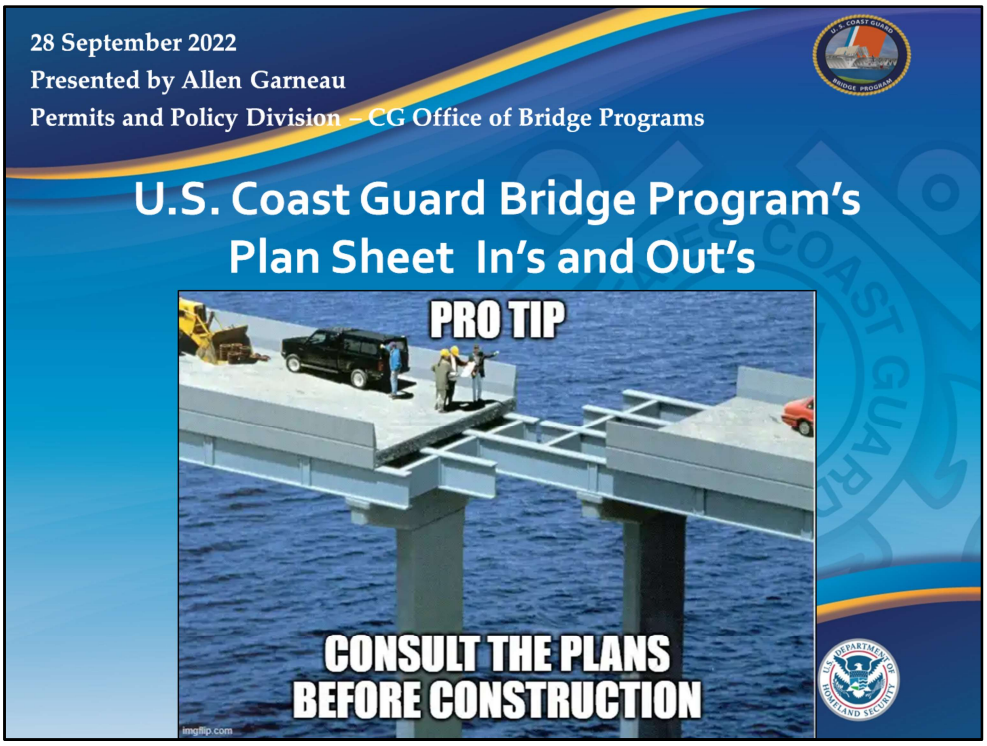
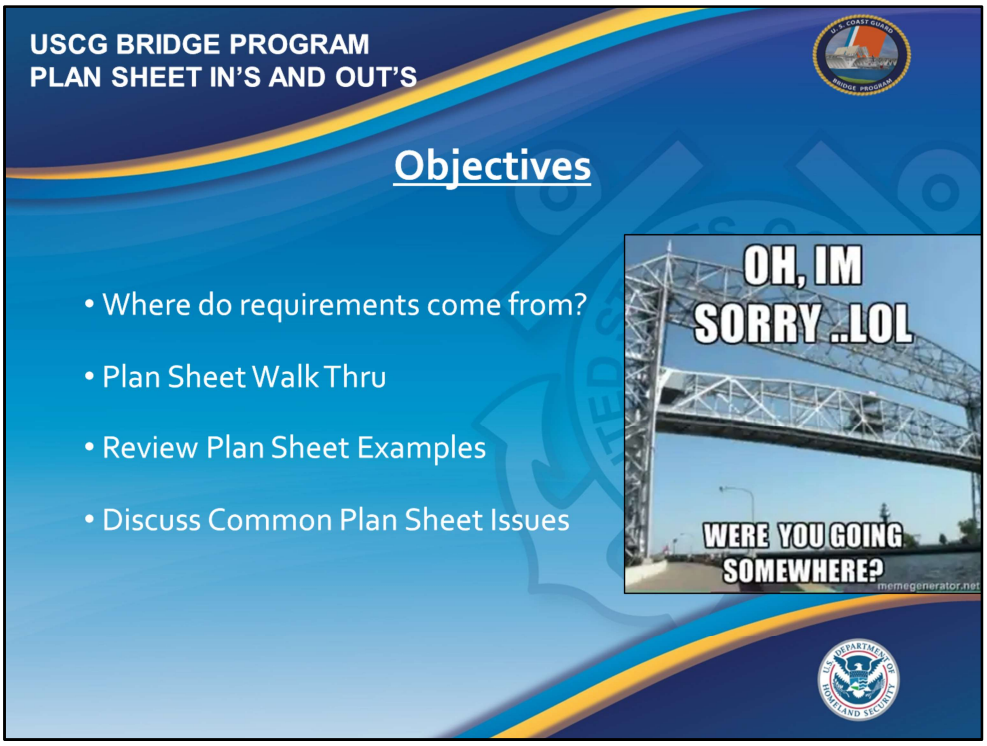


Good day again to those of you who viewed my earlier presentation on Navigation Impact reports, Evaluations and Preliminary Navigational Clearance determinations. My name is Allen Garneau with the Permits and Policy Division of the Coast Guard Office of Bridge Programs at Coast Guard Headquarters in Washington, DC. Next we'll be reviewing the plan sheet requirements for a Coast Guard Bridge Permit. We often find this to be one of the more cumbersome exercises during the permit process so we're going to take a look at the plan sheet job aid we've made available and use it to walk through several examples. Some of this was previously covered in our initial presentation, but this presentation will take a much deeper dive into the requirements. Feel free to ask questions in the Q&A section during the presentation and we'll try to answer them as we go along.



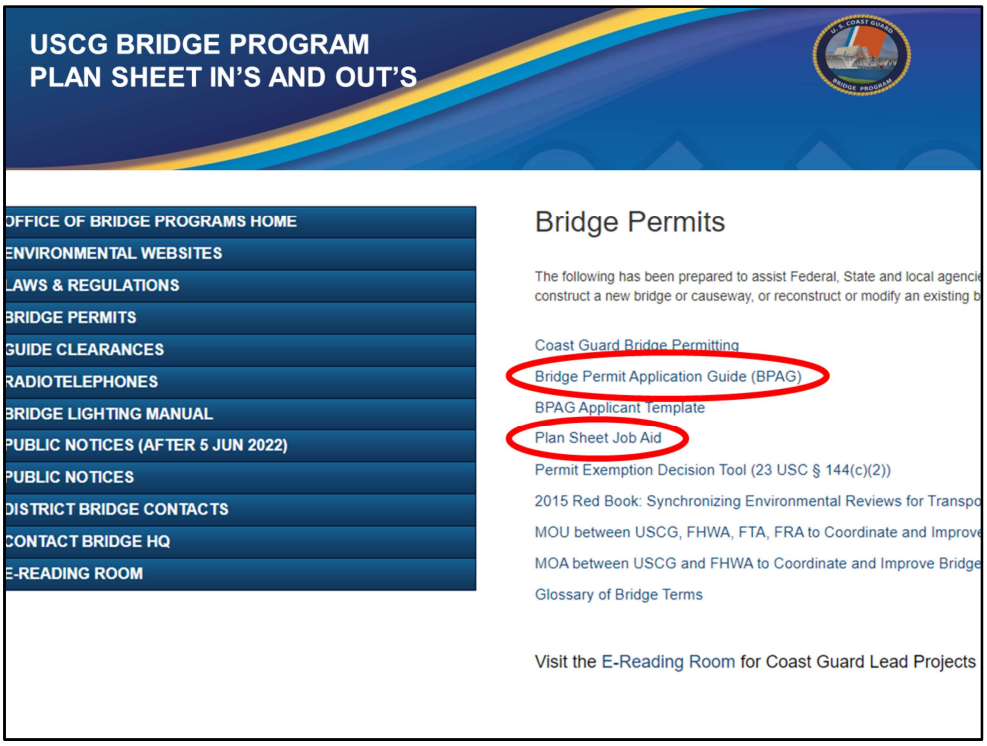
Let's take a look at the objectives for today's presentation. We'll first learn where you can find the plan sheet requirements.

We will next be walking through our plan sheet job aid.

We'll also be looking at various plan sheet examples.

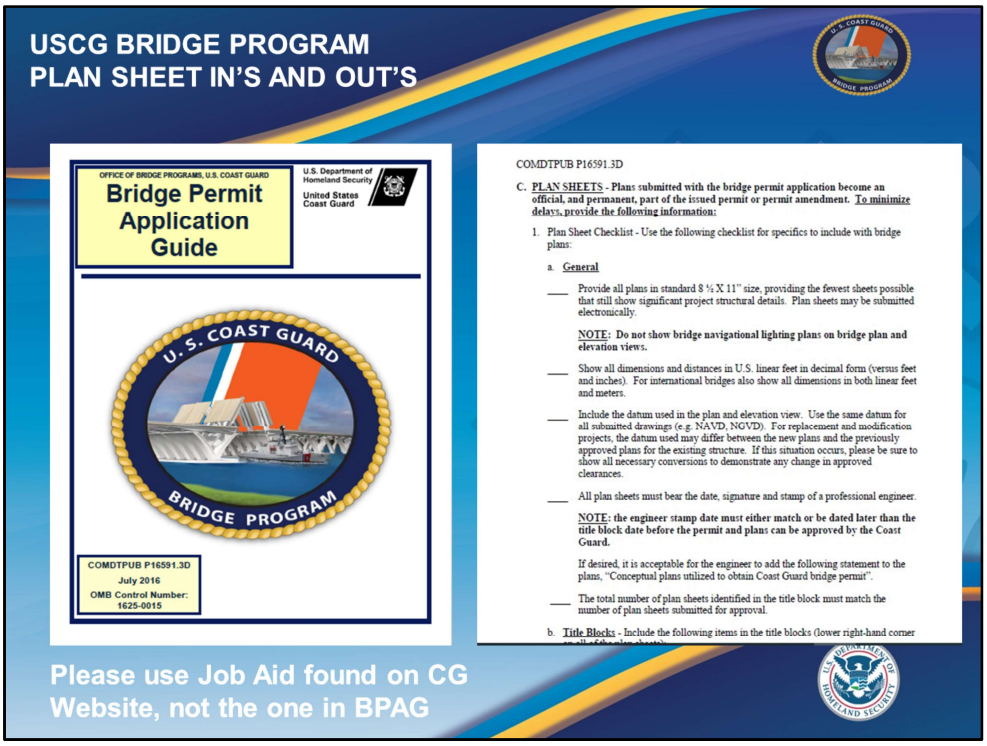
And finally I'll mention some of the most common issues we see with plan sheets for a Coast Guard permit.

A quick internet search for the Coast Guard Office of Bridge Programs will take you to this homepage. Our plan sheet job aid resides within our Bridge Permit Application Guide, which is commonly referred to as the BPAG. Once you get to our Program website you'll then click on the Bridge Permits tab as indicated here.

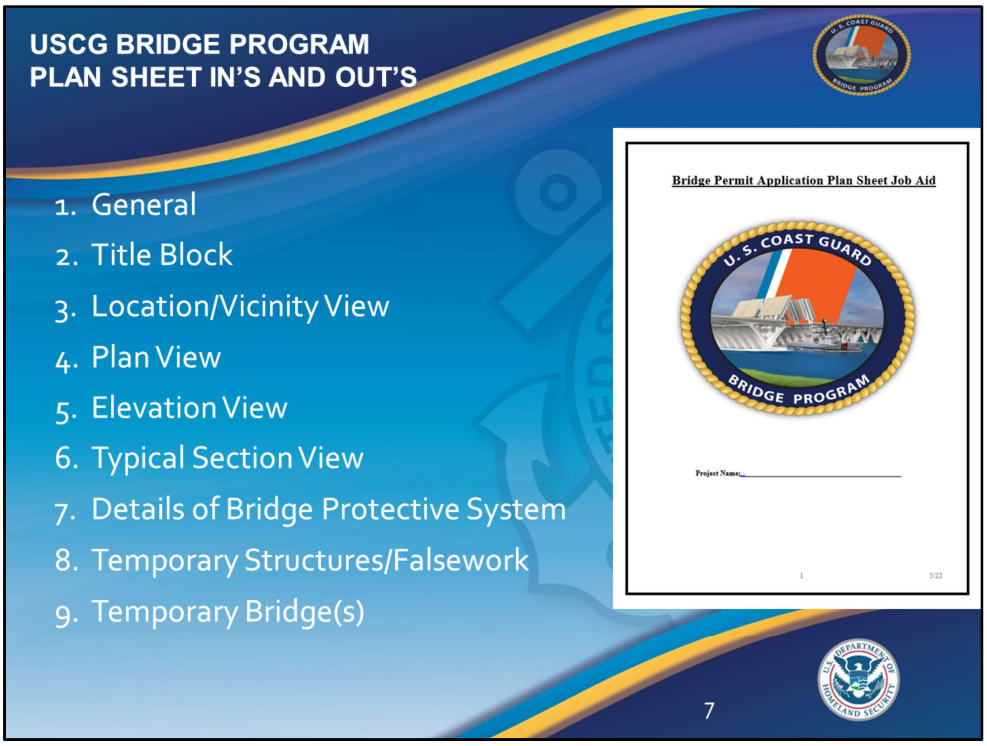


From there, you'll then be able to find a link to both the BPAG and the plan sheet job aid as indicated here. The job aid is available as a fillable Word template for download from our bridge program website. It can also be provided to you by the district bridge office. This job aid template found online is a more up to date version than the one that's found in the BPAG, so we ask that you please always either download it or get it from your CG district bridge office.

As we mentioned previously, our requirements for plan sheets are codified in regulation. The next time you need some light reading might I recommend you open up Title 33 of the Code of Federal Regulations, flip to Chapter 1, Subchapter J, Part 115, section 50 and walla. Here you'll find the requirements for an application for a bridge permit, to include the basic plan sheet requirements. Subparts (f) – (i) detail the requirements for the bridge permit application. To facilitate a smooth application process we do ask that you please use the BPAG and follow the format and requirements for the permit application.



Since the bridge permit application process and plan sheet requirements are codified in the CFR, we've created a guide to assists our applicants with the bridge permitting process called the Bridge Permit Application Guide, or BPAG. Our plan sheet requirements can be found in checklist format in the guide. We're currently revising the BPAG, and the plan sheet job aid will soon be a separate appendix to it. As previously mentioned please use the plan sheet checklist found on our website or the one you received from your local Coast Guard District bridge Office compared to the one found in the current BPAG. While the updates are few and subtle, they make everyone's use of it just a bit easier. You will also find several plan sheet examples for applicants to utilize when submitting their bridge permit application. In a few slides, I will walk through a couple of examples of bridge permit plan sheets.



Let's take a quick look at the format of the Plan Sheet Job Aid once opened. There are 9 different sections in the plan sheet job aid. They are:

The General section which discusses the general requirements for plan sheets

The Title Block section

The section that discusses the Location and Vicinity View

The Plan View section

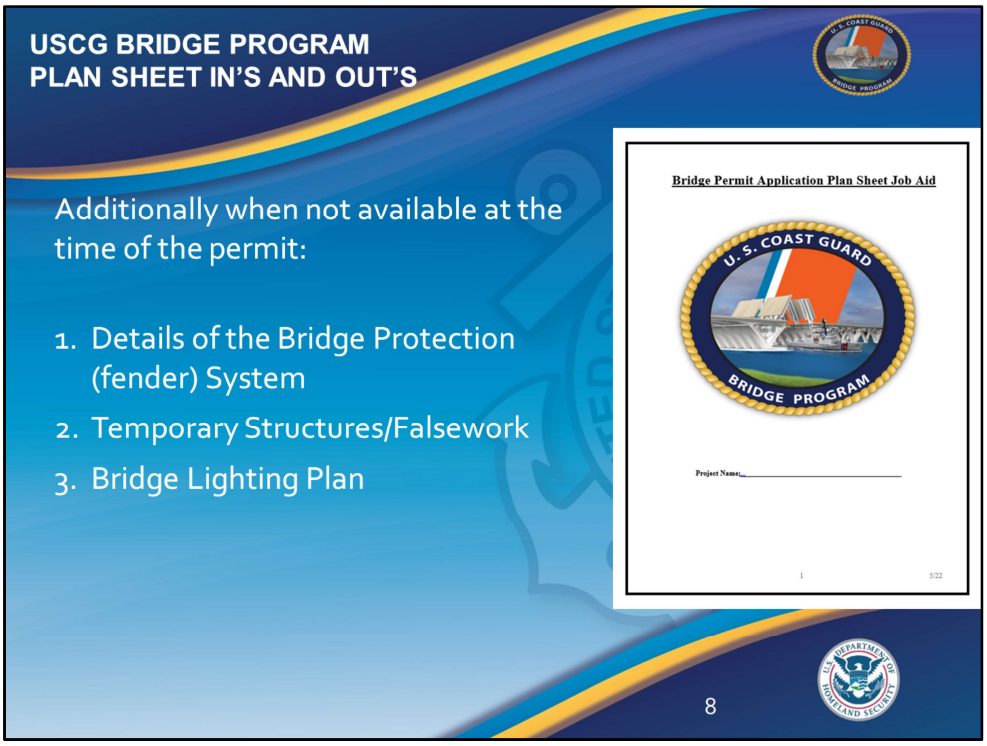
The Elevation View section

The Typical Section View section

A section for Details of Bridge Protective System, commonly known as a fenders system

A section for identifying any Temporary Structures or Falsework that will be used during construction of the bridge

And finally a section for Temporary Bridge(s) which would be required for a Coast Guard public notice and for final permit approval. Temporary bridges must be part of the plan sheet set submitted for permit approval, otherwise a permit amendment will later be needed.

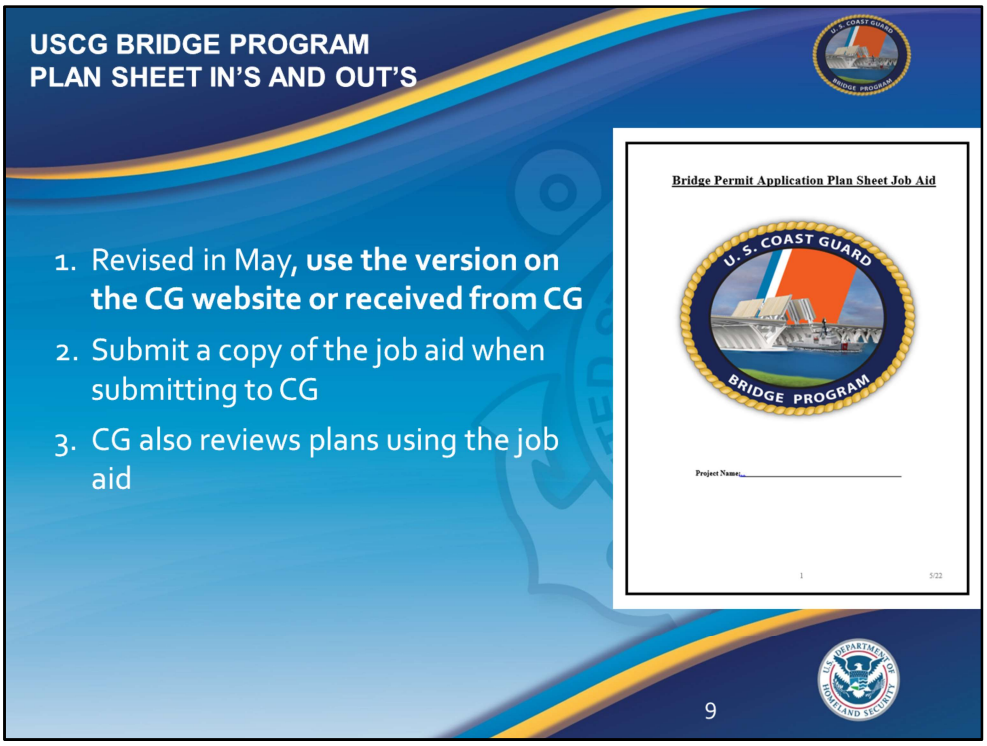


Sometimes certain required details aren't available at the time of the Coast Guard permit, but these items must still be submitted to the local Coast Guard District Bridge Office prior to commencing construction on any bridge project. They include:

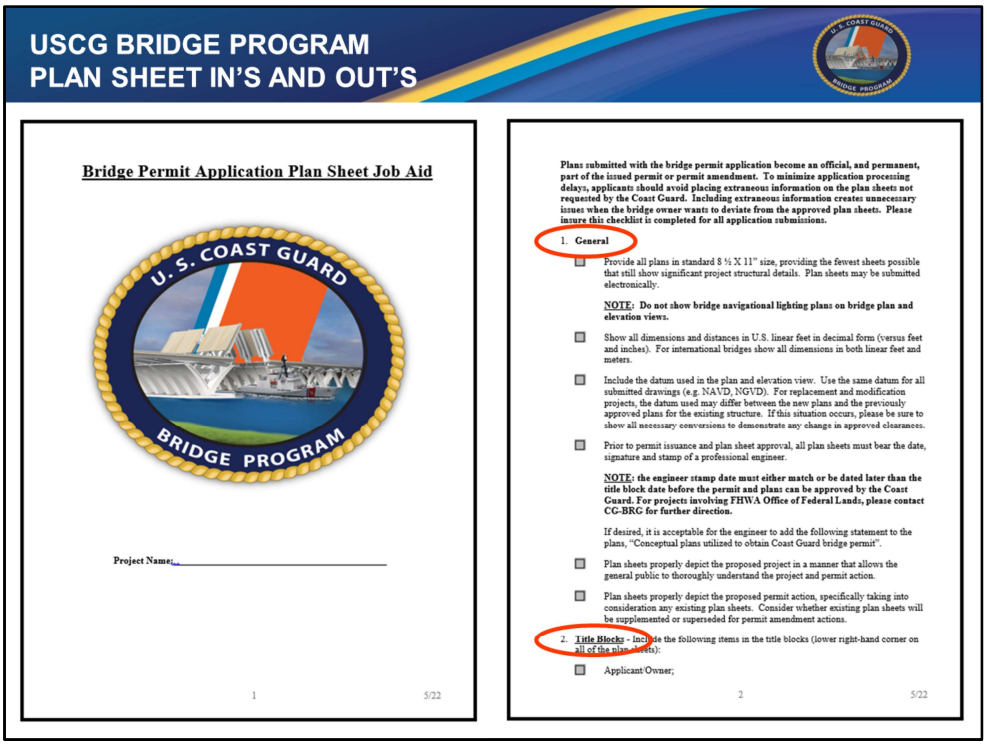
Details of the Bridge Protection System

Details for Temporary Structures/Falsework, which as mentioned on the last slide are different from temporary bridges

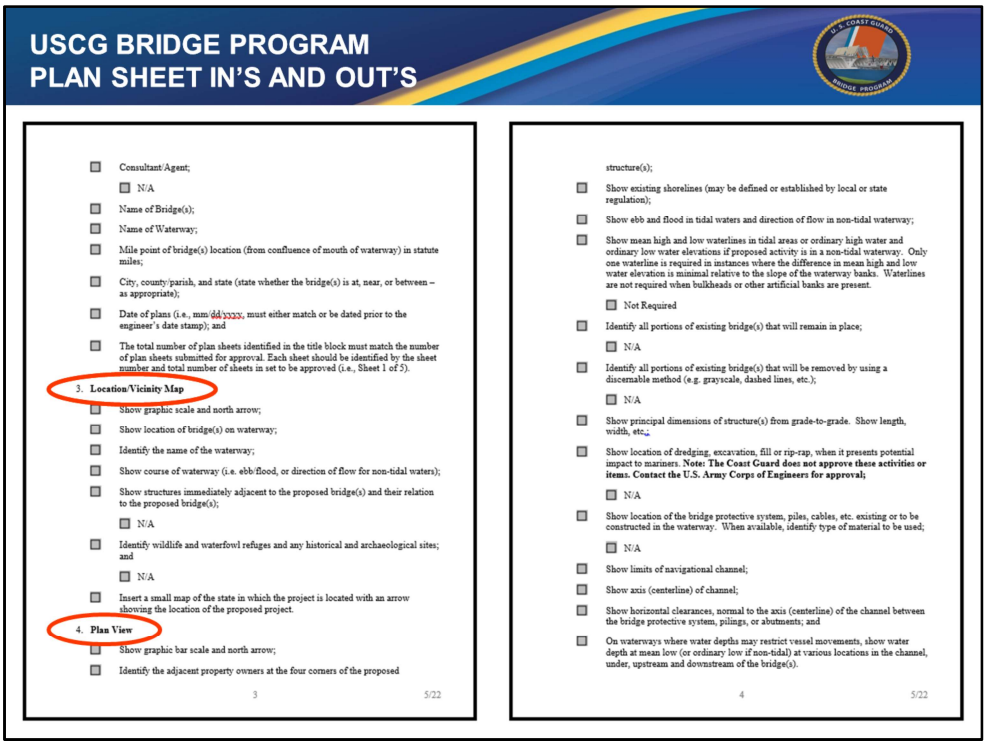
And details for Bridge Lighting Plans. These are separate and are normally decided upon much later in the design and construction process.



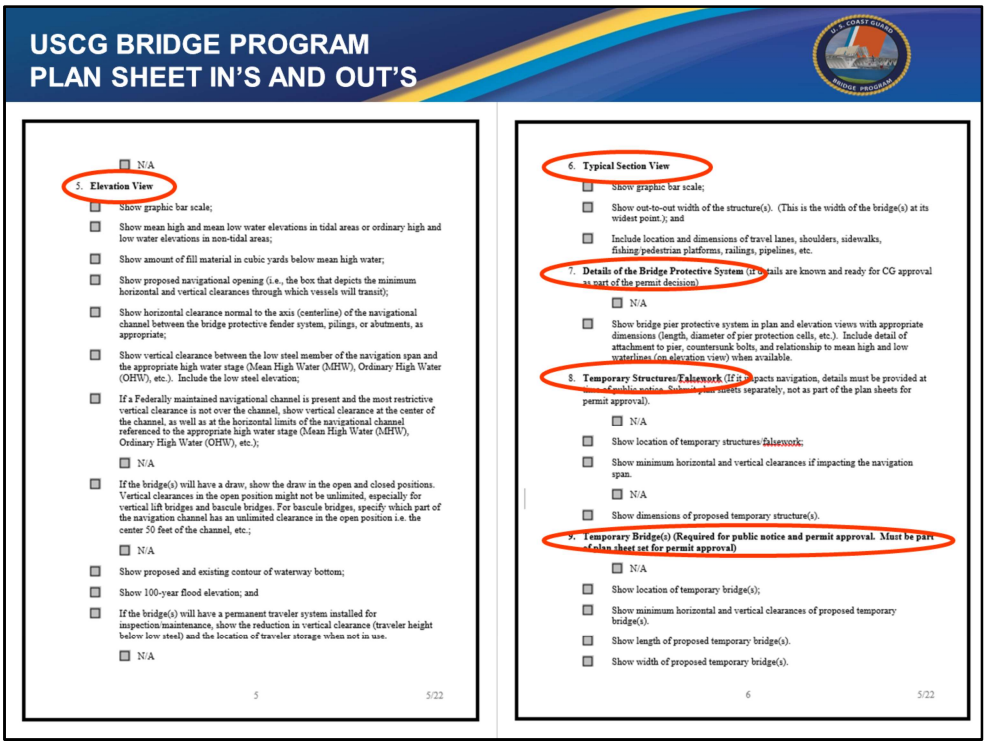
The plan sheet job aid we're presently using and available on our Bridge Program website was recently revised back in May of this year. We find it best if applicants submit a filled out copy of the plan sheet job aid when submitting plans to the district bridge office for review to show it was used it while developing the plans. The Coast Guard also utilizes the plan sheet job aid as well when we review the plans. Most district bridge offices prefer to send copies of the filled out plan sheet checklist directly back to the applicant with any comments after review when updates might be required.



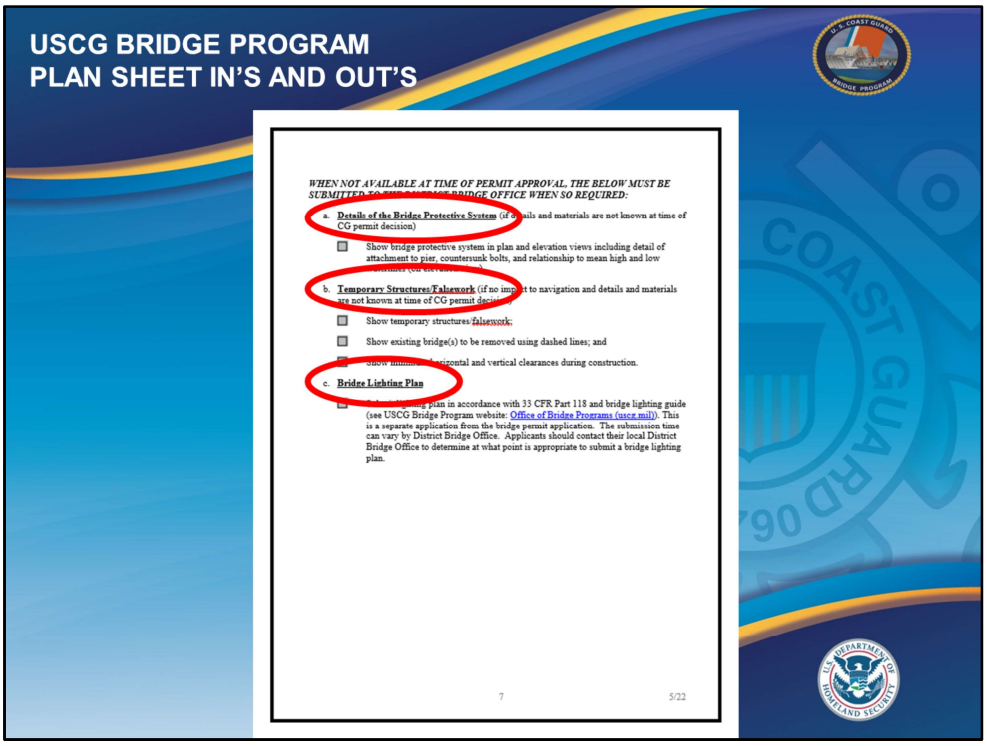
Let's first take a quick look at the main components of the job aid, then we'll discuss each in greater detail. The checklist was developed as a tool to facilitate proper plan sheets for bridge permitting. If you ever have any questions, please be sure to reach out to your local Coast Guard District Bridge Office. Looking here at pages 1 and 2, you'll see page 1 is the cover and the job aid starts with the General Requirements section on page 2. Looking down to the second red circle on the bottom right you'll next see section 2 which is the title block section.



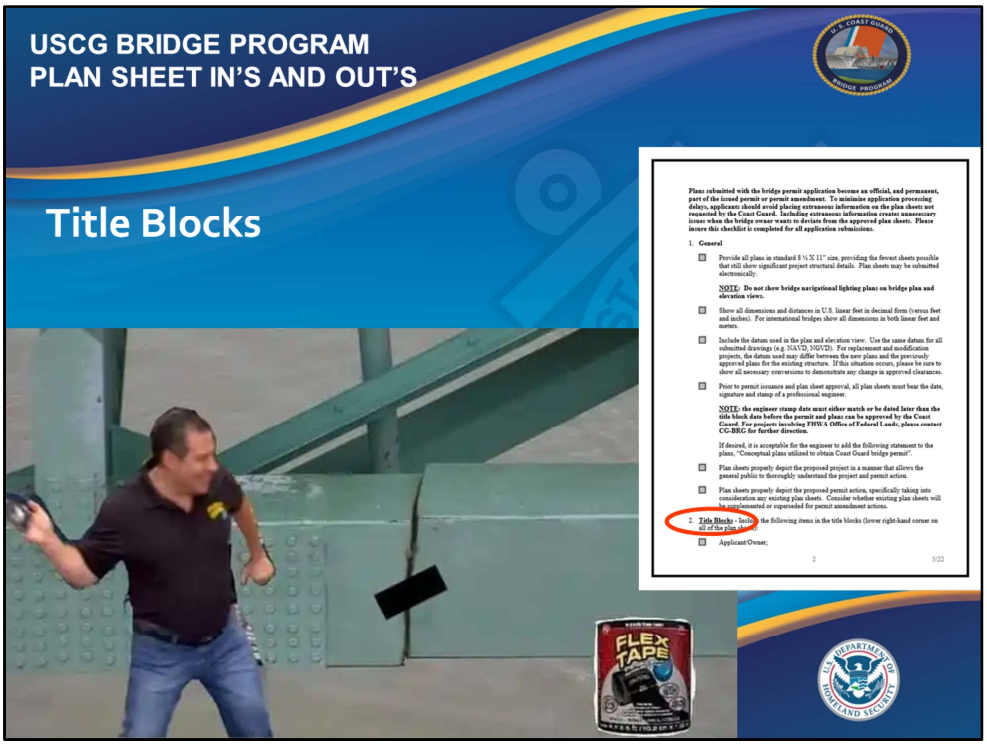
Here's a quick look at pages 3-4 of the plan sheet job aid. The title block section continues on the top left of page 3, we then move to the requirements for location and vicinity map. After that is Section 4 which addresses the plan view requirements which continues through page 4.



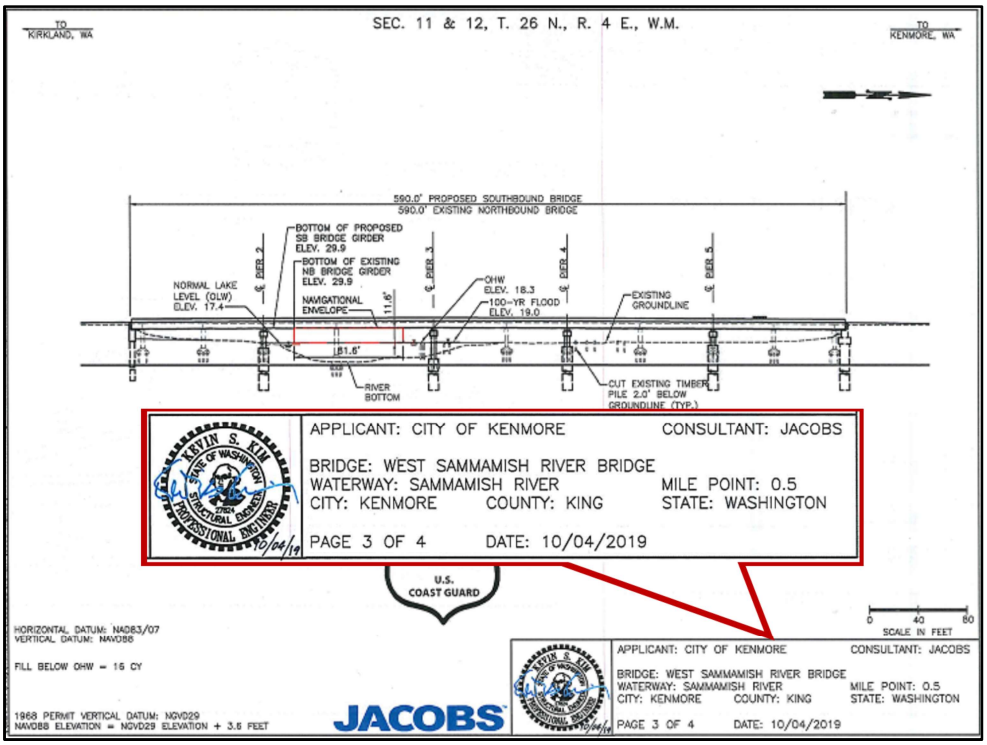
On page 5 we next find the elevation view requirements. Page 6 shows the requirements for the typical section view, followed by the bridge protective system section when one is required and details are known at the time of permitting. Next you'll see the section for temporary structures or falsework, followed by section 9 which is for temporary bridges.



Finally, the last page includes the requirements I previously mentioned for when items aren't available nor required at the time of permit approval such as specific details for a bridge protective system, temporary structures or for bridge lighting.



For now I'm going to skip section 1 which is for the General requirements and to circle back to it towards the end of the presentation as it will all make more sense after we review the rest of the requirements. So instead lets start by taking a closer look at the Title Block Requirements which starts on page 2.



Here's an example of a plan sheet for a bridge over the Sammamish River in the State of Washington. I've expanded the title block located at the bottom right of the plan sheet out to show it easier in the red box. Let's take a look at the requirements as found on the plan sheet checklist.

The Applicant/Owner is identified as the City of Kenmore

The name of the bridge is shown as the West Sammamish River Bridge

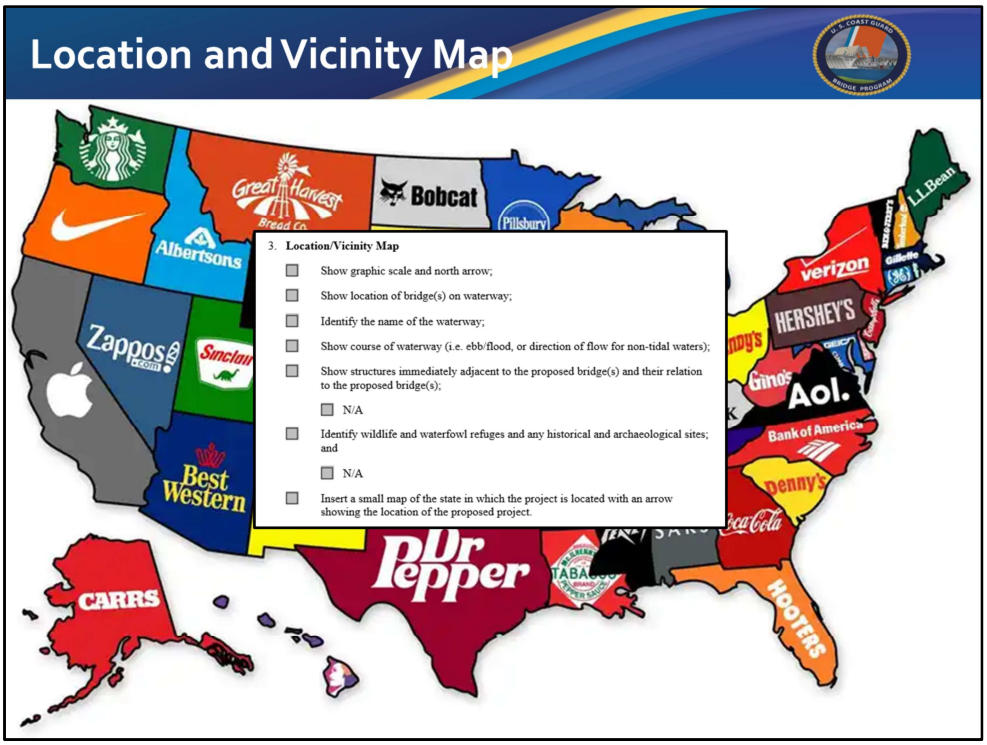
The Waterway name is identified as the Sammamish River with a mile point of 0.5

For the City, county, and state – the project is shown at Kenmore, King County WA

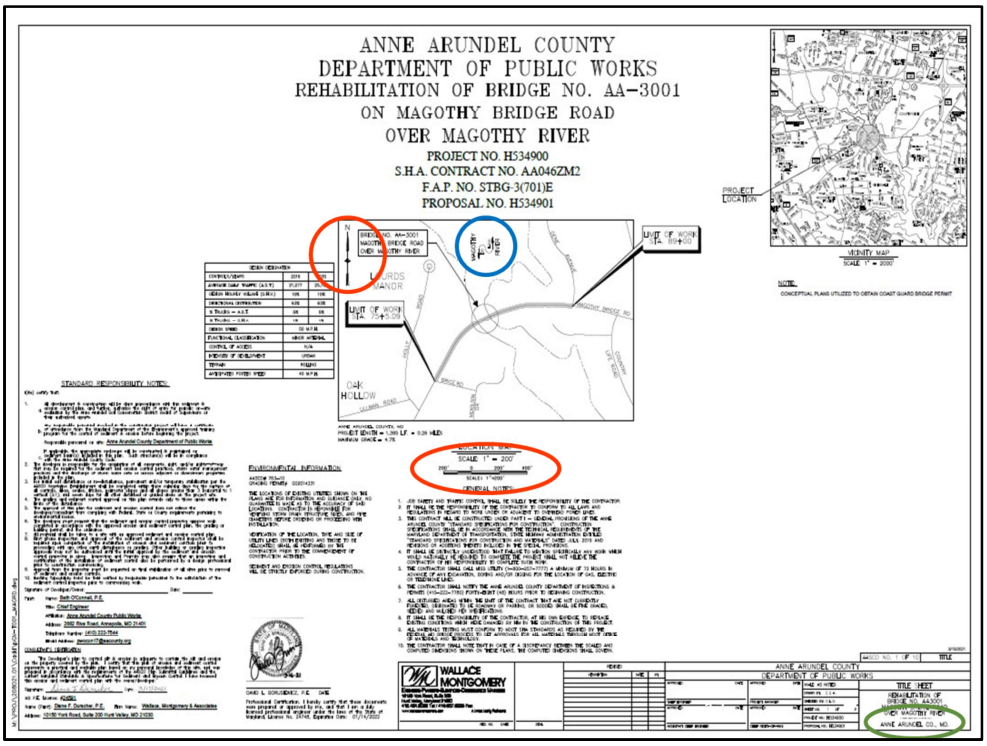
The plans are dated October 4th, 2019 and were stamped and signed by a professional engineer that same day.

His title block example is on an elevation view plan sheet and the plans indicate there are a total of 4 plan sheets for this bridge project and they've labeled this sheet as page 3 of 4. Other than changing the page number, the title block normally remains the same on each page of plan sheets.

One item not seen here in the title block but which is commonly required is listing the name for a consultant or agent. There is not one for this project so it has been omitted.



Moving on, now let's look at two different examples of a Location and Vicinity Plan sheet. These requirements are listed on page 3 of the plan sheet job aid. The purpose of the location and vicinity plans sheet is to provide the viewer with location of the proposed bridge project.



I hate to say it, but this plan sheet is a great example of a bad example of a location and vicinity plan sheet. This plan sheet was actually an initial submission for a bridge replacement project, no one that received Coast Guard approval. You can see how busy and difficult to read it is. Remember, the purpose of Coast Guard plan sheets isn't for construction purposes, they're informational and are intended to clearly depict the project and its proposed clearances in a manner the general public can understand.

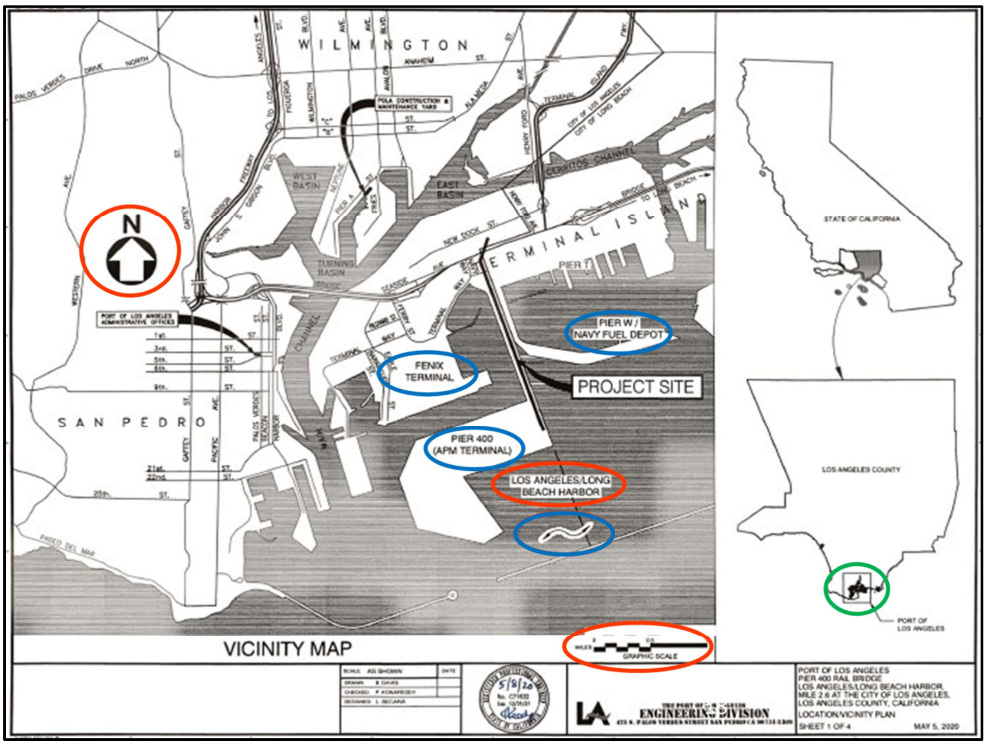
Running through the checklist we do see some of the required items such as a graphic bar scale and a north arrow which are both in circled in red.

If you squint real hard you can identify what body of water this bridge is located on, which is the Magothy River identified in the center in blue, however the location map is much smaller than we'd like barely showing anything in the middle of the plan sheet. The ebb and flood, also in blue, is also present here.

You cannot see adjacent property owners of the bridge, which is a requirement, nor are any wildlife or waterfowl refuges or historical or archaeological sites identified. We'd likely reach back to the applicant to ensure this is not an oversight since we'll likely be speaking to the applicant about other necessary changes.

Lastly, hunting around on this plan sheet you figure out this is actually in the state of Maryland if you look down in the title block down on the bottom right in green, but there is no small map of the state on this plan sheet making it difficult to actually determine this at a quick glance.

With all that said, there are too many unnecessary notes on the plan sheet, if deleted the location map could be enlarged for easier viewing.



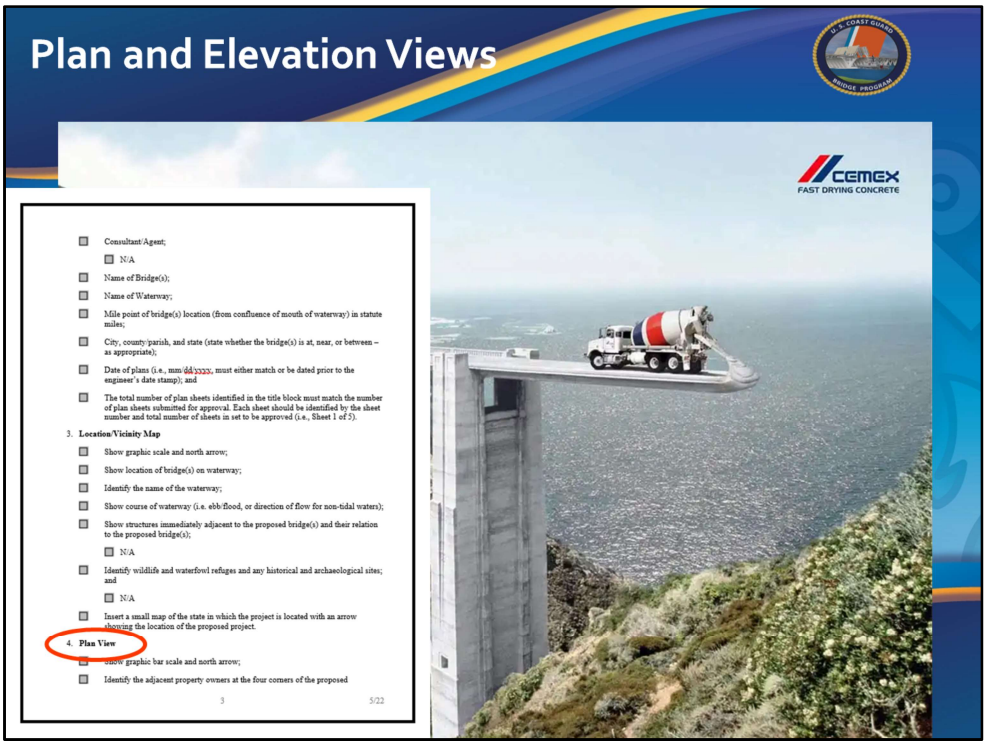
This plan sheet is a much better example of a location and vicinity map that has succinct required information on it. If we review it against the Location and Vicinity plan sheet requirements on the job aid we see the following:

First, looking on the right side of the plan sheet we can clearly see this project is in the State of California, in LA county, and with an arrow showing the location of the proposed project on the bottom right in green.

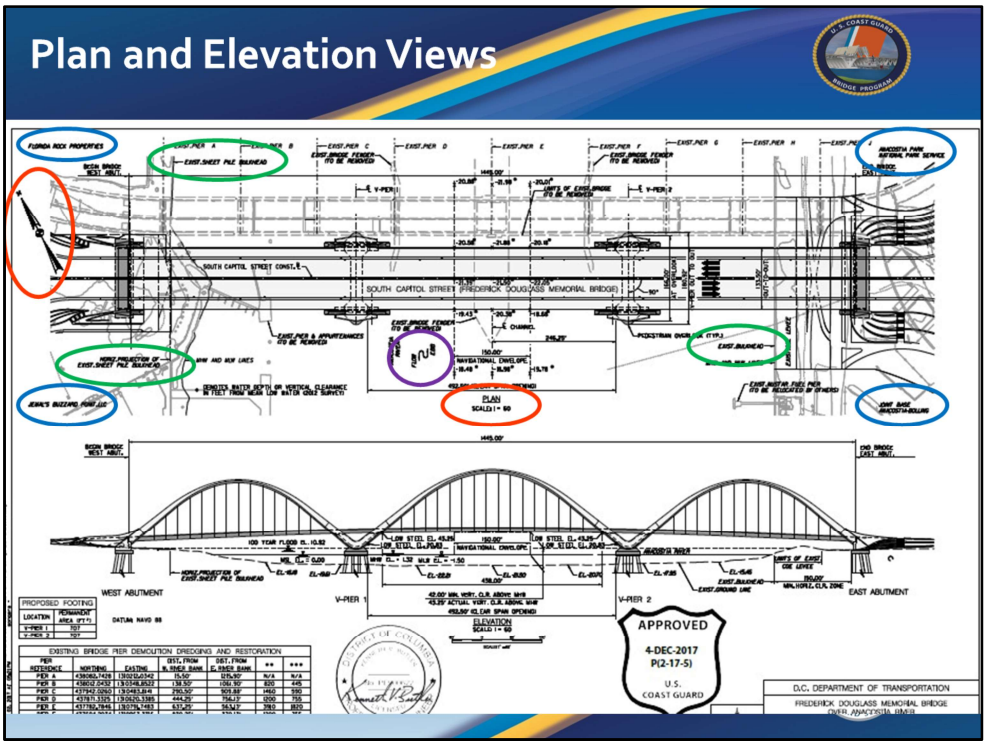
In red we see both the north arrow and the graphic scale and also see the location of the bridge identified as LA/LB Harbor

Circled in blue we see the direction of ebb and flow of the waterway present, and the structures identified adjacent to the proposed bridge such as Pier 400, the Fenix Terminal, and the Navy Fuel Depot. Waterfowl and wildlife refuges and historical sites are not indicated as present here on this plan sheet.

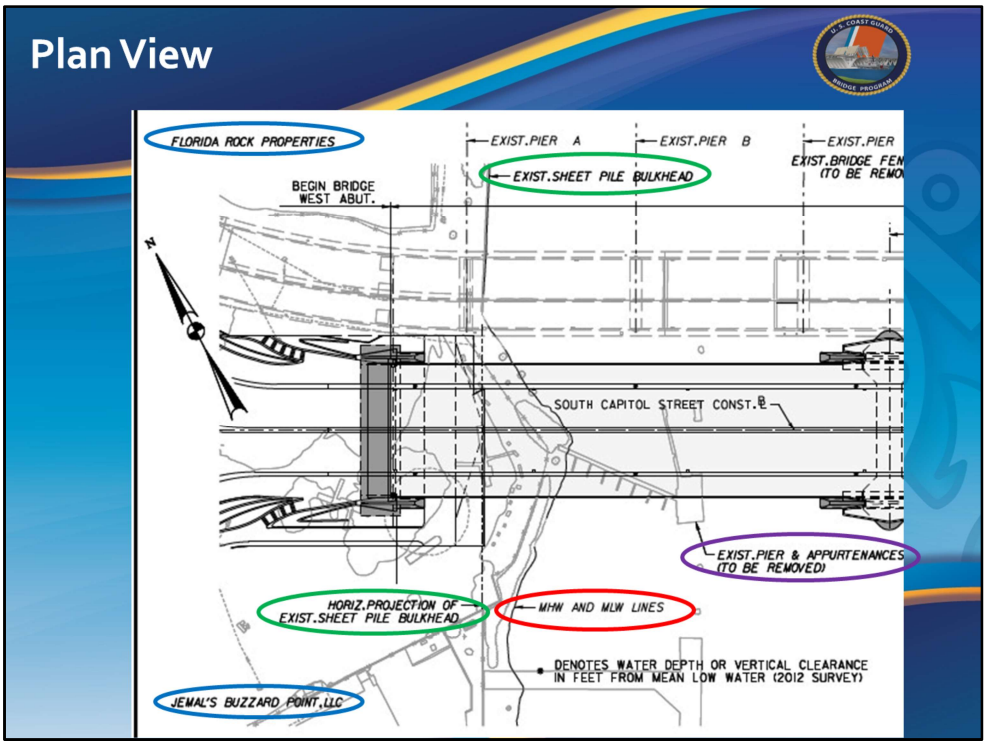
If the Coast Guard issued this plan sheet in a public notice for review and comment it is easy for readers to determine where this is and how it might impact waterway usage.



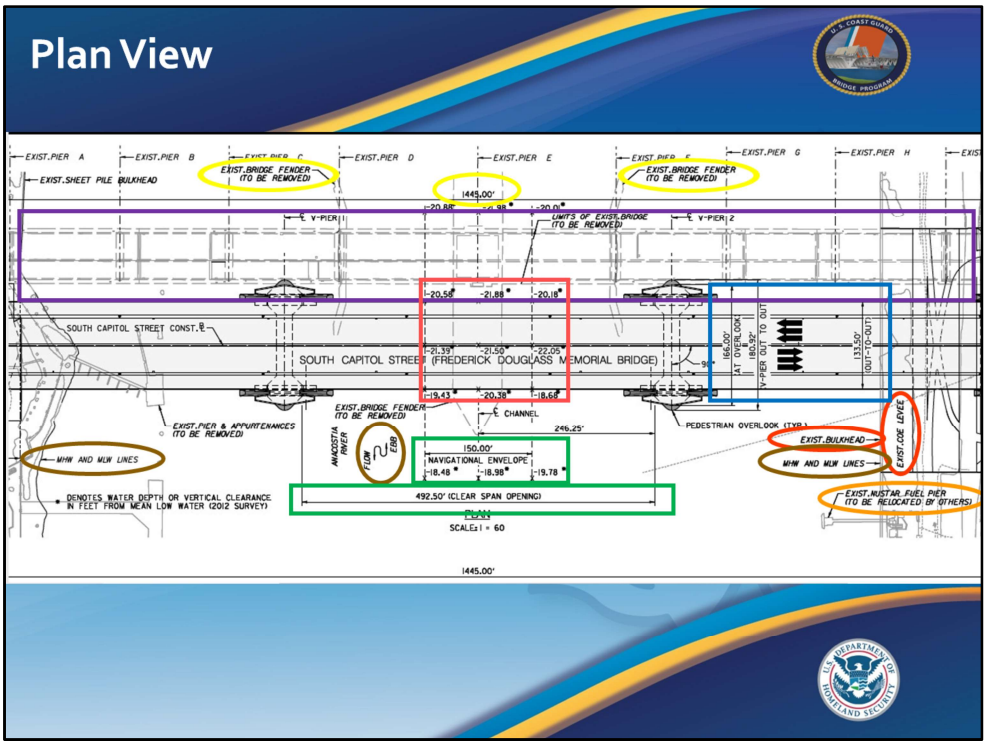
Now let's take a look at some plan and elevation view examples. The plan view is the top down view of the bridge, as if you are looking down from above the bridge, while the elevation view is the side view of the bridge, as if you were looking at the bridge from the waterway. We recognize that it is common for applicants to combine plan and elevation views on one plan sheet so that they are parallel to each other to depict the navigational channel well. Lets first look at an example where the plan and elevation view were provided on one plan sheet, then move on to take closer look at plan and elevation views separately.



Here we have a plan sheet for the Frederick Douglass Memorial Bridge in Washington DC depicting the plan and elevation views on a single plan sheet. This project involved replacing the existing Frederick Douglas Memorial drawbridge with a higher level fixed bridge. This plan sheet has been cropped a bit to make it easier to read. You'll see the plan view on the top half of the sheet and an elevation view on the bottom half. Let's first review the top which depicts the plan view against the job aid starting on page 3. The first requirements are for the graphic bar scale and north arrow, both shown in red. In blue we next see the applicant has identified the adjacent property owners on the four corners of the proposed bridge. We also see the existing shorelines notated in green and the ebb and flow symbol for the waterway in purple.



Here I zoomed in so you can better see in blue that the adjacent property owners are clearly indicated on both sides of the abutment, and in green we can see how the existing shorelines are identified, in this case as bulkheads. The next requirement from the checklist is for mean high and mean low waterlines. Since this is a bulkhead they're shown as one and the same here in red. Also note in purple the applicant identified and existing pier that will be removed during construction of the new bridge.



Now looking at just the top of the combined plan sheet, I've again cropped it a bit more to now just show the plan view.

On the right we can see the east bank of the project is also defined in red by a bulkhead, and also on the right in red you'll see the plan sheet labels the existing Army Corps of Engineer's levee on the southeast river bank abutment.

Below that in orange you can even see an existing fuel pier which was to be relocated before the new bridge was built on the bottom right. These items are all valuable information for mariners to see that the Coast Guard does like to include when they advertise these plans by issuing a public notice.

In brown we again see the ebb and flood for the channel, and also in brown the mean high and mean low waterlines for both sides of the river.

In this example no portions of the existing bridge will remain in place, so this optional question on the job aid is not applicable, but the purple box depicts the grayed out dashed lines which represent the existing draw bridge that will be removed. The job aid asks that this be shown in a "discernable method". This can be by use of a lighter gray color, use of dashed lines, or like in this case use of a hybrid of the two. All are correct so long as they indicate the existing to-be-removed bridge from the proposed bridge in a discernable way.

The job aid asks for the principle dimensions. The overall length of the bridge is listed at the top center in yellow as 1445.0 ft. Also in yellow at the top the applicant notes where the existing bridge fenders are to be removed.

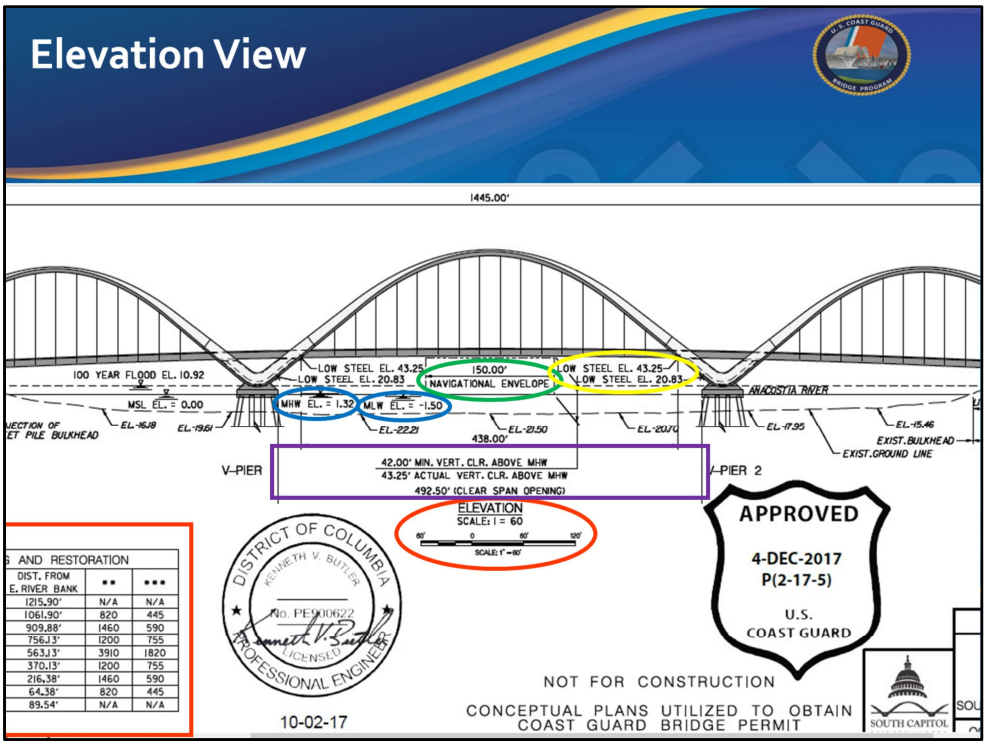
The blue box towards the right indicates where you'll find the width of the bridge, which in this case varies between 133.5 on the right of the blue box to 166.0.

This bridge project will not have a fender system, so identifying the location of the bridge protective system, piles cables, etc., is not applicable for this project, but if it were the location would also need to be shown.

The horizontal clearances are called out in the green box, with 150.00 ft of horizontal clearance in the navigation channel, and 492.50 ft clear span opening (pier to pier)

And lastly, the small red box identifies the varying channel depths between 18 to 22 ft.

As you can see, there's still a lot going on here so simplifying plans as best we can while still meeting the requirements is always preferred.

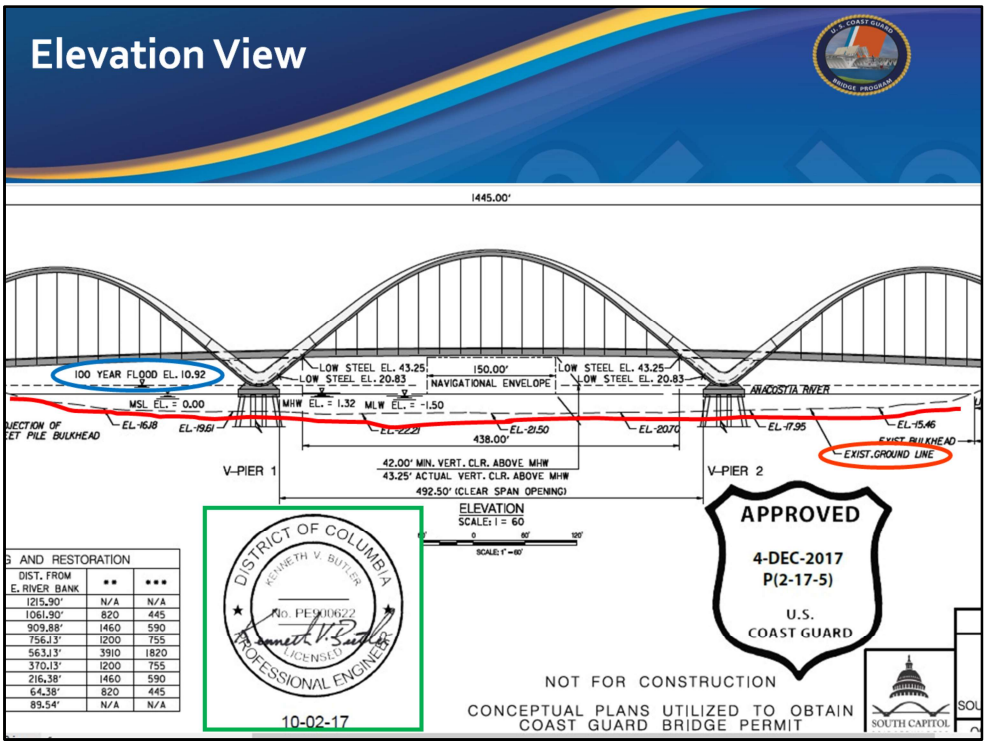


Lets now take a look at the elevation view requirements for a plan sheet. This elevation view is the bottom portion of that same original combined plan sheet. Here again you can see in red the graphic bar scale is present in the center. Both bridge piers require fill so the applicant added a table, also indicated here by the red box, with the amounts of fill at the bottom left of the plan sheet.

In blue we find the MHW and MLW elevation lines. The difference between the two is almost 3 feet.

The navigational opening is again depicted in green as 150.00 ft of horizontal clearance in the channel. In the purple box the minimum vertical clearance above MHW is shown as 42.0 ft, but its also shown as 43.25' at the actual centerline of the channel. They also labeled in the bottom of the purple box the clear span horizontal clearance at low steel between the piers as 492.5 ft. In yellow you'll find the low steel elevation in the navigation span for the roadway at 43.25 ft, and again at the base of the pier as 20.83 ft.

The checklist would next ask about drawbridges but since this bridge is no longer a draw bridge that requirement becomes not applicable.

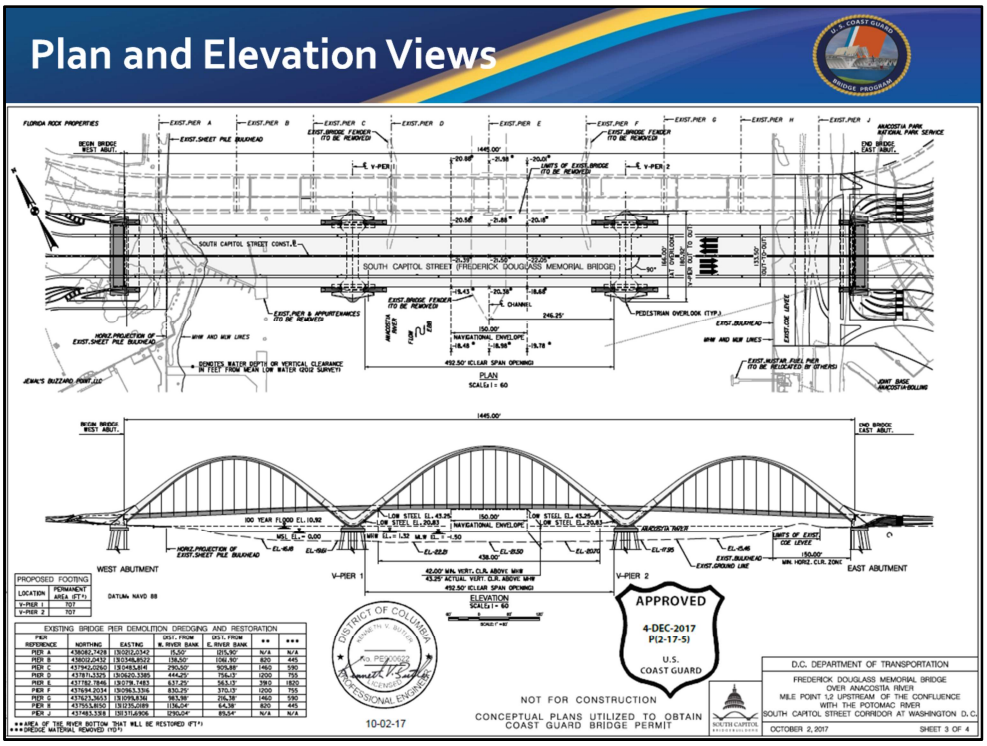


Looking at the same plan sheet we continue with the elevation view requirements and just above the red line I've drawn here we can clearly see the existing contour of the waterway bottom which is the dashed line they labeled here as the existing ground line.

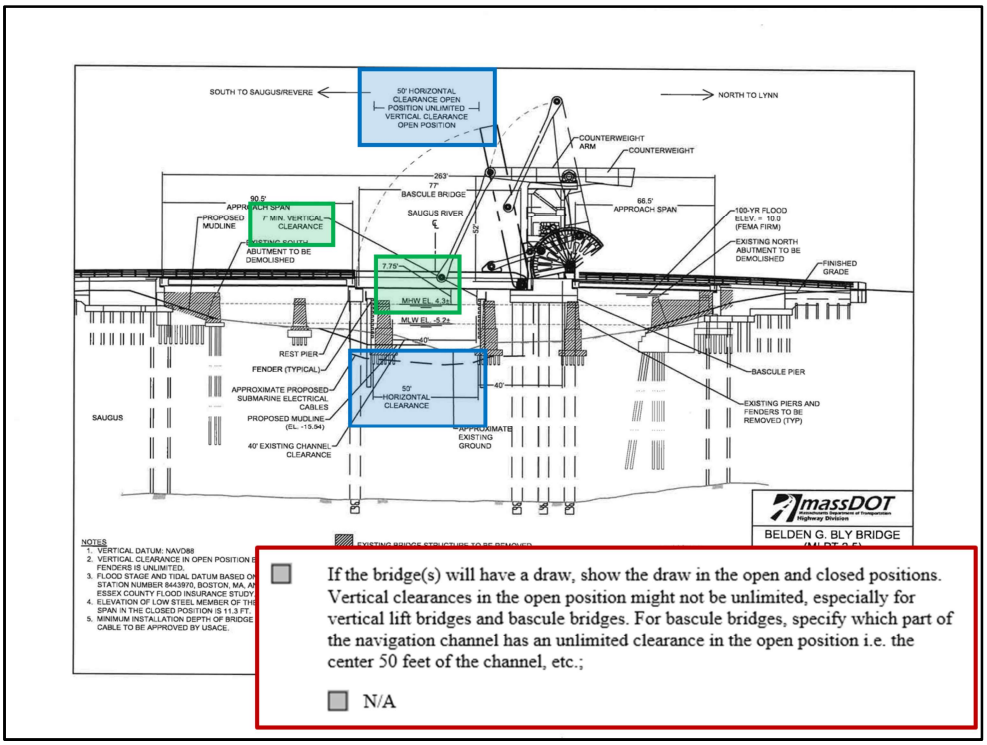
In blue the 100 year flood elevation is identified on the west side of the structure as 10.92 ft.

This bridge will not have a permanent traveler system, so that requirement on the job aid is not applicable. If there was one though it must also be depicted.

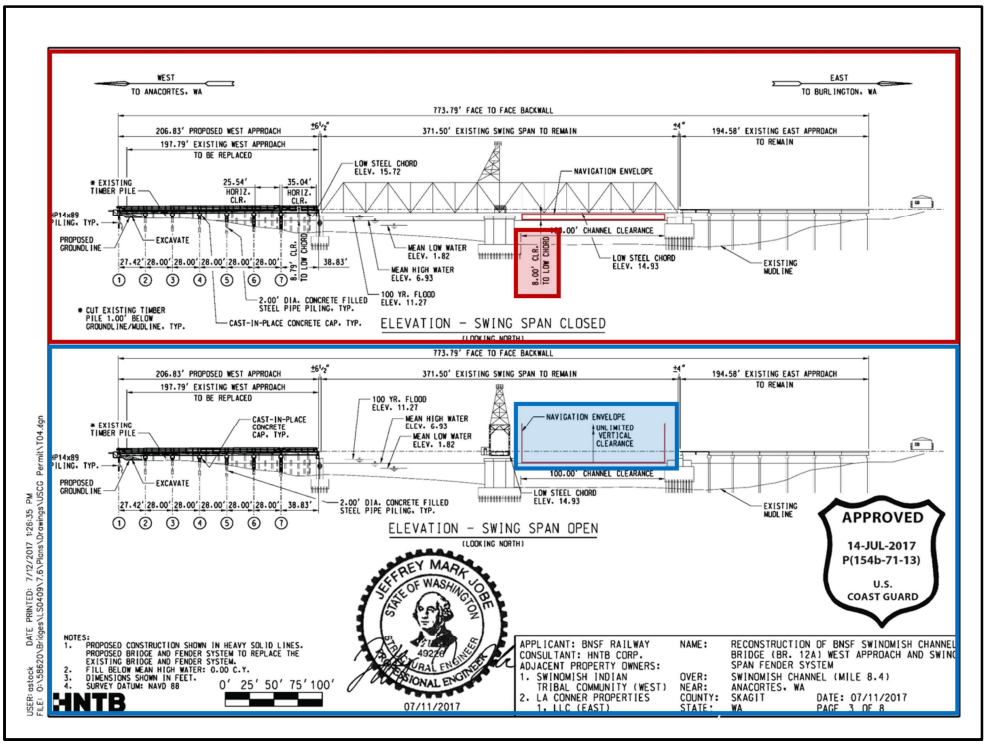
In green you can also see the required professional engineer stamp and signature on this plan sheet. This is a requirement for all plan sheets prior to Coast Guard approval.



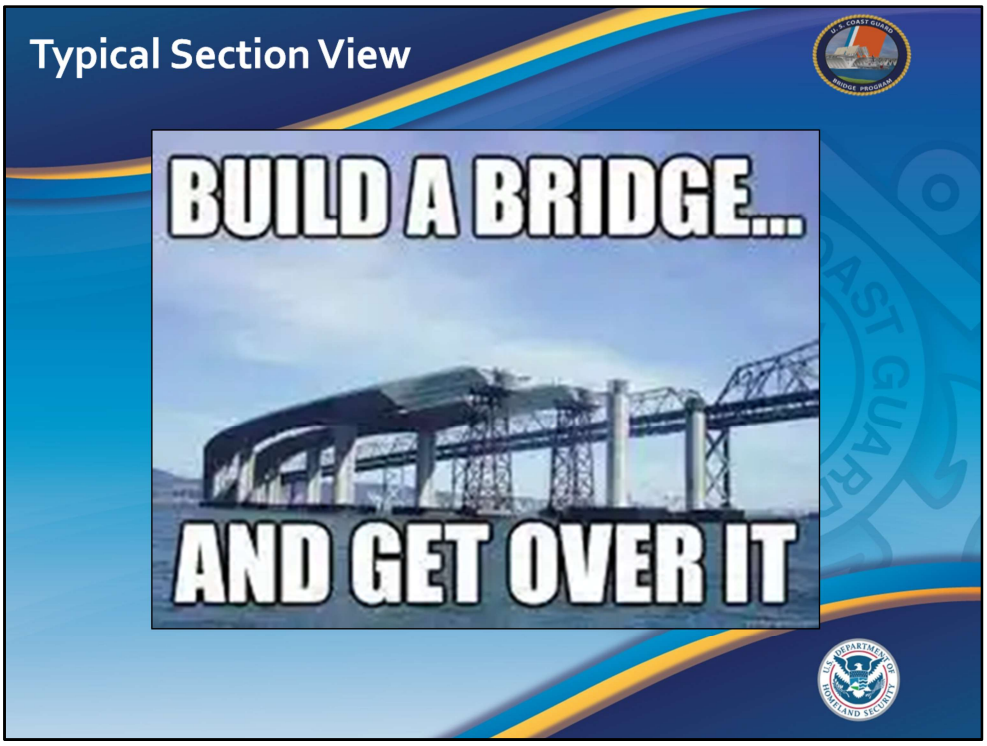
Now that we've looked at each requirement for both plan and elevation views, let's revisit the plan and elevation view parallel to each other. Looking at this plan sheet we see the applicant captured all the requirements needed for both the plan view and elevation view on a single page. There were only four total plan sheets were required for this complex project.



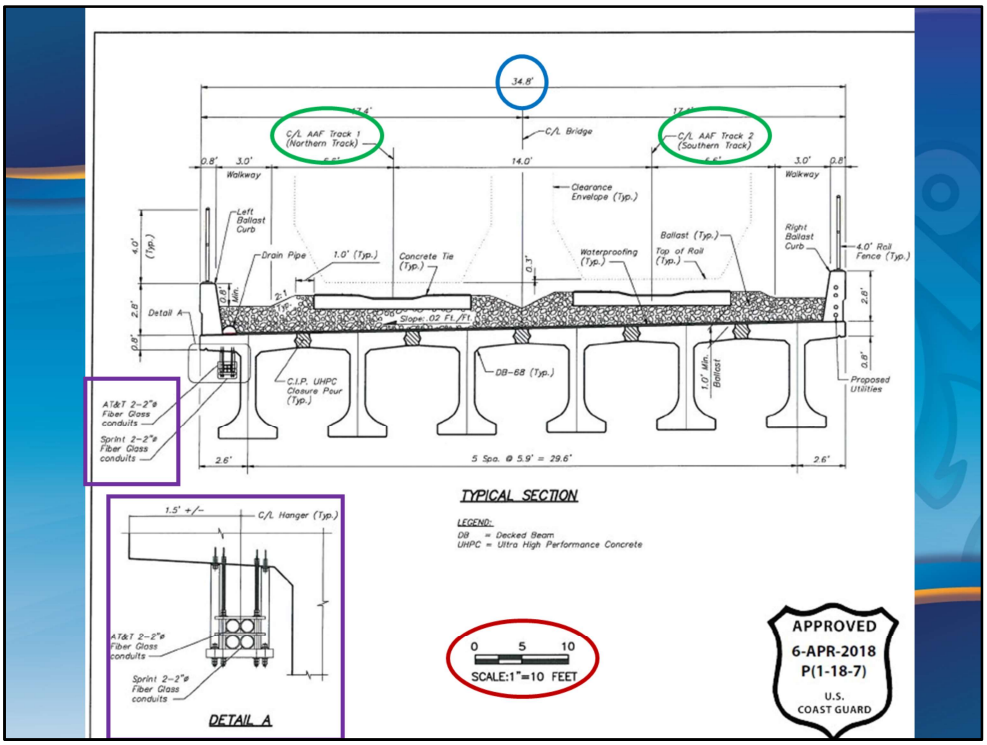
Lets take a quick look at some of the differences for plan sheets for a moveable span bridge. Here is an example of a plan sheet for a bascule drawbridge. The plan sheet job aid identifies the requirement for moveable span bridges, shown here in the red box, to depict the draw in both the open and closed positions. For bascule bridges, we also ask the applicant to specify which parts of the channel have unlimited clearance in the open position since that is often limited. On this plan sheet you can see in the blue boxes there is 50 ft of horizontal clearance available when the bascule leaf is in the open position providing unlimited vertical clearance. When closed, in green we see the bridge allows for a minimum vertical clearance of only 7 ft near the pier, and 7.75 ft in the channel at mean high water.



Here's another example of a movable bridge, this time showing a swing bridge in both the closed (top view in red) and open (bottom view in blue) positions. Looking at both you can see how the vertical clearance changes in the navigation channel from 8.0 ft in the closed position on top to unlimited in the open to navigation position on the bottom.



We'll now take a look at the typical section view requirements which offers a cross view of the bridge.



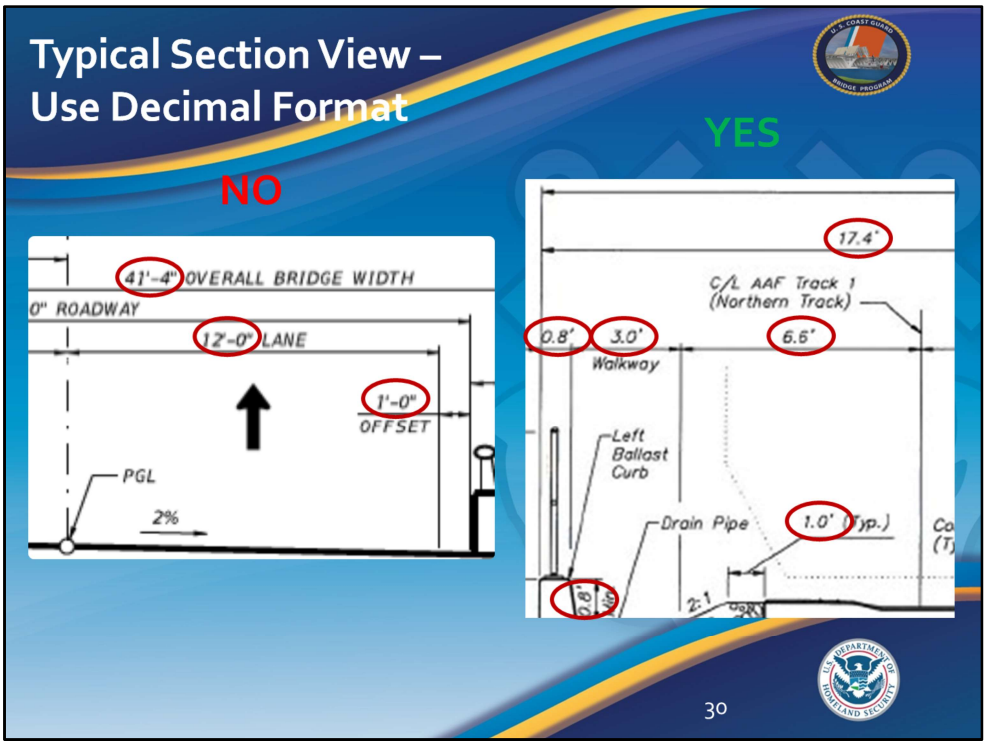
The requirements for the “Typical Section View” are found on page 5 of the plan sheet job aid.

Similar to other plan sheets, I’ve cropped it a bit for easier viewing. Again we require a graphic bar scale which is shown in red

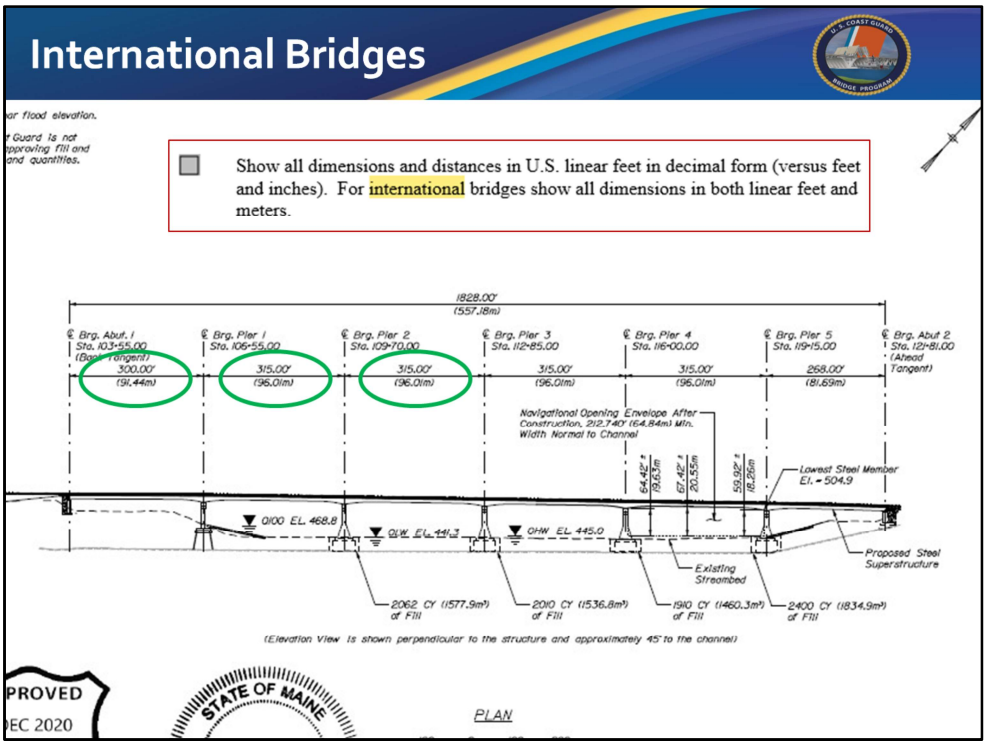
In blue it shows the out to out width of the structure which in this example is 34.8’

This plan sheet is actually for a railroad bridge. In green they depict the northern track (on the left) and southern track (on the right). In some instances, a bridge may have portions where the bridge is wider at certain spots. An example would be if there’s a pedestrian overlook that is wider on a bridge pier. We ask that you please note and depict such special instances on the plan sheet as well.

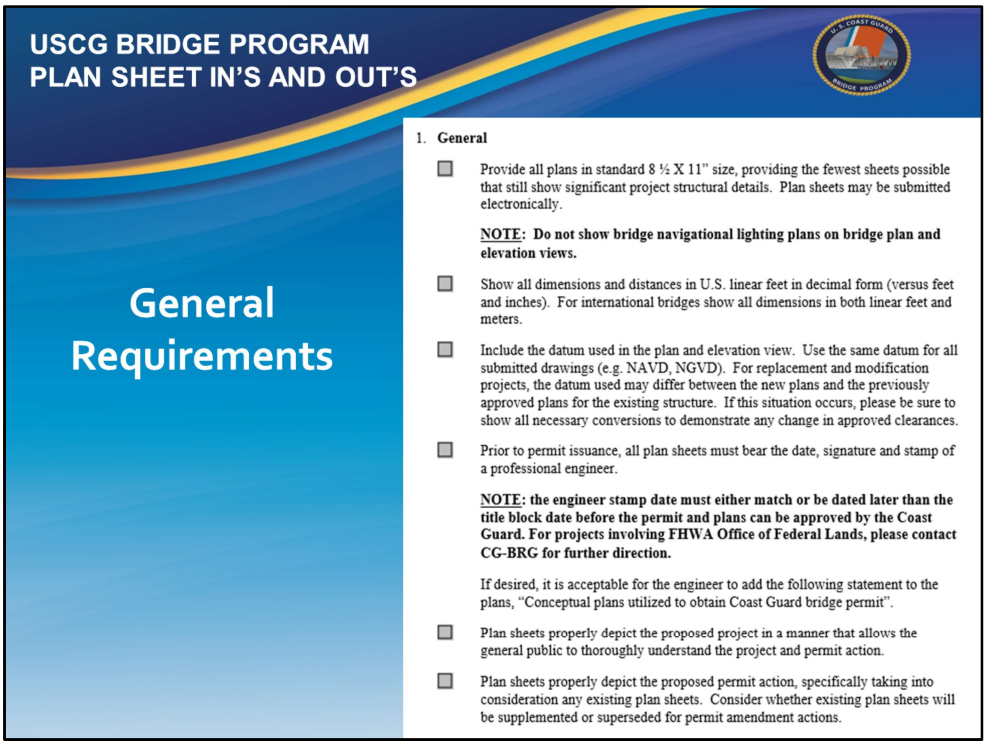
This plan sheet also points out in the purple box on the bottom labeled Detail A an expanded view for utilities on the bridge such as the Fiber Glass Conduits. When we speak to appurtenances to the bridge such as this it is the one area on the plan sheets were we do not require measurements be in decimal form like we do for all other measurements. We allow for normal industry nomenclature such as an eight and a half inch water line, a 2x6 inch wooden post, or in this case a 2 foot 2 inch conduit line. Otherwise though we require all measurements in decimal format.



Again, please use decimal format when depicting measurements.



Last thing about measurements, there is a specific requirement for international bridges that all dimensions and distances be depicted in both linear feet and meters.



Ok, let's circle back now and finally discuss the General plan sheet requirements which are listed at the beginning of the job aid. These general comments really help the Coast Guard take into account the full scope of the bridge permit action at hand.

First and foremost, please use this Plan Sheet Job Aid Template. The whole process goes much more smoothly when it is followed.

We ask that all plans be provided in a standard 8 ½ X 11 format

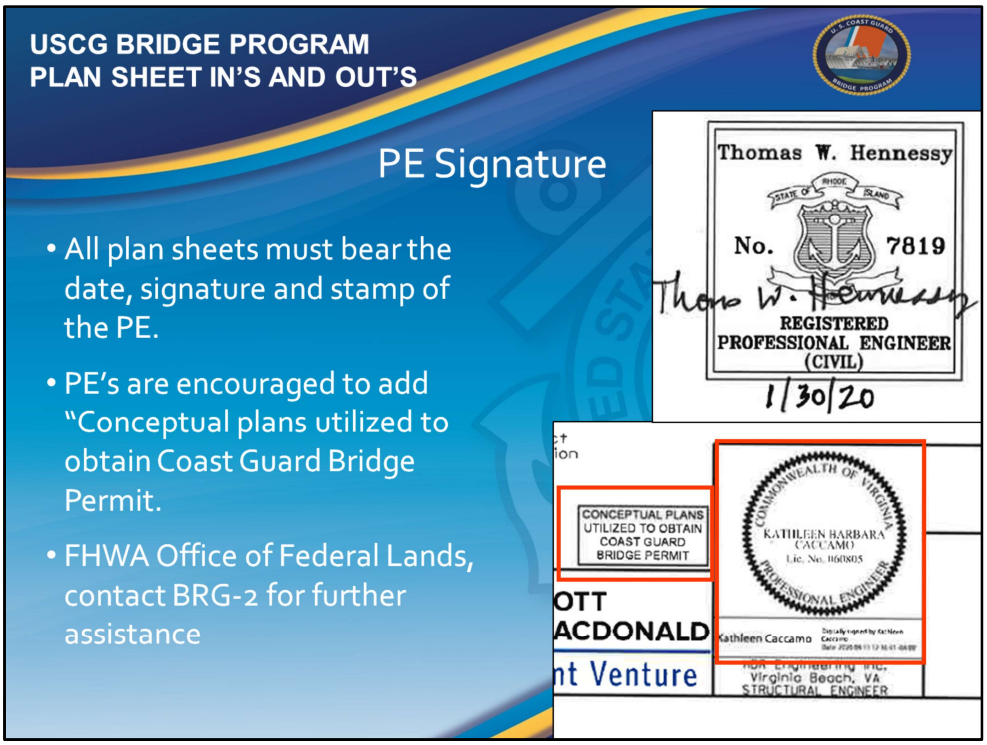
We ask that you please provide the least amount of plan sheets as possible. We often see plan sheet sets ranging from 3-5 pages in length that meet all of our requirements..

As I stated before, the plan sheets will be provided to the public for review and comment through the issuance of a Coast Guard public notice, so plan sheets should be written so that the general public can understand them. These are conceptual drawings that we use to approve the navigational clearances on the waterway, not construction drawings.

As we've shown on the plan sheet samples, all plan sheets must bear the date and signature of a professional engineer before being approved for final permitting.

Remember all navigation lighting plans should be submitted separately to the Coast Guard from the bridge permitting plans. This is normally coordinated after permit approval.

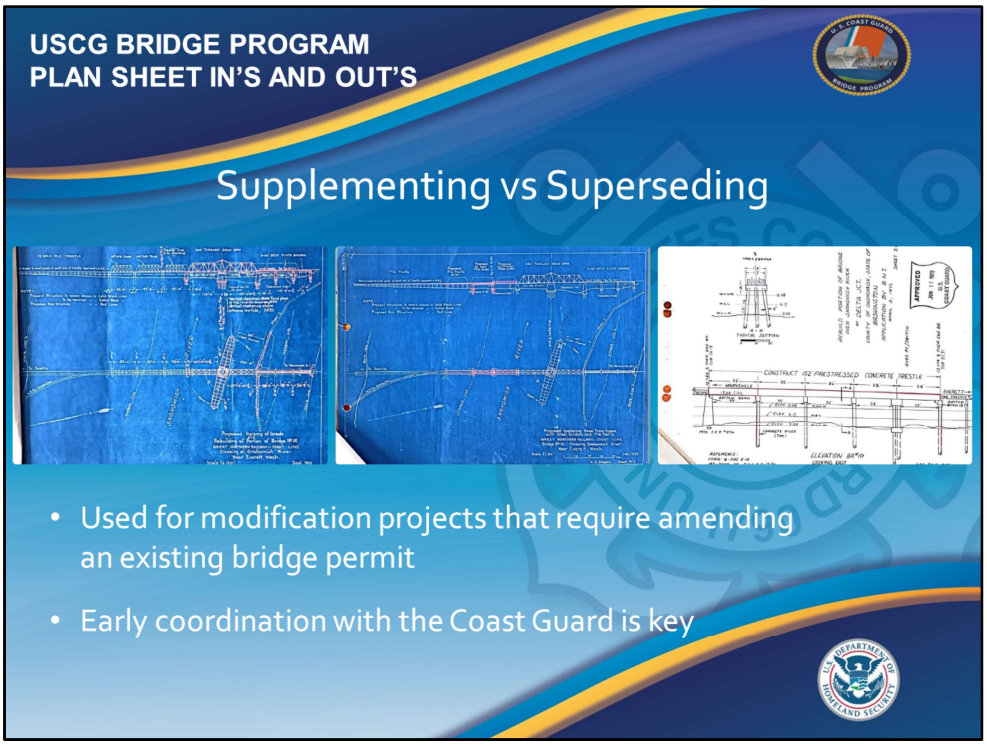
And finally, while not required, our preference is that all plan sheets be in landscape format whenever possible.



Per Bridge Program policy, prior to permit issuance all plan sheets must bear the date, signature and stamp of a Professional Engineer

PE's are encouraged to add "Conceptual plans utilized to obtain Coast Guard Bridge Permit." If desired.

If there's ever a project that involves the FHWA Office of Federal Lands, we ask that you coordinate with the local bridge office for specific requirements.



The last thing I'd like to discuss is we ask that you please be sure to reach out to your local Coast Guard District Bridge Office early in your plan sheet develop process for modification projects to existing bridges that will cause a permit amendment. The reason being we must ensure that plan sheets properly depict the proposed permit action taking into consideration of any existing plan sheets that will either be supplemented or superseded, or a combination of being both supplemented and superseded. Being able to supplement existing plans requires the existing plans to be complete enough to show all necessary attributes in a proper manner. Each modification project is usually unique and the requirements are often complex so early coordination is key to avoiding potential delays. On this slide the plan sheet on the right was used to supplement the two existing plan sheets on the left for a bridge that was built in back in 1921. We could only do this because the plan sheets on the left were available and showed enough detail of what currently exists and how the proposed modification what alter it.

You've made it! This concludes my presentation. I hope you now have a better understanding of our requirements, where to find them, and how we apply them. Thank you.