SUBSTRUCTURE DESIGN CRITERIA

Designed by DRB Date: 9/29/09
Checked by FAQ Date: 9/29/09

GENERAL LIVE LOAD CASE DATA

Barrier Type	2'-8" Jersey			
Barrier Height	2.667	ft		
Barrier Overhang Width	1.625	ft	Measured from Curb to Edge of Deck	
Barrier Weight	410	plf	Individual Barrier scaled in CAD	
Live Load	HS20 & Mil		HS20 & Military	
Truck Wheel Location from Curb	2.000	ft	Based on AASHTO Standard	AASHTO Fig 3.7.6A

GENERAL DESIGN DATA

Design Methodology	L	[L/S]	Load Factor or Service Load	
Pier Concrete Strength (f'c)	3,500	psi	28-Day Strength	GDOT 4.3.1
Allowable Concrete Stress Factor	0.40		Multiplied x f'c	AASHTO 8.15.2.1.1
Reinforcement Steel Strength (fy)	60,000	psi	Grade 60	GDOT 4.3.1
Allowable Stress in Rebar (fs)	24,000	psi	Grade 60	AASHTO 8.15.2.2
Concrete Density for Weight	150	pcf		AASHTO 3.3.6
Concrete Density for E	145	pcf		GDOT p.3-105
Steel Density for Weight	490	pcf		AASHTO 3.3.6
Reinforcement Steel Modulus (E_s)	29,000	ksi		AASHTO 8.7.2
Maximum Concrete Strain (ε_c)	0.003	in/in		AASHTO 8.16.2.3
Seismic Analysis	not req'd			GDOT Fig. 4-5
Minimum Clear Bar Spacing	2.500	in	Assume 2" Aggregate Diameter	
Default Skew	90.0000	°	Measured Betweeen CL Pier & CL Roadway	

CAP DESIGN DATA

Rebar Serviceability Exposure	Moderate		Z = 170 (Moderate); 130 (Severe)	AASHTO 8.16.8.4
Main Reinforcement Bar Size	#11			
Stirrup Bar Size	#5			
Top Cap Rebar Clear Cover	2.000	in		
Minimum Stirrup Spacing	4.000	in		GDOT 4.3.2.1
Cap Design Depth Increment	3.000	in		GDOT 4.3.2.1
Minimum Cap Depth	4.000	ft		
Side Cap Main Rebar Clear Cover	3.000	in		
Max c-c Spacing of Main Rebar	12.000	in		

COLUMN DESIGN DATA

Main Reinforcement Bar Size	#11			
Min Reinforcement Ratio (ρ_{min})	1.00	%	Area Reinforcement / Area Concrete	AASHTO 8.18.2
Max Reinforcement Ratio (ρ_{max})	8.00	%	Area Reinforcement / Area Concrete	AASHTO 8.18.1
Column Main Rebar Clear Cover	3.750	in		
Effective Length Ratio (k)	2.00		Moment in the Longitudinal Direction	
Column Fixity Factor	0.000		0.000 = Fixed; 1.000 = Pinned	
Max c-c Spacing of Main Rebar	12.000	in		

SUBSTRUCTURE DESIGN CRITERIA

FOOTING DESIGN DATA

Soil Density for Weight	0.120	kcf		
Bottom Rebar Clear Cover	3.000	in		
Minimum Footing Width	1.000	ft	Dimension Outside of Column	
Min Footing Thickness - Spread	2.250	ft		GDOT 4.3.1
Min Footing Thickness - Piles	3.000	ft		
Footing Width Increment	0.500	ft		
Footing Thickness Increment	0.250	ft		
Maximum Ratio of Footing Widths	1.000		B/D or D/B; Default = 1.00 (Square)	
Minimum Number of Piles	4			

WIND LOAD DATA

Superstructure Depth				
Barrier Height	2.667	ft	Entered Above	
Deck + Coping	11.000	in		
Top of Cap to Underside of Beam	6.000	in	Assumed Height of Bearing and Seat	
Wind Load on Substructure	40	psf		AASHTO 3.15.2.2
Wind on LL Height Above Deck	6.000	ft		AASHTO 3.15.2.1.2

MISCELLANEOUS LOAD DATA

Design Speed	65	MPH		
Long/Cent LL Height Above Deck	6.000	ft		AASHTO 3.9/3.10.3
Superstructure Material	Concrete		For Coefficient of Thermal Movement	AASHTO 8.16.8.4
Temperature Rise	30	°F		GDOT 3.10.2
Temperature Fall	40	°F		GDOT 3.10.2
Concrete Coefficient of Shrinkage	0.0002			AASHTO 8.5.4
Apply Longitudinal Forces:	6' Above Deck		Use 6' to match GDOT Default	

SUPERSTRUCTURE DEAD LOAD DATA

Deck Top Clearance	2.75	in	North of the Fall Line	GDOT Fig. 4-4
Coping for Dead Load	2.500	in	Assumed for design. 1½" min. Bulb-T	GDOT 3.12.5.1
Metal deck weight	16	psf	When using P/S Beams	GDOT 3.12.2.8
Future Wearing Surface	30	psf		GDOT 2.2.1

NOTES:

1. Design is Only for Uniform Beam Spacing
2. Design Assumes the Pier Cap Length is Equal to the Out-to-Out Bridge Width.
3. Standard Wind Intensities from AASHTO 3.15.2.1.1 are Used
4. Can only Handle 12 P-Loads for Dead Load & Live Load Cases
5. Design Assumes the Columns and Footings are All Identical