Introduction
Standard Plans for single post trusses include 8 post type designations (II-VII). This Appendix provides two methods for determining to post size to be shown on the project plans.

Single Post Truss Post Type Selection Method 1
Method 1 uses charts (Figure 1 through Figure 6). Procedure is as follows.

- Determine the basic dimensions (see Figure 1)
  - Sign Panel Depth, D
  - Length of the longer arm, L₁
  - Length of the shorter arm, L₂
    - For a full cantilever assume L₂ is 2 feet.
  - Height, h, from bottom of base plate to the bottom of the truss.

Verify the basic dimensions meet the following limitations.

- D must be 50 inches, 60 inches, 70 inches, 80 inches, 90 inches, 100 inches, 110 inches, or 120 inches
- L₁, must be less than 40 feet
- L₂, must be less than 30 feet
- Total Length (L₁ + L₂) must be less than or equal to 60 feet
- h must be less than or equal to 20 feet-9 inches. For h greater than 20 feet-9 inches do not use Method 1. Use Method 2, if applicable. If neither method is applicable, a special design is required.

Verify minimum clearance

- Typical minimum vertical clearance to the bottom of truss is
  - 18 feet-6 inches if walkway, sign illumination, or similar is attached to the bottom of the truss
  - 18 feet-0 inches if nothing will extend below the truss.
- If the structure is on the Extra Legal Load Network, other criteria might apply.
- Check whether clearance should be adjusted for future additional paving, overlay, or widening.

Extra attachments are limited to:

- Single-sheet sign-panels strapped directly to the post. Maximum area of the sign panels is the lesser of 16 square foot or 5% of the truss length times the panel depth D (expressed in feet). The sign must be approximately centered on the post horizontally. The sign must be below the post connection to the truss.
- CCTV as shown on Standard Plan ES-16A or lighting as shown on Standard Plan ES-6C.

Find the figure corresponding to the maximum depth, D, of sign panel to be used on the
structure.

Find the location on the selected chart corresponding to the arm lengths $L_1$ and $L_2$ for the sign structure. For “full cantilever” use $L_2$ as 2 feet for purposes of post selection.

Select post size indicated on the chart. If the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
Notes
- For sign panels depth of 100 inches or less, the top of sign panel is the same at the top of truss.
- For sign panel depth of 110 inches the top of sign panel typically is 4 inches above the top of the truss.
- For sign panel depth of 120 inches the top of sign panel typically is 14 inches above the top of the truss.
- The 2 feet minimum length for $L_2$ is approximation used for Method 1. The actual length of $L_2$ may vary somewhat depending on fabrication needs.
- Typical walkway brackets are 5 inches tall.
Figure 2: Post Selection Method 1 for Single Post Overhead Truss 50 inch Sign Panel Depth

Notes
- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on an $h = 20$ feet-9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Figure 3. Post Selection Method 1 for Single Post Overhead Truss 60 inch and 70 inch Sign Panel Depth

Notes
- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on an $h = 20$ feet-9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Notes

- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on an $h = 20$ feet-9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Notes:

- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on an $h = 20$ feet-9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Notes:
- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on $h = 20$ feet-9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Figure 7. Post Selection Method 1 for Single Post Overhead Truss 110 inch Sign Panel Depth

Notes:
- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on an $h = 20$ feet -9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Figure 8. Post Selection Method 1 for Single Post Overhead Truss 120 inch Sign Panel Depth

Notes:
- For a full cantilever, assume 2 feet for $L_2$.
- When selecting post type, if the intersection of $L_1$ and $L_2$ falls on a solid line, use the smaller post type.
- Post selection charts are based on an $h = 20$ feet-9 inches maximum. For $h$ greater than 20 feet-9 inches, use Method 2, if applicable. If neither method is applicable, a special design is required.
- This chart was based on applying a wind pressure of 40.3 psf on the sign panels. This chart assumed full sign coverage.
- For diagram explaining dimensions, see Figure 1.
Single Post Truss Post Type Selection Method 2

Method 2 relies on calculating a “pseudo-moment”. It is not an actual structural design moment and has no intended application outside of the post selection presented here. It is important to verify the structure meets the limitations listed in the procedure and to use the calculation method shown. Significantly unconservative designs might result if:

- Using calculation methods other than those shown to arrive at the “pseudo-moment”
- Using the calculated “pseudo-moment” in other types of design calculations.
- Applying Method 2 to a structure that falls outside of the limitations listed in the procedure.

Notation

*all values are to be positive numbers*

- **Area** = Project area of the sign panel (based on full coverage) (foot squared)
- **D** = Depth of sign panel (inch)
- **DeadA** = Dead Load contribution to PM (pound-foot)
- **DL₁** = Total Dead Load of longer arm (pound)
- **DL₂** = Total Dead Load of shorter arm (pound)
- **DLTr** = Dead Load of the truss from Table 1 (pound)
- **DLOt** = Dead Load of the walkway, sign panels, etc. (pound)
- **ecc₁** = Assumed Dead Load Eccentricity of longer arm = L₁/2 (feet)
- **ecc₂** = Assumed Dead Load Eccentricity of shorter arm = L₂/2 (feet)
- **H** = Height from bottom of base plate to mid-height of the combined truss and sign panel. (feet)
- **h** = height from bottom of base plate to the bottom of the truss (feet)
- **LiveA** = Live Load contribution to PM (pound-foot)
- **L₁** = Length of longer arm (feet)
- **L₂** = Length of shorter arm (feet)
- **PM** = Pseudo-Moment used to determine minimum post size (pound-foot)
- **WindA** = Wind contribution to PM from Equation 3 (pound-foot)
- **WindB** = Wind contribution to PM from Equation 4 (pound-foot)
Procedure:

- Determine the basic dimensions (see Figure 1)
  - Sign Panel Depth, D, in inches
  - Length of the longer arm L1 in feet
  - Length of the shorter arm L2 in feet
  - Height h from bottom of base plate to the bottom of the truss in feet
  - Height H from bottom of base plate to center of sign panel in feet

- Verify the basic dimensions meet the following limitations.
  - D must be 50”, 60”, 70”, 80”, 90”, 100”, 110”, or 120”
  - L1 must be less than 40 feet
  - L2 must be less than 30 feet
  - Total Length, L1+L2 must be less than or equal to 60 feet
  - Post height h must be greater than 20 feet-9 inches and less than or equal to 29 feet-0 inches.
    - For post height h 20 feet-9 inches or less, use Method 1, if applicable. If neither method is applicable, a special design is required.

- Verify minimum clearance
  - Typical minimum vertical clearance to the bottom of truss is
    - 18 feet-6 inches if walkway, sign illumination, or similar is attached to the bottom of the truss
    - 18 feet-0 inches if nothing will extend below the truss.
  - If the structure is on the Extra Legal Load Network, other criteria might apply.
  - Check whether clearance should be adjusted for future additional paving or overlay.

- Verify the design conforms to additional limitations
  - Details of the structure and sign panels must conform to the typical Standard Plans for single post trusses.
  - Must not include CMS or EMS or other electronic sign panels.
  - Center of sign panel must be no more than 43 feet above the surrounding terrain.
  - Extra attachments are limited to:
    - Single-sheet sign-panels strapped directly to the post. Maximum area of the sign panels is the lesser of 16 square feet or 5% of the truss length times the panel depth $D$ (expressed in feet). The sign must be approximately centered on the post horizontally. The sign must be below the post connection to the truss.
• Calculate WindA

\[ H = h + 0.5 + \frac{D}{24} \]  
\[ \text{Area} = \frac{D}{12}(L_1 + L_2) \]  
\[ Wind_A = H(\text{Area})^{40.3} \]

• Calculate WindB

\[ Wind_B = 0.2(Wind_A) \]

• Determine Dead Loads on each arm

Find DL_T from Table 1

Calculated DL_OT

If walkway and/or sign illumination will be installed

\[ DL_{OT} = (L_1 + L_2)110 \]

Otherwise

\[ DL_{OT} = (L_1 + L_2)30 \]

\[ DL_1 = \frac{(DL_T + DL_{OT})L_1}{L_1 + L_2} \]  
\[ DL_2 = \frac{(DL_T + DL_{OT})L_2}{L_1 + L_2} \]

• Calculate Dead_A

\[ ecc_1 = \frac{L_1}{2} \]  
\[ ecc_2 = \frac{L_2}{2} \]  
\[ Dead_A = DL_1(ecc_1) - DL_2(ecc_2) \]

• Calculate Live_A

\[ Live_A = 500(L_1) \]
Appendix A: Post Type Selection – Single Post

- Calculate Pseudo-Moment

\[ PM = Wind_A + Wind_B + Dead_A + Live_A \] (Equation 12)

- Use \( PM \) and Figure 9 to determine minimum post size
## Table 1. Truss Dead Load

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POST TYPE SELECTION BY CHART

Pseudo - Moment (lb-ft.)

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Figure 9. Post Type Selection for Single Post Truss Using Pseudo-Moment