URS

File: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Ramp B\Rating Ramp B Seg 6\[Principal Stresses.xls]Cut 2-2, 1
Forces: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Ramp B\Rating Ramp B Seg 6\[Forces.xls]
Props&Reinf: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Ramp B\Rating Ramp B Seg 6\[Props&Reinf.xls]

PROJECT: **Cline Avenue Ramp B Mainline Seg 6** COMPUTED BY: TSP DATE: 12/4/08
DESCRIPTION: **PRINCIPAL STRESSES** CHECKED BY: DATE:

Principal Stress Calculation at the Web Rating Truck: **HL-93** LL Factor: **Inventory**

γ_{TU}= 1.00
γ_{LL}= 0.80
γ_{TG}= 0.50

Material Properties:
Concrete
f'c = **5000** psi

Web Thickness along the plane
bw = **15.00** in

Allowable Principal Stress Limits:
Allowable Tension = **246** psi (+) = tension
Allowable Compress = **-3000** psi (-) = compression
Vertical Compression Stress = 0 psi (-) = compression

(1 - 1/4" PT Bar @ 0.6 Fpu)
F pt = **0.0** kips
s pt = **60.0** in
b_v = **28.00** in
(fpt) = **0** psi

Calculate @ Section : *"cg"* **SERVICE LOAD COMBINATION III**

Element No.	Node No.	Dead Load @ t=1					Live Load, Maximum Vertical Shear					Uniform Temperature Rise (Fall x -1.00)					Positive Temperature Differential (Negative x -0.30)					Stresses State, t=1				Principal Stresses, t=1		
		Axial Stresses			Vertical	Torsional	Axial Stress			Vertical	Torsional	Axial Stress			Vertical	Torsional	Axial Stress			Vertical	Torsional							
		Top Fiber (psi)	Bot Fiber (psi)	@ cg (psi)	Shear (kips)	Moment (k-ft)	Top Fiber (psi)	Bot Fiber (psi)	@ location (psi)	Shear (kips)	Moment (k-ft)	Top Fiber (psi)	Bot Fiber (psi)	@ location (psi)	Shear (kips)	Moment (k-ft)	Top Fiber (psi)	Bot Fiber (psi)	@ location (psi)	Shear (kips)	Moment (k-ft)	σ_x (psi)	σ_y (psi)	τ_{xy} (Q_x) (psi)	τ_{xy} (M_t) (psi)	$\sigma_{maximum}$ (psi)	$\sigma_{minimum}$ (psi)	ϕ_p (degrees)
1	1	-574	-822	-657	-171	-1297	-92	180	-1	-42	753	2	1	2	1	101	-176	335	-5	-10	-24	-658	0	85	14	0	0	-8.4
1	2	-601	-785	-662	-180	-1301	-151	300	0	51	1502	2	0	2	1	101	-178	339	-5	-10	-24	-664	0	58	7	6	-670	-5.5
2	2	-557	-798	-638	-165	-712	-145	290	1	37	1231	-3	2	-1	3	99	-180	339	-6	-8	23	-642	0	56	13	7	-649	-6.1
2	3	-590	-753	-645	-176	-714	-140	281	1	54	1314	-2	0	-1	3	99	-182	344	-6	-8	23	-648	0	55	15	7	-656	-6.1
3	3	-547	-767	-620	-161	-321	-131	264	2	44	1053	-7	2	-4	4	113	-184	345	-7	-7	51	-627	0	51	19	8	-634	-6.2
3	4	-576	-729	-627	-170	-318	-124	254	2	79	1279	-6	-1	-4	4	113	-186	350	-7	-7	51	-633	0	43	23	7	-640	-5.9
4	4	-538	-742	-606	-157	-65	-121	248	3	66	1000	-10	1	-6	6	130	-187	350	-7	-6	61	-614	0	41	23	7	-621	-6.0
4	5	-566	-694	-609	-173	-68	-115	238	3	94	1204	-9	-2	-7	6	130	-189	356	-7	-6	61	-616	0	39	27	7	-623	-6.1
5	5	-534	-705	-591	-162	78	-114	242	5	105	1105	-12	-2	-8	7	149	-189	356	-7	-6	58	-599	0	30	29	6	-605	-5.6
5	6	-563	-650	-592	-187	67	-102	219	5	117	1242	-10	-5	-8	7	149	-192	362	-6	-6	58	-599	0	36	31	8	-607	-6.4
6	6	-534	-661	-577	-285	181	-95	206	6	106	1228	-12	-4	-10	6	171	-192	362	-7	-6	39	-585	0	80	34	21	-606	-10.7
6	7	-574	-550	-566	-300	156	-80	165	5	117	1365	-11	-8	-10	6	171	-190	337	-7	-6	39	-574	0	82	36	23	-598	-11.2
7	7	-549	-560	-553	-285	192	-75	156	5	114	1332	-13	-7	-11	7	186	-190	337	-7	-7	23	-563	0	77	36	22	-585	-11.0
7	8	-585	-463	-541	-262	148	-58	118	6	125	1473	-11	-10	-10	7	186	-189	316	-5	-7	23	-549	0	64	39	18	-567	-10.2
8	8	-563	-472	-530	-251	127	-29	68	6	98	1427	-13	-9	-11	7	198	-189	316	-5	-8	2	-539	0	68	37	20	-559	-10.7
8	9	-587	-400	-516	-194	66	-37	79	7	133	1559	-11	-12	-11	7	198	-188	300	-3	-8	2	-523	0	34	39	10	-533	-7.8
9	9	-568	-407	-507	-187	2	-11	36	6	103	1498	-13	-12	-12	8	207	-188	300	-3	-10	-23	-516	0	41	37	11	-527	-8.4
9	10	-576	-358	-490	-155	-41	-17	44	7	140	1625	-11	-15	-12	8	207	-188	286	-1	-10	-23	-497	0	16	39	6	-503	-6.3
10	10	-560	-364	-483	-152	-137	8	5	7	108	1545	-12	-14	-13	8	210	-188	286	-2	-12	-50	-491	0	25	36	7	-499	-7.0
10	11	-559	-322	-462	-166	-152	5	10	7	147	1675	-10	-17	-13	8	210	-188	275	0	-12	-50	-470	0	18	38	7	-476	-6.8
11	11	-547	-327	-457	-163	-264	28	-24	7	113	1571	-12	-16	-14	9	205	-188	274	0	-14	-80	-466	0	28	34	8	-474	-7.5
11	12	-532	-303	-436	30	-373	29	-24	7	154	1715	-10	-19	-14	9	205	-189	265	1	-14	-80	-444	0	62	35	20	-464	-11.8
12	12	-531	-303	-435	-117	-392	48	-53	6	122	1644	-10	-19	-14	5	214	-189	265	1	-16	-117	-444	0	9	34	4	-448	-5.5
12	13	-514	-302	-423	12	-456	40	-40	6	150	1690	-10	-19	-14	5	214	-188	254	2	-16	-117	-431	0	51	34	16	-447	-10.8
13	13	-514	-302	-423	24	-496	54	-59	5	123	1649	-10	-19	-14	5	210	-188	254	2	-17	-126	-431	0	48	32	14	-445	-10.2
13	14	-489	-313	-412	161	-562	47	-48	6	152	1699	-9	-19	-13	5	210	-188	245	0	-17	-126	-421	0	112	32	44	-466	-17.2
14	14	-487	-312	-411	346	-673	57	-74	0	151	1628	-10	-19	-14	11	183	-188	245	-1	-18	-131	-425	0	188	27	90	-515	-22.7
14	15	-321	-511	-408	890	-923	79	-117	-11	211	1871	-8	-22	-14	11	183	-192	250	11	-18	-131	-425	0	429	28	0	0	-32.5
15	15	-325	-510	-410	884	-939	79	-117	-11	211	1870	-9	-22	-15	11	186	-192	250	11	-20	-171	-428	0	427	28	0	0	-32.4
15	16	-287	-556	-411	978	-981	84	-124	-11	214	1913	-8	-23	-15	11	186	-192	251	11	-20	-171	-429	0	466	28	0	0	-33.3
16	16	-287	-558	-412	-845	987	78	-98	-3	-94	1224	-8	-22	-15	-4	-83	-192	251	11	62	150	-423	0	362	54	0	0	-31.5
16	17	-350	-441	-392	-159	691	45	-55	-1	-65	1285	-9	-22	-15	-4	-83	-182	236	10	62	150	-402	0	75	49	0	0	-15.8
17	17	-355	-439	-394	-165	677	58	-71	-2	-88	1212	-10	-21	-15	-4	-97	-182	236	10	59	109	-405	0	85	47	0	0	-16.5
17	18	-381	-407	-393	-29	597	22	-24	1	-53	1308	-11	-20	-15	-4	-97	-170	218	9	59	109	-404	0	18	47	10	-414	-9.0
18	18	-389	-405	-396	26	605	-11	9	-2	-87	1220	-13	-20	-16	-2	-124	-171	218	8	58	78	-409	0	7	45	7	-416	-7.1
18	19	-411	-403	-407	5	583	-40	49	-3	-67	1384	-14	-20	-16	-2	-124	-159	211	-4	58	78	-428	0	9	47	7	-435	-7.3
19	19	-420	-400	-411	7	617	-38	49	-2	-68	1285	-15	-19	-17	-2	-138	-160	211	-4	56	50	-431	0	8	45	7	-438	-7.0
19	20	-437	-401	-422	34	577	-66	91	-2	-46	1450	-16	-19	-17	-2	-138	-149	204	-5	56	50	-443	0	9	48	7	-450	-7.2
20	20	-448	-397	-427	38	608	-63	90	0	-49	1322	-17	-19	-18	-2	-143	-150	204	-5	54	28	-448	0	10	45	7	-454	-6.9
20	21	-458	-406	-437	50	572	-86	130	0	-26	1483	-18	-19	-18	-2	-143	-139	197	-6	54	28	-459	0	22	48	10	-469	-8.5
21	21	-469	-402	-443	58	596	-82	127	1	-31	1325	-18	-19	-18	-2	-125	-139	198	-6	53	13	-463	0	23	44	10	-473	-8.1
21	22	-476	-415	-452	61	560	-102	166	1	-7	1477	-19	-19	-19	-2	-125	-129	191	-6	53	13	-474	0	32	46	12	-486	-9.1
22	22	-488	-410	-458	71	572	-97	161	1	-15	1293	-19	-19	-19	-3	-69	-129	191	-7	52	7	-479	0	33	41	11	-491	-8.6
22	23	-490	-431	-468	89	529	-113	198	2	9	1437	-20	-18	-19	-3	-69	-119	186	-7	52	7	-490	0	48	43	16	-506	-10.2
23	23	-504	-426	-475	102	518	-117	207	2	-2	1229	-19	-19	-19	-3	47	-119	186	-7	51	14	-496	0	49	38	15	-511	-9.7
23	24	-499	-459	-485	104	479	-119	226	2	23	1371	-20	-18	-19	-3	47	-109	180	-7	51	14	-506	0	59	40	19	-524	-10.7
24	24	-516	-453	-493	121	433	-125	238	3	11	1146	-18	-18	-18	-4	238	-109	180	-7	50	36	-513	0	61	39	19	-532	-10.6
24	25	-509	-492	-503	106	395	-135	278	5	35	1285	-19	-16	-18	-4	238	-100	175	-6	50	36	-520	0	64	41	20	-540	-10.9
25	25	-528	-485	-514	12	336	-132	272	5	22	1047	-15	-17	-16	-8	534	-100	175	-6	48	68	-528	0	19	41	7	-535	-6.4
25	26	-523	-494	-513	66	279	-127	260	5	47	1190	-16	-13	-15	-8	534	-87	151	-6	48	68	-527	0	49	43	16	-542	-9.6
26	26	-523	-494	-513	69	235	-126	259	5	43	1123	-16	-13	-15	-8	636	-87	151	-6	48	83	-527	0	49	43	16	-542	-9.6
26	27	-510	-510	-510	44	194	-123	253	6	67	1300	-18	-8	-14	-8	636	-75	127	-6	48	83	-523	0	47	46	16	-539	-9.7
27	27	-516	-508	-514	53	66	-122	251	5	56	1126	-17	-8	-14	-8	927	-75	127	-6	48	124	-526	0	46	46	16	-542	-9.7
27	28	-512	-516	-513	55	51	-121	248	6	63	1185	-18	-7	-14	-8	927	-71	120	-6	48	124	-525	0	50	47	17	-542	-10.1
28	28	-518	-513	-517	63	-72	-143	274	0	56	1103	-17	-7	-14	-8	1202	-71	120	-6	47	167	-533	0	51	49	18	-551	-10.3
28	29	-499	-546	-515	67	-123	-132	253	0	76	1251	-18	-2	-13	-8	1202	-59	97	-5	47	167	-531	0	58	51	22	-552	-11.3
29	29	-525	-539	-530	82	-218	-124	237	0	61	1186	-13	-4	-10	-7	1500	-58	97	-5	46	212	-542	0	60	55	23	-565	-11.5
29	30	-498	-585	-528	82	-272	-110	209	0	80	1348	-15	1	-10	-7	1500	-46	74	-5	46	212	-540	0	66	57	27	-567	-12.3
30	30	-524	-578	-543	97	33	-83	155	-1	87	1308	-13	0	-9	-6	1300	-45	74	-4	45	180	-554	0	75	58	30	-584	-12.8
30	31	-490	-638	-541	101	-24	-67	126	-1	104	1512	-16	3	-9	-6	1300	-33	51	-4	45	180	-552	0	82	61	35	-587	-13.7
31	31	-517	-630	-556	113	1192	-65	124	0	103	1488	-21	4	-12	-4	-54	-33	51	-4	44	-34	-570	0	87	58	35	-605	-13.4
31	32	-473	-707	-554	131	1132	-44	83	0	121	1719	-23	5	-14	-4	-54	-22	29	-4	44	-34	-570	0	100	61	43	-612	-14.8
32	32	-509	-697	-574	140	4560	-55	105	1	119	1722	-55	12	-32	-2	-4246	-24	30	-6	41	-707	-608	0	103	232	148	-757	-23.9
32	33	-446	-810	-572	144	4482	-3	5	0	151	2061	-57	12	-33	-2	-4246	-11	4	-6	41	-707	-608	0	116	237	162	-770	-24.6
33	33	-484	-802	-594	148	8508	-2	4	0	156	2165	-38	8	-22	-1	-9186	-7	3	-3	38	-1521	-618	0	119	440	330	-948	-30.5
33	34	-479	-812	-595	153	8501	2	-4	0	159	2198	-38	8	-22	-1	-9186	-6	2	-3	38	-1521	-618	0	122	441	333	-951	-30.6
34	34	-499	-807	-605	-476	-934	0	0	0	-52	396	-14	3	-8	0	1110	-2	1	-1	1	184	-614	0	211	38	88	-702	-19.5
34	35	12	-2	7	0	-903	-1	0	0	0	64	-14	3	-8	0	1110	-2	0	-1	1	184	-2	0	0	44	0	0	-44.2

URS

PROJECT: **Cline Avenue Ramp B Mainline Seg 6** COMPUTED BY: TSP DATE: 12/4/08

DESCRIPTION: **PRINCIPAL STRESSES** CHECKED BY: DATE:

	MAX	MIN
MAX QY	330	-948
MIN QY	249	-867

Principal Stress Calculation at the Web

Material Properties:

Concrete f'c = ***5000*** psi

Web Thickness along the plane bw = ***15.00*** in

Allowable Principal Stress Limits:

Allowable Tension = **246** psi (+) = tension

Allowable Compress = **-3000** psi (-) = compression

Vertical Compression Stress = 0 psi (-) = compression

(1 - 1/4" PT Bar @ 0.6 Fpu)

F pt = ***0*** kips

s pt = ***60*** in

b_v = **15.00** in

(fpt) = **0** psi

Calculate @ Section : *"cg"* **SERVICE LOAD COMBINATION III**

Element No.	Node No.	Dead Load @ t=1					**Live Load, Minimum Vertical Shear**					Uniform Temperature Rise (Fall x -1.00)					Positive Temperature Differential (Negative x -0.30)					Stresses State, t=1				Principal Stresses, t=1		
		Axial Stresses			Vertical	Torsional	Axial Stress			Vertical	Torsional	Axial Stress			Vertical	Torsional	Axial Stress			Vertical	Torsional							
		Top Fiber (psi)	Bot Fiber (psi)	@ cg (psi)	Shear (kips)	Moment (k-ft)	Top Fiber (psi)	Bot Fiber (psi)	@ location (psi)	Shear (kips)	Moment (k-ft)	Top Fiber (psi)	Bot Fiber (psi)	@ location (psi)	Shear (kips)	Moment (k-ft)	Top Fiber (psi)	Bot Fiber (psi)	@ location (psi)	Shear (kips)	Moment (k-ft)	σ_x (psi)	σ_y (psi)	τ_{xy} (Q_y) (psi)	τ_{xy} (M_t) (psi)	$\sigma_{maximum}$ (psi)	$\sigma_{minimum}$ (psi)	ϕ_p (degrees)
1	1	-574	-822	-657	-171	-1297	-92	186	1	-44	-752	2	1	2	1	101	-176	335	-5	-10	-24	-657	0	85	45	0	0	-10.9
1	2	-601	-785	-662	-180	-1301	-94	189	1	-41	-719	2	0	2	1	101	-178	339	-5	-10	-24	-663	0	88	45	26	-688	-10.9
2	2	-557	-798	-638	-165	-712	-85	170	0	12	-722	-3	2	-1	3	99	-180	339	-6	-8	23	-642	0	64	32	14	-656	-8.3
2	3	-590	-753	-645	-176	-714	-76	152	0	24	-669	-2	0	-1	3	99	-182	344	-6	-8	23	-649	0	64	31	14	-663	-8.2
3	3	-547	-767	-620	-161	-321	-129	260	1	-18	-901	-7	2	-4	4	113	-184	345	-7	-7	51	-627	0	71	29	16	-643	-8.8
3	4	-576	-729	-627	-170	-318	-117	235	1	11	-829	-6	-1	-4	4	113	-186	350	-7	-7	51	-634	0	65	27	13	-647	-8.1
4	4	-538	-742	-606	-157	-65	-128	258	1	-3	-1070	-10	1	-6	6	130	-187	350	-7	-6	61	-616	0	64	27	13	-629	-8.3
4	5	-566	-694	-609	-173	-68	-113	228	1	17	-1023	-9	-2	-7	6	130	-189	356	-7	-6	61	-618	0	64	27	13	-631	-8.2
5	5	-534	-705	-591	-162	78	-123	249	1	5	-1267	-12	-2	-8	7	149	-189	356	-7	-6	58	-602	0	63	29	14	-616	-8.5
5	6	-563	-650	-592	-187	67	-112	227	1	23	-1166	-10	-5	-8	7	149	-192	362	-6	-6	58	-602	0	67	27	14	-617	-8.7
6	6	-534	-661	-577	-285	181	-117	236	1	16	-1386	-12	-4	-10	6	171	-192	362	-7	-6	39	-589	0	110	29	31	-620	-12.6
6	7	-574	-550	-566	-300	156	-101	191	0	35	-1273	-11	-8	-10	6	171	-190	337	-7	-6	39	-578	0	109	28	31	-609	-12.6
7	7	-549	-560	-553	-285	192	-105	197	0	28	-1490	-13	-7	-11	7	186	-190	337	-7	-7	23	-567	0	105	32	31	-598	-12.9
7	8	-585	-463	-541	-262	148	-87	154	1	47	-1365	-11	-10	-10	7	186	-189	316	-5	-7	23	-553	0	89	30	24	-577	-11.6
8	8	-563	-472	-530	-251	127	-96	169	1	37	-1561	-13	-9	-11	7	198	-189	316	-5	-8	2	-543	0	88	35	26	-570	-12.1
8	9	-587	-400	-516	-194	66	-76	127	1	57	-1423	-11	-12	-11	7	198	-188	300	-3	-8	2	-528	0	58	33	15	-543	-9.5
9	9	-568	-407	-507	-187	2	-72	117	0	45	-1593	-13	-12	-12	8	207	-188	300	-3	-10	-23	-521	0	59	39	18	-539	-10.3
9	10	-576	-358	-490	-155	-41	-22	30	-2	94	-1455	-11	-15	-12	8	207	-188	286	-1	-10	-23	-504	0	31	37	9	-513	-7.5
10	10	-560	-364	-483	-152	-137	-39	55	-2	76	-1606	-12	-14	-13	8	210	-188	286	-2	-12	-50	-498	0	36	43	12	-510	-8.7
10	11	-559	-322	-462	-166	-152	11	-24	-3	97	-1489	-10	-17	-13	8	210	-188	275	0	-12	-50	-478	0	34	41	12	-489	-8.7
11	11	-547	-327	-457	-163	-264	8	-22	-4	103	-1596	-12	-16	-14	9	205	-188	274	0	-14	-80	-475	0	32	46	12	-487	-9.1
11	12	-532	-303	-436	30	-373	62	-93	-3	141	-1530	-10	-19	-14	9	205	-189	265	1	-14	-80	-451	0	58	47	23	-475	-12.5
12	12	-531	-303	-435	-117	-392	60	-93	-4	139	-1562	-10	-19	-14	5	214	-189	265	1	-16	-117	-451	0	4	49	6	-458	-6.6
12	13	-514	-302	-423	12	-456	69	-101	-4	141	-1570	-10	-19	-14	5	214	-188	254	2	-16	-117	-438	0	48	51	22	-460	-12.2
13	13	-514	-302	-423	24	-496	69	-101	-4	140	-1568	-10	-19	-14	5	210	-188	254	2	-17	-126	-439	0	53	52	24	-463	-12.9
13	14	-489	-313	-412	161	-562	79	-109	-3	142	-1577	-9	-19	-13	5	210	-188	245	0	-17	-126	-428	0	109	54	55	-483	-18.6
14	14	-487	-312	-411	346	-673	78	-108	-3	142	-1540	-10	-19	-14	11	183	-188	245	-1	-18	-131	-427	0	185	55	108	-535	-24.2
14	15	-321	-511	-408	890	-923	114	-153	-9	147	-1571	-8	-22	-14	11	183	-192	250	11	-18	-131	-424	0	409	63	0	0	-32.9
15	15	-325	-510	-410	884	-939	113	-154	-10	142	-1579	-9	-22	-15	11	186	-192	250	11	-20	-171	-427	0	405	64	0	0	-32.8
15	16	-287	-556	-411	978	-981	119	-161	-10	143	-1584	-8	-23	-15	11	186	-192	251	11	-20	-171	-428	0	443	65	0	0	-33.6
16	16	-287	-558	-412	-845	987	87	-128	-12	-209	-2041	-8	-22	-15	-4	-83	-192	251	11	62	150	-430	0	399	28	0	0	-31.6
16	17	-350	-441	-392	-159	691	55	-85	-9	-197	-1886	-9	-22	-15	-4	-83	-182	236	10	62	150	-409	0	117	31	0	0	-18.0
17	17	-355	-439	-394	-165	677	55	-86	-10	-195	-1877	-10	-21	-15	-4	-97	-182	236	10	59	109	-412	0	119	31	0	0	-18.1
17	18	-381	-407	-393	-29	597	20	-40	-7	-172	-1701	-11	-20	-15	-4	-97	-170	218	9	59	109	-410	0	57	29	17	-428	-11.4
18	18	-389	-405	-396	26	605	20	-41	-8	-170	-1691	-13	-20	-16	-2	-124	-171	218	8	58	78	-414	0	34	29	9	-423	-8.4
18	19	-411	-403	-407	5	583	21	-46	-7	-132	-1532	-14	-20	-16	-2	-124	-159	211	-4	58	78	-431	0	30	25	7	-438	-7.1
19	19	-420	-400	-411	7	617	-7	-4	-6	-153	-1514	-15	-19	-17	-2	-138	-160	211	-4	56	50	-435	0	36	23	8	-442	-7.6
19	20	-437	-401	-422	34	577	-1	-15	-7	-118	-1368	-16	-19	-17	-2	-138	-149	204	-5	56	50	-448	0	14	21	3	-450	-4.4
20	20	-448	-397	-427	38	608	-32	33	-6	-138	-1340	-17	-19	-18	-2	-143	-150	204	-5	54	28	-452	0	19	19	3	-455	-4.8
20	21	-458	-406	-437	50	572	-22	16	-7	-105	-1200	-18	-19	-18	-2	-143	-139	197	-6	54	28	-464	0	3	17	1	-465	-2.5
21	21	-469	-402	-443	58	596	-52	66	-5	-123	-1173	-18	-19	-18	-2	-125	-139	198	-6	53	13	-468	0	6	15	1	-469	-2.6
21	22	-476	-415	-452	61	560	-75	108	-5	-65	-1014	-19	-19	-19	-2	-125	-129	191	-6	53	13	-478	0	13	13	1	-480	-3.1
22	22	-488	-410	-458	71	572	-106	162	-3	-83	-1016	-19	-19	-19	-3	-69	-129	191	-7	52	7	-483	0	11	11	1	-484	-2.6
22	23	-490	-431	-468	89	529	-122	200	-3	-66	-889	-20	-18	-19	-3	-69	-119	186	-7	52	7	-494	0	24	9	2	-496	-3.8
23	23	-504	-426	-475	102	518	-101	183	3	-70	-990	-19	-19	-19	-3	47	-119	186	-7	51	14	-495	0	28	11	3	-498	-4.5
23	24	-499	-459	-485	104	479	-105	203	3	-45	-837	-20	-18	-19	-3	47	-109	180	-7	51	14	-505	0	36	9	4	-509	-5.1
24	24	-516	-453	-493	121	433	-114	221	4	-59	-1035	-18	-18	-18	-4	238	-109	180	-7	50	36	-511	0	38	18	6	-518	-6.2
24	25	-509	-492	-503	106	395	-116	243	6	-36	-896	-19	-16	-18	-4	238	-100	175	-6	50	36	-519	0	40	16	6	-525	-6.1
25	25	-528	-485	-514	12	336	-117	247	7	-46	-1104	-15	-17	-16	-8	534	-100	175	-6	48	68	-527	0	3	28	2	-529	-3.4
25	26	-523	-494	-513	66	279	-118	250	7	-24	-975	-16	-13	-15	-8	534	-87	151	-6	48	68	-525	0	26	27	5	-530	-5.7
26	26	-523	-494	-513	69	235	-118	250	7	-27	-1036	-16	-13	-15	-8	636	-87	151	-6	48	83	-525	0	26	31	6	-531	-6.2
26	27	-510	-510	-510	44	194	-114	241	7	-5	-924	-18	-8	-14	-8	636	-75	127	-6	48	83	-522	0	23	30	5	-527	-5.7
27	27	-516	-508	-514	53	66	-115	243	7	-13	-1083	-17	-8	-14	-8	927	-75	127	-6	48	124	-525	0	24	43	8	-533	-7.1
27	28	-512	-516	-513	55	51	-113	239	7	-6	-1048	-18	-7	-14	-8	927	-71	120	-6	48	124	-524	0	27	42	9	-533	-7.4
28	28	-518	-513	-517	63	-72	-120	255	8	-12	-1201	-17	-7	-14	-8	1202	-71	120	-6	47	167	-527	0	28	55	13	-539	-8.7
28	29	-499	-546	-515	67	-123	-105	223	7	10	-1072	-18	-2	-13	-8	1202	-59	97	-5	47	167	-525	0	37	53	15	-540	-9.5
29	29	-525	-539	-530	82	-218	-116	244	7	5	-1316	-13	-4	-10	-7	1500	-58	97	-5	46	212	-536	0	41	67	21	-557	-11.0
29	30	-498	-585	-528	82	-272	-96	202	7	28	-1166	-15	1	-10	-7	1500	-46	74	-5	46	212	-534	0	49	65	23	-558	-11.6
30	30	-524	-578	-543	97	33	-101	212	6	17	-1391	-13	0	-9	-6	1300	-45	74	-4	45	180	-548	0	52	59	21	-570	-10.9
30	31	-490	-638	-541	101	-24	-79	167	6	44	-1219	-16	3	-9	-6	1300	-33	51	-4	45	180	-547	0	62	56	25	-572	-11.7
31	31	-517	-630	-556	113	1192	-84	173	5	54	-1399	-21	4	-12	-4	-54	-33	51	-4	44	-34	-566	0	71	6	10	-577	-7.6
31	32	-473	-707	-554	131	1132	-33	71	3	106	-1309	-23	5	-14	-4	-54	-22	29	-4	44	-34	-567	0	96	5	17	-585	-9.8
32	32	-509	-697	-574	140	4560	-52	103	1	68	-1304	-55	12	-32	-2	-4246	-24	30	-6	41	-707	-608	0	87	169	93	-701	-20.0
32	33	-446	-810	-572	144	4482	-2	6	1	122	-1357	-57	12	-33	-2	-4246	-11	4	-6	41	-707	-608	0	106	166	104	-712	-20.9
33	33	-484	-802	-594	148	8508	-3	5	0	94	-1376	-38	8	-22	-1	-9186	-7	3	-3	38	-1521	-618	0	98	366	249	-867	-28.2
33	34	-479	-812	-595	153	8501	0	0	0	95	-1380	-38	8	-22	-1	-9186	-6	2	-3	38	-1521	-618	0	101	366	251	-869	-28.3
34	34	-499	-807	-605	-476	-934	0	0	0	-75	-804	-14	3	-8	0	1110	-2	1	-1	1	184	-614	0	219	63	109	-723	-21.2
34	35	12	-2	7	0	-903	1	0	0	0	-54	-14	3	-8	0	1110	-2	0	-1	1	184	-2	0	0	46	0	0	-44.5

PRINCIPAL STRESS SUMMARY		Rating Factor RF	
$\sigma_{maximum}$ (psi)	$\sigma_{minimum}$ (psi)	$\sigma_{maximum}$ (psi)	$\sigma_{minimum}$ (psi)
0	0		
26	-688	13.70	66.80
14	-656	16.76	84.94
14	-663	14.02	70.30
16	-643	16.77	87.03
13	-647	11.44	58.81
13	-629	13.79	72.60
13	-631	10.55	54.90
14	-616	10.01	52.78
14	-617	9.14	47.47
31	-620	10.50	51.78
31	-609	9.55	47.10
31	-598	9.65	48.26
24	-577	8.55	43.80
26	-570	9.90	51.41
15	-543	7.54	41.08
18	-539	8.80	48.44
9	-513	6.84	39.03
12	-510	8.04	46.32
12	-489	6.47	37.55
12	-487	7.72	45.01
23	-475	4.97	35.02
6	-458	6.43	39.55
22	-460	5.10	35.80
24	-463	5.38	38.29
55	-483	4.21	34.67
108	-535	3.28	34.31
0	0		
0	0		
0	0		
0	0		
0	0		
17	-428	4.29	32.10
9	-423	5.01	33.13
7	-438	6.15	40.78
8	-442	5.66	37.29
7	-450	7.15	45.77
7	-455	6.60	41.88
10	-469	8.36	52.00
10	-473	7.71	47.50
12	-486	12.08	73.80
11	-491	10.59	64.05
16	-506	13.14	77.91
15	-511	12.31	72.02
19	-524	12.26	88.29
19	-532	13.56	76.99
20	-540	11.39	81.70
7	-535	13.82	82.91
16	-542	11.04	76.73
16	-542	11.81	82.46
16	-539	9.10	62.26
16	-542	10.54	73.04
17	-542	9.63	66.83
18	-551	10.46	73.15
22	-552	8.42	59.13
23	-565	9.48	67.31
27	-567	7.75	55.03
30	-584	7.43	52.98
35	-587	6.30	45.11
35	-605	6.41	45.52
43	-612	5.40	38.90
148	-757	3.21	36.57
162	-770	2.58	29.47
330	-948	0.35	26.15
333	-951	0.32	25.73
109	-723	5.88	65.28
0	0		

File: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Ramp B\Rating Ramp B Seg 6\[Principal Stresses.xls]Cut 2-2, 1
Forces: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Ramp B\Rating Ramp B Seg 6\[Forces.xls]
Props&Reinf: D:\Cline Ave_tsp\Orig Ab with increased Vc AASHTO\Ramp B\Rating Ramp B Seg 6\[Props&Reinf.xls]

PROJECT: **Cline Avenue Ramp B Mainline Seg 6** COMPUTED BY: TSP DATE: 8/25/08
DESCRIPTION: **PRINCIPAL STRESSES** CHECKED BY: DATE:

Principal Stress Calculation at the Web

Rating Truck: **HL-93** LL Factor: **Inventory** γ_{LL}= 0.80
γ_{TG}= 0.50

Material Properties:
Concrete
f'c = ***5000*** psi

Web Thickness along the plane
bw = ***15.00*** in

Allowable Principal Stress Limits:
Allowable Tension = **246** psi (+) = tension
Allowable Compress = **-3000** psi (-) = compression
Vertical Compression Stress = 0 psi (-) = compression

(1 - 1/4" PT Bar @ 0.6 Fpu)
F pt = **0.0** kips
s pt = **60.0** in
b_v = **28.00** in
(fpt) = **0** psi

Calculate @ Section : ***"cg"*** **SERVICE LOAD COMBINATION III**

Stresses State, Dead Load						Stresses State, Maximum Live Load					Stresses State, Minimum Live Load					Capacity	
σ_x (psi)	σ_y (psi)	τ_{xy} (Q_y) (psi)	τ_{xy} (M_t) (psi)	σ_{max} (psi)	σ_{min} (psi)	σ_x (psi)	τ_{xy} (Q_y) (psi)	τ_{xy} (M_t) (psi)	σ_{max} (psi)	σ_{min} (psi)	σ_x (psi)	τ_{xy} (Q_y) (psi)	τ_{xy} (M_t) (psi)	σ_{max} (psi)	σ_{min} (psi)	$\tau_{xy\ max}$ (psi)	$\tau_{xy\ min}$ (psi)
-658	0	70	29	0	0	-1	14	13	0	0	-1	14	13	0	0	472	2691
-664	0	74	25	14	-678	0	17	25	41	-42	-1	13	12	25	-26	473	2689
-642	0	68	13	10	-652	-1	12	21	32	-33	0	4	12	16	-16	467	2698
-648	0	73	13	11	-659	-1	18	22	39	-40	0	8	11	19	-19	469	2695
-627	0	67	4	8	-635	-1	14	18	31	-33	-1	6	15	20	-22	463	2705
-633	0	71	4	9	-642	-2	26	21	46	-49	-1	4	14	17	-18	465	2702
-614	0	66	1	7	-622	-2	22	17	36	-40	-1	1	18	18	-19	460	2710
-616	0	73	1	9	-625	-2	31	20	48	-53	-1	6	17	22	-24	461	2709
-599	0	69	5	9	-608	-4	34	18	49	-57	-1	2	21	22	-24	456	2717
-599	0	79	5	11	-611	-4	38	21	55	-63	-1	8	19	26	-28	456	2717
-585	0	118	7	26	-611	-4	34	21	51	-60	-1	5	23	28	-29	452	2723
-574	0	124	7	28	-603	-4	38	23	57	-65	0	11	21	32	-33	449	2728
-563	0	118	8	27	-589	-4	37	22	55	-64	0	9	25	34	-34	446	2733
-549	0	108	7	23	-572	-5	40	25	61	-70	-1	15	23	38	-39	442	2739
-539	0	104	7	22	-561	-5	31	24	51	-61	0	12	26	38	-39	439	2744
-523	0	80	6	14	-537	-6	42	27	64	-75	-1	18	24	42	-43	435	2751
-516	0	78	4	13	-528	-5	33	26	54	-64	0	14	27	42	-42	433	2754
-497	0	65	4	9	-506	-6	45	28	67	-78	-1	30	25	53	-56	428	2763
-491	0	64	2	9	-500	-6	35	27	56	-67	-1	24	28	50	-53	426	2765
-470	0	69	1	10	-480	-6	47	29	70	-82	-3	31	26	54	-59	420	2775
-466	0	69	1	10	-476	-5	36	27	58	-69	-3	33	28	57	-64	418	2777
-444	0	16	4	1	-444	-5	49	30	74	-85	-2	45	27	69	-74	412	2787
-444	0	45	4	5	-449	-5	39	29	63	-73	-3	44	27	69	-75	412	2787
-431	0	7	5	0	-431	-5	48	30	73	-82	-3	45	28	70	-76	408	2793
-431	0	12	6	1	-432	-4	39	29	64	-73	-3	45	28	69	-76	408	2793
-421	0	67	8	13	-434	-5	49	30	74	-83	-2	45	28	71	-75	405	2797
-425	0	143	11	50	-475	0	48	29	77	-77	-2	46	27	71	-75	406	2795
-425	0	365	17	0	0	-9	68	34	0	0	-7	48	28	0	0	406	2795
-428	0	363	17	0	0	-9	68	34	0	0	-8	46	28	0	0	407	2794
-429	0	401	18	0	0	-9	69	34	0	0	-8	46	29	0	0	407	2794
-423	0	344	24	0	0	-2	30	22	0	0	-9	68	37	0	0	406	2797
-402	0	66	17	0	0	-1	21	23	0	0	-8	64	34	0	0	399	2806
-405	0	68	17	0	0	-1	28	22	0	0	-8	63	34	0	0	400	2805
-404	0	13	16	2	-406	0	17	24	40	-41	-6	56	31	81	-93	400	2805
-409	0	10	16	2	-411	-1	28	22	49	-52	-6	55	30	79	-92	401	2803
-428	0	1	15	1	-428	-2	21	24	43	-48	-6	42	27	64	-75	407	2794
-431	0	2	16	1	-432	-1	22	22	43	-46	-5	49	26	71	-80	408	2793
-443	0	13	15	2	-445	-1	15	25	38	-41	-6	38	24	56	-67	412	2787
-448	0	15	16	2	-450	0	16	23	38	-39	-5	44	23	63	-72	413	2785
-459	0	21	15	3	-462	0	8	25	33	-34	-6	34	21	49	-60	416	2780
-463	0	24	15	3	-467	0	10	23	32	-33	-4	39	20	55	-64	418	2778
-474	0	25	15	3	-477	-1	2	25	27	-28	-4	21	17	34	-42	421	2773
-479	0	29	14	4	-483	-1	5	22	26	-28	-2	27	17	42	-46	422	2771
-490	0	37	13	5	-495	-1	3	24	26	-29	-3	21	15	34	-39	425	2766
-496	0	42	12	6	-502	-2	1	21	20	-23	-3	22	17	36	-42	427	2763
-506	0	43	11	6	-512	-2	8	23	29	-32	-3	15	14	26	-32	430	2759
-513	0	50	14	8	-521	-2	4	19	21	-25	-3	19	17	33	-40	432	2756
-520	0	45	13	6	-526	-4	12	21	29	-38	-5	12	15	22	-32	434	2753
-528	0	8	18	1	-529	-4	7	17	21	-29	-6	15	18	28	-39	436	2749
-527	0	30	17	4	-531	-4	15	20	31	-40	-6	8	16	19	-31	436	2749
-527	0	31	18	5	-531	-4	14	19	29	-37	-6	9	17	21	-33	436	2749
-523	0	21	17	3	-526	-4	22	22	39	-48	-6	2	15	12	-24	435	2751
-526	0	25	21	4	-530	-4	18	19	33	-42	-6	4	18	17	-29	436	2750
-525	0	26	20	4	-529	-4	21	20	36	-45	-6	2	18	15	-26	436	2750
-533	0	29	24	5	-538	0	18	18	37	-37	-6	4	20	18	-31	438	2746
-531	0	31	23	5	-536	0	25	21	45	-46	-6	3	18	16	-28	437	2748
-542	0	36	27	7	-549	0	20	20	40	-40	-6	2	22	18	-30	440	2742
-540	0	37	26	7	-547	0	26	23	48	-49	-5	9	19	24	-34	440	2743
-554	0	42	28	9	-563	-1	28	22	50	-51	-5	6	23	24	-34	444	2737
-552	0	44	27	9	-561	-1	34	25	58	-60	-4	14	20	31	-39	443	2738
-570	0	48	26	9	-580	0	33	25	58	-58	-4	18	23	37	-45	448	2730
-570	0	55	25	11	-581	0	39	29	68	-68	-2	35	22	54	-59	448	2730
-608	0	58	184	84	-693	0	39	29	67	-68	-1	22	22	43	-45	458	2713
-608	0	59	182	84	-692	0	49	34	84	-84	0	40	23	62	-63	458	2713
-618	0	61	370	221	-839	0	51	36	87	-87	0	31	23	54	-54	461	2709
-618	0	63	370	223	-841	0	52	37	88	-89	0	31	23	54	-54	461	2709
-614	0	194	43	81	-695	0	17	7	24	-24	0	24	13	38	-38	460	2710
-2	0	0	42	0	0	0	0	1	0	0	0	0	1	0	0	247	2999