GIRDERS 2 THRU 8 MOMENT TABLE (HL-93 LOADING)						
		0.4 Sp. 1	Pier 1	0.5 Sp. 2	Pier 2	0.6 Sp. 3
I_s	(in^4)	7,591	11,346	6,894	14,878	9,738
$I_c(n)$	(in^4)	20,181	-	17,607	-	26,236
$I_c(3n)$	(in^4)	14,578	-	12,961	-	18,410
$I_c(cr)$	(in^4)	-	15,254	-	18,789	-
S_s	(in^3)	556	771	473	939	773
$S_c(n)$	(in^3)	753	-	642	-	1,027
$S_c(3n)$	(in^3)	693	-	590	-	946
$S_c(cr)$	(in^3)	-	869	-	1032	-
DC1	(k/')	0.82	0.87	0.81	0.92	0.86
M_{DC1}	('k)	518	552	-34	851	760
DC2 *	(k/')	0.61	0.62	0.62	0.62	0.61
M_{DC2}	('k)	379	408	8	578	532
DW	(k/')	0.19	0.19	0.19	0.19	0.19
M_{DW}	('k)	115	124	0	176	161
M_{L+IM}	('k)	1,009	998	689	1,166	1,269
M_u (Strength I)	('k)	3,060	3,133	1,173	4,091	4,077
$\phi_f M_n$	('k)	3,708	3,817	3,368	4,661	4,871
f_s DC1	(ksi)	11.2	8.6	-0.9	10.9	11.8
f_s DC2	(ksi)	6.6	5.6	0.2	6.7	6.7
f_s DW	(ksi)	2.0	1.7	0.0	2.0	2.0
f_s (L+IM)	(ksi)	16.1	13.8	12.9	13.6	14.8
f_s (Service II)	(ksi)	40.6	33.9	16.1	37.3	39.9
$0.95R_hF_{yf}$	(ksi)	47.5	47.5	47.5	47.5	47.5
f_s (Total)(Strength I)	(ksi)	-	-	-	-	-
$\phi_f F_n$	(ksi)	-	-	-	-	-
V_f	(k)	25.4	27.7	-	27.8	26.1

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GIRDER 1 MOMENT TABLE (PEDESTRIAN LOADING)						
		0.4 Sp. 1	Pier 1	0.5 Sp. 2	Pier 2	0.6 Sp. 3
I_s	(in^4)	7,591	11,346	6,894	14,878	9,738
$I_c(n)$	(in^4)	20,061	-	17,508	-	26,060
$I_c(3n)$	(in^4)	14,470	-	12,869	-	18,267
$I_c(cr)$	(in^4)	-	15,254	-	18,789	-
S_s	(in^3)	556	771	473	939	773
$S_c(n)$	(in^3)	752	-	641	-	1,026
$S_c(3n)$	(in^3)	691	-	589	-	945
$S_c(cr)$	(in^3)	-	869	-	1032	-
DC1	(k/')	0.82	0.87	0.81	0.92	0.86
M_{DC1}	('k)	509	542	-34	837	747
DC2 *	(k/')	0.39	0.45	0.47	0.40	0.39
M_{DC2} **	('k)	123	1,173	1,180	1,312	40
DW	(k/')	0.30	0.30	0.30	0.30	0.30
M_{DW}	('k)	184	199	0	282	258
M_{L+IM}	('k)	274	656	344	822	678
M_u (Strength I)	('k)	1,340	3,098	1,777	3,931	2,049
$\phi_f M_n$	('k)	3,765	3,804	3,281	4,649	4,852
f_s DC1	(ksi)	11.0	8.4	-0.9	10.7	11.6
f_s DC2	(ksi)	2.1	16.2	24.1	15.2	0.5
f_s DW	(ksi)	3.2	2.7	0.0	3.3	3.3
f_s (L+IM)	(ksi)	4.4	9.1	6.4	9.6	7.9
f_s (Service II)	(ksi)	22.0	39.2	31.6	41.6	25.7
$0.95R_hF_{yf}$	(ksi)	47.5	47.5	47.5	47.5	47.5
f_s (Total)(Strength I)	(ksi)	-	50.77	-	54.07	-
$\phi_f F_n$	(ksi)	-	50.0	-	44.6	-
V_f	(k)	0.0	0.0	-	0.0	0.0

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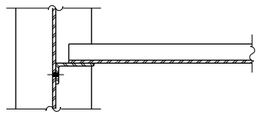
GIRDERS 2 THRU 8 REACTION TABLE (HL-93 LOADING)					
		S. Abut.	Pier 1	Pier 2	N. Abut.
R_{DC1}	(k)	37.50	72.71	92.49	44.54
R_{DC2} ***	(k)	40.26	52.19	62.33	44.24
R_{DW}	(k)	6.53	16.22	19.29	7.74
R_{L+IM}	(k)	74.62	122.49	135.46	78.68
R_{Total}	(k)	158.91	263.61	309.57	175.20

GIRDER 1 REACTION TABLE (PEDESTRIAN LOADING)					
		S. Abut.	Pier 1	Pier 2	N. Abut.
R_{DC1}	(k)	36.79	71.44	90.96	43.74
R_{DC2} ***	(k)	7.83	120.92	116.42	11.92
R_{DW}	(k)	10.44	25.95	30.86	12.37
R_{L+IM}	(k)	17.15	44.10	49.26	19.75
R_{Total}	(k)	72.21	262.41	287.50	87.78

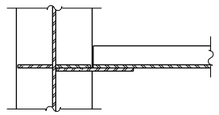
* Load allowance includes 0.025 k/' for duct banks. All girders include weight for two 10' sidewalks for the future condition. A

** Moment includes six concentrated forces of 19.8 k, 16.6 k, 21.8 k, 26.5 k, 28.4 k and 25.6 k due to the unfactored reactions at the locations of the Existing CTA Station stringers (Beams E1 thru E6, respectively) under dead, snow and wind loads.

*** Includes Approach Slab Dead Load Reactions at Abutments.



SECTION A-A



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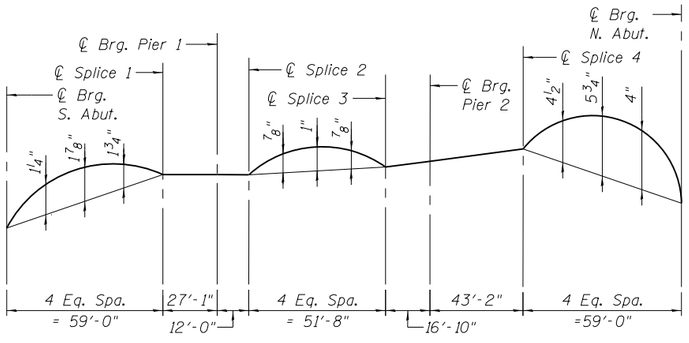
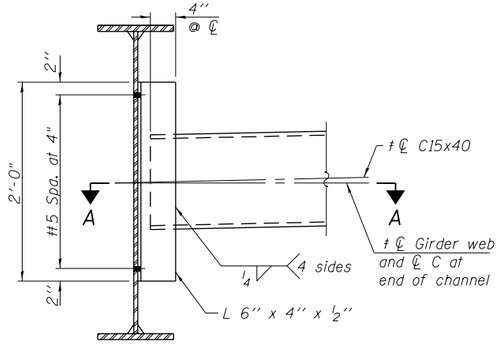
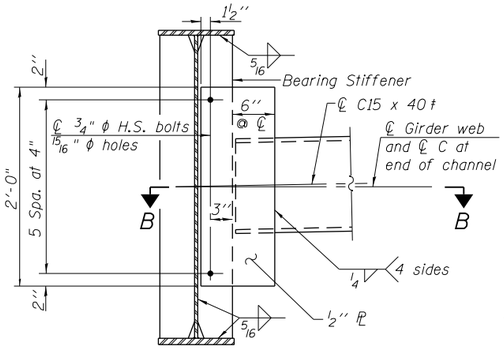


CAMBER DIAGRAM



INTERIOR DIAPHRAGM D1

(104 Required)



INTERIOR DIAPHRAGM D2

(16 Required)

Note:
Two hardened washers required for each set of oversized holes.
† Alternate channels C15x50 are permitted to facilitate material acquisition. Calculated weight of structural steel is based on the lighter section.
The alternate, if utilized, shall be provided at no additional cost to the Department.
†† ¾" ϕ HS bolts, 15/16" ϕ holes

I_s, S_s: Non-composite moment of inertia and section modulus of the steel section used for computing f_s (Total-Strength I, and Service II) due to non-composite dead loads ($in.^4$ and $in.^3$).

$I_c(n)$, $S_c(n)$: Composite moment of inertia and section modulus of the steel and deck based upon the modular ratio, "n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections due to short-term composite live loads ($in.^4$ and $in.^3$).

$I_c(3n)$, $S_c(3n)$: Composite moment of inertia and section modulus of the steel and deck based upon 3 times the modular ratio, "3n", used for computing f_s (Total-Strength I, and Service II) in uncracked sections, due to long-term composite (superimposed) dead loads ($in.^4$ and $in.^3$).

$I_c(cr)$, $S_c(cr)$: Composite moment of inertia and section modulus of the steel and longitudinal deck reinforcement, used for computing f_s (Total-Strength I and Service II) in cracked sections, due to both short-term composite live loads and long-term composite (superimposed) dead loads ($in.^4$ and $in.^3$).

DC1: Un-factored non-composite dead load (kips/ft.).

M_{DC1}: Un-factored moment due to non-composite dead load (kip-ft.).

DC2: Un-factored long-term composite (superimposed excluding future wearing surface) dead load (kips/ft.).

M_{DC2}: Un-factored moment due to long-term composite (superimposed excluding future wearing surface) dead load (kip-ft.).

DW: Un-factored long-term composite (superimposed future wearing surface only) dead load (kips/ft.).

M_{DW}: Un-factored moment due to long-term composite (superimposed future wearing surface only) dead load (kip-ft.).

M_{L+IM}: Un-factored live load moment plus dynamic load allowance (impact) (kip-ft.).

M_u (Strength I): Factored design moment (kip-ft.).
$1.25\ (M_{DC1} + M_{DC2}) + 1.5\ M_{DW} + 1.75\ M_{L+IM}$

$\phi_f M_n$: Compact composite positive moment capacity computed according to Article 6.10.7.1 or non-slender negative moment capacity according to Article A6.1.1 or A6.1.2 (kip-ft).

f_s DC1: Un-factored stress at edge of flange for controlling steel flange due to vertical non-composite dead loads as calculated below (ksi).
M_{DC1} / S_{nc}

f_s DC2: Un-factored stress at edge of flange for controlling steel flange due to vertical composite dead loads as calculated below (ksi).
$M_{DC2} / S_c(3n)$ or $M_{DC2} / S_c(cr)$ as applicable.

f_s DW: Un-factored stress at edge of flange for controlling steel flange due to vertical composite future wearing surface loads as calculated below (ksi).
$M_{DW} / S_c(3n)$ or $M_{DW} / S_c(cr)$ as applicable.

f_s (L+IM): Un-factored stress at edge of flange for controlling steel flange due to vertical composite live load plus impact loads as calculated below (ksi).
$M_{L+IM} / S_c(n)$ or $M_{DW} / S_c(cr)$ as applicable.

f_s (Service II): Sum of stresses as computed below (ksi).
$f_{sDC1} + f_{sDC2} + f_{sDW} + 1.3\ f_s(L+IM)$

$0.95R_hF_yf$: Composite stress capacity for Service II loading according to Article 6.10.4.2 (ksi).

f_s (Total)(Strength I): Sum of stresses as computed below on non-compact section (ksi).
$1.25\ (f_{sDC1} + f_{sDC2}) + 1.5\ f_{sDW} + 1.75\ f_s(L+IM)$

$\phi_f F_n$: Non-Compact composite positive or negative stress capacity for Strength I loading according to Article 6.10.7 or 6.10.8 (ksi).

V_f: Maximum factored shear range in span computed according to Article 6.10.10.

TranSystems

USER NAME = BAWitort	DESIGNED WJC	REVISED A 12/18/2013 WJC/DL	
	CHECKED DL	REVISED	
PLOT SCALE = 0:2.0000 ':' / in.	DRAWN MTS	REVISED	
PLOT DATE = 12/19/2013	CHECKED DL	REVISED	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STRUCTURAL STEEL DETAILS 1
STRUCTURE NO. 016-1708
SHEET NO. 33 OF 55 SHEETS

MUN	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
2090	2013-011R	COOK	356	165
		CONTRACT NO. 60W29		
	ILLINOIS FED. AID PROJECT			

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