Precast Alternates

Using the new standards, providing alternate designs in the plan set, and using the wide flange girders

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Texas Department of Transportation

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Table of Contents

What is an Alternate?

- Is there elements on your project that can be precast or prefabricated
- Original design + new construction idea = alternate plans

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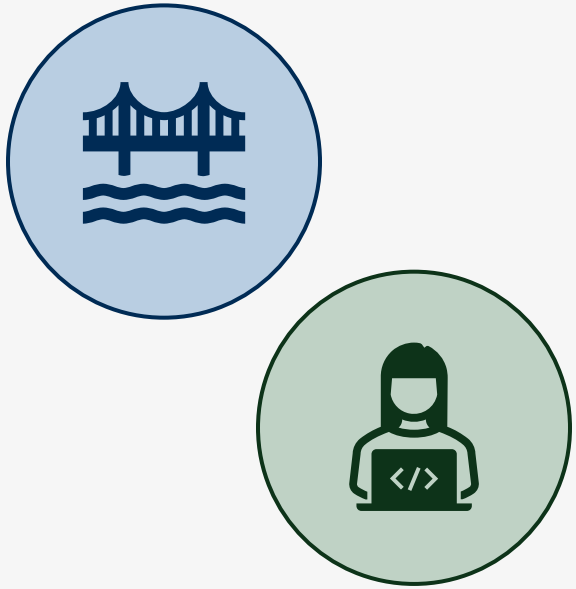

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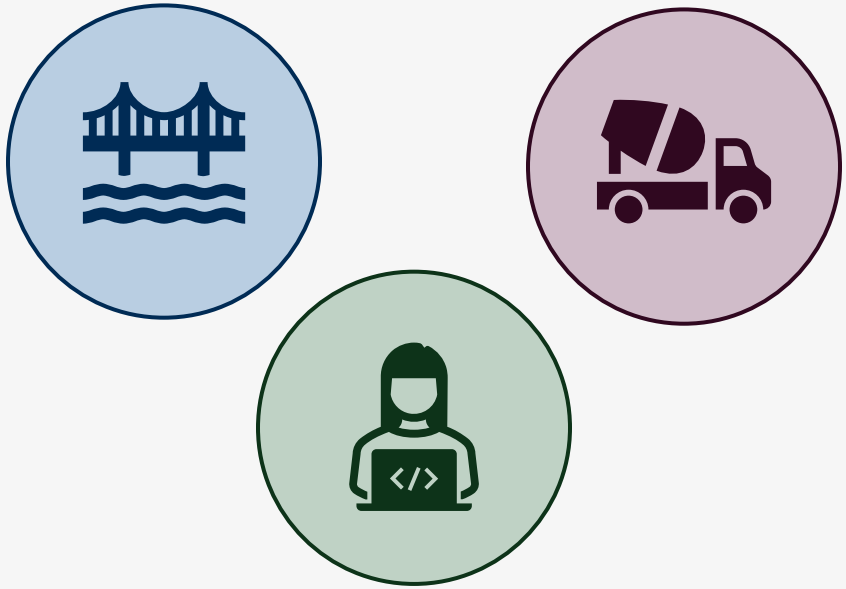

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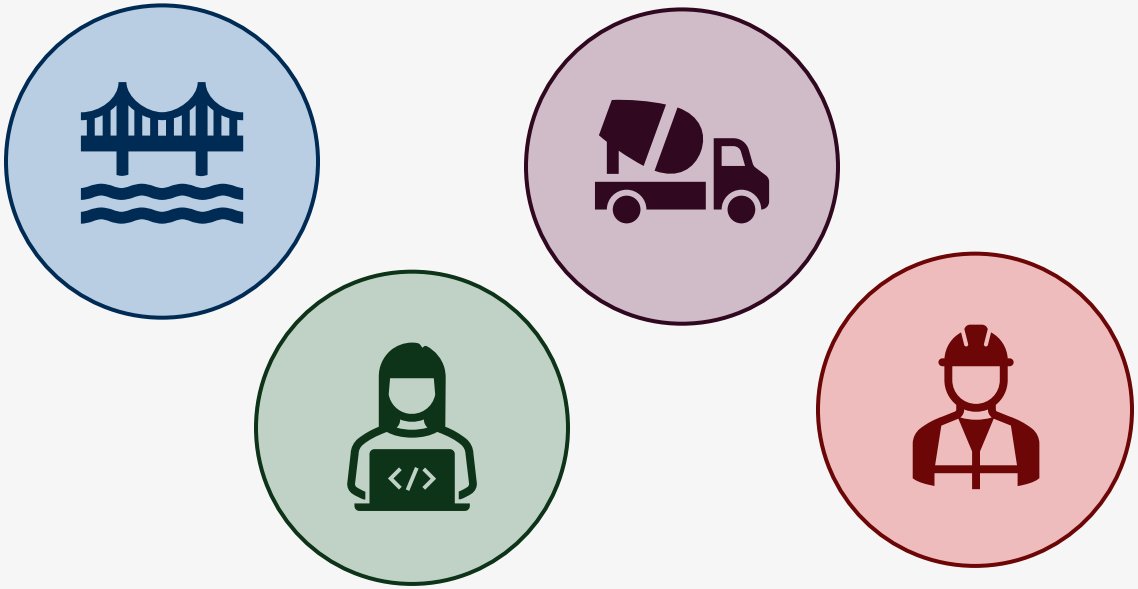

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How to use alternates

- MUST make an allowance in the plan set
  - Allowance in general notes in item 420 and item 425
- Old SOP is gone
- Standards or Form 2800
  - Are you providing a design or is it a post letting change?

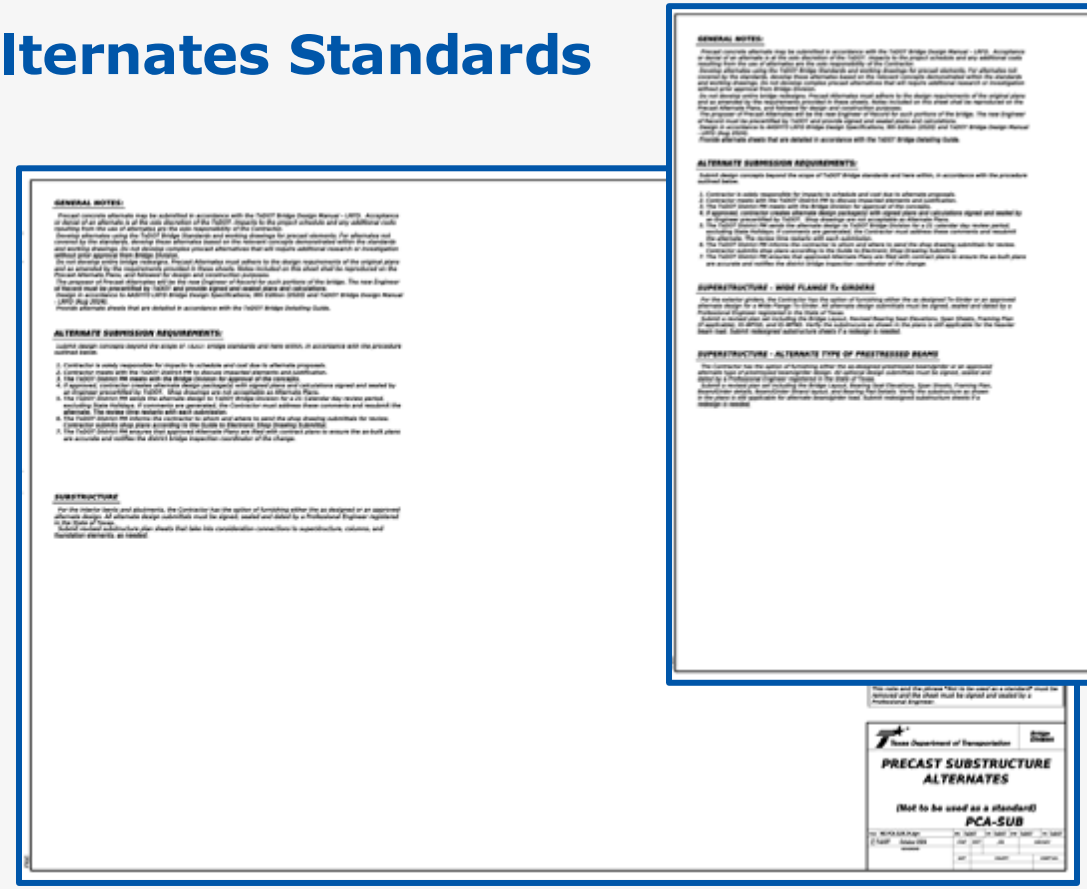
Alternates Standards

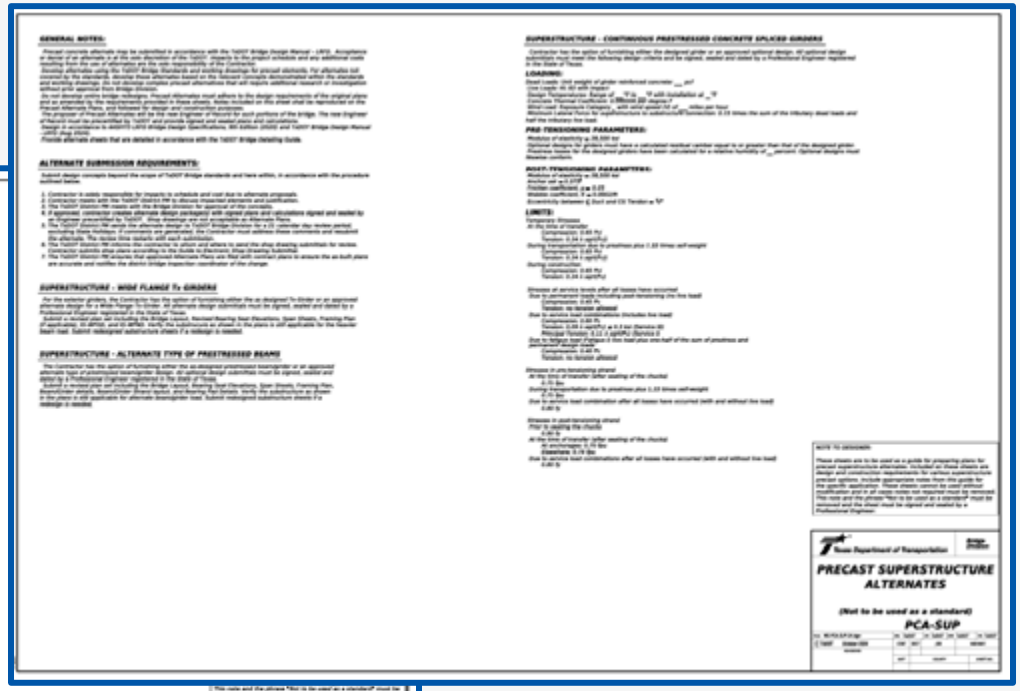
- Can be found under the miscellaneous standards

https://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#MISCELLANEOUSSTANDARDS

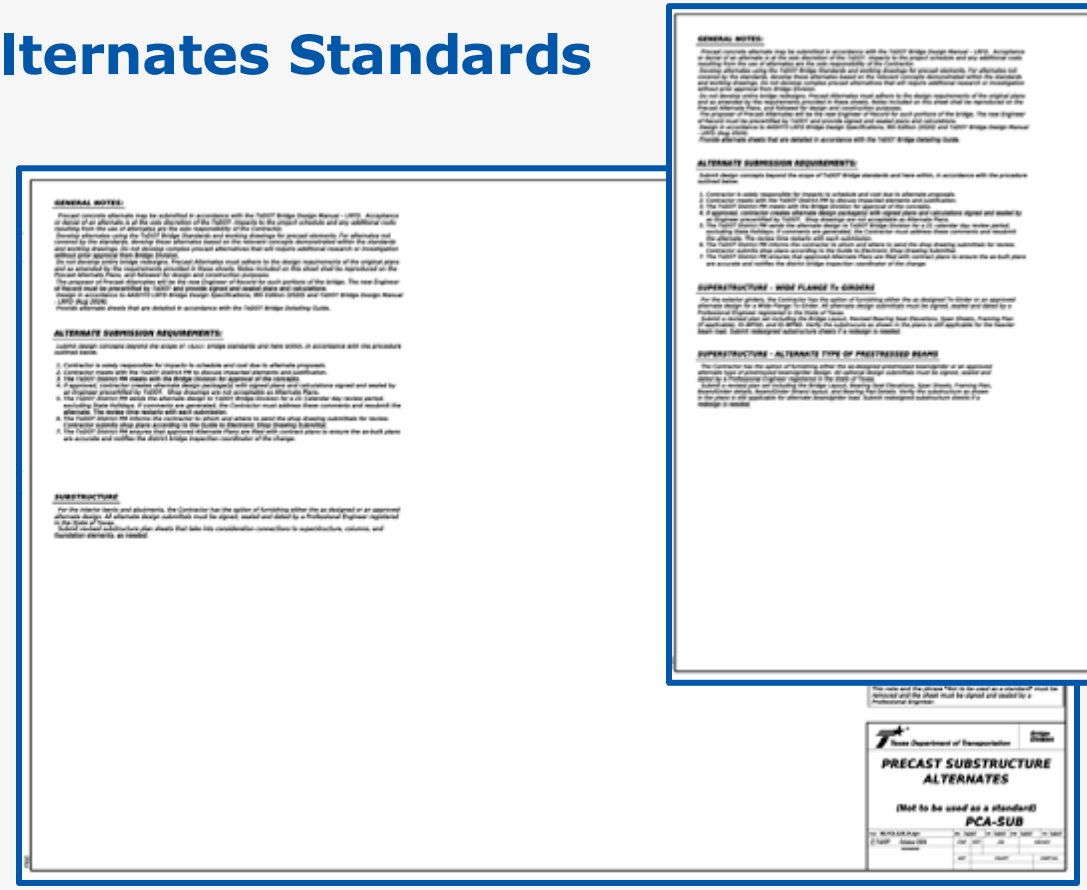
10-24	PCA-SUP	Precast Superstructure Alternates	MS-PCA-SUP-24.dgn
10-24	PCA-SUB	Precast Substructure Alternates	MS-PCA-SUB-24.dgn

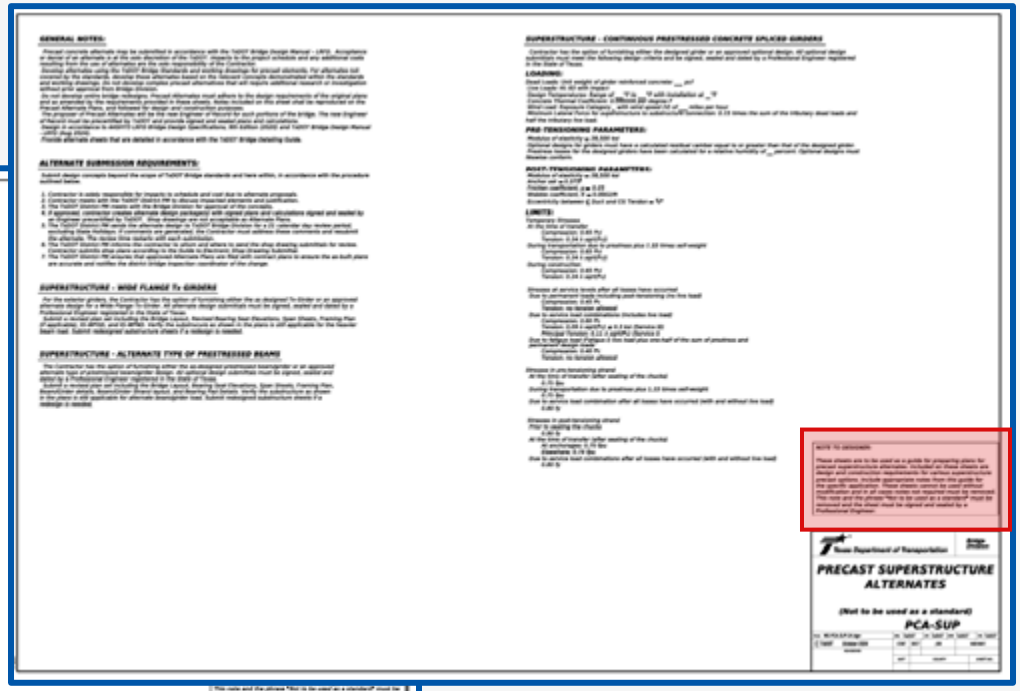
Alternates Standards





Alternates Standards





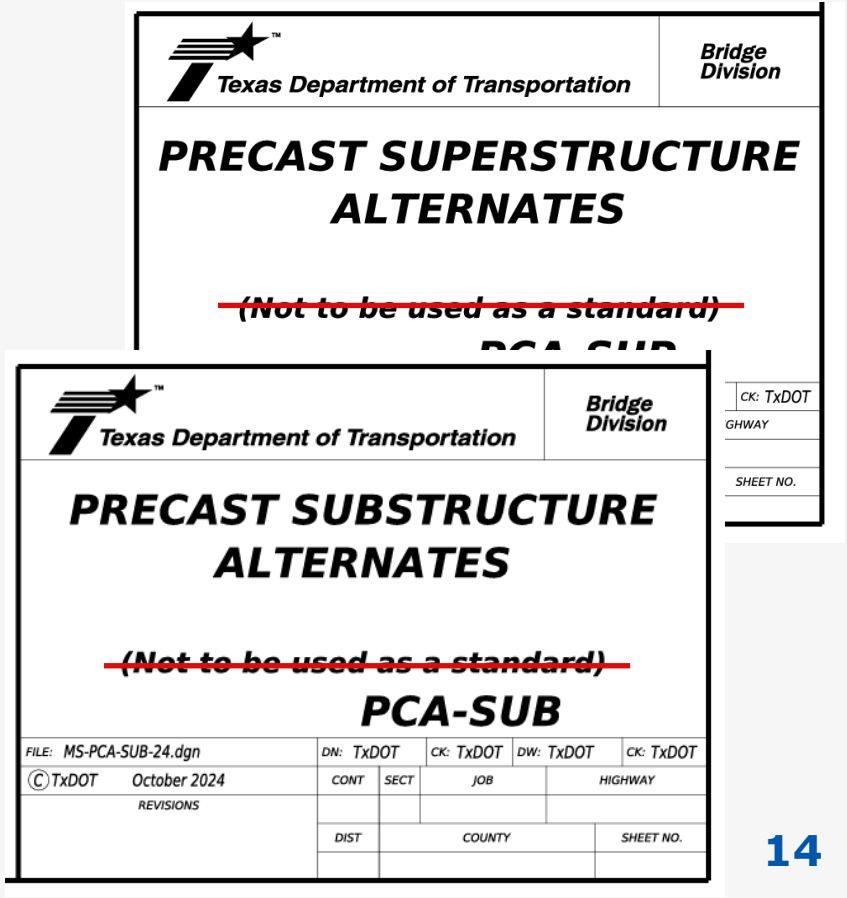
Alternates Standards

NOTE TO DESIGNER:

These sheets are to be used as a guide for preparing plans for precast superstructure alternates. Included on these sheets are design and construction requirements for various superstructure precast options. Include appropriate notes from this guide for the specific application. These sheets cannot be used without modification and in all cases notes not required must be removed. This note and the phrase "Not to be used as a standard" must be removed and the sheet must be signed and sealed by a Professional Engineer.

Alternates Standards

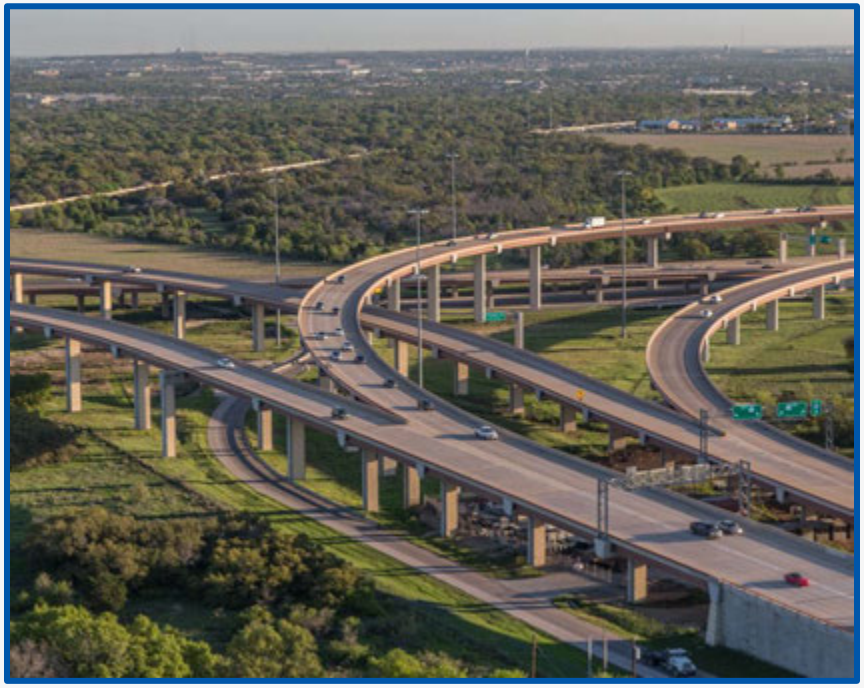
- Notes cover various design and construction requirements
- READ ALL the notes and remove what you don't need
- Remove the note to designer box and "Not to be used as a standard" in title block
- Sign and Seal



Alternates Standards

- General Notes:
  - Precast concrete alternate may be submitted in accordance with the **TxDOT Bridge Design Manual – LRFD.**
  - Acceptance or denial of an alternate is at the sole discretion of the TxDOT. **Impacts to the project schedule and any additional cost resulting from the use of alternates are the sole responsibility of the Contractor.**

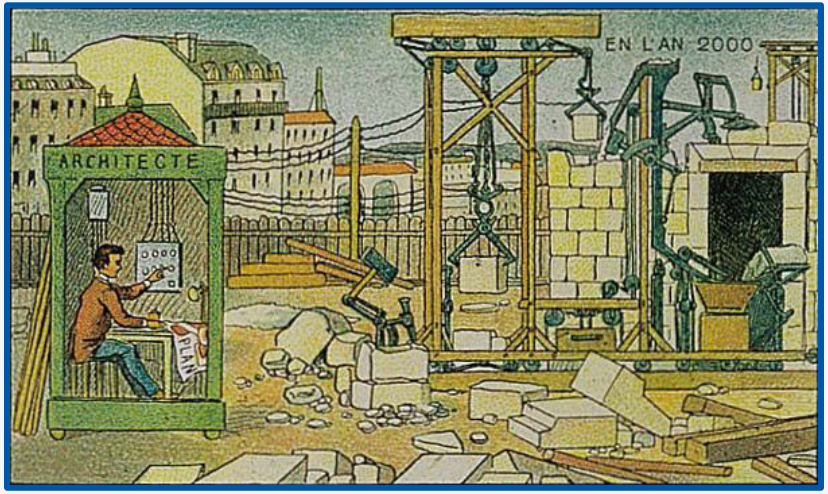
Alternates Standards



- Develop alternates using the TxDOT Bridge Standards and working drawings for precast elements.
- For alternates not covered by the standards, develop these alternates based on the relevant concepts demonstrated within the standards.

What not to do

- Do NOT be innovative
  - Do not develop complex precast alternatives that will require additional research or investigation *without prior approval from Bridge Division*
- Do NOT develop entire bridge redesigns
  - Do keep the intent of the original plans



Source: https://www.cbsnews.com/pictures/a-vision-of-the-future-from-1899/

Submission Requirements

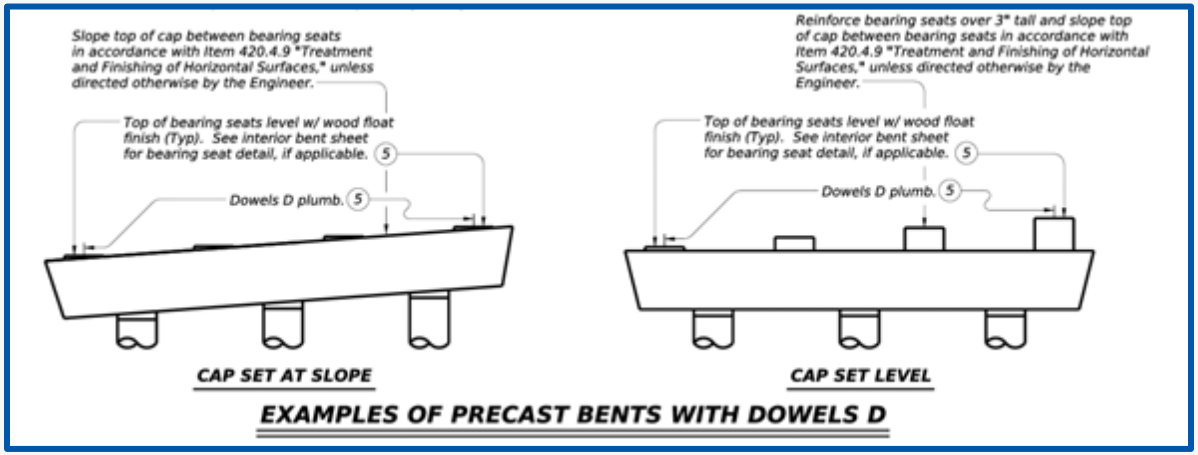
1. Take Responsibility
2. Discuss Impact and Justification
3. Approval of Concepts
4. Create Alternates
5. Bridge Division Review
6. Shop Plan Review
7. Contract Plans

Substructure

- **For the interior bents and abutments**, the Contractor has the **option** of furnishing either the **as designed** or an **approved alternate design**. All alternate design submittals **must be signed, sealed** and dated by a Professional Engineer registered in the State of Texas
- Submit revised substructure plan sheets that take into consideration connections to superstructure, columns, and foundation elements, as needed.

Substructure Precast Bent Options

- PBC-P Precast Conc Bent Cap Opt for Conc & Steel Piles
- PBC-RC Precast Conc Bent Cap Opt for Round Columns
- PPBC-RC Prestressed, Precast Bent Cap Option for Round Columns



Superstructure

- Wide Flange Tx Girders
- Alternate Type of Prestressed Beams
- Continuous prestressed concrete spliced girders

Alternate type of prestressed beams

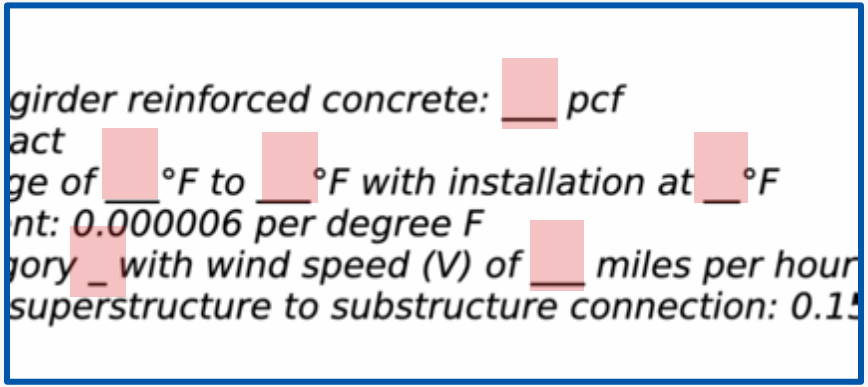
- The Contractor has the **option** of furnishing either the **as-designed** prestressed beam/girder or an **approved alternate type** of prestressed beam/girder design.
- **All optional design submittals must be signed, sealed** and dated by a Professional Engineer registered in the State of Texas

Alternate type of prestressed beams

- Submit a revised plan set
  - Bridge Layout
  - Bearing seat elevations
  - Span Sheets
  - Framing Plan
  - Beam/Girder details
  - Beam/Girder Strand layout
  - Bearing pad details
  - Check foundation loads
  - Substructure sheets

Continuous prestressed concrete spliced girders

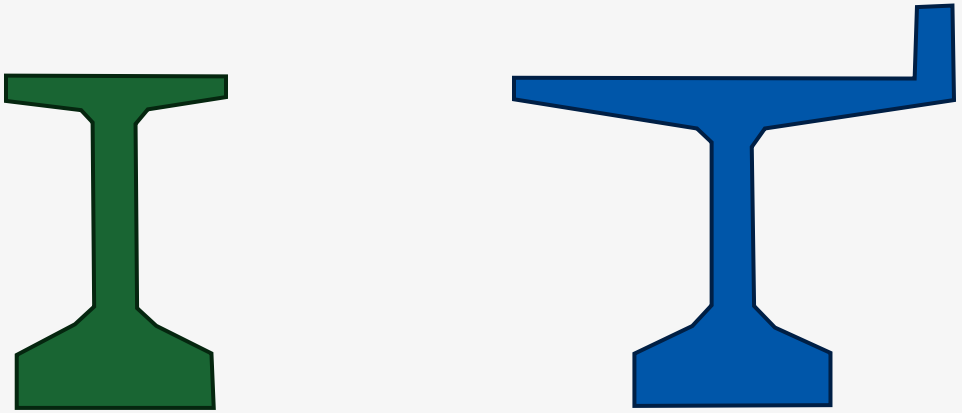
- Approved optional design of spliced girders
  - Important design info to fill out
- Loading
- Pre-tensioning parameters
- Post-Tensioning Parameters
- Stress Limits



Wide Flange

- https://www.dot.state.tx.us/insdtdot/orgchart/cmd/cserve/standard/bridge-e.htm#PRESTRESSEDCONCRETEI-GIRDERS

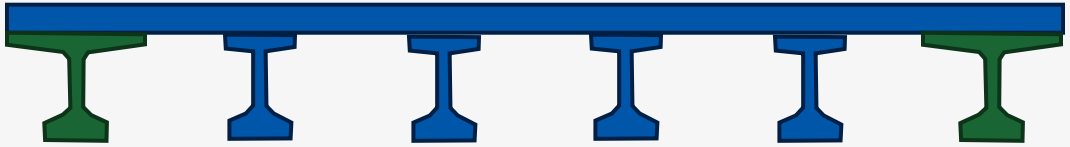
WF-IGD	Prestressed Concrete Wide Flange I-Girder Details	PDF IG-WF-IGD-24.dgn
WF-IGND	Prestressed Concrete Wide Flange I-Girder Designs	PDF IG-WF-IGND-24.dgn

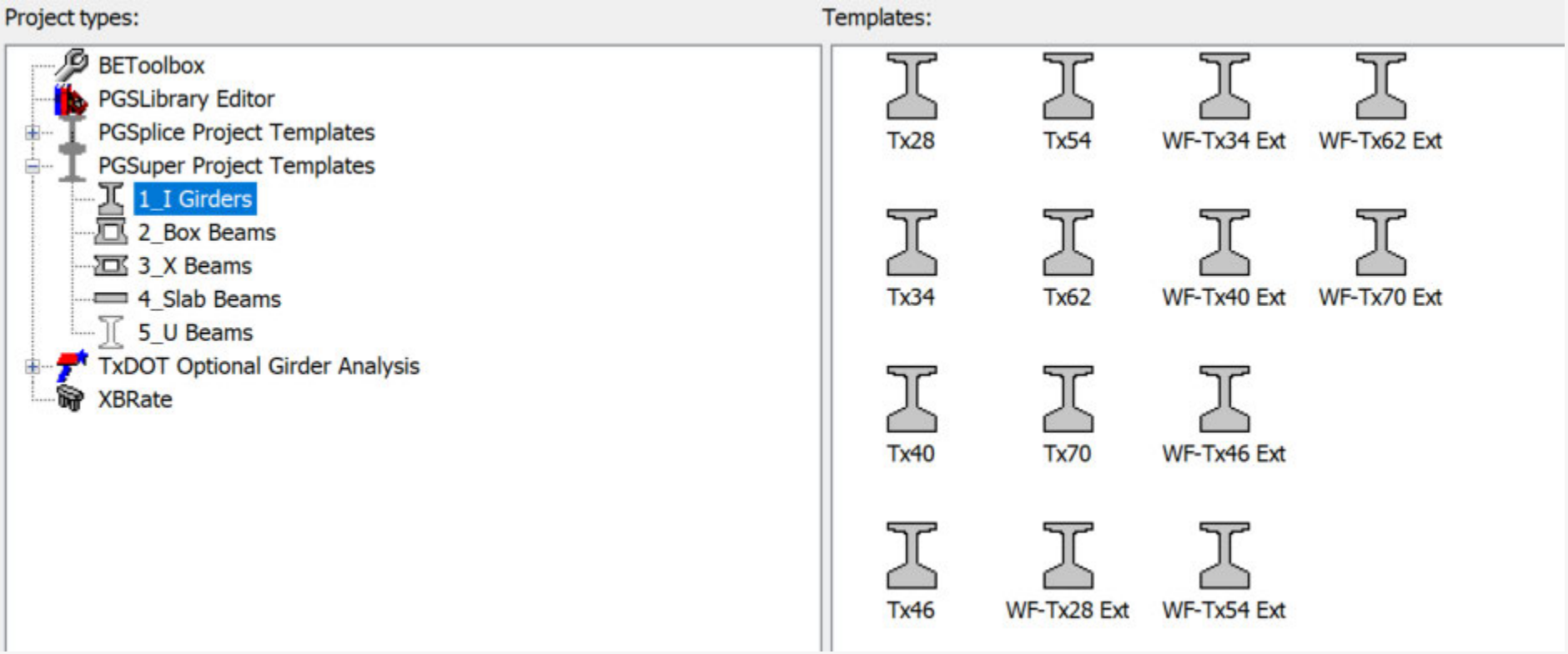


Wide Flange

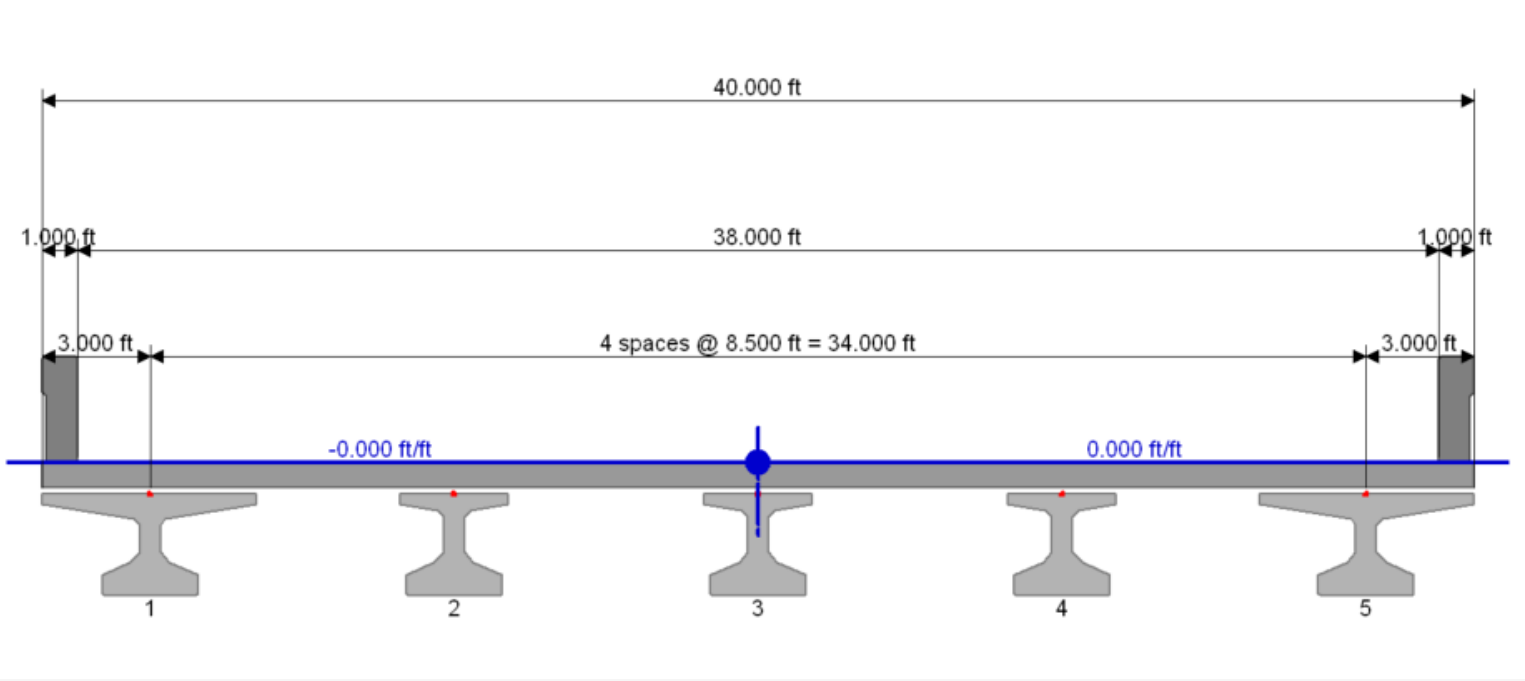
- Encouraged to include exterior wide flange as an option for TxGirder projects
- Include two span sheets
- Memo from 8/6/2024

https://ftp.dot.state.tx.us/pub/txdot-info/cmd/cserve/standard/bridge/memo83.pdf




Project types:
BEToolbox
PGSLibrary Editor
PGSplice Project Templates
PGSuper Project Templates
1_I Girders
2_Box Beams
3_X Beams
4_Slab Beams
5_U Beams
TxDOT Optional Girder Analysis
XBRate
Templates:
Tx28
Tx54
WF-Tx34 Ext
WF-Tx62 Ext
Tx34
Tx62
WF-Tx40 Ext
WF-Tx70 Ext
Tx40
Tx70
WF-Tx46 Ext
Tx46
WF-Tx28 Ext
WF-Tx54 Ext

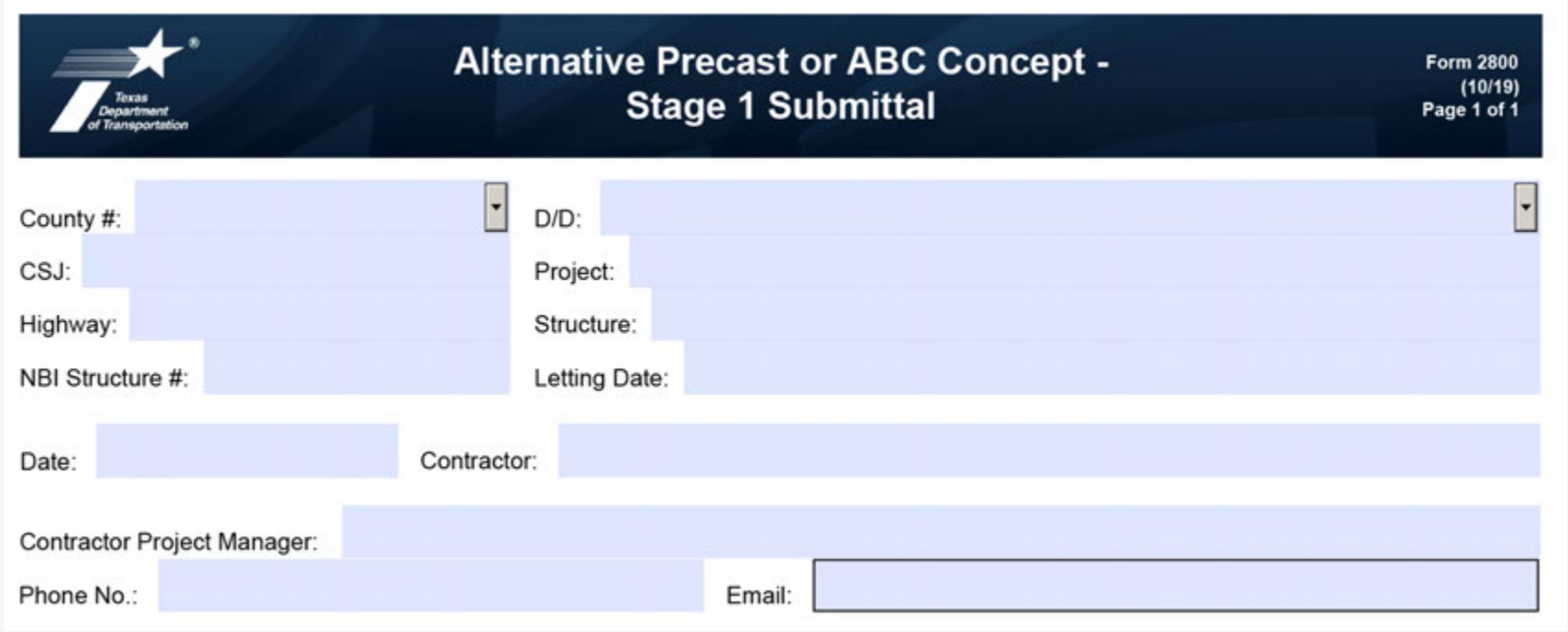
Wide Flange


40.000 ft
1.000 ft
38.000 ft
1.000 ft
3.000 ft
4 spaces @ 8.500 ft = 34.000 ft
3.000 ft
-0.000 ft/ft
0.000 ft/ft
1
2
3
4
5

Form 2800

- This form is getting an update
- Post letting changes needs the form
- Key personnel recommends approval
- District PM can say no
- Update the plans
- No need to be afraid of this form

Form 2800



Alternative Precast or ABC Concept - Stage 1 Submittal

Form 2800 (10/19) Page 1 of 1

County #: D/D:

CSJ: Project:

Highway: Structure:

NBI Structure #: Letting Date:

Date: Contractor:

Contractor Project Manager:

Phone No.: Email:

Form 2800

Alternate Design Concept Description:

Structural Elements Impacted by Alternate Design Concept:

Justification for the benefit to TxDOT that Alternate Concept will provide:

Key personnel that should be considered for Stage 1 Concept Review: Area Engineer, District Director of Construction, District Bridge Engineer, Bridge Division Design Section Director, Engineer of Record.

District Project Manager:

Phone No.: Email:

The signature below represents authority to move forward with Stage 2 Alternate Design Development by the Contractor.

Approved: Yes No

District Project Manager Signature: Date:

In Summary


Allow alternates in plans
Provide good details
Record changes
Success!