STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	SHEET NO. 28
F.A.I. 57	(X1-6-2) VB-2	WILLIAMSON	917	861	51 SHEETS
FED. ROAD CONT. NO. 7	ILLINOIS	FED. AID PROJECT-			

Contract #98950

*INTERIOR GIRDER MOMENT TABLE

		0.4 Sp. 1 or 0.6 Sp. 3	Pier 1 or 2	0.5 Sp. 2
Is	(in⁴)	3990	3990	3990
Ic (n)	(in⁴)	11789	-	11789
Ic (3n)	(in⁴)	8801	-	8801
Ss	(in³)	269	269	269
Sc (n)	(in³)	417	-	417
Sc (3n)	(in³)	377	-	377
Z	(in³)	-	312	-
DC1	(k/')	0.788	0.788	0.788
M DC1	('k)	33.9	206.1	152.4
DC2	(k/')	0.082	0.082	0.082
M DC2	('k)	5.7	16.1	21.3
DW	(k/')	0.354	0.354	0.354
M DW	('k)	24.6	69.3	91.8
M ℓ+Imp	('k)	368.3	307.0	611.0
Mu (Strength I)	('k)	730.9	919.0	1423.9
$\phi_f M_n$, $\phi_f M_{nc}$	('k)	2099.6	1300	2099.6
fs DC1	(ksi)	1.5	9.2	6.8
fs DC2	(ksi)	0.2	0.7	0.7
fs DW	(ksi)	0.8	3.1	2.9
fs 1.3(ℓ+I)	(ksi)	13.8	17.8	22.9
fs (Service II)	(ksi)	16.3	30.8	33.3
fs (Total)(Strength I)	(ksi)	-	-	-
Vsr	(k)	36.5	-	50.4

*INTERIOR GIRDER REACTION TABLE

		Abutment	Pier
R DC1	(k)	7.9	43.5
R DC2+DW	(k)	5.2	23.3
R ℓ	(k)	45.9	76.2
R Imp	(k)	12.6	16.6
R Total	(k)	71.6	159.6

*Data shown is for SN 100-0086 (N.B.), data for SN 100-0087 (S.B.) similar.

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) 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) due to long-term composite (superimposed) dead loads (in.⁴ and in.³).

Z: Plastic Section Modulus of the steel section in non-composite areas. Omit line in Moment Table if not used in design calculations (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.).

$M_{\ell+Imp}$: 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 $M_{\ell+Imp}$

$\phi_f M_n$: Compact composite positive moment capacity computed according to Article 6.10.7.1 (kip-ft.).

$\phi_f M_{nc}$: Compact non-composite negative moment capacity computed according to Article A6.1.1 (kip-ft.).

f_s (Service II): Sum of stresses as computed from the moments below (ksi).
M_{DC1} + M_{DC2} + M_{DW} + 1.3 $M_{\ell+Imp}$

f_s (Total)(Strength I): Sum of stresses as computed from the moments below on non-compact section (ksi).
1.25 (M_{DC1} + M_{DC2}) + 1.5 M_{DW} + 1.75 $M_{\ell+Imp}$

V_r: Factored shear range computed according to Article 6.10.10.

TOP VIEW

DIAPHRAGMS

Beam Web

₵ Beam

4"

1'-11"

½"

½"

4 spaces at 5" cts.

5" min

Slope parallel to superelevation

4 sides

¾" φ H.S. bolts

¹⁵⁄₁₆" φ holes

₵ Diaphragm

C12x25

Bent L 6" x 4" x ½" (or ½" bent ₵ optional)
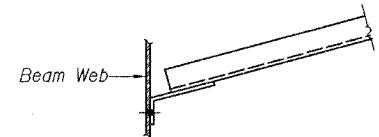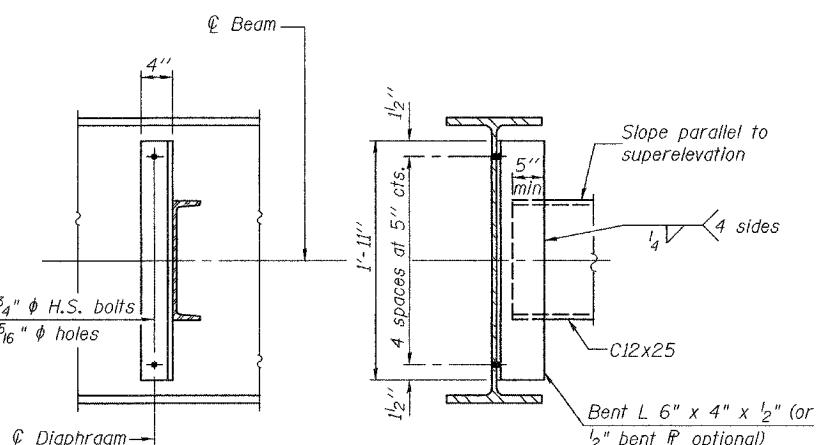
Diaphragm	# Required
D	90
D₁	72
D₂	3
D₃	3
D₄	3
D₅	3
D₆	3
D₇	3
D₈	3
D₉	3
D₁₀	3

Note:
Two hardened washers shall be required over all oversize holes for diaphragms.
Use ¹³⁄₁₆ x 1½ vertical slotted holes in top and bottom connection angles. 6 x 4 x ½ (or bent ₵) for east side of Beam 6 and west side of Beam 18 only. Provide ⁵⁄₁₆ plate washers for slotted holes. Bolts for slotted holes shall be finger tightened prior to the deck pour for Stage II Construction and then fully tightened after completion of the Stage II deck pour.
All diaphragms shall be installed as steel is erected and secured with erection pins and bolts except as otherwise noted. Individual diaphragms at supports may be temporarily disconnected to install bearing anchor rods.

**TOP OF BEAM ELEVATIONS

Location	₵ Brg. N. Abut.	₵ Brg. Pier 1	₵ Splice 1	₵ Splice 2	₵ Brg. Pier 2	₵ Brg. S. Abut.
Beam 1	464.57	464.73	464.76	465.05	465.09	465.36
Beam 2	464.95	465.11	465.14	465.44	465.48	465.74
Beam 3	465.33	465.49	465.52	465.82	465.86	466.12
Beam 4	465.71	465.87	465.90	466.20	466.24	466.50
Beam 5	465.99	466.13	466.16	466.41	466.45	466.70
Beam 6	466.11	466.24	466.27	466.53	466.57	466.82
Beam 7	466.20	466.33	466.36	466.62	466.66	466.90
Beam 8	466.09	466.22	466.25	466.51	466.55	466.79
Beam 9	465.96	466.09	466.12	466.38	466.42	466.67
Beam 10	465.81	465.95	465.98	466.23	466.27	466.52
Beam 11	465.66	465.80	465.83	466.08	466.12	466.37
Beam 12	465.67	465.80	465.83	466.08	466.12	466.37
Beam 13	465.81	465.94	465.97	466.23	466.27	466.51
Beam 14	465.95	466.08	466.11	466.37	466.41	466.66
Beam 15	466.07	466.21	466.24	466.49	466.53	466.78
Beam 16	466.18	466.31	466.34	466.60	466.64	466.88
Beam 17	466.11	466.24	466.27	466.53	466.57	466.81
Beam 18	466.00	466.13	466.16	466.42	466.46	466.70
Beam 19	465.85	465.98	466.01	466.27	466.31	466.56
Beam 20	465.71	465.84	465.87	466.13	466.17	466.41
Beam 21	465.61	465.73	465.76	466.00	466.04	466.26
Beam 22	465.52	465.62	465.64	465.87	465.90	466.12
Beam 23	465.42	465.51	465.53	465.74	465.77	465.97

**For fabrication only

DESIGNED	Michael D. Cima
CHECKED	Fess Teklehaimanot
DRAWN	BECKY M. LEACH
CHECKED	M.D.C. & F.T.

January 22, 2007
EXAMINED Thomas J. Domagalski
ENGINEER OF BRIDGE DESIGN
PASSED Ralph E. Anderson
ENGINEER OF BRIDGES AND STRUCTURES

STRUCTURAL STEEL DETAILS
F.A.I. RT. 57 SEC. (X1-6-2)VB-2
WILLIAMSON COUNTY
STA. 1516+58.56
S.N. 100-0086 (N.B.)
S.N. 100-0087 (S.B.)

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