AASHTO-PCI-ASBI
Segmental Box Girder Standards
for Span-by-Span and
Balanced Cantilever Construction

Span-by-Span Standards 30.5 to 45.7 Meters

Balanced Cantilever Standards 30.5 to 61.0 Meters

Deck Widths 8.40 to 13.50 Meters

December, 1997

Purpose

The standards shown on these sheets have been developed to establish a limited number of practical sections leading to uniformity and simplicity of forming and production methods. These standards are applicable to most conditions of highway bridge loading and usage within the approximate span limits indicated for the sections, and the design loads specified in these General Notes.

Span Limits

The span limits shown on these sheets are approximate only and are not mandatory at either limit. The span limits shown contemplate the use of concrete weighing 155 pcf (including rebar) and concrete strength of not less than 5000 psi. It is intended that the segment depth should generally increase in 300 mm increments for each 6 M increase in span above the minimum span of 30.5 M.

Web Thickness

Web thickness for balanced cantilever construction is based on use of 100% internal tendons in top and bottom slabs (no draped internal or external tendons). The web thickness for balanced cantilever bridges with 100% straight internal tendons may be reduced for segments in the interior 60% of spans in accordance with shear requirements and other provisions of the "AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges". Reductions in shear and web thickness requirements for balanced cantilever construction may also be achieved by use of draped external tendons in the box cells in conjunction with straight internal tendons.

Precast Concrete

Recommended minimum strength of concrete is 5000 psi. Concrete of greater compressive strength may be used, and may be required for structural considerations, in which case limiting stresses will be based on the concrete specifications for the actual project.

Segment Lengths

Maximum Segment Length using these standards is 3000 mm. In curved alignments, the segment length should be kept as close to the Maximum as possible.

Post-Tensioning Steel

Post-Tensioning steel shall be 7-wire, 1/2 inch or 0.6 inch diameter strands, conforming to ASTM A416 (AASHTO M203), Grade 270. The maximum internal tendon size used for balanced cantilever construction under these standards shall not exceed 15-1/2 inch, or 12-0.6 inch diameter Grade 270 low relaxation strands. Unless otherwise stated in the contract special provisions, other aspects of furnishing, installing and grouting of prestressing steel shall be in accordance with the details shown on the plans, and the "Recommended Contract Administration Guidelines for Design and Construction of Segmental Concrete Bridges", March, 1995, American Segmental Bridge Institute.

Reinforcing Steel

All reinforcing steel shall conform to the requirements of the AASHTO Standard Specifications, and shall be ASTM A615, Grade 60, or ASTM A706. When permitted welded grillages shall be shop prepared. Field welding of reinforcing steel will be permitted at the discretion of the engineer.

Shop Drawing Requirements

Shop Drawing Requirements shall be in accordance with the "Recommended Contract Administration Guidelines for Design and Construction of Segmental Concrete Bridges" published by the American Segmental Bridge Institute, March, 1995, unless other provisions are stated in the Contract Special Provisions.

Fabrication, Formwork, Handling, Storage, Shipment and Erection

Fabrication, formwork, handling, storage, shipment and erection of precast segments shall be in accordance with the "Recommended Contract Administration Guidelines for Design and Construction of Segmental Concrete Bridges", March, 1995, American Segmental Bridge Institute, unless other requirements are specified in the Contract Special Provisions. Angular intersections of formwork shall have a minimum radius of 50 mm. Slab and box edges shall have a minimum chamfer of 20 mm.

Epoxy Joining of Precast Concrete Segments

When required by the Contract Drawings, epoxy joining of precast segments shall be in accordance with the Recommended Contract Administration Guidelines for Design and Construction of Segmental Concrete Bridges, March, 1995, American Segmental Bridge Institute, unless other requirements are specified in the Contract Special Provisions.

Temporary Post-Tensioning

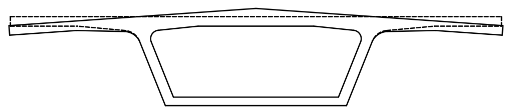
Temporary Post-tensioning required for construction of span-by-span, or balanced cantilever bridges using these standard segments shall be internal bars or tendons in top and bottom slabs unless specifically detailed otherwise in the contract drawings.

Camber Diagrams

For span-by-span construction, a final, long term camber diagram which compensates for deflections in accordance with the assumed material properties shall be provided by the designer. For balanced cantilever construction, camber diagrams shall be prepared by the contractor and reviewed by the designer.

Crown Roadway Cross Sections

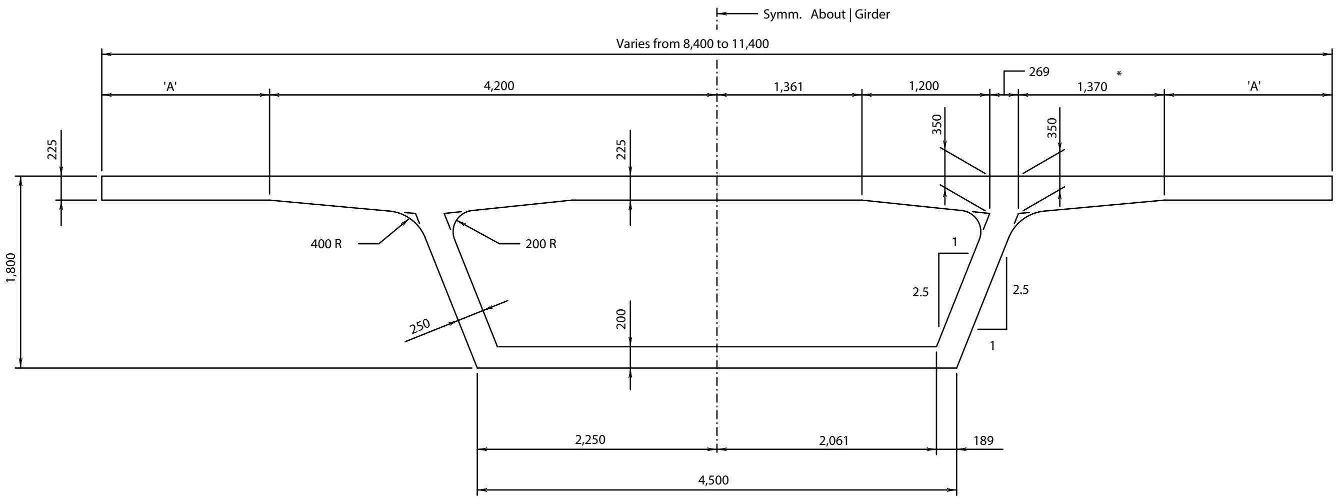
Crown roadways should be accomodated by rotating the cantilever wings downward and building up the top slab between the webs. The shape of the inside void shall remain unchanged.



Wearing Surfaces

For those regions in which deicing chemicals are used on roadways, a sacraficial wearing surface is recommeneded to protect the structural deck and thereby enhance the life of the structure. In regions where deicing chemicals are not used, as-cast riding surfaces without wearing surfaces may be used.

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN AND BALANCED CANTILEVER CONSTRUCTION	GENERAL NOTES



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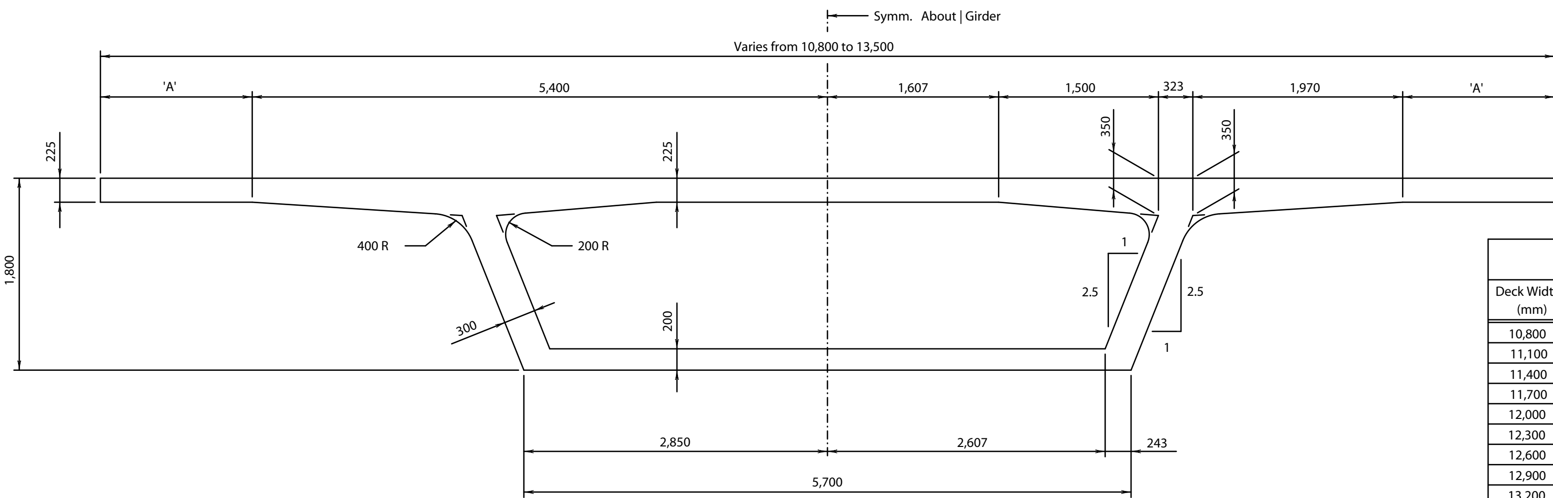


1800-2

NOTES:

1. Area denotes cross-sectional area.
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * For widths less than 8,400 mm, the 1,370 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

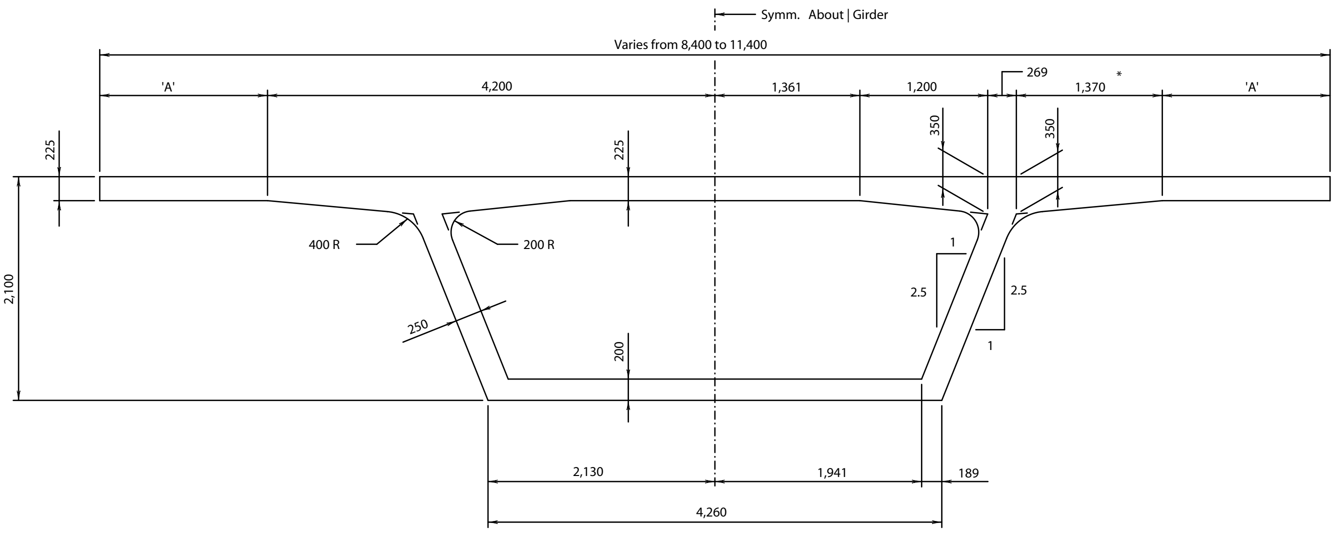
1800-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	3,920,000	287	1.784	651
8,700	150	3,988,000	292	1.804	642
9,000	300	4,055,000	297	1.823	633
9,300	450	4,123,000	302	1.841	625
9,600	600	4,190,000	307	1.859	616
9.900	750	4,258,000	312	1.876	608
10,200	900	4,325,000	317	1.893	601
10,500	1,050	4,393,000	322	1.909	593
10,800	1,200	4,460,000	326	1.924	586
11,100	1,350	4,528,000	331	1.940	579
11,400	1,500	4,595,000	336	1.954	572

1800-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	4,964,000	363	2.258	642
11,100	150	5,032,000	368	2.277	635
11,400	300	5,099,000	373	2.295	628
11,700	450	5,167,000	378	2.313	621
12,000	600	5,234,000	383	2.331	615
12,300	750	5,302,000	388	2.348	608
12,600	900	5,369,000	393	2.365	602
12,900	1,050	5,437,000	398	2.381	596
13,200	1,200	5,504,000	403	2.397	590
13,500	1,350	5,572,000	408	2.412	584

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	1800 mm SEGMENT DEPTH



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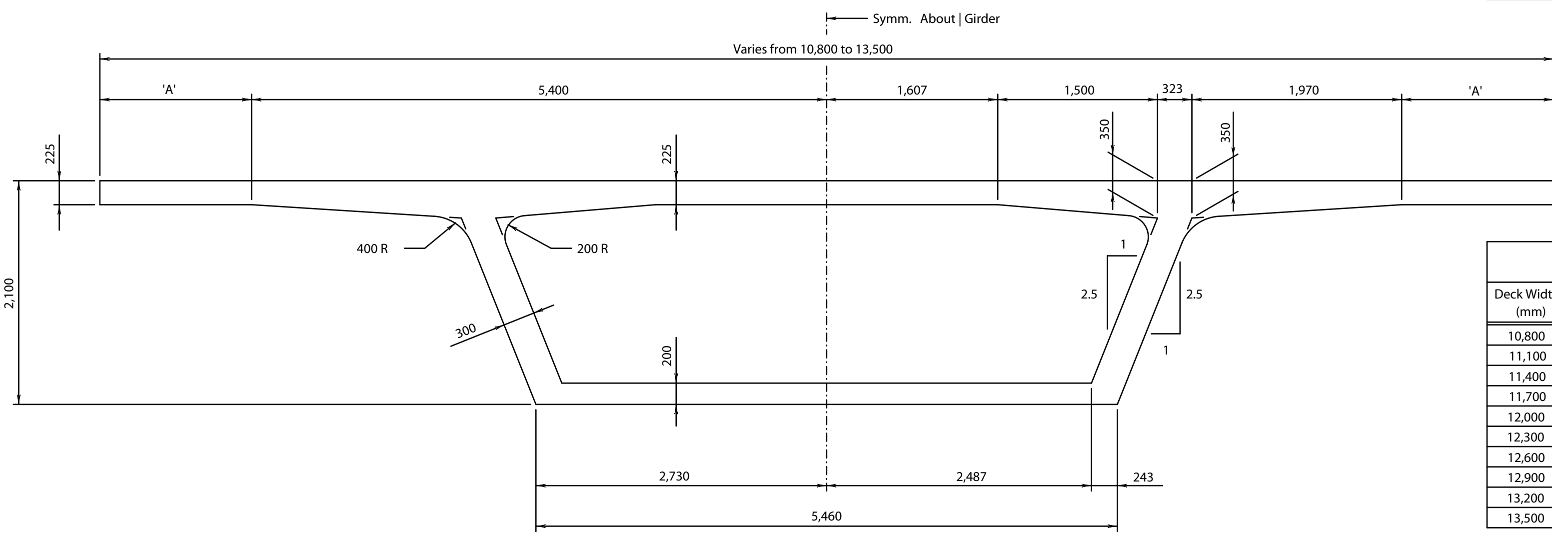


2100-2

NOTES:

1. Area denotes cross-sectional area.
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * For widths less than 8,400 mm, the 1,370 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

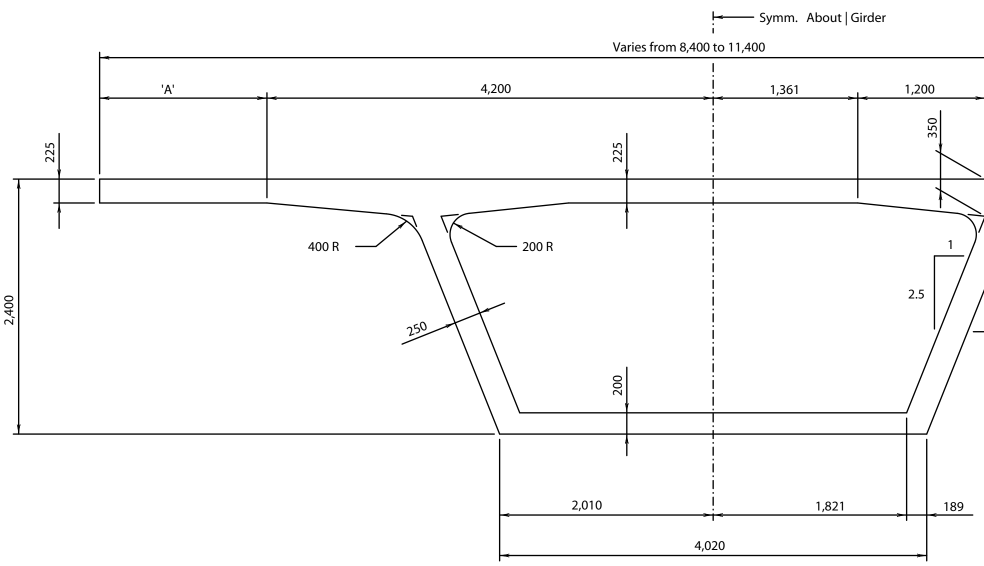
2100-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	4,033,000	295	2.515	747
8,700	150	4,101,000	300	2.542	737
9,000	300	4,168,000	305	2.568	726
9,300	450	4,236,000	310	2.593	717
9,600	600	4,303,000	315	2.617	707
9,900	750	4,371,000	320	2.641	698
10,200	900	4,438,000	325	2.665	689
10,500	1,050	4,506,000	330	2.687	680
10,800	1,200	4,573,000	335	2.709	672
11,100	1,350	4,641,000	340	2.730	664
11,400	1,500	4,708,000	345	2.750	656

2100-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	5,110,000	374	3.198	739
11,100	150	5,178,000	379	3.225	731
11,400	300	5,245,000	384	3.250	723
11,700	450	5,313,000	389	3.276	715
12,000	600	5,380,000	394	3.300	708
12,300	750	5,448,000	399	3.324	700
12,600	900	5,515,000	404	3.347	693
12,900	1,050	5,583,000	409	3.370	686
13,200	1,200	5,650,000	414	3.392	679
13,500	1,350	5,718,000	419	3.414	672

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	2100 mm SEGMENT DEPTH



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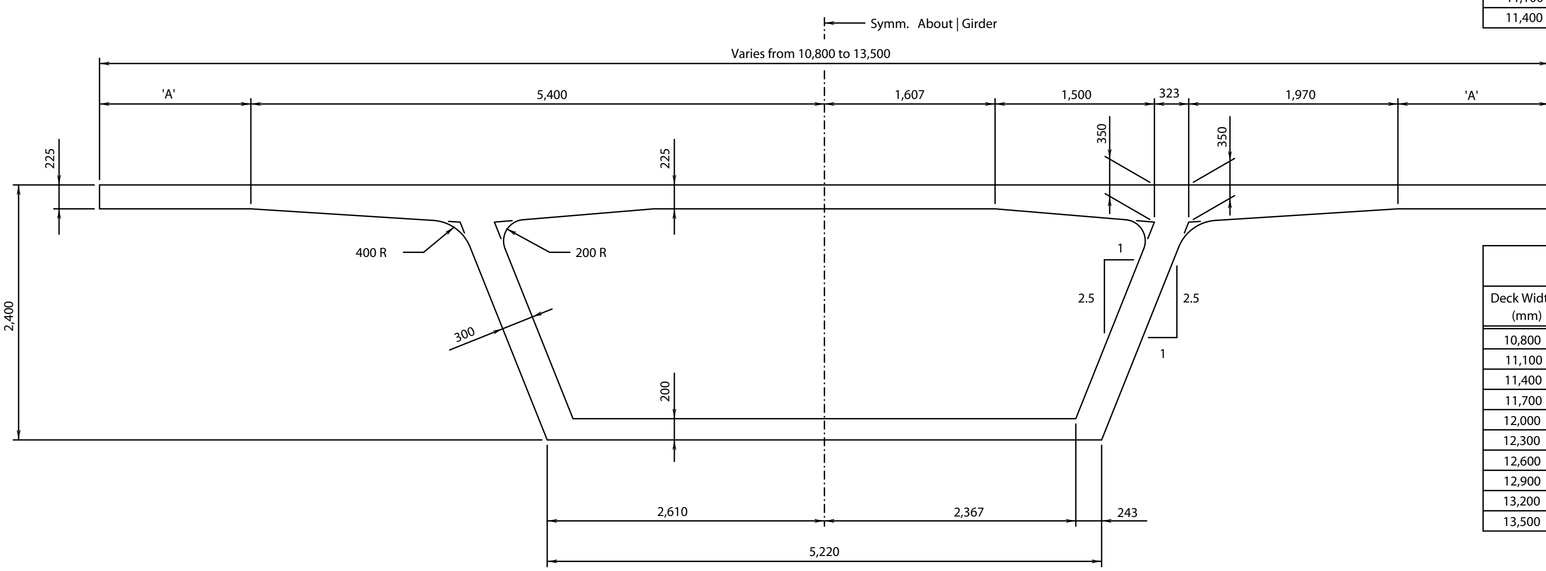


2400-2

NOTES:

1. Area denotes cross-sectional area.
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * For widths less than 8,400 mm, the 1,370 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

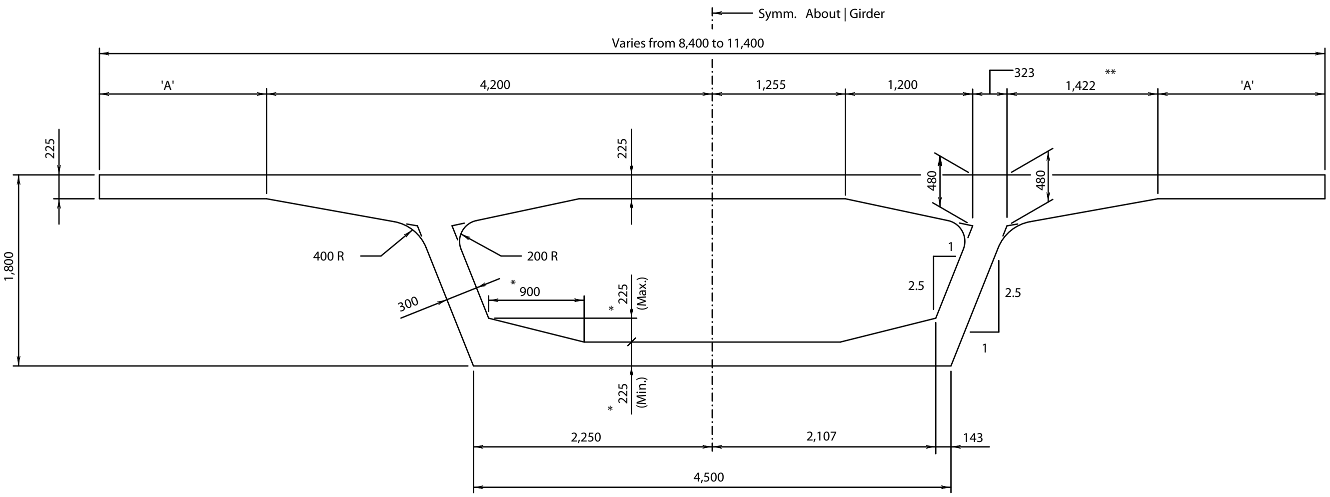
2400-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	4,147,000	304	3.366	842
8,700	150	4,214,000	308	3.402	830
9,000	300	4,282,000	313	3.437	819
9,300	450	4,349,000	318	3.470	808
9,600	600	4,417,000	323	3.502	797
9,900	750	4,484,000	328	3.534	787
10,200	900	4,552000	333	3.565	777
10,500	1,050	4,619,000	338	3.594	767
10,800	1,200	4,687,000	343	3.623	758
11,100	1,350	4,754,000	348	3.651	749
11,400	1,500	4,822,000	353	3.678	740

2400-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	5,256,000	385	4.303	836
11,100	150	5,323,000	390	4.339	827
11,400	300	5,391,000	395	4.373	818
11,700	450	5,458,000	400	4.406	809
12,000	600	5,526,000	404	4.439	801
12,300	750	5,593,000	409	4.471	792
12,600	900	5,661,000	414	4.502	784
12,900	1,050	5,728,000	419	4.532	776
13,200	1,200	5,796,000	424	4.562	769
13,500	1,350	5,863,000	429	4.591	761

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	2400 mm SEGMENT DEPTH



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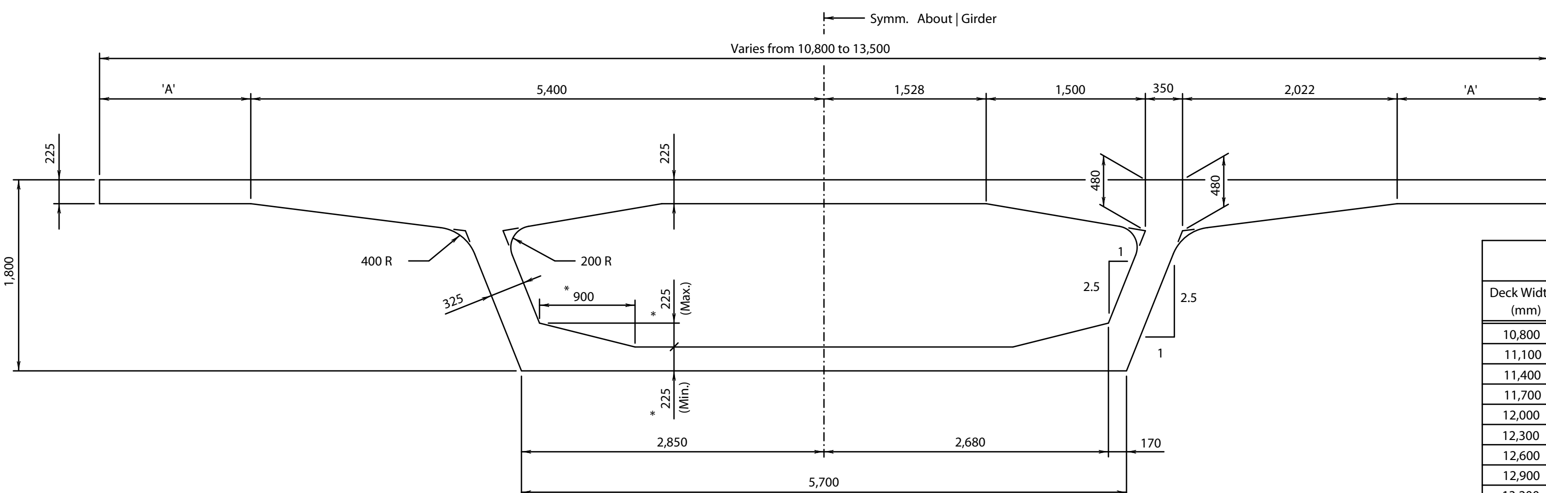


1800-2

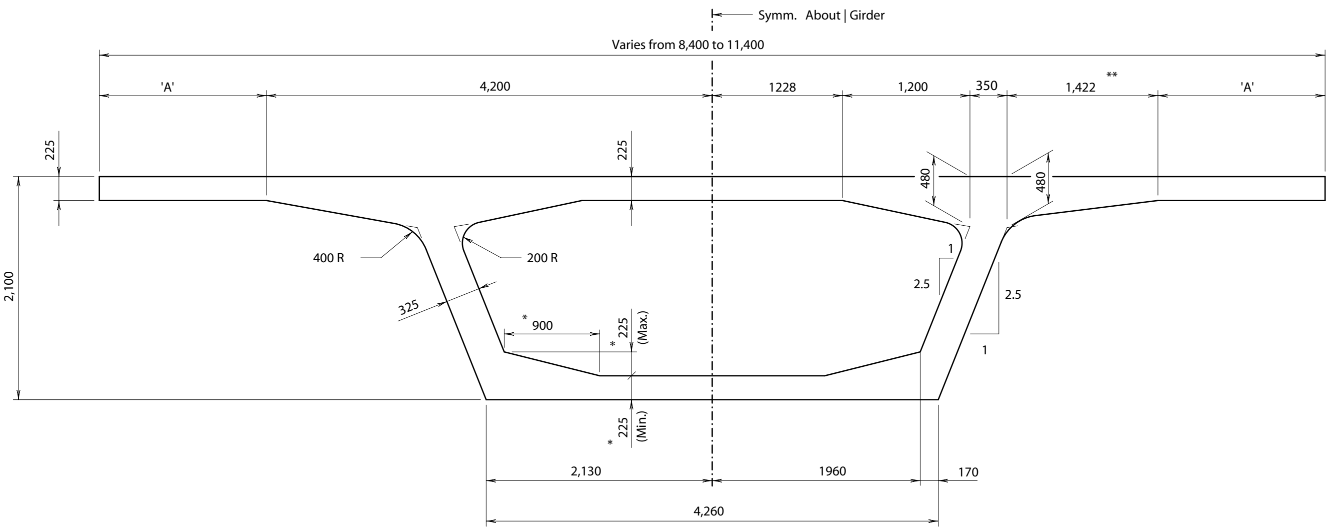
1800-1					
Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	4,687,000	343	2.060	692
8,700	150	4,755,000	348	2.083	684
9,000	300	4,822,000	353	2.105	676
9,300	450	4,890,000	358	2.126	668
9,600	600	4,957,000	363	2.147	660
9,900	750	5,025,000	368	2.167	653
10,200	900	5,092,000	373	2.187	646
10,500	1,050	5,160,000	378	2.206	639
10,800	1,200	5,227,400	383	2.225	632
11,100	1,350	5,295,000	388	2.243	626
11,400	1,500	5,362,000	393	2.261	619

NOTES:

1. Area denotes cross-sectional area.
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * Bottom slab thickness may increase to a maximum of 450 mm at piers. 900 mm dimension adjusts accordingly
6. ** For widths less than 8,400 mm, the 1,422 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

1800-2					
Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	5,805,000	425	2.559	672
11,100	150	5,872,000	430	2.580	666
11,400	300	5,940,000	435	2.601	659
11,700	450	6,007,000	440	2.621	653
12,000	600	6,075,000	445	2.641	647
12,300	750	6,142,000	450	2.660	641
12,600	900	6,210,000	455	2.679	636
12,900	1,050	6,277,000	460	2.697	630
13,200	1,200	6,345,000	464	2.716	624
13,500	1,350	6,412,000	469	2.733	619

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	1800 mm SEGMENT DEPTH



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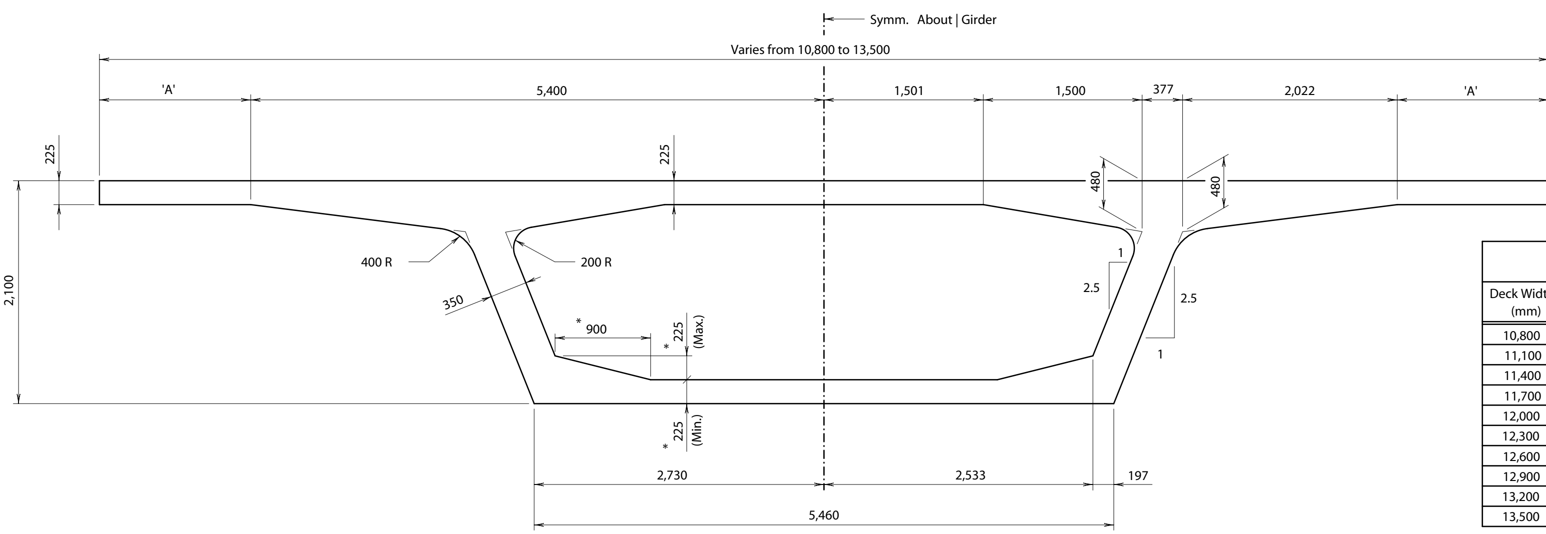

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2100-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	4,916,000	360	2.967	799
8,700	150	4,984,000	365	2.999	790
9,000	300	5,051000	370	3.030	781
9,300	450	5,119,000	375	3.060	772
9,600	600	5,186,000	380	3.089	763
9,900	750	5,254,000	385	3.118	755
10,200	900	5,321,000	390	3.145	747
10,500	1,050	5,389,000	394	3.172	739
10,800	1,200	5,456,000	399	3.199	731
11,100	1,350	5,524,000	404	3.225	723
11,400	1,500	5,591,000	409	3.250	716

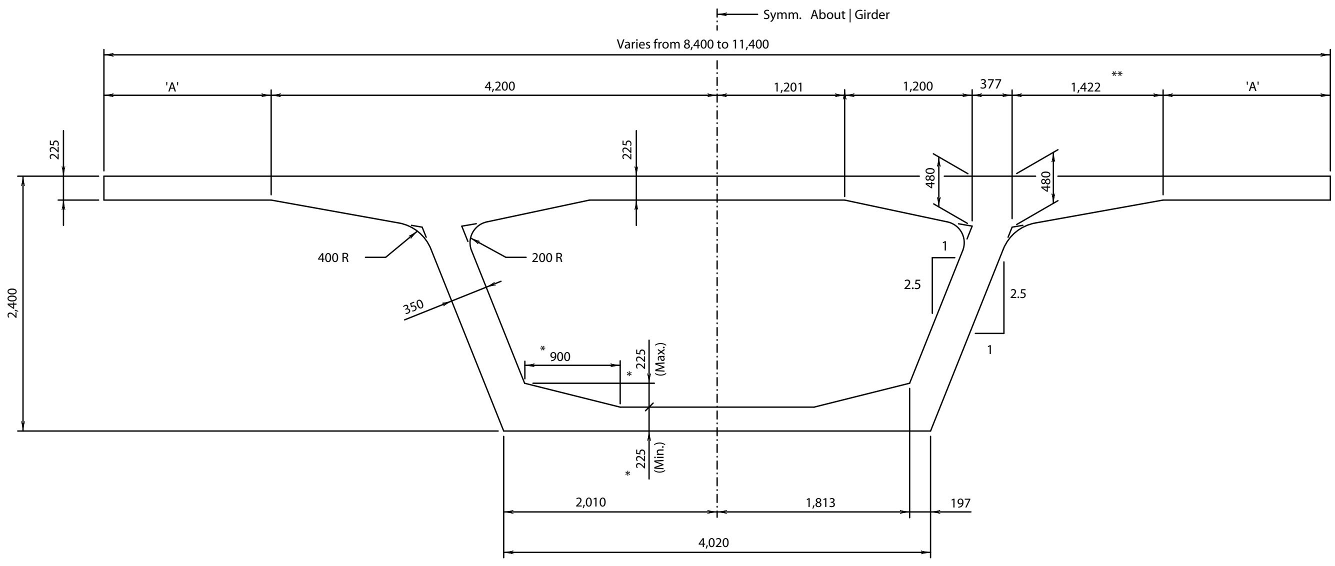
NOTES:

1. Area denotes cross-sectional area.
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * Bottom slab thickness may increase to a maximum of 450 mm at piers. 900 mm dimension adjusts accordingly
6. ** For widths less than 8,400 mm, the 1,422 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

2100-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	6,050,000	443	3.685	776
11,100	150	6,117,000	448	3.715	769
11,400	300	6,185,000	453	3.744	762
11,700	450	6,252,000	458	3.772	755
12,000	600	6,320,000	463	3.800	748
12,300	750	6,387,000	468	3.827	741
12,600	900	6,455,000	472	3.854	734
12,900	1,050	6,522,000	477	3.880	728
13,200	1,200	6,590,000	482	3.906	722
13,500	1,350	6,657,000	487	3.931	715

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	2100 mm SEGMENT DEPTH



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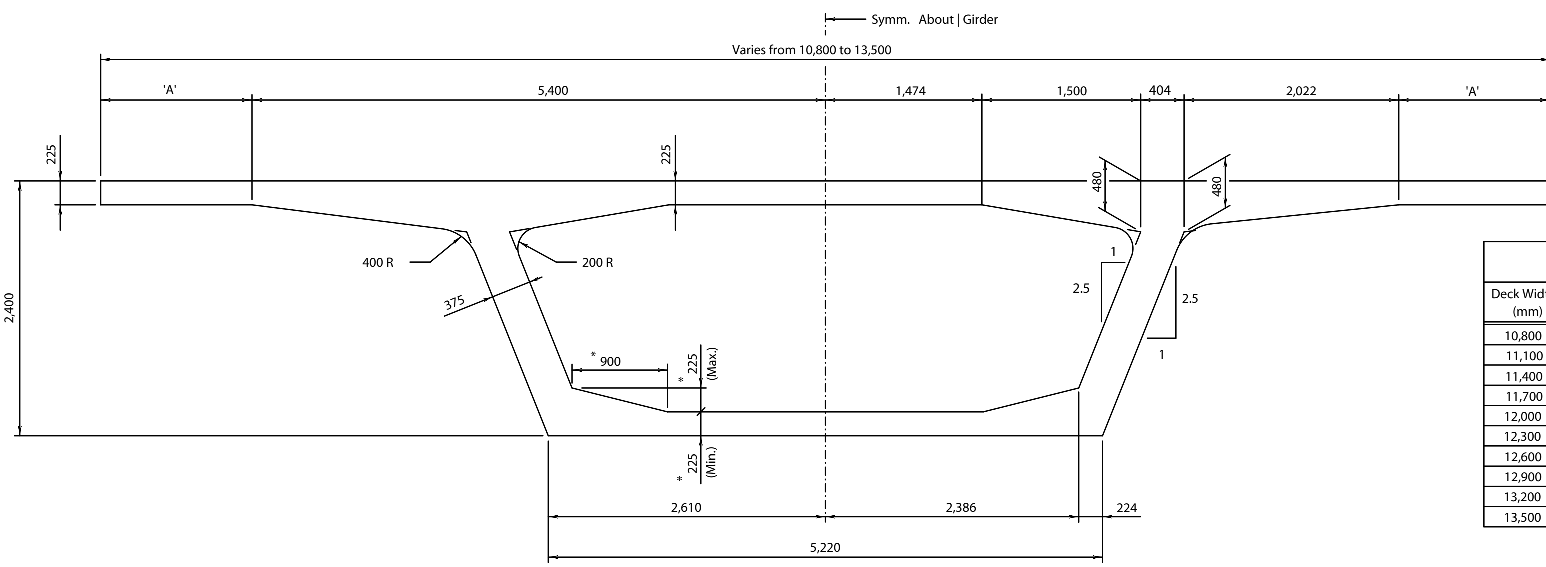

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2400-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	5,177,000	379	4.064	908
8,700	150	5,245,000	384	4.107	898
9,000	300	5,312,000	389	4.148	888
9,300	450	5,380,000	394	4.188	878
9,600	600	5,447,000	399	4.228	869
9,900	750	5,515,000	404	4.266	859
10,200	900	5,582,000	409	4.304	850
10,500	1,050	5,650,000	414	4.340	841
10,800	1,200	5,717,000	419	4.376	833
11,100	1,350	5,785,000	423	4.411	824
11,400	1,500	5,852,000	428	4.445	816

NOTES:

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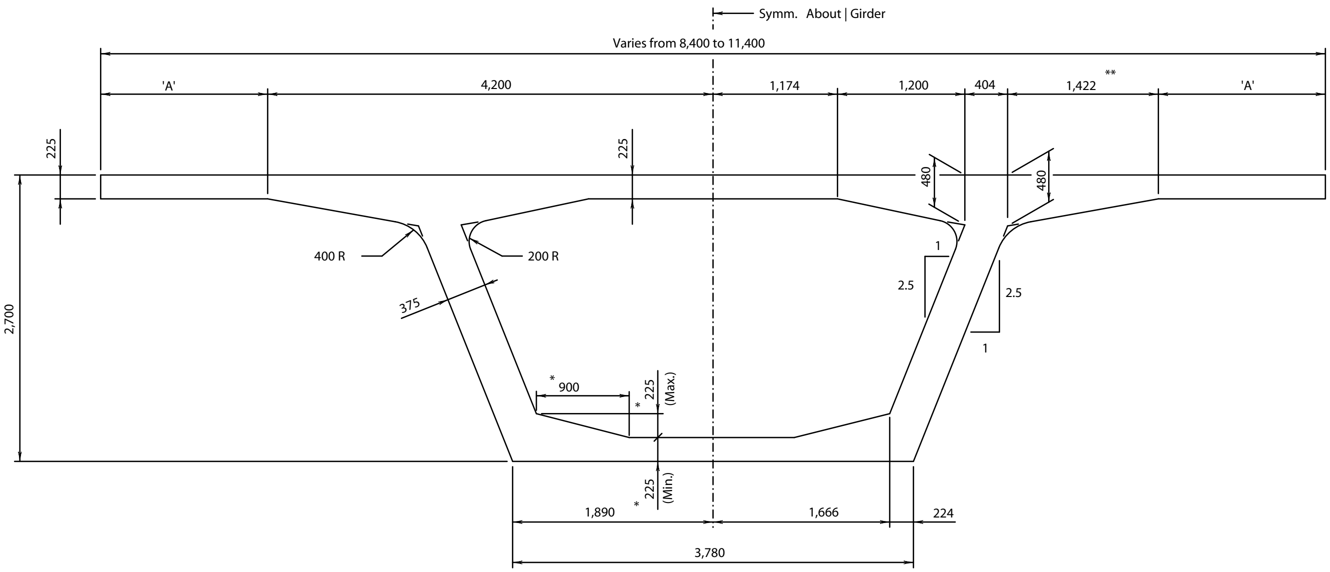
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * Bottom slab thickness may increase to a maximum of 450 mm at piers. 900 mm dimension adjusts accordingly
6. ** For widths less than 8,400 mm, the 1,422 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

2400-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	6.327,000	463	5.045	882
11,100	150	6,395,000	468	5.085	874
11,400	300	6,462,000	473	5.124	866
11,700	450	6,530,000	478	5.162	858
12,000	600	6,597,000	483	5.199	851
12,300	750	6,665,000	488	5.236	843
12,600	900	6,732,000	493	5.272	836
12,900	1,050	6,800,000	498	5.307	829
13,200	1,200	6,867,000	503	5.342	821
13,500	1,350	6,935,000	508	5.376	815

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	2400 mm SEGMENT DEPTH



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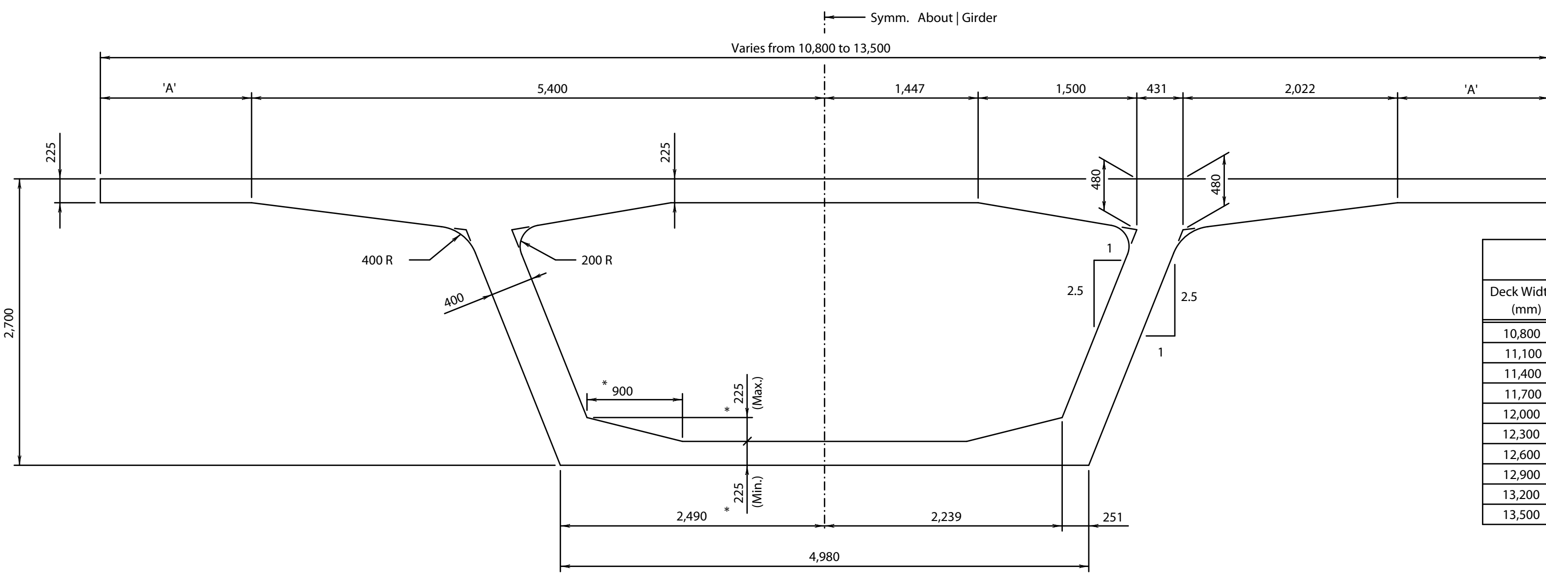

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2700-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	5,471,000	401	5.368	1,021
8,700	150	5,539,000	405	5.423	1,010
9,000	300	5,606,000	410	5.477	999
9,300	450	5,674,000	415	5.530	989
9,600	600	5,741,000	420	5.581	978
9,900	750	5,809,000	425	5.632	968
10,200	900	5,876,000	430	5.681	958
10,500	1,050	5,944,000	435	5.729	949
10,800	1,200	6,011,000	440	5.776	939
11,100	1,350	6,079,000	445	5.822	930
11,400	1,500	6,146,000	450	5.867	921

NOTES:

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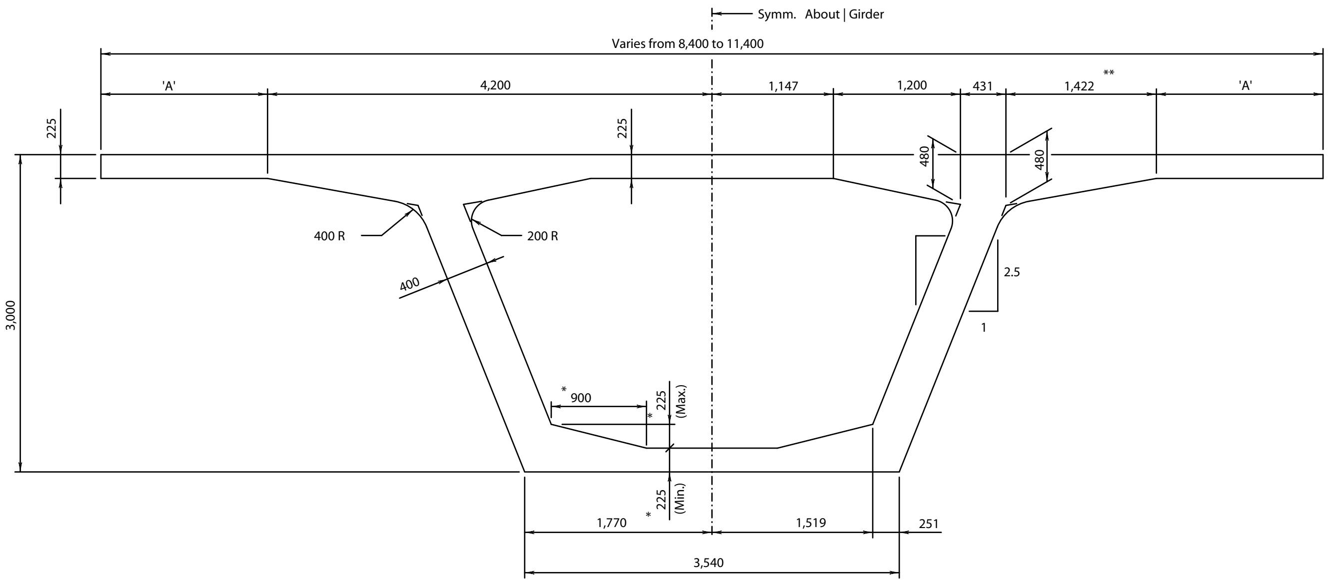
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * Bottom slab thickness may increase to a maximum of 450 mm at piers. 900 mm dimension adjusts accordingly
6. ** For widths less than 8,400 mm, the 1,422 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

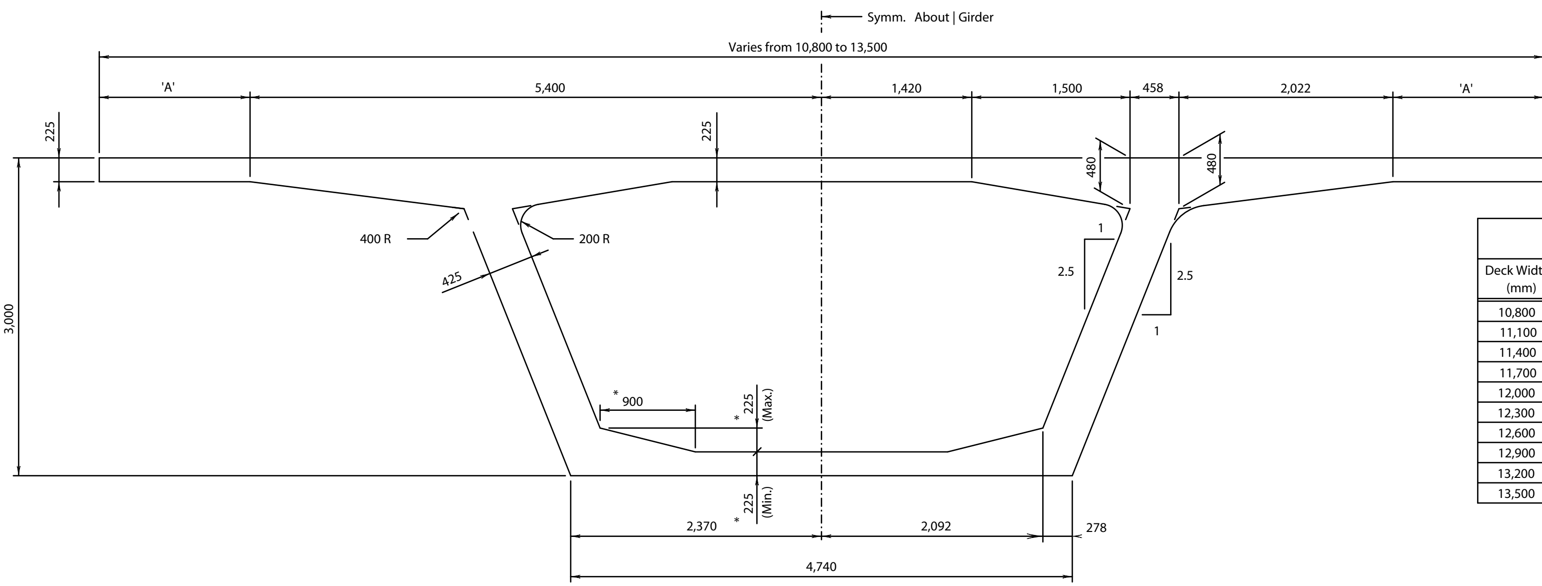
2700-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	6,637,000	486	6.656	992
11,100	150	6,705,000	491	6.708	983
11,400	300	6,772,000	496	6.759	974
11,700	450	6,840,000	501	6.809	966
12,000	600	6,907,000	506	6.858	958
12,300	750	6,975,000	511	6.906	949
12,600	900	7,042,000	515	6.953	941
12,900	1,050	7,110,000	520	6.999	934
13,200	1,200	7,177,000	525	7.045	926
13,500	1,350	7,245,000	530	7.089	918

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	2700 mm SEGMENT DEPTH



3000-1



3000-2

3000-1

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
8,400	0	5,797,000	424	6.897	1,137
8,700	150	5,865,000	429	6.968	1,125
9,000	300	5,932,000	434	7.036	1,114
9,300	450	6,000,000	439	7.104	1,102
9,600	600	6,067,000	444	7.169	1,091
9,900	750	6,135,000	449	7.234	1,081
10,200	900	6,202,000	454	7.296	1,070
10,500	1,050	6,270,000	459	7.358	1,060
10,800	1,200	6,337,000	464	7.418	1,050
11,100	1,350	6,405,000	469	7.477	1,040
11,400	1,500	6,472,000	474	7.535	1,030

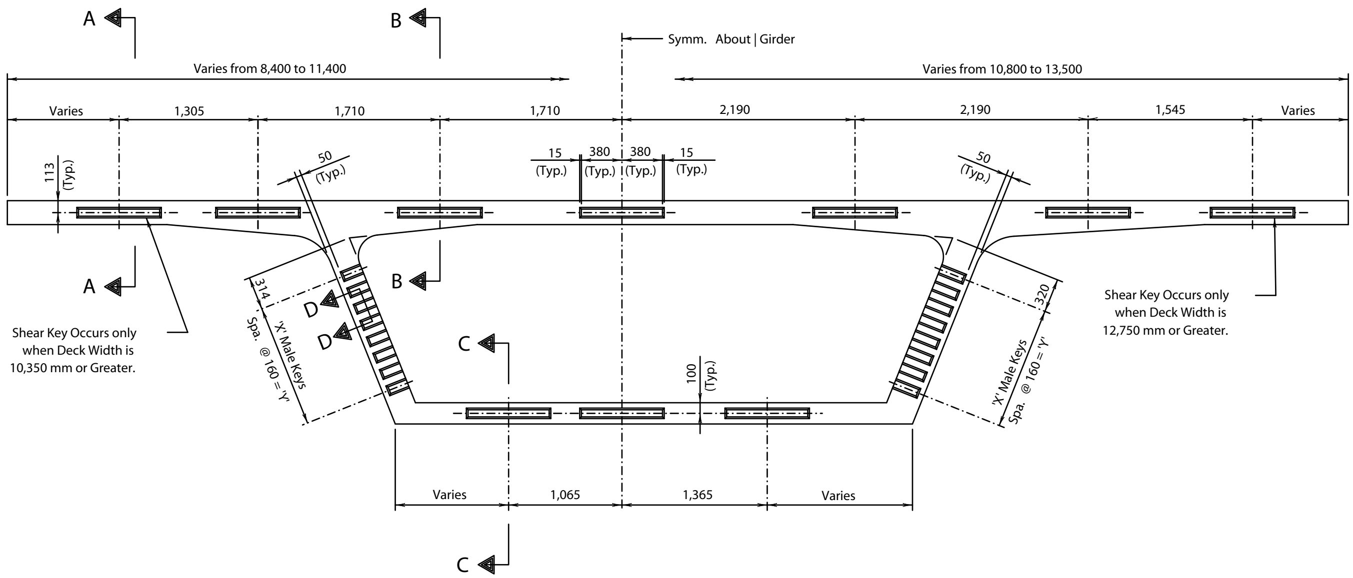
NOTES:

1. Area denotes cross-sectional area.
2. Wt denotes segment weight for 3000 mm segment.
3. Ix denotes bending moment of inertia.
4. Yt denotes distance from the centroidal axis to the top of section.
5. * Bottom slab thickness may increase to a maximum of 450 mm at piers. 900 mm dimension adjusts accordingly
6. ** For widths less than 8,400 mm, the 1,370 mm dimension is decreased. The depth of the slab at the edge of the segment increases accordingly.

3000-2

Deck Width (mm)	'A' (mm)	Area (mm^2)	Wt/3,000 mm (Kn)	Ix (m^4)	Yt (mm)
10,800	0	6,980,000	511	8.540	1,105
11,100	150	7,047,000	516	8.606	1,095
11,400	300	7,115,000	521	8.671	1,086
11,700	450	7,182,000	526	8.735	1,077
12,000	600	7,250,000	531	8.797	1,068
12,300	750	7,317,000	536	8.858	1,059
12,600	900	7,385,000	541	8.919	1,051
12,900	1,050	7,452,000	545	8.978	1,042
13,200	1,200	7,520,000	550	9.036	1,034
13,500	1,350	7,587,000	555	9.093	1,026

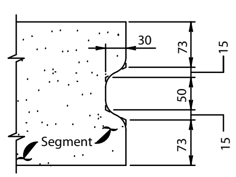
AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	3000 mm SEGMENT DEPTH



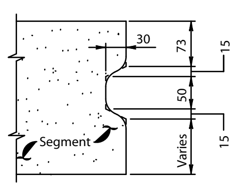
BULKHEAD HALF SECTION - SERIES 1

BULKHEAD HALF SECTION - SERIES 2

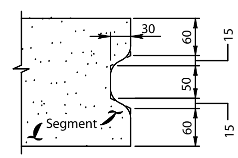
Segment Depth (mm)	'X'	'Y' (mm)
1800	6	800
2100	8	1,120
2400	10	1,440



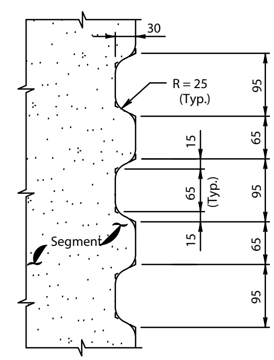
SECTION A-A



SECTION B-B

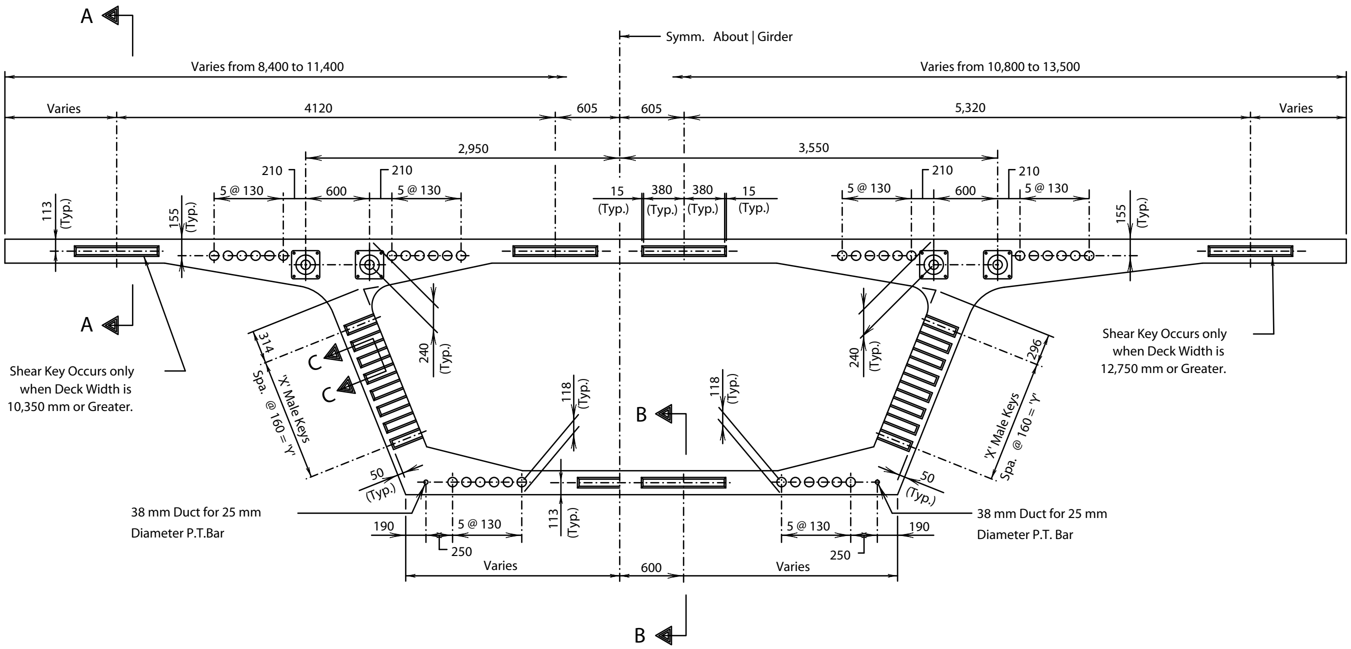


SECTION C-C



SECTION D-D

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	STANDARD BULKHEAD DETAILS



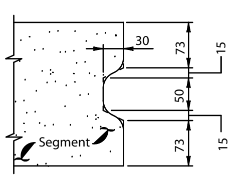
BULKHEAD HALF SECTION - SERIES 1

BULKHEAD HALF SECTION - SERIES 2

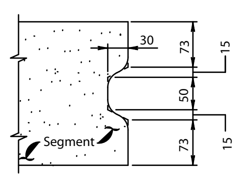
NOTES:

1. Unless otherwise noted, all ducts are 90 mm diameter for 12 x 15mm diameter or 15 x 13 mm diameter strand tendons.
2. Post-tensioning layouts for balanced cantilever construction using these standards shall utilize the duct and anchorage locations shown. Details shall be in acccordance with the "Recommended Contract Administration Guidelines for Design and Construction of Segmental Concrete Bridges".

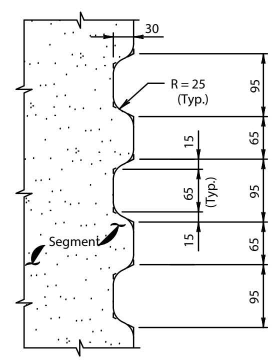
Segment Depth (mm)	'X'	'Y' (mm)
1800	4	480
2100	6	800
2400	8	1,120
2700	10	1,440
3000	12	1,760



SECTION A-A

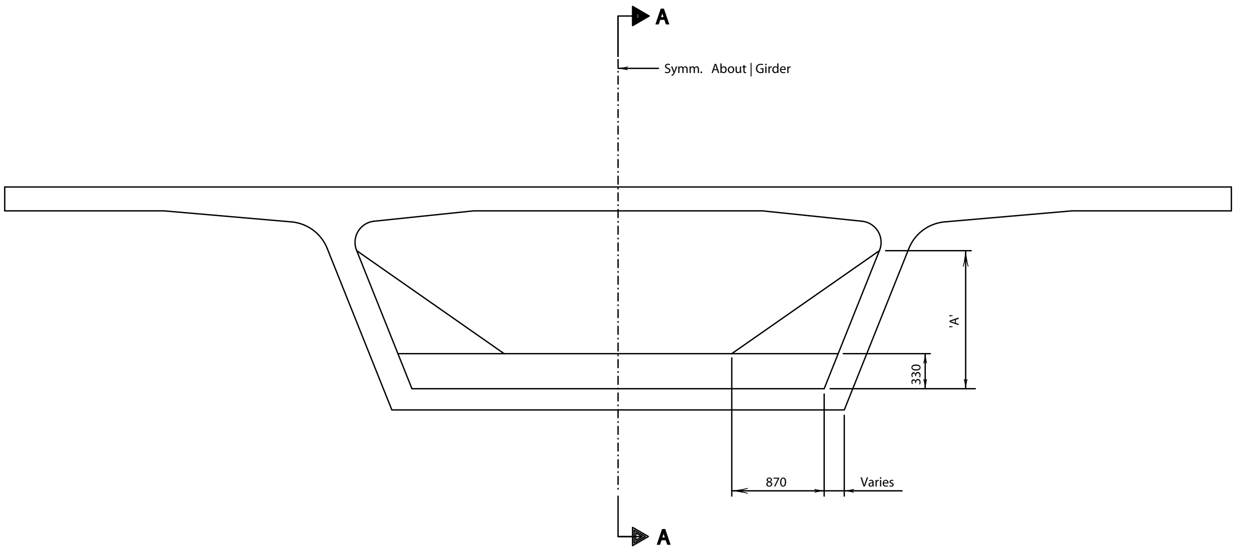


SECTION B-B

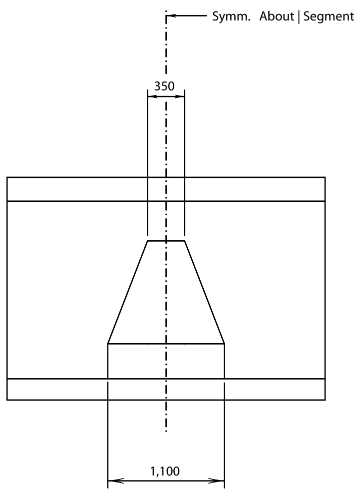


SECTION C-C

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	STANDARD BULKHEAD DETAILS



CROSS SECTION



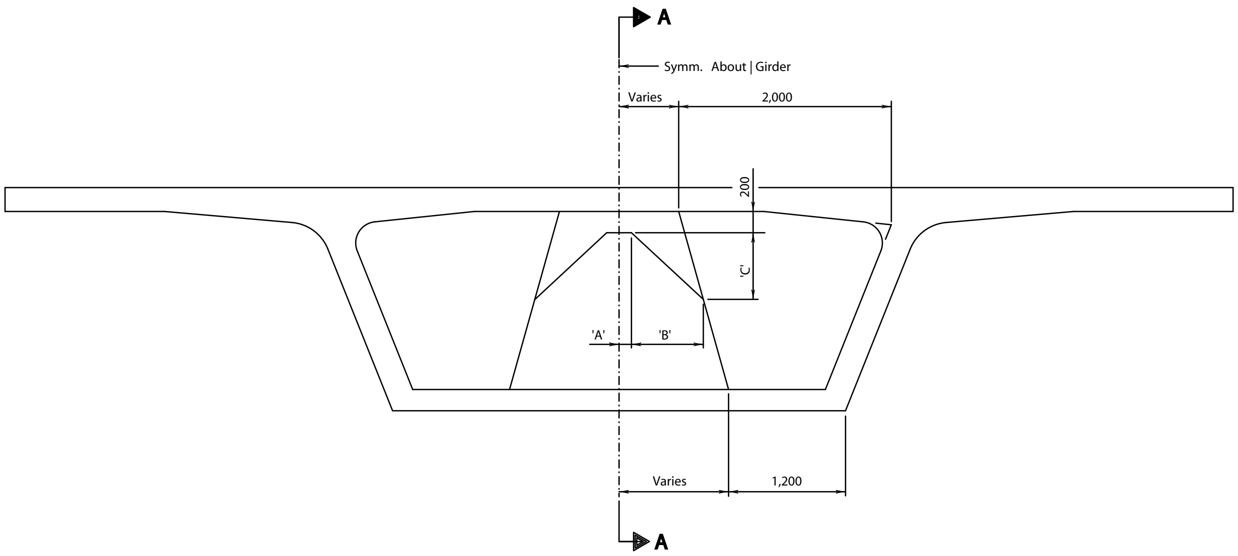
SECTION A-A

NOTES:

1. The weight given is for the deviation diaphragm only. The Total segment weight is the weight of the diaphragm plus the weight for the cross-section listed on the segment dimension sheets.

Section Type	'A' (mm)	Dev. Dia. Wt. (Kn)
1800-1	1,000	50
1800-2	1,000	59
2100-1	1,300	53
2100-2	1,300	62
2400-1	1,600	56
2400-2	1,600	66

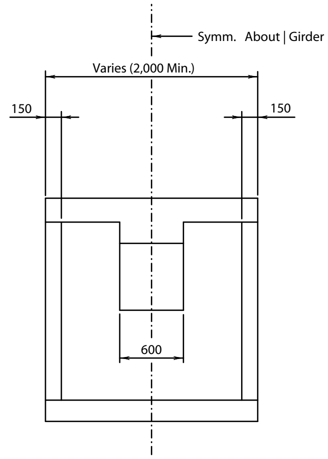
AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	DEVIATION DIAPHRAGM DIMENSIONS



CROSS SECTION

NOTES:

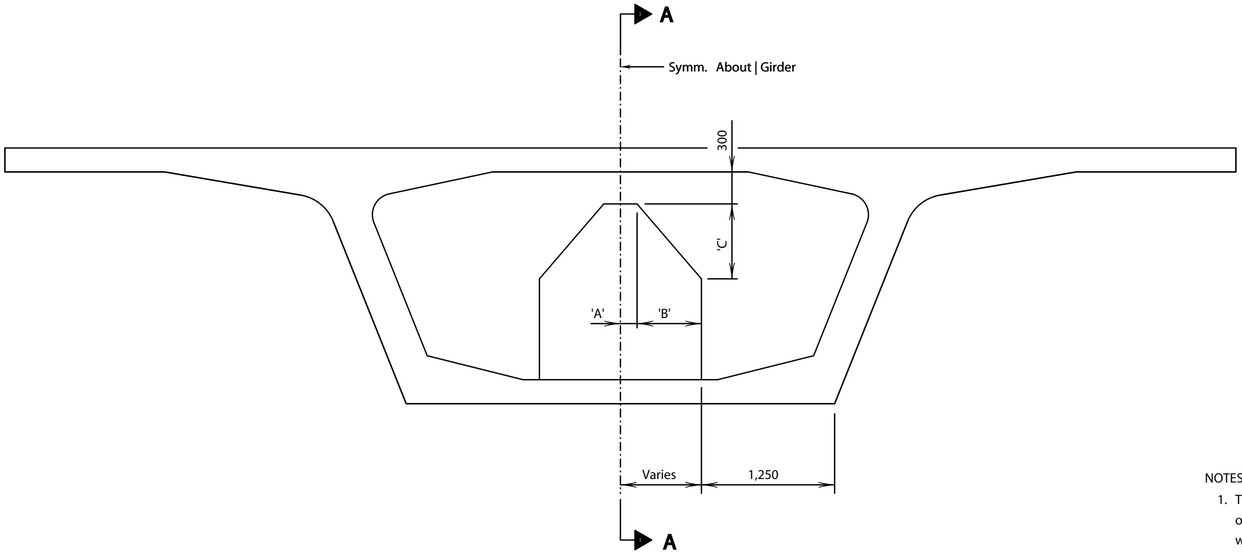
1. The weight given is for the diaphragm only. The Total segment weight is the weight of the diaphragm plus the weight for the cross-section listed on the segment dimension sheets. The weight given is for the minimum segment length of 2.000 M. The Additional weight given is the increase in diaphragm weight per additional 1.000 M. increase in segment length.



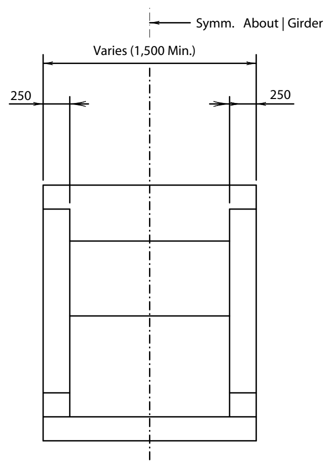
SECTION A-A

Section Type	'A' (mm)	'B' (mm)	'C' (mm)	Weight (KN)	Add. Weight (KN)
1800-1	171	625	460	173	98
1800-2	239	1,230	716	179	95
2100-1	116	615	570	212	120
2100-2	176	1,201	869	219	117
2400-1	74	598	683	251	143
2400-2	128	1,167	1026	259	139

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	INTERIOR PIER SEGMENT DIAPHRAGM DIMENSIONS



CROSS SECTION



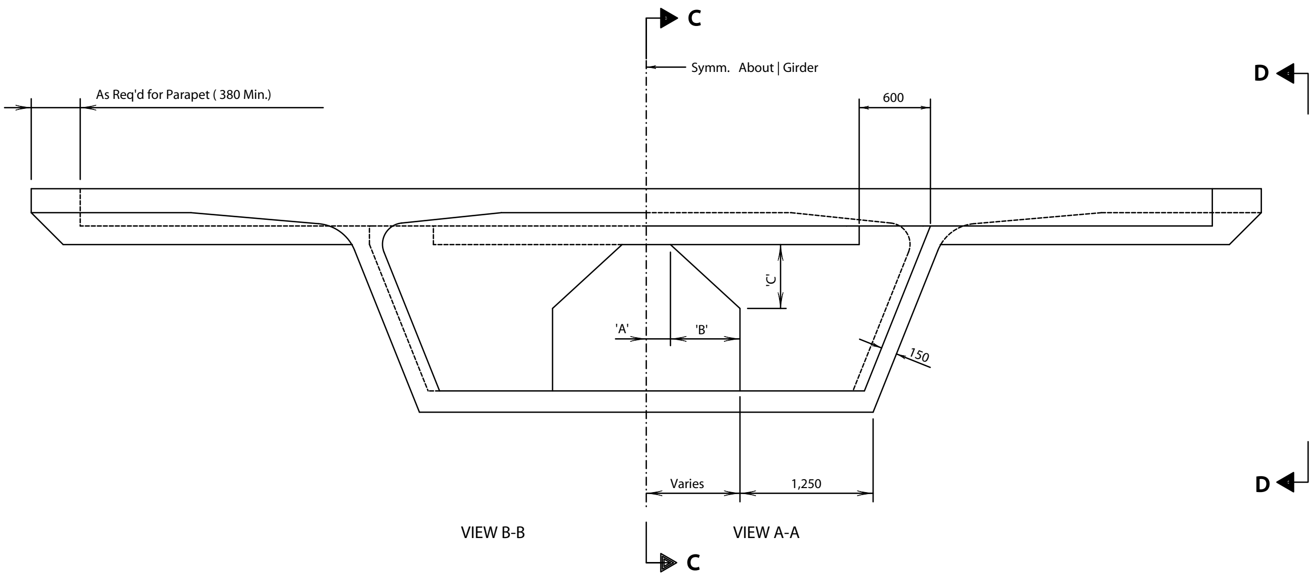
SECTION A-A

NOTES:

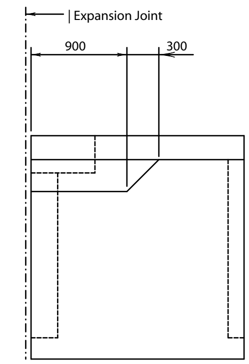
1. The weight given is for the diaphragm only. The Total segment weight is the weight of the diaphragm plus the weight for the cross-section listed on the segment dimension sheets. The weight given is for the minimum segment length of 1.500 M. The Additional weight given is the increase in diaphrgm weight per additional 1.000 M. increase in segment length.

Section Type	'A' (mm)	'B' (mm)	'C' (mm)	Weight (KN)	Add. Wt. (KN)
1800-1	357	643	475	95	95
1800-2	413	1,187	687	111	111
2100-1	221	659	618	116	116
2100-2	313	1,167	846	135	135
2400-1	156	604	703	137	137
2400-2	239	1,121	994	158	158
2700-1	106	534	763	158	158
2700-2	181	1,059	1,130	181	181
3000-1	65	455	790	180	180
3000-2	134	986	1,252	205	205

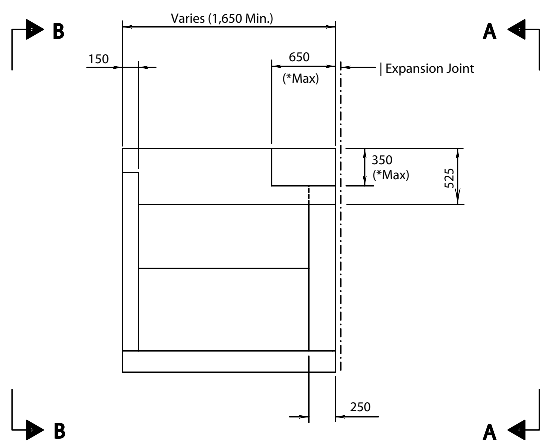
INTERIOR PIER SEGMENT
DIAPHRAGM DIMENSIONS



CROSS SECTION



VIEW D-D



SECTION C-C

NOTES:

1. The weights given in each column are for the minimum width (8,400 mm or 10,800 mm) and maximum width (11,400 mm or 13,500 mm) segments respectively.

2. Weight (1.650) and Weight (3.000) denotes the weight 1.650 M and 3.000 M segment lengths respectively.

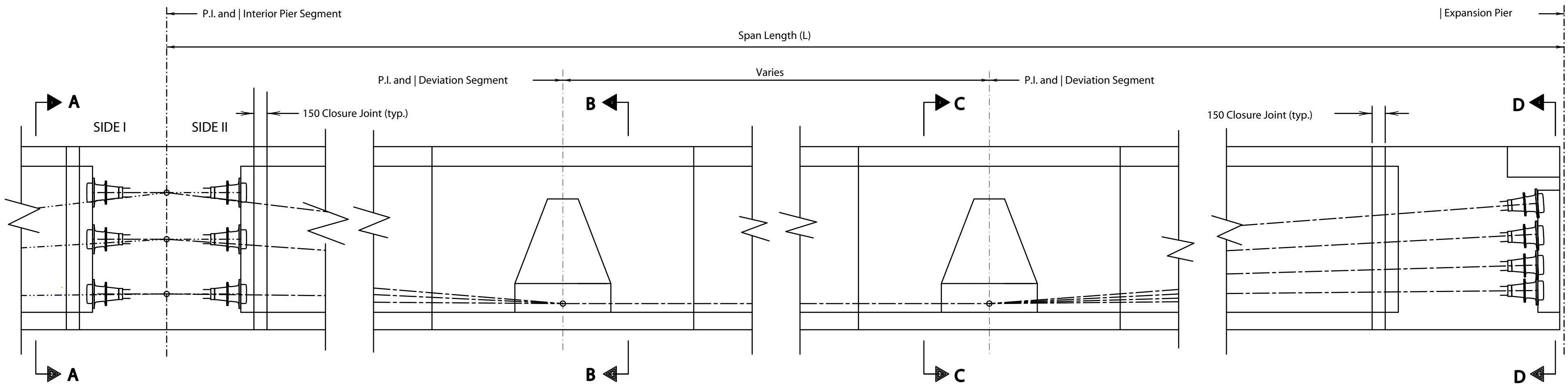
3. * Actual Dimensions Depend upon Expansion Joint Device Specified.

SPAN-BY-SPAN

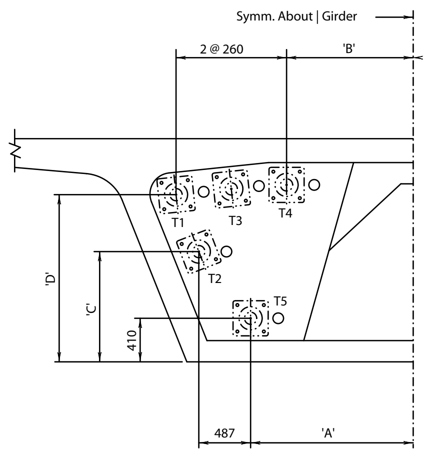
Section Type	'A' (mm)	'B' (mm)	'C' (mm)	Weight (1.650) (KN)	Weight (3.000) (KN)
1800-1	306	694	512	268/303	544/600
1800-2	413	1,187	687	328/359	658/710
2100-1	221	659	618	302/337	614/670
2100-2	313	1,167	846	365/396	736/787
2400-1	156	604	703	337/372	686/742
2400-2	239	1,121	994	404/435	815/866

BALANCED CANTILEVER

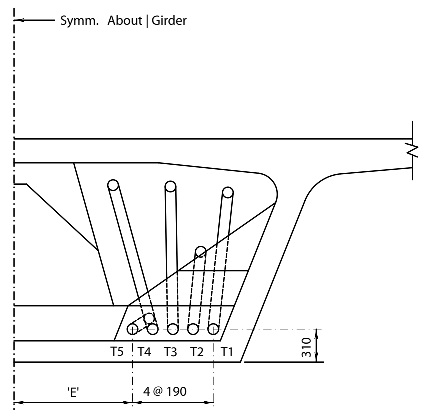
Section Type	'A' (mm)	'B' (mm)	'C' (mm)	Weight (1.650) (KN)	Weight (3.000) (KN)
1800-1	306	694	512	276/311	559/616
1800-2	413	1,187	687	334/365	675/726
2100-1	221	659	618	311/345	629/686
2100-2	313	1,167	846	372/403	753/804
2400-1	156	604	703	346/381	702/758
2400-2	239	1,121	994	411/442	833/884
2700-1	106	534	763	383/418	777/834
2700-2	181	1,059	1,130	451/482	915/966
3000-1	65	455	790	421/456	855/912
3000-2	134	986	1,252	492/523	998/1049



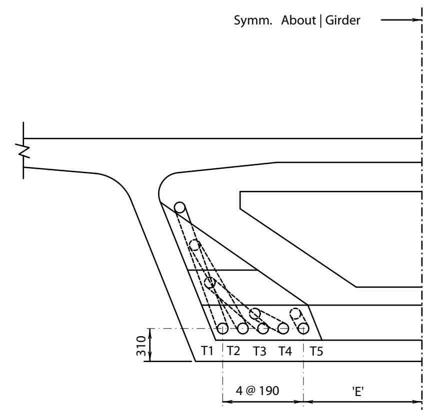
ELEVATION



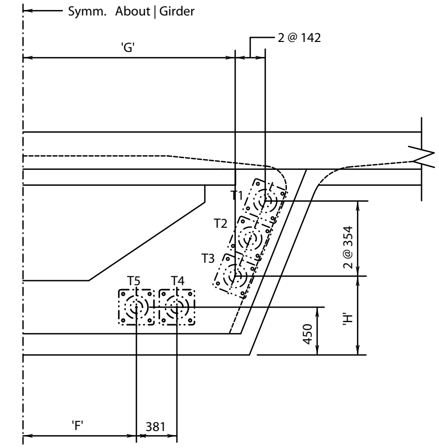
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

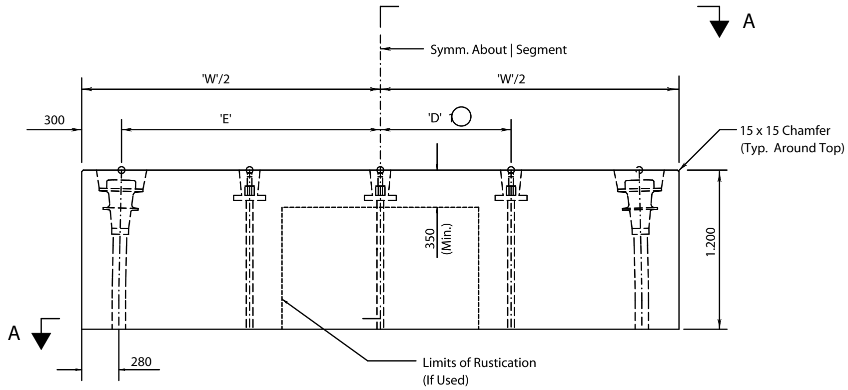
	Section Type	'A' (mm)	'B' (mm)	'C' (mm)	'D' (T1) (mm)	'D' (T3) (mm)	'D' (T4) (mm)
SIDE I	1800-1	1,650	1,192	737	1,273	1,327	1,365
	1800-2	2,196	1,738	737	1,273	1,327	1,365
	2100-1	1,530	1,192	1,037	1,573	1,627	1,665
	2100-2	2,076	1,738	1,037	1,573	1,627	1,665
	2400-1	1,410	1,192	1,337	1,873	1,927	1,965
	2400-2	1,956	1,738	1,337	1,873	1,927	1,965

	Section Type	'A' (mm)	'B' (mm)	'C' (mm)	'D' (T1) (mm)	'D' (T3) (mm)	'D' (T4) (mm)
SIDE II	1800-1	1,390	932	737	1,300	1,354	1,365
	1800-2	1,936	1,478	737	1,300	1,354	1,365
	2100-1	1,270	932	1,037	1,600	1,654	1,665
	2100-2	1,816	1,478	1,037	1,600	1,654	1,665
	2400-1	1,150	932	1,337	2,100	1,954	1,965
	2400-2	1,696	1,478	1,337	2,100	1,954	1,965

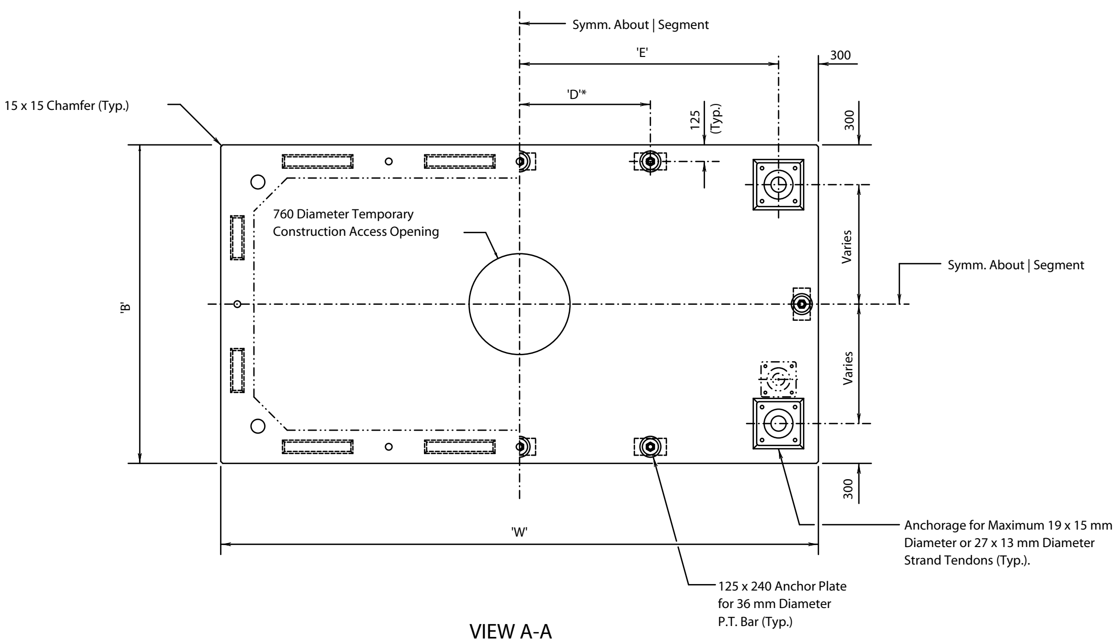
Section Type	'E' (mm)
1800-1	1,235
1800-2	1,781
2100-1	1,115
2100-2	1,661
2400-1	995
2400-2	1,541

Section Type	'F' (mm)	'G' (mm)	'H' (mm)
1800-1	1,658	1,996	442
1800-2	2,168	2,542	442
2100-1	1,448	1,996	742
2100-2	2,048	2,542	742
2400-1	1,328	1,996	1,042
2400-2	1,928	2,542	1,042

AASHTO - PCI - ASBI SEGMENTAL BOX GIRDER STANDARDS	FOR SPAN-BY-SPAN CONSTRUCTION SPANS 30.5 TO 45.7 METERS	POST-TENSIONING LAYOUT



ELEVATION



VIEW A-A

Section Type	'W' (mm)	'B' (mm)	'D' (mm)	'E' (mm)
1800-1	4020	1800	865	1730
1800-2	4260	1800	925	1850
1800-3	4500	1800	985	1970
1800-4	5220	1800	1165	2330
1800-5	5460	1800	1225	2450
1800-6	5700	1800	1285	2570
2400-1	3540	2400	745	1490
2400-2	3780	2400	805	1610
2400-3	4020	2400	865	1730
2400-4	4260	2400	925	1850
2400-5	4500	2400	985	1970
2400-6	4740	2400	1045	2090
2400-7	4980	2400	1105	2210
2400-8	5220	2400	1165	2330
2400-9	5460	2400	1225	2450
2400-10	5700	2400	1285	2570

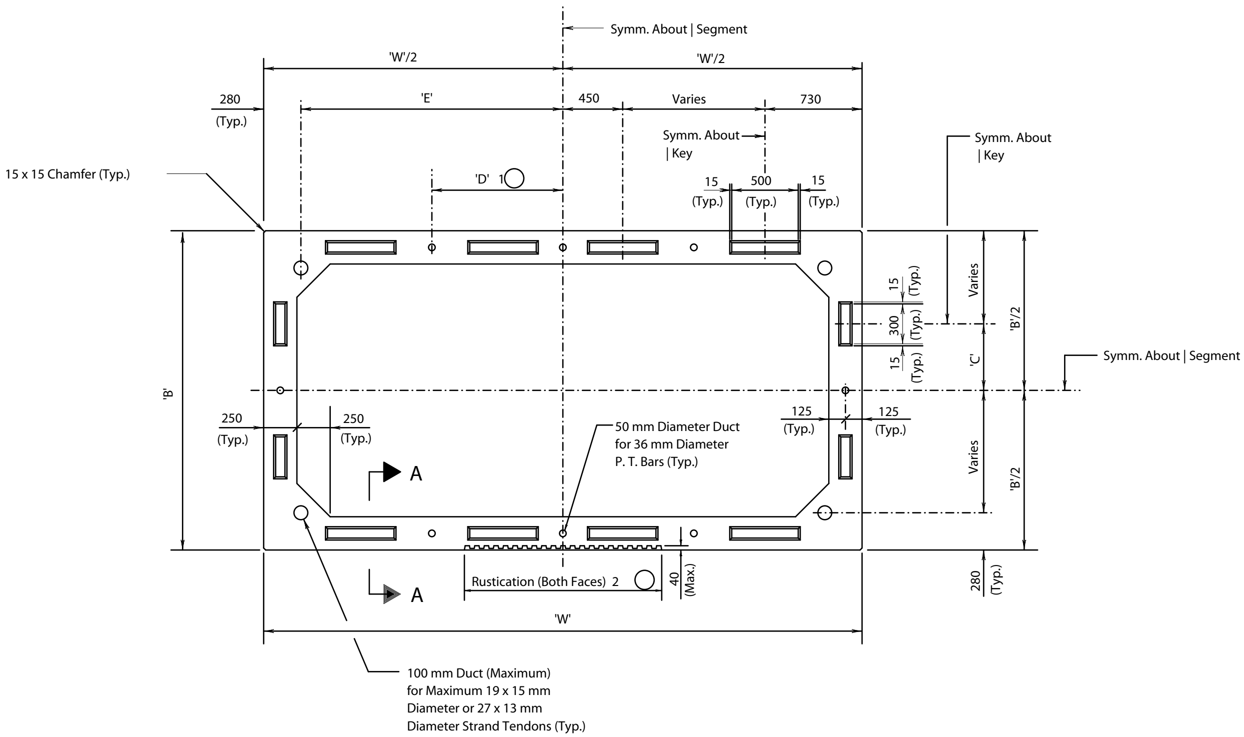
NOTES:

1 Duct is Not Present for Segment Widths ('W') of 4020 mm or Less.

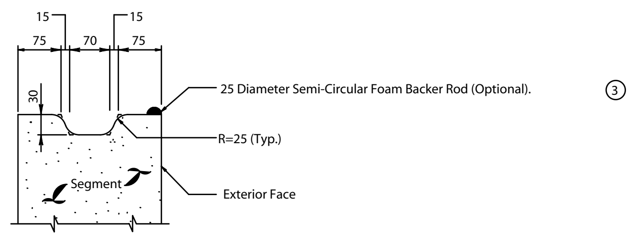
GENERAL NOTES

1. For Shear Key and Duct Dimensions and Locations, See Box Pier Segment Dimensions Sheet.

PROPOSED AASHTO - PCI - ASBI SEGMENTAL SUBSTRUCTURE STANDARDS	FOR SPAN-BY-SPAN AND BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	BOX PIER CAP SEGMENT DIMENSIONS



PLAN VIEW



SECTION A-A

Section Type	'W' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)
1800-1	4020	1800	350	865	1730
1800-2	4260	1800	350	925	1850
1800-3	4500	1800	350	985	1970
1800-4	5220	1800	350	1165	2330
1800-5	5460	1800	350	1225	2450
1800-6	5700	1800	350	1285	2570
2400-1	3540	2400	500	745	1490
2400-2	3780	2400	500	805	1610
2400-3	4020	2400	500	865	1730
2400-4	4260	2400	500	925	1850
2400-5	4500	2400	500	985	1970
2400-6	4740	2400	500	1045	2090
2400-7	4980	2400	500	1105	2210
2400-8	5220	2400	500	1165	2330
2400-9	5460	2400	500	1225	2450
2400-10	5700	2400	500	1285	2570

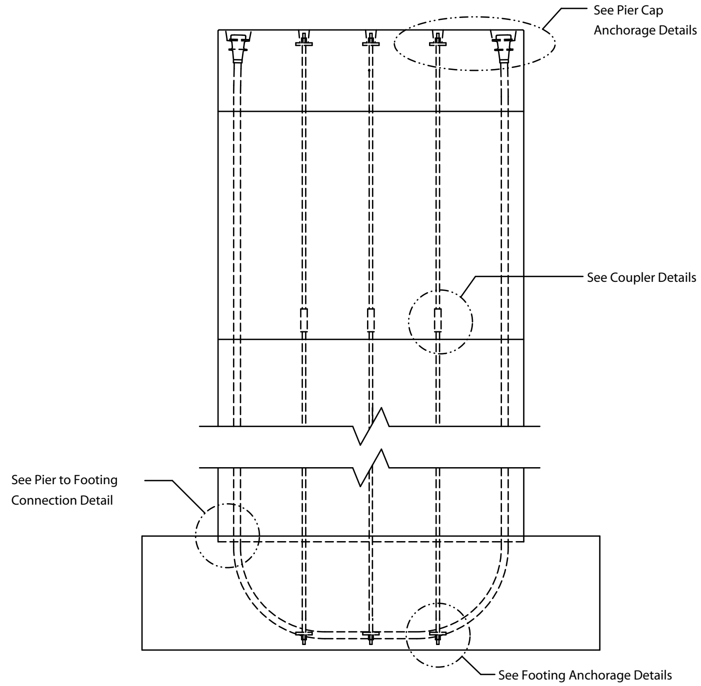
NOTES:

1. Duct is Not Present for Segment Widths ('W') of 4020 mm or Less.
2. Rustication can be Provided by Form Liners and is Optional.
3. Foam Backer Rod is Glued to Bottom Segment Relative to Joint Before Erection of the Next Segment and is to Prevent Epoxy From Sqeezing Out onto the Exterior Face. Remove Backer Rod After Erection of Column is Complete. Alternatively, if a Smooth Exterior Face is Desired, Any Epoxy Squeeze May be Scraped Off of the Segment While the Epoxy is Still Workable.

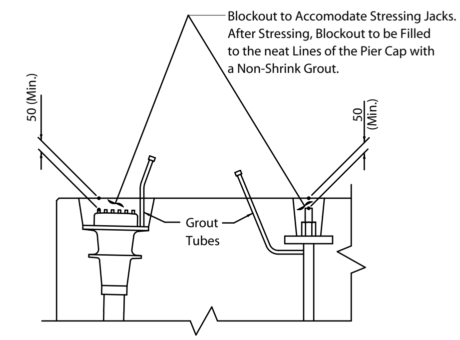
GENERAL NOTES:

1. Segment Heights are Variable and May be Modified by Precaster to Suit Means and Methods of Casting.

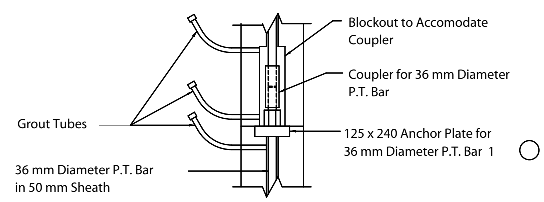
PROPOSED AASHTO - PCI - ASBI SEGMENTAL SUBSTRUCTURE STANDARDS	FOR SPAN-BY-SPAN AND BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	BOX PIER SEGMENT DIMENSIONS



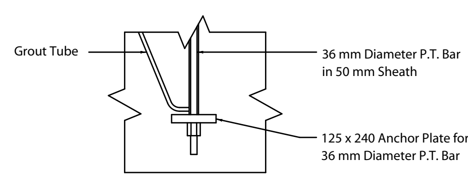
TYPICAL ELEVATION



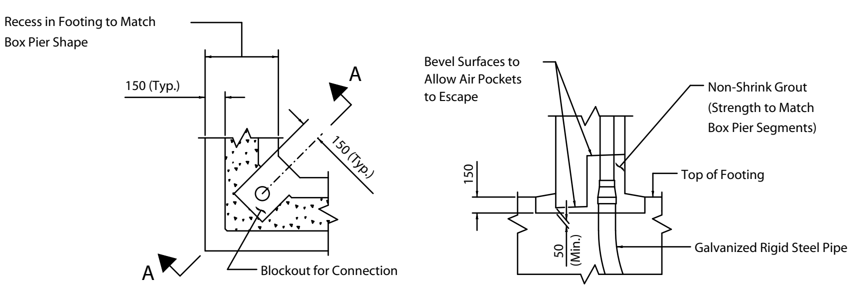
PIER CAP ANCHORAGE DETAILS



COUPLER DETAILS



FOOTING ANCHORAGE DETAILS

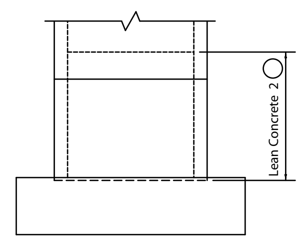


PLAN

SECTION A-A

PIER TO FOOTING CONNECTION DETAIL

(Strand Tendon Connection Shown, P.T.Bar Connection Similar)



LEAN CONCRETE PLUG

NOTES:

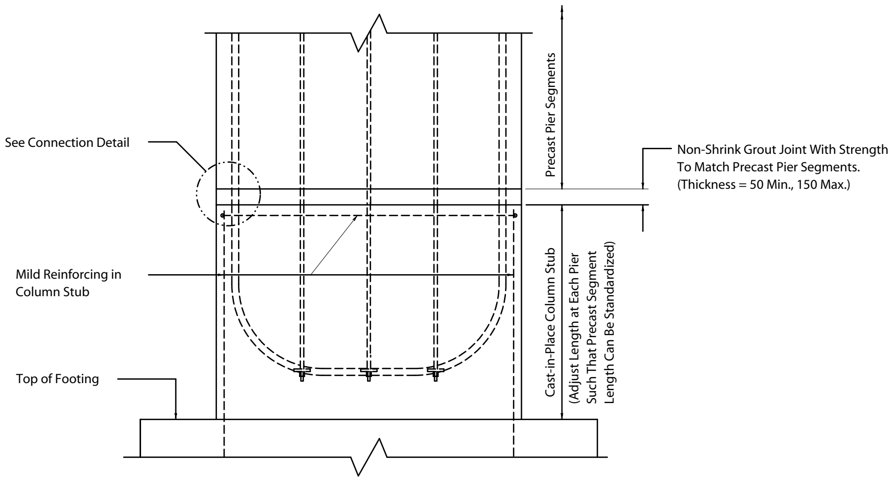
1. In order to Maintain Proper Concrete Cover, Plates are Temporary And Shall be Removed Prior to Coupling the Next Length of Bar for All P.T. Bars Adjacent to Rustication Provided by Form Liners.

2. Lean Concrete May be Used to Fill the Hollow Box Pier Up to an Elevation Determined by the Designer. This Could be Done to Help Resist Localized Loads from Vehicular or Ship Impact, or for Those Portions of a Pier Below the Water Table.

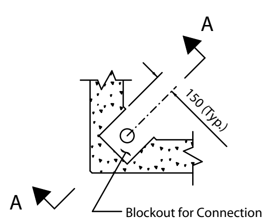
GENERAL NOTES:

1. Box Pier Segments Shall be Match-Cast and Utilize Type A Epoxy Joints.
2. Vehicular iImpact Shall be in Accordance with the AASHTO LRFD Bridge Design Specifications.
3. The Box Pier Details Shown on These Standards are Intended for Use in Seismic Zones 1 and 2. In Seismic Zones 3 and 4, the Designer is Responsible for Investigating Whether the Use of These Segments is Suitable and for Determining Appropriate Details.
4. The Box Pier Segments in These Standards Shall be Designed for Zero Tension Across the Joints when Only Dead and Live load Effects are Considered. When Effects from Other Loads, Such as Wind, are Considered, 3 f'c Tension (Units lb, in) is Allowed Across the Joints. The Permanent Effects of Creep and Shrinkage Shall be Included with Dead Loads.
5. The Duct Locations Shown are Standard Locations. The Designer is Responsible for Determining The Amount of Post-Tensioning Required and Utilizing Post-tensioning in the Standard Locations as Appropriate. All Duct Locations Need Not be Utilized.
6. The Post-Tensioning Bars May be Temporary and Used for Erection Only, or Permanent and Counted Towards Required Capacity.
7. The Number of Joints Where the P. T. Bars are Coupled Depends Upon the Erection Sequence. Sufficient Locations Shall be Provided so that a Minimum Stress of 275 kPa Across the Epoxied Joints is Achieved in the Contact Time of the Epoxy Being Used.
8. The Blockouts for the Pier Cap Anchorages Shall be Uniformly Coated with an Epoxy Bonding Compound. Immediately Following the Application of the Bonding Compound, the Blockouts Shall be Filled with a Non-Shrink Grout and Finished to the Neat Lines of The Pier Cap. After the Grout has Cured, Two Coats of a Mineral Stabilized Coal Tar Base Emulsion Shall be Applied to Cover The Grout Pour-Back and 50 mm to Each Side.
9. Additional Aesthetic Treatments May be Possible as Long as the Interior Core Dimensions are Not Modified. Contact Your Local Precaster for Options and the Associated Costs.

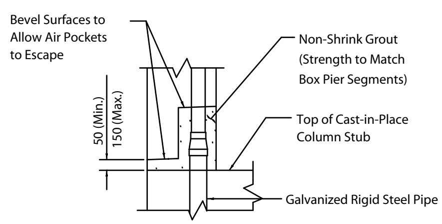
PROPOSED AASHTO - PCI - ASBI SEGMENTAL SUBSTRUCTURE STANDARDS	FOR SPAN-BY-SPAN AND BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	PRECAST BOX PIER DETAILS I



TYPICAL ELEVATION



PLAN



SECTION A-A

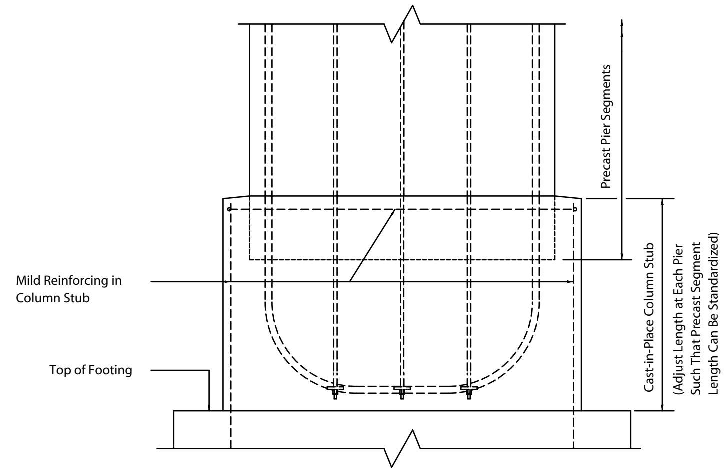
CONNECTION DETAIL

(Strand Tendon Connection Shown, P.T.Bar Connection Similar)

Notes:

1. Shear Keys, as Shown in These Standards, Shall be Present in the Top of the Cast-in-Place Column Stub

ALTERNATE FOOTING CONNECTION DETAIL 1



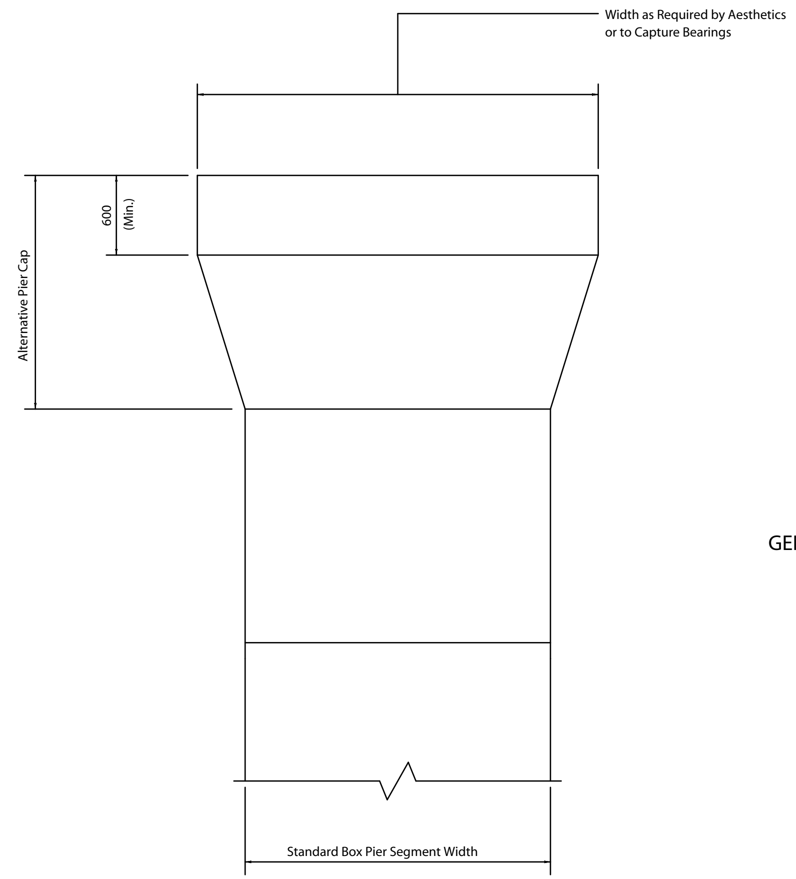
TYPICAL ELEVATION

Constuction Sequence:

1. Support First Precast Segment at Proper Elevation Above Footing.
2. Install Formwork, Mild Reinforcing and Post-Tensioning Hardware.
3. Cast Column Stub.
4. After Column Stub Concrete Reaches Minimum Specified Strength, Continue With Erection of Precast Segments

ALTERNATE FOOTING CONNECTION DETAIL 2

PROPOSED AASHTO - PCI - ASBI SEGMENTAL SUBSTRUCTURE STANDARDS	FOR SPAN-BY-SPAN AND BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	PRECAST BOX PIER DETAILS II



ALTERNATE BOX PIER CAP SEGMENT

GENERAL NOTES:

1. Designers Should Contact Their Local Precaster Before Finalizing Alternative Pier Cap Dimensions.

2. Box Column Post-Tensioning Can Run Straight in Pier Cap and Need Not Flare Out to Match Slopes of Pier Cap.

PROPOSED AASHTO - PCI - ASBI SEGMENTAL SUBSTRUCTURE STANDARDS	FOR SPAN-BY-SPAN AND BALANCED CANTILEVER CONSTRUCTION SPANS 30.5 TO 61.0 METERS	PRECAST BOX PIER DETAILS III