



User Guide to Standard Plans Section S OVERHEAD SIGNS – VERSATILE TRUSS

Standard Plan Numbers:

S100, S101, S102, S103, S104, S105, S106, S107, S108, S109,
S110, S111, S112, S113, S114, S115, S116, S117, S118, S119,
S120, S121, S122, S123, S124

This User Guide only covers the Versatile version of the Overhead Sign Truss

Background and Implementation:

The Versatile Truss is a new truss design. It replaces the changeable message sign (CMS) overhead sign truss. The Versatile Truss can accommodate sign panels (up to 240 inches tall), exit plaques (up to 60 inches tall), changeable message signs (CMS), and extinguishable message signs (EMS).

The original standard overhead truss on Standard Plan sheets S1 through S22 will remain available in the Standard Plans during a limited transition period. Projects should begin to callout the Versatile Truss as soon as possible. The original Standard Plan truss will eventually be discontinued from the Standard Plans.

This user guide applies to the latest version of the Standard Plan Numbers above.

Description of Component:

The Versatile Truss is a one post or two post overhead structural support for:

- Overhead sign panel type - Formed Single Sheet Aluminum
- Overhead sign panel type - Laminated Type A-1
- CMS 500
- CMS 700
- CMS 710
- EMS with or without flashing beacons

Standard Plan ES-16A may be used to mount a CCTV 5, CCTV 10, or CCTV 15 pole on top of the post of the Versatile Truss. Standard Plan ES-6C may be used to mount a Type 10 or Type 15 luminaire standard on top of the post of the Versatile Truss.



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Standard Plan Features:

Single Post	Two Post	Description
S100		General Information: maximum span lengths, list of information required on project plans, design notes, and general notes.
S101	S106	Truss layout and configuration. Sign and exit plaque placement. For two post type– camber and limits on location of bolted chord splices.
S102	S107	Truss member and post selection tables. Frame width schematic.
S103	S108	Base plate and anchorage details
S104	S109	CIDH pile foundation details and post details
S105	S110	Concrete pedestal with CIDH pile foundation details and post details.
S111		Truss member connection details
S112		Truss chord splice details
S113		Truss to steel post connection details
S114		CIDH pile foundation with inspection pipes
S115		Walkway layout and details
S116		Additional walkway details, sign luminaire mounting channel details, and walkway grating details.
S117		Mounting beam to truss connection details and walkway cover plate details.
S118		Walkway safety railing details
S119		Details for mounting laminated panels type A to mounting beams.
S120		Details for removable sign panel frames and for mounting to mounting beams. Used for mounting overhead sign single-sheet aluminum formed panels.
S121		Details for mounting formed panels to removable sign panel frames.
S122		Exit plaque mounting details
S123		CMS mounting details
S124		EMS and flashing beacon mounting details



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Project Development Procedures:

- (1) Confirm that the proposed sign structure location will not conflict with existing underground structures or utilities.
- (2) Consult with Geotechnical Services (GS) for each proposed sign structure location.
 - Geotechnical Services will determine whether the proposed sign location will meet the minimum soil parameters for the CIDH foundation listed on sheet S100.
 - Geotechnical Services may need to perform foundation investigations. Based on these investigations, Geotechnical Services may consult with the Office of Design and Technical Services (ODTS) in order to confirm the CIDH pile foundation depth, which in some instances may be longer than the Minimum CIDH Pile Length called out in the Standard Plans (sheets S104, S105, S109, and S110).
 - For sign structures where Geotechnical Services has recommended a longer CIDH pile length than called out in the Standard Plans, the project plans are to indicate the Geotech recommended CIDH pile length.
 - The CIDH pile length shall not be shorter than that indicated on the Standard Plans unless a special foundation design for the sign location has been prepared by ODTS.
- (3) If any elements of the proposed sign structure do not conform to the Standard Plans, a request for a special design needs to be submitted to ODTS.
 - If a nonstandard foundation design (such as, spread footings or multiple piles) is required for the site, consult with both Geotechnical Services and ODTS. Foundation investigations may be required in order to provide a special foundation design for the location.
- (4) For questions related to sign structures contact the following:
 - ODTS for questions on the interpretation of the Standard Plans or the User Guide.
 - The Office of Structure Quality Management for questions on the interpretation of the construction specifications.
 - The Structures Representative with Structure Construction for the review of the fabricator's shop drawings. The Structures Representative may contact ODTS with specific questions pertaining to the shop drawings submitted by the fabricator.



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General Instructions:

Structural Design Notes:

See sheet S100.

Determining Truss Frame Depth and Truss Member Sizes:

The “Truss Frame Depth and Vertical Angle Spacing Table” on sheets S101 and S106 lists the three frame depths for the Versatile Truss based on sign depth. Please note, CMS and EMS are not to be stacked vertically.

The “Truss Member Table” on sheets S102 and S107 lists the truss member sizes based on the Frame Depth and the Longer Arm or Span Length.

- For unbalanced one post type structures (see sheet S100), use the length of the longest arm when using the “Truss Member Table”.
- For cantilever one post type structures (see sheet S100), use the length of the cantilever arm when using the “Truss Member Table”.
- For two post type structures (see sheet S100), use the length of the main span between the post centerlines when using the “Truss Member Table”.

Determining the Post Type:

The “Post Selection Table” on sheets S102 and S107 lists the Post Type required based on the Post Clear Height (h), Longer Arm or Main Span Length, and Sign Panel Depth (D).

- The Post Clear Height, h, is measured from the base plate elevation to the bottom of the bottom chord on the truss. (See the “Elevation” view on sheets S104, S105, S109, and S110).
- The Sign Panel Depth, D, is the height in inches of the sign panel, CMS, or EMS.

Exit Plaque Placement:

The “Sign and Exit Plaque Placement” detail and the Notes on sheets S101 and S106 provide guidance on the number of exit plaques that can be mounted on the Versatile Truss and on their placement.

Sheet S122 provides details for mounting the exit plaque on to the Versatile Truss.

Using the Concrete Pedestal with a CIDH Pile Foundation:

The purpose of the concrete pedestal is to raise the height of the base plate elevation and the steel post above the ground elevation. There are two primary reasons for needing to raise the height of the base plate elevation and the steel post.



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- (1) A Post Clear Height, h , greater than 28 feet is needed due to site topography.
- (2) A post protected by concrete barriers is to be placed in the highway median and the base plate elevation of the post is to match the top of barrier height.

For case 2 above, a square pedestal shall be selected in order to allow the placement of concrete barrier transitions against the face of the pedestal.

Checking Minimum Clearance:

Please note:

- Sign panels will typically project below the Versatile Truss.
- Walkways will project a minimum of 13.5 inches below the bottom of a sign panel (see sheet S115).
- When the sign panel depth is less than the truss frame depth, the mounting beam will project 6 inches below the bottom of the truss. See the “Walkway with Sign” detail on sheet S115.

It is recommended that a minimum vertical clearance no less than 18.5 feet be used. This allows for future overlays of the roadway to be performed and still maintain an 18-foot clearance under the sign structure.

Verifying the Maximum Allowed Sign Depth on an Existing Versatile Truss:

See Appendix A.

Additional Drawings Needed to Complete PS&E:

Project plans must depict:

- (1) Sign structure location
- (2) Total length of structure frame, main span length (for two post type), cantilever length, and arm lengths (for one post type)
- (3) Sign panel type
- (4) Sign panel sizes, locations, and layout on structure
- (5) If sign luminaires are required
- (6) If a walkway is required
- (7) Walkway length (if required)
- (8) Height from bottom of base plate to bottom of truss (Post Clear Height, h)
- (9) Base plate elevation
- (10) Pedestal height (L) and shape, if applicable
- (11) Post Type (for as-built purposes)



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- (12) Photoelectric unit location (if required)
- (13) Non-standard minimum vertical clearance requirements

BEES Items and Quantities:

Furnish Sign Structure (Versatile Truss):

The fabrication and delivery of the Versatile Truss to the project site is paid by the structure's weight in pounds (of steel).

- To determine the quantity of steel in the Versatile Truss:
 - see Appendix B for one-post type
 - see Appendix C for two-post type

Install Sign Structure (Versatile Truss):

The installation of the Versatile Truss is paid by the structure's weight in pounds (of steel). The quantities are the same as for Furnish Sign Structure (Versatile Truss).

Aluminum Walkway Grating (Versatile Truss):

The aluminum walkway grating is paid for by square feet.

- The project plans call out the length of the walkway (if required).
- The aluminum walkway grating width is called out on S115.

Cast-In-Drilled-Hole Concrete Pile (Sign Foundation):

The length for payment for the CIDH pile is the length of the CIDH pile plus the pedestal height (if applicable). See S104, S105, S109, and S110.

Restrictions on Use of Standard Plans:

If project conditions require any deviations from these standards, please consult with ODTS. A special design may be required.

Some examples are:

- Additional loads (other than those from standard sign panels, CMS, and EMS) are proposed or anticipated
- Additional holes or welding not shown
- Deviations from dimensions
- Weak soils
- Locations where finish grade at base of post is more than 33 feet above surrounding terrain