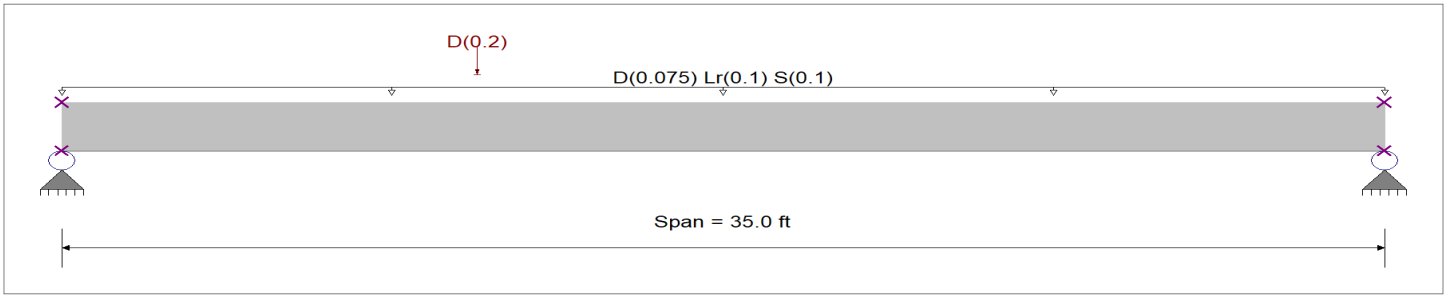
Code References

Governing Code : IBC 2018, CBC 2019
Load Combinations Used : IBC 2018

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 35.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0150, Lr = 0.020, S = 0.020 ksf, Tributary Width = 5.0 ft, (Roof Load)

Point Load : D = 0.20 k @ 11.0 ft, (RTU)

DESIGN SUMMARY

Maximum Bending =	27.908 k-ft	Maximum Shear =	3.20 k
Load Combination	+D+Lr	Load Combination	+D+Lr
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	17.150 ft	Location of maximum on span	0.000 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	1.174 in	357	Span #1	Lr Only
Max Upward Transient Deflection	0.000 in	0	N/A	
Max Downward Total Deflection	2.142 in	196	Span #1	+D+Lr
Max Upward Total Deflection	0.000 in	0	N/A	

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 35.00 ft	1			27.91		27.91					3.20		
D Only													
Dsgn. L = 35.00 ft	1			12.61		12.61					1.45		
+D+Lr													
Dsgn. L = 35.00 ft	1			27.91		27.91					3.20		
+D+S													
Dsgn. L = 35.00 ft	1			27.91		27.91					3.20		
+D+0.750Lr													
Dsgn. L = 35.00 ft	1			24.08		24.08					2.76		
+D+0.750S													
Dsgn. L = 35.00 ft	1			24.08		24.08					2.76		
+0.60D													
Dsgn. L = 35.00 ft	1			7.57		7.57					0.87		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	2.1418	17.500		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.200	3.125
Overall MINimum		
D Only	1.450	1.375
+D+Lr	3.200	3.125

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DESCRIPTION: Existing RTU (With RTU Load)

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+D+S	3.200	3.125
+D+0.750Lr	2.762	2.688
+D+0.750S	2.762	2.688
+0.60D	0.870	0.825
Lr Only	1.750	1.750
S Only	1.750	1.750

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, K-SERIES
Based on a Maximum Allowable Tensile Stress of 30 ksi

Joist Designation	18K3	18K4	18K5	18K6	18K7	18K9	18K10	20K3	20K4	20K5	20K6	20K7	20K9	20K10	22K4	22K5	22K6	22K7	22K9	22K10	22K11
Depth (In.)	18	18	18	18	18	18	18	20	20	20	20	20	20	20	22	22	22	22	22	22	22
Approx. Wt. (lbs./ft.)	6.6	7.2	7.7	8.5	9	10.2	11.7	6.7	7.6	8.2	8.9	9.3	10.8	12.2	8	8.8	9.2	9.7	11.3	12.6	13.8
Span (ft.) ↓																					
18	550	550	550	550	550	550	550														
	550	550	550	550	550	550	550														
19	514	550	550	550	550	550	550														
	494	523	523	523	523	523	523														
20	463	550	550	550	550	550	550	517	550	550	550	550	550	550							
	423	490	490	490	490	490	490	517	550	550	550	550	550	550							
21	420	506	550	550	550	550	550	468	550	550	550	550	550	550							
	364	426	460	460	460	460	460	453	520	520	520	520	520	520							
22	382	460	518	550	550	550	550	426	514	550	550	550	550	550	550	550	550	550	550	550	550
	316	370	414	438	438	438	438	393	461	490	490	490	490	490	548	548	548	548	548	548	548
23	349	420	473	516	550	550	550	389	469	529	550	550	550	550	518	550	550	550	550	550	550
	276	323	362	393	418	418	418	344	402	451	468	468	468	468	491	518	518	518	518	518	518
24	320	385	434	473	526	550	550	357	430	485	528	550	550	550	475	536	550	550	550	550	550
	242	284	318	345	382	396	396	302	353	396	430	448	448	448	431	483	495	495	495	495	495
25	294	355	400	435	485	550	550	329	396	446	486	541	550	550	438	493	537	550	550	550	550
	214	250	281	305	337	377	377	266	312	350	380	421	426	426	381	427	464	474	474	474	474
26	272	328	369	402	448	538	550	304	366	412	449	500	550	550	404	455	496	550	550	550	550
	190	222	249	271	299	354	361	236	277	310	337	373	405	405	338	379	411	454	454	454	454
27	252	303	342	372	415	498	550	281	339	382	416	463	550	550	374	422	459	512	550	550	550
	169	198	222	241	267	315	347	211	247	277	301	333	389	389	301	337	367	406	432	432	432
28	234	282	318	346	385	463	548	261	315	355	386	430	517	550	348	392	427	475	550	550	550
	151	177	199	216	239	282	331	189	221	248	269	298	353	375	270	302	328	364	413	413	413
29	218	263	296	322	359	431	511	243	293	330	360	401	482	550	324	365	398	443	532	550	550
	136	159	179	194	215	254	298	170	199	223	242	268	317	359	242	272	295	327	387	399	399
30	203	245	276	301	335	402	477	227	274	308	336	374	450	533	302	341	371	413	497	550	550
	123	144	161	175	194	229	269	153	179	201	218	242	286	336	219	245	266	295	349	385	385
31	190	229	258	281	313	376	446	212	256	289	314	350	421	499	283	319	347	387	465	550	550
	111	130	146	158	175	207	243	138	162	182	198	219	259	304	198	222	241	267	316	369	369
32	178	215	242	264	294	353	418	199	240	271	295	328	395	468	265	299	326	363	436	517	549
	101	118	132	144	159	188	221	126	147	165	179	199	235	276	180	201	219	242	287	337	355
33	168	202	228	248	276	332	393	187	226	254	277	309	371	440	249	281	306	341	410	486	532
	92	108	121	131	145	171	201	114	134	150	163	181	214	251	164	183	199	221	261	307	334
34	158	190	214	233	260	312	370	176	212	239	261	290	349	414	235	265	288	321	386	458	516
	84	98	110	120	132	156	184	105	122	137	149	165	195	229	149	167	182	202	239	280	314
35	149	179	202	220	245	294	349	166	200	226	246	274	329	390	221	249	272	303	364	432	494
	77	90	101	110	121	143	168	96	112	126	137	151	179	210	137	153	167	185	219	257	292
36	141	169	191	208	232	278	330	157	189	213	232	259	311	369	209	236	257	286	344	408	467
	70	82	92	101	111	132	154	88	103	115	125	139	164	193	126	141	153	169	201	236	269
37								148	179	202	220	245	294	349	198	223	243	271	325	386	442
								81	95	106	115	128	151	178	116	130	141	156	185	217	247
38								141	170	191	208	232	279	331	187	211	230	256	308	366	419
								74	87	98	106	118	139	164	107	119	130	144	170	200	228
39								133	161	181	198	220	265	314	178	200	218	243	292	347	397
								69	81	90	98	109	129	151	98	110	120	133	157	185	211
40								127	153	172	188	209	251	298	169	190	207	231	278	330	377
								64	75	84	91	101	119	140	91	102	111	123	146	171	195
41															161	181	197	220	264	314	359
															85	95	103	114	135	159	181
42															153	173	188	209	252	299	342
															79	88	96	106	126	148	168
43															146	165	179	200	240	285	326
															73	82	89	99	117	138	157
44															139	157	171	191	229	272	311
															68	76	83	92	109	128	146

TOTAL CAPACITY = 329 LB/FT
TOTAL LIVE CAPACITY = 179 LB/FT

TOTAL LOAD = 180 LB/FT
TOTAL LIVE LOAD = 100 LB/FT

CAPACITIES > LOADS, OK