

PLANNING AND ENGINEERING GUIDELINES & STANDARDS (PEGS)

SUPPLEMENT NUMBER: PEGS-21-003

MAY 5, 2021

CIVIL/SUE CONFINED SPACE CAD STANDARDS

Effective immediately, the following modification shall be made to the MDOT MAA 2021 PEGS Manual:

PEGS Volumes and Sections impacted:

Volume 1	Appendix 1D	Section 1D.3.3 – Civil/SUE Confined Space Drawings
Volume 1	Appendix 1D-1	Section 1D-1.2 – Major and Minor Groups
Volume 1	Appendix 1E	Section 1E.3.1 – Common Attributes
Volume 1	Appendix 1E	Section 1E.6.3 – Project GIS Data Requirements
Volume 7	Chapter 2	Section 2.6 – Requirements for Identification and Reporting of Confined Spaces during the Design Process

A. Volume 1, Appendix 1D, Section 1D.3.3 – Confined Space Drawings

Insert NEW Section 1D.3.3 Confined Space Drawings (attachment)

B. Volume 1, Appendix 1D-1, Section 1D-1.2 – Major and Minor Groups

Add new Major/Minor Group row to existing table, alphabetically above existing row

CONT:

CONF	Confined Space
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C. Volume 1, Appendix 1E, Section 1E.3.1 – Common Attributes

1. Add the following to existing item B:

If a feature class contains Confined Space attribute, see Volume 1, Appendix 1D.3.3 Structure ID for details of the Confined Space Structure ID format.

2. Add NEW item I:

I. Confined Space – A field for specific Utility feature classes that may store features fitting the definition of a Confined Space. This field shall be assigned the domain Code Boolean as defined in provided in Appendix 1E-1, Feature Types, which will limit potential values to Yes, No, or <null>.

D. Volume 1, Appendix 1E, Section 1E.6.3 – Project GIS Data Requirements

Add “Confined Space Structures” to the list of examples under GIS Data Example in existing row External Above Ground & Underground Utilities.

E. Volume 7, Chapter 2, Section 2.6 – Requirements for Identification and Reporting of Confined Spaces during the Design Process

Delete Paragraph 6 in its entirety and replace with the following:

As the design is developed through the 60% and 100% submittals, the Consultant shall record in these submittals, specific details and an evaluation of alternatives based on development of the findings presented in the 30% design submittal/report. Confined Space CAD standards, including Confined Space Structure ID, are documented in Volume 1, Appendix 1.D.3 Civil/SUE Confined Space Drawings. Confined Space GIS data standards are documented in Volume 1 Chapter 1E.3 Attributes & Domains.

Consultants listed herein are required to distribute this PEGS standard supplement to their respective staff and subconsultants.

If you believe this standard supplement conflicts with any other codes or regulations or if you should have any questions regarding this matter, please contact the Director, Office of Engineering and Construction at (410) 859-7093.



4/29/2021

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5/4/21

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DISTRIBUTION

Attachment:
Appendix 1D, Section 1D.3.3 – Confined Space Drawings

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ATTACHMENT

Appendix 1D, Section 1D.3.3 – Confined Space Drawings

1D.3.3 Civil/SUE Confined Space Drawings

When a Civil or Subsurface Utility Engineering project includes either an inspection of existing confined space (CS) structures, or design of new CS structures, data regarding each structure shall be included in the contract drawings and associated digital data submissions. Consultants shall submit confined space CAD data at all design phases beginning with the 30% design phase (see [Volume 2, Chapter 3.2 Deliverables by Design Phase](#)).

Before working with confined space data, consultants should be familiar with the MDOT-MAA Confined Spaces guidelines in [Volume 7, Chapter 02 Confined Spaces](#), and the MDOT-MAA GIS Standards in [Volume 1, Appendix 1E GIS Standards](#).

1D.3.3.1 Submissions Format

Confined space data in CAD shall be entered in a dedicated AutoCAD .DWG file, attached to plan sheets as an external reference (xref) as needed. Each CS structure shall be represented by an AutoCAD block entity.

Two CS block definitions, named **conf-spac** and **conf-spac-prmt**, have been pre-defined by MDOT-MAA, and contain attribute definitions which must be populated by the consultant. **Conf-space** is to be used to represent unpermitted confined spaces, and **conf-spac-prmt** is to be used to represent permitted confined spaces.



[Figure 1D3.3.1 examples of conf-spac.dwg and conf-spac-prmt.dwg](#)

Click [here](#) to download **conf-spac.dwg**, or [here](#) to download **conf-spac-prmt.dwg**, two AutoCAD .DWG2013 files which may be inserted into any existing AutoCAD file to represent CS structures.

1D.3.3.2 AutoCAD Drawing Composition

Instances of the blocks **conf-spac** and **conf-spac-prmt** should be inserted on the appropriate layer. Instances representing existing CS structures may be inserted on layer C-CONF-EXST, while those representing new work may be inserted on layer C-CONF-NEWW.

The blocks **conf-spac** and **conf-spac-prmt** are dynamic blocks with multiple visibility states, each corresponding to a type of CS structure. After an instance of the block is inserted, the visibility state must be changed to indicate the type of CS structure it represents. By default, the block's visibility state is set to EMH (electrical manhole).

The blocks also contain a set of AutoCAD Attributes, representing various types of data relating to CS structures. These attributes shall be populated by the consultant with all data known for each CS structure. See [1D3.3.4 Confined space attribute data](#) for a list of these attributes.

1D.3.3.3 Structure ID

Each CS structure shall be given a unique Structure ID by the consultant. This Structure ID will be confirmed by MDOT-MAA following submission at the Conformed design phase.

Structure IDs shall consist of five parts, separated by underscores or dashes, as illustrated in Figure 1D3.3.3.



Figure 1D.3.3.3, Structure ID Format

- **SUE Grid ID:** The first part of the Structure ID shall be the Grid ID of the 500'x500' SUE grid name in which the structure is located (See [Volume 1, Chapter 1.5 Subsurface Utility Engineering \(SUE\) Data Requirements for AIRPortal](#)).
- **Structure Type Code:** The second part of the Structure ID shall be the applicable Structure Type Code (see Table 1D3.3.3 below). The structure type codes coincide with SUE Aliases. NOTE: Consultants may request that MDOT-MAA create additional structure type codes, as needed.
- **X Position:** The third part of the Structure ID shall be the distance perpendicular to the west edge of the SUE grid containing the structure, to the center of the structure (i.e. the X-coordinate within the SUE grid), rounded to the nearest foot; should a structure's center fall directly on the boundary between two SUE grids, it shall be assumed to be located in the grid to the west at position 000
NOTE: Parts three and four are separated by a dash rather than an underscore
- **Y Position:** The fourth part of the Structure ID shall be the distance perpendicular to the south edge of the SUE grid containing the structure, to the center of the structure (i.e. the Y-coordinate with the SUE grid), rounded to the nearest foot; should a structure's center fall directly on the boundary between two grids, it shall be assumed to be located in the grid to the north, at position 000
- **Date of Installation:** The fifth part of the Structure ID shall be the month and year of the structure's installation in MMYYYY format; this part shall not be added until the Record or As-Built design phase, following the structure's construction

Example Structure ID's:

- 38-35_TMH_152-156_012003 - SUE grid 37-35, Telecommunications Manhole, position 152ft east by 156ft north, installed January 2003
- 38-33_EMH_069-219_122003 - SUE grid 38-33, Electrical Manhole, position 069ft east by 219ft north, installed December 2003
- 36-31_SWI_385-385_011988 - SUE grid 36-31, Stormwater Inlet, position 385ft east by 385ft north, installed January 1988

Confined Space Structure Types and Codes	
Structure Type	Structure Type Code
Confined Space Structure	
Electrical Manhole	EMH

Telecommunications Manhole	TMH
Sanitary Sewer Manhole	SSM
Sanitary Sewer Lift Station/Ejector	SSL
Storm Water Manhole	SWM
Storm Water Lift Station	SWL
Storm Water Inlet	SWI
Water Booster Pump Station	WPS
Glycol Diversion Vault	GDV
Glycol Force Main Vault	GFM
Glycol Lift Station	GLS
Glycol Storage Tank	GST
Oil Water Separator	OWS
Hydrant Fuel Manhole	HFM

Table 1D3.3.3, Confined Space Structure Types and Codes

1D.3.3.4 Confined space attribute data

The block **conf-spac** contains AutoCAD attribute definitions which must be populated for each CS structure. There is no AutoCAD attribute definition for Structure Type, since this data is represented by the block's visibility state.

The attribute definitions within the block are all set to be invisible, to avoid creating visual clutter in the plan set. However, attribute values may be viewed and edited at any time by double-clicking an instance of the block, which will open AutoCAD's Enhanced Attribute Editor.

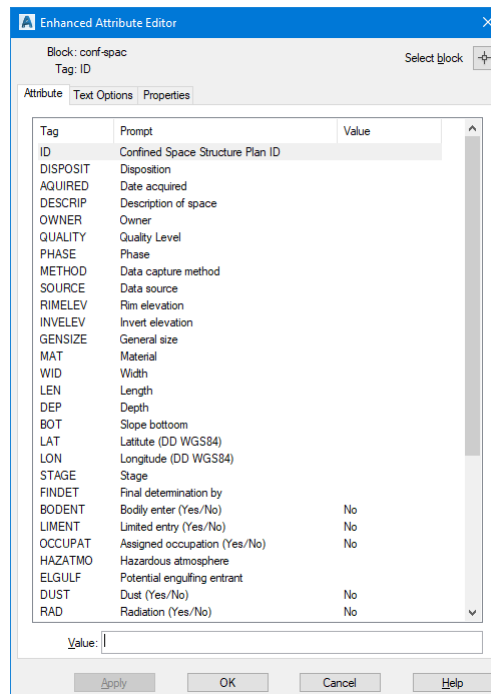


Figure 1D3.3.4 AutoCAD Enhanced Attribute Editor

Attributes defined in block conf-spac				
Category	Attribute Name	Attribute Tag	Attribute Prompt	Example Value
GENERAL INFORMATION	ID:	ID	Structure ID	404-54-EMH-001
	DISPOSITION:	DISPOSIT	Disposition	IN SERVICE
	DATE ACQUIRED:	ACQUIRED	Date Acquired	20190405 (formatted YYYYMMDD)
	DESCRIPTION OF SPACE:	DESCIP	Description of Space	ELECTRICAL MANHOLE WEST OF EMPLOYEE PARKING LOT
	OWNER:	OWNER	Owner	MAA
	QUALITY LEVEL:	QUALITY	Data quality level	D
	PHASE:	PHASE	Phase	CONFORMED
	CAPTURE METHOD:	METHOD	Data capture method	CAD DIGITAL
PHYSICAL PROPERTIES	DATASOURCE:	SOURCE	Data source	MAA-CO-19-006_C2.02
	RIM ELEVATION:	REMELEV	Rim elevation	110.55
	INVERT ELEVATION:	INVELEV	Invert elevation	108.08
	GENERAL SIZE:	GENSIZE	General size	4'-2"
	MATERIAL:	MAT	Material	PRECAST
	WIDTH:	WID	Width	5'-6"
	LENGTH:	LEN	Length	3'-6"
	DEPTH:	DEP	Depth	3'-0"
	SLOPE BOT:	BOT	Slope bottom	999
	LATITUDE (DD WGS84):	LAT	Latitude (DD WGS84):	39.177579
ASSESSMENT VALUES	LONGITUDE (DD WGS84):	LON	Longitude (DD WGS84):	-76.668939
	STAGE:	STAGE	Stage	PERMIT REQUIRED CONFINED SPACE
	FINAL DETERMINATION BY:	FINDET	Final determination by	JOHN SMITH
	BODILY ENTRY:	BODENT	Bodily entry (Yes/No)	YES
	LIMITED ENTRY:	LIMENT	Limited entry (Yes/No)	YES
	ASSIGNED OCCUPATION:	OCCUPAT	Assigned occupation (Yes/No)	YES
	HAZARDOUS ATMOSPHERE:	HAZATMO	Hazardous atmosphere	CARBON MONOXIDE
	POTENTIAL ENGULFING ENTRANT:	ENGULF	Potential engulfing entrant	NONE
	DUST:	DUST	Dust (Yes/No)	NO
	RADIATION:	RAD	Radiation (Yes/No)	NO
	NOISE:	NOISE	Noise (Yes/No)	NO

HEAT / STEAM:	HEAT	Heat / steam (Yes/No)	<i>NO</i>
MECHANICAL / MOVING PARTS:	MECHMOV	Mechanical / moving parts (Yes/No)	<i>NO</i>
POTENTIAL ENERGY:	POTENG	Potential energy (Yes/No)	<i>NO</i>
ELECTRICAL:	ELEC	Electrical (Yes/No)	<i>NO</i>
BIOLOGICAL HAZARD:	BIOHAZ	Biological hazard (Yes/No)	<i>NO</i>
LACK OF O2:	LACKO2	Lack of oxygen/O2 (Yes/No)	<i>NO</i>
HAZARDOUS CHEMICAL:	HAZCHEM	Hazardous chemical (Yes/No)	<i>NO</i>
NO HAZARD:	NOHAZ	No hazard (Yes/No)	<i>NO</i>
OTHER HAZARD:	OTHHAZ	Other hazard (Yes/No)	<i>NO</i>
HORIZONTAL ENTRY:	HORIZ	Horizontal entry (Yes/No)	<i>YES</i>
VERTICAL ENTRY:	VERT	Vertical entry (Yes/No)	<i>NO</i>
HORIZONTAL / VERTICAL ENTRY COMBINATION	HORZVER	Horizontal / vertical entry combination (Yes/No)	<i>NO</i>

[Table 1D3.3.4 Attributes defined in block conf-spac](#)

1D3.3.5 GIS Data

Electronic deliverables for design projects include GIS data (see [Volume 2, Chapter 3.2 Deliverables by Design Phase](#) and [Volume 1, Appendix E GIS Standards](#) for details). GIS data will include a field denoting whether a structure is a confined space, which must be populated with a **Yes** value for each structure that is a confined space and with a **No** value for each structure that is not a confined space; see [Volume 1 Chapter 1E.3 Attributes & Domains](#) for details.