



Office of Structures  
*Guidelines and Procedures Memorandums*

PLAN DEVELOPMENT SECTION

**PLAN DEVELOPMENT SECTION  
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 <p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-75-3(4)
	Date: 03-16-2018
<b>Boring and Drive Tests</b>	Approval: 

On all structures for which borings and drive tests are taken, plan sheets showing the tests shall be prepared and included as a part of the contract plans. The sheet shall be titled "Borings and Drive Tests". The majority of this sheet shall be prepared by the Maryland Department of Transportation, State Highway Administration (MDOT SHA). This sheet shall contain the following information:

1. All applicable borings and drive tests plotted to scale with all field data including the following information: the elevation of ground surface at the borings, the station and offset of the boring from the proposed baseline, and the numerical designation of the boring from the original request. Each boring shall be plotted with reference to a shown datum line located directly beneath every boring. Faint dashed grid lines shall be drawn at ten foot intervals from the datum across the plan sheet to assist in reading the boring. The elevations of the grid lines shall be labeled. The boring logs shall be plotted such that all logs relating to a substructure unit (Abut. "A", Pier 1, etc.) are adjacent to each other and not necessarily in numerical order. Whenever possible, an individual boring log shall remain continuous and not be split. When the depth of the boring results in the log extending beyond the limits of a standard plan sheet orientated landscape, the boring shall be rotated so it is read with the plan sheet orientated portrait.
2. A plan layout of the baseline (drawn to scale with scale noted) shall appear and indicated thereon (to scale) shall be the locations and designations of all borings and drive tests indicated on that sheet. This plan shall be titled "Borings and Drive Test Location Plan". Consultants/Designers shall add a plan view of the structure to this layout.
3. The general notes regarding the boring and drive tests provided by the Office of Materials and Technology shall be shown next to the location plan below the boring logs.
4. Each boring and drive test shall be plotted so that the first column shall indicate "S" or "N"; second column shall indicate "C"; third column shall be patterned to indicate variance in soil material, with material descriptions and pertinent water level indications outside the columns. To the right of the material column, elevations at each change in material classification shall be indicated.
5. Indicate on each boring and drive test (to scale) the foundation elevation of the proposed support unit (i.e. bottom of footing, bottom of caisson, and/or estimated pile tip elevations.)  
  
Example: "B.O.F. Abut. A El. 320.00"
6. Indicate the estimated scour depth for hydraulic structures.

**Once the plans sheets for the boring drive tests are completed, a copy of the sheets shall be sent to the Office of Materials Technology for verification.**

 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-75-5(4)
	Date: 03-16-2018
<b>Use of Structure Details for Contract Documents</b>	Approval: 

In an effort to reduce the amount of time necessary to check structure plans, many of the details which are repetitive from structure to structure have been placed on Detail sheets. These Details are published in the Structural Details Manual available on the MDOT SHA website ([www.roads.maryland.gov](http://www.roads.maryland.gov)). It is the responsibility of the designer to determine if the published Structural Detail is appropriate for inclusion in any project. If the published Structural Details are modified in any way; the details shall be removed from the Detail section of the plans and included with the structure drawings as a non-standard element.

For an in-house project, the project team leader shall, at the time of structural/final review, determine the Details that pertain to each structure, and prepare the necessary Detail plans for inclusion in the contract documents.



For a consultant project, the consultant firm shall, at the time of structural/final review, determine the Details that pertain to each structure, and prepare a written request to the in-house team leader for the development of the Detail plans to be included in the contract documents.

As an aid to those utilizing the Structural Details Manual, the standard plates have been prepared as follows:

1. All Detail sheets that are For Office Use Only, i.e. to be used as a guide in preparing details on contract drawings are so marked and are printed on blue paper and have notes indicating that they are only guides for plan development.
2. All Detail sheets that are to be used on contract drawings and require additional information be added to them prior to the final development of the contract plans, are printed on pink paper.

For your information, the Detail numbering system developed has the following meaning. The main categories are identified as follows:

Chapter	Abbreviation	Chapter	Abbreviation
Foundation	FND	Reinforcing Details	REBAR
Substructure	SUB	Aesthetics	AES
Superstructure	SUP	Structure Inventory	SI
Maintenance of Traffic	MOT	Noise Barriers	NB
Retaining Wall	RW	Structure Repairs	SR
Box Culvert	BC	Miscellaneous	Misc


 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-75-6(4)
	Date: 03-16-2018
<b>Revisions to Advertised Plans</b>	Approval: 

I. Plan Revisions as Part of an Addendum to a Project



- A. All revisions shall be made clearly using good CADD practices. Deletions are permitted when making revisions to the advertised Plans.
- B. Revision(s) to the Plans shall be accompanied by the Addendum number in a triangle immediately adjacent to the revision(s). If the revision involves more than one location on a sheet then each location shall be noted with the Addendum number in the triangle.
- C. The Addendum number in a triangle must also appear in the revision block with the initials of the person making the revision and the date of the addendum.
- D. When the magnitude of the revision results in the introduction of a new sheet, it shall be placed in its proper sequence in the Plans and given a sheet number with a decimal (example: 26.1, 26.2, or 26.3 etc.) depending on the number of sheets of the revision. In the revision block the description should read, "New Sheet Added." This sheet shall be stamped, with OOS and the date the project was advertised.
- E. When the magnitude of the revision results in the deletion of all the details on a sheet, it shall be replaced with a new sheet containing only a note stating, "This Sheet Not Used." This sheet shall be stamped, with OOS and the date the project was advertised.
- F. All revisions to the Plans will be indicated on the title sheet. The Addendum number in a triangle, the sheets affected, and the date of the addendum shall be shown. When an addendum is issued with changes to the Plans after one or more addenda have been previously issued with no changes to the Plans, then the previous addenda should be noted on the title sheet, with an indication that they contained no changes to the Plans.

II. Plan Revisions After the Award of a Project

- A. All revisions shall be made clearly in red using good CADD practices using CADD (level 60). Deletions are not permitted when making revisions to the "as bid" plans. If it is impossible to correct an existing detail, then a new detail should be drawn as close to the original as possible and the old detail crossed out.

 <p>MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number: P-75-6(4)</p>
		<p>Date: 03-16-2018</p>
<p><b>Revisions to Advertised Plans</b></p>		

- B. Revision(s) to the Plans shall be accompanied by the revision number in a square immediately adjacent to the revision(s). The revision number will be the number of the revision to the project as a whole and not to the individual sheet being revised. If there have been revisions to the Plans under an Addendum, then revisions after the award of the contract will start with the number one in a square. If the revision involves more than one location on a sheet, then each location shall be noted with the revision number in a square.
- C. The revision number in a square must also appear in the revision block along with the initials of the person making the revision and the date the revision is made.
- D. When the magnitude of the revision results in the introduction of a new sheet, it shall be placed in its proper sequence in the Plans and given a sheet number with a decimal (example: 26.1, 26.2, or 26.3 etc.) depending on the number of sheets of the revision. This sheet does not need to be drawn in red. In the revision block the description should read "New Sheet Added." This note shall be in red. This sheet shall be stamped with OOS and the date the project was advertised.
- E. When the magnitude of the revision results in the deletion of all the details on a sheet, the entire sheet shall be crossed out with an X. In the revision block the description should read "This Sheet Deleted."
- F. All revisions to the project will be indicated on the title sheet. The revision number in a square, the sheets affected and the date of the revision shall be shown.

 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-75-7(4)
	Date: 03-16-2018
<b>Views on Plan Sheets</b>	Approval: 

All views on Structural Plan sheets must be drawn to scale, except for profile grade line diagrams.

The following scales are the only ones that are acceptable for structural elements:

**Engineering Scales**

- 1" = 10'-0"
- 1" = 20'-0"
- 1" = 30'-0"
- 1" = 40'-0"
- 1" = 50'-0"
- 1" = 60'-0"
- 1" = 100'-0"
- 1" = 200'-0"

**Architectural Scales**

- 1/8" = 1'-0"
- 1/4" = 1'-0"
- 3/32" = 1'-0"
- 3/16" = 1'-0"
- 3/8" = 1'-0"
- 3/4" = 1'-0"
- 1/2" = 1'-0"
- 1" = 1'-0"
- 1 1/2" = 1'-0"
- 3" = 1'-0"

Mixed scales such as 1" = 50' horizontal and 1" = 10' vertical shall not be used except for girder elevations.


The General Plan and Elevation for all bridges shall be drawn at a scale that will allow the entire structure to be shown on one sheet. Additional General Plan and Elevation sheets may be drawn at a larger scale on separate sheets with match marks in order to show the necessary details.

Each Substructure Unit shall have its own Plan and Elevation views.

The Plan view of each substructure unit must show a north arrow, a baseline or working line with a station or working point at the centerline of bearing, a skew angle and all dimensions necessary to construct the unit. The Elevation view of each substructure unit must show an existing and proposed ground line (where practical), water level or tidal range (where applicable) and all elevations (including bridge seat) and dimensions necessary to construct the unit. When piles are required for a structure, a separate plan view of each footing and piles shall be drawn showing the information listed above with all dimensions necessary to locate every pile.

In no case shall terms such as opposite hand or similar be used to indicate a view.





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		Number: P-75-7(4)
		Date: 03-16-2018
<b>Views on Plan Sheets</b>		

The practice of omitting a portion of a view because it is too large will not be permitted. The completed substructure unit or section shall be shown to scale in total, even if match lines and/or additional plan sheets are required.

One detail may be drawn to indicate reinforcing steel, etc. for one or more units.

The scale to be used in drawing the Plan, Elevation and Pile Plan (if applicable) of substructure units shall be such that maximum use of the plan sheet is made.

The scale to be used in drawing details in which reinforcing steel is indicated, except pile plans showing rebar pattern over piles, shall be at least  $3/8" = 1'-0"$  to ensure that the configuration and location of the reinforcing steel is clear. If the drawing appears cluttered and drawing it at a larger scale requires match lines, then the plans shall contain two details of an element, one for dimensions and one for reinforcing. Both these details shall be drawn at the same scale, preferably on the same sheet.

 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <b>Memorandum</b></p>	<b>PLANS</b>
	Number: P-75-8(4)
	Date: 03-16-2018
<b>Finished Roadway Elevations</b>	Approval: 

All contract plans for bridges shall include a separate sheet(s) titled Finished Roadway Elevations on which shall be shown top of deck elevations. Beams and girders, for the purpose of this memorandum, are designated as stringers.

1. A Plan View of each span shall be provided. The Finished Roadway Elevations shall be shown on the Plan View at the locations noted below. A chart shall not be used to list the elevations.
2. Finished Roadway Elevations shall be given along the Profile Grade Line at intervals not exceeding 12 feet between extreme station limits of the structure.
3. Finished Roadway Elevations shall be given along all cross-sectional "break" lines, crown break and gutter lines, not exceeding 12 foot intervals longitudinally. Generally, these finished grade elevations shall be at the same interval as those given along the Profile Grade Line.
4. For bridges with decks carried by stringers, Finished Roadway Elevations shall be given longitudinally over the centerline of each stringer at intervals generally in multiples of one eighth (1/8) of the span length, but not exceeding 12 feet for spans 48' c/c bearings and greater, and at multiples of one quarter (1/4) of the span length, for spans less than 48' c/c bearings. (Distances between intervals shall be dimensioned and the fraction of the span listed i.e. 3/8 point.)



The Finished Roadway Elevation sheet shall also include:

1. A reference note: "For vertical curve data and super elevation transition data see sheet no. \_\_\_\_."
2. A small typical section of the superstructure noting the points where elevations are given.
3. North arrow and stationing along the Baseline.
4. Designations or numbering of stringers, abutments, piers and spans.
5. Designation and identification of bridge.
6. Definition of Finished Roadway Elevations, i.e.

Finished Roadway Elevations shown are top of proposed concrete deck.

or

Finished Roadway Elevations shown are top of proposed concrete overlay.

 <p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-76-11(4)
	Date: 08-01-2018
<b>Bridge Deck Pouring Sequence</b>	Approval: 

**GENERAL**

All bridges shall have a deck pouring sequence in the Plans. The purpose of a pouring sequence is to minimize the potential for cracking of the finished concrete deck. It shall be the goal of the designer to develop a pouring sequence with volumes of concrete that can be placed in approximately 3 hours at a minimum pouring rate of 35 yd<sup>3</sup>/hr per crew and which makes effective use of crews and equipment.

For any structure or stage of construction which has more than 100 yd<sup>3</sup> of concrete in a pour or is being poured in both positive and negative moment areas, one or more pouring sequences shall be provided in the Plans. At a minimum, a pouring sequence shall be provided with individual pours that can be placed by a single crew as specified above. The designer shall also evaluate possible alternate pouring sequences that utilize higher rates of placement. If applicable, alternate pouring sequences shall be added to the Plans.


**TEMPORARY BRACING**

On structures with tall, slender stringers, very light or narrow flanged members, supported by four or less stringers, or where construction phasing requires that a stage be constructed on four or less stringers, the designer shall review the design for stability of the stringers during the placement of the deck concrete. If the stability is questionable, a suggested bracing concept shall be shown on the Plans. This bracing may take the form of additional permanent bracing, temporary steel or timber bracing or cable guy wires. Assumptions made in the development of the temporary bracing, such as loads on temporary overhang brackets, shall be shown on the Plans. If temporary bracing is shown on the plans, the following note shall be included:

"For Stage Numbers \_\_ and \_\_ (or, For deck pouring), the Contractor shall provide temporary/permanent bracing between girders to assure the stability of the unit and to prevent any rotation of the girders as placement of deck concrete takes place. A suggested bracing scheme is shown based on an assumed forming concept. The Contractor is to submit his proposed forming and temporary/permanent bracing plan for approval. If the proposed forming & bracing plan varies from the concept shown in the contract drawings, the Contractor must submit for approval computations, prepared by an Engineer, registered in the State of Maryland, to demonstrate the adequacy of the proposed temporary/permanent bracing."

**LOGITUDINAL JOINTS**

All bridges with longitudinal expansion joints that can be crossed by traffic shall be evaluated for any special pouring requirements necessary to ensure that the cross slope is maintained across the joint.

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	Number: P-76-11(4)
	Date: 08-01-2018
<b>Bridge Deck Pouring Sequence</b>	Approval: See Sheet 1

**CONTINUOUS DECK – ADDITIONAL REINFORCING**

The additional longitudinal reinforcing steel placed in continuous deck slabs over supports shall be limited in length to the negative pour(s) areas.

**CLOSURE POURS**

On bridge decks with staged construction, a closure pour shall be added to the deck pour sequence when the finished elevation of the prior stage and the pre-pour elevation of the subsequent stage is greater than 1 inch. The closure pour shall be centered between girders as much as practical. An option for pouring the concrete diaphragms at the abutments in the prior stage shall be provided to the contractor.

**HEAVY SKEWS**

On bridge decks with heavy skews, consideration shall be given to the placement of the screed rails to accommodate the skew without excessive hand finishing.

**DECK POUR NOTES**


All Plans requiring a deck pouring sequence shall include the following note:

"The Contractor shall follow the pouring sequence shown on these Plans. No other pouring sequence will be allowed."

If one or more pouring sequences appears on the Plans, the note shall continue:

"The Contractor shall not intermix procedures from alternate sequences.

If the Contractor elects to place the larger pours shown in the alternate sequence(s) and during placement the Engineer decides that the intended quality of finish is not being provided, the Engineer may order the Contractor to place the concrete as shown for the smaller pours. The Engineer will be the sole judge as to whether or not the quality is satisfactory."

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		Number: P-76-11(4)
		Date: 08-01-2018
<b>Bridge Deck Pouring Sequence</b>		Approval: See Sheet 1

**EXAMPLES**

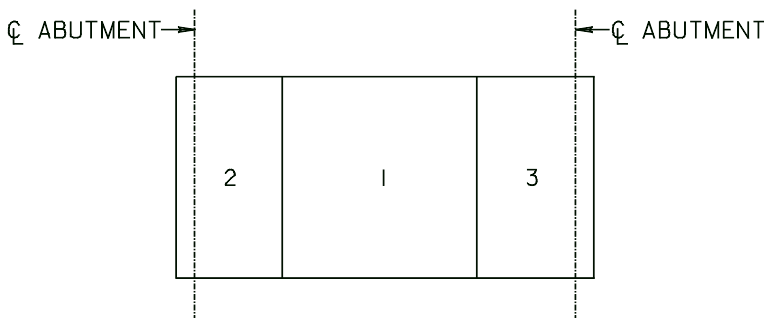
The following are examples of acceptable pouring sequences for typical structures. Other schemes may be developed by the designer for evaluation by the Director – Office of Structures. Any bridge with more than four (4) continuous spans shall be poured in a sequence similar to those shown on the subsequent diagrams.

**SINGLE SPAN, STEEL STRINGER OR PRECAST CONCRETE GIRDER BRIDGE**

In general, any simple span structure which has less than 150 yd<sup>3</sup> of concrete in the bridge deck slab shall be poured in one operation and the following note shall be included in the Plans:

"No special pouring sequence is required for this structure."

For a simple span structure which has over 150 yd<sup>3</sup> of concrete in the bridge deck slab, the following shall appear on the Contract Documents:




"The pouring sequence for the bridge deck slab shall be made in the numbered order indicated; 1,2,3, except as modified below.

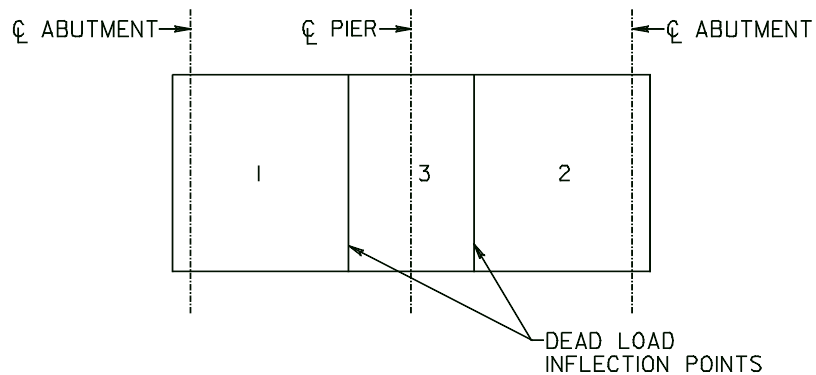
There must be at least forty (40) hours between the completion of pour number one and the start of the next numbered pour. The Contractor may make pours 2 and 3 without any delay between them.

The Contractor may reverse the order of pours numbered 2 and 3."

Note to Designers - The first pour should be sized to contain approximately 2/3 of the total volume of concrete in the deck, but not to exceed 150 yd<sup>3</sup>.


 <p>MARYLAND DEPARTMENT OF TRANSPORTATION</p> <p>STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures</p> <p><i>Guidelines and Procedures</i></p> <p><i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number:</p> <p>P-76-11(4)</p>
		<p>Date:</p> <p>08-01-2018</p>
<p><b>Bridge Deck Pouring Sequence</b></p>		<p>Approval:</p> <p>See Sheet 1</p>

**TWO SPAN CONTINUOUS STEEL STRINGER BRIDGE**

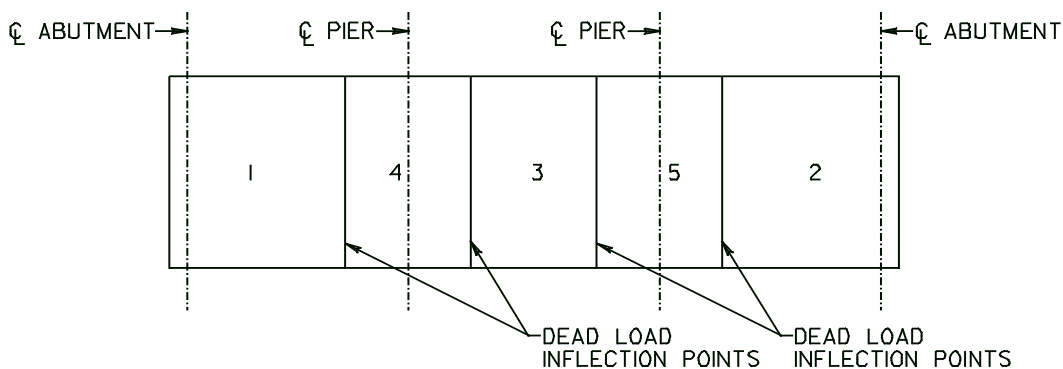


"The pouring sequence for the bridge deck slab shall be made in the numbered order indicated; 1,2,3, except as modified below. There must be at least forty (40) hours between the completion of one numbered pour and the start of the next numbered pour.

The Contractor may reverse the order of pours numbered 1 and 2."

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	Number: P-76-11(4)
	Date: 08-01-2018
<b>Bridge Deck Pouring Sequence</b>	Approval: See Sheet 1

**THREE SPAN CONTINUOUS STEEL STRINGER BRIDGE**




"The pouring sequence for the bridge deck slab shall be made in the numbered order indicated; 1,2,3,4,5, except as modified below.

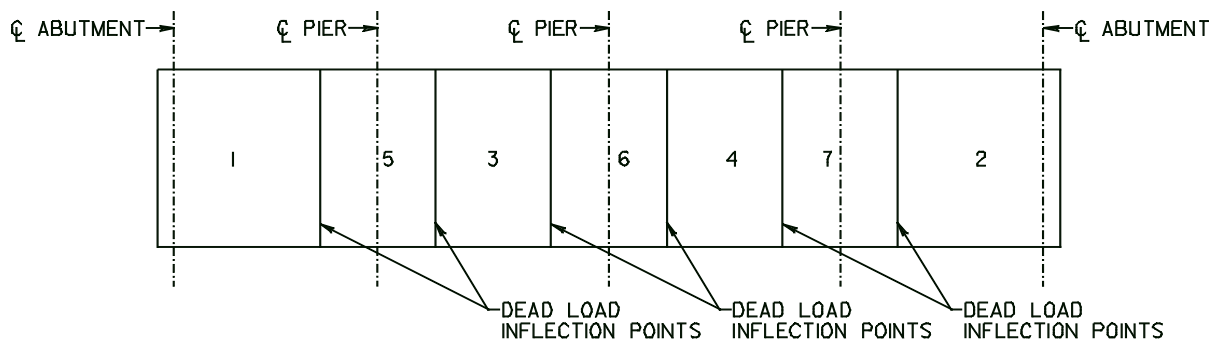
There must be at least forty (40) hours between the completion of one numbered pour and the start of the next numbered pour, except that there may be sixteen (16) hours between the completion of pour numbered 4 and the start of pour numbered 5.

The Contractor may reverse the order of the following numbered pours:

- 1 and 2
- 4 and 5"

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	Date: 08-01-2018
<b>Bridge Deck Pouring Sequence</b>	Approval: See Sheet 1

**FOUR SPAN CONTINUOUS STEEL STRINGER BRIDGE**




"The pouring sequence for the bridge deck slab shall be made in the numbered order indicated; 1,2,3,4,5,6,7, except as modified below. There must be at least forty (40) hours between the completion of one numbered pour and the start of the next numbered pour, except that there may be sixteen (16) hours between pours numbered 5, 6 and 7.

The Contractor may reverse the order of the following number pours:

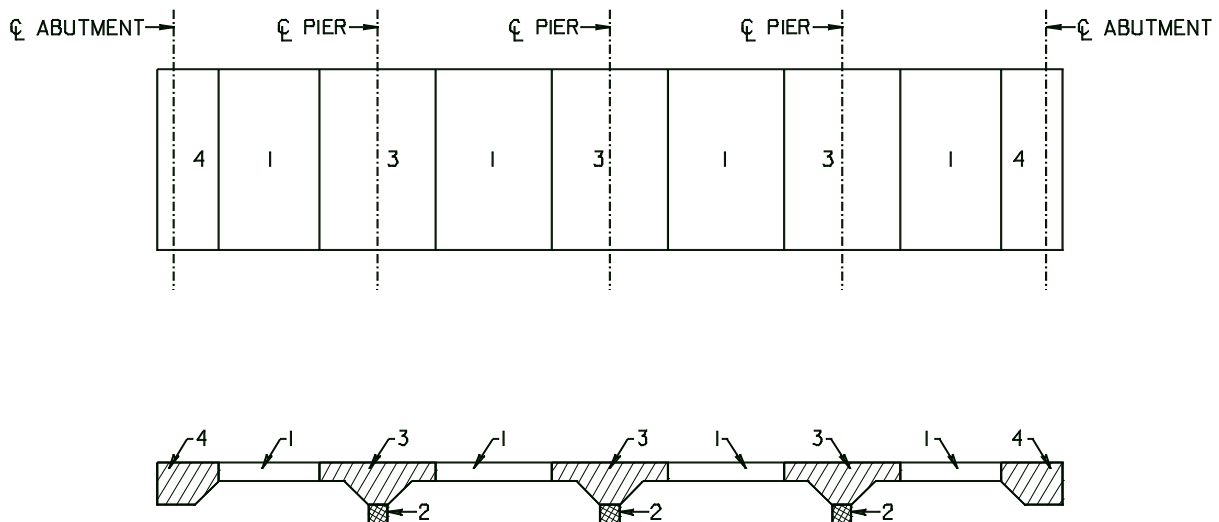
- 1 and 2
- 3 and 4
- 5, 6 and 7 may be completed in any order"





 <b>MARYLAND DEPARTMENT OF TRANSPORTATION</b>  STATE HIGHWAY ADMINISTRATION	Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i>	<b>PLANS</b>
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		Date: 08-01-2018
<b>Bridge Deck Pouring Sequence</b>		Approval: See Sheet 1

**MULTIPLE SIMPLE SPAN, PRECAST CONCRETE GIRDER BRIDGES**  
**MADE CONTINUOUS FOR LIVE LOAD**



"The pouring sequence for the bridge deck slab shall be made in the numbered order indicated: 1,2,3,4. The Contractor may place a pour numbered 2 as soon as the pours numbered 1 on both sides of it have been in place for a minimum of 16 hours. [All pours numbered 1 do not have to be in place prior to starting pours numbered 2]. The Contractor may place a pour numbered 3 section as soon as the pour numbered 2 under it has been in place for a minimum of 40 hours. [All pours numbered 1 and 2 sections do not have to be in place prior to starting pours numbered 3]. The Contractor may place pours numbered 4 as soon as all of the pours numbered 2 have been in place for a minimum of 40 hours. [All pours numbered 3 sections do not have to be in place prior to starting pours numbered 4]."



 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-77-13(3)
	Date: 04-11-2018
<b>Outlet Drain Pipes Through Stems of Retaining Walls. Abutments and Wingwalls</b>	Approval: 

Where outlet drain pipes are required for relief of possible hydraulic pressures, the following shall be adhered to:

- All outlet drain pipes through stems of retaining walls, abutments, and wing walls (for abutments, box culverts and pipe headwalls) shall be indicated on the plans as "4" Diameter P.V.C. Pipe".
- Maximum spacing between outlet drains to be 15 ft c/c.
- Every effort shall be made to space outlet drains so that they are not located below or within 1'-6" horizontally from of a bearing pad. This will help to minimize cracking from the pipes that may extend to the bearing area.
- If front face of wall is visible to vehicular or pedestrian traffic, outlet drain pipes shall extend 3" beyond the front face of the wall so as to minimize staining.
- Outlet drain pipes that would extend onto a sidewalk area shall be placed under the sidewalk and outlet into gutter.
- All other outlet drain pipes shall be placed flush with front face of wall.


 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-77-14(4)
	Date: 03-16-2018
<b>General Notes</b>	Approval: 

General Notes listing applicable design codes, material properties, etc. shall be placed in the upper right corner of the General Plan & Elevation sheet of all Construction Plans. Special cases may require an alternative positioning which shall have the approval of the OOS Project Manager prior to utilization.

A complete and updated General Notes document is maintained in the MDOT SHA Structural Details and Guidelines website page:

<https://www.roads.maryland.gov/Index.aspx?PageId=777>

This document serves as a guide for the development of the General Notes. For each project, this guide should be used to develop the Pre TS&L and / or TS&L plans. All notes that do not apply to a particular project shall be removed. Prior to submitting the final plans, this guide should be checked to verify that the latest changes to the document are incorporated.



 <p><b>MDOT</b> MARYLAND DEPARTMENT OF TRANSPORTATION</p> <p>STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number: P-78-15(G)</p>
		<p>Date: 04-11-2018</p>
<p><b>Inclusion of Existing Structure Plans in Project</b></p>		<p>Approval: <b>DRAFT</b></p>

On all projects where an existing structure is involved either by widening or rehabilitating, removing, painting, etc., scanned images of the pertinent existing structure plans shall be included with the contract documents.

The title sheet for the project shall include a statement, such as:

"For the convenience and information of bidders, scanned images of the plans for existing pertinent structure(s) are included with this contract. No responsibility for their accuracy or completeness is assumed by the State Highway Administration. Dimensions, details, etc. as shown thereon may not be as built.

Included for your use are Sheets 1 to 8, 15, 21 to 23 of Contract A 522-021-625 and Sheets 1 to 8 of Contract A 632-119-672."



 <p>MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number: P-81-18(G)</p>
		<p>Date: 03-16-2018</p>
<p><b>Hydrological and Hydraulic Data</b></p>		<p>Approval; </p>

All drainage structures for which hydrological and hydraulic computations have been made, shall utilize the Plan sheets specifically prepared for this purpose, and no data shall appear on the General Plan and Elevation sheet. The Hydrological and Hydraulic Data Plan sheet shall be the first one following the General Plan and Elevation. In the General Notes, the reference to this sheet should be made as follows.

For Hydrological and Hydraulic data, see sheet titled -

"-----"

One such sheet shall be utilized for each applicable structure in a contract.

 <p><b>MARYLAND DEPARTMENT OF TRANSPORTATION</b></p> <p>STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures</p> <p><i>Guidelines and Procedures</i></p> <p><i>Memorandum</i></p>	<p><b>PLANS</b></p>
	<p>Number:</p> <p>P-82-20(G)</p>	<p>Number:</p> <p>P-82-20(G)</p>
	<p>Date:</p> <p>03-16-2018</p>	<p>Date:</p> <p>03-16-2018</p>
<p><b>Piling</b></p>		<p>Approval:</p> 



Where piling is called for on a project each support requiring piling shall have the following information on the drawing containing the pile layout for that support.

Example only		PILE DATA				
SUBSTRUCTURE UNIT	PILE TYPE	REQUIRED HAMMER ENERGY (FT-LB)	MINIMUM PENETRATION ELEVATION	ESTIMATED TIP ELEVATION	DESIGN LOAD (KIPS)	MINIMUM DRIVING LOAD (P <sub>d</sub> ) (KIPS)
ABUTMENT A	HP 14x102	58,000-120,000	EL. 255.00	EL. 240.00	400	620
WING WALL I & II	HP 14x102	41,000-84,000	EL. 255.00	EL. 240.00	280	440

In addition to the above include the following notes on the pile layout sheets.

Shop Plans shall show how rebars are to be tied as well as how they will be held in place above piling while pour is being made.

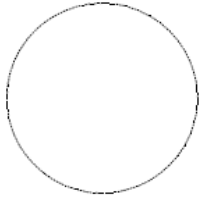
The minimum driving load and minimum penetration shown on these plans must be achieved for each pile. If the estimated tip elevation is not reached or is exceeded while achieving the minimum driving load and the minimum penetration, the pile will be considered satisfactory.



 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-83-23(G)
	Date: 03-16-2018
<b>Consultant Firm's Name on Contract Documents</b>	Approval: 

In addition to requirements of GPM No. P-76-10(G) indicating placement of consultant's name on all structure project title sheets the following is required:

The Consultant shall place their firm's name and address in a block (approximately 4" by 2") in the lower right corner adjacent to the title block on all structure sheets prepared for the Office of Structures.

The Consultant shall place the Seal and written signature of a Professional Engineer on the Title Sheet for each Contract with notes specifying the plan sheets for the certification, as shown below. This will be required for all types of structures (boxes, retaining walls, bridges, etc.). If there is more than one structure in a Contract, a separate seal shall be placed for each structure.

<b>CONSULTANT LOGO HERE</b>	
<b>SHEET NOS. AND OTHER CLARIFICATIONS</b>	
<b>I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.</b> MD LICENSE NO. _____ EXPIRATION DATE: _____	

 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-83-24(G)
	Date: 03-16-2018
<b>Procedure for Contracts with More Than One Structure</b>	Approval: 

**Structures Location Map:**

All Contracts containing two or more structures, regardless of structure type, (examples of structure types are bridges, box culverts, retaining walls and noise walls) shall have a Structures Location Map prepared. This Structures Location Map shall be included with every submission made for the project and shall be included in the advertised bid package as the first plan sheet in the structures' section. The Structures Location Map will consist of a to-scale map of the entire project limits. The map shall contain a north arrow and all structures will be clearly indicated on the map and labeled with the structure number and any other project specific designation (NB-A, RW-1, S1, etc.). The intent of this sheet is to present an overview of all the structures in the contract and their relation to each other.

**Structural Detail Requirements:**

The plan sheets for each structure in a contract (dual bridges are considered one structure) shall contain all the necessary notes and details so that it can be constructed without reference to any other structure's plan sheets in the contract. This includes General Notes and Structure Detail Plates.


**Numbering Sheets:**

To simplify the process of cross-referencing details on large projects where the sheet numbers are not always known until just prior to advertising, each structure shall have its own numbering system on the plan sheets. The General Plan and Elevation on the first structure shall be designated as S1-1. All subsequent sheets for that structure will also bear the S1 designation with the proper sequential sheet number following the dash. The General Plan and Elevation of the second structure shall be designated as S2-1. The remaining sheets and structures shall be numbered similarly. This cross-referencing sheet number designation shall appear in the lower right hand corner of the title block. (see Figure A)

All cross-referencing notes should read as follows:

"For details of F-Shape parapet not shown, see Drawing No. S1-18."



 <b>MARYLAND DEPARTMENT OF TRANSPORTATION</b> STATE HIGHWAY ADMINISTRATION	<b>Office of Structures</b> <i>Guidelines and Procedures</i> <b>Memorandum</b>	<b>PLANS</b>
		Number: P-83-24(G)
		Date: 03-16-2018
<b>Procedure for Contracts with More Than One Structure</b>		Approval: See Sheet 1




REVISIONS	OFFICE OF STRUCTURES		
	 <b>MARYLAND DEPARTMENT OF TRANSPORTATION</b> STATE HIGHWAY ADMINISTRATION		
	REPLACEMENT OF STEEL GIRDER BRIDGE NO. XXXXXXX ON MD 555 (EAST STREET) OVER WATER CREEK		
	<b>GENERAL PLAN AND ELEVATION</b>		
	SCALE <u>NA</u>	DATE <u>MARCH 2018</u>	CONTRACT NO. <u>BAXXX5180</u>
	DESIGNED BY <u>XXX</u>	DRAWN BY <u>XXX</u>	
	CHECKED BY <u>XXX</u>		
	DRAWING NO. <b>S2 - 1</b> OF 52	SHEET NO. 40 OF 132	
PLOTTED: \$DATE\$ FILE: \$FILE\$			



FIGURE A – Title Block Example for Multiple Structures

 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-85-26(G)
	Date: 04-11-2018
<b>Provisions for Inspection Cat-Walks in the Design of Bridge Structures</b>	Approval: 

All bridges must be inspected every two years by the MDOT State Highway Administration.

Most bridges can be inspected utilizing the State's Snooper which is capable of carrying a man over the side of a bridge and reaching 40 feet inside the edge of the bridge, or by utilizing a ladder mounted on the ground away from all types of traffic.

Those bridges, or portions of bridges, which cannot be inspected due to excessive bridge width, electrified lines, etc., shall contain provisions in the design and construction contract documents which will allow an inspection to be safely completed. This will entail construction of cat-walks between all girders which are inaccessible by normal means of inspection.


 <p><b>Office of Structures</b> <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-86-28(G)
	Date: 03-16-2018
<b>Geometric and Footing Layout Sheet</b>	Approval: 

On all structure projects, a Geometric and Footing Layout Sheet shall be included in the plans. Each structure (dual bridges can be counted as one structure) shall have its own Geometric and Footing Layout Sheet. This will apply to all structures, new or existing, for which a new footing is being poured. The Geometric and Footing Layout Sheet shall immediately follow the General Plan and Elevation Sheet (except on bridges over water where it shall follow the Hydrologic and Hydraulic Data Sheet).

The purpose of this sheet is to provide a clear presentation of the structure's basic geometrics and footing layout. In many cases structures are being designed and constructed in complicated geometric situations where the layout may not be easily deduced or laid out for construction purposes. In order to provide a clear understanding of the geometric and footing layout to the contractor and field personnel, this sheet shall be prepared as indicated below. Every structure on a curve shall have a straight line (preferably a tangent to curve) established as a working line. If dual bridges are significantly different then one working line shall be provided for each bridge. All dimensions, angles etc., shall be off of this working line. All dimensions shall be in feet and decimals of a foot, to the nearest one hundredth of a foot.

The following information, where applicable, shall appear on the Geometric Layout Sheet:

1. Baseline or centerline of construction (for both the roadway on the bridge and for the roadway underneath).
2. Baseline or centerline of survey (where different than Item 1 above)
3. All horizontal alignment data (including P.C., P.T. TS, SC, etc.) for roadways on curves.
4. A working line for laying out the structure, including all pertinent stations, working points, skew angles, offsets, etc. The working line shall be listed in a table with coordinate data and shall coordinate with the centerline of bearing.
5. All centerlines of bearings and/or centerlines for all supports, including working points and skew angles.
6. Dimensions from the working line along centerline of bearing to the extremities of all footings. Dimensions from the working line to steps in footings and construction joints.
7. Complete dimensional layout of all pier, abutment and wing wall footings to create a closed traverse around the entire unit. (No piles or rebar shall appear on this sheet.)
8. All other pertinent dimensions and angles referenced to the working line.
9. North arrow and destination arrows.



 <p><b>MARYLAND DEPARTMENT OF TRANSPORTATION</b> STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number: P-86-28(G)</p>
		<p>Date: 03-16-2018</p>
<p><b>Geometric and Footing Layout Sheet</b></p>		

10. Benchmarks.

11. Any other pertinent data which the designer feels may be necessary to clarify the layout.

The layout shall be shown in a scale drawing on the sheet using a scale large enough to make maximum use of the sheet. A small exaggerated view may be included to show the relationship between the baseline and the working line or to clarify a complex situation. Use of mixed scales shall not be permitted. The designer shall make liberal use of notes and comments necessary to clarify the layout.

All working points established on the layout sheet shall appear on all succeeding sheets, and from which all layouts shall be referenced.

 <p>MARYLAND DEPARTMENT OF TRANSPORTATION</p> <p>STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures</p> <p><i>Guidelines and Procedures</i></p> <p><i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number:</p> <p>P-90-33(4)</p>
		<p>Date:</p> <p>03-16-2018</p>
<p><b>Conduits in Bridge Parapets for CHART</b></p>		<p>Approval:</p> 

In order to accommodate the communication cables for CHART (Chesapeake Highway Advisory Routing Traffic) on certain highways, two 3"φ conduits will be placed in lieu of the one 4"φ in bridge parapets. One conduit is for electrical/lighting and/or traffic signal use and the other conduit is for CHART when needed.



The routes identified to receive the two 3"φ conduits are:

I-95, I-97, I-270, I-370, I-495, I-595 (US 50), I-695, I-795, US 48 (I-68),  
 US 50 (QA & AA), MD 32, MD 100, ICC

The two 3"φ conduits are to be placed in the outside parapets of dual bridges, and in both parapets of single bridges. They are to be placed in all the mainline, overpass structures, and ramp bridges for the routes indicated above. Conduits are to be placed in retaining walls with parapets that run along the shoulder lines only when access behind the walls will not be available after the wall is built. The junction boxes shall be placed at the same locations as currently required for the one 4"φ conduit.

For all other highways, continue to request the need of conduits from the Traffic Engineering Division.

The other routes will continue to have one 4"φ conduit.

	<b>Office of Structures</b> <b><i>Guidelines and Procedures</i></b> <b><i>Memorandum</i></b>	<b>PLANS</b>
		Number: P-93-36(4)
		Date: 08-01-2018
<b>Designating Structural Elements</b>		Approval: 

In order to have a uniform system of designating structural elements (Abutments, Piers, Wingwalls and Stringers) the following convention shall be used.

Abutments

Abutments for single bridges shall be designated as Abutment A and Abutment B. Abutment A will be located at the low station end of the bridge. New structures should be oriented with stations increasing from left to right. Existing structures that are being replaced or rehabilitated should be oriented the same as the existing bridge plans. This may result in stations increasing from right to left. (See Figure A)

For dual bridges, separate abutments should be individually identified as Abutment A and Abutment B for the one bridge and Abutment C and Abutment D for the other. Abutments A and B shall be plotted above the baseline. Abutments A and C shall be on the low station ends of the bridges. (See Figure B)

Piers

Piers shall be designated as 1,2,3 etc. with Pier 1 located adjacent to Abutment A and proceeding consecutively toward Abutment B. For dual bridges, each pier will have a unique number. For example, Piers 1-4 between Abutments A and B and Piers 5-6 between Abutment C and D. (See Figure B)

Wing Walls

Wingwalls shall be designated by Roman Numeral with the lower Roman Numeral being on the left side of a Plan View when looking stations ahead at each Abutment. All wingwalls/endposts shall be numbered. Abutment A will always have Wingwalls I and II, Abutment B - Wingwalls III and IV, Abutment C - Wingwalls V and VI and Abutment D - Wingwalls VII and VIII. (See Figures A and B)

All of the above nomenclature shall appear on the General Plan view and shall appear on each drawing wherever these elements are portrayed.

Stringers (Girders/Beams/Slabs)

Stringers shall be designated by number with number 1 being on the left side of a Plan View when looking stations ahead. For dual bridges, each stringer will have a unique number. For example, stringers 1-4 for one bridge and 5-8 for the other. (See Figure B)

For existing bridges being widened or rehabilitated, the existing elements to remain (Abutments, Piers and Stringers) shall be redrawn and labeled the same as the existing plans. The existing designations shall then be crossed out (yet, still readable) and redesignated as described above.

**Designating Structural Elements**

For example, on bridge widenings, number the existing and proposed stringers as if they are all new. This may result in old stringers 1-4 becoming 2-5. (See Figure C)

Do not alter the designations on the existing documents.

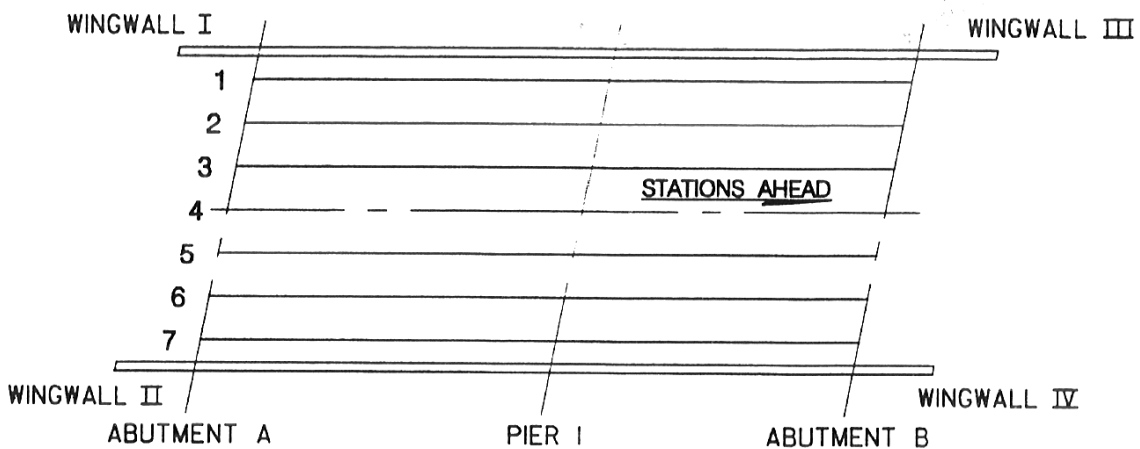


FIGURE A

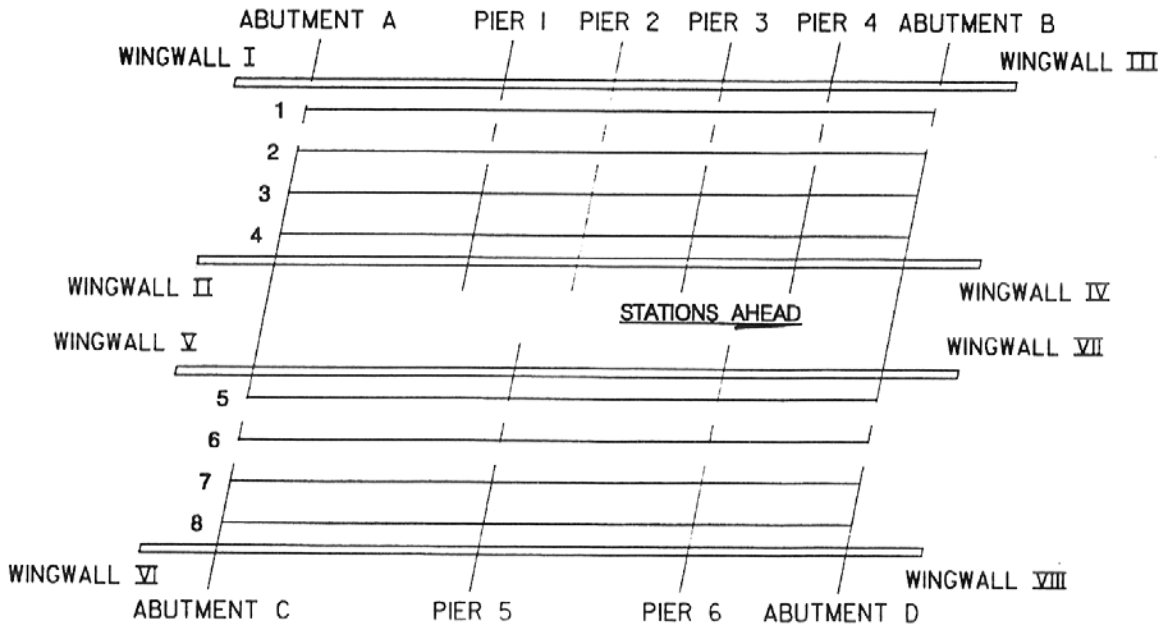


FIGURE B

**Designating Structural Elements**

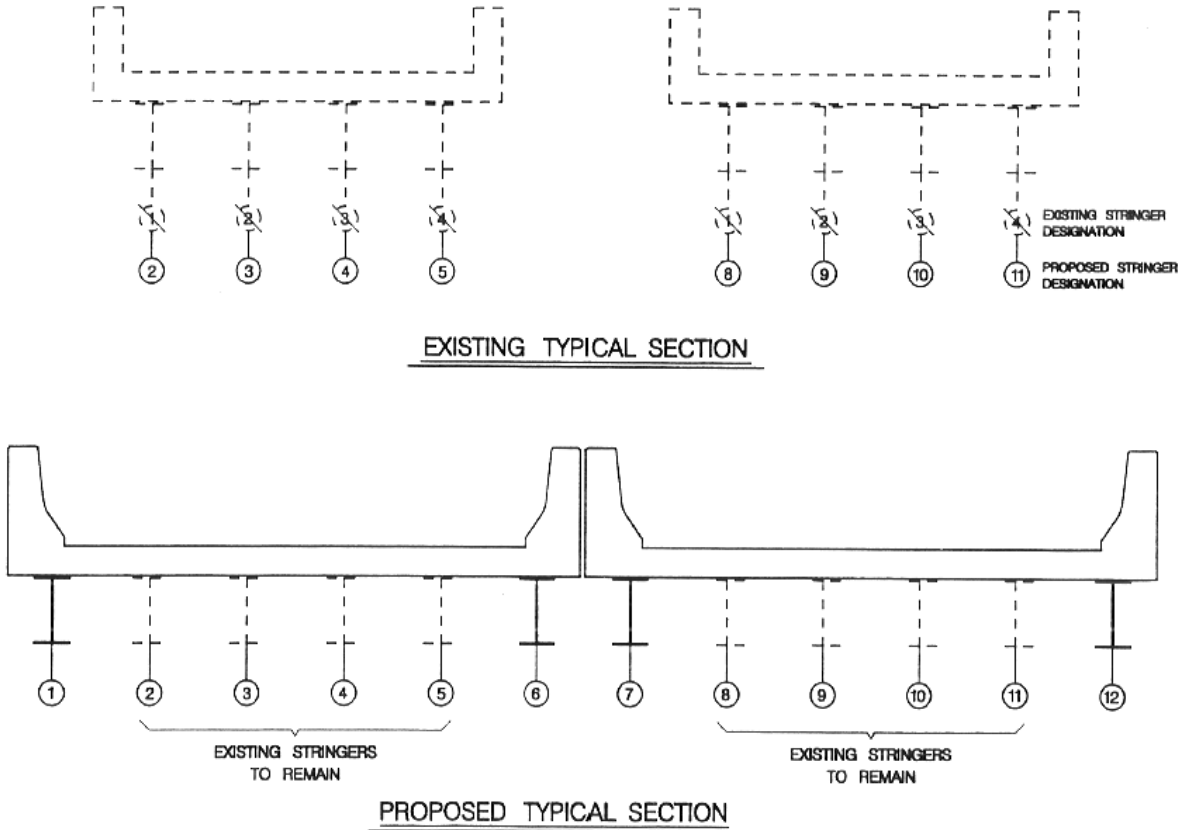



FIGURE C




	Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i>	<b>PLANS</b>
		Number: P-93-37(4)
		Date: 03-16-2018
<b>Contract Plans for Noise Barriers</b>		Approval:

Contract documents for noise barrier projects shall include Plans and Special Provisions for the MDOT SHA Standard Noise Barrier System and provide opportunity for proprietary noise barrier alternates.


MDOT SHA has Standard Plans for ground mounted noise barriers and barriers mounted on top of retaining walls utilizing 12', 16', and 20' post spacings with stacked panels. The Contract Plans shall be prepared for only one spacing, as approved by the Offices of Environmental Design and Office of Structures. The Contractor will then be given the option to select one of the other two spacings if they are both acceptable, or be given only one other option depending on the wall location and topography. The option selected for detailing will be the one that we believe will be the most economical. The standards for the other two spacings will be included in the Contract. If the Contractor selects one of the other two options, the General Plan and Elevation for the post spacing on which the Contractor's bid was based as well as the final caisson chart for that option must be revised. The Contract Documents shall indicate who will be responsible for that work.

The Plans shall contain the following information:

- A. Highway Plans showing all topography, drainage structures, noise barrier, etc.
- B. A structure key plan sheet showing all structures, including noises barriers and retaining walls, in the Contract.
- C. Plan and Elevation views of the proposed Noise Barrier based on the selected post spacing indicating the following data:
  - 1. Base line construction alignment data.
  - 2. Beginning and ending wall stations.
  - 3. Horizontal offsets to face of Noise Barrier.
  - 4. Right-of-way lines.
  - 5. Elevation on top and bottom of each wall panel.
  - 6. Original and proposed ground profiles, in front of and behind the Noise Barrier.

 <p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
	Number: P-93-37(4)
	Date: 03-16-2018
<b>Contract Plans for Noise Barriers</b>	Approval:

7. Acoustic profile.
  8. Location and height of retaining walls, or Jersey barriers if applicable.
  9. Location of overhead signs or roadway lighting, if applicable.
  10. Location (horizontally and vertically) and size of any existing or proposed structures, utility lines or any other appurtenances which could affect the Noise Barrier.
  11. Caisson numbers for the selected post spacing.
- D. Chart showing each caisson number, station, offset, top of pad elevation, diameter and depth of all caissons. A view shall be provided explaining all data provided. See Attachment A. Additional columns shall be shown on the chart for other acceptable caisson spacings. In these columns a caisson depth shall be indicated every 100'± required for that particular location.
- E. Any aesthetic treatment that will be used on the Noise Barrier. The designer shall evaluate the proposed treatment for its compatibility with other structures in or near the project.
- F. Any Sequence of Construction requirements which will affect the construction of the Noise Barrier.
- G. The logs and location of all borings taken at each Noise Barrier site.
- H. Details for MDOT SHA Standard Concrete Noise Barrier System for the selected spacing as well as other spacing(s) which may be allowed.
- I. Details for Bridge Mounted Noise Barrier System, if required.
- J. Any required special details such as grade beams, posts over the maximum standard height, special corner details, end treatment, retaining walls, Jersey barriers, etc.
- K. Soil parameters and safety factors used in the design of the caissons for the ground mounted noise barriers utilizing the COM624P computer program.


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	Date: 03-16-2018
<b>Contract Plans for Noise Barriers</b>	Approval:

PROPRIETARY NOISE BARRIERS

To allow for the use of proprietary noise barrier alternatives, the Contract Documents will also include, where applicable, the magnitude, location and direction of external loads due to bridges, overhead signs, traffic surcharge, etc., which must be accounted for in design, and a list of approved Proprietary Barrier Alternatives from which the Contractor may select and furnish for the Contract bid price.

CROSS SECTIONS


Cross sections showing original groundline, proposed groundline and location of noise barriers for full length of barriers must be available for review by bidders at the time of advertisement.

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		Number: P-94-38(4)
		Date: 03-16-2018
<b>Contract Documents for Retaining Walls</b>		Approval:

Plans and Special Provisions for specific Proprietary Retaining Walls will not be included in the advertised contract documents. Data necessary for the design of the walls will be provided. Cross sections will be available for review by Contractor prior to bidding. The contract documents will include the data listed below. After the award of the contract, complete plans for the selected wall will be prepared by the Wall Firm and added to the contract documents by a Red Line Revision. The cost incidental to the preparation of approved drawings and special provisions for the Proprietary Wall is to be included in the appropriate construction bid item.

Data included in the MDOT SHA Contract Documents:


- A. Highway Plans showing all topography, drainage structures, etc.
- B. Retaining Wall envelope indicating the following data:
  1. Beginning and Ending Wall Stations
  2. Horizontal and Vertical Roadway Alignment Data
  3. Horizontal Offsets to Face of Retaining Wall
  4. Right-of-way Lines
  5. Superelevation Data
  6. Location and Height of Noise Walls, if applicable
  7. Location of Overhead Signs or Roadway Lighting, if applicable
  8. Location (horizontal and vertical) and Size of any existing or proposed Structures, Utility Lines or any other appurtenances which will affect the Wall
  9. Elevations on Top of Wall (Parapet, Coping of Traffic Barrier) at Beginning and Ending of Wall, at 100' maximum spacing, and at Profile Break Points
  10. Elevations at Highest Permissible Level for Bottom of Footing or Leveling Pad
  11. Original and Proposed Ground Profiles, in front of and behind the wall

 <p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<b>PLANS</b>
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12. At stream locations, extreme high water and normal water levels, and any special protection barrier needed
- C. Any aesthetic treatment that will be used on the Wall. The designer shall evaluate the proposed treatment for its compatibility with other structures in or near the project.
- D. Any Sequence of Construction requirements which will affect the construction of the Wall.
- E. The logs and location of all borings taken at each Wall site.
- F. Magnitude, location and direction of external loads due to bridges, overhead signs, traffic surcharge, etc.
- G. The allowable bearing capacity at Bottom of Footing or Leveling Pad and under reinforced earth mass. Maximum allowable total and differential settlements.
- H. A list of approved Proprietary Walls from which the Contractor must select and furnish for the contract bid price. (Special Provisions will stipulate that Contractor identify selected wall type at time of bid.)
- I. complete contract documents for any non-proprietary walls (e.g. concrete cantilever, crib wall, etc.), if required.


Prior to bidding on the Contract, the wall firm shall visit each wall site to familiarize themselves with any special physical conditions, sumps, springs, etc. After award of the Contract, the Wall firm, at no cost to MDOT SHA, shall prepare mylar plans, in addition to shop drawings, using standard MDOT SHA format, and special provisions, which shall become part of the contract documents. MDOT SHA shall issue the documents as a Red Line Revision. These plans shall be based on the standard details and specifications on file in the Office of Structures, shall be prepared to MDOT SHA Details and shall include, but not be limited to, the following items:

- A. A Plan and Elevation Sheet or Sheets for each Wall which contain the following:
1. An Elevation View of the Wall which indicates the elevation at the top of the Wall (Traffic Barrier, Coping or Parapet) at all Horizontal and Vertical Break Points, and at least at every 100 feet along the Wall, elevations at top or bottom of leveling pad or footing, distance along face of wall to all steps in footings or

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<b>Contract Documents for Retaining Walls</b>	Approval:

leveling pads, designation as to type of panel or depth of module, length of straps or mesh and distance, vertically and horizontally, along face of Wall to where changes in length of the straps or mesh occur, allowable and maximum bearing pressures, and original and final ground lines.

2. A Plan View of the Wall which indicates the offset from construction baseline to face of wall at all changes in horizontal alignment, distance from front face of wall to extreme limit of module, strap or mesh, right-of-way limits behind wall, with offsets and stations to corners, locations of noise walls and signs near the wall by station and offsets, and centerline of drainage structures and utilities behind and passing through or under walls.
  3. Any General Notes required for constructing the Wall.
  4. Limits and extent of reinforced soil volume.
- B. All Horizontal and Vertical Curve Data affecting the Wall.
- C. All details for Traffic Barriers, Copings and Parapets, as well as that required for railings and fencing.
- D. All details necessary for attaching Light Standards and Noise Walls.
- E. All details for foundations and leveling pads including details for steps in footings.
- F. All details necessary for showing or detailing aesthetic treatment of facing panels.
- G. Typical Panels and Modules, as well as special Panels or Modules at bends, etc. shall be detailed, showing all dimensions necessary to construct the element, all reinforcing steel in the element and the location of reinforcement element attachment devices embedded in the facings.
- H. Typical sections of the Wall showing how internal drainage or surface drainage behind the Wall is handled. Typical cross sections showing limits of construction and in fill sections, limits and extent of select granular backfill material placed above original ground.

 <p><b>MDOT</b> MARYLAND DEPARTMENT OF TRANSPORTATION</p> <p>STATE HIGHWAY ADMINISTRATION</p>	<p>Office of Structures <i>Guidelines and Procedures</i> <i>Memorandum</i></p>	<p>PLANS</p>
		<p>Number: P-94-38(4)</p>
		<p>Date: 03-16-2018</p>
<p><b>Contract Documents for Retaining Walls</b></p>		<p>Approval:</p>

- I. All details for constructing Walls around Bridge Supports, Drainage Facilities and Sign Footings, etc., shall be clearly indicated. Particular attention shall be given to accommodating Wall construction around Abutments.
- J. All quantities and special provisions, including suggested sequence of construction, necessary to construct the wall.
- K. Minor lengthening and/or lowering of a wall, to make use of standard panels or modules is acceptable, provided the as-planned top of wall profile is maintained. Aesthetic treatment to facing panels or modules is to be carried to top of footing or leveling pad.
- L. All detailed calculations for the Wall, including sliding, overturning, internal stability, etc., which are the responsibility of the Wall firm, shall be submitted. Limits of design responsibility, if any, shall be noted. All plans and calculations shall be prepared and signed by a professional engineer, licensed in the State of Maryland.
- M. Completed contract documents for each wall shall be submitted to the Office of Structures within sixty (60) calendar days after award for review and approval in the same manner as shop drawings.