massDOT
Massachusetts Department of Transportation
Highway Division

CAD Standards Manual

September 2020
Version 4.4.1

Table of Contents

Introduction

This document provides a single source location for the Massachusetts Department of Transportation (MassDOT), Highway Division, CAD Standards, as well as support files necessary for the preparation of CAD files relevant to highway projects.

The purpose of this CAD Standard is to standardize drawing information and improve electronic data sharing between disciplines within MassDOT and from consultants working for MassDOT. It is recognized that there remains existing documentation found within MassDOT which may conflict with some parts of this CAD Standard. All efforts have been made to resolve the instances of conflict but MassDOT does not guarantee that all discrepancies have been found or resolved. This document supersedes all CAD related requirements found within any documentation currently used within the MassDOT, Highway Division.

Please direct any questions or comments about this document to:
Email: CAD.Standard@dot.state.ma.us

Software

The MassDOT Highway Division currently uses the following CAD software products.

AutoCAD
AutoCAD Map 3D
AutoCAD Civil 3D
AutoCAD Raster Design

PLEASE NOTE:
Actual software version used by MassDOT internally will change from time to time, therefore please refer to the specific project contract or contact the project manager for actual version and submission requirements.

All new projects must use the latest version of the drawing template, available on the MassDOT CAD Standard website. Please download the current drawing template and supporting files prior to beginning any MassDOT Highway Division projects.

Civil 3D Objects

To ensure the integrity and continuity of an efficient workflow and design process throughout the survey, design, construction, and Building Information Modeling (BIM) processes, all MassDOT projects shall require the use of Civil 3D objects.

The following design items must be created as Civil 3D objects and must be assigned MassDOT Civil 3D Object Styles using the provided MassDOT Civil 3D drawing template.

POINTS
SURFACES
ALIGNMENTS
PROFILES
SECTIONS
CORRIDORS
PIPE NETWORKS

Not all Disciplines use these design elements, therefore some disciplines will not have a specific Civil 3D Object requirement. Please refer to each discipline's Civil 3D Objects section for details.

General Drawing Data Requirements

File Types

All project submissions shall include the following file types. All project related Drawing Files shall be provided in all formats listed below.

- AutoCAD Drawing format (.dwg) [Placed in DWG project folder]
- Adobe Portable Document Format (.pdf) [Placed in PDF project folder]

PDF files shall be created from within the AutoCAD environment and contain Layer information.

It is a requirement that each project drawing/sheet created for a project shall be published/plotted to DWG, and PDF, and placed in the appropriate folder. All external references (DWG, DGN, PDF, TIFF, MrSID, JPG, etc.) which are used in support of the creation of these project sheets shall be stored within the XREF folder only (Subfolder of DWG). For more information on folder structure and file location please see the Digital Submission Requirements section of this manual.

Discipline Codes

The following discipline codes shall be used in all file naming for all projects. Use the discipline code relative to the authoring discipline, i.e. Traffic creates TR files, Highway Design creates HD files, and Survey creates SV files. Where a file contains plans for more than one discipline, use the predominant discipline code, i.e. HD file prepared by HD contains GT or TR plans.

BR Bridge
EV Environmental
HD Highway Design
GT Geotechnical
LD Landscape Design
LO Layouts
RD Record Utility Location
RW Right of Way
SV Survey
TR Traffic
UT Utilities

Discipline codes are used in file naming, layer naming, and block naming.

File Naming

The following file naming standard for all CAD related files created, used, or submitted to the organization shall be followed. The Bridge Department has expanded upon this requirement; please refer to the Bridge File Naming section of this document for further details.
This applies to all CAD drawings and PDF's used in support of, or used in conjunction with this CAD Standard.

File names shall begin with their project file/MEPA number assigned (available through the MassDOT Project Manager), followed by an underscore and the appropriate discipline code. In the instance where there is more than one file, assign an appropriate sequential number to the end (ex. 1,2,3). Special characters are not permitted except for the following; hyphens [**-**], underscores [**_**], and/or parenthesis [**( )**].

Example 1.
A set of engineering design plans and documents were prepared for project file number 123456; acceptable filenames would be as follows:

123456_HD1.dwg	123456_ HD1.pdf	123456_ HD1.dwg
123456_ HD2.dwg	123456_ HD2.pdf	123456_ HD2.dwg
123456_TR1.dwg	123456_ TR1.pdf	123456_ TR1.dwg
123456_SV.dwg	123456_SV.pdf	123456_SV.dwg
123456_RW1.dwg	123456_RW1.pdf	123456_RW1.dwg
123456_RW2.dwg	123456_RW2.pdf	123456_RW2.dwg

Optional File Name Identifier

An optional identifier can be used to enter any information relevant for identification. Simply enclose the information within parenthesis (*****). A 15 character maximum is allowed within the parenthesis.

Example 2.
A set of design plans and documents were prepared for project file number 123456; acceptable filenames would be as follows:
123456_HD(Design-REHAB)
123456_TR(Rte_44_Raynham)
123456_RW(P1234_AB-Design)

Digital Submission Requirements

Digital Submission Requirements for all CAD related project files are detailed in the following sections. All project CAD related files shall be stored in a project CAD folder and furnished to MassDOT for all project submissions.

This folder shall include all files necessary to form the basis of and recreate the project drawings for the use of MassDOT while maintaining all reference paths. This includes, but is not limited to, all .dwg files used in the creation of linework, text, engineered models, or sheets; survey field data and research materials; GIS data; LiDAR/Point Cloud Data; and plan sheet pdf publishing files. All other non-CAD project files shall be submitted as a separate portion to the Project Manager's specification.

The CAD submission shall be provided in a single compressed file that contains the folder structure described below.

MassDOT Project Templates

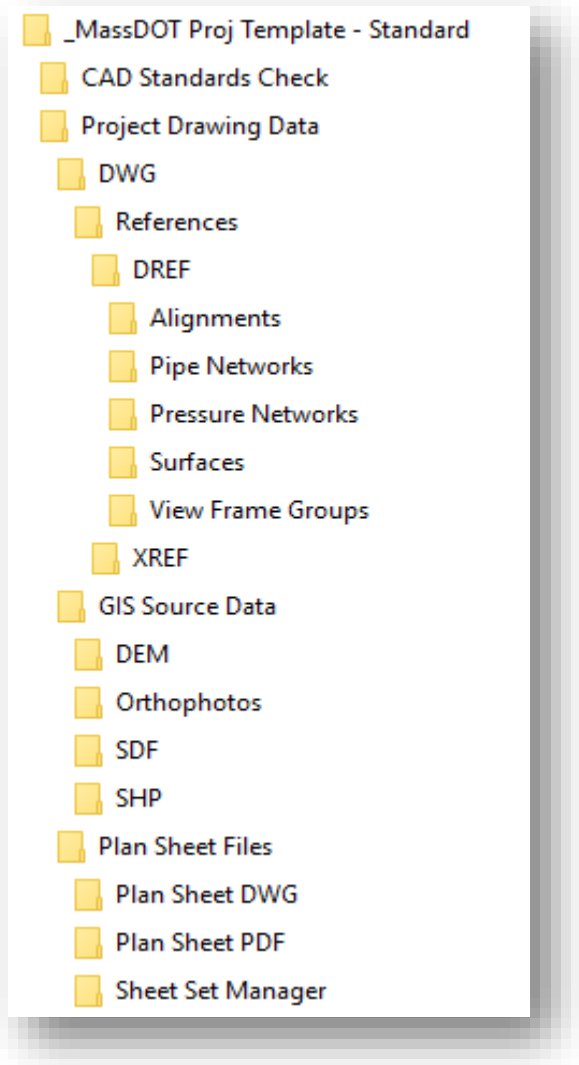
All MassDOT projects shall utilize a pre-created standard project folder structure called a project template. The project template to be used varies by project type. MassDOT provides these project templates to users to streamline and standardize the creation of the project CAD folder.

Within several of the standard folders, it is permissible to create additional folders as needed. This provides the user flexibility to implement a drawing structure that aids in meeting the organizational requirements of the user while conforming to an accepted MassDOT standard structure. Not all standard MassDOT folders allow for creation of subfolders within it. In each folder description below, it is noted if the creation of additional subfolders is allowed.

The MassDOT-provided project templates are described in detail in the following pages. Please note that the descriptions for folders which are common to both the Standard Project Template and the Survey Project Template are not repeated unless the intended folder contents vary significantly from the originally given description.

Standard MassDOT Project Template

The project CAD folder for **all projects other than survey baseplans** is shown and described below.



MassDOT Proj Template - Standard

The MassDOT Proj Template – Standard folder shall be renamed using the Project File number followed by the word CAD followed by the relevant submission level (i.e. 25Stage, 75Stage, 100Stage, FINALPSE). For example, 654456 CAD 75Stage.

NOTE: Do not use the % symbol in file names.

CAD Standards Check

The CAD Standards Check folder shall contain all files necessary to ensure project dwg files comply with the MassDOT CAD Standard. Please refer to the CAD Standards Review Process for information regarding required submission files.

Project Drawing Data

The Project Drawing Data folder shall contain all files necessary for producing project plan sheets.

Project Drawing Data > DWG

The DWG folder contains any dwg files used to generate plan sheet linework and annotation. Additional subfolders can be created as necessary.

Project Drawing Data > DWG > References

The References folder contains any dwg files used as AutoCAD External References (XREF's) and Civil 3D Data Shortcuts (DREF's).

Project Drawing Data > DWG > References > DREF

The DREF folder contains dwg files that define source data used as a Civil 3D Data Shortcut. It has subfolders broken down according to the supported Civil 3D Data Shortcut-enabled Civil 3D object (Alignments, Surfaces, Pipe Networks, Pressure Networks, and View Frame Groups).

Project Drawing Data > DWG > References > XREF

The XREF folder contains any dwg files that are used as an XREF such as the survey baseplan (in design projects), 2D linework design file (design layout), or border and title block file. Additional subfolders can be added as necessary.

Project Drawing Data > GIS Source Data

The GIS Source Data folder shall contain any GIS data used for project mapping. Within the GIS Source Data folder additional folders organize the GIS data by file type, and each file type can optionally be broken down into GIS data type by the user by creating additional subfolders.

Project Drawing Data > Plan Sheet Files

The Plan Sheet Files folder is where all sheet files used to create plotted plan sheets and any Sheet Set Manager files used to publish sheets are stored (if using Civil 3D sheet creation functions and/or Sheet Set Manager).

Project Drawing Data > Plan Sheet Files > Plan Sheet DWG

The Plan Sheet DWG folder contains files of type .dwg that are used to create the sheet layout tabs (the plotted plan sheets) referenced from the project dwg files located in the Project Drawing Data > DWG folder.

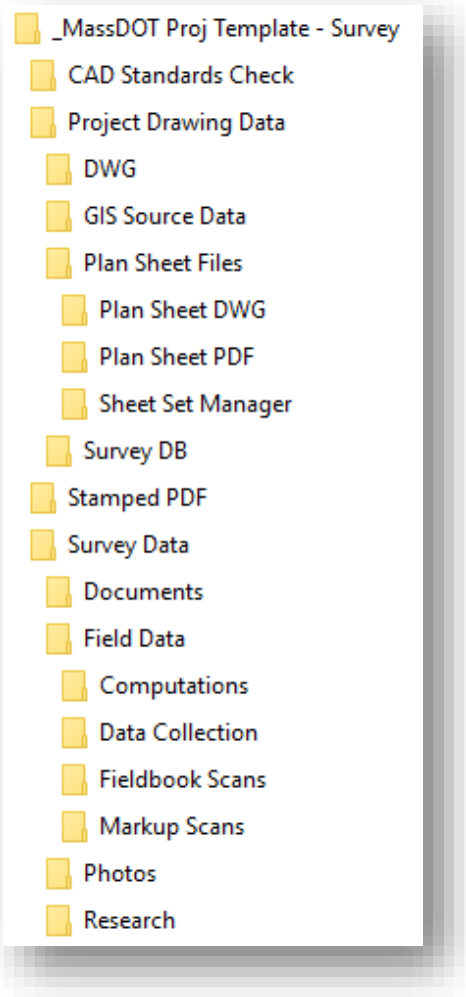
NOTE: When Civil 3D sheet creation functions such as View Frame Groups or Create Section Sheets command are used to generate sheet layout tabs in a separate dwg file (a .dwg sheet file), the save location of the resulting dwg sheet files should be set to this folder.

Project Drawing Data > Plan Sheet Files > Plan Sheet PDF

The Plan Sheet PDF folder contains the plotted .pdf sheet files.

Survey Project Template

The Project CAD Folder for **all survey baseplan projects** is shown and described below.



Project Drawing Data > Survey DB

The Survey DB folder is to be used as the Working Folder for all project Civil 3D survey databases.

Stamped PDF

Signed and Sealed PDF copy of the submitted survey base plan. Create subfolders as needed.

Survey Data

This folder contains all files necessary to form the basis of the survey including general documents, field data, site photos, and survey research.

Survey Data > Documents

Scans, PDFs, etc. of project related documents to include MassDOT issued control package, survey request form, amendment requests, surveyors report, etc. Create subfolders as needed.

Survey Data > Field Data

Folder to store all field data. Create additional subfolders as needed.

Survey Data > Field Data > Computations

Folder to store all traverse reduction files, level reduction files, traverse worksheets, etc. Create subfolders as needed based on data being computed.

Survey Data > Field Data > Data Collection

All data collector files for download /upload. Include edited and unedited copy of all download files. Create subfolders as needed.

Survey Data > Field Data > Fieldbook Scans

Scans of field notebook. Create subfolders as needed.

Survey Data > Field Data > Markup Scans

Scans of field notes not included in field books, including invert sheets, recon mark ups, field edits, etc. Create subfolders as needed.

Survey Data > Photos

Folder for photographs of site. Create subfolders as needed.

Survey Data > Research

Folder to store all FEMA, property, roadway, utility, zoning, etc. research. Create subfolders as needed.

MassDOT Project CAD Folder Management Policies

Policy on Unused Project Template Folders

MassDOT project templates are designed to support a wide array of project types and sizes with diverse data organization requirements. Therefore, it is possible not all file folders included in the project templates will be used for a given MassDOT project. At project submission, it is at the user's discretion whether these unused folders will be removed from the Project CAD Folder or remain in place for future use.

Policy on the Use of eTransmit Feature

Do not use the AutoCAD E-Transmit function when submitting project data, due to the improper binding of xref's, consolidation of project folders, and the destruction of data shortcut functions which occur.

Drawing Setup

Drawing Template

1. All DWG files created for any MassDOT Highway Division project must use the latest version of the MassDOT Civil 3D Template by default.
2. This template includes MassDOT specific Civil 3D styles, fonts, dimension styles, (all prefixed with "MassDOT" or "DOT"), and most of the standard MassDOT Annotation, Design and Survey layers needed for completion of MassDOT projects.
3. All project data must be located on the following;
   Horizontal Datum - Massachusetts State Plane Coordinate System of 1983 (NAD83) US Feet
   Vertical Datum – North American Vertical Datum of 1988 (NAVD88)
   or as otherwise specified by the MassDOT Project Manager.
4. Any information referenced in design drawings shall not be moved or rotated from the original coordinates used in the drawing.

Borders and Sheets - DesignCenter

1. The Civil 3D drawing template contains a Sample Sheet only. The Title Sheet and Index Sheet can be found in the HWYDESIGN_SHEETS.dwg.
2. Each MassDOT Highway Division section has a standard set of pre-defined sheets. Detailed information as to the contents of each can be found in the Plan Requirements of the appropriate section.
3. The available sheets are listed below.

   BRIDGE_SHEETS.dwg
   ENVIRONMENTAL_SHEETS.dwg
   HWYDESIGN_SHEETS.dwg*
   LANDSCAPE_SHEETS.dwg
   LAYOUT_SHEETS.dwg
   ROW_SHEETS.dwg
   SURVEY_SHEETS.dwg
   TRAFFIC_SHEETS.dwg
   UTILITY_SHEETS.dwg

4. The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

*Contains the MassDOT Title Sheet and Index Sheet

Scale and Units

All CAD drawing models, i.e. plan views, shall be drafted at full scale in engineering units such that one drawing unit equals one foot. Where sections, elevations, or details are necessary, the use of architectural units is permitted.

Font & Text Styles

The following fonts and text styles are approved for MassDOT use and are pre-defined within the drawing template. These shall be the only fonts and text styles used on Plan & Detail Sheets.

NAME	DESCRIPTION	SIZE	FONT
DOT-BR4	Bridge Text	(size 0.125)	RomanS
DOT-BR5	Bridge Text	(size 0.1563)	RomanS
DOT-BR6	Bridge Text	(size 0.1875)	RomanS
DOT-BR8	Bridge Text	(size 0.25)	RomanS
DOT-BR8B	Bridge Text BOLD	(size 0.25)	Bold
DOT-E	Existing Text	(size 0.10)	RomanS
DOT-E-OBL	Existing Text OBLIQUE	(size 0.10)	RomanS
DOT-LO	Layout Text	(size 0.10)	RomanS
DOT-P	Proposed Text	(size 0.125)	Arial
DOT-P-OBL	Proposed Text OBLIQUE	(size 0.125)	Arial
DOT-PB	Proposed Text BOLD	(size 0.125)	Arial Bold
DOT-Street	Street and Town Text	(size 0.25)	Arial Bold
DOT-Title	Title Text for Layouts		RomanT

Text Style Usage

- All existing text other than Bridge, Layouts and Record Utility shall use the DOT-E text style.
- All proposed text other than Bridge, Layouts and Record Utility shall use the DOT-P text style.
- For Bridge text style usage please refer to the Bridge Section in this manual.
- All Layout geometry, stationing, notes, and property owner information text used on Layout Plans shall use the DOT-LO text style.
- All Utility Record Location text shall use the DOT-E-OBL, (Existing Text OBLIQUE) text style.
- Street and Town names shall use the DOT-Street text style.
- Layout Titles text as pre-defined within Layout Titles blocks shall use the DOT-Title text style.
- DOT-PB (Proposed Text Bold) is provided to be used as needed.
- DOT-P-OBL (Proposed Text OBLIQUE) is provided to be used as needed.

Dimension Styles

The following dimension styles are approved for MassDOT use and are pre-defined within the drawing template. These shall be the only dimension styles used on Plan & Detail Sheets.

NAME	DESCRIPTION	FONT
DOT-E	Existing Text (size 0.10)	RomanS
DOT-P	Proposed Text (size 0.125)	Arial
DOT-BR-FT	Bridge Text (size 0.125)	RomanS
DOT-BR-IN	Bridge Text (size 0.125)	RomanS

Multileader Styles

The following multileader styles are approved for MassDOT use and are pre-defined within the drawing template. These shall be the only multileader styles used on Plan & Detail Sheets.

NAME	DESCRIPTION	FONT
DOT-BR_arrow	Bridge Text (size 0.125)	RomanS
DOT-BR_arrow_One Line FR	Bridge Text (size 0.125) For use with fractions)	RomanS
DOT-BR_arrow_tilde	Bridge Text (size 0.125)	RomanS
DOT-E_arrow	Existing Text (size 0.10)	RomanS
DOT-E_arrow_tilde	Existing Text (size 0.10)	RomanS
DOT-E_dot	Existing Text (size 0.10)	RomanS
DOT-LO_arrow	Layout Text (size 0.10)	RomanS
DOT-LO_spline_arrow	Layout Text (size 0.10)	RomanS
DOT-P_arrow	Proposed Text (size 0.125)	Arial
DOT-P_arrow_tilde	Proposed Text (size 0.125)	Arial
DOT-P_dot	Proposed Text (size 0.125)	Arial

Table Styles

The following table styles are approved for MassDOT use and are pre-defined within the drawing template. These shall be the only table styles used on Plan & Detail Sheets.

NAME	DESCRIPTION	FONT
DOT-E	Existing Text (size 0.10)	RomanS
DOT-P	Proposed Text (size 0.125)	Arial
INDEX	Proposed Text (size 0.125)	Arial

Symbols and Blocks

Symbols have been developed for existing survey and proposed construction items to closely represent those provided in Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide, 2006. These symbols must be used for plans prepared for MassDOT. No substitute symbols will be accepted. Additional symbols may be added for items not listed. However, the list of additional symbols with descriptions must be included with the plan submission to MassDOT.

Each section has a standard set of pre-defined symbols and blocks contained within the DWG files listed below.

- BRIDGE_SYMBOLS.dwg
- GENERAL_SYMBOLS.dwg
- GEOTECH_SYMBOLS.dwg
- HWYDESIGN_SYMBOLS.dwg
- HWYDESIGN_WCR_DRIVEWAY.dwg
- LANDSCAPE_SYMBOLS.dwg
- LAYOUT_SYMBOLS.dwg
- SURVEY_SYMBOLS.dwg
- TRAFFIC_CONTROL_DETAILS.dwg
- TRAFFIC_SYMBOLS.dwg
- UTILITY_SYMBOLS.dwg

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

General Linetype and Text Layer Guidelines

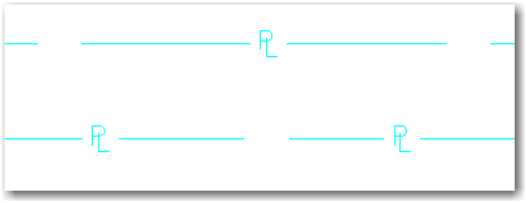
Property Lines

Property boundary line segments shall be drafted as a standard property line on layer EX-SV-LN-PROP or as a boundary line segment under common ownership (if present) on layer EX-SV-LN-PROP-COMMON.

Standard Property Lines

Standard property boundary line segments shall be drawn on layer EX-SV-LN-PROP and denoted using one of the following methods:

1. For property lines longer in length than 2.5 times the drawing scale (i.e. greater than 50 feet for 1”=20’ scale drawing), draw the property boundary line segments with the layer’s default linetype EXIST PROP LINE SYMBOL. This linetype automatically inserts the Property Line symbol at regular intervals along the line:



2. For property lines shorter in length than 2.5 times the drawing scale (i.e. 50 feet for 1”=20’ scale drawing) where the property line is not long enough to allow the symbol to be inserted, first change the property boundary line segment linetype to EXIST PROP LINE, then do one of the following:

    - Insert the SV-PL block provided within the template and Survey_Symbols.dwg at various intervals along the property line.

-or-

    - Add a Civil 3D curve and/or line label object of *MassDOT_SV_EX_LN_PL Symbol* style (provided within the template) at various intervals along the property line.

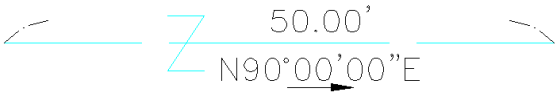
Property Lines Under Common Ownership

When property boundary line segments under common ownership are encountered, they shall be drawn on layer EX-SV-LN-PROP-COMMON and denoted using one of the following methods:

- Insert the SV-Z block provided within the template and Survey_Symbols.dwg once with its horizontal axis oriented along the property line.

-or-

- Add a Civil 3D curve and/or line label object of *MassDOT_SV_EX_Z Symbol* style (provided within the template) once along the property line.



Woods and Brush Lines

Woods have 2 line types to be used within different scenarios. Brush lines would be used the same, except modify the linetype scale to a value of 0.5.
TREELINE_L – use where the edge of woods line is located on the left side of the direction of survey.
TREELINE_R – use where the edge of woods line is located on the right side of the direction of survey.

Guardrail Lines

Guardrails have 4 line types to be used within different scenarios.
GRDRAIL-WOOD-LT – use where the wood guardrail is located on the left side of the direction of survey. This places the posts onto the back of the line, away from roadway.
GRDRAIL-WOOD-RT – use where the wood guardrail is located on the right side of the direction of survey. This places the posts onto the back of the line, away from roadway.
GRDRAIL-STEEL-LT – use where the steel guardrail is located on the left side of the direction of survey. This places the posts onto the back of the line, away from roadway.
GRDRAIL-STEEL-RT – use where the steel guardrail is located on the right side of the direction of survey. This places the posts onto the back of the line, away from roadway.

Text Layers

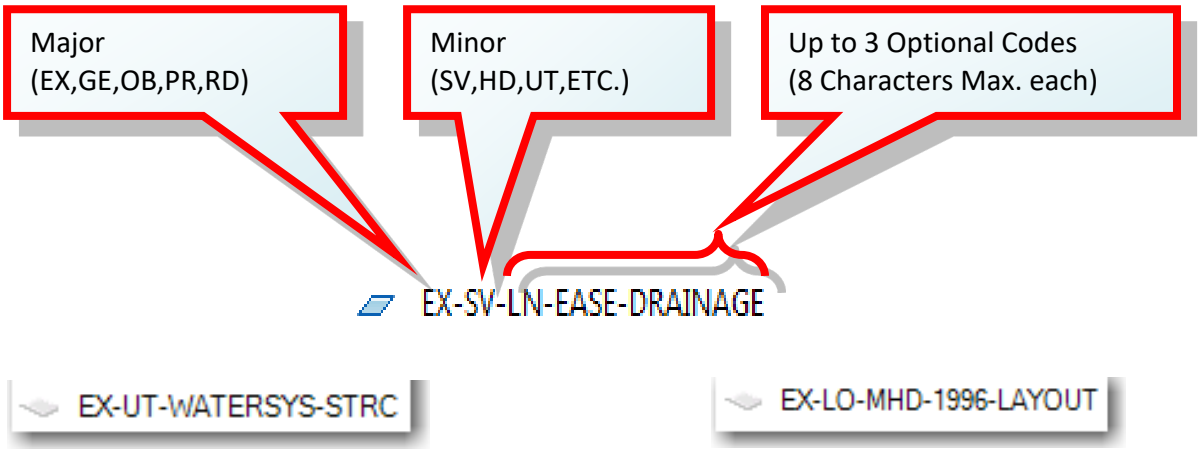
When labeling an object with a piece of description text, always place the text onto the TEXT layer for the object, i.e. drainage rims labeling would be placed on – EX-UT-DRAIN-TEXT. If no TEXT layer is available, place the text onto the object layer, i.e. EOP label would be placed on EX-SV-EOP, 3’ CLF label would be placed on EX-SV-FNC-CLF

Do not assume that all general text is placed onto the EX-SV-TEXT or PR-HD-TEXT layers.

Layers and Layer Naming

Layer Naming

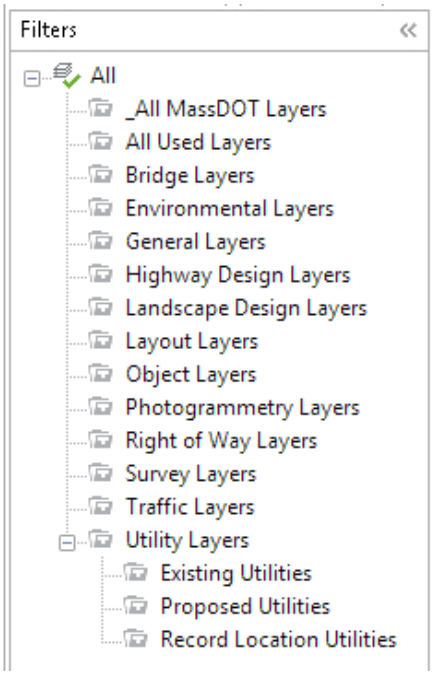
The drawing template has been provided with standardized layers designed to accommodate information required in any drawing. Every attempt must be made to use the layers provided. In the event that an additional layer is required, the following layer naming procedure shall be used.
Each layer (excluding OB and GE layers) must be assigned a Major and a Minor code separated by a hyphen (-).
Additionally, the use of up to 3 Optional Codes is allowed to aid customization of a layer if necessary.
Each layer must also use the appropriate Plot Styles provided. (See Plot Styles section)



Major Codes	Minor Codes (i.e. Discipline Codes)	Optional Codes
EX – Existing Feature	BR Bridge	Up to 3 separate Optional Codes may be created to provide additional information to the layer name. Each optional code cannot be larger than eight (8) characters.
GE – General Feature (general notes, sheets, title blocks)	EV Environmental	
PR – Proposed Feature	GT Geotechnical	
OB – Civil 3D Object Layers	HD Highway Design	
RD – Record Location Feature	LD Landscape Design	
	LO Layouts	
	RW Right of Way	
	SV Survey	
	TR Traffic	
	UT Utilities	

Layer Filters

A standard set of layer filters has been provided within the Layer Manager to organize all MassDOT layers into their unique discipline groups.



Master Layer List

Please see **Appendix A: Master Layer List** for a full list of AutoCAD layers in the MassDOT template.

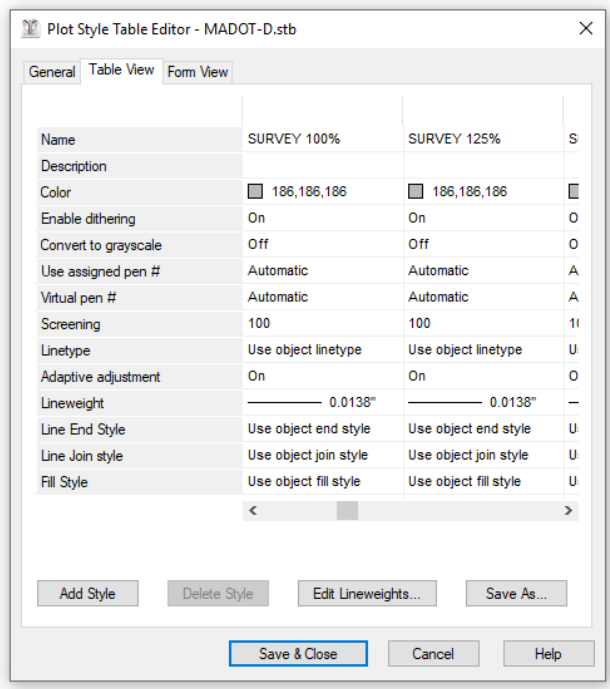
Plot Styles

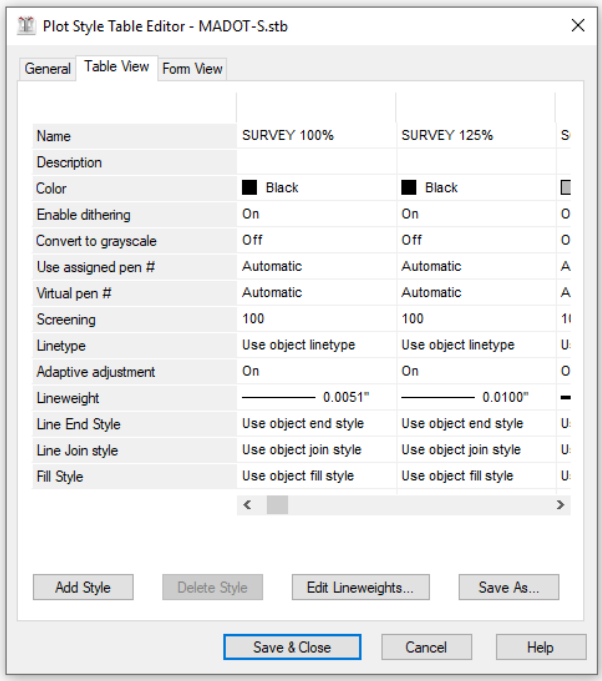
Purpose

MassDOT Highway Division has created a standard set of plot styles to aid in plotting. These plot styles are intended to provide seamless integration while passing DWG files back and forth between the Survey Division, Design Divisions, as well as the other Divisions.

Definitions

MassDOT Highway Division has adopted the following named plot style standards:
MADOT-C.stb (use this for Color Plotting, i.e. presentations)
MADOT-D.stb (use this for all Design sections)
MADOT-E.stb (use this for all Environmental Color Plotting)
MADOT-LO.stb (use this for all Layouts Plotting)
MADOT-R.stb (use this for all Right-of-Way Plotting)
MADOT-S.stb (use this for all Survey Baseplan Plotting)
MADOT-U.stb (use this for all Utility Color Plotting)



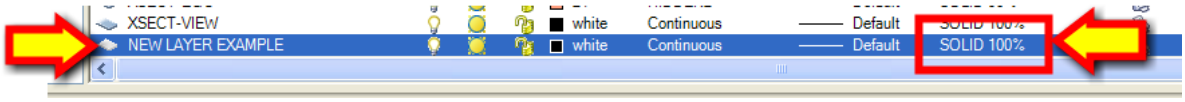


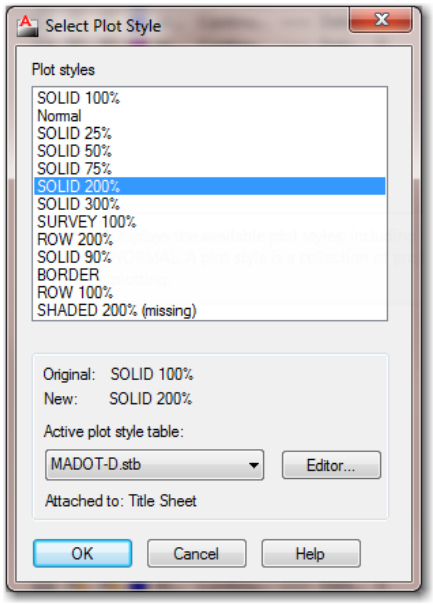
Using Plot Styles

All of the default Civil 3D objects and/or layers contained within the MassDOT drawing template have all the appropriate styles pre-assigned to them. The plot styles have been created to ensure that each Section can maintain their own plotting requirements without affecting the plotting within other Sections.

For example, a survey base plan will be plotted dark and solid within the Survey Division (using the MADOT-S.stb file), while within the Design Divisions, (using the MADOT-D.stb file), the survey base plan information will be automatically plotted grayscale/shaded, and the proposed design information will be plotted dark and solid. Right of Way drawings will be plotted (using the MADOT-R.stb file) showing the survey base plan information grayscale/shaded, the proposed design information as dark and solid, and the Right of Way information (boundary lines, easement lines and text etc.) as bold.

When creating NEW layers or objects, users will need to assign plot styles appropriately using the following suggested steps. After the layer has been created inside the Layer Properties Manager, select the plot style entry, as shown.





Policy on Model Space vs. Paper Space

The use of both Model Space and Paper Space is necessary to create clean looking drawing files and a more consistent document within the AutoCAD environment, and therefore, it is a requirement that all DWG files in use, or in support of projects, at the MassDOT Highway Division shall use these environments.

Model Space -
One of the two primary spaces in which objects reside. A geometric model is placed in a three-dimensional coordinate space called model space. It is within model space where a project will be created, annotated, and dimensioned.

All drawing models shall be drawn in model space and shall be drawn to actual scale. Any additional item that helps define the model or add model data such as details, dimensions, elevations, names, descriptive text, etc. shall be drawn in model space.

Paper Space -
One of the two primary spaces in which objects reside. It is within paper space where a layout of specific views of the project model, border and title block, and general notes are placed in order to print a clean and consistent document.

All secondary drawing elements shall be placed in Paper Space. Title block, sheet notes, titles, and legends shall be considered secondary drawing elements.

Note: Any information referenced in design drawings shall not be moved or rotated from the original coordinates used in the drawing. When copying model space information between drawings (NON-CIVIL 3D OBJECTS), verify that the UCS coordinates in both drawings are set to “World” prior to executing the copy-paste commands.

Policy on External References and Data Shortcuts

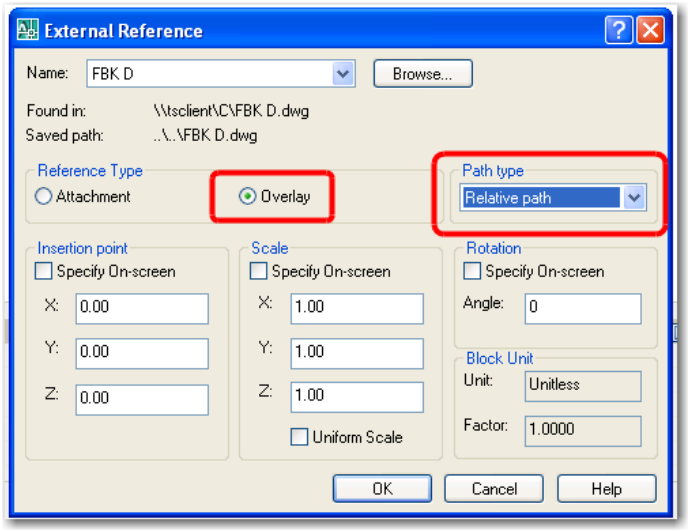
The following policies shall be followed when creating dwg file references in the project drawing structure.

External References

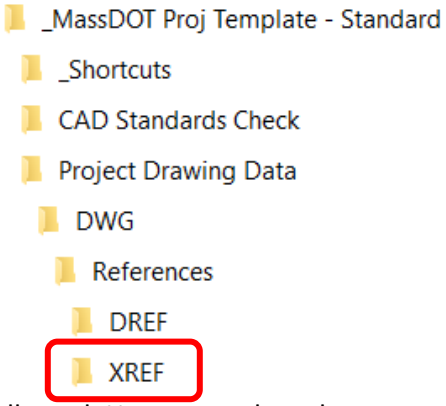
All externally referenced source drawings (XREF's) shall be inserted on layer GE-XREF, and this layer shall remain locked to avoid accidentally moving or erasing the reference drawing.

It is acceptable to create additional XREF layers as necessary by adding an Optional Modifier 8 characters or less as described in the section Layer Naming. Please note the reason for these user-created layers in the CAD Standard Check Audit Notes.

All externally referenced source drawings shall be inserted as OVERLAYS and set to RELATIVE PATH. The use of XREF's as "attachments" or "full path" will not be accepted.



All external referenced files of type dwg shall be stored within the References > XREF folder. Within the XREF folder additional subfolders may be created to organize project files as necessary.



The use of temporary XREF's is allowed. However, when the temporary XREF is no longer needed, DETACH the temporary XREF properly through the External Reference Manager.
DO NOT SIMPLY DELETE THE XREF WITHIN THE DWG FILE.

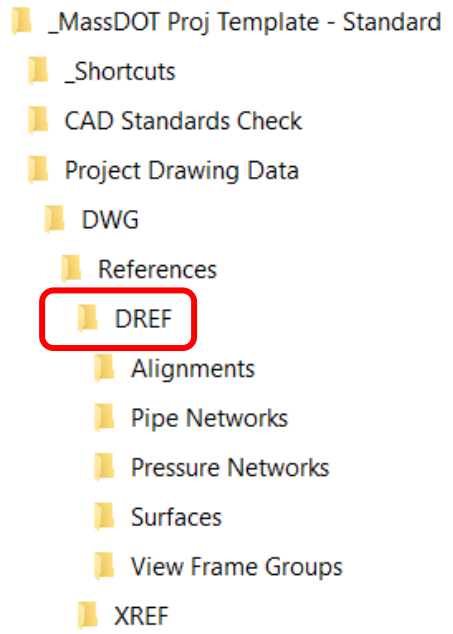
*Note: Externally referenced data shall not be moved or rotated from the original coordinates used in the drawing.

Data Shortcuts (Civil 3D only)

MassDOT Highway Division does not require the use of Data Shortcuts (DREF's). However, where used, the following procedures shall be followed to allow for the seamless transfer of project files after the data references have been created.

The Data Shortcut folder, specifically the *"_Shortcuts"* folder, shall be located in the Project "Working" folder as shown below. No drawings shall be located within these folders.

When project drawing structures become sufficiently large or complex with many DREF's, DREF'd dwg files should be stored within the DREF folder according to the type of object being defined in the dwg file as shown below:



Pipe Networks (Civil 3D only)

Civil 3D pipe network styles and network part lists are provided in the MassDOT Civil 3D template for existing, record location, and proposed storm sewers as well as existing and record location sanitary sewer utilities. The following are notes on proper usage of pipe networks for MassDOT projects.

- Existing and record location pipe objects should reflect the field observations or record location, elevations, sizes, and material of the pipes and structures being modeled as accurately as possible.

- If necessary, pipe and structure sizes and/or materials may be added to the pipe network parts lists either by adding part families from the Civil 3D pipe network catalog or by modifying the Civil 3D pipe network catalog itself.

- Pipe and structure objects shall use the proper style to represent the correct status of the utility, i.e. existing, record location, or proposed.

- Pipes 24” and over shall use a double-line pipe display. Pipes less than 24” shall use a single-line display.

- Structure objects shall use the proper style to represent the correct frame and cover/grate combination.

- Annotation: The MassDOT template provides an array of options for labeling and displaying pipe network data that are based on utility status, utility type, and amount of object data to display. In addition, the MassDOT template provides both structure and pipe tables for creating storm sewer schedules.

- Civil 3D has a built-in software limitation in the stock Civil 3D Imperial pipe network catalog. The Material definition for the Reinforced Concrete Pipe part family is set to “Constant”, and unless the catalog is modified, the material will only list “Reinforced Concrete” as the pipe material. Due to this limitation, it does not allow these pipes to be labeled automatically with the common abbreviation “RCP”. MassDOT has provided pipe labels specifically to address this and allow for automatic labeling of reinforced concrete pipes as “RCP” without having to modify the pipe network catalog. These styles can be identified as having “RCP” in the label style name.

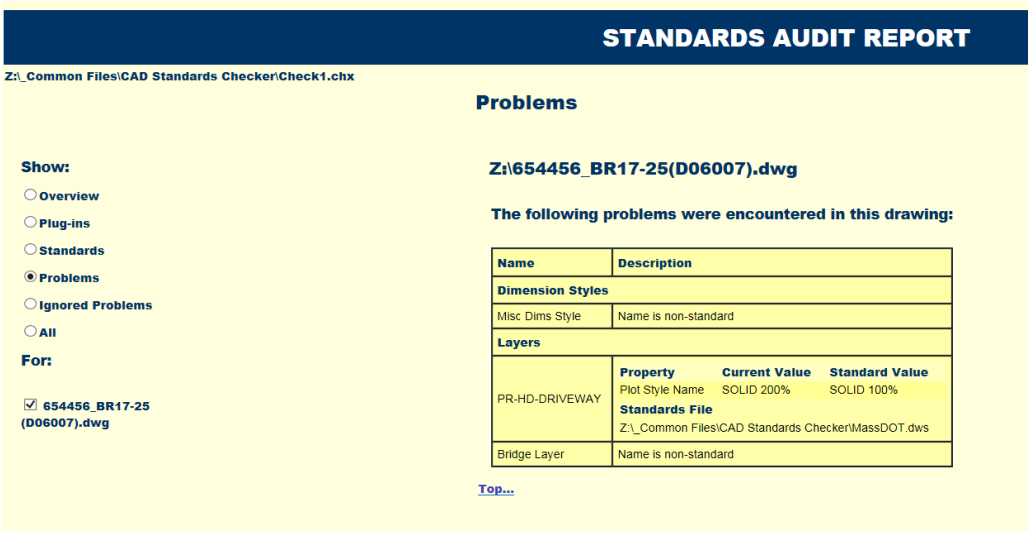
- The MassDOT part lists, pipe rule sets, and structure rule sets are based upon the latest edition of the MassDOT Standard Specifications and Construction Details.

CAD Standard Review Process

A CAD Standards Review ***must*** be performed for all project submissions. The following shall be included.

Standards Audit Report

The Autodesk Batch Standards Checker application shall be used to audit all project drawings for compliance with the MassDOT CAD Standard. A **Standards Audit Report**, as shown below, will be generated and provides a list of deviations from the MassDOT CAD Standard. The Standards Audit Report shall be included with every project submission.



STANDARDS AUDIT REPORT

Z:_Common Files\CAD Standards Checker\Check1.chx

Problems

Show:

- ○ Overview
- ○ Plug-ins
- ○ Standards
- ◉ Problems
- ○ Ignored Problems
- ○ All

For:

☑ 654456_BR17-25 (D06007).dwg

Z:\654456_BR17-25(D06007).dwg

The following problems were encountered in this drawing:

Name	Description
Dimension Styles	
Misc Dims Style	Name is non-standard
Layers	
PR-HD-DRIVEWAY	**Property** **Current Value** **Standard Value** Plot Style Name SOLID 200% SOLID 100% **Standards File** Z:_Common Files\CAD Standards Checker\MassDOT.dws
Bridge Layer	Name is non-standard

Top...

All project drawings shall be checked for conformity with this standard using the drawing standards file (MassDOT_*version_release*.dws), provided in the CAD Standard download.

Audit Notes Document

A supporting **Audit Notes document** will also be required to validate, in detail, all instances of non-conformity with the MassDOT CAD Standards, or to confirm adherence to these standards.

CAD Standard Review Workflow

The following procedures are required to be followed to create the Standards Audit Report and the Audit Notes associated with it.

1. Launch the version-applicable Autodesk Batch Standards Checker application.
2. Add all project drawings to be audited.
3. Choose the version of the drawing standards file (.dws file), which corresponds to the version of the drawing template used to create the drawing.
4. Execute Start Check command.
5. Once the check has completed, a Standards Audit Report is displayed.
6. Select "SHOW > PROBLEMS" on the left side of the report.
7. Export this Report to HTM using the following file naming convention:
    - **For all projects excluding Bridge Projects:**
      File names shall begin with the project file number (available through the MassDOT Project Manager), followed by the appropriate submittal designation enclosed in brackets, i.e. [25Stage], [PSE], etc., and followed by (AUDITREPORT). Example: 123456[75Stage](AUDITREPORT).htm
    - **For Bridge Projects:**
      File names shall begin with the project file number (available through the MassDOT Project Manager), followed by the appropriate Sketch Plans or Construction Drawings Submittal designation enclosed in brackets, i.e. [SP1], [S2], [SF], etc., and followed by (AUDITREPORT). Example: 123456[SP1](AUDITREPORT).htm
8. An Audit Notes document, in PDF format, shall be prepared using the *MassDOT CAD Standard Audit Notes.doc*, provided in the CAD Standard download. The Audit Notes document shall list all instances of non-conformity with the MassDOT CAD Standards (if any), and shall provide an explanation for each item listed as a "problem" in the Standards Audit Report.
    - **For all projects excluding Bridge Projects:**
      File names shall begin with the project file number followed by the appropriate submittal designation enclosed in brackets, i.e. [25Stage], [PSE], etc., and followed by (AUDITNOTES). Example: 123456[75Stage](AUDITNOTES).pdf
    - **For Bridge Projects:**
      File names shall begin with the project file number followed by the appropriate Sketch Plans or Construction Drawings Submittal designation enclosed in brackets, i.e. [SP1], [S2], [SF], etc., and followed by (AUDITNOTES). Example: 123456[SP1](AUDITNOTES).pdf
9. Place the Standards Audit Report and the associated Audit Notes within the CAD Standards Check folder in the project CAD folder (See section on Digital Submission Requirements).

Bridge

File Naming

Sketch Plans

The file name of every drawing in a set of Bridge Sketch Plans shall begin with the respective project file/MIPA number (available through the MassDOT Project Manager), followed by an underscore and the bridge discipline code "BR", followed by the respective sheet number or respective sheet range in the referenced Sketch Plans set (1, 2, 3, 1-10, 11-15, etc.), and followed by the Bridge Number in parenthesis.

For example, for a drawing file, which contains sheets 3, 4, 5, & 6 of a set of Sketch Plans with the following data:

Bridge Project File Number:	605291
Sheet Nos. 3, 4, 5, & 6:	3-6
Bridge Number:	D-06-007

the proper filename would be: **605291_BR3-6(D06007)**

Construction Drawings

The file name of every drawing in a set of Bridge Construction Drawings shall begin with the respective project file/MIPA number (available through the MassDOT Project Manager), followed by an underscore and the bridge discipline code "BR", followed by the respective sheet number or respective sheet range in the referenced Construction Drawings set (1, 2, 3, 1-10, 11-15, etc.), and followed by the Bridge Number in parenthesis.

For example, for a drawing file, which contains sheets 17 through 25 of a set of Construction Drawings with the following data:

Bridge Project File Number:	605291
Sheet Nos. 17-25:	17-25
Bridge Number:	D-06-007

the proper filename would be: **605291_BR17-25(D06007)**

Submission Text Block

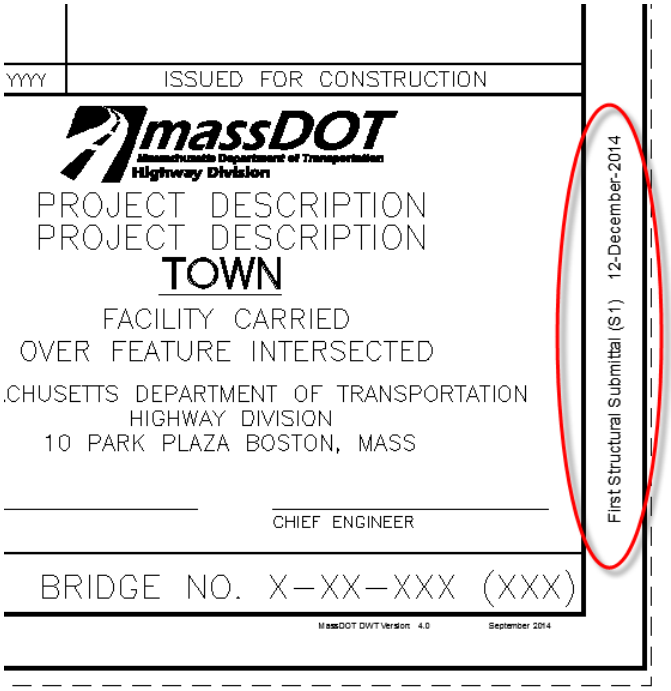
In order to track the date and level of submission of the respective bridge project's Sketch Plans and Structural Submittals, a text block showing the level of submission, the submittal designation, and the actual date of submission to MassDOT has been provided in the lower right corner of each bridge layout sheet (see below).

All drawings in the submitted set ***must*** contain the referenced text block with the above required information. The following list identifies Sketch Plan and Structural Submittal submission levels and their respective submittal designations to be used in the text block on each submitted drawing:

- First Sketch Plans submittal set SP1
- Second Sketch Plans submittal set SP2
- Nth Sketch Plans submittal set SP#
- Final Sketch Plans submittal set SPF

- First Structural submittal set S1
- Second Structural submittal set S2
- Nth Structural submittal set S#
- Final Structural submittal set SF

For example, the figure below demonstrates the modified text block, assuming First Structural submittal and DECEMBER 12, 2014 as the actual submittal date.



Bridge Plan Requirements

All Bridge Construction Drawings shall conform to the MassDOT LRFD Bridge Manual and Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Bridge Construction Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

Bridge Sheet Template Layouts

The BRIDGE_SHEETS.dwg is a sheet template that contains the paper space layouts defining the standard sheet configuration and formatting for drafting and annotating the model view(s) on each cut sheet for Bridge Project Plan submittals. The Bridge layouts have been consolidated from previous versions due to the functionality of the newly created dynamic blocks. These blocks allow the designer to select the appropriate configuration for the Bridge Project Sketch Plans and Construction drawings. See the matrix below for selecting the correct sheet layout to use.

No other borders will be accepted.
The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the BRIDGE_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Bridge Construction Plan Sheet Layout Templates

Old Layout	New Layout	Description	Comments
C01-1L-MBr-MBin C01-1L-MBr-SBin C01-1L-SBr-MBin C01-2L-MBr-MBin C01-2L-MBr-SBin C01-2L-SBr-MBin C01-2L-SBr-SBin	C01_CONSULTANT	First Sheet of Construction Drawings containing the standard first sheet title block to be used by consultants only.	Use functionality of dynamic title block to configure all required Title Block data. Sheet text such as the number of bridges and BINs can be added by double-clicking the attribute or creating a sheet set from the MassDOT Bridge Sheet Set Manager template.
	C01_IN-HOUSE	First Sheet of Construction Drawings containing the standard first sheet title block to be used by MassDOT In-House only.	
C02-MBr-MBin C02-MBr-SBin C02-SBr-MBin C02-SBr-SBin	C02-1	Second Sheet of Construction Drawings including Traffic, Seismic, Hydraulic, and Temporary Water Control Data Blocks and the standard subsequent sheet title block.	Use functionality of dynamic title block to configure all required title Block data. Sheet text such as the number of bridges and BINs can be added by double-clicking the attribute or creating a sheet set from the MassDOT Bridge Sheet Set Manager template. These sheets now contain required standard design data blocks.
	C02-2	Second Sheet of Construction Drawings including Traffic, Seismic, and Hydraulic Data Blocks and the standard subsequent sheet title block.	
	C02-3	Second Sheet of Construction Drawings including Traffic and Seismic Data Blocks and the standard subsequent sheet title block.	
	C03	Subsequent Sheet Construction Drawing Sheets including the standard subsequent sheet title block.	Use functionality of dynamic title block to configure all required Title Block data. Sheet text such as the number of bridges and BINs can be added by double-clicking the attribute or creating a sheet set from the MassDOT Bridge Sheet Set Manager template.

Bridge Sketch Plan Sheet Layout Templates

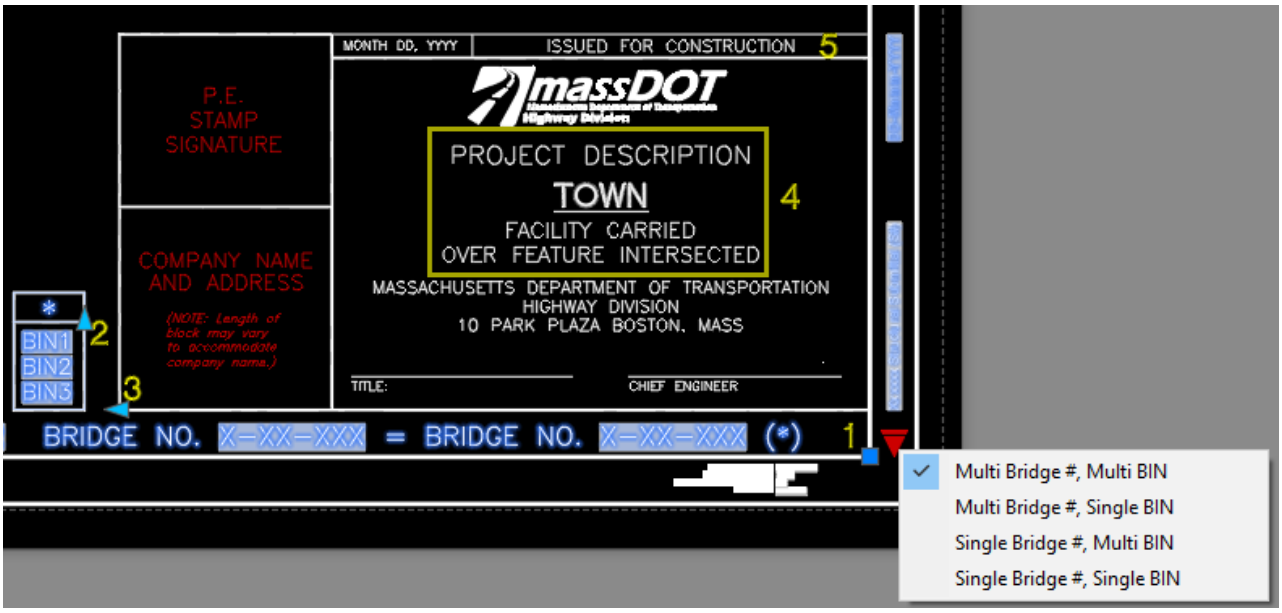
Old Layout	New Layout	Description	Comments
SK1-MBr-MBin SK1-MBr-SBin SK1-SBr-MBin SK1-SBr-SBin	SK1-1_CONSULTANT	First Sheet of Sketch Plans containing Traffic, Seismic, Hydraulic, and Project Information Data Blocks and the standard first sheet title block to be used by consultants only.	Use functionality of dynamic title block to configure all required Title Block data. Sheet text such as the number of bridges and BINs can be added by double-clicking the attribute or creating a sheet set from the MassDOT Bridge Sheet Set Manager template. These sheets now contain required standard design data blocks.
	SK1-2_CONSULTANT	First Sheet of Sketch Plans containing Traffic, Seismic, and Project Information Data Blocks and the standard first sheet title block to be used by consultants only.	
	SK1-1_IN-HOUSE	First Sheet of Sketch Plans containing Traffic, Seismic, Hydraulic, and Project Information Data Blocks and the standard first sheet title block to be used by MassDOT In-House only.	
	SK1-2_IN-HOUSE	First Sheet of Sketch Plans containing Traffic, Seismic, and Project Information Data Blocks and the standard first sheet title block to be used by MassDOT In-House only.	
SK2-MBr-MBin SK2-MBr-MBin SK2-SBr-MBin SK2-SBr-Sbin	SK2	Subsequent Sheet of Sketch Plans containing the standard subsequent sheet title block.	Use functionality of dynamic title block to configure all required Title Block data. Sheet text such as the number of bridges and BINs can be added by double-clicking the attribute or creating a sheet set from the MassDOT Bridge Sheet Set Manager template.

Bridge Sheet Dynamic Blocks

The Construction Drawing and Sketch Plan layout sheets contain dynamic blocks to configure all required Title Block data, the number of bridges and BINs for the project, as well as the configuration and placement of required design data blocks.

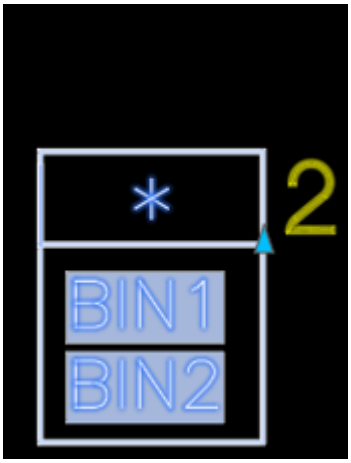
1. Bridge Number and BIN Block

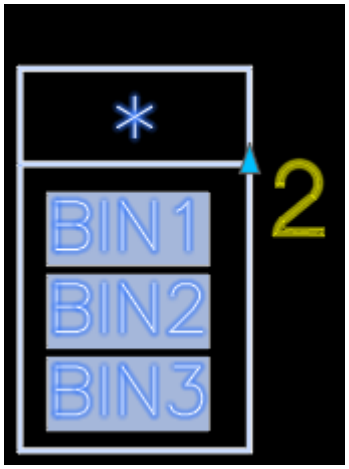
Select the block then click on the blue down arrow to select the appropriate configuration. When a Single BIN selection is made, the Multi BIN block to the left of the Title block will become invisible. Select the Bridge and BIN Numbers and double-click to edit the attribute text manually. Alternatively, this text may be automatically populated with the use of the Sheet Set Manager functionality described at the end of this document.



2. Multi BIN Block

Select the BIN block then click on the vertical drag arrow to change the size of the block to accommodate either two or three BIN numbers. Select the BIN Numbers text and double-click to edit the attribute text manually. Alternatively, this text may be automatically populated with the use of the Sheet Set Manager functionality described at the end of this document.

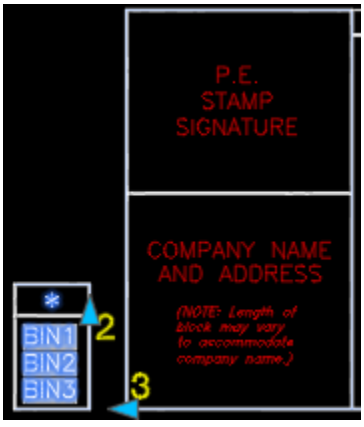


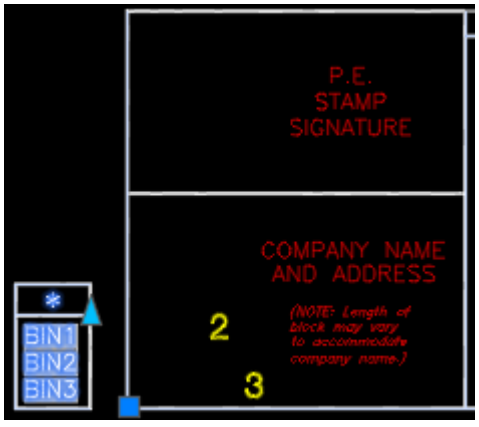


In cases where there is no title block the BIN block may be dragged horizontally to adjust, if necessary. Select just the BIN block and click on the horizontal drag arrow to move left or right to adjust location.

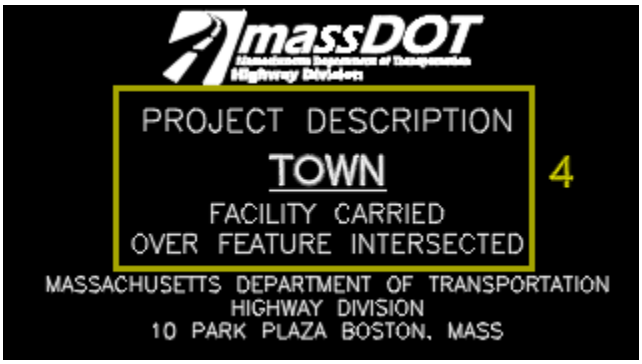
3. PE Stamp and Company Name Block

Select the Company Name block and click and drag the blue drag arrow to adjust the width of the block as needed to accommodate the company name. Select both the Company Name and BIN blocks, then click on the blue drag arrow to drag both blocks simultaneously. As long as both of these are selected, they will remain fixed to one another and move accordingly.





4. Project Information Block



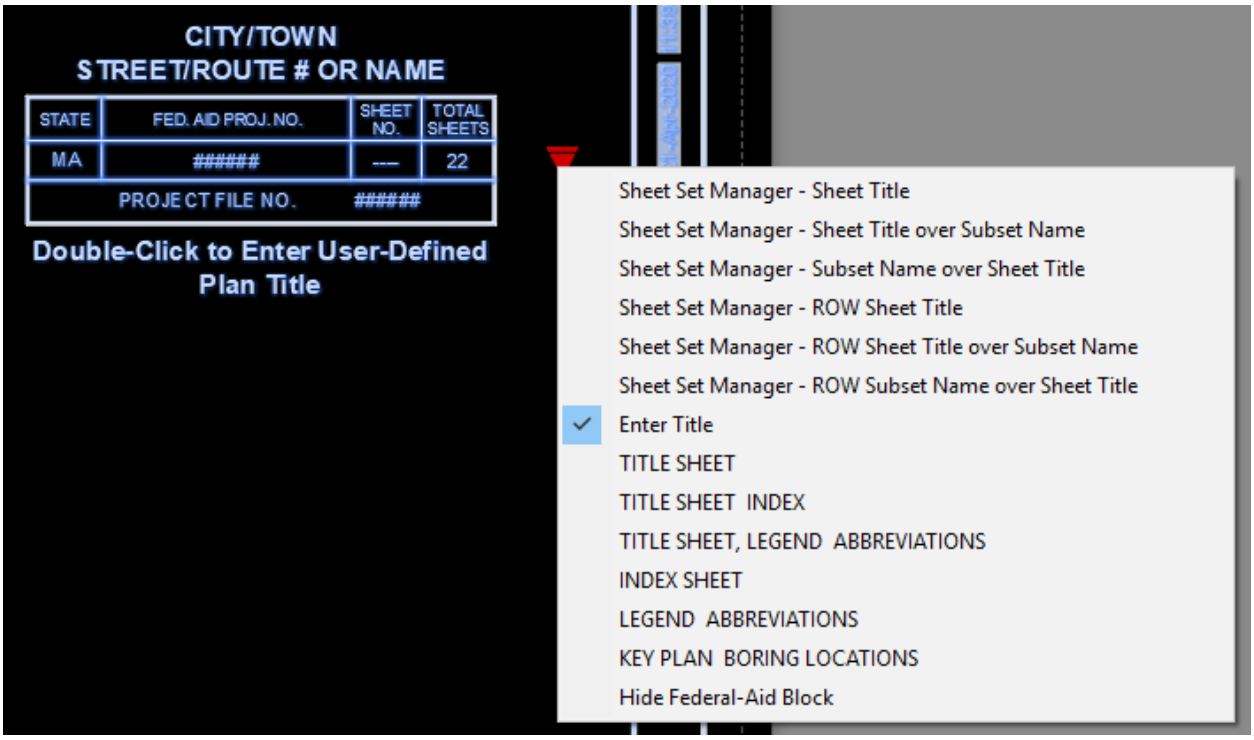
Select the Project Information text and double-click to edit the attribute text manually. Alternatively, this text may be automatically populated with the use of the Sheet Set Manager functionality described at the end of this document.

5. Revision Table Block

Select the Revision Table block, right click and choose Add Row Above to insert a row to the table. Then add appropriate text to table.

6. Federal Aid Block

Users may select a pre-defined sheet name by selecting the Federal Aid block, then clicking on the blue down arrow and choosing a sheet name from the list.



When the desired sheet name is not listed, simply double-click the sheet title attribute and enter the text manually.

Bridge Sheet Set Template

MassDOT provides content for creating Bridge sheets according to MassDOT CAD Standard conformance using the Sheet Set Manager (SSM) functionality found in all Autodesk AutoCAD-based applications such as Autodesk Civil 3D. Sheet Set Manager is a sheet set creation, management, and publishing tool that allows sheet data such as project & sheet numbers, project title, and project information to be stored in a central database, the sheet set. MassDOT has created the content necessary to enable SSM functionality for MassDOT Bridge projects. The use of Sheet Set Manager for Bridge projects is enabled but optional. If users prefer to utilize manual sheet creation methods, simply double-click on sheet block attributes and enter text manually.

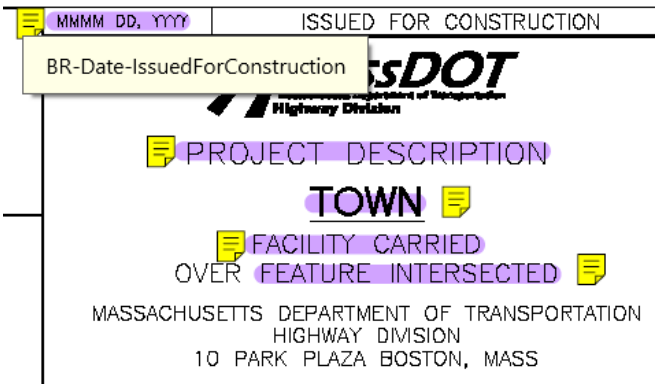
The **MassDOT-SSM Template-BR.dst** Sheet Set Template contains the following custom property names and default values. When a project sheet set is created using the MassDOT-SSM Template-BR.dst template and the sheet set properties are populated, all sheets contained in that sheet set will be automatically updated with the applicable values. The MassDOT-SSM Template-BR.dst can be found in the Sheets folder.

Sheet Set Property*	Initial Value	Description
BR-SheetNUM	X	Bridge sheet number
BR-Approved_By	Approved By	In-House Use Only
BR-Checked_By_1	1st Checker	In-House Use Only
BR-Checked_By_2	2nd Checker	In-House Use Only
BR-Date-IssuedForConstruction	MMMM DD, YYYY	Issued For Construction Date for Bridge projects
BR-Designer_1	1st Designer	In-House Use Only
BR-Designer_2	2nd Designer	In-House Use Only
BR-Drawn_By_1	1st Drafter	In-House Use Only
BR-Drawn_By_2	2nd Drafter	In-House Use Only
BR-Facility_Carried	FACILITY CARRIED	Name of facility carried for Bridge projects
BR-Facility_Intersected	FEATURE INTERSECTED	Name of facility intersected for Bridge projects
Bridge_1-BIN	BIN1	Bridge Identification Number 1
Bridge_1-BR#	X-XX-XXX	Bridge 1 Bridge Number
Bridge_2-BIN	BIN2	Bridge Identification Number 2
Bridge_2-BR#	X-XX-XXX	Bridge 2 Bridge Number
Bridge_3-BIN	%%	Bridge Identification Number 3
BR-Proj_Desc	PROJECT DESCRIPTION	Bridge Project Description
BR-Proj-Submission-Date	DD-Month-YYYY	Bridge Project submission date
BR-Proj-Submission-Name	Xxxxxx Structural Submittal (S#)	Bridge Project submission name
BR-Spec_By	1st Specs	In-House Use Only
BR-TotalSheets	X	Total Bridge Sheets
CITY/TOWN*	CITY/TOWN	Enter CITY if the project is in a CITY municipality or leave the default TOWN
Consultant_Address_1	ADDRESS	Consultant address line 1
Consultant_Address_2	ADDRESS	Consultant address line 2
Consultant_Address_Municipality*	CONSULTANT TOWN	Consultant address municipality
Consultant_Address_State*	MA	Consultant address, state
Consultant_Address_ZIP*	#####-####	Consultant address, zip code
Consultant_Name	COMPANY NAME	Consultant name
Proj-#-FedAid	-	Federal-Aid project number
Proj-#-MassDOT	XXXXXX	MassDOT project file number
Proj-County	COUNTY	Project county

Sheet Set Property*	Initial Value	Description
Proj-Field_Book_#	XXXXXX	Project survey field book number
Proj-Field_Chief*	FML	Project survey field chief
Proj-Length_Feet*	12345.67	Project length in feet
Proj-MassDOT_Dist*	IV	MassDOT district
Proj-Municipality	TOWN	Project municipality
Proj-PARS_#*	####	Project PARS number
Proj-Street_Name/Route#	STREET/ROUTE # OR NAME	Project name (typically the name of the route #, street, or road)
Proj-Submission-Date*	MM/DD/YYYY	Project milestone date
Proj-Submission-Name*	##% SUBMISSION	Project milestone name
Total Sheets	1	Total number of sheets

*Some common Sheet Set Properties may reside in the Bridge sheet set template but are not used for bridge projects.

Please refer to BRIDGE_SHEETS_SSM_Fields.pdf for information on where the properties listed above are used in the BRIDGE_SHEETS.dwg sheet layouts. All property fields are highlighted with a sticky note attached showing the property field name. Please hover over or double click the note to see the property name. See example below. The BRIDGE_SHEETS_SSM_Fields.pdf can be found in the Manuals folder.



Bridge Symbols and Blocks

A Bridge Section symbol and block library is available within the "BRIDGE_SYMBOLS.dwg".

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

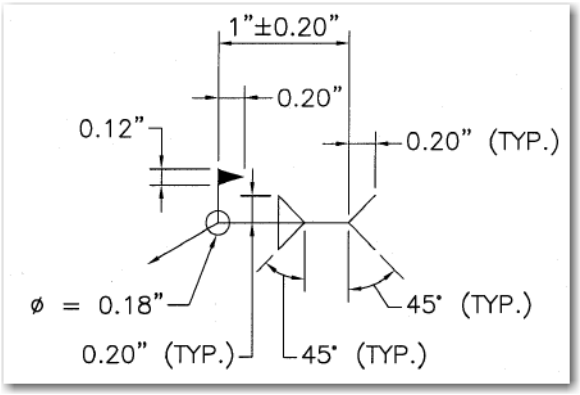
Section Symbols and Section Tails

These symbols (found in the BRIDGE_SYMBOLS.dwg) are used together to indicate the plane along which a section view is being taken. The section symbol is comprised of a split circle superimposed on an arrow. This arrow, along with the tail arrow, indicates the direction of the section view. The line which divides the split circle into two text blocks is always drawn horizontal. The top text block gives the section number; the bottom text block gives the sheet number on which the section view is shown. Sections shall be numbered in consecutive order from the start to the end of the bridge construction drawings. The first section that appears on the bridge construction drawings shall be Section 1 and there shall be no repetition of any section number.

Welding Symbols

Weld and welding symbols (found in the BRIDGE_SYMBOLS.dwg) shall be consistent with AWS 2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examination. The symbol provided within the BRIDGE_SYMBOLS.dwg CAD file shall be modified as required to convey all information necessary to construct the welded joint as designed.

Standard Welding Symbol



Dynamic Title Text Blocks and Section Number/Detail Letter Designation Blocks

Individual Detail Title Text Blocks, Subtitle Text Block, and Entire Drawing Sheet Title Text Blocks
Individual Detail Title Text Blocks (BR-TITLE-SINGLE-BR6 and BR-TITLE-DOUBLE-BR6), Subtitle Text Block (BR-SUBTEXT) and Entire Drawing Sheet Title Text Blocks (BR-TITLE-SINGLE-BR8 and BR-TITLE-DOUBLE- BR8) are found in BRIDGE_SYMBOLS.dwg and are dynamic blocks that contain attributes for the detail title, subtitle, or the entire drawing sheet title, as well as the scale of the details or the entire drawing sheet.

The text above the line shall indicate the Individual Detail Title, Subtitle, or the Entire Drawing Sheet Title. The scale of the details or the entire drawing shall be provided below the line.

Note: The only difference between a “single” block and a “double” block is the length of the actual title
– in the case of a lengthy title the user should use a “double” block, which prompts for two lines of text.

Section Number Designation Blocks and Detail Letter Designation Blocks
Section Number Designation Block (BR-SEC-NUM) and Detail Letter Designation Block (BR-DET-LET) are found in the BRIDGE_SYMBOLS.dwg and are dynamic blocks that contain attributes for the section number or a detail letter, the sheet number where the section/detail is taken from, and the scale of the section/detail.

Sometimes, these blocks will need to be used as subtitles. In such cases, Section Number Designation Block (BR-SEC-NUM-SUBT) and Detail Letter Designation Block (BR-DET-LET-SUBT) shall be used.

The above blocks are comprised of a split circle connected to a line. The text above the line indicates the words SECTION or DETAIL. The scale of the section or a detail shall be provided below the line. The top text block of the split circle shall specify the section number (1, 2, 3, etc.) or a detail letter (A, B, C, etc.). The bottom text block of the split circle indicates the sheet number where the section or a detail is taken from.

Using Dynamic Title Text Blocks and Section Number/Detail Letter Designation Blocks
After inserting the above dynamic block:

1. The user shall double click on any text attribute within the block and type the necessary text in the Enhanced Attribute Editor.
2. Subsequently, the user shall click on the grip below the Choose Scale prompt to select the actual scale of the detail or the entire drawing from the prompted list, which corresponds to the Bridge Annotation Scale List contained in the MassDOT CAD template. There are additional prompts for Not To Scale or no text options.
3. Finally, the user shall select the block again and move the directional grip at the end of the horizontal line to size the line appropriately. The text will dynamically move to stay centered on the line.

Bridge Graphical Standards

Bridge Standard Detail Drawings
Bridge Standard Detail Drawings shall be inserted as unexploded blocks into model space at a scale of 1. Where editing the block is necessary, use the AutoCAD Block Editor to edit the block in place.

When displaying the detail within paper space, create a viewport to the scale noted within the detail. This will size the detail appropriately for plotting purposes.

Concrete Excavation Surface Cut Line
The PR-BR-CONSTJT layer shall be used as follows:

- To represent the concrete cut line (on elevation views) or the concrete cut surface (in section views) on existing concrete construction when defining limits of concrete excavation.
- On details with existing and proposed construction, to represent the interface between old and new concrete, and ONLY if this interface was created through the excavation of the existing concrete construction.
- To represent the raked finish given to a concrete surface against which a second pour of concrete will be placed, such as the top of a bridge deck under the sidewalk slab.

The PR-BR-COMP layer shall be used as follows:

- If proposed concrete is cast onto an existing un-excavated concrete surface.

Centerlines
The PR-BR-CENTER layer shall be used to indicate the following:

- The centerlines of beams, both for dimensioning purposes and for indicating the location of beams on the plan view of an abutment or pier.
- The centerlines of bearings, on abutment or pier plan views, on bridge seat cross sections, on framing Construction Drawings, and elsewhere.
- The centerlines of bolts, holes, and any other object for the purpose of dimensioning.

The baseline of construction shall be formatted on all bridge plans according to the graphical standards specified in the following table and placed on the PR-BR-CONST-CENTER layer.

DESCRIPTION	SYMBOL	HEIGHT	DIA.	TO BE USED WITH	APPEARANCE
WHOLE STATION					
PROPOSED PLAN	○		0.125"	℄ OF CONSTRUCTION	
KEY PLAN	○		0.094"	℄ OF CONSTRUCTION	
TICK MARK					
PROPOSED PLAN	I	0.125"		℄ OF CONSTRUCTION	
KEY PLAN	I	0.094"		℄ OF CONSTRUCTION	

MassDOT has provided Civil 3D alignment object and label styles to correctly format the baseline of construction based on the above table. All alignment objects for bridge baseline of construction shall be assigned the MassDOT_Bridge Construction Centerline alignment style. For Bridge alignments shown on Bridge Key Plans, the MassDOT_Bridge Key Plan alignment label set shall be used. For alignments shown on all Bridge plans other than Bridge Key Plans, the MassDOT_Bridge alignment label set shall be used.

Witness/Hatch Lines

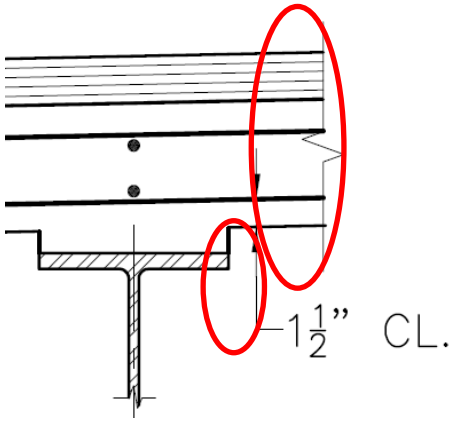
The PR-BR-HATCH layer shall be used for drawing witness lines when dimensioning, and for hatching and cross hatching.

Dimension Lines

The PR-BR-DIMS layer shall be used for all dimensions. The dimension style, DOT-BR-FT, shall be used for dimensions 24” and greater. The dimension style, DOT-BR-IN, shall be used for dimensions of less than 24”.

Manually Created Dimension Extension Lines

The PR-BR-DIMS-EXT layer shall be used in situations where a dimension line needs to be manually extended or where a line needs to be drawn with a line weight matching that of the typical dimension line, i.e. break lines, etc.

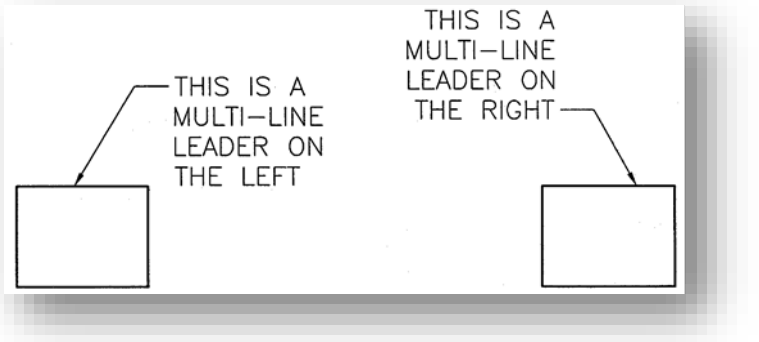


Off Detail Dimension Lines

The PR-BR-DIMS layer shall be used with a double ARROW symbol (found in the BRIDGE_SYMBOLS.dwg) at one end to indicate that a particular dimension or spacing of objects continues beyond the edge of the given detail in the direction of the double arrows.

Text with Leaders

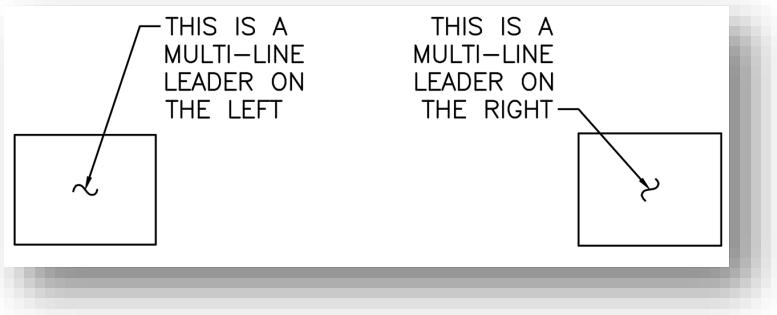
The PR-BR-DIMS layer shall be used for all text with leaders. The multi-leader styles DOT-BR_arrow, DOT-BR_arrow_tilde, and DOT-BR-One Line FR, found within the MassDOT drawing template, shall be used.



`

DOT-BR-One Line FR shall be used with fractions. The fraction shall stack horizontally and the leader line tail shall be aligned with the fraction line.

The multi-leader style DOT-BR_arrow_tilde, found within the MassDOT drawing template, shall be used to point inside any structural element, as shown below.



Proposed Rebar Sections

These symbols represent the end view of a proposed rebar in section views and also represent bent bars, such as L or U bars, where the bent leg is not in the plane of the drawing. The filled circle of the given diameter is used to represent all rebars in the specified scale regardless of the actual diameter.

Existing Rebar Sections

These symbols represent the end view of an existing rebar in section views where existing and proposed rebars are shown together and also represent bent bars, such as L or U bars where the bent leg is not in the plane of the drawing. The open circle of the given diameter is used to represent all existing rebars in the specified scale regardless of the actual diameter.

Text Styles and Usage

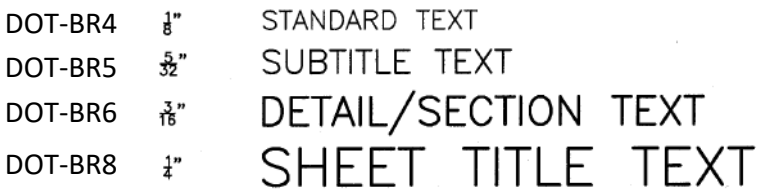
The text style to be used on all Bridge Construction Drawings and Bridge Sketch Plans shall be as shown below,

DOT-BR4 (placed on EX-BR-TEXT or PR-BR-TEXT layers)
To be used for all lettering on the Construction Drawings and Sketch Plans. This includes annotating details, notes, dimensions, etc.

DOT-BR5 (placed on PR-BR-TEXT-S layer)
Subtitles on individual detail drawings.

DOT-BR6 (placed on PR-BR-TEXT-D layer)
Individual detail drawing titles, including section designations.

DOT-BR8 (predefined within BRIDGE_SHEETS.dwg)
When giving a title to an entire sheet.



Abbreviations

Abbreviations may be used on Bridge Construction Drawings and Bridge Sketch Plans. A standard list of abbreviations has been provided below. Periods, where shown, are not to be omitted so that the reader can be sure that these abbreviations are intentional rather than being misspelled words.

When using abbreviations, the following guidelines will be adhered to:

1. An abbreviation may be used when there is no doubt of its meaning and when it saves significant space on the drawings.

2. Avoid abbreviations on the plan and elevation sheet.

3. Do not abbreviate important words in titles.

4. For words whose abbreviations are not universally recognized in the construction industry the word should be spelled out and followed with the abbreviation in parenthesis the first time it appears on the Construction Drawings and/or Sketch Plans.

5. Abbreviations should not be used in the text of notes unless they are conventional abbreviations, such as H.S. Bolt for High Strength Bolt.

List of Standard Abbreviations

A
Abutment ABUT.
Alternate ALT.
And &
Annual Average Daily Traffic AADT
Approach slab APPR. SLAB
Approximate APPROX.
At @
Avenue AVE.

B
Barrels BBL.
Beam Number 1 BM. #1
Bearing, Bearings BRG., BRGS.
Bench mark B.M.
Bituminous BIT.
Bottom BOT.
Boulevard BLVD.
Bridge Number A-01-001 BR. NO. A-01-001

C
Catch basin C.B.
Cast-in-place C.I.P.
Cast iron pipe C.I. PIPE
Cement CEM.
Center To Center C. TO C.
Clearance, Clear CL.
Concrete CONC.
Construction CONST.
Culvert CULV.
Chamfer CHAMF.

D
Degrees (angular) º
Degrees (thermal) ºF
Diameter DIA. or ∅
Distance DIST.
Dowel DWL.
Drive DR.
E
Each EA.
East E.
East (for survey bearings) E
Eastbound E.B.
Elevation EL.
Equal (as in equal spaces) EQ.
Expansion EXP.
Existing EXIST.
Exterior EXT.

F
Far Face F.F.
Federal Highway Administration FHWA
Figure, Figures FIG., FIGS.
Floor Beam Number 1 F.B. #1

G
Galvanized GALV.
Gage GA.

H
Hexagonal Head HEX. HEAD
High Performance Concrete H.P.Concrete
High Performance Steel H.P.S.
High Strength H.S.
Highway HWY.
Horizontal HORIZ.
Hot Mix Asphalt HMA

I
Inside Diameter I.D.
Interior INT.

J
Joint JT.

STANDARD ABBREVIATIONS (CONT.)
K
Kips K
Kips per square inch KSI
Kips per square foot KSF

L
Latex Modified Concrete L.M.C.
Longitudinal LONGIT.
Lump sum L.S.

M
Manhole M.H.

Massachusetts Department of Transportation MassDOT
Maximum MAX.
Miles per Hour MPH
Minimum MIN.
Miscellaneous MISC.
Modified MOD.

N
Near Face N.F.
New Jersey Barrier N.J. BARRIER
North N.
North (for survey bearings) N
Northbound N.B.
Northeast(erly) N.E.
Northwest(erly) N.W.
Not to scale N.T.S.
Number NO. or #
Numbers NOS.

O
On Center O.C.
Outside Diameter O.D.
Outside To Outside O. TO O.

P
Pavement PVMT.
Perpendicular PERP.
Point of Compound Curvature P.C.C.
Point of Curvature P.C.
Point of Intersection P.I.
Point of Tangency P.T.
Point of vertical curvature P.V.C.
Point of vertical intersection P.V.I.
Point of vertical tangency P.V.T.
Polyvinyl chloride pipe P.V.C. PIPE
Pounds per square inch PSI
Proposed PROP.

R
Radius = R =
Railroad RR.
Reinforced, Reinforcing REINF.
Remove REM.
Remove and Reset R. & R.
Required REQ'D
Retaining Wall RET. WALL
Right Of Way R.O.W.
Road RD.
Roadway RDWY.
Route RTE.

S
Seconds SEC.
Section SECT.
Sheet number 1 SH. #1
Sidewalk SDWK.
South S.
South (for survey bearings) S
Southeast(erly) S.E.
Southwest(erly) S.W.
Southbound S.B.
Spaces SP.
Specification SPEC.
Speed (design speed) V
Square SQ.
Square feet SF
Square inches SI
Stainless steel S.S.

STANDARD ABBREVIATIONS (CONT.)

S (cont.)
Station STA.
Stay-In-Place Forms S.I.P. FORMS
Street ST.
Surfacing SURF.
Symmetrical SYM.

T
Tangent TAN.
Temporary TEMP.
Tons per square foot TSF
Typical TYP.

V
Variable VAR.
Vertical VERT.
Vertical Curve V.C.

W

Wearing Surface	W.S.
West	W.
West (for survey bearings)	W
Westbound	W.B.
Wingwall	W.W.
Working Point	W.P.
Wrought Iron Pipe	W.I. PIPE

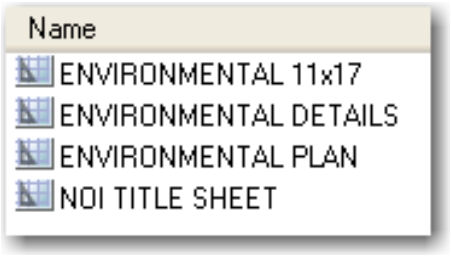
Environmental

Environmental Plan Requirements

All Environmental Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

When creating Paper Space layouts, a default set of sheets, i.e. layouts, have been created within the “ENVIRONMENTAL_SHEETS.dwg” CAD file. This contains standard borders for all Environmental plans. The following layouts are included,



No other borders will be accepted.

The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the ENVIRONMENTAL_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Highway Design

Civil 3D Objects

The following design items must be created as AutoCAD Civil 3D objects and must be assigned MassDOT Civil 3D Object Styles using the provided MassDOT Civil 3D drawing template.
POINTS
SURFACES
ALIGNMENTS
PROFILES - SECTIONS
CORRIDORS
PIPE NETWORKS

Title Sheet Revision Block

The revision block on the title sheet shall be used to track submission and re-submission revision dates during the project design phase. All information shall be cleared from the revision block on the Title Sheet mylar when the project is advertised. From this point on, the revision block shall be used to track all revisions during the project construction phase and shall become a permanent part of the Title Sheet.

Title Sheet Submittal Text

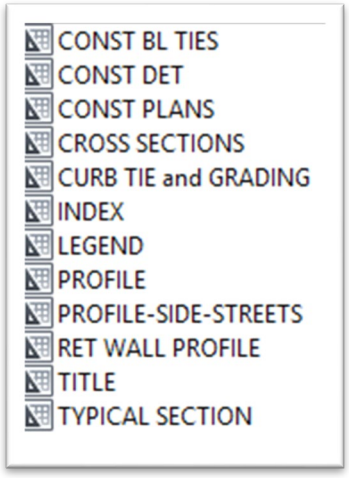
Please erase %SUBMITTAL from the final submittal. There should be no submittal stage text on the final title sheet.

Highway Design Plan Requirements

All Highway Design Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

When creating Paper Space layouts, a default set of sheets, i.e. layouts, have been created within the “HWYDESIGN_SHEETS.dwg” CAD file. This contains standard borders and title blocks for all Highway Design plans. The following layouts are included,



No other borders will be accepted.

The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the HWYDESIGN_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Please note: The MassDOT Title Sheet and Index Sheet are now located in the HWYDESIGN_SHEETS.dwg.

Highway Design Symbols and Blocks

Symbols have been developed for the proposed construction items to closely represent those provided in Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide, 2006. These symbols must be used for plans prepared for MassDOT. No substitute symbols will be accepted. Additional symbols may be added for items not listed. However, the list of additional symbols with descriptions must be included with the plan submission to MassDOT.

A Highway Design Section symbol and block library is available within the "HWYDESIGN_SYMBOLS.dwg".

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

MassDOT Wheelchair Ramp and Driveway Crossing Layout Blocks

MassDOT provides several AutoCAD Dynamic Blocks for quickly and easily laying out common wheelchair ramps and driveway sidewalk crossings found in the latest version of the MassDOT Construction Standard Details Manual. The layout blocks are drafted to MassDOT CAD Standard-specifications and are intended for use on straight sections of roadway where the edge of traveled way is a single tangent section. These blocks can be found in HWYDESIGN_WCR_DRIVEWAY.dwg.

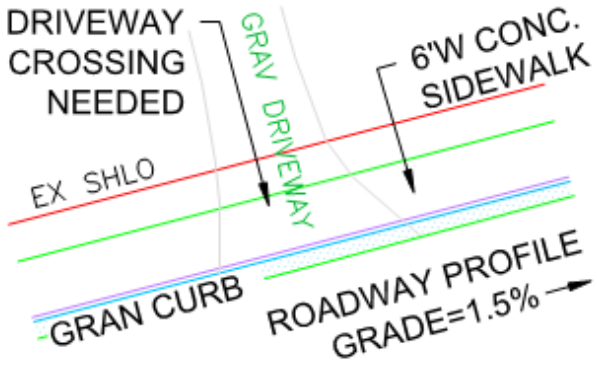
When inserted into the dwg file, the block automatically aligns to the linework of the edge of traveled way where it is placed. The linework endpoints of where the wheelchair ramp or driveway crossing connect are adjustable so that the layout block linework can be transitioned in to the rest of the roadway design. This allows users to adjust the layout block easily to suit the geometric constraints found at that location of the roadway while still maintaining ADA geometric minimum requirements.

To use the layout blocks, a user simply performs a standard block insertion using the desired layout block, inserting it by using an AutoCAD object snap at the desired location on the edge of traveled way linework. The block shall self-align to the edge of traveled way linework. The user then adjusts the dynamic block grips to suit the sidewalk/driveway geometry at that roadway location. Optionally, the block can be exploded to expose the linework for other uses such as converting to Civil 3D feature lines for setting sidewalk elevations or adjusting geometry further beyond the dynamic block constraints.

The following page shows an example of the typical layout block workflow.

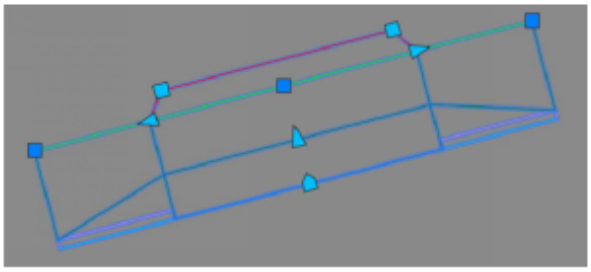
ROADWAY LAYOUT BLOCK USAGE EXAMPLE

DESIGN SCENARIO: FULL-DEPTH ROADWAY WIDENING AND 6' WIDE SIDEWALK CONSTRUCTION AT GRAVEL DRIVEWAY. ADD STANDARD MASSDOT DRIVEWAY CROSSING AND TIE NEW DRVEWAY CROSSING INTO EXISTING GRAVEL DRIVEWAY AT STATE HIGHWAY LAYOUT LINE.

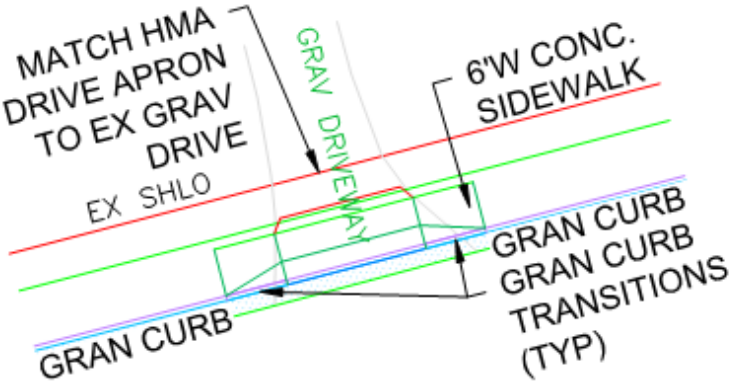


DESIGN PRIOR TO DRIVEWAY CROSSING LAYOUT DESIGN

INSERT BLOCK:
MassDOT_Driveway Transition

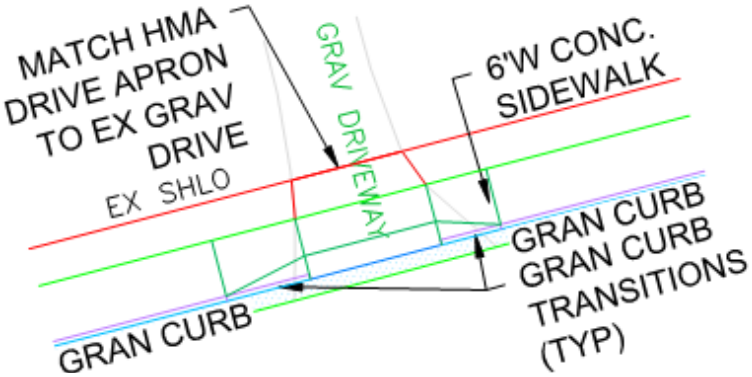


DRIVEWAY LAYOUT BLOCK DYNAMIC GRIPS



AS-INSERTED:
BLOCK APPEARANCE FOLLOWING DRIVEWAY CROSSING BLOCK INSERTION, PRIOR TO ADJUSTING DYNAMIC GRIPS

ADJUST GRIPS:
BLOCK APPEARANCE FOLLOWING ADJUSTMENT OF DYNAMIC GRIPS TO ACHIEVE INTENDED FINAL DESIGN LAYOUT



Landscape Design

Landscape Design Plan Requirements

All Landscape Design Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

The use of Paper Space is now a requirement. Please refer to the *"Policy on Model Space vs. Paper Space"* located earlier within this document.

When creating Paper Space layouts, a default set of sheets, i.e. layouts, have been created within the "LANDSCAPE_SHEETS.dwg" CAD file. This contains standard borders and title blocks for all Landscape Design plans. The following layouts are included,

No other borders will be accepted.

The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the LANDSCAPE_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Landscape Design Symbols and Blocks

Symbols have been developed for the proposed construction items to closely represent those provided in Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide, 2006. These symbols must be used for plans prepared for MassDOT. No substitute symbols will be accepted. Additional symbols may be added for items not listed. However, the list of additional symbols with descriptions must be included with the plan submission to MassDOT.

A Landscape Section symbol and block library is available within the "LANDSCAPE_SYMBOLS.dwg".

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

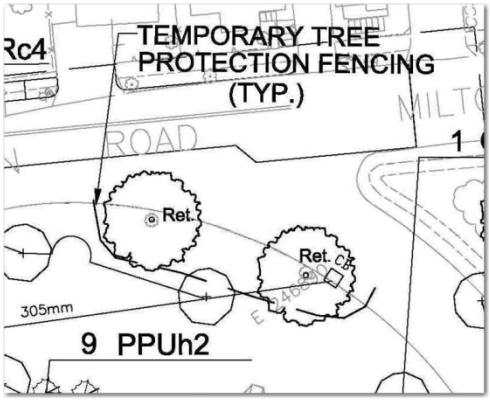
Landscape Planting Plans

Existing Vegetation
Ensure that existing trees and other vegetation within the project limits are shown on the plans, including size and type.

Invasive Plants
If applicable, identify and delineate invasive plant species within and bordering the project limits. Include approximate area of plants.

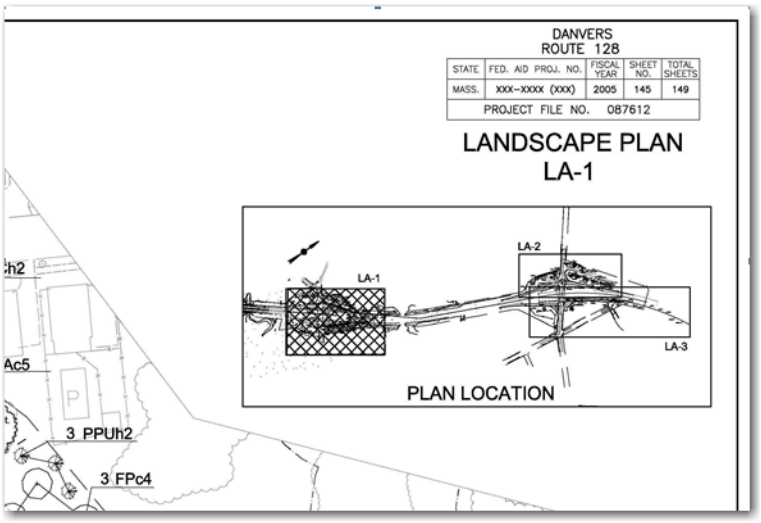
Survey Layers
Show all layers such as utilities, signs, signals and lighting to avoid plant placement conflicts.

Tree Protection
Show tree protection measures on the Construction and Landscape Plans. Include tree protection for existing trees within or adjacent to construction staging areas.



Key Plan

Landscape key plans are useful on interchange, large corridor and shared-use path projects. Show a smaller key plan on each sheet with the corresponding sheet highlighted for reference (Optional).



North Arrow

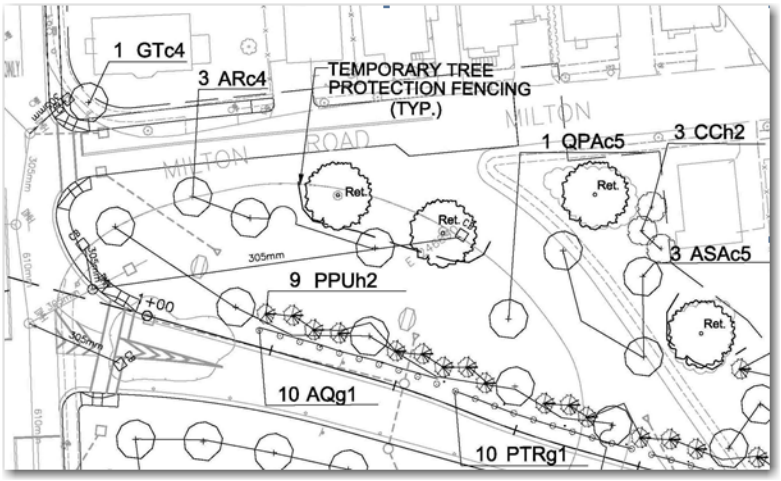
Show a north arrow on all landscape plans except detail sheets.

Bar Scale

Show a bar scale on all landscape plans. Detail sheets may include bar scales as needed.

Plant Symbols

Show plant symbol graphics to accurately show proper plant spacing of plant material based on the species type and specified size. Link groups of the same plant species together with a continuous leader line and label with a quantity and an alphanumeric symbol that corresponds to the plant list. (See *Plant List* below).



Plant List

Provide a plant list on each sheet that corresponds to plants for that sheet. Include a summary plant list with the landscape details.

Plant lists will include the following:

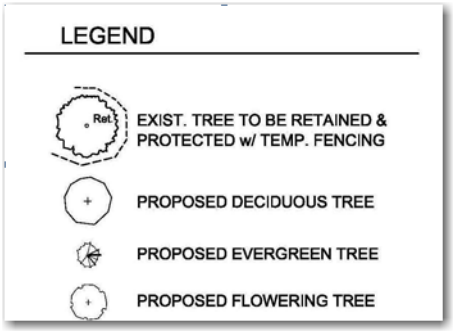
- Quantity for each species
- Symbol (alphanumeric)
- Description (per *MassDOT*-Nomenclature & List of Standard Items)
- Botanical Name
- Specified Size
- Comments/Notes
- Quantity per area (where applicable)

PLANT LIST–SHEET

SYM	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
TREES					
AMCh3	3	Amelanchier canadensis	Shad Tree	1–1.5" caliper	
MCRBh2	5	Malus 'Red Baron'	Crabapple–Columnar 'Red Baron'	6–8 FT	
TONh2	14	Thuja occidentalis 'Nigra'	Arborvitae–Eastern 'Nigra'	6–8 FT	

Legend

Provide a legend on each sheet for symbols, hatch patterns and other relevant information.

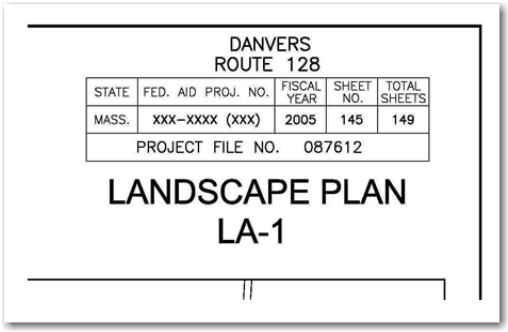


Notes

Add or remove notes from the standard note block as necessary. Notes should avoid repeating information contained in specifications to avoid conflicts.

Supplemental Sheet Numbers (Optional)

Limit supplemental sheet references to the landscape set (LA 1, LA 2, etc.).



Wetland Replication Plans

Show the following (where applicable):
Existing Conditions

- Legend
- Existing Wetland Delineation limits
- Impacted Area limits
- Impacted Area size
- 100 Ft Buffer Zone
- 100 Ft Floodplain
- 200 Ft Riverfront Area
- Existing Vegetation Limits (include inventory of plant species)
- Invasive Species (where applicable)
- Non-tidal Wetlands-Include elevation:

- Ordinary High Water

- Tidal Wetlands- Include elevation for each:

- Mean Low Water line (MLW)
- Mid Tide line
- Mean High Tide line (MHW)
- High Tide line (HTL) Also known as: Mean Higher High Water or Spring Tide line

- Hydrologic monitoring location: Tide gauges, piezometers, etc. (where applicable)
- Reference wetland area (where applicable)

Proposed

- Legend
- Notes
- Erosion control measures
- Existing trees to remain (include protection measures)
- Wetland mitigation limits & area (restoration, replication, enhancement)
- Grading contours- (typically 1 foot intervals) Include proposed water line for non-tidal wetlands and proposed intertidal zones for tidal wetlands, including:

- Mean Low Water line (MLW)
- Mid Tide line
- Mean High Tide line (MHW)
- High Tide Line (HTL) Also known as: Mean Higher High Water or Spring Tide line

Also, include this information in a table format on the plan.

- Plantings (See Landscape Plan requirements)
- Seeding limits and type
- Invasive Species treatment areas
- Temporary Wildlife barriers- Goose exclusion Fence, Turtle Barriers, etc. (where applicable)
- Hydrologic monitoring locations: tidal gauges, piezometers, etc. (where applicable)

Layouts

Layouts Plan Requirements

Please refer to the MassDOT Plan Preparation Guidelines for Consultants Preparing Layout/Easement Plans document for detailed information regarding Layout Plan preparation and requirements.

All Layouts Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

The use of Paper Space is now a requirement. Please refer to the *"Policy on Model Space vs. Paper Space"* located earlier within this document.

Layouts Section title blocks can be obtained from the "LAYOUT_SYMBOLS.dwg"

When creating Paper Space layouts, a default set of sheets, i.e. layouts, have been created within the "LAYOUT_SHEETS.dwg" CAD file. This contains standard borders for all Layouts Section related plans. The following layouts are included,

No other borders will be accepted.

The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the LAYOUTS_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Text Style specific to Layout Plans

All Layout geometry, stationing, notes, and property owner information text used on Layout Plans shall use the DOT-LO text style.

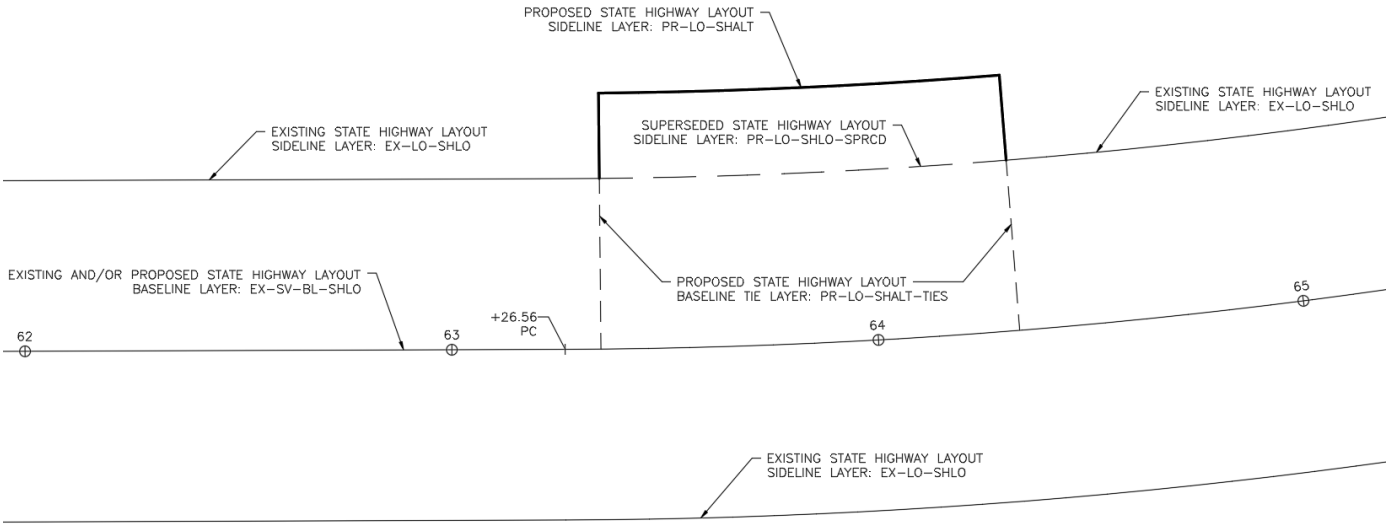
Layer Naming Requirement specific to Layout layer use

It is a requirement that all layers include at least one of their references, such as Layout Number, Recorded Book and Page, and/or Year of layout. Please use the following examples:

EX-LO-SHLO-1923-BK12-PG45
EX-LO-SHLO-1977
EX-LO-SHLO-1944-LO1234.

State Highway Layout (and Alteration) – Linestyle Graphic

- An alteration line to a State Highway Layout (SHLO) is a BOLD continuous line/curve with bearing and distance or radius and length indicated on the outside of the line/curve. Use layer PR-LO-SHALT.
- The superseded State Highway Layout line is a thin dashed line. Use layer PR-LO-SHLO-SPRCD.
- The existing State Highway Layout line is a thin continuous line. Use layer EX-LO-SHLO.
- The existing State Highway Layout Baseline is a thin continuous line. Use layer EX-SV-BL-SHLO and the Civil 3D Alignment Object Style MassDOT_Layout Plan_Record_Baseline.



Layouts Symbols and Blocks

Symbols have been developed for the proposed construction items to closely represent those provided in Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide, 2006. These symbols must be used for plans prepared for MassDOT. No substitute symbols will be accepted. Additional symbols may be added for items not listed. However, the list of additional symbols with descriptions must be included with the plan submission to MassDOT.

A Layouts Section symbol and block library is available within the “LAYOUT_SYMBOLS.dwg”.

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

Right of Way

Right of Way Plan Requirements

Please refer to the MassDOT Plan Preparation Guidelines for Consultants Preparing Right-of-Way Plans document for detailed information regarding Right-of-Way Plan preparation and requirements.

Survey

Civil 3D Objects

The following design items must be created as AutoCAD Civil 3D objects and must be assigned MassDOT Civil 3D Object Styles using the provided MassDOT Civil 3D drawing template.
POINTS
SURFACES
ALIGNMENTS
PROFILES - SECTIONS
PIPE NETWORKS

Using Utility Layers

MassDOT Highway Division has three (3) categories of utilities to be shown on plans. These are Existing, Proposed, and Record.

EXISTING (Layer convention EX-UT-)
Utility objects that have been observed and/or field located shall be placed on the appropriate EX-UT- layer. Only field located utilities and their descriptions are to be placed on EX-UT- layers.

RECORD (Layer convention RD-UT-)
Utility objects that have not been observed and/or physically located shall be placed on the appropriate RD-UT- layer.

Only utility locations that are derived from Dig Safe markings, from evidence such as pavement patches, and/or from record drawings are to be placed on the RD-UT- layers.

PROPOSED (Layer convention PR-UT-)
Utility objects that are being designed for future installation shall be placed on the appropriate PR-UT- layer. The tie in structure/facility for the proposed utility shall remain on the existing or record layer as appropriate.

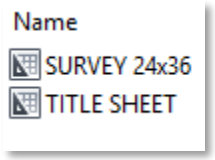
Survey Plan Requirements

All Survey Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

The use of Paper Space is now a requirement. Please refer to the *"Policy on Model Space vs. Paper Space"* located earlier within this document.

When creating Paper Space layouts, a default set of sheets, i.e. layouts, have been created within the "SURVEY_SHEETS.dwg" CAD file. This contains standard borders and title blocks for all Survey plans. The following layouts are included,



No other borders will be accepted.

The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the SURVEY_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Survey Symbols and Blocks

Symbols have been developed for the existing survey items to closely represent those provided in Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide, 2006. These symbols must be used for plans prepared for MassDOT. No substitute symbols will be accepted. Additional symbols may be added for items not listed. However, the list of additional symbols with descriptions must be included with the plan submission to MassDOT.

A Survey Section symbol and block library is available within the “SURVEY_SYMBOLS.dwg”.

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

Description Key Sets

A standard MassDOT Description Code set is included within the MassDOT drawing template.

All survey projects shall use the _MassDOT Survey description key set. An asterisk (*) has been appended to each description key code in order to allow the use of Civil 3D multi-code capability for field-to-finish line work.

The file *MassDOT Data Collector File.txt* is a text file of the MassDOT Description Key Codes that can be transferred to a data collector. The list of Description Key Codes must be used for MassDOT Baseplan preparation. All listed features must be described with the corresponding code. No substitute codes will be accepted.

A miscellaneous code (Z*) has been provided in the instance that a feature is not listed.

Figure Prefixes

A standard figure prefix database has been provided which automatically places field-to-finish line work onto the proper MassDOT layers.
A sample point file, *MassDOT TESTPNTS.txt*, and sample field book, *MassDOT Points and Figures.FBK* are available in the download package.

The *MassDOT Testpnts.txt* file contains data for point codes, each with a different MassDOT description code. You may wish to import these points into a drawing as an example of the layers, description codes, and symbols.
The *Points and Figures.fbk* file contains data for point codes and figure codes, each with a different MassDOT description code. You may wish to import this file into a drawing as an example of the layers, description codes, symbols, and figures.
The following table contains both Description Keys and Figure Prefixes. Since the field-to-finish functionality uses the same codes, codes which do not have Figure Prefixes associated with them are SHADED. Any code that is not shaded has both a Description Key and a Figure Prefix.
Parameters used in Description Key Codes are noted in **BOLD**. See the section following the code list for the explanation of the proper use of Parameters in Description Keys.
The * noted in each code simply refers to the ability to use multiple codes for a single location; it is not required in the proper coding of a point.

~?	BAD CODE
BCB*	BOTTOM BIT. CURB
BCC*	BOTTOM CONC CURB
BCE*	BOTTOM SLOPED EDGING CURB
BCG*	BOTTOM GRANITE CURB
BCO*	BOTTOM CURB - OTHER
BD*	BUILDING
BRAB*	BRIDGE - ABUTMENT BOT
BRAT*	BRIDGE - ABUTMENT TOP
BRCB*	BRIDGE - CONCRETE BEAM
BRCL*	BRIDGE - COLUMN
BRCN*	BRIDGE - CONCRETE
BRDK*	BRIDGE - DECK
BRFB*	BRIDGE - EXPOSED FOOTING BOTTOM
BRFT*	BRIDGE - EXPOSED FOOTING TOP
BRIB*	BRIDGE - I BEAM
BRJB*	BRIDGE - JERSEY BARRIER
BRMP*	BRIDGE - METAL PLATE
BROT*	BRIDGE - OTHER
BRPR*	BRIDGE - PIER TOP
BRPS*	BRIDGE - PIER (POINT)
BRRL*	BRIDGE - RAILING
BRSM*	BRIDGE - STRUCT MEMBER
BRSS*	BRIDGE - STRUCT MEMBER (POINT)
BRST*	BRIDGE - STEEL
BRWB*	BRIDGE - WINGWALL BOTTOM
BRWD*	BRIDGE - WOOD
BRWT*	BRIDGE - WINGWALL TOP
BRXJ*	BRIDGE - EXPANSION JOINT
BS*	BOTTOM OF SLOPE
BWL*	BROKEN WHITE LINE
BYL*	BROKEN YELLOW LINE
CBC*	CATCH BASIN CENTER
CBDF*	CATCH BASIN - D FRAME
CBE*	CATCH BASIN – BACK CENTER EDGE
CBR*	CATCH BASIN - ROUND
CC*	CONCRETE COVER
CI*	CURB INLET
CL*	CENTER LINE - MISCELLANEOUS
CR*	CROWN OF ROAD
CS*	CHANGE IN SLOPE

CUBC*	CULVERT - CONCRETE BOX
CUBS*	CULVERT - STONE BOX
CUCC*	CULVERT - CONCRETE CIRCULAR
CUCS*	CULVERT - STONE CIRCULAR
DAMC*	DAM - CONCRETE
DAMO*	DAM - OTHER
DECK*	DECK - HSE OR BLDG
DEMT*	ELECTRIC METER
DFPL*	FLAG POLE
DGFP*	GAS PUMP
DGMT*	GAS METER
DI*	DROP INLET
DL*	DITCH LINE
DMBX*	MAILBOX
DMHR*	METAL HAND RAIL
DOC*	OIL
DPCR*	$1 $2 POST
DPLN*	PLANTER
DPSQ*	$1 $2 POST
DROC*	ROCK OUTCROP
DSPP*	STAND PIPE
DSTR*	STAIRS
DVLT*	VAULT UNDERGROUND
DVPP*	VENT PIPE
DWP*	DETECTABLE WARNING PAD – ADA
DWEL*	WELL
DWHL*	CONCRETE WHEEL STOP
DWMT*	WATER METER
DYL*	DBL YELLOW LINE
EC*	EDGE CONC
EG*	EDGE GRAVEL
EHH*	ELECTRIC HAND HOLE
EL*	EDGE GRASS/LAWN
EM*	EDGE MATERIAL PILE
EO*	EDGE OF OTHER SURFACE TYPE
EP*	EDGE PAVE - BITUMINOUS
ERP*	EDGE RIPRAP
EW*	EDGE OF WATER
FCBW*	FENCE - BARBED WIRE
FCCL*	FENCE - CHAIN LINK

FCCR*	FENCE - CEDAR RAIL
FCGA*	FENCE - GATE POST
FCIP*	FENCE - IRON PIPE
FCOT*	FENCE - OTHER
FCS*	FENCE - SEDIMENTATION
FCWD*	FENCE - WOOD
FES*	FES $1 $2 FLARED END SECTION
FFE*	FINISHED FLOOR ELEV
FL*	STREAM/RIVER FLOW LINE
FN*	FOUNDATION
GCSL*	GUARD RAIL - CABLE - STL POSTS LEFT OF DIR OF SURVEY
GCSR*	GUARD RAIL - CABLE - STL POSTS RIGHT OF DIR OF SURVEY
GCTL*	GUARD RAIL - CABLE - TRIA POSTS LEFT OF DIR OF SURVEY
GCTR*	GUARD RAIL - CABLE - TRIA POSTS RIGHT OF DIR OF SURVEY
GFL*	GAS FILL - GAS STATION
GGT*	GAS GATE
GPL*	GPL $1 - GUY POLE
GRET*	GUARD RAIL - END TREATMENT
GRTD*	GUARD RAIL - STL THRIE BEAM DBL FACED
GRTL*	GUARD RAIL - STL THRIE BEAM POSTS LEFT OF DIR OF SURVEY
GRTR*	GUARD RAIL - STL THRIE BEAM POSTS RIGHT OF DIR OF SURVEY
GRWD*	GUARD RAIL - STL W BEAM DBL FACED
GRWL*	GUARD RAIL - STL W BEAM POSTS LEFT OF DIR OF SURVEY
GRWR*	GUARD RAIL - STL W BEAM POSTS RIGHT OF DIR OF SURVEY
GTBH*	BHL $1 – BORING HOLE
GTOW*	MW $1 – MONITORING WELL
GTTP*	TP $1 – TEST PIT
GWA*	GUY WIRE ANCHOR
HB*	HAYBALES FOR EROSION CONTROL
HC*	HEADWALL - CONC
HO*	HEADWALL - OTHER
HS*	HEADWALL - STONE
HYD*	HYDRANT

INV*	INV $1 $2 - INVERT
JBDF*	PRECAST CONC BARRIER (DBL FACED)
JBSF*	PRECAST CONC BARRIER (SINGLE FACED)
LPDL*	LIGHT POST DOUBLE LIGHT
LPL*	LIGHT POLE SINGLE LIGHT
MBMK*	BENCHMARK $1 $2 $3 $4
MDHL*	DRILL HOLE
MDSK*	DISK $1 $2 $3
MELP*	ESCUTCHEON PIN LEAD PLUG
MFLY*	CHK SHOT
MHC*	CATV MANHOLE
MHD*	DRAIN MANHOLE
MHE*	ELECTRIC MANHOLE
MHG*	GAS MANHOLE
MHM*	STEAM MANHOLE
MHO*	MANHOLE - MISC
MHS*	SEWER MANHOLE
MHT*	TELEPHONE MANHOLE
MHW*	WATER MANHOLE
MIPE*	IP $1 $2 – IRON PIPE
MMAG*	MAG NAIL
MMHB*	$1 $2 $3 $4 MASSACHUSETTS HIGHWAY BOUND
MMON*	$1 $2 $3 $4 – MONUMENT
MPHB*	$1 $2 $3 $4 PHOTO CONTROL - BOTH
MPHH*	$1 $2 $3 $4 PHOTO CONTROL - HORIZONTAL
MPHV*	$1 $2 $3 $4 PHOTO CONTROL - VERTICAL
MPKN*	PK NAIL
MREB*	$1 $2 REBAR/IRON PIN
MRRS*	RAILROAD SPIKE
MRST*	TOWN LINE ROAD STONE
MSTN*	STAKE & NAIL
MTBD*	TOWN BOUND
MTRV*	$1 $2 $3 $4 – TRAVERSE STATION
MXCT*	X-CUT
OH*	OVERHANG

OS*	ON SLOPE
OW*	OVERHEAD WIRE
PELH*	SPOT ELEV - HIGH POINTS
PELL*	SPOT ELEV - LOW POINTS
PELV*	SPOT ELEV - INTER SHOTS
RRRM*	RUBBER MAT
RRSG*	RAILROAD SIGNAL
RRSW*	RAILROAD SWITCH
RRTK*	RAILROAD TRACKS
SI*	SILL - DOOR, BUILDING, FOUNDATION
SWA*	SWALE
SWL*	SOLID WHITE LINE
SYL*	SOLID YELLOW LINE
TC*	TOP OF CURB
TFCC*	TRAFFIC SIGNAL CONTROLLER CABINET
TFEA*	END OF MAST ARM
TFFB*	FLASHING BEACON
TFHS*	HANDICAP SPACE - PAVEMENT MARKING
TFMA*	TRAFFIC SIGNAL MAST ARM POLE
TFMR*	TRANSFORMER
TFMT*	PARKING METER
TFPB*	TRAFFIC PULL BOX
TFPD*	TRAFFIC SIGNAL - PEDESTRIAN
TFS1*	SIGN
TFS2*	SMALL SIGN - DOUBLE POST
TFSG*	TRAFFIC SIGNAL – POST MOUNTED
TFSN*	BILLBOARD OR OTHER LARGE GROUND SIGN
TFSO*	OVERHEAD SIGN (LOCATION OF OVRHNG)
TFSS*	SIGN
TFSW*	TRAFFIC SIGNAL SPAN WIRE ASSEMBLY POLE
TFUL*	LOOP DETECTOR
TPL*	TROLLEY POLE
TRNP*	CROSS COUNTRY TRANSMISSION POLE
TS*	TOP OF SLOPE
UC*	UTILITY - CABLE LINE
UD*	UTILITY - DRAINAGE
UE*	UTILITY - ELECTRIC

UFB*	UFB $1 - UTILITY POLE & FIRE BOX
UG*	UTILITY - GAS
ULT*	ULT $1 – UTILITY POLE SINGLE LIGHT
UM*	UTILITY - STEAM
UO*	UTILITY - MISCELLANEOUS
UPDL*	UPDL $1 – UTILITY POLE DOUBLE LIGHT
UPL*	UPL $1 – UTILITY POLE
US*	UTILITY - SEWER
UT*	UTILITY - TELEPHONE
UW*	UTILITY - WATER
VGBF*	BF#$1 $2 $3 $4 – BANK FLAG
VGBU*	BUSH
VGCA*	CULTIVATED AREA EDGE
VGHE*	HEDGE
VGSM*	$1" $2 – TREE (LESS THAN 10”)
VGST*	STUMP
VGT*	$1"$2 - TREE (10” AND LARGER)
VGWA*	SWAMP/MARSH OR WETLAND OUTLINE
VGWF*	WF# $1 $2 $3 $4 – WETLAND FLAG
VGWL*	WOODS OR BRUSH LINE
WGT*	WATER GATE
WLBR*	WALL - BRICK (FACE @ GROUND)
WLCN*	WALL - CONCRETE (FACE @ GROUND)
WLDF*	WALL - DOUBLE FACED (FACE @ GROUND)
WLOT*	WALL - OTHER (FACE @ GROUND)
WLPT*	WALL - POINTED WALL (FACE @ GROUND)
WLRT*	WALL - RETAINING (FACE @ GROUND)
WLSM*	WALL - STONE MASONRY
WLST*	WALL - STONEWALL
WLTP*	WALL - TOP (ANY TYPE)
WWPV*	PAVED WATERWAY
WSO*	WATER SHUT OFF
Z*	$1 $2 $3 $4 MISCELLANEOUS CODE (ANY CODE NOT FOUND)

Description Key Codes with Parameters

The following description key codes use parameters, or additional information, within the code. A short description of what shall be included within the code is shown <…>.
Do not include special characters such as #, ”, ?, or !

DPCR <diameter in inches> <material>
DPSQ <size in inches> <material>
FES <FES width in inches> <material>
GPL <number>
GTBH <number>
GTOW <well number>
GTTP <test pit number>
INV <pipe diameter in inches> <pipe material>
MBMK <set> <set in/on> <USER> <USER>
MDSK <type> <number> <year>
MIPE <diameter in inches> <USER>
MMHB <type/mark of location> <USER> <USER> <USER>
MMON <type/mark of location> <USER> <USER> <USER>
MPHB <set> <MassDOT name if applicable> <USER> <USER>
MPHH <set> <MassDOT name if applicable> <USER> <USER>
MPHV <set> <MassDOT name if applicable> <USER> <USER>
MREB <USER> <USER>
MTRV <set> <MassDOT name if applicable> <USER> <USER>
UFB <pole number>
ULT <pole number>
UPDL <pole number>
UPL <pole number>
VGBF <number> <USER> <USER> <USER>
VGSM <diameter in inches> <type>
VGT <diameter in inches> <type>
VGWF <number> <USER> <USER> <USER>
Z <USER> <USER> <USER> <USER>

Tree Code Description Key

The tree code, VGT, has been redefined to automate the sizing of the tree symbol. The tree code, VGSM, (used for smaller caliper trees) uses a uniformly sized symbol. Both codes are automatically labeled with the size and tree type. Tree types of CON and DEC, for coniferous and deciduous, have been established.

The code will use the descriptor (VGSM or VGT), followed by a space, then the diameter (in inches) of the tree trunk (do not include the *inches* ” character in code), followed by a space, and finally the tree type, CON or DEC. See the following examples;

Wetland Flag Code Description Key

The wetland flag code has been redefined to automate the symbol, and automatically label it with the flag number. The code will use the VGWF descriptor, followed by a space, then the flag number.
See the following examples;

When using this code, the Wetland Flag symbol and text label will be placed onto the EX-SV-WETL-TEXT layer separate from the Wetland Line layer, EX-SV-WETL.

Traffic

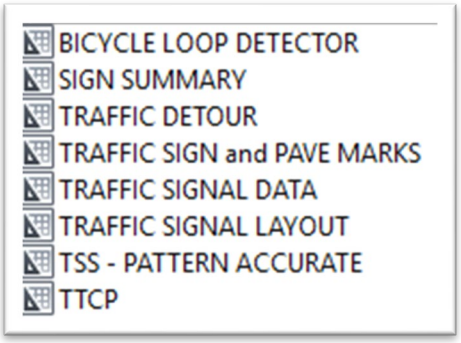
Traffic Plan Requirements

All Traffic Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All necessary layers, text styles, plot styles, and dimension styles are included within this template.

The use of Paper Space is now a requirement. Please refer to the *"Policy on Model Space vs. Paper Space"* located earlier within this document.

When creating Paper Space layouts, a default set of sheets, i.e. layouts, have been created within the "TRAFFIC_SHEETS.dwg" CAD file. This contains standard borders and title blocks for all Traffic plans. The following layouts are included,



No other borders will be accepted.

The use of DesignCenter to drag-n-drop these layouts into a project DWG is recommended.

ATTENTION
Do not use the TRAFFIC_SHEETS.dwg for any design related AutoCAD work. They do not contain the necessary layers, text styles, dimension styles or plot styles.

Traffic Symbols and Blocks

Symbols have been developed for the proposed construction items to closely represent those provided in Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide, 2006. These symbols must be used for plans prepared for MassDOT. No substitute symbols will be accepted. Additional symbols may be added for items not listed. However, the list of additional symbols with descriptions must be included with the plan submission to MassDOT.

A Traffic Section symbol and block library is available within the “TRAFFIC_SYMBOLS.dwg”.

NOTE: The use of DesignCenter to drag-n-drop these symbols and blocks into a project DWG is recommended.

Utilities

Using Utility Layers

MassDOT Highway Division has three (3) categories of utilities to be shown on plans. These are Existing, Proposed, and Record.

EXISTING (Layer convention EX-UT-)
Utility objects that have been observed and/or field located shall be placed on the appropriate EX-UT- layer. Only field located utilities and their descriptions are to be placed on EX-UT- layers.

RECORD (Layer convention RD-UT-)
Utility objects that have not been observed and/or physically located shall be placed on the appropriate RD-UT- layer. Only utility locations that are derived from Dig Safe markings, from evidence such as pavement patches, and/or from record drawings are to be placed on the RD-UT- layers.

PROPOSED (Layer convention PR-UT-)
Utility objects that are being designed for future installation shall be placed on the appropriate PR-UT- layer. The tie in structure/facility for the proposed utility shall remain on the existing or record layer as appropriate.

Utilities Plan & Plotting Requirements

All Utility Drawings shall conform to Chapter 18 (Plans, Specifications, & Estimates) of the Massachusetts Highway Department Project Development & Design Guide and the Engineering Directive No. E-11-003. This CAD Standard is the sole location for all MassDOT Highway Division CAD related standards. Where inconsistencies occur between this CAD Standard document and any other MassDOT Highway Division manuals currently in use, this CAD Standard document must be adhered to. It is not intended to remove any requirements from other MassDOT Highway Division manuals, currently in use, which are not specifically addressed herein.

All Drawings must be created using the current version of the MassDOT drawing template. The version number of the drawing template is listed within the lower right corner of each paper space border and placed on a no-plot layer. All default layers, text styles, plot styles, and dimension styles are included within this template.

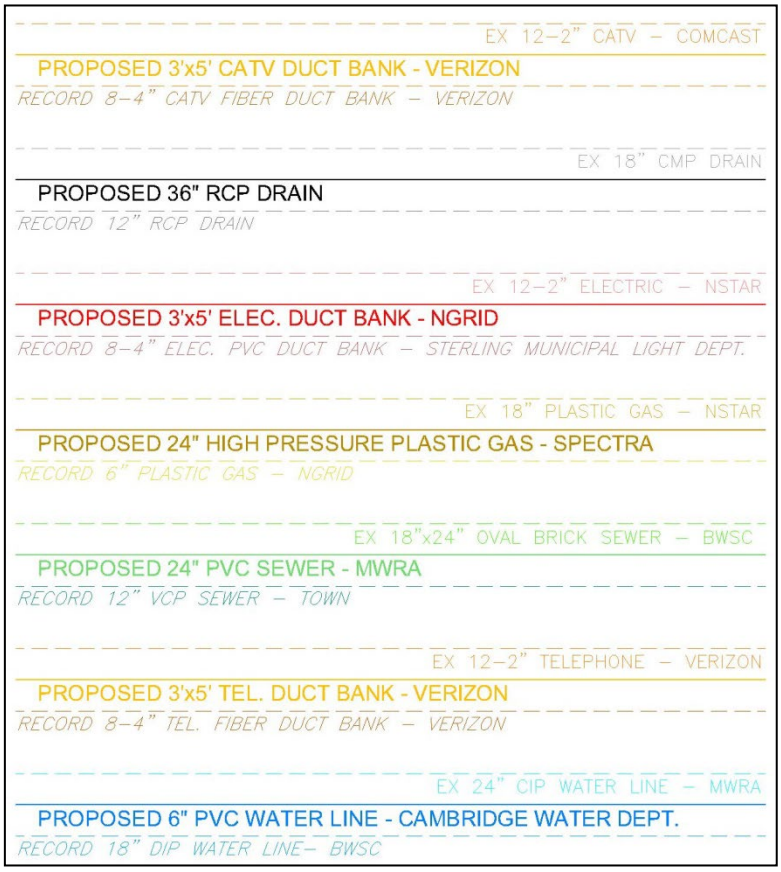
All base utility layers and colors have been defined within the drawing template. Where additional utility layer names are needed to further define a utility, please conform to the Layer Naming requirements defined previously in this document. Please use the default color assigned to the base utility. No other colors will be accepted.

All Utility Plans must have a color-coded Legend located on each sheet.

All utility lines shall be clearly labeled as follows:
Size of Utility
Utility Type
Utility Owner

The Designer shall be responsible for contacting the utility companies to verify the location and type of utilities found within the project limits that may or may not be on the Survey Base Plan.

Pursuant to a requirement for printing color utility plans listed within the Engineering Directive E-11-003, a color plot style has been provided. When producing color utility prints, please use the MADOT-U.stb file.



APPENDIX A

MASTER LAYER LIST

The following is the Master Layer List of all layers contained within the MassDOT drawing template.

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
0	white	Continuous	SOLID 100%	0
Defpoints	white	Continuous	SOLID 100%	Defpoints
EX-BR-COMP	8	DASHDOT2	BR 50%	Existing Bridge Features
EX-BR-COMP-HIDN	8	HIDDEN	BR 50%	Existing Bridge Features - Hidden
EX-BR-HATCH	254	Continuous	SOLID 25%	Existing Bridge Hatching
EX-BR-REBAR	magenta	DASHDOT2	BR 100%	Existing Bridge Rebar
EX-BR-TEXT	141	Continuous	BR 50%	Existing Bridge Text
EX-EV-REGL-BUFFER-100	240	DASHEDX2	ENVR EXIST	Regulatory – 100 ft Buffer Zone
EX-EV-REGL-FLOOD	magenta	BORDERX2	ENVR EXIST	Regulatory – Flood Zones
EX-EV-REGL-MHW	212	BORDER	ENVR EXIST	Regulatory – Mean High Water - Tidal
EX-EV-REGL-OHWL	212	BORDER2	ENVR EXIST	Regulatory – Ordinary High Water - Non-Tidal
EX-EV-REGL-RIVR-FRNT	221	BORDER2	ENVR EXIST	Regulatory – Riverfront Protection Zones
EX-EV-TEXT	magenta	Continuous	ENVR EXIST	Regulatory – Environmental Existing Text
EX-GT-FEAT	9	Continuous	BR 50%	Geotechnical Existing Features
EX-LD-SITE-FEAT	170	Continuous	SURVEY 100%	Landscape Design Existing Site Features
EX-LD-VEGE	green	Continuous	SURVEY 100%	Landscape Design Existing Trees, Shrubs, and Vegetation
EX-LD-VEGINV	12	Continuous	SURVEY 100%	Landscape Design Existing Invasive Vegetation
EX-LO-CT	red	PHANTOM	ROW 100%	Existing County Layout Lines
EX-LO-GEOM	red	Continuous	ROW TEXT	Existing Geometry Text for Layout Lines

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-LO-RR	red	EXIST RR SIDELINE	ROW 100%	Existing Railroad Layout Lines
EX-LO-SHLO	red	Continuous	ROW 100%	Existing State Highway Layout Lines
EX-LO-TEXT	red	Continuous	ROW TEXT	Existing Text for Layout Information
EX-LO-TN	red	CENTER	ROW 100%	Existing Town/City Layout Lines
EX-LO-TP	red	PHANTOM2	ROW 100%	Existing Turnpike Authority Layout Lines
EX-SV-BL-CT	150	DASHED	ROW 100%	Existing Baseline - County
EX-SV-BL-GEOM	150	Continuous	ROW TEXT	Existing Baseline - Geometry Text
EX-SV-BL-RR	150	EXIST RR SIDELINE	ROW 100%	Existing Baseline - Railroad
EX-SV-BL-SHLO	150	CONST BASELINE	ROW 100%	Existing Baseline State Highway
EX-SV-BL-TEXT	150	Continuous	ROW TEXT	Existing Baseline Text
EX-SV-BL-TN	150	DASHED2	ROW 100%	Existing Baseline City/Town
EX-SV-BL-TP	150	DASHED	ROW 100%	Existing Baseline - Turnpike Authority
EX-SV-BL-XX	150	DASHED2	ROW 100%	Existing Baseline - Miscellaneous
EX-SV-BLDG	9	Continuous	SURVEY 100%	Existing Buildings, Decks
EX-SV-BMRK	red	Continuous	SURVEY 150%	Existing Benchmark Symbols
EX-SV-BMRK-TEXT	red	Continuous	SURVEY 125%	Existing Benchmark Text
EX-SV-BP-ALL	253	Continuous	SURVEY 100%	Existing Survey Point - Default Point Layer
EX-SV-BP-TEXT	253	Continuous	SURVEY 100%	Existing Survey Point - Text Labels
EX-SV-BR-DETL	9	Continuous	SOLID 50%	Existing Bridge Items and Structures as Surveyed
EX-SV-BR-TEXT	9	Continuous	SURVEY 100%	Existing Bridge Text as Surveyed
EX-SV-CLOUD	193	Continuous	SOLID 100%	EX-SV-CLOUD
EX-SV-CONT-MJR	142	DASHED	SURVEY 100%	Existing Contours - MAJOR

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-SV-CONT-MNR	54	DASHED2	SURVEY 80%	Existing Contours - MINOR
EX-SV-CONT-TEXT	red	Continuous	SURVEY 100%	Existing Contours - Text
EX-SV-CONT-USER	172	Continuous	SOLID 50%	Existing User-Defined Contours
EX-SV-CTRL	red	Continuous	SURVEY 150%	Existing Traverse and Photo Control Points
EX-SV-CTRL-TEXT	red	Continuous	SURVEY 125%	Existing Traverse and Photo Control Points Text
EX-SV-CURB-BOT	61	Continuous	SURVEY 125%	Existing Bottom Curb
EX-SV-CURB-TOP	133	Continuous	SURVEY 100%	Existing Top/Back Curb
EX-SV-DETL	8	Continuous	SURVEY 100%	Existing Miscellaneous Detail
EX-SV-EOC	131	Continuous	SURVEY 125%	Existing Edge of Concrete
EX-SV-EOG	9	Continuous	SURVEY 125%	Existing Edge of Soil, Gravel, and Stone
EX-SV-EOP	90	Continuous	SURVEY 125%	Existing Edge of Pavement
EX-SV-EOTHR	9	Continuous	SURVEY 125%	Existing Edge of Other Surface
EX-SV-EROS	55	Continuous	SURVEY 100%	Existing Erosion Control
EX-SV-FIGURE	magenta	Continuous	SURVEY 100%	Existing Survey Figure
EX-SV-FNCE-CLF	37	FENCE - CHAIN LINK	SURVEY 125%	Existing Chain Link or Metal Fences
EX-SV-FNCE-OTHR	37	FENCE - CHAIN LINK	SURVEY 125%	Existing Fences - Other
EX-SV-FNCE-WOOD	37	FENCE - WOOD RAIL	SURVEY 125%	Existing Wood Fences
EX-SV-GRDL-STBM	9	Continuous	SURVEY 100%	Existing Steel Post Guardrail and Barrier
EX-SV-GRDL-WOOD	9	Continuous	SURVEY 100%	Existing Wood Post Guardrail and Barrier
EX-SV-GRIDT	white	Continuous	SURVEY 100%	Existing Survey Grid Tick
EX-SV-GRND	9	Continuous	SURVEY 100%	Existing Ground Surface
EX-SV-GRND-TEXT	9	Continuous	SURVEY 100%	Existing Ground Surface - Text

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-SV-LN-EASE	white	LINE OF EASE	ROW 100%	Existing Easement Lines
EX-SV-LN-GEOM	white	Continuous	ROW TEXT	Existing Boundary Line Geometry Text
EX-SV-LN-PROP	cyan	EXIST PROP LINE SYMBOL	ROW 100%	Existing Abutting Property Lines
EX-SV-LN-PROP-COMMON	cyan	EXIST PROP LINE	SURVEY 80%	Existing Abutting Property Lines Under Common Ownership
EX-SV-LN-STATE	yellow	EXIST STATE BNDY LINE	ROW 100%	Existing State Boundary Lines
EX-SV-LN-TEXT	white	Continuous	ROW TEXT	Existing Boundary Line Text
EX-SV-LN-TN	yellow	CENTERX2	ROW 100%	Existing Town/City Boundary Lines
EX-SV-MONU	red	Continuous	SURVEY 150%	Existing Monuments, Survey Points
EX-SV-MONU-TEXT	red	Continuous	SURVEY 125%	Existing Monuments, Survey Points Text Layer
EX-SV-PH-BLDG	9	Continuous	SURVEY 100%	Photogrammetry - Existing Buildings, Decks
EX-SV-PH-BR-LIMIT	9	Continuous	SURVEY 100%	Photogrammetry - Outline of Existing Bridge
EX-SV-PH-CONT-MJR	143	DASHED	SURVEY 100%	Photogrammetry - Existing Contours - MAJOR
EX-SV-PH-CONT-MNR	57	DASHED2	SURVEY 80%	Photogrammetry - Existing Contours - MINOR
EX-SV-PH-CONT-OBS	magenta	Continuous	SURVEY 100%	Photogrammetry - Outline of Obscured Ground
EX-SV-PH-CONT-TEXT	30	Continuous	SURVEY 100%	Photogrammetry - Existing Contours - Text
EX-SV-PH-CONT-USER	173	Continuous	SOLID 50%	Photogrammetry - Existing User-Defined Contours
EX-SV-PH-CURB-BOT	61	Continuous	SURVEY 125%	Photogrammetry - Existing Bottom Curb
EX-SV-PH-CURB-TOP	133	Continuous	SURVEY 100%	Photogrammetry - Existing Top/Back Curb
EX-SV-PH-DETL	8	Continuous	SURVEY 100%	Photogrammetry - Existing Miscellaneous Detail
EX-SV-PH-EOC	131	Continuous	SURVEY 125%	Photogrammetry - Existing Edge of Concrete
EX-SV-PH-EOG	9	Continuous	SURVEY 125%	Photogrammetry - Existing Edge of Soil, Gravel, and Stone
EX-SV-PH-EOP	90	Continuous	SURVEY 125%	Photogrammetry - Existing Edge of Pavement

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-SV-PH-EOTHR	9	Continuous	SURVEY 125%	Photogrammetry - Existing Edge of Other Surface
EX-SV-PH-EROS	55	Continuous	SURVEY 100%	Photogrammetry - Existing Erosion Control
EX-SV-PH-FNCE-CLF	37	FENCE - CHAIN LINK	SURVEY 125%	Photogrammetry - Existing Chain Link or Metal Fences
EX-SV-PH-FNCE-OTHR	37	FENCE - CHAIN LINK	SURVEY 125%	Photogrammetry - Existing Fences - Other
EX-SV-PH-FNCE-WOOD	37	FENCE - WOOD RAIL	SURVEY 125%	Photogrammetry - Existing Wood Fences
EX-SV-PH-GRDL-STBM	9	Continuous	SURVEY 100%	Photogrammetry - Existing Steel Post Guardrail and Barrier
EX-SV-PH-GRDL-WOOD	9	Continuous	SURVEY 100%	Photogrammetry - Existing Wood Post Guardrail and Barrier
EX-SV-PH-GRND	30	Continuous	SURVEY 100%	Photogrammetry - Existing Ground Surface
EX-SV-PH-GRND-TEXT	30	Continuous	SURVEY 100%	Photogrammetry - Existing Ground Surface - Text
EX-SV-PH-PM-DASH	9	BROKEN LANE LINE	SOLID 50%	Photogrammetry - Existing Pavement Markings - Dashed
EX-SV-PH-PM-SOLID	9	Continuous	SOLID 50%	Photogrammetry - Existing Pavement Markings - Solid
EX-SV-PH-RRTR	9	Continuous	SURVEY 100%	Photogrammetry - Existing Railroad Items
EX-SV-PH-SRF-BDR	white	Continuous	SURVEY 100%	Photogrammetry - Surface - Border
EX-SV-PH-SRF-FLT	white	Continuous	SURVEY 100%	Photogrammetry - Surface - Faults, Breaklines
EX-SV-PH-SRF-VIEW	8	Continuous	SURVEY 100%	Photogrammetry - Surface - TIN lines
EX-SV-PH-TEXT	104	Continuous	SURVEY 125%	Photogrammetry - Existing Text
EX-SV-PH-TR-FEAT	181	Continuous	SURVEY 100%	Photogrammetry - Traffic Items
EX-SV-PH-UNI	magenta	Continuous	SURVEY 100%	Photogrammetry - Existing Object Unidentifiable
EX-SV-PH-UTILITY	30	Continuous	UTILITY EXIST	Photogrammetry - Existing Utilities
EX-SV-PH-UTILITY-OVHD	30	HIDDEN	UTILITY EXIST	Photogrammetry - Existing Overhead Wires
EX-SV-PH-VEGE	104	Continuous	SURVEY 100%	Photogrammetry - Existing Vegetation
EX-SV-PH-WALL	163	Continuous	SURVEY 125%	Photogrammetry - Existing Walls - Other

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-SV-PH-WALL-RETW	163	Continuous	SURVEY 125%	Photogrammetry - Existing Walls - Retaining
EX-SV-PH-WALL-STONE	163	STONEWALL	SURVEY 125%	Photogrammetry - Existing Walls - Balanced Stone
EX-SV-PH-WETL	blue	DASHED	ENVR EXIST	Photogrammetry - Existing Wetlands, Ponds, Rivers
EX-SV-PH-WETL-TEXT	blue	Continuous	ENVR TEXT	Photogrammetry - Existing Wetlands Text and Symbols
EX-SV-PM-DASH	9	BROKEN LANE LINE	SOLID 50%	Existing Pavement Markings - Dashed
EX-SV-PM-SOLID	9	Continuous	SOLID 50%	Existing Pavement Markings - Solid
EX-SV-RIPRAP	113	Continuous	SURVEY 100%	Existing Edge of Riprap
EX-SV-RRTR	9	Continuous	SURVEY 100%	Existing Railroad Items
EX-SV-SRF-BDR	white	Continuous	SURVEY 100%	Existing Surface - Border
EX-SV-SRF-FLT	white	Continuous	SURVEY 100%	Existing Surface - Faults, Breaklines
EX-SV-SRF-VIEW	8	Continuous	SURVEY 100%	Existing Surface - TIN lines
EX-SV-TEXT	104	Continuous	SURVEY 125%	Existing Text
EX-SV-TR-FEAT	181	Continuous	SURVEY 100%	Existing Traffic Items
EX-SV-TRAV-ANNO	magenta	Continuous	SURVEY 100%	Existing Traverse Annotatoins for "Curb Tie & Grading Plan"
EX-SV-TRAV-BLTIE	magenta	DASHED2	SURVEY 100%	Survey Traverse Tie Line
EX-SV-TRAV-GEOM	magenta	Continuous	SURVEY 100%	Survey Traverse Line Geometry Text
EX-SV-TRAV-LINE	magenta	CENTERX2	SURVEY 100%	Survey Traverse Line
EX-SV-TRAV-TEXT	magenta	Continuous	SURVEY 100%	Survey Traverse Text
EX-SV-VEGE	104	Continuous	SURVEY 100%	Existing Vegetation
EX-SV-WALL	163	Continuous	SURVEY 125%	Existing Walls - Other
EX-SV-WALL-RETW	163	Continuous	SURVEY 125%	Existing Walls - Retaining
EX-SV-WALL-STONE	163	STONEWALL	SURVEY 125%	Existing Walls - Balanced Stone

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-SV-WETL	blue	DASHED	ENVR EXIST	Existing Wetlands, Ponds, Rivers
EX-SV-WETL-TEXT	blue	Continuous	ENVR TEXT	Existing Wetlands Text and Symbols
EX-SV-WSHD	170	HIDDEN2	SURVEY 150%	Existing Surface Watershed Boundaries
EX-SV-WSHD-FLOW	50	CENTER2	SURVEY 100%	Existing Surface Watershed Flow Path
EX-SV-WSHD-TEXT	170	Continuous	SURVEY 100%	Existing Surface Watershed Text
EX-TR-FEAT	181	Continuous	SURVEY 100%	Existing Traffic Items
EX-UT-CATV-STRC	30	Continuous	UTILITY EXIST	Existing Communication/CATV Structures
EX-UT-CATV-TEXT	30	Continuous	UTILITY EXIST	Existing Communication/CATV Text
EX-UT-CATV-UGND	30	HIDDEN2	UTILITY EXIST	Existing Communication/CATV Underground
EX-UT-DRAIN-STRC	252	Continuous	UTILITY EXIST	Existing Drainage Structures
EX-UT-DRAIN-TEXT	252	Continuous	UTILITY EXIST	Existing Drainage Text
EX-UT-DRAIN-UGND	252	HIDDEN2	UTILITY EXIST	Existing Drainage Underground
EX-UT-ELEC-OVHD	11	HIDDEN	UTILITY EXIST	Existing Overhead Wires
EX-UT-ELEC-STRC	11	Continuous	UTILITY EXIST	Existing Electric Structures
EX-UT-ELEC-TEXT	11	Continuous	UTILITY EXIST	Existing Electric Text
EX-UT-ELEC-UGND	11	HIDDEN2	UTILITY EXIST	Existing Electric Underground
EX-UT-GAS-STRC	42	Continuous	UTILITY EXIST	Existing Gas Structures
EX-UT-GAS-TEXT	42	Continuous	UTILITY EXIST	Existing Gas Text
EX-UT-GAS-UGND	42	HIDDEN2	UTILITY EXIST	Existing Gas Underground
EX-UT-OIL-STRC	42	Continuous	UTILITY EXIST	Existing Oil Structures
EX-UT-OIL-TEXT	42	Continuous	UTILITY EXIST	Existing Oil Text
EX-UT-OIL-UGND	42	HIDDEN2	UTILITY EXIST	Existing Oil Underground

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
EX-UT-OTHR-STRC	42	Continuous	UTILITY EXIST	Existing Utility - Other Structures
EX-UT-OTHR-TEXT	42	Continuous	UTILITY EXIST	Existing Utility - Other Text
EX-UT-OTHR-UGND	42	HIDDEN2	UTILITY EXIST	Existing Utility - Other Underground
EX-UT-SEWER-STRC	80	Continuous	UTILITY EXIST	Existing Sewer Structures
EX-UT-SEWER-TEXT	80	Continuous	UTILITY EXIST	Existing Sewer Text
EX-UT-SEWER-UGND	80	HIDDEN2	UTILITY EXIST	Existing Sewer Underground
EX-UT-STEAM-STRC	42	Continuous	UTILITY EXIST	Existing Steam Structures
EX-UT-STEAM-TEXT	42	Continuous	UTILITY EXIST	Existing Steam Text
EX-UT-STEAM-UGND	42	HIDDEN2	UTILITY EXIST	Existing Steam Underground
EX-UT-TELE-STRC	30	Continuous	UTILITY EXIST	Existing Telephone/Communication Structures
EX-UT-TELE-TEXT	30	Continuous	UTILITY EXIST	Existing Telephone/Communication Text
EX-UT-TELE-UGND	30	HIDDEN2	UTILITY EXIST	Existing Telephone/Communication Underground
EX-UT-TR-UGND	30	CONDUIT	UTILITY EXIST	Existing Traffic Items - Underground
EX-UT-WATERSYS-STRC	cyan	Continuous	UTILITY EXIST	Existing Water Systems Structures
EX-UT-WATERSYS-TEXT	cyan	Continuous	UTILITY EXIST	Existing Water Systems Text
EX-UT-WATERSYS-UGND	cyan	HIDDEN2	UTILITY EXIST	Existing Water Systems Underground
GE-CANT	122	Continuous	SOLID 100%	Cant Lines
GE-DETAILS	white	Continuous	GE-DETAILS	Default General Paperspace Details
GE-DETAILS-COLOR	white	Continuous	COLOR OBJECT	***THAW FOR COLOR PLOTTING ONLY***
GE-DETAILS-PATT	white	Continuous	GE-DETAILS	Default General Paperspace Details - Patterns
GE-IMAGES	white	Continuous	BORDER	Default Images Layer
GE-MHAUL	red	Continuous	SOLID 100%	Mass Haul Lines

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
GE-MTCH	231	Continuous	SOLID 100%	Match Lines and Text
GE-MTCH-TEXT	231	Continuous	OB TEXT 100%	Match Line Text
GE-NONPLOT	white	Continuous	SOLID 100%	General Non-Plotting Layer
GE-PROF-EGC	21	DASHED	SOLID 50%	Profile - Existing Grade Centered Along Alignment
GE-PROF-EGC-TEXT	9	Continuous	SOLID 50%	Profile - Existing Grade Text
GE-PROF-EGL	red	BORDER2	SOLID 50%	Profile - Existing Grade Left of Alignment
GE-PROF-EGR	104	DIVIDE2	SOLID 50%	Profile - Existing Grade Right of Alignment
GE-PROF-FGC	magenta	Continuous	SOLID 100%	Profile - Finish Grade Centered Along Alignment
GE-PROF-FGC-TEXT	white	Continuous	SOLID 100%	Profile - Finish Grade Text
GE-PROF-TEXT	white	Continuous	SOLID 100%	Profile General Text
GE-SAMPLE	yellow	Continuous	SOLID 25%	Sample Line - OBJECT
GE-SAMPLE-LINE	yellow	Continuous	SOLID 25%	Sample Line Base Layer
GE-SAMPLE-TEXT	yellow	Continuous	OB TEXT 100%	Sample Line - LABEL
GE-SHEET	white	Continuous	BORDER	Default Border Layer
GE-SRF-BDR	yellow	Continuous	SURVEY 100%	Surface Border
GE-SRF-GRID	9	Continuous	SURVEY 100%	Surface Grid
GE-SRF-PNTS	red	Continuous	SURVEY 100%	Surface points
GE-SRF-VIEW	8	Continuous	SURVEY 100%	Surface TIN lines
GE-SUPER	160	Continuous	SOLID 100%	Superelevation Lines
GE-TABLE	white	Continuous	OB TEXT 150%	Default Tables layer
GE-TEXT	white	Continuous	OB TEXT 150%	Default General Paperspace Text
GE-VFRM	142	Continuous	SOLID 100%	View Frame Border

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
GE-VFRM-TEXT	142	Continuous	SOLID 100%	View Frame Text
GE-VIEW-BDR	white	Continuous	SOLID 100%	Graph View Border
GE-VIEW-GRID	252	Continuous	SOLID 50%	Graph View Grid
GE-VIEW-TEXT	white	Continuous	SOLID 100%	Graph View Text
GE-VIEWPORT	white	Continuous	BORDER	Default Paperspace Viewport layer
GE-XREF	white	Continuous	BORDER	Default External Reference layer
GE-XSECT-CONST	red	Continuous	SOLID 100%	Cross Section - Constructed Features
GE-XSECT-EG	21	HIDDEN2	SOLID 90%	Cross Section - Existing Grade
GE-XSECT-EG-TEXT	9	Continuous	SOLID 50%	Cross Section - Existing Grade Text
GE-XSECT-FG	white	Continuous	SOLID 100%	Cross Section - Finish Grade
GE-XSECT-FG-TEXT	white	Continuous	SOLID 100%	Cross Section - Finish Grade Text
GE-XSECT-MATL-PATT	white	Continuous	SOLID 90%	Cross Section - Material Section - Patterns
GE-XSECT-TEXT	white	Continuous	SOLID 100%	Cross Section General Text
OB-ASSM	white	Continuous	SOLID 100%	Assembly - OBJECT
OB-BASELINE	white	Continuous	ROW 100%	Alignment - OBJECT
OB-BASELINE-TEXT	white	Continuous	OB TEXT 150%	Alignment - LABEL
OB-BLDG	white	Continuous	SOLID 100%	Building Site - OBJECT
OB-CANT	white	Continuous	SOLID 100%	Cant View - OBJECT
OB-CATCH	white	Continuous	SOLID 100%	Catchment - OBJECT
OB-CATCH-TEXT	white	Continuous	OB TEXT 100%	Catchment - LABEL
OB-CORR	white	Continuous	SOLID 100%	Corridor - OBJECT
OB-FEATURE	white	Continuous	SOLID 100%	Feature Line - OBJECT

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
OB-FIGURE	white	Continuous	SOLID 100%	Survey Figure - OBJECT
OB-FIGURE-TEXT	white	Continuous	OB TEXT 100%	Survey Figure - LABEL
OB-GRAD	white	Continuous	SOLID 100%	Grading - OBJECT
OB-GRAD-TEXT	white	Continuous	OB TEXT 100%	Grading - LABEL
OB-INTERFER	white	Continuous	SOLID 100%	Interference - OBJECT
OB-INTERSEC	white	Continuous	SOLID 100%	Intersection - OBJECT
OB-INTERSEC-TEXT	white	Continuous	OB TEXT 100%	Intersection - LABEL
OB-MHAUL	white	Continuous	SOLID 100%	Mass Haul Line - OBJECT
OB-MHAUL-VIEW	white	Continuous	SOLID 100%	Mass Haul View - OBJECT
OB-PARCEL	white	Continuous	ROW 100%	Parcel - OBJECT
OB-PARCEL-TEXT	white	Continuous	OB TEXT 100%	Parcel - LABEL
OB-PROF	white	Continuous	SOLID 100%	Profile - OBJECT
OB-PROF-TEXT	white	Continuous	OB TEXT 100%	Profile - LABEL
OB-PROF-UTIL	white	Continuous	SOLID 100%	Utility Line Profile - OBJECT
OB-PROF-VIEW	white	Continuous	SOLID 100%	Profile View - OBJECT
OB-SUBASM	white	Continuous	SOLID 100%	Subassembly - OBJECT
OB-SUPER	white	Continuous	SOLID 100%	Superelevation View - OBJECT
OB-SURFACE	white	Continuous	SOLID 100%	Surface - OBJECT
OB-SURFACE-COLOR	white	Continuous	COLOR OBJECT	Surface - OBJECT - Color Plotting
OB-SURFACE-TEXT	white	Continuous	OB TEXT 100%	Surface - LABEL
OB-SURVEY	white	Continuous	SOLID 100%	Survey Network - OBJECT
OB-TEXT-LINE	white	Continuous	OB TEXT 100%	General Segment - LABEL

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
OB-TEXT-NOTE	white	Continuous	OB TEXT 100%	General Note - LABEL
OB-UTIL	white	Continuous	UTILITY PROP	Utility Line - OBJECT
OB-UTIL-STRC	white	Continuous	UTILITY PROP	Utility Structure - OBJECT
OB-UTIL-STRC-TEXT	white	Continuous	OB TEXT 100%	Utility Structure - LABEL
OB-UTIL-TEXT	white	Continuous	OB TEXT 100%	Utility Line - LABEL
OB-VFRM	white	Continuous	SOLID 100%	View Frame - OBJECT
OB-VFRM-TEXT	white	Continuous	OB TEXT 100%	View Frame - LABEL
OB-XSECT	white	Continuous	SOLID 100%	Section - OBJECT
OB-XSECT-MATL	white	Continuous	SOLID 100%	Material Section - OBJECT
OB-XSECT-TEXT	white	Continuous	OB TEXT 100%	Section - LABEL
OB-XSECT-UTIL	white	Continuous	SOLID 100%	Utility Line Section - OBJECT
OB-XSECT-VIEW	white	Continuous	SOLID 50%	Section View - OBJECT
PR-BR-CENTER	cyan	CENTER	BR 100%	Proposed Centerline of Components
PR-BR-COMP	red	Continuous	BR 100%	Proposed Bridge Features
PR-BR-COMP-HIDN	red	HIDDEN	BR 100%	Proposed Bridge Features - Hidden
PR-BR-CONST-CENTER	cyan	CENTER	BR 150%	Proposed Centerline of Construction and Survey Baseline
PR-BR-CONST-CENTER-GEOM	yellow	Continuous	BR 100%	Proposed Centerline of Construction - Geometry Text
PR-BR-CONSTJT	white	ZIGZAG	BR 100%	Proposed Construction Joint and Proposed Concrete Surface Cut Line
PR-BR-DIMS	cyan	Continuous	BR XREF	Proposed Bridge Dimensions
PR-BR-DIMS-EXT	cyan	Continuous	BR 50%	Proposed Bridge Dimensions - Manually Created Extension Lines
PR-BR-HATCH	blue	Continuous	SOLID 50%	Proposed Bridge Hatching
PR-BR-REBAR	magenta	Continuous	BR 200%	Proposed Bridge Rebar

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
PR-BR-TEXT	yellow	Continuous	BR 100%	Proposed Bridge Text
PR-BR-TEXT-D	green	Continuous	BR 175%	Proposed Bridge Detail/Section Text
PR-BR-TEXT-S	241	Continuous	BR 150%	Proposed Bridge Sub-Title Text
PR-BR-TEXT-T	red	Continuous	BR 175%	Proposed Bridge Sheet Title Text
PR-EV-EROS	131	Continuous	ENVR PROP	Proposed Environmental - Erosion Control
PR-EV-REGL-MITG	131	Continuous	ENVR PROP	Regulatory – Mitigation Areas
PR-EV-TEXT	131	Continuous	ENVR PROP	Environmental – Proposed Text
PR-GT-FEAT	white	Continuous	BR 100%	Proposed Geotechnical Features and Text
PR-HD-AREA	142	Continuous	SOLID 100%	Proposed Calculated Area
PR-HD-ASSM	white	Continuous	SOLID 100%	Proposed Assembly
PR-HD-ASSM-LINK	red	Continuous	SOLID 100%	Proposed Assembly: corridor and section links
PR-HD-ASSM-XSECT	white	Continuous	SOLID 100%	Proposed Assembly: corridor cross section
PR-HD-BARRIER	cyan	Continuous	SOLID 75%	Proposed Concrete Barrier
PR-HD-BL-CT	white	DASHED	ROW 200%	Proposed Baseline - County
PR-HD-BL-GEOM	white	Continuous	ROW 100%	Proposed Baseline - Proposed Geometry Text
PR-HD-BL-RR	white	DASHEDX2	ROW 200%	Proposed Baseline - Railroad
PR-HD-BL-SHLO	white	DASHED	ROW 200%	Proposed Baseline - State Highway
PR-HD-BL-TEXT	white	Continuous	ROW 100%	Proposed Baseline - Proposed Text
PR-HD-BL-TN	white	DASHED2	ROW 200%	Proposed Baseline - City/Town
PR-HD-BL-XX	white	DASHED2	ROW 200%	Proposed Baseline - Miscellaneous
PR-HD-CONT	33	Continuous	SOLID 100%	Proposed Contours
PR-HD-CONT-USER	white	Continuous	SOLID 100%	Proposed User-Defined Contours

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
PR-HD-CORR	white	Continuous	SOLID 100%	Proposed Corridor
PR-HD-CORR-PATT	141	Continuous	SOLID 100%	Proposed Corridor: corridor patterns
PR-HD-CORR-SHAP	32	Continuous	SOLID 100%	Proposed Corridor and Section shapes
PR-HD-CORR-SHAP-PATT	white	Continuous	SOLID 100%	Proposed Corridor and Section Shapes hatching
PR-HD-CURB-BOT	140	Continuous	SOLID 125%	Proposed Bottom of Curbing
PR-HD-CURB-TOP	191	Continuous	SOLID 90%	Proposed Top and Back of Curbing
PR-HD-DAYL	white	HIDDEN	SOLID 200%	Proposed Daylight
PR-HD-DETL	140	Continuous	SOLID 100%	Proposed Miscellaneous Items
PR-HD-DRIVEWAY	red	Continuous	SOLID 100%	Proposed Driveway Edge of Pavement
PR-HD-EPAV	150	Continuous	SOLID 125%	Proposed Edge of Pavement
PR-HD-FLOW	160	PHANTOM	SOLID 90%	Proposed Flow Line
PR-HD-FNCE-CLF	62	FENCE - CHAIN LINK	SOLID 100%	Proposed Fence - Chain Link
PR-HD-FNCE-WRF	62	FENCE - WOOD RAIL	SOLID 100%	Proposed Fence - Wood Rail
PR-HD-GRAD-BREAK	cyan	CENTER	SOLID 90%	Proposed Pavement Grade Break
PR-HD-GRAD-PATT	126	Continuous	SOLID 90%	Proposed Grading Hatching
PR-HD-GRAD-TEXT	white	Continuous	SOLID 100%	Proposed Grading Text
PR-HD-GRDL-STBM	71	GRDRAIL-STEEL-LT	SOLID 100%	Proposed Guardrail - Steel Posts
PR-HD-GRDL-STEEL	71	GRDRAIL-STEEL-LT	SOLID 100%	Proposed Guardrail - Steel Posts
PR-HD-GRDL-WOOD	71	GRDRAIL-WOOD-LT	SOLID 100%	Proposed Guardrail - Wood Posts
PR-HD-GRVL	white	Continuous	SOLID 100%	Proposed Gravel
PR-HD-LIMIT-GRAD	70	DASHED2	SOLID 100%	Proposed Limit of Grading
PR-HD-LIMIT-MILL-OVRLAY	200	HIDDEN2	SOLID 125%	Proposed Limit of Micromilling and Overlay

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
PR-HD-LIMIT-WORK	magenta	Continuous	SOLID 300%	Proposed Limit of Work
PR-HD-PAVERS	210	Continuous	SOLID 100%	Proposed Edge of Pavers
PR-HD-RIPRAP	106	Continuous	SOLID 125%	Proposed Edge of Riprap
PR-HD-SAWCUT	cyan	HIDDEN2	SOLID 100%	Proposed Sawcut Line
PR-HD-SSLP	white	HIDDEN	SOLID 90%	Proposed Sideslope
PR-HD-TEXT	white	Continuous	SOLID 100%	Proposed General Design Text
PR-HD-TREEL	32	TREELINE_L	SOLID 100%	Proposed Treeline
PR-HD-TRGT	210	Continuous	SOLID 100%	Proposed Highway Geometry Model Target
PR-HD-WALK	green	Continuous	SOLID 100%	Proposed Sidewalks
PR-HD-WALK-DWP	yellow	Continuous	SOLID 100%	Proposed Detectable Warning Panel
PR-HD-WALK-JOINT	114	Continuous	SOLID 90%	Proposed Sidewalk Exp Joint at Grade Break
PR-HD-WALL-CONC	225	RETWALL-LEFT	SOLID 100%	Proposed Walls - Concrete
PR-HD-WALL-OTHER	225	RETWALL-LEFT	SOLID 100%	Proposed Walls - Other
PR-HD-WALL-STONE	225	STONEWALL	SOLID 100%	Proposed Walls - Balanced Stone
PR-HD-WSHD	red	HIDDEN2	SOLID 200%	Proposed Surface Watershed Boundaries
PR-HD-WSHD-FLOW	80	CENTER2	SOLID 100%	Proposed Surface Watershed Flow Path
PR-HD-WSHD-TEXT	red	Continuous	SOLID 100%	Proposed Surface Watershed Text
PR-LD-DETAILS	white	Continuous	SOLID 100%	Proposed Landscaping Details
PR-LD-DIMS	240	Continuous	SOLID 100%	Proposed Landscaping Dimensions
PR-LD-GRCOVER	green	Continuous	SOLID 100%	Proposed Landscaping Ground Cover
PR-LD-HATCH	white	Continuous	SOLID 100%	Proposed Landscaping Hatching
PR-LD-ORNGRASS	yellow	Continuous	SOLID 100%	Proposed Landscaping Ornamental Grass

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
PR-LD-PERNNL	red	Continuous	SOLID 100%	Proposed Landscaping Perennial Plants
PR-LD-PLNT-TAG	240	Continuous	SOLID 200%	Proposed Landscaping Plant Tag
PR-LD-SEED	green	Continuous	SOLID 100%	Proposed Landscaping Seed Standard
PR-LD-SHRUB	white	Continuous	SOLID 100%	Proposed Landscaping Shrubs
PR-LD-SITE-FURNISH	182	Continuous	SOLID 100%	Proposed Landscaping Site Furnishings
PR-LD-TEXT	240	Continuous	SOLID 100%	Proposed Landscaping Text
PR-LD-TREE	white	Continuous	SOLID 200%	Proposed Landscaping Trees
PR-LD-TREE-PROT	182	Continuous	SOLID 200%	Proposed Landscaping Tree Protection
PR-LO-CT	blue	Continuous	ROW 200%	Proposed County Layout Lines
PR-LO-GEOM	blue	Continuous	ROW 200%	Proposed Geometry Text for Layout Lines
PR-LO-RR	blue	Continuous	ROW 200%	Proposed Railroad Layout Lines
PR-LO-SHALT	blue	Continuous	ROW 200%	Proposed State Highway Alteration Lines
PR-LO-SHALT-TIES	blue	DASHED2	ROW 100%	Proposed State Highway Alteration Baseline Ties
PR-LO-SHDISC	blue	DASHED	ROW 200%	Proposed State Highway Discontinuance Lines
PR-LO-SHLO-SPRCD	blue	DASHED	ROW 100%	Proposed State Highway Superseded Layout Lines
PR-LO-TEXT	blue	Continuous	ROW 200%	Proposed Text for Layout Information
PR-LO-TN	blue	Continuous	ROW 200%	Proposed Town/City Layout Lines
PR-RW-AREACALC-PERM	green	Continuous	SOLID 100%	No-plot layer for ROW parcel area calculations
PR-RW-AREACALC-TEMP	yellow	Continuous	SOLID 100%	No-plot layer for ROW parcel area calculations
PR-RW-MISC	211	Continuous	ROW 200%	Proposed Miscellaneous RW Items
PR-RW-MONU	211	Continuous	ROW 200%	Proposed Monuments
PR-RW-PERMEASE-CT	green	LINE OF EASE	ROW 200%	Proposed Permanent Easement (Various) for County

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
PR-RW-PERMEASE-ST	green	LINE OF EASE	ROW 200%	Proposed Permanent Easement (Various) for State
PR-RW-PERMEASE-TN	green	LINE OF EASE	ROW 200%	Proposed Permanent Easement (Various) for Town/City
PR-RW-TEMPEASE	green	LINE OF EASE	ROW 200%	Proposed Temporary Easement (Various)
PR-RW-TEXT	211	Continuous	ROW 200%	Proposed Right of Way Text
PR-RW-TEXT-DISP	211	Continuous	ROW 200%	Proposed Right of Way Dispositions Text
PR-TR-FEAT	31	Continuous	SOLID 100%	Proposed Traffic Items
PR-TR-LGHT	31	Continuous	SOLID 100%	Proposed Traffic Lighting
PR-TR-PVMK	31	Continuous	SOLID 100%	Proposed Traffic Pavement Markings
PR-TR-SGNL	31	Continuous	SOLID 100%	Proposed Traffic Signals
PR-TR-SGNS	31	Continuous	SOLID 100%	Proposed Traffic Signs
PR-TR-TEXT	31	Continuous	SOLID 100%	Proposed Traffic Text
PR-TR-UGND	31	CONDUIT	UTILITY PROP	Proposed Traffic Items - Underground
PR-UT-CATV-STRC	40	Continuous	UTILITY PROP	Proposed Communication/CATV Structures
PR-UT-CATV-TEXT	40	Continuous	UTILITY PROP	Proposed Communication/CATV Text
PR-UT-CATV-UGND	40	Continuous	UTILITY PROP	Proposed Communication/CATV Underground
PR-UT-DRAIN-DITCH	white	DASHEDX2	UTILITY PROP	Proposed Drainage Ditch
PR-UT-DRAIN-PROF	white	Continuous	UTILITY PROP	Proposed Drainage Profile
PR-UT-DRAIN-STRC	white	Continuous	UTILITY PROP	Proposed Drainage Structures
PR-UT-DRAIN-TEXT	white	Continuous	UTILITY PROP	Proposed Drainage Text
PR-UT-DRAIN-UGND	white	Continuous	UTILITY PROP	Proposed Drainage Pipes
PR-UT-DRAIN-UGND-PATT	white	Continuous	UTILITY PROP	Proposed Drainage Hatching
PR-UT-DUCE-ROW-ALT	192	Continuous	UTILITY PROP	Proposed DUCE Right of Way Alteration

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
PR-UT-ELEC-OVHD	red	HIDDEN	UTILITY PROP	Proposed Overhead Wires
PR-UT-ELEC-STRC	red	Continuous	UTILITY PROP	Proposed Electric Structures
PR-UT-ELEC-TEXT	red	Continuous	UTILITY PROP	Proposed Electric Text
PR-UT-ELEC-UGND	red	Continuous	UTILITY PROP	Proposed Electric Underground
PR-UT-GAS-STRC	44	Continuous	UTILITY PROP	Proposed Gas Structures
PR-UT-GAS-TEXT	44	Continuous	UTILITY PROP	Proposed Gas Text
PR-UT-GAS-UGND	44	Continuous	UTILITY PROP	Proposed Gas Underground
PR-UT-SEWER-PROF	93	Continuous	UTILITY PROP	Proposed Sewer Profile
PR-UT-SEWER-STRC	93	Continuous	UTILITY PROP	Proposed Sewer Structures
PR-UT-SEWER-TEXT	93	Continuous	UTILITY PROP	Proposed Sewer Text
PR-UT-SEWER-UGND	93	Continuous	UTILITY PROP	Proposed Sewer Pipes
PR-UT-SEWER-UGND-PATT	white	Continuous	UTILITY PROP	Proposed Sewer Hatching
PR-UT-TELE-STRC	40	Continuous	UTILITY PROP	Proposed Telephone Structures
PR-UT-TELE-TEXT	40	Continuous	UTILITY PROP	Proposed Telephone Text
PR-UT-TELE-UGND	40	Continuous	UTILITY PROP	Proposed Telephone Underground
PR-UT-WATERSYS-PROF	150	Continuous	UTILITY PROP	Proposed Water System Profile
PR-UT-WATERSYS-STRC	150	Continuous	UTILITY PROP	Proposed Water System Structures
PR-UT-WATERSYS-TEXT	150	Continuous	UTILITY PROP	Proposed Water System Text
PR-UT-WATERSYS-UGND	150	Continuous	UTILITY PROP	Proposed Water System Pipes
PR-UT-WATERSYS-UGND-PATT	white	Continuous	UTILITY PROP	Proposed Water System Hatching
RD-UT-CATV-STRC	34	Continuous	UTILITY EXIST	Record Location Communication/CATV Structures
RD-UT-CATV-TEXT	34	Continuous	UTILITY EXIST	Record Location Communication/CATV Text

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
RD-UT-CATV-UGND	30	HIDDEN2	UTILITY EXIST	Record Location Communication/CATV Underground
RD-UT-DRAIN-STRC	251	Continuous	UTILITY EXIST	Record Location Drainage Structures
RD-UT-DRAIN-TEXT	251	Continuous	UTILITY EXIST	Record Location Drainage Text
RD-UT-DRAIN-UGND	251	HIDDEN2	UTILITY EXIST	Record Location Drainage Underground
RD-UT-ELEC-OVHD	15	HIDDEN	UTILITY EXIST	Record Location Overhead Wires
RD-UT-ELEC-STRC	15	Continuous	UTILITY EXIST	Record Location Electric Structures
RD-UT-ELEC-TEXT	15	Continuous	UTILITY EXIST	Record Location Electric Text
RD-UT-ELEC-UGND	15	HIDDEN2	UTILITY EXIST	Record Location Electric Underground
RD-UT-GAS-STRC	52	Continuous	UTILITY EXIST	Record Location Gas Structures
RD-UT-GAS-TEXT	52	Continuous	UTILITY EXIST	Record Location Gas Text
RD-UT-GAS-UGND	52	HIDDEN2	UTILITY EXIST	Record Location Gas Underground
RD-UT-OIL-STRC	52	Continuous	UTILITY EXIST	Record Location Oil Structures
RD-UT-OIL-TEXT	52	Continuous	UTILITY EXIST	Record Location Oil Text
RD-UT-OIL-UGND	52	HIDDEN2	UTILITY EXIST	Record Location Oil Underground
RD-UT-OTHR-STRC	52	Continuous	UTILITY EXIST	Record Location Utility - Other Structures
RD-UT-SEWER-STRC	126	Continuous	UTILITY EXIST	Record Location Sewer Structures
RD-UT-SEWER-TEXT	126	Continuous	UTILITY EXIST	Record Location Sewer Text
RD-UT-SEWER-UGND	126	HIDDEN2	UTILITY EXIST	Record Location Sewer Underground
RD-UT-STEAM-STRC	52	Continuous	UTILITY EXIST	Record Location Steam Structures
RD-UT-STEAM-TEXT	52	Continuous	UTILITY EXIST	Record Location Steam Text
RD-UT-STEAM-UGND	52	HIDDEN2	UTILITY EXIST	Record Location Steam Underground
RD-UT-TELE-STRC	34	Continuous	UTILITY EXIST	Record Location Telephone/Communication Structures

NAME	COLOR	LINETYPE	PLOT STYLE	DESCRIPTION
RD-UT-TELE-TEXT	34	Continuous	UTILITY EXIST	Record Location Telephone/Communication Text
RD-UT-TELE-UGND	34	HIDDEN2	UTILITY EXIST	Record Location Telephone/Communication Underground
RD-UT-TR-UGND	34	CONDUIT	UTILITY EXIST	Record Location Traffic Items - Underground
RD-UT-WATERSYS-STRC	142	Continuous	UTILITY EXIST	Record Location Water Systems Structures
RD-UT-WATERSYS-TEXT	142	Continuous	UTILITY EXIST	Record Location Water Systems Text
RD-UT-WATERSYS-UGND	142	HIDDEN2	UTILITY EXIST	Record Location Water Systems Underground