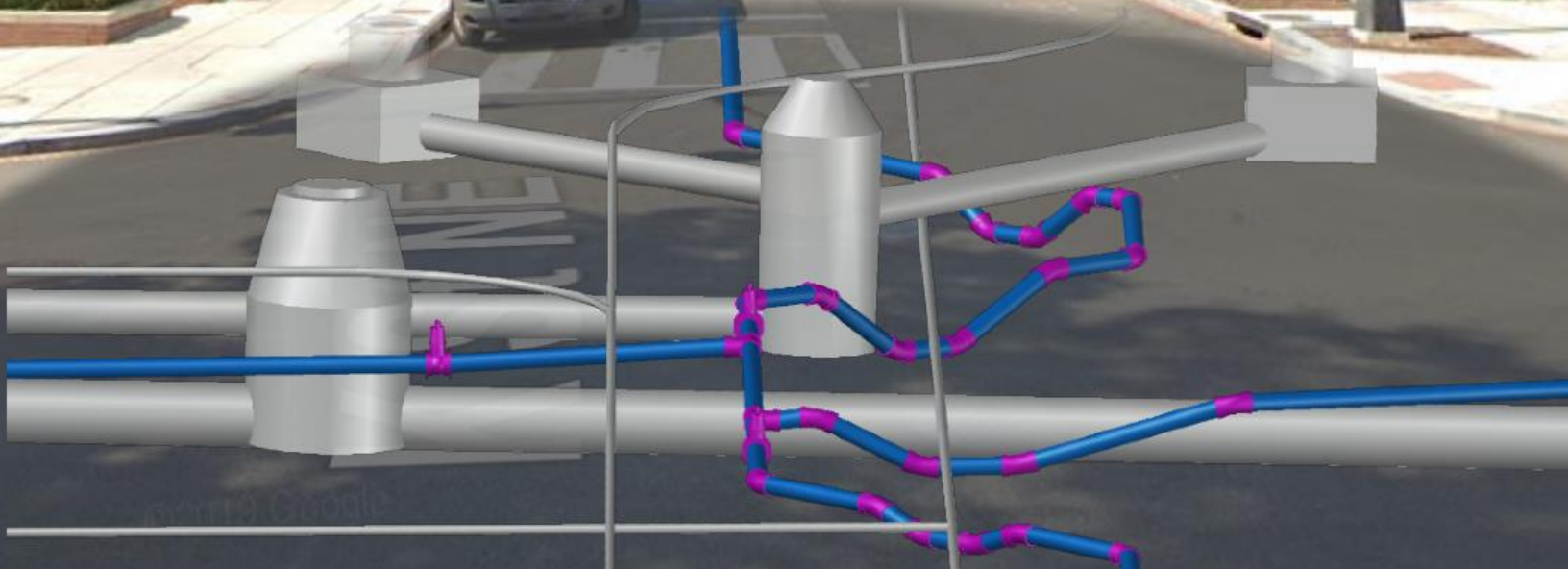


**DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY
(DC Water)**



**LINEAR CAD
MANUAL**

April 2023

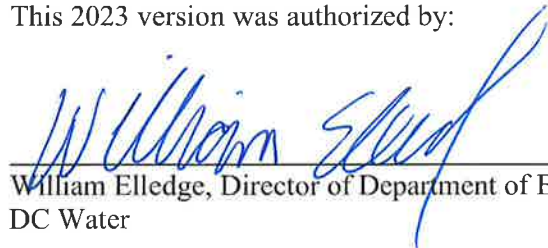


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Authorization Form

Log of Revisions		
Revision Number	Date	Brief Description of Revision
1	April 2023	This is a significant rewrite superseding previous CAD manuals for linear water and sewer work.

This 2023 version was authorized by:



William Elledge, Director of Department of Engineering and Technical Services
DC Water

4-1-23

Date

The text portion of this LCM is available at <https://dcwater.com/design-and-construction-standards>.

Appendices and support files are necessary for use of the LCM. Individuals outside the DC Water firewall can obtain the appendices and support files by asking their DC Water Project Manager or another DC Water representative. Individuals inside the DC Water firewall can obtain the appendices and support files DC Water’s enterprise information management software (at time of publication DC Water uses OpenText, also known as Livelink).

For information about delegated approval requirements within the LCM, see [Article 1.5 Revisions](#), [Article 1.6 Deviations](#), and [Paragraph 2.9.3 Project Specific Details](#).

(Image credit: Google Streetview, dated July 2019)

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Table of Contents

Table of Contents	v
List of Figures	xv
List of Tables	xv
Acronyms and Abbreviations	xvi
Definitions.....	xvii
Typeface.....	xx
1. Introduction.....	24
1.1 Purpose.....	24
1.2 Audience	24
1.3 Role of the PDE	24
1.4 Organization of LCM.....	24
1.5 Revisions	26
1.6 Deviations	27
2. General CAD Standards.....	28
2.1 Software	28
2.2 Layers.....	28
2.3 Linetypes.....	29
2.4 Drawing Sheet Size.....	29
2.5 Acceptable Scales	29
2.6 Annotation.....	30
2.6.1 Text Styles	30
2.6.2 Text Orientation	30
2.6.3 Font	31
2.6.4 Leaders.....	31
2.6.5 Dimensions	31
2.6.6 Note Label Styles.....	32
2.7 Use of Paper Space	33
2.8 Notes	33
2.8.1 General Notes	33
2.8.2 Sheet Notes	33
2.8.3 Coded Notes.....	34
2.8.4 Design Notes.....	36
2.9 Details	36
2.9.1 Standard Details	36
2.9.2 3rd Party Details	37
2.9.3 Project Specific Details.....	37
2.9.4 Civil Details	37
2.9.5 Detail Callouts	37

2.10 Legends	38
2.11 Maps.....	38
2.11.1 Location Map.....	39
2.11.2 Site Map.....	40
2.11.3 Key Map	40
2.12 Plotting.....	41
3. CAD System Setup	42
3.1 File Structure.....	42
3.1.1 CAD Standards Folder	42
3.1.2 CAD Projects Folder.....	42
3.2 Drawing Templates	44
3.3 Folder and File Naming Conventions	45
3.3.1 Fields Used for Creating Folder and File Names.....	45
3.3.2 CAD Project Folder Naming	46
3.3.3 Survey Folder.....	47
3.3.4 Drawing Names	47
3.3.5 Plan Names (single page pdfs).....	47
3.3.6 Plan Set Names (multi-page pdfs)	48
3.3.7 Related documents.....	48
3.3.8 Milestone Submissions	48
3.4 Support File Settings.....	48
3.4.1 Pipe Network Catalog Settings	48
3.4.2 Pressure Network.....	49
3.4.3 Pay Items.....	49
3.4.4 AutoCAD Civil 3D Profile	49
3.4.5 Plot Style Table.....	49
3.5 External References	49
3.6 Data Shortcuts.....	50
3.7 Data Links	51
3.8 Plot Standards	51
3.9 Drawings Version Control during Bidding and Construction.....	51
4. Sheet Set Manager and Title Blocks.....	52
4.1 Sheet Set Templates.....	52
4.2 Sheet Set Template Attributes.....	52
4.2.1 Sheet Set-Specific Attributes and Sheet-Specific Attributes	52
4.2.2 Attributes to be carried to other fields	52
4.2.3 DCRA Compliance	52
4.2.4 Sheet Designations.....	52
4.3 Sheet Coordination.....	53
4.4 Sheet Order	54

4.5 Sheet Numbering.....	55
4.6 Submittal Sheets.....	56
4.7 Title Blocks.....	57
4.7.1 DC Water Title Block.....	57
4.7.2 DDOT Linear Design Title Block.....	57
4.8 Publishing.....	57
5. GIS Drawing.....	58
5.1 Purpose.....	58
5.2 Layers.....	58
5.2.1 Layer Filters.....	59
5.3 Labels.....	59
5.3.1 Roads.....	59
5.3.2 Square Boundaries.....	59
5.3.3 Lots and Addresses.....	60
5.3.4 Pressure Zones.....	60
5.3.5 Hardscape.....	60
5.4 Linework.....	61
5.4.1 Street Lines and Rights-of-Way.....	61
5.4.2 Lot Lines.....	61
5.4.3 Pressure Zone Lines.....	61
5.4.4 Buildings.....	61
5.4.5 Building Restriction Lines.....	61
5.5 Hatching.....	62
5.5.1 Buildings.....	62
5.5.2 Concrete.....	62
5.5.3 Stone & Pavers.....	62
5.5.4 Brick.....	62
5.5.5 Gravel.....	62
5.6 Points.....	62
5.6.1 Description Key Sets.....	62
5.6.2 Symbols.....	62
6. Survey Raw Drawing.....	64
6.1 Purpose.....	64
6.2 Layers.....	64
6.2.1 Layer Filters.....	64
6.3 Data Shortcuts.....	64
6.4 Labels.....	64
6.5 Survey User Settings.....	64
6.6 Survey Databases.....	65
6.6.1 Import Events.....	65

6.6.2 Networks.....	65
6.6.3 Figures	65
6.6.4 Survey Points	66
6.7 Equipment Databases.....	66
6.8 Figure Prefix Databases	66
6.9 Linework Code Sets	66
6.10 Traverse.....	66
6.11 Code List.....	66
6.12 Points.....	66
6.12.1 Point Codes & Attributes	66
6.12.2 Description Key Sets	67
6.12.3 Point Groups	67
6.12.4 Point Styles	67
6.13 Surfaces.....	67
6.13.1 Existing Surface Creation for Water and Sewer Replacement	67
6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets.....	68
6.13.3 Existing Surface Display.....	68
7. Survey Drawing.....	69
7.1 Purpose.....	69
7.2 Layers.....	69
7.2.1 Layer Filters	69
7.3 Labels.....	69
7.3.1 Asset Tags.....	69
7.4 Linework.....	69
7.4.1 Lot Lines, Street Lines, and Right-of-Way Lines.....	70
7.5 Hatching.....	70
7.6 Points.....	70
7.6.1 Symbols	70
7.6.2 Existing Surface	70
8. Existing Utility Drawing.....	71
8.1 Purpose.....	71
8.2 Layers.....	71
8.2.1 Layer Filters	71
8.3 Labels.....	71
8.4 Annotation.....	71
8.5 Linework.....	71
8.5.1 Water Services	71
8.5.2 Sewer Laterals.....	72
8.5.3 Depiction of Pipe Width	72
8.6 Existing Surface	72

8.6.1 Existing Surface Reference.....	72
8.6.2 Existing Surface Display.....	72
8.7 Utility Quality Level Designation (ASCE 38).....	72
8.8 Pipe Network.....	72
9. General Sheets	74
9.1 Purpose.....	74
9.2 Layers.....	74
9.2.1 Layer Filters.....	74
9.3 External References.....	74
9.3.1 Drawings.....	74
9.3.2 PDFs.....	74
9.3.3 Data Shortcuts.....	74
9.4 Labels.....	74
9.4.1 Contract and Project Title (Cover).....	74
9.4.2 Project Areas (Cover).....	75
9.4.3 Street Names (Site Maps).....	75
9.5 Sheets.....	75
9.5.1 Cover Sheet and Project Data.....	75
9.5.2 Sheet Index and Project Data.....	75
9.5.3 Site Map Sheet.....	76
9.5.4 Legend Sheet.....	76
9.5.5 Abbreviations Sheet.....	76
9.5.6 General Notes Sheet.....	77
9.5.7 Water Fittings and Coded Notes Sheet.....	77
9.5.8 Sewer Rehabilitation Coded Notes, Legends, and Detail Sheet.....	77
9.5.9 Standard Detail Sheets.....	77
9.5.10 3rd Party Detail Sheets.....	78
9.5.11 Project Specific Detail Sheets.....	78
10. Survey Sheets	79
10.1 Purpose.....	79
10.2 Layers.....	79
10.2.1 Layer Filters.....	79
10.2.2 Layer States.....	79
10.3 External References.....	79
10.3.1 Drawings.....	79
10.4 Labels.....	80
10.4.1 Traverse Points.....	80
10.5 Linework.....	80
10.6 Key Map.....	80
10.7 Blocks.....	80

10.7.1 Match Lines	80
10.7.2 North Arrows	80
10.7.3 Graphic Scale	80
10.8 Tables	80
10.8.1 Traverse Control Tables.....	80
10.9 Points.....	81
10.9.1 Traverse Points	81
10.10 Existing Surface	81
10.10.1 Existing Surface Reference.....	81
10.10.2 Existing Surface Display.....	81
10.11 Street Alignments.....	81
10.11.1 Alignment Data Shortcut	82
10.11.2 Alignment Stationing	82
10.11.3 Alignment Naming.....	82
10.11.4 Alignment Settings.....	82
10.12 View Frames	82
10.13 Match Lines.....	83
10.14 Sheets	83
10.14.1 Survey Control Sheets.....	83
10.14.2 Existing Conditions Sheets	84
11. Water Design Drawing and Sheets	85
11.1 Purpose.....	85
11.2 Layers.....	85
11.2.1 Layer Filters	85
11.2.2 Layer States.....	85
11.3 External References	85
11.3.1 Drawings.....	85
11.3.2 Data Links.....	85
11.4 Labels.....	85
11.4.1 Pressure Pipe Networks	85
11.4.3 Traverse Points	86
11.4.4 Water Service Information.....	86
11.5 Linework	86
11.5.1 Water Service Lines	86
11.5.2 Abandoned Watermains.....	86
11.5.3 Civil Detail Outline.....	87
11.5.4 Limits of Disturbance	87
11.6 Key Map.....	87
11.7 Blocks	87
11.7.1 Match Lines	87

11.7.2 North Arrows	87
11.7.3 Graphic Scale	87
11.7.4 Existing Structures to be Abandoned or Removed	87
11.7.5 Fire Hydrant Stamp.....	87
11.7.6 Valve Stamp.....	88
11.8 Tables.....	89
11.8.1 Watermain Line & Curve Tables	89
11.8.2 Water Service Tables	89
11.9 Points.....	89
11.9.1 Road CL & Profile Intersection Points	89
11.10 Surfaces.....	89
11.10.1 Existing Surface Reference.....	89
11.10.2 Existing Surface Display.....	89
11.10.3 New Surfaces	89
11.11 Design Alignments.....	90
11.12 View Frames	90
11.13 Match Lines.....	90
11.14 Pipe Networks and Pressure Pipe Networks	90
11.14.1 Pressure Pipe Networks for New Water Assets	90
11.14.2 Pressure Pipe Network Styles	90
11.14.3 Pipe Networks for Utility Crossings	90
11.15 Profiles	90
11.15.1 Profile Creation.....	90
11.15.2 Profile Surface Reference	91
11.15.3 Profile Views	91
11.16 Sheets	91
11.16.1 Watermain Replacement Sheets	91
11.16.2 Watermain Profile Sheets	92
11.16.3 Civil Detail Sheets	92
11.16.4 Hydrant and Valve Table Sheets.....	92
11.16.5 Water Service Table Sheets	92
12. Sewer Design Drawing and Sheets	93
12.1 Purpose.....	93
12.2 Layers.....	93
12.3 External References	93
12.4 Labels	93
12.4.1 Pipe Networks.....	93
12.5 Linework	93
12.5.1 Sewer Laterals.....	93
12.5.2 Abandoned Sewers.....	94

12.5.3 Civil Detail Outline.....	94
12.5.4 Limits of Disturbance	94
12.6 Key Map.....	94
12.7 Blocks	94
12.7.1 Match Lines	94
12.7.2 North Arrows	94
12.7.3 Graphic Scale.....	94
12.7.4 Maintenance Hole Stamp.....	94
12.8 Tables.....	95
12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule.....	95
12.9 Points.....	97
12.9.1 Road CL & Profile Intersection Points	97
12.10 Surfaces.....	97
12.10.1 Existing Surface Reference.....	97
12.10.2 Existing Surface Display.....	97
12.10.3 Surfaces for External Point Repairs.....	98
12.11 Design Alignments.....	99
12.11.1 Sewer Rehabilitation Sheets	99
12.11.2 Civil Details showing External Point Repairs.....	99
12.11.3 New Sewers & Sewer Replacement	99
12.12 View Frames	99
12.13 Match Lines.....	100
12.14 Pipe Networks	100
12.14.1 Pipe Networks for New Sewer Assets	100
12.14.2 Pipes.....	100
12.14.3 Structures	100
12.14.4 Pipe Networks for Utility Crossing.....	101
12.15 Profiles	101
12.15.1 Profile Creation.....	101
12.15.2 Profile Surface Reference	101
12.15.3 Profile Views	101
12.16 Sheets	101
12.16.1 Sewer Replacement Plan and Profile Sheets.....	101
12.16.2 Sewer Rehabilitation Sheets	101
12.16.3 Civil Detail Sheets	102
12.16.4 Sewer Lateral Rehabilitation Schedule Sheets.....	102
12.16.5 Sewer Bypass Table Sheets	102
12.16.6 Sewer Maintenance Hole Table Sheets.....	102
12.16.7 Pipe and Maintenance Hole Rehabilitation Schedule Sheets.....	102
13. Surface Restoration Plans	103

13.1 Purpose.....	103
13.2 Layers.....	103
13.3 External References	103
13.4 Linework	103
13.4.1 Water Service Lines	103
13.4.2 Curb Repair/Replacement.....	103
13.4.3 Pavement Restoration	103
13.4.4 Sidewalk Restoration	104
13.4.5 Grass Restoration.....	104
13.5 Hatching.....	104
13.6 Key Map.....	104
13.7 Blocks	104
13.7.1 Match Lines	104
13.7.2 North Arrows	104
13.7.3 Graphic Scale.....	104
13.8 Tables.....	104
13.9 Design Alignments.....	105
13.10 View Frames	105
13.11 Match Lines.....	105
13.12 Subassemblies	105
13.13 Assemblies	105
13.14 Corridors	105
13.15 Pay Items.....	105
13.16 Quantity Takeoffs	105
13.17 Sheets	106
14. Erosion and Sediment Control Plans	107
14.1 Purpose.....	107
14.2 Layers.....	107
14.3 External References	107
14.3.1 Drawings.....	107
14.3.2 PDFs.....	107
14.4 Dimensions.....	107
14.5 Linework	107
14.6 Key Map.....	107
14.7 Blocks	108
14.7.1 Match Lines	108
14.7.2 North Arrows	108
14.7.3 Graphic Scale.....	108
14.7.4 Inlet Protection.....	108
14.7.5 Tree Protection.....	108

14.7.6 Advertisement Note	108
14.8 Design Alignments.....	108
14.9 View Frames	108
14.10 Match Lines.....	108
14.11 Sheets	108
14.11.1 ESC General Sheets	108
14.11.2 ESC Plans	109
15. Traffic Control Plans	110
15.1 Purpose.....	110
15.2 Layers.....	110
15.3 External References	110
15.3.1 Drawings.....	110
15.3.2 PDFs.....	110
15.4 Labels.....	110
15.5 Dimensions.....	111
15.6 Hatching.....	111
15.7 Blocks	111
15.7.1 Traffic Control	111
15.7.2 North Arrows	111
15.7.3 Graphic Scale.....	111
15.7.4 Advertisement Note	111
15.8 Viewports	111
15.9 Match Lines.....	112
15.10 Sheets	112
15.10.1 TCP General Sheets	112
15.10.2 Traffic Control Plans.....	113
16. As-Builts And Record Drawings	114
16.1 Purpose.....	114
16.2 Sheet Designator	114
16.3 Requirements From Other Drawing Types	114
16.4 File Management.....	114
16.5 Stamps, Schedules, and Tables	114
16.6 Title Block and Layers	115
16.7 Record Drawing Disclaimer.....	115
17. Submission and Audit Process.....	116
17.1 CAD Standards Checklist	116
17.2 External References	116
17.3 E-Transmit	116
17.4 Submission.....	116
17.5 CAD Standards Checker	116

18. BIM 360	117
18.1 Purpose.....	117
18.2 BIM 360 Management	117
18.3 BIM 360 Access.....	117
18.4 BIM 360 Collaboration	117
18.4.1 Uploads/Submittals	117
18.4.2 BIM 360 Transmittals	118
18.5 BIM 360 CAD Standards Site	119

List of Figures

Figure 1: Text Orientation.....	8
Figure 2: Note Label Styles available in the CAD Standards Templates.....	9
Figure 3: Example Sheet Note.....	11
Figure 4: Sample Fields to Use when Creating Coded Notes.....	12
Figure 5: Example Coded Note.....	12
Figure 6: Example Design Note.....	13
Figure 7: Civil Design Callout.....	15
Figure 8: Example Cover Sheet and Location Map.....	16
Figure 9: Example Site Map.....	17
Figure 10: Example Key Map.....	18
Figure 11: Example File Structure.....	21
Figure 12: Example Plan Set Names as Submitted to DCRA.....	25
Figure 13: Xref Dialog Box.....	28
Figure 14: Data Shortcuts in AutoCAD Civil3D.....	29
Figure 15: Example Labels for Lot Lines, Addresses, Street Names, and Squares.....	38
Figure 16: Phantom linetype used for GIS sourced street lines and right-of-way lines.....	39
Figure 17: Survey User Settings.....	43
Figure 18: Modified phantom linetype used for survey located street lines and lot lines.....	49
Figure 19: Abbreviated Sheet Index Example.....	55
Figure 20: Fire Hydrant Stamp Example.....	67
Figure 21: Valve Stamp Example.....	68
Figure 22: Civil Detail Callout Example.....	72
Figure 23: Example Maintenance Hole Block (Block Name: DCW-SSWR-MH-STMP).....	75
Figure 24: Clock Position for inflow and outflow pipes.....	75
Figure 25: Surface Styles.....	79
Figure 26: Pipe Styles.....	82
Figure 27: Example SRP and TCP Sheets shown in Sheet Set Manager.....	88
Figure 28: Example ESC Sheets shown in Sheet Set Manager.....	91
Figure 29: Example BIM 360 Deliverables Folder.....	100
Figure 30: Example BIM 360 Transmittal Tab.....	100
Figure 31: Example BIM 360 Transmittal Dialog Box.....	101

List of Tables

Table 1: Folders inside the CAD Standards Folder	44
Table 2: Contents of Project Folder	44
Table 3: Plot Style Tables	51
Table 4: Sheet Groups & Designations.....	53
Table 5: Sheet Order	54
Table 6: Sheets in Each Submittal	56

Table 7: Pipe Network Parts Lists and Rule Sets.....	73
Table 8: Pressure Pipe Labels Styles	86

Acronyms and Abbreviations

ASCE	American Society of Civil Engineers
C	Civil Design Sheet (sheet designation)
CAD	Computer-aided drafting and design
CD	Civil Detail Sheet (sheet designation)
CIP	Capital improvement program
COGO	Coordinate geometry
CT	Civil Table Sheet (sheet designation)
DC	District of Columbia
DC Water	District of Columbia Water and Sewer Authority
DCRA	(District of Columbia) Department of Consumer and Regulatory Affairs
DOEE	(District of Columbia) Department of Energy and Environment
DDOT	District of Columbia Department of Transportation
dtm	Digital terrain model (file extension)
<i>dwg</i>	AutoCAD Drawing (file extension)
<i>dws</i>	AutoCAD Standards File (file extension)
<i>dwt</i>	AutoCAD Drawing Template (file extension)
ES	Erosion and Sediment Control Plan (sheet designation)
ESC	Erosion and Sediment Control
G	General Sheet (sheet designation)
GE	Erosion and Sediment Control Plan General Sheet (sheet designation)
GIS	Geographical information system
GT	Traffic Control Plan General Sheet (sheet designation)
LCM	Linear CAD Manual
MOT	Maintenance of traffic
NPS	National Park Service
OCTO	(District of Columbia) Office of the Chief Technology Officer
PDE	Project Design Engineer
pdf	Portable document format (file extension)
SDWM	Small diameter watermain
SR	Surface Restoration Plan (sheet designation)
SRP	Surface Restoration Plan
TC	Traffic Control Plan (sheet designation)
TCP	Traffic Control Plan
txt	Text file (file extension)
V	Existing Conditions Sheet (sheet designation)
VC	Survey Control Sheet (sheet designation)
xml	Extensible markup language (file extension)
<i>xref</i>	External reference (within AutoCAD)

Definitions

- **As-Built** – Actual conditions of work as-constructed, regardless of whether that work is identical or different than Drawings depicting the work. This includes all additions, deletions, and deviations to the project work.
- **As-Built Drawings** – A record of the As-Built work performed by a construction contractor that is documented on Drawing(s).
 - **Partial As-Built Drawings:** As-Built Drawings that are certified and submitted to DC Water prior to the end of construction and which show all As-Built work up to that moment in time.
 - **Final As-Built Drawings:** As-Built Drawings that are certified and submitted to DC Water after all construction work is complete and which contain all As-Built work performed during construction.
- **CAD Standards** – The set of guidelines, procedures, and policies described in this LCM that describe the way CAD shall be implemented to produce linear design Drawings. The CAD Standards include the appearance of design Drawings and Sheets. The purpose of CAD Standards is to improve productivity and interchange of CAD documents between different PDEs.
- **Civil Design Drawings** – The Civil Design Drawing is used to design and depict project work for water, combined sewer, sanitary sewer, and storm sewer assets. Civil Design Sheets use the sheet designator C for both water and sewer.
 - **Sewer Design Drawings** – The Sewer Design Drawing is a subset of the Civil Design Drawing used for sewer work. See [Section 12 Sewer Design Drawing and Sheets](#) for more information.
 - **Water Design Drawings** – The Sewer Design Drawing is a subset of the Civil Design Drawing used for water work. See [Section 11 Water Design Drawing and Sheets](#) for more information.

Projects that include water and sewer follow the requirements for Sewer Design Drawings and Water Design Drawings taking advantage of combined efficiencies where possible and adjusting requirements as needed to create a holistic project design.

- **Civil Detail** – A Plan with larger scale (zoomed in) used to show a finer, more detailed project area when a traditional (20-scale or 50-scale) Plan does not clearly depict site information. Civil Detail Sheets use the sheet designator CD.
- **BIM 360** – A collaborative cloud file sharing site for submitting, commenting, and managing .dwg files. This includes real time sharing and version tracking, and consultant submittals. Sharing of templates, support files, and standard documents.
- **Designer** – A drafting technician and/or user of AutoCAD who creates technical Drawings (Plans, profiles, details, etc.) that depict a site and/or work to be executed on that site. A Designer usually has specific technical training in AutoCAD and may have an Associate’s Degree in Engineering Technology or a Bachelor’s Degree in Engineering or similar field.
- **Drawing** – An electronic AutoCAD file with file extension dwg. Drawing, Map, Plan, and Sheet are unique terms and are not interchangeable.
- **Erosion and Sediment Control (ESC) Plan** – ESC Plans depict practices to be used by a construction contractor to meet regulatory requirements for controlling erosion on the project site and prevent sediment runoff leaving the project site. ESC Plans are prepared to obtain permits from District of Columbia Department of Energy and Environment (DOEE) and other jurisdictions. ESC Plans are shown on Sheets with the designator ES. See [Section 14 Erosion and Sediment Control Plan](#) for more information.

- **Existing Conditions Sheet** – The Existing Conditions Sheet document existing site conditions, including all geographical information system (GIS), survey, and utility information. Existing Conditions Sheets use the sheet designator V. See [Section 10 Survey Sheets](#) for more information.
 - **Existing Utility Drawing** – The Existing Utility Drawing is used to process and display existing utilities. Survey located utility features are included in the Survey Drawing, but subsurface and overhead utility lines are drawn in the Existing Utility Drawing. Both dry utilities (electric, communication, gas, etc) and wet utilities (water and sewer only) are drawn in the Existing Utility Drawing. See [Section 8 Existing Utility Drawing](#) for more information.
 - **General Sheets** – General Sheets show general project information relevant to the *Sheet Set* as a whole. General Sheets use the sheet designator G. See [Section 9 General Sheets](#) for more information.
 - **GIS Drawing** – The GIS Drawing shows property information and any surface features collected from various GIS databases. The GIS Drawing and the Survey Drawing are used together to show surface features on a project site. See [Section 5 GIS Drawing](#) for more information.
 - **Linear CAD Manual (LCM)** – This document, including its appendices and support files, latest version as authorized by DC Water.
 - **Maintenance of Traffic (MOT)** – The practices and procedures shown on TCPs and used to obtain permits. MOT includes TCPs, permitting, traffic control devices, and operating traffic control in the field.
 - **Map** – A diagrammatic depiction of an area as seen on a horizontal plane at ground level (as if looking down from a helicopter). Maps depict a relatively large scale (zoomed out). DC Water’s CAD Standards include three types of standard Maps, each defined below. See [Article 2.11 Maps](#) for more information on each of the three standard Maps.
 - **Key Map** – A diagrammatic depiction of the vicinity immediately surrounding the limits of work shown on the current Sheet. Key Maps include Sheet boundaries of the current and adjacent Sheets. They help the user with Sheet orientation and maneuvering between Sheets in a Plan Set.
 - **Location Map** – A diagrammatic depiction of Washington DC in its entirety, its streets, and the project site. The Location Map for DC Water project is shown on the Cover Sheet.
 - **Site Map** – A diagrammatic depiction of the entire project that usually includes enough street location to orient the project within a neighborhood.
- Drawing, Map, Plan, and Sheet are unique terms and are not interchangeable.
- **may** – Indicates something that is not mandatory but permissible. The terms may and should are not interchangeable with must or shall.
 - **must** – Indicates a mandatory requirement. Failure to meet a mandatory requirement is cause to reject a submittal. The terms may and should are not interchangeable with must or shall. The terms must and shall are interchangeable.
 - **Phasing Plan** – Phasing Plans depict sequencing of different TCPs in the same project area. Phasing Plans use the sheet designator GT. See [Paragraph 15.10.1.2 TCP Phasing Plan](#) for more information.
 - **Plan** – A diagrammatic depiction of an area as seen on a horizontal plane at ground level (as if from a helicopter). Plans depict a relatively small scale (zoomed in). Drawing, Map, Plan, and Sheet are unique terms and are not interchangeable. A single page pdf is also referred to as a Plan.
 - **Plan Set** – A Plan Set is a pdf of all Sheets depicting the project work. Plan Set is also a hard copy printout of the Plan Set pdf. Plan Set and *Sheet Set* are unique terms and not interchangeable.
 - **Planimetrics** – The depiction of geographic/survey features that are represented independent of elevation. Planimetric features are represented in a 2D Drawing (at elevation zero) as they are seen from an aerial photograph.

- **Project Design Engineer (PDE)** – The individual responsible for signing and sealing the project Plans and specifications, specifically the individual or firm who is in responsible charge of the design as defined by the regulatory requirements of the District of Columbia (DC) or other jurisdiction as defined by the project location. The PDE shall have a current Professional Engineer license in DC. The PDE shall also be licensed in Maryland or Virginia depending on the project’s location in those states. The PDE shall ensure the project complies with all requirements of this LCM. See [Article 1.3 Role of the PDE](#) for more information.
- **Record Drawing** – Drawings compiled from information based on design Drawings; modified based on As-Built Drawings and information, or other record information (such as addenda, work change directives, change orders, inspection reports, survey data, etc.); prepared in an approved electronic format; and recorded in an approved repository as reference documents for future work. When Record Drawings are created as part of a traditional project they use traditional sheet designators (described in [Table 4: Sheet Groups & Designations](#)), but when Record Drawings are produced outside the traditional project design process, the Record Drawing uses the V sheet designator.
- **shall** – Indicates a mandatory requirement. Failure to meet a mandatory requirement is cause to reject a submittal. The terms may and should are not interchangeable with must or shall. The terms must and shall are interchangeable.
- **Sheet** – a Drawing layout tab in paper space that depicts a title block and other Sheet information, usually including a view frame and/or viewport that in turn depicts a portion of the project work. Drawing, Map, Plan, and Sheet are unique terms and are not interchangeable. Sheets are numbered with discipline categories such as G-1, C-1.2, or ES-1.3.
- **Sheet Set** – an organized and named collection of Sheets from one or more Drawings. *Sheet Set* is a term within AutoCAD Civil 3D. A *Sheet Set* includes all the layout tabs from the Drawing(s). In common conversation, a *Sheet Set* is sometimes called a drawing set even though it is not exactly accurate. Plan Set and *Sheet Set* are unique terms and not interchangeable.
- **should** – Indicates something that is recommended but not mandatory. Failure to do what "should" be done is not cause for submittal rejection. The term should is not interchangeable with must or shall.
- **Squares** – Squares are a system of grids (typically city blocks) that overlay all of DC. Squares create a DC-wide grid system that uniquely determine the position of lots, lot lines, street lines, and right-of-way lines. See [Section 5.3.2 Square Boundaries](#) for more information.
- **Standard Detail** – Depiction of a common appurtenance that is used on multiple projects and does not change from project to project. Examples include water service connections and fire hydrants. Standard Details are authorized by DC Water, published on DC Water’s website, and labeled as “Standard Details.” Standard Details are used on multiple projects with no changes except when approved by DC Water. See [Paragraph 2.9.1 Standard Details](#) for more information.
- **Surface Restoration Plan (SRP)** – SRPs depict assumed limits of surface restoration that will be included in the Schedule of Prices or Opinion of Probable Construction Cost. SRPs use the sheet designator SR. Use of the term “Plan” in this case could also be termed “Sheet” but “Plan” is used because SRPs are not included in the *Sheet Set* provided to bidders. See [Section 13 Surface Restoration Plans](#) for more information.
- **Survey Drawing** – The Survey Drawing shows any surface features collected using field survey (including existing utility features). The Survey Drawing and the GIS Drawing are used together to depict surface features on a project site. See [Section 7 Survey Drawing](#) for more information.
- **Survey Raw Drawing** – The Survey Raw Drawing is used to process and display raw survey data. It contains all 3D survey data and surfaces. See [Section 6 Survey Raw Drawing](#) for more information.
- **Traffic Control Plan (TCP)** – TCPs depict practices to be used by a construction contractor to meet regulatory requirements for controlling traffic flow around and/or through the project site. TCPs are

prepared to obtain permits from the District of Columbia Department of Transportation (DDOT). TCPs use the sheet designator TC. Use of the term “Plan” in this case could also be termed “Sheet” but “Plan” is used as this is the terminology used by DDOT. See Section 15 Traffic Control Plans for more information.

Typeface

Font: Arial italic (for example, *ByLayer*) is used throughout this document to indicate AutoCAD terms such as tools, commands, menus, dialog box names, layers, styles, settings, file names, file paths, folder names, or within AutoCAD.

Capitalization: File names, folder paths, and folder names are capitalized to match the file or folder. All Sheet titles and defined terms are capitalized. Named AutoCAD terms are also capitalized as proper nouns. General AutoCAD terms are not capitalized (unless their usage within a sentence warrants capitalization, such as the first word in a sentence).

For example:

- *VI-PROP-RWAY-E* is the name of a *layer*, so it is noted in Arial italic. It is also a named AutoCAD term, so it is capitalized as in AutoCAD. Because *layer* is not a specific term it is not capitalized, but it is in Arial italic because it is a general AutoCAD term.
- A reference to *Surface Style Settings* is a dialog box in AutoCAD so it is noted in Arial italic. It is also a named dialog box in AutoCAD, so it is capitalized.
- A reference to the *surface style* called *DCW_SURVEY* is an AutoCAD term, so it is noted in Arial italic. Because it is also a named AutoCAD term it is capitalized as used in AutoCAD. Note that *surface style*, while an AutoCAD term, is not named, so it is noted in Arial italic, but not capitalized.

Underline: hyperlinks to websites, bookmarks, numbered sections within this document are underlined.

1. INTRODUCTION

1.1 PURPOSE

The Linear CAD Manual (LCM) is the primary computer-aided drafting and design (CAD) reference for preparing linear design Drawings in the Capital Improvement Program (CIP) of the District of Columbia Water and Sewer Authority (DC Water). The LCM is referenced as required criteria in the Standard Scope of Work Exhibits of the DC Water Professional Services Agreement. The LCM presents CAD Standards to be used to produce all Design Drawings and Record Drawings for linear infrastructure that are produced by DC Water and its consultants.

The goal of the LCM is to ensure a consistent approach among different projects and different Project Design Engineers (PDEs). Furthermore, where multiple projects are part of a series of similar projects the LCM aims to establish criteria whereby design documents are integrated and consistent among multiple CAD users (see [Article 1.2](#) Audience below). The goal is also to document the CAD Standards for linear design.

The LCM is written at a level that assumes a working knowledge of AutoCAD Civil 3D. The LCM is not a how-to manual for AutoCAD or Civil 3D and excludes descriptions of how to perform functions within AutoCAD or Civil 3D. The LCM also excludes design criteria.

1.2 AUDIENCE

The LCM shall be used by all parties designing linear projects for DC Water, including DC Water employees, consultants, subconsultants, contractors, subcontractors, and other parties. This includes CIP projects for new or modified linear infrastructure.

1.3 ROLE OF THE PDE

Requirements in this LCM do not supplant sound engineering judgement or the need for the PDE to exhibit responsible charge of the project design. The primary role of the PDE is to provide ultimate responsible charge of the project design. The secondary role of the PDE is to ensure the project design complies with all requirements of the LCM.

Throughout the LCM there are multiple examples, guides, and AutoCAD templates. For example, general notes are provided in templates within the LCM support files. While these general notes and other content are pulled from example projects and may be appropriate for other projects, the PDE shall review and revise this content as needed to maintain responsible charge of the project design.

If there are any conflicts between the LCM and other standard documents published by DC Water, the PDE shall notify DC Water. If the requirements herein do not comply with sound engineering judgement for a specific project situation, or are otherwise not appropriate for a given project, the PDE shall submit a deviation request as described in [Article 1.6](#) Deviations.

1.4 ORGANIZATION OF LCM

The text portion of the LCM is organized into 18 sections. The first four sections describe general content that applies broadly. The next four sections describe content specific to Drawings that contain reference information; these Drawings are not printed but are primarily used as external references (*xrefs*). The next eight sections describe content specific to various Sheet types; these Sheets are used for creating a Plan Set that can be printed. The section 17 describes content related to the submission and audit process. Section 18 describes the use of cloud collaboration tools that the PDE may be asked to use if the CIP

project is a collaboration between DC Water in-house staff and consulting staff. Below is a more detailed description of each section:

- Section 1 Introduction – Describes the purpose of the LCM, its audience and organization, as well as information about revisions and deviations.
- Section 2 General CAD Standards – Describes information about acceptable software platforms, layers, linetypes, Sheet size, acceptable Sheet scales, annotation, types of notes, use of details, legends, and different types of Maps used throughout the Drawings.
- Section 3 CAD System Setup – Describes folder structure, folder naming, drawing templates, file naming, support file settings, use of *xrefs*, data shortcuts, and plotting standards.
- Section 4 Sheet Set Manager and Title Blocks – Describes *Sheet Set* templates and their attributes, Sheet coordination, the order of Sheet in a Plan Set, title blocks, and publishing.
- Section 5 GIS Drawing – Describes creation of the GIS Drawing and its use to show information obtained from various GIS databases.
- Section 6 Survey Raw Drawing – Describes use of the Survey Raw Drawing where Designers process raw survey data.
- Section 7 Survey Drawing – Describes creation of the Survey Drawing and its use to show all field located features except utilities.
- Section 8 Existing Utility Drawing – Describes creation of the Existing Utilities Drawing and its use to show all existing utilities.
- Section 9 General Sheets – Describes creation of the Drawings for the General Sheets.
- Section 10 Survey Sheets – Describes creation of the Survey Control Sheet and the Existing Conditions Sheets which document the existing conditions of a project site prior to any construction.
- Section 11 Water Design Drawing and Sheets – Describes creation of the Water Design Drawing and Sheets. These Sheets show all DC Water assets to be rehabilitated, replaced, or installed new. This section also describes layout of the Sheets depicting the water design features to be included in the *Sheet Set*.
- Section 12 Sewer Design Drawing – Describes creation of the Sewer Design Drawing and Sheet. These Sheets show all DC Water sewer assets (sanitary, storm, and combined) to be rehabilitated, replaced, or installed new. This section also describes layout of Sheets depicting the sewer design features to be included in the *Sheet Set*.
- Section 13 Surface Restoration Plan – Describes creation of SRPs and their use to identify surface restoration limits and quantities needed for the project.
- Section 14 Erosion and Sediment Control – Describes creation of ESC Plans and their use to define methods of erosion and sediment control during construction as well as the need to obtain permits from the District of Columbia Department of Consumer and Regulatory Affairs (DCRA) as well as the DOEE.
- Section 15 Traffic Control Plans – Describes creation of TCPs and their use to define MOT during construction as well as the need to obtain permits from DDOT.
- Section 16 AsBuilts and Record Drawings – Describes the requirements to follow when producing As-Builts and Record Drawings.
- Section 17 Submission and Audit Process – Describes submission requirements and the process whereby DC Water will audit the Drawings to confirm compliance with the CAD Standards.
- Section 18 BIM 360 – Describes folder structure, how to gain access, submittals, versioning, viewing and comments.

This LCM also includes appendices and support files in electronic format.

- The appendices contain necessary examples. Many of the examples in the appendices have cross references to the section of this text portion of the LCM that will give you information referring to the template and style being applied. Many of those sections will also refer you to other appendices that will further define the styles, layers, settings etc.
- All support files needed to adhere to the LCM are contained in a downloadable zip file named DCW Linear Design Support Files.zip, that can be downloaded from the CAD Standards Construction Cloud Site, see [Section 18](#). Support files include the following:
 - Most recent appendices
 - Version log
 - Templates (*.dwt)
 - Blocks
 - Layers
 - Pay items
 - Pipes catalog
 - Plot files
 - Pressure pipes catalog
 - Profiles
 - Subassemblies
 - Survey settings
 - Tool palettes

1.5 REVISIONS

This version of the LCM (dated April 2023) supersedes all previous CAD Manuals for linear water and sewer design. The LCM is a “living” document, and, therefore, will be periodically revised.

Users of the LCM are encouraged to propose revisions to the manual that will improve its usefulness for all Designers. A revision is a change to the LCM that would apply to all projects from that point forward (see [Article 1.6 Deviations](#) below for more information about one-time, project specific deviations). To propose a revision, contact DC Water’s CAD Supervisor. Proposed revisions will be evaluated by the CAD Supervisor and other relevant stakeholders within DC Water. All revisions to the LCM require the approval of the Engineering and Technical Services Director or delegate.

In future updates, changes will be shared in the following manner:

- Changes to this text portion of the LCM will be denoted with a side bar in the margin next to the text that was changed. This volume may be updated with a Supplemental LCM when changes are minor. While software updates by Autodesk will undoubtedly require revisions to the LCM, we do not expect frequent changes to this text portion of the LCM.
- The appendices will be updated by changing the date on the cover. The cover page and file name will be dated, and the entire file will be changed. Changes will not be denoted, but a revision log at the beginning of the document will be included to summarize the changes. The latest appendices are included with the latest support files (see next).
- The support files are included in a single zip file. Inside the zip file is a VersionLog.txt file that lists the latest revision date and summarizes revisions to various support files. We expect frequent changes to the support files, especially with software updates by Autodesk.

This version is a significant rewrite, so no changes are denoted in this April 2023 version.

Because the LCM includes this text volume dated April 2023 as well as appendices and support files with more recent dates, confirm with DC Water at the start of every project to confirm you have the latest LCM support files.

Projects shall comply with the version of this LCM that is in effect at the time of

- task order execution for consultant led design projects, or
- design start in P6 for in-house design projects.

1.6 DEVIATIONS

One-time, project specific deviations from the requirements of the LCM are only permitted when approved in writing by any Senior Manager or Director within DC Water. Include a statement identifying why the deviation is needed. This deviation request can take many forms (email, letter, memo, PowerPoint, etc.), but shall be in writing and can be submitted as part of the regular submittal process.

2. GENERAL CAD STANDARDS

2.1 SOFTWARE

The following software products shall be used to produce linear design Drawings.

- AutoCAD
- AutoCAD Civil 3D
- Autodesk BIM 360
- ESRI ArcGIS
- Microsoft Excel

Contact DC Water to identify version of AutoCAD in effect at the time the projects start. Various survey software products are permissible if they are compatible with AutoCAD. Various TCP development software products are also permissible if they are allowed by the local jurisdiction approving the TCPs. DC Water will host all BIM 360 project sites. No other software is allowed.

2.2 LAYERS

The drawing templates (.dwt) within the LCM support files, contain a thorough, pre-defined layer list. Each Drawing type and Sheet type described later in this LCM has more details on layers for that Drawing/Sheet type. Use the layers already loaded in the drawing templates for the appropriate Drawing/Sheet type. These layers contain unique color, *linetype*, and *lineweight* properties. A complete listing of layers is included in [Appendix A](#). Consult with DC Water CAD Supervisor before creating any new layers.

All layers shall follow the naming convention:

- Designator - Major Group - Minor Group – Minor Group - Minor Group - Suffix
- XX-XXXX-XXXX-XXXX-XXXX-X

Examples include:

- *CI-SHET-VFRM-TEXT*
- *CI-WATR-SERV-Q*
- *VF-BLDG-DECK*
- *VI-PROP-RWAY-E*
- *VI-SSWR-PIPE-36IN-TEXT*

The basic rules followed by this naming convention are as follows:

- Layer names contain capital letters and numbers only.
- All fields are separated with dashes.
- Layer names do not contain spaces.
- The “designator” field is limited to one or two characters.
- The major and minor fields are exactly four characters long (with few exceptions).
- Up to three minor groups can be used.
- The suffix field must be limited to one character, which is used to indicate status. This field is optional.

Refer to [Appendix A](#) for more information

2.3 LINETYPES

The *linetype* file *DCW-Linetype.lin* is included with the LCM support files and a listing of the *linetypes* is included in [Appendix B](#). *Linetypes* are associated with the *layers* provided in the *drawing templates*. *Lines*, *polylines*, *multilines*, and other linework shall be *ByLayer*.

2.4 DRAWING SHEET SIZE

Final design and construction documents shall use ANSI D 22"x34" Sheet size, a plot style is provided with the support files. Drawings can be plotted at half scale. Half scale Sheet size is ANSI B 11" x 17", a half scale plot style file is also provided with the support files.

2.5 ACCEPTABLE SCALES

Standard horizontal scales are limited to the following:

- 1" = 5' (standard scale for Civil Details, including congested intersections, external point repairs, and other similar areas required more detailed depiction)
- 1" = 20' (standard scale for Watermain Replacement Sheets, Sewer Replacement Plan and Profile Sheets, Water Profile Sheets, SRPs, ESC Plans, and TCPs)
- 1" = 50' (standard scale for Sewer Rehabilitation Sheets, except external point repairs)
- 1" = 200' (default scale for Site Maps)
- 1" = 400' (standard scale for Key Maps, see [Paragraph 2.11.3 Key Map](#) for more information)
- 1" = 40,000' (outline of DC nested inside the Key Map, see [Paragraph 2.11.3 Key Map](#) for more information)

Additional acceptable horizontal scales are limited to the following:

- 1" = 1'
- 1" = 10'
- 1" = 30'
- 1" = 100'

Acceptable vertical scales are limited to the following:

- The standard vertical scale on profiles is 1" = 5' for most areas.
- In areas that are particularly flat, 1" = 1' may be used.
- In areas that are particularly steep, 1" = 10' may be used.
- 1" = 2' may also be used.
- If the plan view is shown at 1" = 5' (as is the case for Civil Detail Sheets) the vertical scale of the corresponding profile shall be 1" = 1'.

The following requirements define the most common scales:

- Plans shall be shown at 1" = 20' unless noted otherwise.
- In areas where features are crowded on the Plan, the Plan shall include a callout to a Civil Detail and that Civil Detail shall be shown at 1' = 5'. (See [Paragraph 2.9.4 Civil Details](#) and [Paragraph 2.9.5.1 Callouts for Civil Details](#) for more information.)
- Sewer Rehabilitation Sheet shall use 1' = 50' with callouts to Civil Details for external point repairs.

- The default scale for a Civil Detail (including external point repairs) is 1" = 5'. Use of 1" = 20' for external point repairs is permissible only if 1) the plan and profile can clearly convey all needed information and 2) the external point repair is not located in a roadway. This sometimes occurs along the Potomac Interceptor or on National Park Service (NPS) property.
- Site Maps are usually shown at 1" = 200' and may be adjusted to 1" = 100' or 1" = 400' for project areas that are particularly large or small.
- The Location Map on the Cover Sheet is not a round-numbered engineering scale but is sized to fit on the Cover Sheet while showing the entire extents of DC. Projects on the Potomac Interceptor may deviate from this scale as needed when creating a Location Map.
- The Key Map in the lower right corner of the Sheets shall have a viewport scale of 1" = 400' and the DC Map nested inside the Key Map shall have a viewport scale of 1" = 40,000'.

2.6 ANNOTATION

Annotation includes text, leaders, and dimensions. Annotation standards are briefly described below and described in more detail in [Appendix C](#).

2.6.1 Text Styles

Use only the standard *text styles* contained in the templates within the LCM support files. Almost all text shown on Sheets shall be one of the following four text styles:

- *ANNO .094* shall be used for all text identifying existing features.
- *ANNO .10* shall be used for all text, unless noted otherwise.
- *ANNO .12* shall be used for Square labels, most titles (such as "Key Map" or "Legend"), and pressure zone boundary labels.
- *ANNO .15* shall be used for street names.

Other *text styles* (*Standard*, *Standard Thin*, and *Standard Wide*) are included in the templates for special uses (such as various text objects in the General Sheets) and other occasional uses where a different text style is needed. For more information and a complete list of allowable *text styles*, associated fonts and sizes, as well as other settings, see [Appendix C](#).

2.6.2 Text Orientation

All text shall be Plan readable. Text shall read from the bottom and right of the Sheet. The text will flip direction at 10 degrees past vertical. See [Figure 1: Text Orientation](#) below.

TEXT ROTATION SETTINGS

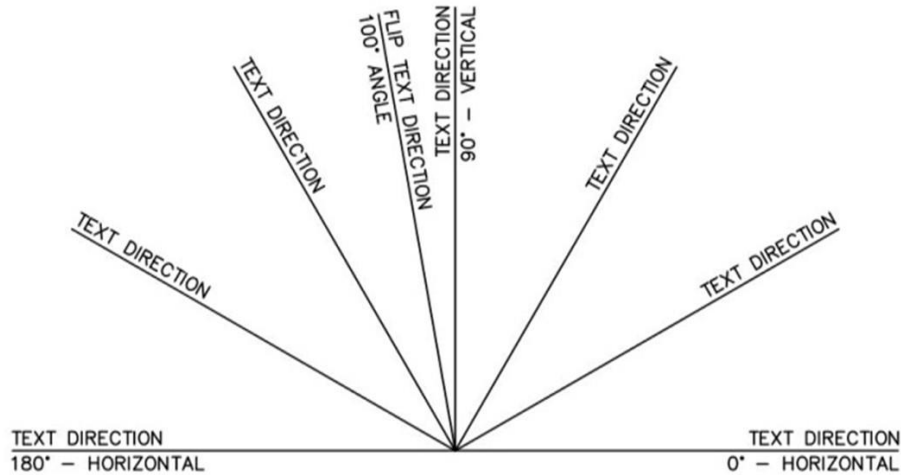


Figure 1: Text Orientation

2.6.3 Font

All annotation shall use arial font. Simplex, RomanS, and RomanD are no longer used because they are not supported in Revit.

2.6.4 Leaders

Standard *leader styles* contained in DC Water drawing *templates* in the support files shall be used. The *Annotative Multileader Style* called *DCW_Leaders* is the default leader style in all *templates*. All leaders shall be annotative and drawn in model space. If a leader with a specific scale is required, use the appropriately scaled multileader style. For information about and examples of the multileader styles, please refer to [Appendix C](#).

2.6.5 Dimensions

Standard *dimension styles* contained in all drawing templates in the LCM support files shall be used. The *Annotative Dimension Style* called *DCW_Dims* is preset as the default dimension style in all DC Water drawing templates and shall be used for all dimensions. All dimensions shall be drawn in *model space* and shall be rounded to one decimal place (nearest tenth). Dimensions shall be aligned in almost every case. For a list of *dimension styles*, their associated settings, and examples, please refer to [Appendix C](#).

Dimensions shall be placed on layer *C-ANNO-DIMS* using *DCW_Dims Dimension Style*. In the event that a scale specific, non-annotative dimension style is needed, DC Water has provided additional dimension styles in the drawing *templates* (*DCW_DIMS_05SCALE*, *DCW_DIMS_20SCALE*, and *DCW_DIMS_50SCALE* are the most common).

Use points in a *coordinate table*, not dimensions, to show the location of assets to be constructed (see [Paragraph 11.8.1 Watermain Line & Curve Tables](#) and [Paragraph 12.8.1 Pipe Rehabilitation Schedule](#) and

Maintenance Hole Rehabilitation Schedule for more information about coordinate tables).

When a new water or sewer asset is close to an existing building, retaining wall, or other object that could be damaged if the foundation were undermined, include a note requiring the contractor to pothole prior to excavation and adjust the alignment as needed to protect existing infrastructure.

Dimensions shall NOT be used to show the distance from existing utilities to curb lines because these objects are not parallel, and the dimension varies along the alignment. New assets to be constructed shall also NOT be dimensioned to curb lines or other physical objects.

Right-of-way lines are dimensioned only in the ESC's or TCPs and only nominally (rounded to the nearest ten feet). The nominal dimension is required on ESC's and TCP to document roadway designations so permits can be obtained. Designers shall consider rights-of-way shown are generally from GIS and are not surveyed unless a specific need exists to locate the rights-of-way more accurately. All right-of-ways shall meet the right-of-way widths shown in the DDOT Transportatoin Online Permitting System (TOPS).

2.6.6 Note Label Styles

Figure 2: Note Label Styles available in the CAD Standards Templates shown below lists the *Note Label Styles* available in the templates and are referenced throughout this LCM.

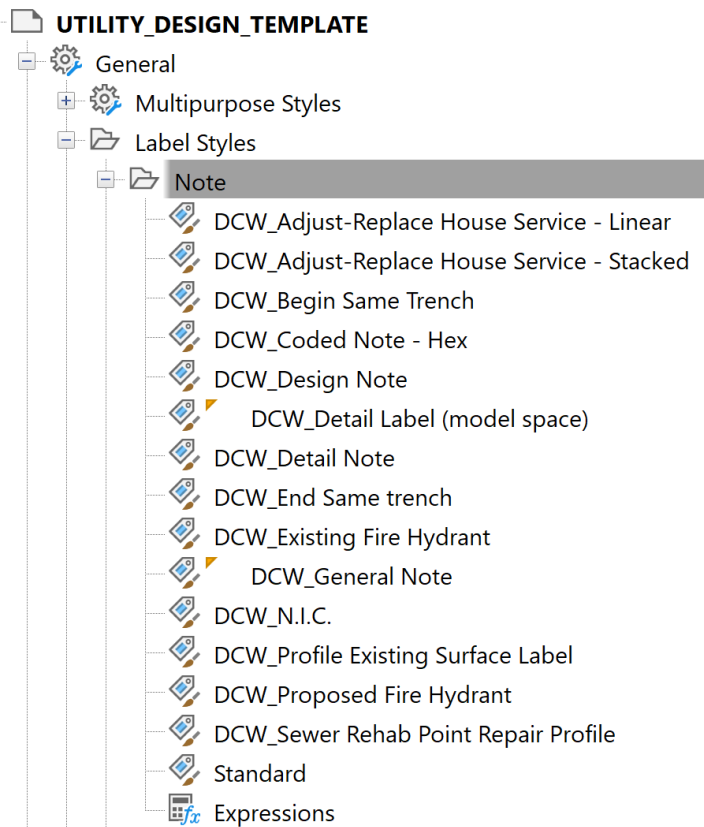


Figure 2: Note Label Styles available in the CAD Standards Templates

2.7 USE OF PAPER SPACE

The only objects in paper space are:

- Sheet notes (see [Paragraph 2.8.2 Sheet Notes](#) for more information)
- Location labels and street names on the Location Map (see [9.5.1 Cover Sheet](#) for more information)
- Traverse control tables (see [Paragraph 10.8.1 Traverse Control Tables](#) for more information)
- Advertisement note (see [Paragraph 14.7.6 Advertisement Note](#) for more information)
- Manual match lines (see [Paragraph 10.13 Match Lines](#) for more information about creating automatic match lines in model space and [Paragraph 10.7.1 Match Lines](#) for more information about creating manual match lines in paper space)
- Title block (see [Article 4.7 Title Blocks](#) for more information)
- North arrow (see [Paragraph 10.7.2 North Arrows](#) and [Paragraph 2.11.3 Key Map](#) for more information)

2.8 NOTES

Four types of notes may be used: general notes, sheet notes, coded notes, and design notes. Each are described in the sections below.

All notes convey information to the end user of the Sheet, either as a directive or for general information. Write notes in imperative mood; imperative mood conveys a command, but leaves the subject, often the construction contractor, hidden. Examples include:

- “Prevent sediment discharge” instead of “The Contractor shall prevent sediment discharge.”
- “Provide Concrete Blocking per Std. Det WD550 (W40.01)” instead of “The Contractor shall install Concrete Blocking per Std. Det WD550 (W40.01).”

Even though the *templates* are pre-populated with notes, the PDE has ultimate responsible charge of the project design and shall ensure the notes are appropriate and consistent with relevant standards and sound engineering judgement. The PDE shall modify the notes in the *templates* as needed to meet project needs.

2.8.1 General Notes

General notes are those that apply to the entire project. They apply to many, if not all, Sheets in a *Sheet Set*. General notes shall be shown on the General Sheet(s): G, GE, or GT Sheets. General notes shall be grouped based on subject where applicable (see *drawing template* named *UTILITY_DESIGN_TEMPLATE.dwt* for example groupings).

2.8.2 Sheet Notes

Sheet notes are those that apply broadly to a specific Sheet. A sheet note is used when the information only applies to a specific Sheet, or a small number of Sheets. Furthermore, a sheet note is used when the information cannot be shown to apply at a specific point but applies throughout much of the site shown within the limits of the Sheet. Sheet notes are shown on the right portion of Sheets and are created in paper space. Try to minimize use of sheet notes. [Figure 3: Example Sheet Note](#) shows an example sheet note.

A block called *DCW-Sheet Notes* is included in the drawing templates and when inserted at 0,0,0 will be placed at the desired location.

The boundary between 1) a general note applying to “most, if not all” Sheets in a *Sheet Set*, and 2) a sheet note applying to a “small number of Sheets” in a *Sheet Set* is purposefully ambiguous. The Designer and PDE may determine where that boundary should be for each specific *Sheet Set* and sheet note.

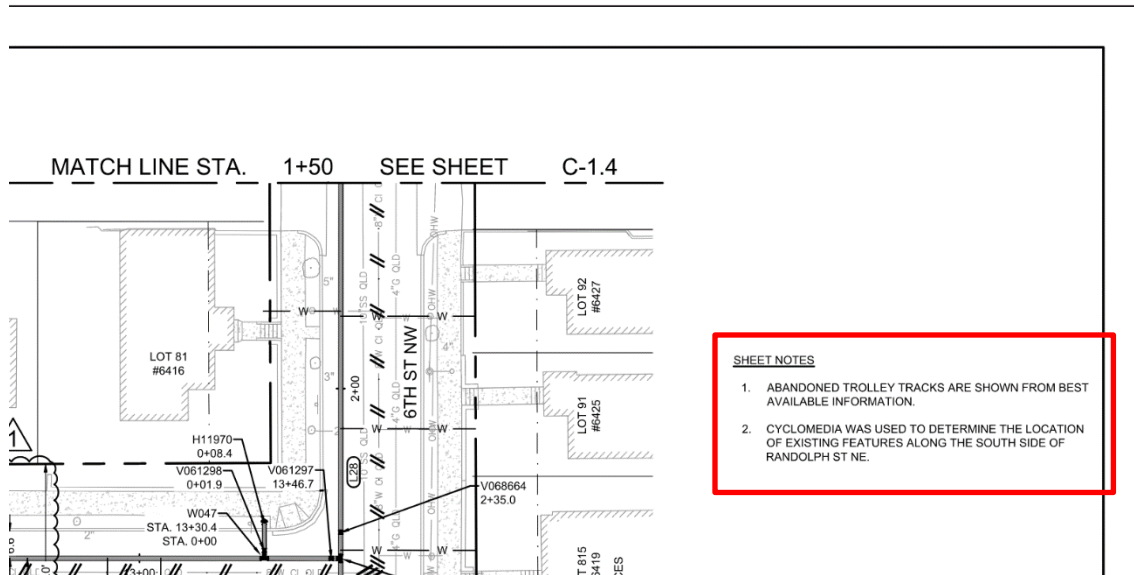
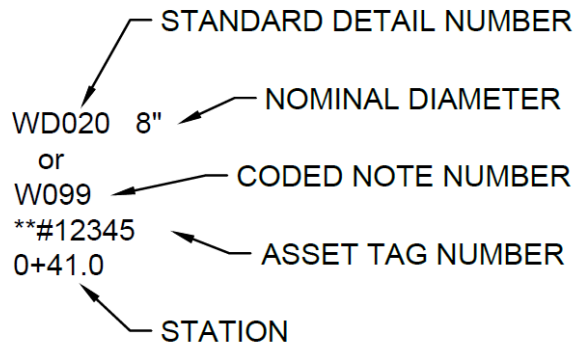


Figure 3: Example Sheet Note

2.8.3 Coded Notes

Coded notes are those that apply to a specific point on a Sheet; specifically, a leader can point to a specific coordinate and provide information relevant to that exact location. Coded notes usually recur at multiple locations on a Sheet or through a *Sheet Set* (such as a fire hydrant or a tee). All coded notes shown on Sheets shall be in model space. Coded notes shall be listed in a table in the General Sheets with coded note information; the most common coded notes are included in the drawing templates on Sheet G-5. Figure 4: Sample Fields to Use when Creating Coded Note below shows the different fields to use when creating coded notes and Figure 5: Example Coded Note below shows several coded notes for the watermain appurtenances (hydrant, valve, bend, and tee).

NEW WATER LABEL



ASSET TAG NUMBER DESIGNATOR
 VT = VALVE
 H = HYDRANT

Figure 4: Sample Fields to Use when Creating Coded Notes

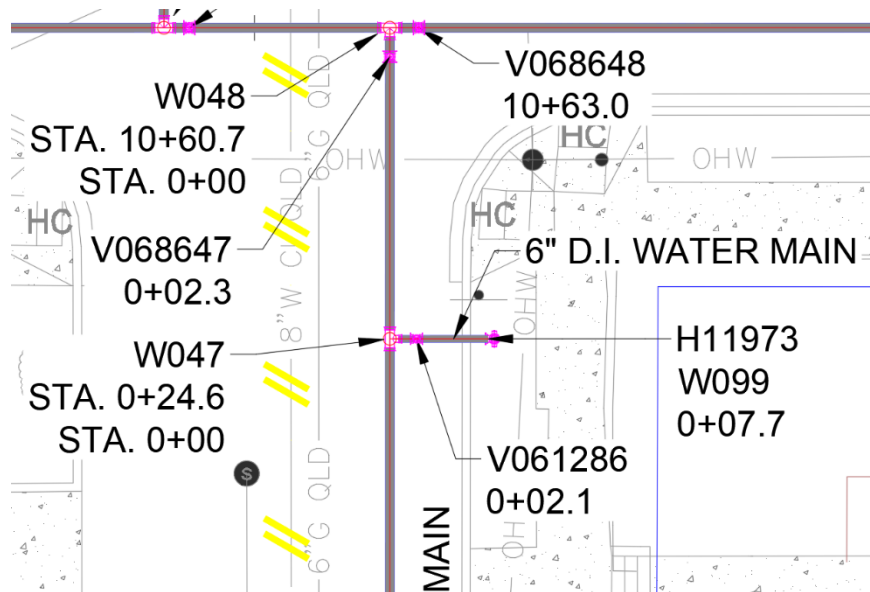


Figure 5: Example Coded Note

2.8.4 Design Notes

Design notes are those that apply to a specific point on a Sheet (just like a coded note); but unlike a coded note, design notes are uncommon design related information not repeated in many other notes. All design notes will be shown in model space of the corresponding Sheet. [Figure 6: Example Design Note](#) below shows two design notes (circled in red) for “concrete blocking” as well as several coded notes (located at bends, tees, valves, etc.).

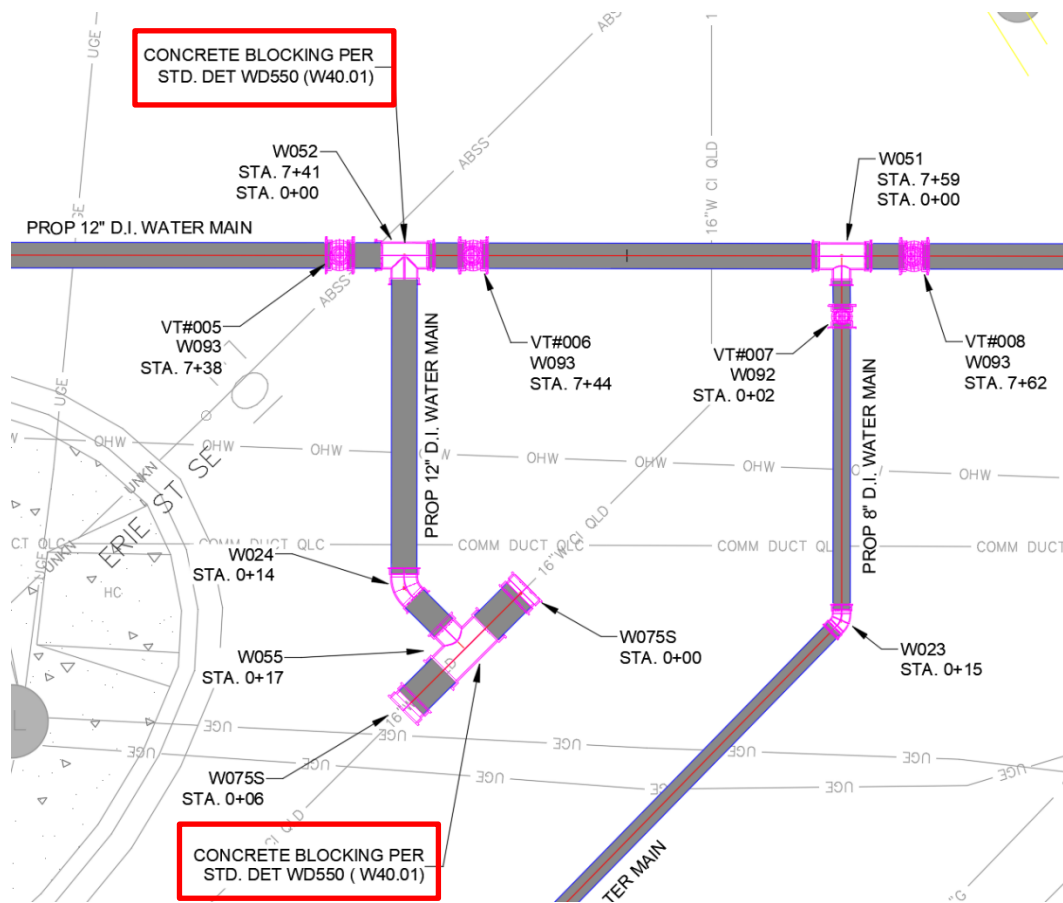


Figure 6: Example Design Note

2.9 DETAILS

DC Water CAD Standards use four types of details: Standard Details, 3rd party details, project specific details, and Civil Details. From time to time, other “details” are needed; in this situation, the Drawings may use the term “detail” so long as they are differentiated from the four types listed above. For example: “structural detail,” “rebar detail,” or “fabrication detail” are all preferential to “detail.”

2.9.1 Standard Details

DC Water’s Standard Details are used for common items such as water service connections and fire hydrants that do not change from project to project. The Standard Details can be found on the DC Water website. Standard Details may be printed within the *Sheet Set* or referenced because they are published at dcwater.com for the public.

Even though the Standard Details are approved by DC Water, published for the public, and widely used, each project has specific needs. Use of the Standard Details does not replace the need for sound engineering judgement or the need for the PDE to exhibit responsible charge of the project design. The PDE has ultimate responsible charge of the project design and shall ensure the design complies with and is consistent with relevant standards and sound engineering judgement. If there are any conflicts between these documents or the requirements of a Standard Detail are not appropriate for a given project, the PDE shall submit a deviation request as described in [Article 1.6 Deviations](#). The PDE may also replace a Standard Detail with a project specific detail if approved by DC Water. The PDE should periodically review DC Water website for most updated and recently developed standard details.

2.9.2 3rd Party Details

Any details from other parties (such as DDOT or NPS) shall be shown on 3rd Party Detail Sheets.

Details used for ESC are from DOEE and therefore 3rd Party Details, but for permitting reasons the ESC details are included with the General ESC Sheets (see [Paragraph 14.11.1 ESC General Sheets](#) for more information).

2.9.3 Project Specific Details

Project specific details depict appurtenances, assets, and other items that are not included in DC Water's Standard Details. They may be used on multiple projects but may be different on different projects and are often customized for each project. Project specific details are used when a Standard Detail does not meet the needs of the project or when a needed appurtenance is not included in the Standard Details.

A Standard Detail may be a "starter" to create a project specific detail for appurtenances that are like Standard Details when the project needs dictate, but this requires approval in writing by a Senior Manager within DC Water.

2.9.4 Civil Details

A Civil Detail is used when a 20-scale or 50-scale Plan cannot sufficiently clarify the intent of the Drawing. The most common use of a Civil Detail is in a congested intersection on a Watermain Replacement Sheet or an external point repair on a sewer. When this is the case, use a callout to identify a Civil Detail has been used. The Civil Detail shows a small portion of the site at 1" = 5' for watermain replacement. Variable scales are acceptable for sewer point repair. See [Figure 6: Civil Design Callout](#) below for an example Civil Detail callout.

2.9.5 Detail Callouts

2.9.5.1 Callouts for Civil Details

Civil Details are called out using the symbology shown on the legend (see [UTILITY_DESIGN_GS_TEMPLATE.dwt](#)). The callout includes a circle with the Civil Detail number on top and the Civil Detail Sheet number on bottom. On the Civil Detail Sheet, similar symbology is shown with the Civil Detail number on top and the Civil Design Sheet number on bottom. See [Figure 6: Civil Design Callout](#) below for an example Civil Detail callout.

DETAIL PLAN DESCRIPTION

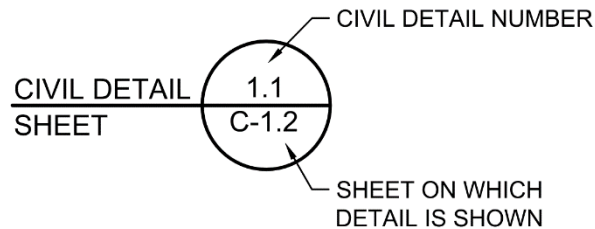


Figure 6: Civil Design Callout

Civil Details are numbered sequentially. For example, if a project has two neighborhoods, the second detail in the first neighborhood would be numbered Civil Detail 1.2 and the eighth detail in the second neighborhood is labeled Civil Detail 2.8. (For more on neighborhoods, see [Paragraph 3.3.1.2 Neighborhood.](#)) See [Paragraph 11.16.3 Civil Detail Sheets](#) and [Paragraph 12.16.3 Civil Detail Sheets](#) for more information about the callout as shown in the Civil Detail Sheet.

2.9.5.2 Callouts for Other Details

Standard Details, project specific details, and 3rd party details are called out in one of two ways. First, a detail may be called out using a design note as in the example in [Figure 6: Example Design Note](#) above. Second, a detail may be called out using a coded note as shown on the legend of the template called *UTILITY_DESIGN_GS_TEMPLATE.dwt* under the header *NEW WATER LABEL*. These callouts will start with WD, GD, or other similar prefix per the templates. Note the reference within the *CODED NOTES LEGEND* in the *UTILITY_DESIGN_GS_TEMPLATE.dwt*.

2.10 LEGENDS

Legends for ESC, TCP, Civil Design Sheets, and Record Drawings are included in the following templates:

- *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt*
- *TCP_MOT_TEMPLATE.dwt*
- *UTILITY_DESIGN_GS_TEMPLATE.dwt*

Verify the legend in the template includes all Plan symbology (linetypes, blocks, etc.) used throughout the *Sheet Set* and that these items are current. Add additional symbology as needed. If symbology shown in the template is not used, leave it shown on the legend. For additional information about the General Legend Sheet see [Paragraph 9.5.4 Legend Sheet](#), about the ESC legend see [Paragraph 14.11.1 ESC General Sheets](#), and about the TCP legend see [Paragraph 14.11.1 ESC General Sheets](#).

An additional, small legend may be added to individual Sheets as needed for unique reasons. For example, a vegetation Plan will frequently have different symbols for different species of trees to be planted. In this case, an additional legend specific to the vegetation symbology may be included on the legend Sheet (a G Sheet) or on the same Sheet showing the vegetation to be planted.

2.11 MAPS

Three types of standard Maps used throughout the *Sheet Set* are described in the sections below: Location Map, Site Map, and Key Map.

2.11.1 Location Map

A Location Map is a diagrammatic depiction of the entirety of Washington DC, its streets, and the project site. The Location Map is part of the Cover Sheet (Sheet G-1) and identifies the project's location within DC (see [Figure 7: Example Cover Sheet and Location Map](#)). Identify the location of the project by using a leader, box, circle, tilde, or a combination as needed. Show multiple project locations that are part of the same project on a single Location Map on the Cover Sheet.

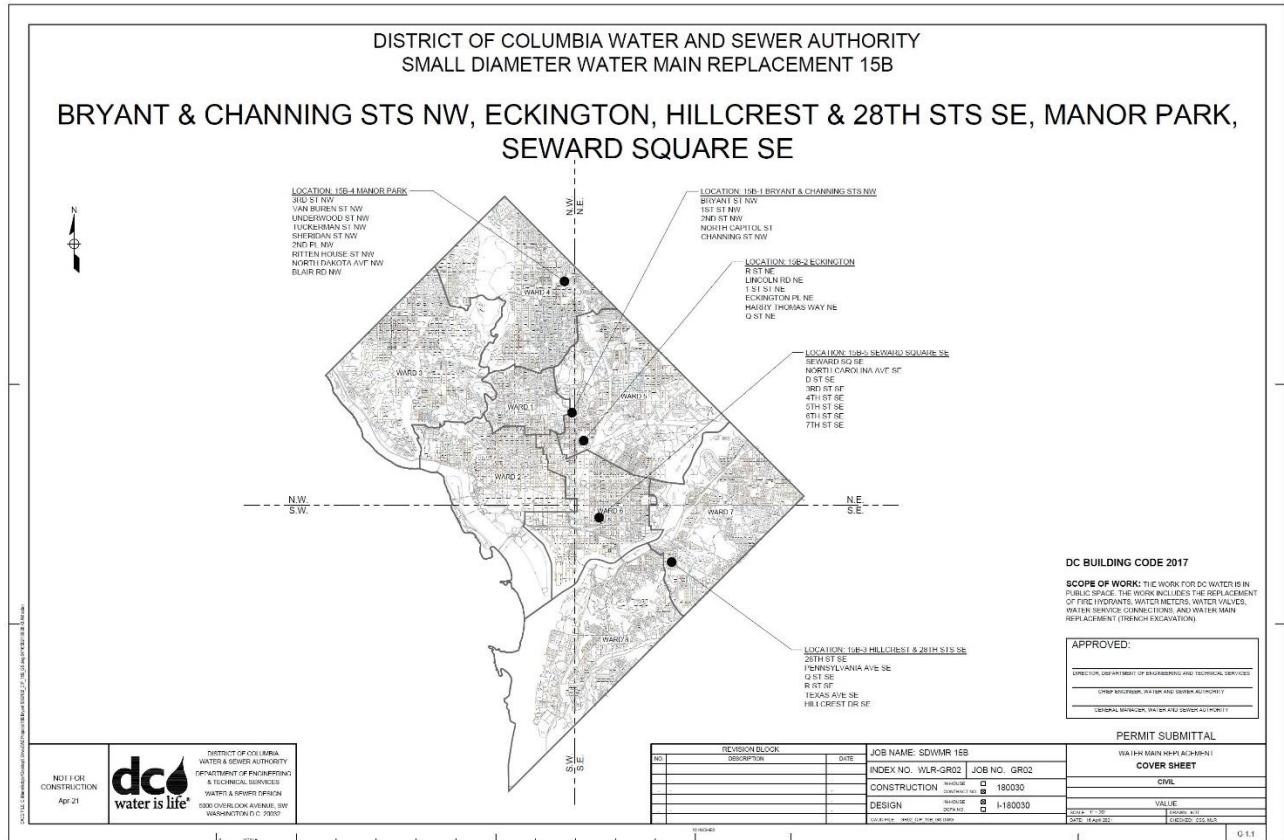


Figure 7: Example Cover Sheet and Location Map

2.11.2 Site Map

Site Maps are included in the G Sheets immediately following the Sheet Index. The Site Map Sheet shows the overall project site (see Figure 8: Example Site Map below for an example). Site Maps include KeyMap.dwg linework, new watermain centerlines, and Sheet boundaries. The KeyMap.dwg includes street names, but these cannot be used in the Site Map viewport. To show the appropriate street name labels in the Site Map requires creating text in paper space and freezing the street names in the viewports. When projects include multiple sites, show each site on separate Site Maps. If necessary, use multiple Sheets.

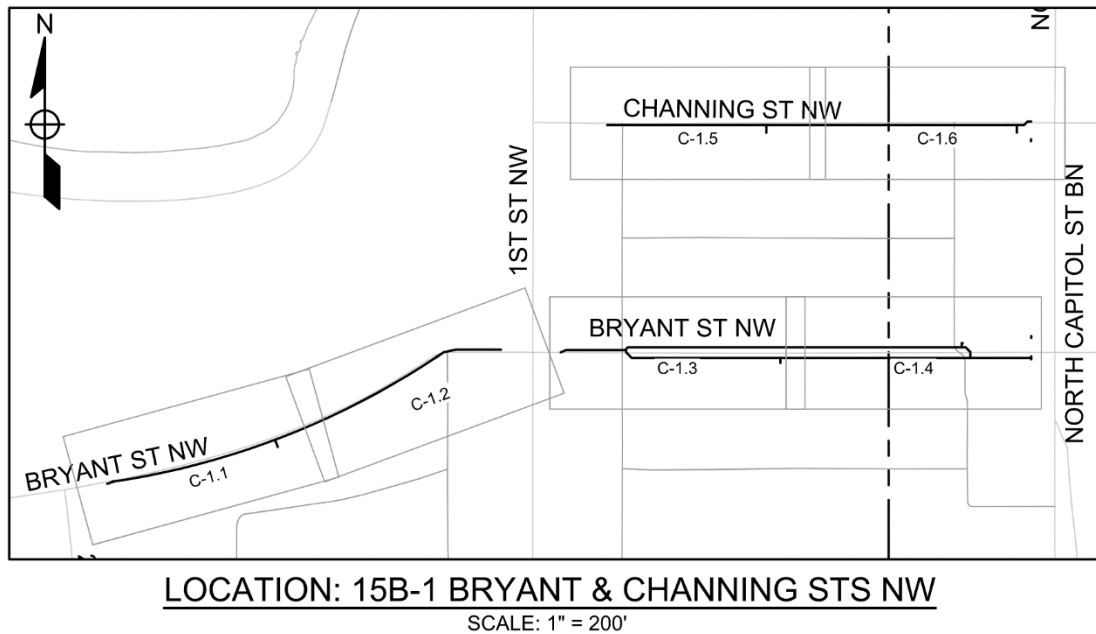


Figure 8: Example Site Map

2.11.3 Key Map

A Key Map is a diagrammatic depiction of the vicinity immediately surrounding the limits of work shown on the current Sheet. See [Figure 9: Example Key Map](#) below. The Key Map is made of two viewports showing the *KeyMap.dwg xref* with different *layer states*. See [Appendix A](#) for more information about the *layer states* to use. The SITE marker within the nested portion of the Key Map shall also be manually adjusted to the project location.

Key Maps are located near the bottom right corner of Sheets. They are used to improve maneuvering between Sheets and clarify information that crosses multiple Sheets. Key Maps shall be used on Existing Conditions Sheets, Civil Design Sheets, SRPs, and ESC Plans. Each of those Plan types shall use the same view frames (see [Article 4.3 Sheet Coordination](#) for more detail).

A *DCW-NORTH ARROW* block on the *G-SHET-NRTH* layer is in the upper left corner of every Key Map in the following templates: *UTILITY_DESIGN_TEMPLATE.dwt*, *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt*, and *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt*. The north arrow shall always be oriented vertically. Copy the north arrow as needed for each Key Map.

Key Maps are not used on TCPs. Phasing Plans are used instead. This is for two reasons: 1) the limits of traffic control devices often extend beyond the work limits shown on other Sheets, and 2) TCPs must keep track of multiple phases that occur in the same space over time. For more information on Phasing Plans see [Paragraph 15.10.1.2 TCP Phasing Plan](#).

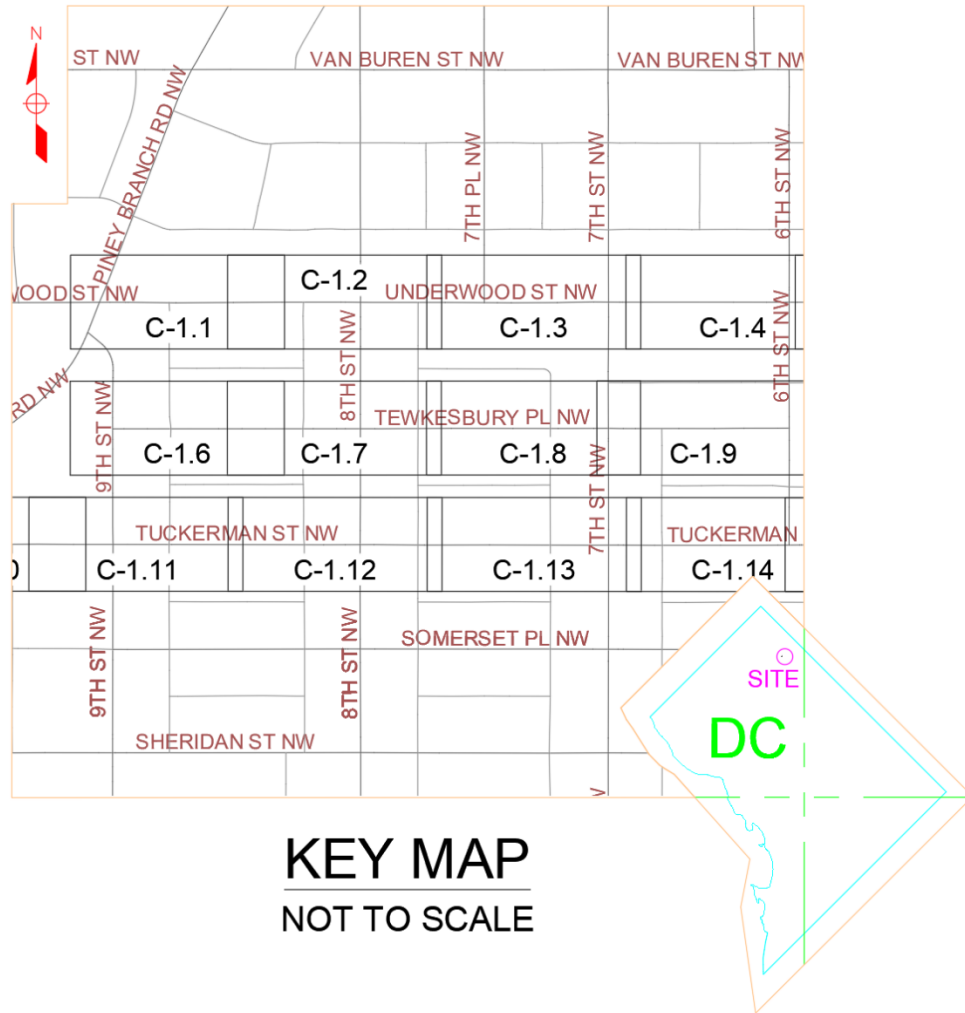


Figure 9: Example Key Map

2.12 PLOTTING

Available *plot styles* are described in [Appendix D](#).

3. CAD SYSTEM SETUP

This section provides standards for general setup to support the use of the CAD Standards described throughout this LCM.

3.1 FILE STRUCTURE

The CAD Standards will not properly function without certain folders and files organized in the manner described in the sections below. The LCM support files contain folder- and file-structures for: 1) standards folders/files and 2) project folders/files.

The CAD Standards require two specific folders be placed on company servers/drives: one named *CAD Standards* (see [Paragraph 3.1.1 CAD Standards Folder](#)) and the other named *CAD Projects* (see [Paragraph 3.1.2 CAD Projects Folder](#)). The *CAD Standards* and *CAD Projects* Folders must be side-by-side within the same parent folder.

In [Figure 10: Example File Structure](#) the example shows both folders under a common parent folder as required. For DC Water this is the “I Drive.” This parent folder will vary for each consultant, depending on the file standards for each consultant. Some consultants may need to create multiple copies of the *CAD Standards* and *CAD Projects* Folders if consultants do not use a consolidated CAD folder/drive. No matter the file structure used by any consultant the two folders simply must be in the same parent folder.

3.1.1 CAD Standards Folder

Files needed for the CAD Standards are stored in the *CAD Standards* folder. The needed files and folders are part of LCM support files. The *CAD Standards* folder must be copied to a shared drive or server location that is accessible to all CAD users so it can be stored and referenced from the project files. The *CAD Standards* folder must also be parallel to the *CAD Project* Folder (described in the next section).

The structure of the *CAD Standards* folder is shown in [Figure 10: Example File Structure](#) below and the content of each of those folders is described in [Table 1: Folders inside the CAD Standards Folder](#) below. When unzipping the support files attached to this LCM, this folder will be created automatically if the zip file is in the correct folder when it is unzipped. The correct folder will vary based in the different server configurations of each consultant.

3.1.2 CAD Projects Folder

The project folders and files are stored separate from the *CAD Standards* folder. The *CAD Projects* Folder must be in the same parent folder as the *CAD Standards* folder. The project files do not necessarily require access between or among projects.

A *Project Template* Folder is included in the LCM support files. The *CAD Project* Folder for each project shall be created by pasting a copy of the *Project Template* Folder in the parent folder. After pasting the *Project Template* Folder, rename the folder as described in [Paragraph 3.3.2 CAD Project Folder](#). The folder structure within *Project Template* folder is shown below in [Article 3.2 Drawing Templates](#) and the content of each of those folders is described below in [Table 2: Contents of Project Folder](#).

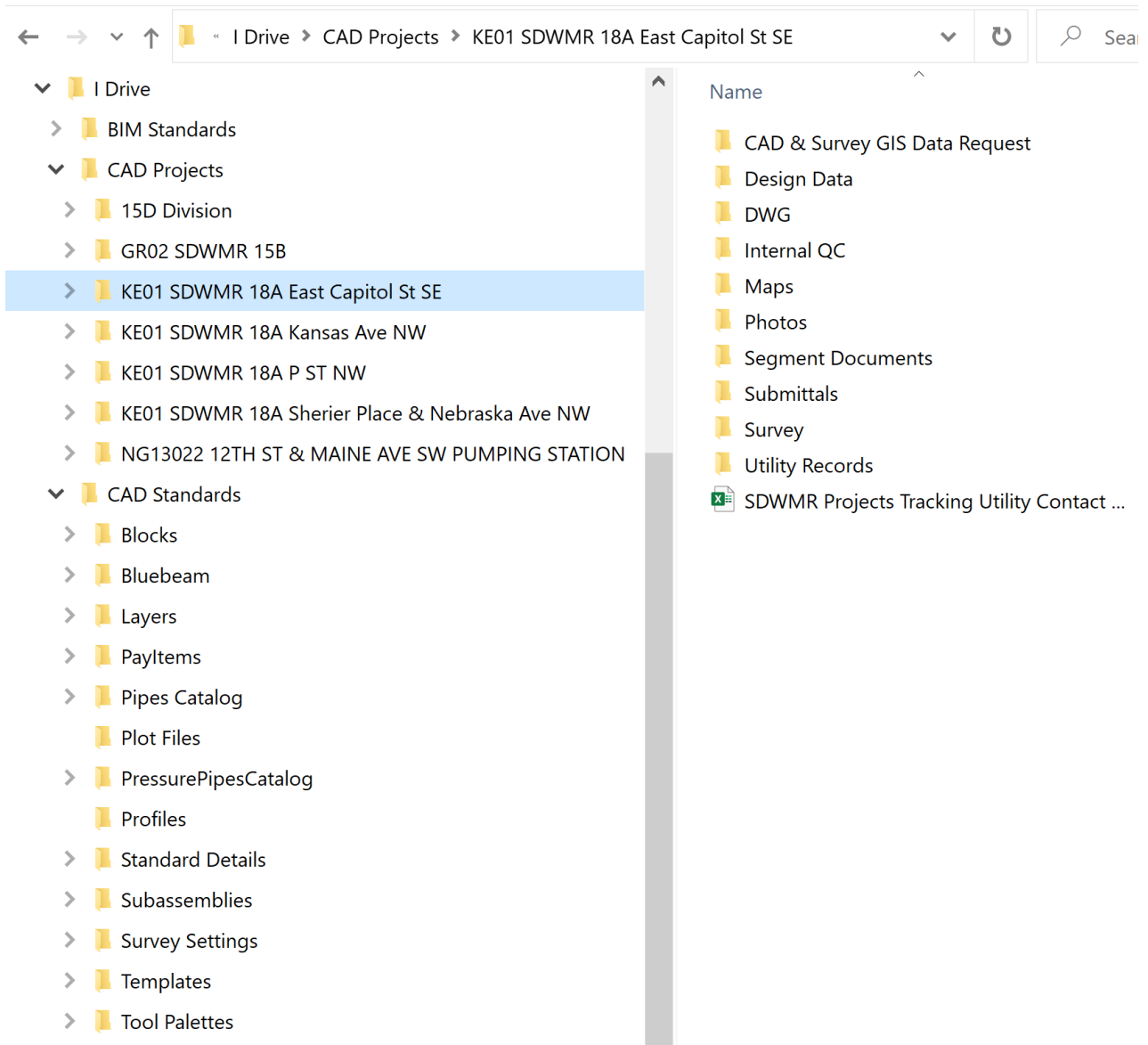


Figure 10: Example File Structure

Table 1: Folders inside the CAD Standards Folder

Subfolder	Contents
Blocks	DCW Blocks
Layers	DCW standard layer related files and information
Macros and LISP	Reserved for future use
PayItems	DCW standard pay item and quantity takeoff files
Pipes Catalog	DCW standard pipes catalogs and supporting files
Plot Files	DCW standard plot files
PressurePipesCatalog	DCW standard Pressure Pipes catalog and supporting files
Profiles	DCW standard Profile and customization files
Subassemblies	DCW standard Subassembly files
Survey Settings	DCW standard survey setting support files
Templates	DCW standard template files
Tool Palettes	DCW standard tool palette files

Table 2: Contents of Project Folder

Folder	Contents
CAD & Survey GIS Data Request	Files provided by the internal GIS group
Design Data	Any data directly related to and/or displayed in the design Drawings
DWG	All working .dwg files
Internal QC	Documents published for internal CAD QC
Maps	Any Maps related to the project
Photos	Any project related photos
Segment Documents	Various correspondence, memos, emails, etc.
Submittals	Project submittal documents
Survey	Survey data
Utility Records	Internal and external existing utility records

3.2 DRAWING TEMPLATES

Drawing templates have been created to standardize the design process. These templates are included in the support files of the LCM. The drawing templates are stored in the ...*CAD Standards\Templates* folder and contain custom *settings*, *styles*, *blocks*, *data shortcuts*, etc. necessary for each Drawing type. The following drawing *templates* are described in this LCM:

- *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt*
- *EXISTING_UTILITY_TEMPLATE.dwt*
- *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt*
- *SURVEY_GIS_TEMPLATE.dwt*
- *TCP_MOT_TEMPLATE.dwt*
- *UTILITY_DESIGN_GS_TEMPLATE.dwt*
- *UTILITY_DESIGN_TEMPLATE.dwt*

At the start of each project, confirm you have the latest LCM support files with all templates, appendices, and other support files. The templates are regularly updated.

3.3 FOLDER AND FILE NAMING CONVENTIONS

DC Water has established a standard naming convention for all AutoCAD files and folders that store AutoCAD files. Below are the standard naming conventions. The folders and files are named using the P6 job number, neighborhood, project service type, Drawing type, and other similar information. All text components can be separated by an underscore or a space. See below for information about the different components of folder and file names as well as several examples.

3.3.1 Fields Used for Creating Folder and File Names

3.3.1.1 P6 Job Number

The CAD Standards require use of the DC Water P6 job number. A P6 job number has four digits (for example: F201 or HX03). At DC Water the first two digits of the job number are a project number (for example HX is the project name for all SDWM 16 jobs). The CAD Manual requires use of the four-digit job number (for example, HX01 is the job name for SDWM 16A). If the project does not have a P6 job number a different identifying “job number” shall be created and used. When a P6 job number is not available, create a “job number” that does not have 4 digits to signify to others it is not a P6 job number. Examples of an alternative “job number” are DMB01, 002, KyleT03, CSomers04, FloridaAve5, or NPS103.

3.3.1.2 Neighborhood

The neighborhood name shall use the neighborhood names shown on the *DC_neighborhoods_map.png* located in the LCM support files. As of the date this LCM was published this Map is also available at https://en.wikipedia.org/wiki/Neighborhoods_in_Washington,_D.C./media/File:DC_neighborhoods_map.png.

This Map does not reflect precise neighborhood boundaries as neighborhood boundaries are an inherently social feature. Even though the neighborhoods do not have precise delineations, the names on this Map are all in common use. DC Water uses this Map to differentiate different projects areas and to simplify communication.

If a project area crosses more than one neighborhood, use the neighborhood with most work. If the work is divided near equally, choose either neighborhood name.

3.3.1.3 Project Service Type

The choices for project service type follow:

- Sewer Replacement: Use for sanitary, storm, or combined sewer projects that are not primarily rehabilitation.
- Sewer Rehab: Use for sanitary, storm, or combined sewer projects that are primarily rehabilitation.
- Watermain Replacement: Use for watermain projects (including SDWM).

When a project consists of more than one project type, use the type that predominates. If the work is evenly split, choose either.

Project service type is also an attribute in the title block.

The project service type is used in the file naming of pdfs that are sent to DCRA for permitting and must meet their requirements and maintain consistency with the attribute in the title block. Therefore, the

project service type shall be descriptive of the work to be done and relatively short. If the project service types listed above do not accurately convey the work to be done, create a different project type that is short and descriptive of the work being depicted.

3.3.1.4 Drawing Type

The choices for Drawing type follow:

- GIS: Use for the GIS Drawing.
- SurveyRaw: Use for the Survey Raw Drawing
- Survey: Use for the Survey Drawing
- ExUtil: Use for the Existing Utility Drawing
- Gen: Use for the General Sheet Drawings
- WaterDesign: Use for Water Design Drawings on all water projects
- SRehabDesign: Use for Sewer Design Drawings on sewer rehabilitation projects, including external point repairs
- SewerDesign: Use for Sewer Design Drawings on all sewer projects that are not sewer rehabilitation
- SRP: Use for SRPs
- ESC: Use for ESC Plans
- TCP: Use for TCPs

3.3.1.5 Sheet Label / Sheet Number

The Sheet label is only seen within AutoCAD (in the *Sheet Set Manager* and the tabs along the bottom of the AutoCAD window). The Sheet label within AutoCAD shall be identical to the Sheet Number (ie: G-1, C-1.2, C-2.2, CD-3, etc.).

3.3.1.6 Submittal Title

See [Article 4.6 Submittal](#) for list of acceptable submittal titles.

3.3.1.7 Sheet Title

See [Table 5: Sheet Order](#) for the list of acceptable Sheet titles.

3.3.1.8 Date

When the date is used in a file name it shall be in YYMMDD format. For example, November 3, 2020 will be noted “201103.”

3.3.2 CAD Project Folder Naming

The CAD Project Folder shall be copied from the *Project Template* folder as described in [Paragraph 3.1.2 CAD Projects Folder](#). Once pasted, the *Project Template* folder shall be renamed using the following example. If the project information is:

- Job number: JX01
- Neighborhood: Capitol Hill
- Project service type: Sewer Rehab

...then the CAD Project Folder name shall be:

- JX01_Capitol_Hill_Sewer Rehab

3.3.3 Survey Folder

A folder named *survey* shall be in the CAD Project folder. This folder stores all survey data except the Survey Raw Drawing and the Survey Drawing which are both stored in the *DWG* folder. It is often desirable to store an original, unmodified version of the Survey Drawing and/or Survey Raw Drawing as they were received from their source. The original, unmodified version of these drawings shall be stored in the survey folder with *ORIGINAL* appended to the file name. The version used for *xrefs* shall be the version in the *DWG* folder.

3.3.4 Drawing Names

Drawings shall be located under the CAD Project folder in the subfolder named *DWG* and shall be named using the following example. If the Drawing information is:

- Job number: G502
- Neighborhood: Forest Hills
- Project service type: Sewer Rehab
- Drawing type: GIS

...then the CAD Drawing name shall be:

- G502_Forest_Hills_Sewer_Rehab_GIS

3.3.5 Plan Names (single page pdfs)

Single page pdfs are used for DCRA permit submission. DCRA requires single page pdfs with a specific file naming system. The file name of single page pdfs used for DCRA permit submission shall use the following example. If the page information is:

- Sheet number: C-1.7
- Project service type: Sewer Replacement
- Sheet title: Sheet Index and Project Data

...then the Plan name shall be:

- C-1.7_Sewer_Replacement_Sheet_Index and Project_Data.pdf

Pdfs shall be saved in the *Submittals* folder in the appropriate subfolder for the given Submittal.

Figure 11: Example Plan Set Names as Submitted to DCRA below shows a series of pdfs following this naming convention from a small example project. The files are sorted by name, not shown in the order they appear in a full Plan Set.

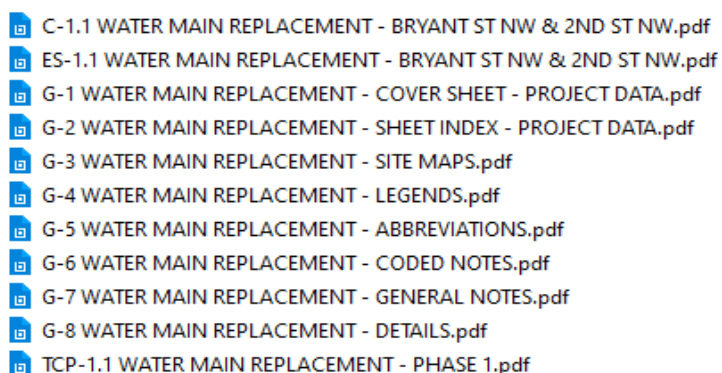


Figure 11: Example Plan Set Names as Submitted to DCRA

3.3.6 Plan Set Names (multi-page pdfs)

Plan Set pdfs shall be saved in the *Submittals* folder in the appropriate subfolder for the given Submittal. The pdf shall be named using the following example. If the project information is:

- Job number: SoDakota01
- Project service type: Watermain Replacement

...then the Plan Set file name shall be:

- SoDakota01_Watermain Replacement.pdf

3.3.7 Related documents

While developing the Drawings, multiple scans, pdfs, and other documents are used to collect information. This could be from field markups of draft plans during a site walk, workshop notes, a desktop review, etc. All such documents used to create the existing conditions shall be scanned and named using the following example. If the project information is:

- P6 job number: G603
- Neighborhood: Trinidad
- Project service type: Sewer Rehab
- Date: June 7, 2019 (190607)
- Identifier: Field Walk Markups

...then the document name shall be:

- G603__Trinidad_Sewer Rehab_190607_Field_Walk_Markups

The identifier listed below could have a wide range of values and shall be named as needed to clarify the content of the scan. The documents shall be saved in the subfolder named *Segment Documents* under the CAD Project folder.

3.3.8 Milestone Submissions

All documents submitted for milestones (such as Pre-Final Design) shall be in a zip file (see [Section 17 Submission and Audit Process](#) for requirements) and shall be saved in the *Submissions* folder with the following naming example. If the project information is:

- Job number: DMB01
- Project service type: Watermain Replacement
- Submittal title: Record Drawing
- Date: Jul 18, 2018 (180718)

...then the document shall be:

- DMB01_Watermain Replacement_Record_Drawing_180718.zip

3.4 SUPPORT FILE SETTINGS

3.4.1 Pipe Network Catalog Settings

The *pipe catalog* shall be set to *DCW Imperial Pipe Catalog* and the *structure catalog* must be set to *DCW Imperial Structure Catalog*. The *catalogs* are stored in *...|CAD Standards|Pipes Catalog* and are included in the LCM support files.

3.4.2 Pressure Network

The *pressure network catalog database file* shall be set to *DC_Water_SDWMR*. The *catalog* is stored in *... \CAD Standards \PressurePipesCatalog* and is included in the LCM support files.

3.4.3 Pay Items

The *pay item file*, *categorization file*, and *formula file* shall be set to *PayItemDCW*. This file is stored in *... \CAD Standards \PayItems* and is included in the LCM support files. The *Pay Items* to be used are listed in [Appendix E](#).

3.4.4 AutoCAD Civil 3D Profile

DC Water has developed a standard DC Water Profile for AutoCAD Civil 3D. The DC Water profile is called *DCWater_C3D_YYYY* where *YYYY* is the year of the most recent update in the LCM support files. It is stored in *... \CAD Standards \Profiles* and is included in the LCM support files. This profile location of the *DCW Standards* files mirrors that of DC Water (*I:\CAD Standards\...*). As this will vary from firm to firm, please refer to *DCW Civil 3D YYYY Contractor LCM support files Documentation.docx* included in the LCM support files for additional information and instructions.

3.4.5 Plot Style Table

The *plot style table search path* must be set to the *... \CAD Standards* folder. This is automatically set when the *user profile* mentioned in the previous subsection is applied.

3.5 EXTERNAL REFERENCES

Drawings typically require the use of *xrefs* (see [Figure 12: Xref Dialog Box](#) below). To facilitate this process, each of the templates contains placeholders for each of the required *xrefs*. Standard names have been assigned to these placeholder files to improve *layer state* and other reference functionality across the project Drawings.

When a new file is created using one of the templates, the paths of all the placeholder *xrefs* shall be updated to point to the corresponding *DWG* subfolder under the CAD Project Folder.

Each placeholder has the necessary *xref* properties, including the following:

- All project *xrefs* are attached as overlays to avoid circular references.
- All project *xrefs* are inserted at 0,0,0 using a scale of 1,1,1.

For a full list of the *xrefs* attached to each template/Drawing and the corresponding settings, please refer to [Appendix F](#).

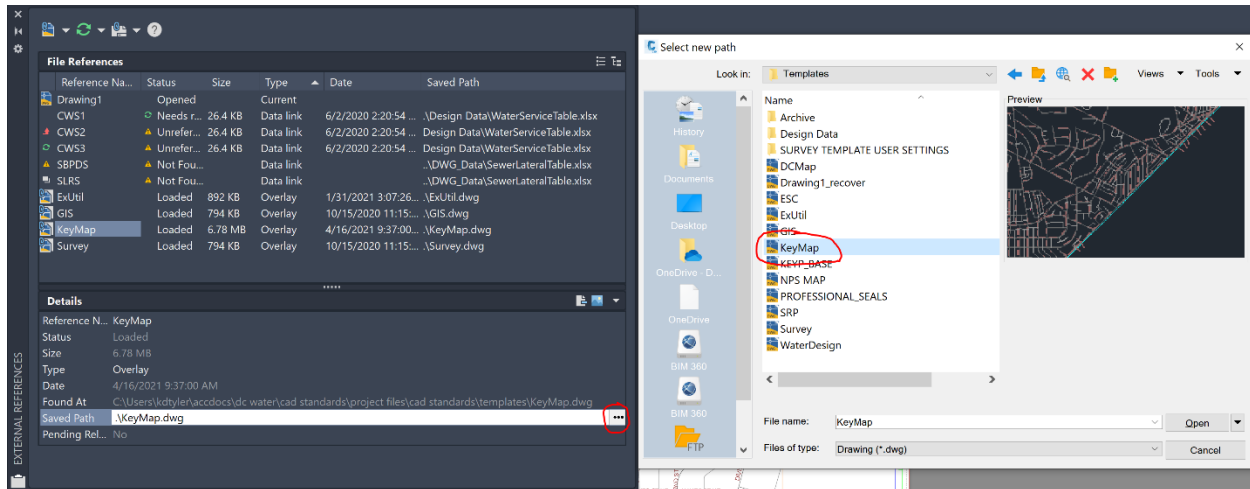


Figure 12: Xref Dialog Box

3.6 DATA SHORTCUTS

Data shortcuts are created for the following:

- Existing *surfaces* (see [Article 6.3 Data Shortcuts](#))
- New *surfaces* for external point repairs (see [Paragraph 12.10.3.2 Data Shortcuts](#))
- *Alignments* (see [Paragraph 10.11.1 Alignment Data Shortcut](#))
- *Pipe networks* (see [Article 8.8 Pipe Network](#) and [Paragraph 12.14.1 Pipe Networks for New Sewer Assets](#))
- *Pressure pipe networks* (see [Paragraph 11.14.1 Pressure Pipe Networks for New Water Assets](#))
- *View frames* (see [Article 4.3 Sheet Coordination](#))
- *Profiles* (see [Paragraph 11.15.1 Profile Creation](#))

Data shortcuts shall be stored in the *Shortcuts* folder (see [Figure 13: Data Shortcuts in AutoCAD Civil 3D](#)) within the *Design Data* folder (using the examples above the folder path would be ...*\CAD Projects\F101... \Design Data\Shortcut*). The working folder for the *data shortcuts* will be set to ...*\CAD Projects\F101... \Design Data*.

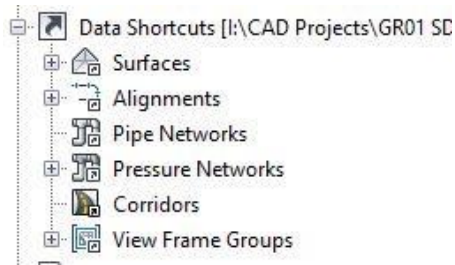


Figure 13: Data Shortcuts in AutoCAD Civil 3D

3.7 DATA LINKS

Data links are created for the following:

- Traverse control tables (see [Paragraph 10.8.1 Traverse Control Tables](#))
- Water service tables (see [Paragraph 11.8.2 Water Service Tables](#))
- Sewer lateral rehabilitation schedule (see [Paragraph 12.16.4 Sewer Lateral Rehabilitation Schedule Sheets](#))
- Pipe rehabilitation schedule and maintenance hole rehabilitation schedule (see [Paragraph 12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule](#))

Data links shall be stored in the *Design Data* folder within the *Project* folder (using the examples above the folder path would be ...*\CAD Projects\F101... \Shortcut*).

3.8 PLOT STANDARDS

Three standard, color-dependent *Plot Style Table files* are used for plotting design sets. The *Plot Style Tables* are stored in ...*\CAD Standards\Plot Files* and are included in the LCM support files. These *Plot Style Tables* are listed in [Table 3: Plot Style Tables](#) below.

Table 3: Plot Style Tables

Name of Plot Style Table file	Used for ...
<i>DCWASA.ctb</i>	Full size black and white Sheets
<i>DCWASA_COLOR.ctb</i>	Full size color prints
<i>DCWASA_HALF_SCALE.ctb</i>	Half scale black and white Sheets

For detailed information about these *Plot Style Tables*, please refer to [Appendix D](#). The half scale plot file must be applied to the layout to print the half scale set legibly.

3.9 DRAWINGS VERSION CONTROL DURING BIDDING AND CONSTRUCTION

Once a project is advertised for construction, changes to Drawings are noted with clouds and revision blocks. Once a project reaches Issued for Bid status, the Drawings are a “living document” and change shall be made only via addendum. This means there can only be one version of the “live” Drawings. Track all changes in the Drawings once a project has been issued for bid.

4. SHEET SET MANAGER AND TITLE BLOCKS

4.1 SHEET SET TEMPLATES

Sheet Set templates are stored in ... \CAD Standards\Templates and are included in the LCM support files.

4.2 SHEET SET TEMPLATE ATTRIBUTES

The *template* named *DESIGN_SHEET_SET.dst* provided in the LCM support files contains many different attributes for use in organizing and plotting project Sheets. All necessary project and Sheet-specific information must be input in the *Sheet Set Manager*. The different types of attributes contained in the *sheet set template* are described below.

4.2.1 Sheet Set-Specific Attributes and Sheet-Specific Attributes

The DC Water CAD Standards make use of attributes that are Sheet specific, and *sheet set* specific. An example Sheet specific attribute is Sheet number (such as G-1) or Sheet title (such as General Notes Sheet). An example *sheet set* specific attribute is project name or consultant name.

Sheet set-specific attributes are also known as *Sheet Set* custom properties. These attributes apply to the entire *Sheet Set* and will populate the *Sheet Set linked fields* of all title blocks associated to the *Sheet Set Manager*. Please refer to [Appendix G](#) for a list of these attributes and their settings, along with their placement/use in the title blocks.

Sheet-specific attributes are also known as Sheet Custom Properties. These attributes apply to individual Sheets and will populate the Sheet linked attributes of the title block associated to that Sheet within the *Sheet Set Manager*. Please refer to [Appendix G](#) for a list of these attributes and their settings, along with their placement/use in the title blocks.

4.2.2 Attributes to be carried to other fields

Certain attribute values in the Title Block will carry through to other field for data entry. The following attributes are in the title block and the same value shall be replicated in other locations as described:

- Project service type and location are also used in file naming (see [Paragraph 3.3.1 Fields Used for Creating Folder and File Names](#))
- Sheet title and discipline are also used in the Sheet Index (see [Paragraph 9.5.2 Sheet Index and Project Data](#))

4.2.3 DCRA Compliance

There is a box in the upper right corner of the title block. This space is reserved for DCRA. Do not place anything in box at the top right corner. Also, there is a corner on the bottom left for a second PE stamp for the occasional Sheet where this is required.

4.2.4 Sheet Designations

[Table 4: Sheet Groups & Designations](#) lists all Sheet groups with their designations and descriptions. A Sheet designation is the letter part of the Sheet number.

Table 4: Sheet Groups & Designations

Sheet Group	Designation	Description
General Sheets	G	Depict general project information such as the Sheet Indexes, legends, general notes, Standard Details, 3rd party details, project specific details, and other related information that applies to the entire project.
Survey Control Sheets	VC	Depicts all survey control points and traverse recovery sketches.
Existing Conditions Sheets	V	Depicts site Planimetrics including surface features, existing utilities below and above ground, and existing asset tags for all DC Water assets. Existing Conditions Sheets are not included in Plan Sets issued for bid. Includes Record Drawings in some cases
Subsurface Utility Engineering Sheets	SU	Depicts existing utilities below and above ground. Includes Record Drawings in some cases
Civil Design Sheets	C	Depicts water and/or sewer assets to be rehabilitated, replaced, and/or installed new. Civil Design Sheets include Watermain Replacement Sheets, Sewer Replacement Plan and Profile Sheets, and Sewer Rehabilitation Sheets.
Civil Detail Sheets	CD	Depicts detailed areas from the Watermain Replacement Sheets, Sewer Replacement Plan and Profile Sheets, or Sewer Rehabilitation Sheets at a larger scale.
Civil Table Sheets	CT	Depicts the following tables: hydrant and valve tables, water service tables, sewer lateral tables, and sewer bypass tables. The tables include blank spaces for new assets to be filled out with As-Built information during construction.
Surface Restoration Plans	SR	Depicts areas of surface restoration and quantity takeoffs per Sheet.
Erosion & Sediment Control General Sheets	GE	Depicts general erosion and sediment control information.
Erosion & Sediment Control Plans	ES	Depicts the erosion and sediment control for the construction phase of the project. These Sheets are submitted for permit approval.
Traffic Control Plan General Sheets	GT	Depicts general traffic control information. These Sheets are submitted for permit approval.
Traffic Control Plans	TC	Depicts traffic control requirements during the construction phase of the project. These Sheets are submitted for permit approval.

4.3 SHEET COORDINATION

All water and sewer projects shall use view frames on the following Sheets to depict the same plan view boundaries on Sheets with different designations:

- V Sheets
- C Sheets
- ES Sheets
- SR Sheets

For example, Sheet V-4.2 depicts the same project area as Sheet C-4.2, Sheet ES-4.2, and Sheet SR-4.2. See [Article 10.12](#) for more information and additional requirements. TCPs do not use the same view frames (see [Paragraph 15.10.1.2 TCP Phasing Plan](#) for more information).

Additional Sheets that require correlation between designations include:

- Civil Details that show external point repairs require a corollary 20 scale V Sheet, ES Sheet, and SR Sheet because there is usually no 50-scale Plan showing the excavation work.
- Sewer Rehabilitation Sheets require a corollary V Sheet at 50 scale even though the V Sheet relies primarily on GIS information.

Sheets that do not require correlation between designations include:

- Civil Detail Sheets showing new watermains or new sewers do not need a corollary 5-scale V Sheet, ES Sheet, or SR Sheet, because the 20-scale C Sheet has a corollary 20-scale V Sheet, ES Sheet, and SR Sheet.
- Sewer Rehabilitation Sheets do not require ES Sheet or SR Sheet unless excavation is required.

Create and save *data shortcuts* of the *view frames* in the *Shortcut* folder. The *view frames* exist in each Drawing and are shared with a *data shortcut*. For more information see [Article 3.6 Data Shortcuts](#). For more information about view frames, please refer to [Article 10.12 View Frames](#) and [Article 12.12 View Frames](#).

4.4 SHEET ORDER

[Table 5: Sheet Order](#) below lists all Sheet Titles and Plan Titles described in the LCM in the order they are to appear in a published Plan Set and the *Sheet Set*. Not every Sheet will be needed for every project, but some Sheets are required on every project; see footnotes and appropriate Paragraph for more information. Even when a Sheet is required for a certain project, it may not be required for each submittal (see [Article 4.6 Submittal Sheets](#) for more information about which Sheets are required for each submittal).

In the rare event that a project warrants information that does not fit into any of the Sheets or Plans listed below, a new Sheet shall be included at the end of the appropriate Sheet designation group or a new Sheet designation group can be created and placed at the end of the Plan Set. Similarly, if information needs to be provided that is not appropriate for the designations listed below, a new designation may be added at the end of the Sheet Set.

Table 5: Sheet Order

Sheet/Plan Title	Designation (Paragraph 4.2.4)	See Paragraph ...
Cover & Project Data	G	9.5.1
Sheet Index & Project Data	G	9.5.2
Site Map	G	9.5.3
Legend	G	9.5.4
Abbreviations	G	9.5.5
General Notes	G	9.5.6
Water Fitting and Coded Notes ¹	G	9.5.7
Sewer Rehabilitation Coded Notes, Legends, & Detail ^{2,3}	G	9.5.8
Standard Details ³	G	9.5.9
3rd Party Details ³	G	9.5.10
Project Specific Details ³	G	9.5.11
Survey Control	VC	10.14.1
Existing Conditions ^{4,5}	V	10.14.2

Sheet/Plan Title	Designation (Paragraph 4.2.4)	See Paragraph ...
Subsurface Utility Engineering	SU	<u>10.14.3</u>
Watermain Replacement ¹	C	<u>11.16.1</u>
Sewer Replacement Plan and Profile ^{2,3}	C	<u>12.16.1</u>
Sewer Rehab ^{2,3}	C	<u>12.16.2</u>
Watermain Profile ¹	CP	<u>11.16.2</u>
Civil Details ³	CD	<u>11.16.3</u>
Hydrant and Valve Table ¹	CT	<u>11.16.4</u>
Water Service Table ¹	CT	<u>11.16.5</u>
Sewer Lateral Table ^{2,3}	CT	<u>12.16.4</u>
Sewer Bypass Table ^{2,3}	CT	<u>12.16.5</u>
Sewer Maintenance Hole Table ^{2,3}	CT	<u>12.16.6</u>
Pipe and Maintenance Hole Schedule	CT	<u>12.16.7</u>
Surface Restoration ^{3,5}	SR	<u>13.17</u>
ESC Cover ^{3,5}	GE	<u>14.11.1</u>
ESC Stormwater Warning Sign and General Notes ^{3,5}	GE	<u>14.11.1</u>
ESC Legend and Tree Protection Note ^{3,5}	GE	<u>14.11.1</u>
DOEE 3 rd Party Details ^{3,5}	GE	<u>14.11.1</u>
Erosion Sediment Control ^{3,5}	ES	<u>14.11.2</u>
TCP Cover ^{3,5}	GT	<u>15.10.1</u>
TCP Phasing ^{3,5}	GT	<u>15.10.1</u>
TCP General Notes & Legend ^{3,5}	GT	<u>15.10.1</u>
TCP Typical ^{3,5}	TC	<u>15.10.1</u>
Traffic Control ^{3,5}	TC	<u>212884489615.10.2</u>

- ¹ Only used on water projects.
- ² Only used on sewer projects.
- ³ Used when dictated by project needs.
- ⁴ Only used for project areas with excavation
- ⁵ Excluded from the Plan Set issued for bid.

4.5 SHEET NUMBERING

Each group of drawing shall be numbered sequentially by designator. See [Table 4: Sheet Groups & Designations](#) and [Table 5: Sheet Order](#) for the appropriate designator for each Sheet Title.

All General Sheets (G, GE, and GT) use the format G-#, where # increases sequentially with each Sheet in series, for example GT-1, GT-2, GT-3, etc.

All other Sheets use the format C-#.#. The first # represent a neighborhood and the second # represents the sequential Sheets within that neighborhood. For example, if a project has two neighborhoods, each with three Sheets the C Sheets would be numbered C-1.1, C-1.2, C-1.3, C-2.1, C-2.2, and C-2.3. This same numbering sequence shall be applied to each group designator. The order of the neighborhood numbers is arbitrary and may be selected by the Designer.

See [Article 4.3 Sheet Coordination](#) for more information and additional requirements related to Sheet coordination among the V, C, ES, and SR Sheets.

For VC, CP, CD, and CT Sheets, the same numbering scheme shall be followed for the neighborhood but need not be broken to show the assets separated by Sheet. For example, using the numbering example above, if all the fire hydrant stamps, valve stamps, and water service tables could be fit on one Sheet, they would be numbered as follows:

- CT-1.1 (hydrants and valves for neighborhood 1)
- CT-1.2 (water service lines for neighborhood 1)

- CT-2.1 (hydrant and valves for neighborhood 2)
- CT-2.2 (water service lines for neighborhood 2)

4.6 SUBMITTAL SHEETS

When a Sheet is required for a certain project (per the various Sections listed in [Table 5: Sheet Order](#)) that Sheet is not necessarily required for each submittal. When a specific Sheet is required for a project, [Table 6: Sheets in Each Submittal](#) defines which Sheets shall be included in each submittal for that project. [Table 6: Sheets in Each Submittal](#) only includes the most common submittals; refer to the Project Design Manual Volume 1 for the complete list of submissions.

Table 6: Sheets in Each Submittal

Sheet/Plan Title	Submittal						
	Existing Conditions	Preliminary Design	Pre-Final Design & Backcheck	Issued for Bid & Issued for Construction	AsBuilt	Record Drawing	Attachment to Solicitation as “ Available Information”
Cover & Project Data	X	X	X	X	X	X	
Sheet Index & Project Data		X	X	X	X	X	
Site Map	X	X	X	X	X	X	
Legend	X	X	X	X	X	X	
Abbreviations		X	X	X	X	X	
General Notes		X	X	X	X	X	
Water Fitting and Coded Notes			X	X	X	X	
Sewer Rehabilitation Coded Notes, Legends, & Detail			X	X	X	X	
Standard Details			X	X	X	X	
3rd Party Details			X	X	X	X	
Project Specific Details			X	X	X	X	
Survey Control	X	X	X	X	X	X	
Existing Conditions	X	X		X			
Subsurface Utility Engineering			X	X			
Watermain Replacement		X	X	X	X	X	
Sewer Replacement Plan and Profile		X	X	X	X	X	
Sewer Rehab		X	X	X	X	X	
Watermain Profile			X	X	X	X	
Civil Details			X	X	X	X	
Hydrant and Valve Table			X	X	X	X	
Water Service Table			X	X	X	X	
Sewer Lateral Table			X	X	X	X	
Sewer Bypass Table			X				X
Sewer Maintenance Hole Table			X	X	X	X	
Pipe and Maintenance Hole Schedule			X	X	X	X	
Surface Restoration			X		X		
ESC Cover			X				X
ESC Stormwater Warning Sign and General Notes			X				X
ESC Legend and Tree Protection Note			X				X
DOEE 3 rd Party Details			X				X
Erosion Sediment Control			X				X
TCP Cover							X
TCP Phasing							X

Sheet/Plan Title	Submittal						
	Existing Conditions	Preliminary Design	Pre-Final Design & Backcheck	Issued for Bid & Issued for Construction	AsBuilt	Record Drawing	Attachment to Solicitation as “Available Information”
TCP General Notes & Legend							X
TCP Typical							X
Traffic Control							X

4.7 TITLE BLOCKS

The sections below define the available title blocks and their templates.

4.7.1 DC Water Title Block

The standard title block is named *CIP_TTLBLK* and has been inserted in all standard linear design layouts of the drawing *templates (UTILITY_DESIGN_TEMPLATE.dwt)*. The title block is ANSI D 22” x 34” with an insertion point of 0,0,0. This title block contains fields that are linked to properties in the *Sheet Set* (see [Article 4.2 Sheet Set Template Attributes](#)). All *links* shall be active and remain dynamically tied to the *Sheet Set* for the project. There shall be no broken links between the title block and the *Sheet Set*. For more information about this title block and the fields contained therein, please refer to [Appendix G](#).

DC Water has created title blocks to use with other sheet sizes when required. The title block named *CIP_TTLBLK_ARCH_D* is to be used with ARCH D 24” x 36” sheets, and *CIP_TTLBLK_LETTER* is to be used with Letter 8.5” x 11” sheets.

4.7.2 DDOT Linear Design Title Block

When DC Water “participates” in a DDOT capital project by adding DC Water capital improvements into DDOT’s bid package, the DC Water design uses DDOT’s title block. This title block is called *DDOT_TTLB* and has been inserted in the *DDOT... layouts* of the *UTILITY_DESIGN_TEMPLATE.dwt*. The title block is size ANSI D 22” x 34” with an insertion point of 0,0,0. Please refer to [Appendix G](#) for more information.

4.8 PUBLISHING

In *Page Setup Manager*, the *UTILITY_DESIGN_TEMPLATE.dwt* has a *Standard Page Setup* called *ANSI D.pdf* which shall be used when publishing the design. The *PDFSHX* variable in AutoCAD shall be set to 0 (zero) when publishing. For *Standard Page Layout settings*, please refer to [Appendix G](#).

5. GIS DRAWING

5.1 PURPOSE

The purpose of the GIS Drawing is to depict all property information and surface features gathered from various GIS databases at DC Water, the DC Office of the Chief Technology Officer (OCTO), and other sources.

The GIS Drawing shall be created from the *SURVEY_GIS_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate GIS Drawing shall be created for each neighborhood.

Linework, hatching, and other AutoCAD objects may be drawn in the GIS Drawing or the Survey Drawing depending on whether they were field surveyed or not. For example, in a sewer rehabilitation project with no excavation the survey is typically limited to maintenance hole information only. In this example the curb lines would not be surveyed, rather brought in from GIS data; the curb linework would, therefore be drawn in the GIS Drawing, not the Survey Drawing.

The GIS Drawing shall include the following information:

- railways,
- streams, creeks, bodies of water,
- pressure zones (water projects only), combined sewer system boundary (sewer projects only)
- parks, forests,
- street names,
- squares, lot lines, lot numbers, addresses, street lines, right-of-way lines,
- building footprints, walls,
- any large structures or facilities (schools, government buildings, apartment complexes, colleges, universities, community centers, churches, etc.), and
- other similar features.

On occasion a field survey is only used to locate a limited number of surface features (as described above for a project with no excavation). When a limited feature field survey is used the GIS Drawing shall also include surface feature including:

- pavement, curbs, sidewalks, handicap ramps, grates,
- street trees, special trees, wooded areas
- walls,
- utility features (except those located by topographic survey or subsurface utility engineering), and
- other similar surface features.

5.2 LAYERS

The *SURVEY_GIS_TEMPLATE.dwt* is populated with all layers needed to adhere to the standards when creating the GIS Drawing. The only layers that are to be used in the GIS Drawing are *VI- layers*, which store digital survey information. The *VF- layers* included in the template are reserved for field surveyed data and are not to be used for GIS data. For a list and description of the *VI- layers*, please refer to [Appendix A](#) and the LCM support files.

5.2.1 Layer Filters

Layer filters have been created to make navigation of the layer sets more efficient. For a list of those layer filters and the layers they contain, please refer to [Appendix A](#) and the LCM support files.

5.3 LABELS

The sections below define the labels, associated text styles, and sizes for information that shall populate the GIS Drawing.

5.3.1 Roads

All roadways and alleys must be labeled using the ANNO .15 Text Style and be placed on the VI-ROAD-NAME-E Layer. There shall be a minimum of one label for each roadway shown on each Sheet. All road labels shall include road name, road type, and city quadrant (for example: FLORIDA AVE NW). All alleys shall be labeled and indicate whether they are private or public. The following roadway abbreviations shall be used:

- ST – Street
- CIR – Circle
- RD – Road
- AVE – Avenue
- HWY – Highway
- PRK – Parkway
- NE – Northeast
- NW – Northwest
- SE – Southeast
- SW – Southwest

5.3.2 Square Boundaries

Square boundaries shall be shown in the GIS Drawing. Square boundaries are available from DC OCTO. There shall be a minimum of one label for each square shown on each Sheet. All squares shall be labeled using the ANNO .12 text style on the *VI-PROP-TEXT-SQRE-E* Layer. [Figure 14: Example Labels for Lot Lines, Addresses, Street Names, and Squares](#) shown below for an example Square number label (shown in magenta).

Squares are a system of grids (typically city blocks) that overlay all of DC. Squares create a DC-wide grid system that uniquely determine the position of lots, lot lines, street lines, and right-of-way lines. Each Square is an island, alone unto itself. Most Squares are unrelated to other Squares by measure, rather by record.

The published official street widths cannot be used to accurately set lot lines or determine right-of-way; Squares must be used to establish lot lines and right-of-way lines. Some Squares are divided by streets, with the same Square on both sides of a street. Since there is no DC-wide survey coordinate system, squares were placed in their approximate location using the best fit method.

Squares are calculated by the outer extents of the record or tax lots within a defined area (typically a city block). There are approximately 4896 active squares. Squares were numbered starting at 1 and are currently in the 6000 series. Not all squares are active. A common cause of squares becoming inactive is

street closing leading to the combining of squares. When the squares are combined usually the lower square number is retired and the higher square number remains active for the combined square.

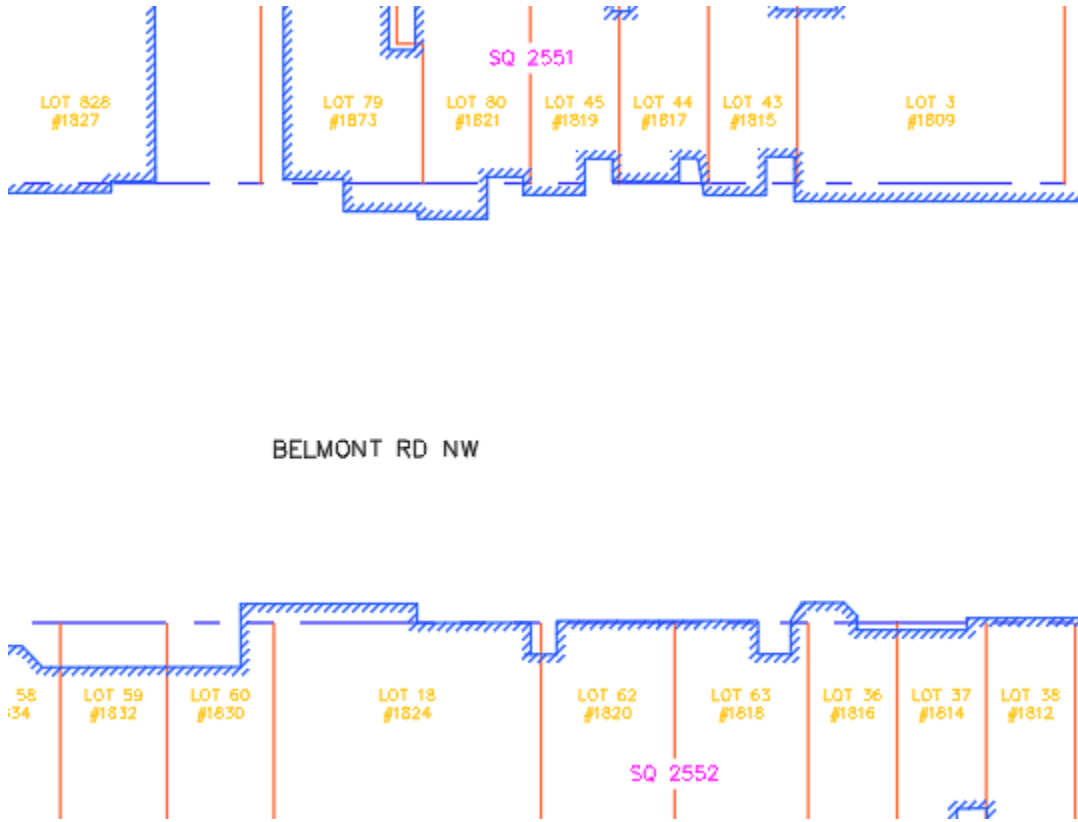


Figure 14: Example Labels for Lot Lines, Addresses, Street Names, and Squares

5.3.3 Lots and Addresses

All lots, parcels, tax lots, and properties must be labeled with a lot or parcel number. All buildings shall be labeled with a lot number and physical address using the *ANNO .094 Text Style* on the *VI-PROP-TEXT-E* Layer. Lot numbers shall be generated starting from north to south to keep the lot numbers organized so they can be read the same way across the Sheet. In the label, the lot number shall be shown first and the physical address second. Physical addresses should always be designated with the # symbol as a prefix. See [Figure 14: Example Labels for Lot Lines, Addresses, Street Names, and Squares](#) below for example lot and address labels.

5.3.4 Pressure Zones

All pressure zone lines shall be labeled on each side of the line designating the pressure zone on each Sheet. All pressure zones lines shall be labeled with text that uses *ANNO .12 Text Style* on the *VI-PRES-ZONE-TEXT-E* Layer.

5.3.5 Hardscape

All hardscape not designated with hatching shall be labeled with text that uses *ANNO .094 Text Style* on

the appropriate, corresponding *VI-...-TEXT* layer.

5.4 LINEWORK

All linetypes in the GIS Drawing shall be set to ByLayer and use the line layers in the *SURVEY_GIS_TEMPLATE.dwt*. For a list, description, and associated properties of those layers see the LCM support files. Below are guidelines that must be followed for various linework types.

5.4.1 Street Lines and Rights-of-Way

Street lines and right-of-way lines obtained from any sources other than field located markers shall be shown and drawn on *layer VI-PROP-STLN-E* which uses the *phantom linetype* (see [Figure 15: Phantom linetype used for GIS sourced street lines and right-of-way lines](#)). The *polyline linetype generation* shall be enabled, and the *polylines* must be broken at angle points, as well as at points of curvature, tangency, compound curvature, and reverse curvature. Do not adjust GIS street lines or right-of-way lines to connect to the surveyed property boundaries, instead include a note clarifying source of data and the discrepancy. See [Paragraph 7.4.1 Lot Lines, Street Lines](#) for more information. Street widths (right-of-ways) must match those widths shown in DDOT Transportatoin Online Permitting System ([TOPS](#)).



Figure 15: Phantom linetype used for GIS sourced street lines and right-of-way lines

5.4.2 Lot Lines

Lot lines taken from any sources other than field located markers shall be shown in the GIS Drawing. Lot lines that are retrieved from GIS (not survey located) are drawn on *layer VI-PROP-LINE-E* which uses the continuous linetype. Lot lines that duplicate street lines or right-of-way lines shall be removed.

Lot lines that require accurate location shall be shown in the Survey Drawing, not in the GIS Drawing, because they shall be survey located with a coordinate or station/offset label and may also require a field marker. Do not adjust GIS street lines or right-of-way lines to connect to the surveyed street lines, instead include a note clarifying source of data and the discrepancy. See [Paragraph 7.4.1 Lot Lines, Street Lines](#) for more information.

5.4.3 Pressure Zone Lines

All pressure zones that dissect or traverse the project area shall be shown and shall be drawn on *layer VI-PRES-ZONE-E* with a global width of 0.5.

5.4.4 Buildings

All buildings shall be shown. Buildings that are less than 15 feet from the edge of the design trench excavation shall be field located and drawn in the Survey Drawing. All buildings that are more than 15 feet from the design trench can be drawn from other data sources (primarily GIS). All buildings drawn from external data sources shall be drawn on *layer VI-BLDG-OTLN-E* which uses the *continuous linetype*.

5.4.5 Building Restriction Lines

Building Restriction Lines (BRL) shall be shown where applicable. BRL's shall be drawn on the *layer VI-PROP-BRLN* which uses the *dashed dot 2 linetype* at the proper distance interval from the right-of-way

lines. BRL *polylines* must be broken at angle points, as well as at points of curvature, tangency, compound curvature, and reverse curvature as well as following angle points, points of curvature, tangency, compound curvature, and reverse curvature of the right-of-way lines where applicable. The BRL's shall match the BRL locations and dimension intervals shown in DDOT transportation Online Permitting System (TOPS).

5.5 HATCHING

The sections below define the hatching, associated styles, and scales for information that shall populate the GIS Drawing.

5.5.1 Buildings

All buildings shall be hatched with *ANSI131* using an offset of 1.5 feet and set at a scale of 10. All building hatching shall have an angle no less than 30 degrees perpendicular to the street line for which the building address is applied. The preferred angle setting is 45 degrees. The hatching shall be non-associative and created on *layer VI-BLDG-HTCH*.

5.5.2 Concrete

All concrete shall be hatched with the *AR-CONC pattern* and set at a scale of 0.5. The hatching shall be non-associative and created on *layer VI-PVMT-CONC-SURF*.

5.5.3 Stone & Pavers

All stone shall be hatched with the *HEX pattern* and set at a scale of 3.5. The hatching shall be non-associative and created on *layer VI-PVMT-STON-SURF*.

5.5.4 Brick

All concrete shall be hatched with the *BRICK pattern* and set at a scale of 3.5. The hatching shall be non-associative and created on *layer VI-PVMT-BRCK-SURF*.

5.5.5 Gravel

All concrete shall be hatched with the *DOTS pattern* and set at a scale of 20. The hatching shall be non-associative and created on *layer VI-PVMT-GRVL-SURF*.

5.6 POINTS

Points must be inserted from the GIS database and then converted to coordinate geometry (COGO) points using the DC Water code lists. For a list of point codes, please refer to the support files of the LCM.

5.6.1 Description Key Sets

DC Water has developed a *Description Key Set* called *DC Water* that is included in the support files of the LCM and the default *Description Key Set* in the *SURVEY_GIS_TEMPLATE.dwt*. It can be accessed from the *Survey* tab in AutoCAD Civil 3D.

5.6.2 Symbols

All symbols shall be blocks assigned to point markers using Point Styles. Some point markers shall be rotated to align with streets and buildings. All symbology shall accurately depict the field location and

rotation of feature.

6. SURVEY RAW DRAWING

6.1 PURPOSE

The purpose of the Survey Raw Drawing is to process raw field data.

The Survey Raw Drawing shall be created from the *SURVEY_GIS_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate Survey Raw Drawing shall be created for each neighborhood.

The Survey Raw Drawing shall contain all the 3D survey data, existing surfaces, and surfaces to be constructed/restored. True COGO points are included. All points are included. Linework in the Survey Raw Drawing is at elevation.

6.2 LAYERS

The only layers that will appear in the Survey Raw Drawing are *V- layers*. The *VF- layers* included in the template are reserved for field-surveyed data and are not to be used for GIS data. The *VI- layers* found in the template are reserved for digital survey information and are not to be used in the Survey Raw Drawing. The *Survey_GIS_Template.dwt* is populated with all layers needed to comply with the CAD standards. For a list and description of those layers, please refer to [Appendix A](#).

6.2.1 Layer Filters

See [Paragraph 5.2.1 Layer Filters](#) for more information.

6.3 DATA SHORTCUTS

A *data shortcut* of the *surface(s)* shall be created in the *Shortcuts* folder of the associated project. For more information on *data shortcut* and *Data Shortcut Project Folders*, refer to [Article 3.6 Data Shortcuts](#).

6.4 LABELS

There shall be no labels in the Survey Raw Drawing. All labeling for Planimetrics shall be done in the Survey Drawing (see [Section 7 Survey Drawing](#)).

6.5 SURVEY USER SETTINGS

Survey User Settings in AutoCAD Civil 3D establish the necessary paths and other options for working with the survey functionality. A predefined *Survey User Settings file* is included in the LCM support files. These user settings shall be used for the *Survey Databases*. See [Figure 16: Survey User Settings](#) for more information. For a full list of those *Survey User Settings*, please refer to [Appendix H](#).

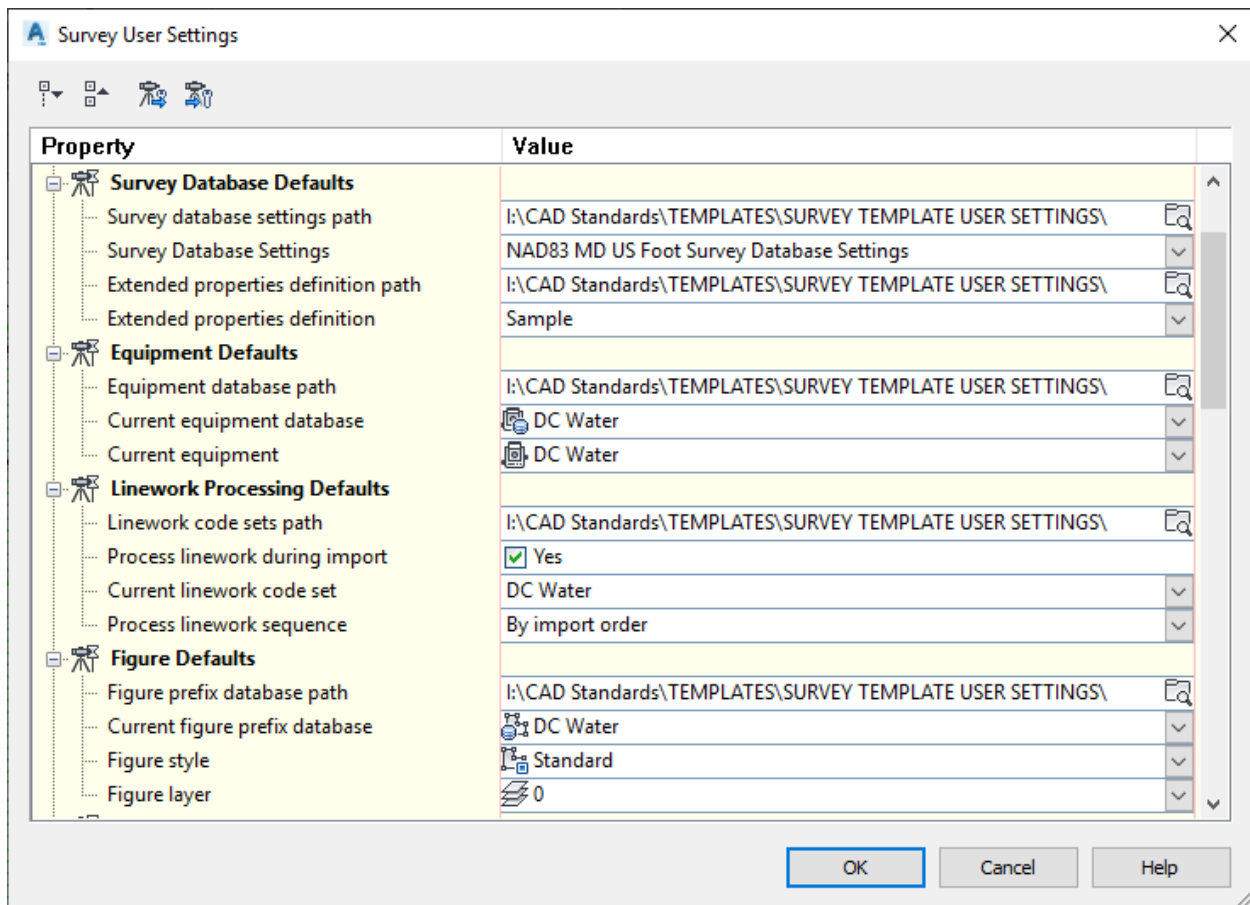


Figure 16: Survey User Settings

6.6 SURVEY DATABASES

A *Civil 3D Survey Database* shall be attached to all CIP Projects. This section provides information regarding the use and application of these databases. The survey database must be provided with all submissions.

6.6.1 Import Events

There shall be only one import event. All .txt files, raw files, field book files, and xml's shall be combined into one file for import.

6.6.2 Networks

Section reserved for future use.

6.6.3 Figures

There are two figure styles in the *SURVEY_GIS_TEMPLATE.dwt*: *DCW_Flatten* and *DCW_At Elevation*. *DCW_Flatten* shall be used for all figures within *SURVEY_GIS_TEMPLATE.dwt*.

6.6.4 Survey Points

All codes or code lists used for survey points shall correspond with standard symbology, see [Appendix H](#).

6.7 EQUIPMENT DATABASES

The LCM support files contain an equipment database called DC WATER which shall be used when survey data is imported to a survey database. This setting is established as part of the survey user settings discussed in [Article 6.5 Survey User Settings](#) above. For detailed equipment database settings information, please refer to [Appendix H](#).

6.8 FIGURE PREFIX DATABASES

The LCM support files contain a *Figure Prefix Database* called DC WATER which shall be used when survey data is imported to a Survey Database. This setting is established as part of the *Survey User Settings* discussed in [Article 6.5 Survey User Settings](#) above. For detailed *Figure Prefix Database settings* information, please refer to [Appendix H](#).

6.9 LINEWORK CODE SETS

The LCM support files contain a *Linework Code Set* called DC WATER which shall be used when survey data is imported to a survey database. This setting is established as part of the *Survey User Settings* discussed in [Article 6.5 Survey User Settings](#) above. For detailed *Linework Code Set Settings* information, please refer to [Appendix H](#).

6.10 TRAVERSE

A *traverse figure* and *network* shall be used to depict the traverse loop. The *Survey Database Settings file* defines the acceptable tolerance. A report of the network closure shall be included in the *Survey Data* folder.

6.11 CODE LIST

DC Water has developed a code list for use with the survey template and survey databases. All points that exist in the survey database shall match those developed by DC Water. Any field code list used shall be translated to DC Water codes and be accompanied by a .txt file or field book file. For the current DC Water Code list, please refer to [Appendix H](#). The PDE may use their own code list for collecting field data, however the codes must be modified to match the code list developed by DC Water before it can be imported into the survey database.

6.12 POINTS

6.12.1 Point Codes & Attributes

DC Water has developed a standard Code List that is included in the support files of the LCM. The Code List consists of a set of main codes and a group of attributes that can be applied to the codes. Many of the attributes will directly affect the symbology size and layers. Use the code list to ensure the Description Key Set and the Figure Pre-fix Database produces the correct symbology and places the field linework (figures) on the correct layers. For the Code List and their attributes, please refer to [Appendix H](#) or the support files.

6.12.2 Description Key Sets

See Paragraph 5.6.1 Description Key Sets for requirements.

6.12.3 Point Groups

All necessary *point groups* are predefined in the *SURVEY_GIS_TEMPLATE.dwt*.

6.12.4 Point Styles

All necessary *point styles* are predefined in the *SURVEY_GIS_TEMPLATE.dwt*.

6.13 SURFACES

The following projects (and portions of projects) shall comply with Paragraph 6.13.1 Existing Surface Creation when creating an existing surface:

- All watermain replacement projects
- The portion of sewer projects with new or replaced sewers
- The portion of sewer rehabilitation projects in the immediate area of an external point repair

The following projects shall comply with Paragraph 6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets when creating an existing surface:

- The portion of sewer rehabilitation projects that show rehabilitation not requiring excavation

Sewer rehabilitation projects often have Sewer Rehabilitation Sheets and Civil Detail Sheets showing the same project area. Compliance is dictated by the work shown on a particular Sheet, not the project area. For example, a Sewer Rehabilitation Sheet may show a few blocks of cured-in-place pipe with one or more callouts to an external point repair the Sewer Rehabilitation Sheet would comply with Paragraph 6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets because it does not show the excavation (it only includes a callout to another sheet where the excavation is shown). On the Civil Details showing the external point repair, the Civil Detail would comply with Paragraph 6.13.1 Existing Surface Creation for Water and Sewer Replacement because it shows the excavation.

6.13.1 Existing Surface Creation for Water and Sewer Replacement

There is a surface named *EXISTING SURFACE* with the correct styles and settings in the *SURVEY_GIS_TEMPLATE.dwt* which shall be used to create the existing surface in the Survey Raw Drawing. If the project requires multiple surfaces, append a numeric count such as 01, 02, etc. to the end of the surface name. This surface is set to rebuild automatically as data is added. As stated in Article 6.1 Purpose when a project has multiple neighborhoods each neighborhood will have a separate Survey Raw Drawing; each neighborhood shall also have a separate surface that shall be created in each separate Survey Raw Drawing.

Boundaries

Surface Boundaries shall be created from point to point along the outer edge of topographic survey information and added to the existing surface.

Breaklines

Breaklines shall be created from all survey located figures within the survey database and added to the existing surface.

Point Groups

The predefined Spot Shots Point Group is already assigned to the existing surface. This Point Group shall be updated once the survey data has been processed.

6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets

Creating a surface as described in the previous section requires detailed topographic survey. Sewer rehabilitation projects rarely include field survey sufficient to create such a surface in areas with no excavation. In areas with no excavation, field survey is usually limited to maintenance hole rim and invert elevations. The information below describes the process for creating a surface for Sewer Rehabilitation Sheets.

6.13.2.1 Alternate Data Sources

When available survey data is not sufficient to create an accurate surface, use the following data sources, listed in order of preference:

- Digital terrain model (dtm) downloaded from DC OCTO (or other sources)
- Contours available from DC OCTO

Use of the dtm for creating existing surfaces for Sewer Rehabilitation Sheets has two downsides. First, the spacing between dtm points may not be sufficiently dense to depict a surface with the appropriate level of detail. Second, the boundary of the dtm may create a surface with a file size that is too large for computer hardware. While a dtm is the preferred data source for creating a surface for sewer rehab, choose to use either a dtm or contours to create a surface based on their ability to manage these problems.

6.13.2.2 Existing Surface Creation

Populate the surface named *EXISTING SURFACE* in the *SURVEY_GIS_TEMPLATE.dwt* to create an existing surface. The Designer may use the full suite of tools within AutoCAD Civil 3D (dtm, dem, contours, breaklines, feature lines, points, etc.) to create a surface that can accurately display contours per [Paragraph 6.13.3 Existing Surface Display](#).

6.13.2.3 Datum Issues

The Sewer Rehabilitation Sheets shall show contours (see [Paragraph 6.13.3 Existing Surface Display](#)) as well as individual rim and invert elevations in the Maintenance Hole Rehabilitation Schedule (see [Paragraph 12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule](#)). As required in the previous sections, the surface is from a different data source (dtm or contours) than the rim and invert elevations (field survey). A sheet note shall be included documenting the source of the contours and the source of rim and invert elevations. The Designer and surveyor may or may not be able to reconcile the datums of the different sources. Do not adjust source data to force a better fit; simply cite the sources of the data.

6.13.2.4 Existing Surface Overlap

In portions of sewer rehabilitation projects that are predominantly non-excavated rehabilitation with an occasional external point repair there will be two overlapping existing surfaces from two different sources. The Sewer Rehabilitation Sheets will show the surface created from downloaded dtms/contours per [Paragraph 6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets](#) while the Civil Details showing the external point repair(s) will show the surface created from detailed field survey per [Paragraph 6.13.1 Existing Surface Creation](#). This is not only acceptable but required; a sheet note shall be added to cite the data sources of each surface used on each Sheet.

6.13.3 Existing Surface Display

The existing surface is not displayed in this Drawing. It may be displayed for temporary purposes as

needed. For information about displaying the surface in Sheets, see [Paragraph 10.10.2 Existing Surface Display](#), [Paragraph 11.10.2 Existing Surface Display](#), and [Paragraph 12.10.2 Existing Surface Display](#).

7. SURVEY DRAWING

7.1 PURPOSE

The purpose of the Survey Drawing is to show all features that were field located in a survey.

The Survey Drawing shall be created from the *SURVEY_GIS_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate Survey Drawing shall be created for each neighborhood.

Linework, hatching, and other AutoCAD objects may be in the GIS Drawing or the Survey Drawing depending on whether they were field surveyed or not.

The Survey Drawing shall show all field-located information, including visible utility features. Subsurface and overhead utilities features are shown in the Existing Utility Drawing. See [Section 8 Existing Utility Drawing](#) for more information). All polylines and hatching in the Survey Drawing shall be at elevation zero. Surveyed utility features drawn in the Survey Drawing are referenced into the Existing Utility Drawing.

Linework in the Survey Drawing is flattened (elevation zero) and points are not displayed.

7.2 LAYERS

The only layers that will appear in the Survey Drawing are *V- layers*. The *VF- layers* included in the template are reserved for field surveyed data and are NOT to be used for GIS data. The *VI- layers* found in the template are reserved for digital survey information and are NOT to be used in the Survey Drawing. The survey template is populated with all layers that are needed to adhere to CAD standards. For a list and description of those layers, please refer to [Appendix A](#) and the LCM support files.

7.2.1 Layer Filters

See [Paragraph 5.2.1 Layer Filters](#) for more information.

7.3 LABELS

All labeling for Planimetrics shall be done in the Survey Drawing. Handicap ramps, curbs, vegetation, and any hardscape not denoted by hatching shall be labeled. There shall be one label per feature per Sheet. The labels shall be rotated to align with the feature or the bottom/right of the Sheet. For a list of the point codes associated with the labels and their attributes, please refer to [Appendix H](#).

7.3.1 Asset Tags

Asset tags shall be included on the *V- Sheets* depict existing DC Water assets that will be modified or impacted. The format and content of the *label style* will be defined in a future update. Refer to *templates* in the LCM support files for future updates.

7.4 LINEWORK

All *figures* within the associated *Survey Database* shall be inserted into the Survey Drawing. The *figures* shall then be converted to *2D polylines* and flattened to elevation zero.

7.4.1 Lot Lines, Street Lines, and Right-of-Way Lines

Lot lines, street lines, and right-of-way lines based on field survey data sources shall be shown in the Survey Drawing on *layer VF-PROP-STRT-LINE-E* which uses the modified phantom linetype (see [Figure 17: Modified phantom linetype used for survey located street lines and lot lines](#)). When field located lot lines duplicate street lines or right-of-way lines, the street line and/or right-of-way lines shall be removed.



Figure 17: Modified phantom linetype used for survey located street lines and lot lines

When using lot lines, street lines, or right-of-way lines to accurately construct a curb stop or cleanout adjacent to a property boundary, one of the following scenarios shall be completed.

- The property boundary shall be field surveyed, marked in the field, and the markers shall be called out in the Drawings. These field located property boundaries shall be drawn in the Survey Drawing, not in the GIS Drawing.
- The property boundary shall be accurately drawn in the Survey Drawing per all available survey information. The corp stop or cleanout shall be drawn accurately in the Civil Drawing and include either a coordinate callout or a station/offset.

The objective is to provide the necessary information on the Sheet to allow the contractor to construct the corp stop or cleanout accurately adjacent to the property boundary.

See [Paragraph 5.4.2 Lot Lines](#) for more information about lot lines not based on survey located information.

7.5 HATCHING

See [Article 5.5 Hatching](#) for requirements.

7.6 POINTS

All survey points within the associated *Survey Database* shall be inserted into the Survey Drawing. The Drawing may require manual point creation where additional labels are necessary. For more information, please refer to [Article 7.3 Labels](#).

7.6.1 Symbols

See [Paragraph 5.6.2 Symbols](#) for requirements.

7.6.2 EXISTING SURFACE

No surfaces are created or referenced in the Survey Drawing. Surfaces are created in the Survey Raw Drawing (see [Article 6.13 Surfaces](#)). The surface may be referenced and displayed as needed but shall be deleted when no longer needed.

8. EXISTING UTILITY DRAWING

8.1 PURPOSE

The purpose of the Existing Utility Drawing is to depict existing subsurface and overhead utility lines, including utility vaults.

The Existing Utility Drawing shall be created from the *EXISTING_UTILITY_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate Existing Utility Drawing shall be created for each neighborhood.

The Existing Utility Drawing shall show all existing, subsurface and overhead utility lines, including both dry utilities (electric, communication, gas, etc) and wet utilities (water and sewer only). Survey located utility features are referenced from the Survey Drawing. The Existing Utility Drawing shall also show any known future utilities not in the scope of work (usually noted as future work by others). Visible utility features are referenced into the Existing Utility Drawing from the Survey Drawing.

8.2 LAYERS

The only *layers* that will appear in the Existing Utility Drawing are *V*-discipline *layers*. The *layers* will have a prefix of *VI*-. For a list of these *layers*, *layer settings*, purpose, and definitions, please refer to the LCM support files and [Appendix A](#). Pipes shall be drawn on the appropriate utility *layer* by size.

8.2.1 Layer Filters

See [Paragraph 5.2.1 Layer Filters](#) for more information.

8.3 LABELS

All pipe segments that are not long enough to generate the linetype label shall be labeled in Plan. These independent labels shall be *multiline text (mtext)* using *Text Style ANNO .094* with a *background mask*. Labels shall be placed on the corresponding utility *layer*, such as *VI-WATR-MISC-TEXT*, *VI-SSWR-MISC-TEXT*, or *VI-NGAS-MISC-TEXT* so they can be filtered out in the C Sheets.

8.4 ANNOTATION

The only *text style* to be used in the Existing Utility Drawing is *ANNO .094*. This *text style* will be available and set as a default in the *EXISTING_UTILITY_TEMPLATE.dwt*. For a list of all available *text styles* and their associated settings, please refer to the LCM support files. See [Article 2.6 Annotation](#) for additional requirements.

8.5 LINEWORK

All linetypes needed for the Existing Utility Drawing have been created and associated with existing layers found in the *EXISTING_UTILITY_TEMPLATE.dwt*. *Polyline linetype settings* shall be set to *ByLayer*. For a list, description, and associated properties of those layers, please refer to the LCM support files.

8.5.1 Water Services

Polylines shall be drawn at elevation zero on layer *VI-WATR-SERV* for services 2" and smaller, and on a layer representing the correct material, size, and location accuracy (ASCE 38); i.e., *VI-WATR-CAST-03IN-QLLD* for services larger than 2" to represent water service lines for every property within the

contracted area. For all projects that include any modification of the servicing water main.

8.5.2 Sewer Laterals

Polylines shall be drawn at elevation zero on layer *VI-SSWR-LTRL* to represent sewer laterals for every property in the project area. For all projects that include any modification or relining of existing storm or sewer collection piping and structures.

8.5.3 Depiction of Pipe Width

All pipes under 24” nominally shall be shown as single lines. All pipes 24” and larger nominally shall be shown using double continuous lines. The double lines shall depict true exterior dimension of the utility. Labels shall be displayed along the center line using the appropriate *layer*. Pipelines large enough to have a wall thickness greater than 24 inches may be shown with double continuous lines representing the inside and outside of each wall; in this situation clearly differentiate between the pipe wall and the pipe opening.

8.6 EXISTING SURFACE

8.6.1 Existing Surface Reference

Existing Utility Drawings shall reference an existing surface via a *Data Shortcut reference* of the *EXISTING FIELD SEG XX-XX surface* found in the *...Design Data\Shortcuts* folder in the project folder. For information about *Data Shortcuts*, see [Article 3.6 Data Shortcuts](#). The surface is not referenced for display, rather it is referenced for use with pipe networks and pressure pipe networks.

For information about creation of the existing surface see [Paragraphs 6.13.1 Existing Surface Creation for Water and Sewer Replacement](#) and [6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets](#).

8.6.2 Existing Surface Display

Surfaces are not displayed in the Existing Utility Drawings; the *surface style* shall be set to *DCW_No Display Surface Style*.

8.7 UTILITY QUALITY LEVEL DESIGNATION (ASCE 38)

All existing utilities shall be labeled with size, service type, and location accuracy (Level A, B, C, or D) as defined by American Society of Civil Engineers (ASCE) 38 (latest version). These labels are created with standard *linetypes* preloaded in the *template* and associated with layers for each utility size and quality level. When the lines are too short to display the correct linetype label the size, service type, and location accuracy manually using *mtext* (see [Article 8.3 Labels](#) above). Size is not required for electric lines or communications lines unless a duct bank is labeled in the available information from the utility owner.

8.8 PIPE NETWORK

Pipe networks shall be created for all existing utilities crossing any design alignments. The pipe network shall be the minimum length necessary to create an accurate horizontal and vertical crossing location based on the best available information. Use the *DCW_EX... Parts List* that corresponds with the type of utility. [Table 7: Pipe Network Parts Lists and Rule Sets](#) below shows the *Parts Lists* and *Pipe Rule Sets* available for each utility type in the *UTILITY_DESIGN_TEMPLATE.dwt*. Data shortcuts shall be created for these pipe networks.

The pipe network can be created in the Existing Utility Drawing, but is usually created in the Civil Design

Drawing. If the pipe network is created in the Existing Utility Drawing a Data Shortcut shall be created, see [Article 3.6 Data Shortcuts](#). The pipe network does not need to be displayed in the Existing Utility Drawing.

Table 7: Pipe Network Parts Lists and Rule Sets

Parts List	Pipe Rule Set
DCW_EX_Communications	DCW_Communications
DCW_EX_Electric	DCW_Electric
DCW_EX_Gas	DCW_Gas
DCW_EX_Sanitary Sewer	DCW_Sewer
DCW_EX_Storm Sewer	DCW_Sewer
DCW_EX_Water	DCW_Water

This small pipe network is used to auto populate utility crossings in the profile (see [Article 11.15 Profiles](#) and [Paragraph 12.16.1.2](#) for more information). The *pipe rule set* has predefined setting for default depths and other information that shall be verified and appropriately adjusted. In the profile, the callout on the oval representing the crossing pipe shall include the quality level. A Sheet Note shall be included stating quality level B, C, and D are unverified depth and requiring the construction contractor to verify the depth prior to excavation.

9. GENERAL SHEETS

9.1 PURPOSE

The purpose of the General Sheets is to depict general project information relevant to the project.

General Sheets shall be created from the *UTILITY_DESIGN_GS_TEMPLATE.dwt*.

General Sheets are commonly referred to as “G Sheets.” Discipline specific General Sheets for ESC and TCP are described in [Article 14.11 Sheets](#) and [Article 15.10 Sheets](#), respectively.

9.2 LAYERS

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* used to create the General Sheets is populated with all layers needed to adhere to the standards. The only layers that will be used in the General Sheet Drawing are G-designated *layers*, which store general information. The other *layers* included in the template are NOT to be used in the General Sheet Drawing. For a list and description of the *G-layers*, please refer to [Appendix A](#).

9.2.1 Layer Filters

There are no *layer filters* associated with the General Sheets.

9.3 EXTERNAL REFERENCES

9.3.1 Drawings

The KeyMap Drawing is referenced into the *UTILITY_DESIGN_GS_TEMPLATE.dwt*.

When the General Sheets Drawing is created from the *template*, the Drawing names shall remain, but the referenced Drawing paths shall be changed to point to the associated project folder and project specific Drawing.

9.3.2 PDFs

There are several PDFs referenced in the *UTILITY_DESIGN_GS_TEMPLATE.dwt* on the Standard Detail Sheets. The template includes all Standard Details. Any details not needed for the project shall be detached. The PDFs shall then be rearranged to show six details per Sheet. Additional PDFs may need to be inserted for 3rd Party Details.

9.3.3 Data Shortcuts

The drawing template *UTILITY_DESIGN_GS_TEMPLATE.dwt* includes attached *Data Shortcut Water Service #*. These *data shortcuts* are not needed in the General Sheets Drawing.

9.4 LABELS

Label styles for titles, locations, and streets are preloaded in the *UTILITY_DESIGN_GS_TEMPLATE.dwt template*. All text sizes and text styles for General Sheets are preset in the templates.

9.4.1 Contract and Project Title (Cover)

These titles shall be modified to represent the relevant project information.

9.4.2 Project Areas (Cover)

As mentioned above, the Cover Sheet shall show all project locations. The location titles shall have the project name and relevant location name where appropriate. This title shall be modified to represent all locations in the *Sheet Set*.

The Location Map shall include labels for each project area in paper space with multileaders using the DCW_Leaders_Cover Multileader Style.

9.4.3 Street Names (Site Maps)

The street names shall include name, roadway type, and city quadrant. On the Site Map the street names shall be drawn in model space. Note the difference for street names on the Key Map which are drawn in paper space.

9.5 SHEETS

9.5.1 Cover Sheet and Project Data

The Cover Sheet shall be included as Sheet G-1 in all design submittals. The Cover Sheet shall include DC Water's full name and the project name. The Cover Sheet shall also include a Location Map showing the full extents of DC with leaders labeling all project locations. The location titles shall include the location name/street names of the project work. A model Cover Sheet is included in the *UTILITY_DESIGN_GS_TEMPLATE.dwt*. [Appendix I](#) includes examples and additional information.

The Cover Sheet includes a few items that are required for DCRA permit processing, including a project address and text describing the scope of work. This information shall be created to meet the DCRA requirements for DCRA permitting.

9.5.2 Sheet Index and Project Data

There shall be one overall Sheet Index for entire project starting with Sheet G-2 of the General Sheets. Multiple Sheets may be needed and shall follow in sequence (G-3, G-4, etc.).

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* contains a model Sheet Index. The Sheet Index shall be created as a table using the *SHEET INDEX table style* preloaded in the template. This table must be filled out manually after all Sheets have been created. For the properties of this *table style*, refer to [Appendix G](#). Refer to [Appendix I](#) for an example Sheet Index and other related information.

The Sheet Index Sheet includes a few items that are required for DCRA permit processing, including text listing the project address and scope of work. The address and scope shall be modified to meet the DCRA requirements for DCRA permitting. This information is identical to the information on the Cover Sheet.

SHEET INDEX		
SHEET	PROJECT TYPE	SHEET TITLE
GENERAL SHEETS		
G-1	WATER MAIN REPLACEMENT	COVER SHEET - PROJECT DATA
G-2	WATER MAIN REPLACEMENT	SHEET INDEX - PROJECT DATA
G-3	WATER MAIN REPLACEMENT	SITE MAPS
G-4	WATER MAIN REPLACEMENT	LEGENDS
G-5	WATER MAIN REPLACEMENT	ABBREVIATIONS
G-6	WATER MAIN REPLACEMENT	CODED NOTES
G-7	WATER MAIN REPLACEMENT	GENERAL NOTES
G-8	WATER MAIN REPLACEMENT	DETAILS
CIVIL PLAN AND PLAN DETAIL SHEETS		
C-1.1	WATER MAIN REPLACEMENT	BRYANT ST NW & 2ND ST NW
EROSION & SEDIMENT CONTROL PLAN SHEETS		
ES-1.1	WATER MAIN REPLACEMENT	BRYANT ST NW & 2ND ST NW
TRAFFIC CONTROL PLAN SHEETS		
TCP-1.1	WATER MAIN REPLACEMENT	PHASE 1

Figure 18: Abbreviated Sheet Index Example

9.5.3 Site Map Sheet

The Site Map Sheet shall include all the project locations with local streets names. Site Maps shall show all streets that are within the project area. A model Site Map Sheet is included in the *UTILITY_DESIGN_GS_TEMPLATE.dwt* template. See [Figure 8: Example Site Map](#) on page 17. [Appendix I](#) includes an example Site Map Sheet and other relevant information. Projects with multiple neighborhoods may require multiple Site Map Sheets.

9.5.4 Legend Sheet

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains a model Legend Sheet. This Sheet has been populated with the symbology and linetypes most typically used for each discipline. Verify the legend is complete and accurate for the work being depicted. If a symbol or linetype is not used, the Designer shall leave the symbol/linetype and associated description as shown in the template. If additional symbols are needed, the Designer shall add it to the end of the legend. See [Article 2.10 Legends](#) for more information and [Appendix I](#) for example Legend Sheets.

9.5.5 Abbreviations Sheet

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains model Abbreviations Sheets for Water Design, Sewer Design, and Record Drawing Abbreviations Sheets. These Sheets have been populated with abbreviations typically used for each discipline. Verify the abbreviations are complete, accurate, and appropriate for the project. If an abbreviation from the template is not used, the Designer may leave or delete the abbreviation as shown in the template. If additional abbreviations are needed, the Designer shall add it to the abbreviation list at the appropriate place. See [Appendix I](#) for an example Abbreviation Sheet.

9.5.6 General Notes Sheet

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains model General Notes Sheets. These Sheets have been populated with the general notes typically used for watermain replacement and sewer rehabilitation projects. Verify the abbreviations are complete, accurate, and appropriate for the project. If a General Note is not appropriate, the Designer shall delete or modify the General Note to be appropriate for the specific needs of the project. Additional General Notes are needed as the list in the template is not comprehensive for all project types. The Designer shall add General Notes as needed. See [Appendix I](#) for example General Notes Sheets.

9.5.7 Water Fittings and Coded Notes Sheet

This Sheet is only used on watermain projects. The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains a model Water Fittings and Coded Notes Sheet. This Sheet is populated with the *Water Fitting and Coded Note Tables*. These *tables* have been populated with the *fitting labels* and associated with *pressure network parts*. Verify that coded notes on the Civil Design Sheets correspond with the coded notes on the Water Fittings and Coded Notes Sheet. If a coded note is not used, the Designer shall leave the coded note and description as shown in the template. If additional coded notes are needed, the Designer shall add it to the end of the list. See [Appendix I](#) for an example Sheet.

9.5.8 Sewer Rehabilitation Coded Notes, Legends, and Detail Sheet

This Sheet is only used on sewer rehabilitation projects. The *UTILITY_DESIGN_GS_TEMPLATE.dwt* contains a model Sewer Rehabilitation Coded Notes, Legends, and Detail Sheet.

This Sheet is populated with:

- Coded notes
- Maintenance Hole Rehabilitation Legend,
- Pipe Rehabilitation Legend.
- Pipe Shape Legend
- Maintenance Hole Rehabilitation Detail (a project specific detail).
- Maintenance Hole Stamp Legend

The coded notes shall be added using the *Note Label Style* named *DCW_Coded Note - Hex*. This *Note Label Style* can be found in the *UTILITY_DESIGN_GS_TEMPLATE.dwt*.

This Sheet has been populated with the most used items. Review all details, legends, and coded notes to verify they are complete, accurate, and appropriate for the project. To maintain consistency between projects, do not change the numbering/lettering of the coded notes or legends shown in the template. If any changes are needed, submit a deviation request as described in [Article 1.6 Deviations](#). If additional items are needed add them to the end. If an item in any of the legends is not used on the project, the numbering/lettering shall remain. Ensure the detail is being applied appropriately.

9.5.9 Standard Detail Sheets

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains model Water, Sewer, Drainage, and General Standard Details Sheets. These Sheets are populated with the most frequently used Standard Details. Every Standard Detail that is referenced in the *Sheet Set* shall be included on these Sheets. Ensure the appropriate Standard Details are included to meet the specific needs of the project. Standard Details may or may not be needed, depending on the specific needs of a project. If a deviation from a

Standard Detail is warranted, submit a deviation request as described in [Article 1.6 Deviations](#).

9.5.10 3rd Party Detail Sheets

When details from other agencies, utilities, or other external parties are used for a project those details are shown on 3rd Party Detail Sheets. This occurs most frequently with details from DDOT, DOEE, and NPS, but can include others as well. The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains a placeholder for 3rd Party Detail Sheets. These Sheets are blank and shall only be used on projects that reference 3rd Party Details. Every 3rd Party Detail that is referenced in the *Sheet Set* shall be included on these Sheets. Ensure all 3rd Party Details are appropriate for the specific needs of the project and requirements of the 3rd party.

The *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt* template contains the Erosion and Sediment Control Details Sheets. The *TCP_MOT_TEMPLATE.dwt* template contains the TCP Standard Details Sheets. For permitting reason, details for ESC and TCPs are not included in the section for 3rd Party Details but are included with their respective disciplines. See [Paragraph 14.11.1 ESC General Sheets](#) for more information about DOEE 3rd Party Details and [Article 15.10 Sheets](#) for more information about DDOT 3rd Party Details.

9.5.11 Project Specific Detail Sheets

The *UTILITY_DESIGN_GS_TEMPLATE.dwt* template contains a placeholder for Project Specific Detail Sheets. These Sheets are blank and shall only be used on projects that require project specific details. Every project specific detail that is referenced in the *Sheet Set* shall be included on these Sheets.

10. SURVEY SHEETS

10.1 PURPOSE

Survey Sheets include the Survey Control Sheet(s) and the Existing Conditions Sheets. The purpose of the Survey Control Sheet is to document the control points and traverse recovery of those control points. The purpose of the Existing Conditions Sheet is to document the existing site conditions in the project area. This includes GIS, survey, and utility information.

The Existing Conditions Sheet shall be created from the *UTILITY_DESIGN_TEMPLATE.dwt*.

The Existing Conditions Sheets include:

- Existing surface features
- Existing utility features (above and below grade)
- Property information
- GIS information (See [Section 5](#))
- Survey control points
- Traverse loop
- Traverse (control point) recovery sketch

The Survey Control Sheet is designated with VC in the Sheet numbers. The Existing Conditions Sheets are designated with V in the Sheets numbers and are used during field walks to QC the survey and base mapping work. Completion of the Existing Conditions Sheets signify completion of the survey and base mapping phase of a project. Preliminary design shall not start in a portion of the project area until the Existing Conditions Sheets are complete for that portion of the project area.

10.2 LAYERS

All existing features shall be drawn on layers with the VI- prefix. For a list of these layers, their settings, and their purpose, please refer to [Appendix A](#) and the LCM support files.

10.2.1 Layer Filters

See [Paragraph 5.2.1 Layer Filters](#) for more information.

10.2.2 Layer States

Layer states have been created to make Plan production more efficient. For a list of those layer states and their associated settings, please refer to [Appendix A](#) and the LCM support files.

10.3 EXTERNAL REFERENCES

10.3.1 Drawings

The following Drawings shall be referenced into the Existing Conditions Sheets and are already referenced in the drawing template *UTILITY_DESIGN_TEMPLATE.dwt*:

- KeyMap
- ExUtil
- Survey
- GIS

The Drawing names shall remain unchanged, but when the Existing Conditions Sheets are created from the template, the referenced drawing paths shall be changed to point to the associated project folder.

10.4 LABELS

10.4.1 Traverse Points

Traverse points shall use the *point label style* named *DCW_Traverse*. This is set as the default point style in the *UTILITY_DESIGN_TEMPLATE.dwt*.

10.5 LINEWORK

All existing conditions linework shall be contained in external reference drawings.

10.6 KEY MAP

All Existing Conditions Maps shall include a Key Map near the bottom right corner. See [Paragraph 2.11.3 Key Map](#) for more information.

10.7 BLOCKS

The *UTILITY_DESIGN_TEMPLATE.dwt* has the following blocks preloaded for use.

10.7.1 Match Lines

Automatic match lines are created using *view frames* (see [Article 10.13 Match Lines](#) for more information about automatic match lines). When the project includes intersecting alignments (roadways) or adjoining sheets without associated match lines, automated match lines will not generate the desired result. In this instance, the *DCW-MATCH LINE-NO STA Block* shall be inserted in paper space at the intersection of the alignment and the viewport. The Block shall be rotated and adjusted manually to show the adjoining Sheet location. The station and Sheet information shall be filled in manually as well.

10.7.2 North Arrows

The *DCW-NORTH ARROW Block* shall be inserted on the *G-SHET-NRTH* layer outside of the upper left corner of every plan and *Civil Detail viewport*. Any additional Plan viewports created in a Drawing, requires the *DCW-NORTH ARROW Block* to be inserted on the *G-SHET-NRTH Layer* near the upper left portion of the viewport.

10.7.3 Graphic Scale

The *DCW-GRAPHIC-SCALE Block* shall be inserted on *G-TITL-TEXT layer* and centered below every Plan, Civil Detail, and profile viewport. Any additional Plan, Civil Detail, or profile viewports created in a Drawing require the *DCW-GRAPHIC-SCALE Block* to be inserted on the *G-TITL-TEXT Layer* in a similar location, relative to the viewport.

10.8 TABLES

10.8.1 Traverse Control Tables

One point table shall be created per Project Neighborhood using the *Table Style* named *DCW_TRAVERSE CONTROL TABLE* on a Survey Control Sheet. Tables shall be inserted in paper space on a VC Sheet.

10.9 POINTS

10.9.1 Traverse Points

All traverse/control points shall be inserted into the Drawing from the associated *survey database*. Use the *DCW_TRV Point Style* and *DCW_TRAVERSE LABEL Point Label Style*.

10.10 EXISTING SURFACE

10.10.1 Existing Surface Reference

Water projects do not require a surface to be referenced in the Existing Conditions Sheet because the contours are not shown on water plan sheets. Sewer projects shall reference existing *surface(s)* into the Existing Conditions Sheets via a *Data Shortcut* to the *EXISTING FIELD SEG XX-XX surface* found in the *...Design Data\Shortcuts* folder in the project folder. For information about Data Shortcuts, see [Article 3.6 Data Shortcuts](#).

For information about creation of the existing surface(s) see [Paragraphs 6.13.1](#) and [6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets](#).

10.10.2 Existing Surface Display

Water projects do not require a surface be displayed. All sewer projects shall display existing surface(s) using the Surface Style *DCW_SURVEY Surface Style*. This style has all settings in place to meet the CAD Standards. For more information on the Surface Styles and its various settings, see [Appendix I](#). Sewer rehabilitation projects will display two different surfaces in the same projects area. First, a surface created from dtms/contours per [Paragraph 6.13.2](#) shall be displayed on Sewer Rehabilitation Sheets. Second, a surface created from detailed field survey per [Paragraph 6.13.1](#) shall be displayed on the Civil Detail Sheets showing the external point repair(s). A Sheet Note shall be added to cite the data sources of each surface used on each Sheet.

10.11 STREET ALIGNMENTS

This Section applies only to Water Replacement Sheets and Civil Detail Sheets showing external point repairs. Sewer Rehabilitation Sheets and Civil Detail Sheets showing 1" = 5' scale water replacement do not require creation of a street alignment.

Alignments shall be created along the centerline of the roadways using a polyline (because the pipe has not been designed yet, this is expected to be an approximation). These "street alignments" shall be used to create view frames (see [Article 10.12 View Frames](#)), Sheets (see [Article 10.14](#)), and associated match lines (see [Article 10.13](#)). The street alignment will be converted to a design alignment later (See [Article 11.11](#) and [12.11](#) for more information). Street alignments are required for any project work that will require excavation. For sewer rehabilitation work that does not require excavation, street alignments are not required on every street, but are required as needed to show the entire project area on the Sewer Rehabilitation Sheets (see [Paragraph 12.11.1](#) for more information and requirements).

Street alignments are usually created in the Civil Design Drawing; data shortcuts are used to bring them into the Existing Conditions Sheets; this allows the alignments to be used to create the sheet while also allowing the alignment to be associated with the pressure network in the Civil Design Drawing.

10.11.1 Alignment Data Shortcut

Data shortcuts shall be added to the shortcuts folder for street alignments, for more information see [Article 3.6 Data Shortcuts](#). See [Article 11.11 Design Alignments](#) for more information and additional requirements.

10.11.2 Alignment Stationing

Alignments for water projects are generally stationed from north to south and west to east, showing left to right on the sheet. Alignments for Sewer Replacement Plan and Profile Sheets and Civil Details showing external point repairs are stationed from downstream to upstream, on the Sheet. Sewer Rehabilitation Sheets do not show stationing because there is no alignment. Given the awkward, complex configuration of roadway and intersections in DC, the stationing guidelines are often adjusted to make alignments and sheet cuts work best.

Stationing for Civil Details showing external point repairs shall be coordinated with the CCTV footage. This usually requires starting the alignment with STA 0+00 at the edge of the existing maintenance hole where the existing pipe starts (not the edge of the block used to represent the maintenance hole in AutoCAD, but the actual location where the CCTV started). See [Paragraph 12.11.2](#) for additional requirements related to external point repairs.

10.11.3 Alignment Naming

Alignments shall be named by street. When naming alignments for external point repairs, it is common to have multiple alignments in a single street; in this case the name shall include a numerical suffix (for example: Military_Rd_NE_01, Military_Rd_NE_02. If two or more external point repairs are between the same two maintenance holes, only one alignment is required; both external point repairs shall be part of the same alignment.

10.11.4 Alignment Settings

The correct settings for alignments are established as defaults within the *UTILITY_DESIGN_TEMPLATE.dwt*. These alignments shall be *centerline type alignments* using the *DCW_Water and Sewer Design Alignment Style* and the *DCW_Major Minor and Curves Alignment Label Set*. For additional information regarding these styles, please refer to [Appendix I](#).

Design alignments shall be displayed using the *DCW_Water and Sewer Design Alignment Style*.

10.12 VIEW FRAMES

View frames shall be used to create Existing Conditions Sheets and populate the *Sheet Set* (except Sewer Rehabilitation Sheets; see [Article 12.12 View Frames](#)). Although view frames are not used to create Sheets for Sewer Rehabilitation Sheet boundaries, follow the guidelines below when creating sheets.

When creating view frames follow the guidelines listed below. Many of the guidelines for creating view frames are based on 20-scale Plans and will be impractical for 5-scale Civil Detail Sheets or 50-scale Sewer Rehabilitation Sheets. These guidelines will not all be possible all the time but shall be followed when reasonably possible.

- Do not cut through intersections; if an intersection is included in a view frame, the entire intersection shall be visible in the view frame.
- Orient north to the top or right (water replacement projects only because sewer replacement and external point repairs has downstream on the left).

- Show at least 50' beyond the point where new pipe connects to existing pipe.
- Minimize number of sheets
- Show more than 100' of design.

Complete all view frame adjustments before creating sheets. View frames have two conflicting requirements: 1) they shall show at least 50' beyond points where existing and new connect, and 2) they are created before the pipe alignment is finalized. Resolving this apparent conflict requires some estimation and engineering judgement when creating the view frame.

Layout *C-#.1* from the *UTILITY_DESIGN_TEMPLATE.dwt* shall be used as the template for Sheets. The View Frame Style shall be set to *DCW_Sheet View Frames*. The *View Frame Label Style* shall be set to *DCW_Sheet View Frame Labels*. These *styles* are established as defaults within the template.

See [Article 4.3 Sheet Coordination](#) and [Article 12.12 View Frames](#) for more information and additional requirements.

10.13 MATCH LINES

Automatic match lines shall be created with the view frames using the *DCW_Match Line Style*. The *Match Line Label Styles* shall be set to *DCW_Left_With Station* and *DCW_Right_With Station*. These Styles are established as defaults within the template. Automatic match lines do not work with intersecting alignments (roadways); at intersecting roadways refer to [Paragraph 10.7.1 Match Lines](#) for information about creating manual match lines in paper space.

10.14 SHEETS

10.14.1 Survey Control Sheets

A Survey Control Sheet is required on all projects that require accurate field staking of assets to be constructed. All survey control coordinates shall be rounded to two decimal places (nearest hundredth).

- One example when a Survey Control Sheet is required is a project that requires a valve or maintenance hole to be installed in an accurate location.
- Another example requiring a Survey Control Sheet is a project that includes a curb stop or cleanout that needs to be placed directly adjacent to a street line.
- An example project that does not require a Survey Control Sheet is a sewer rehabilitation project with no cleanouts where all work is dimensionally referenced from maintenance hole locations, even if that project requires excavation if that excavation is dimensioned from a maintenance hole (note dimensioning can be shown via dimensions in Plan view, a table, or a schedule).

The Survey Control Sheets shall show the traverse control tables (see [Paragraph 10.8.1](#)), all control points, the traverse loop, and traverse recovery sketches. The Sheets shall be created using layout *VC-#.1* from the *UTILITY_DESIGN_TEMPLATE.dwt* template. If a Survey Control Sheet is required for a project it shall be VC-1 and if multiple Sheets are required shall be numbered sequentially (VC-2, VC-3, etc.). The scale of the viewport may be adjusted to show all control points for a neighborhood on one sheet; alternatively, the neighborhood may be broken into multiple viewports or Sheets designing on the site configuration. The viewport showing the survey control points usually shows limited site information such as curb lines, sidewalk, buildings, and little else.

10.14.2 Existing Conditions Sheets

The extents of the project area shown on each Existing Conditions Sheet shall be coordinated with the following as dictated by the needs of Water Design Drawing (see [Section 11](#)) or the Sewer Design Drawings (see [Section 12](#)):

- 20-scale Watermain Replacement Sheets (see [Paragraph 11.16.1 Watermain Replacement Sheets](#))
- 20-scale Sewer Replacement Plan and Profile Sheet (see [Paragraph 12.16.1 Sewer Replacement Sheets](#))
- 50-scale Sewer Rehabilitation Sheet (see [Paragraph 12.16.2 Sewer Rehabilitation Sheets](#))
- 5-scale Civil Detail Sheets (see [Paragraph 11.16.3 Civil Detail Sheets](#) for information about Civil Details on water projects and [Paragraph 12.16.3 Civil Detail Sheets](#) for information about Civil Details on sewer projects).

The Sheets shall be created from the referenced view frame groups using layout *C-#.1* from the *UTILITY_DESIGN_TEMPLATE.dwt* template. Use the minimum number of Sheets necessary to produce a clean *Sheet Set*.

See [Article 4.3 Sheet Coordination](#) and [Article 10.12 View Frames](#) for more information and additional requirements.

10.14.3 Subsurface Utility Engineering Sheets

The extents of the project area shown on each Subsurface Utility Engineering Sheet shall be coordinated with the following as dictated by the needs of Water Design Drawing (see [Section 11](#)) or the Sewer Design Drawings (see [Section 12](#)):

- 20-scale Watermain Replacement Sheets (see [Paragraph 11.16.1 Watermain Replacement Sheets](#))
- 20-scale Sewer Replacement Plan and Profile Sheet (see [Paragraph 12.16.1 Sewer Replacement Sheets](#))
- 50-scale Sewer Rehabilitation Sheet (see [Paragraph 12.16.2 Sewer Rehabilitation Sheets](#))
- 5-scale Civil Detail Sheets (see [Paragraph 11.16.3 Civil Detail Sheets](#) for information about Civil Details on water projects and [Paragraph 12.16.3 Civil Detail Sheets](#) for information about Civil Details on sewer projects).

The Sheets shall be created from the referenced view frame groups using layout *C-#.1* from the *UTILITY_DESIGN_TEMPLATE.dwt* template. Use the minimum number of Sheets necessary to produce a clean *Sheet Set*.

See [Article 4.3 Sheet Coordination](#) and [Article 10.12 View Frames](#) for more information and additional requirements.

11. WATER DESIGN DRAWING AND SHEETS

11.1 PURPOSE

This purpose of the Water Design Drawings and Sheets is to depicts the rehabilitation, replacement, or installation of new DC Water linear water assets.

The Water Design Drawing shall be created from the *UTILITY_DESIGN_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate Water Design Drawing shall be created for each neighborhood.

11.2 LAYERS

All work to be constructed shall be drawn on layers with the *CI-* prefix. For a list of these layers, their settings, and their purpose, please refer to [Appendix A](#) and the LCM support files.

11.2.1 Layer Filters

See [Paragraph 5.2.1 Layer Filters](#) for more information.

11.2.2 Layer States

See [Paragraph 10.2.2 Layer States](#) for requirements.

11.3 EXTERNAL REFERENCES

11.3.1 Drawings

The following Drawings shall be referenced into the Water and Sewer Design Drawing and are already referenced in the drawing template *UTILITY_DESIGN_TEMPLATE.dwt*:

- *KeyMap*
- *ExUtil*
- *GIS*
- *Survey*

The Drawing names shall remain unchanged, but when the Water Design Drawing and Sewer Design Drawing are created from the template, the referenced drawing paths shall be changed to point to the associated project folder.

11.3.2 Data Links

Data links shall be created for water service tables and sewer lateral tables. They shall be linked to the *WaterServiceTable.xlsx* and *SewerLateralTable.xlsx* within the *Design Data* folder of the project.

11.4 LABELS

11.4.1 Pressure Pipe Networks

There shall be at least one *pipe label* between all tees and/or reducers per Sheet. All new fittings and design components shall be labeled in Plan using standard labels and sizes as shown in [Appendix I, Table 8: Pressure Pipe Labels Styles](#) below outlines the appropriate use of the different *label styles* and provides guidance where changes are necessary.

Table 8: Pressure Pipe Labels Styles

Part Type	Plan Label Style	Notes
Pipe	DCW_NEW_Nominal Diameter and Material	
Elbow/Bend	DCW_Coded Note and Station	
Cross	DCW_Coded Note and Station	
Cap	DCW_Coded Note and Station	
Tee	DCW_Coded Note and Station	Edit label text to depict both stations
Sleeve	DCW_Coded Note and Station	
Plug	DCW_Coded Note and Station	
Thrust Block	DCW_Coded Note and Station (WD)	Displays rectangular outline around label
Reducer	DCW_Coded Note and Station	
Fire Hydrant	DCW_NEW_Hydrant Label and Station	Hydrant name shall display in label "H#"
Gate Valve	DCW_NEW_Valve Label and Station	Valve name shall display in label "VT#"
Air Blowoff (In-line)	DCW_NEW_Coded Note and Station (WD)	Displays rectangular outline around label
6" Drain Blowoff	DCW_NEW_Coded Note and Station (WD)	Displays rectangular outline around label
6" Air Blowoff	DCW_NEW_Coded Note and Station (WD)	Displays rectangular outline around label

11.4.2 Design Alignments

All alignment segments shall be labeled in Plan view using *DCW_Line (Tag)* or *DCW_Curve (Tag) Label Styles*. All pipe deflection angles along an alignment that have not been defined with a curve shall be labeled in Plan view using the *DCW Deflection Angle Label Style*.

11.4.3 Traverse Points

See Paragraph 10.4.1 Traverse Points for requirements.

11.4.4 Water Service Information

Water services included in the project shall be labeled using the *Note Label Style* named *DCW_Adjust-Replace House Service...* and placed in each square showing the number of water services to be adjusted or replaced on each Sheet. Water services NOT included in the project shall be labeled using the *Note Label Style* named *DCW_N.I.C.* for each lot shown on the Sheet. The *labels* shall be manually edited when necessary.

11.5 LINEWORK

11.5.1 Water Service Lines

For properties with 2" and smaller existing water service lines, polylines shall be drawn at elevation zero on layer *CI-WATR-SERV-PBLC-Q* to represent new water service lines in public space and *CI-WATR-SERV-PRVT-Q* to represent new water service lines on private property. The water service lines shall be drawn perpendicular from the new watermain to the building, lot line, or beyond the lot line, to the existing water meter if the meter is located on private property.

11.5.2 Abandoned Watermains

Existing watermains to be abandoned shall be traced with a polyline at elevation zero on layer *CD-WATR-*

PIPE-ABND.

11.5.3 Civil Detail Outline

The areas shown on Civil Details shall be outlined with a *polyline* on *layer C-ANNO-DETL* in *model space* that represents the extents of the *viewport* on the Civil Detail Sheet.

11.5.4 Limits of Disturbance

When the project area is located outside public space, a limit of disturbance shall be shown in the Civil Design Drawing. The areas within the limits of disturbance shall be outlined with a *polyline* on *layer CS-EROS-LLOD-LINE* in *model space*. The limit of disturbance shall include sufficient workspace for all work, including erosion and sediment control, surface restoration, traffic control, temporary water systems, sewer bypass systems, and site access. All limits of disturbance shall be accessible from public space (you cannot have an island of disturbance inside private property because the island itself cannot be accessed from public space or other limits of disturbance).

11.6 KEY MAP

All Civil Design Sheets shall include a Key Map near the bottom right corner. See [Paragraph 2.11.3 Key Map](#) for more information.

11.7 BLOCKS

The *UTILITY_DESIGN_TEMPLATE.dwt* has the following blocks preloaded for use.

11.7.1 Match Lines

Automatic match lines are created using view frames (see [Article 10.13 Match Lines](#) for more information about automatic match lines). When the project includes intersecting alignments (roadways), automated match lines will not generate the desired result. In this instance, the DCW-MATCH LINE-STA. Block shall be inserted in paper space at the intersection of the alignment and the viewport. In the instance that there are adjoining sheets without associated intersecting alignments, the DCW-MATCH LINE-NO STA. Block shall be inserted in paper space along intersecting edge of the viewport. The Block shall be rotated and adjusted manually to show the adjoining Sheet location. The station and Sheet information shall be filled in manually as well.

11.7.2 North Arrows

See [Paragraph 10.7.2 North Arrows](#) for requirements.

11.7.3 Graphic Scale

See [Paragraph 10.7.3 Graphic Scale](#) for requirements.

11.7.4 Existing Structures to be Abandoned or Removed

The *DCW-PROP-ABND* block shall be placed on all structures that are to be abandoned. The *DCW-PROP-RMVL* block shall be placed on all structures that are to be removed.

11.7.5 Fire Hydrant Stamp

The *CT-#.1* layout tab within the *UTILITY_DESIGN_TEMPLATE* contains several *DCW-WATR-FHYD-*

STMP Blocks. The *F.H. DATA* and *DRAWING* information shall be manually entered into each *block* as needed. Create copies of the *CT-#.1* tab if additional *blocks* are needed. Remove additional *blocks* that are not needed. Complete appropriate cells while leaving the remaining cells for the contractor to fill in with As-Built information.

F.H. DATA		H11973
ELEV.		
PRESS.		
H.H.		
DATE		
F.B.		
PAGE		
SHEET		C-1.3

Figure 19: Fire Hydrant Stamp Example

11.7.6 Valve Stamp

The *CT-#.1* layout tab within the *UTILITY_DESIGN_TEMPLATE* contains several *DCW-WATR-VALV-STMP Blocks*. The *VALVE DATA*, *SIZE*, and *DRAWING* information shall be manually entered into each *block* as needed. Create copies of the *CT-#.1* tab if additional *blocks* are needed. Remove additional *blocks* that are not needed. Complete appropriate cells while leaving the remaining cells for the contractor to fill in with As-Built information.

VALVE DATA		V068652
SIZE		8"
KIND		
MAKE		
PURPOSE		
POSITION		
COVER		
MAIN STEM		
DEPTH		
TO CLOSE		
TURNS		
PLACED		
PROP. OF		
KEY NUT		
SHEET		C-1.1/CD-1.1

Figure 21: Valve Stamp Example

11.8 TABLES

11.8.1 Watermain Line & Curve Tables

One *line table* and/or *curve table* shall be created per Sheet. These tables shall contain the Alignment Tag Label Data and shall be inserted in model space as *Alignment Line Tables* and *Alignment Curve Tables* using the *DCW_Water Design Style*. Distances and coordinates shown in watermain tables shall be rounded to one decimal place (nearest tenth of a foot).

11.8.2 Water Service Tables

Water service tables shall be created with *data shortcuts* to an Excel file within the project folder, for more information see [Article 3.6 Data Shortcuts](#). A single water service table shall be inserted on sheet CT-#.2. Additional Sheets shall be created by copying CT-#.2 if additional tables are required. The *tables* shall use the *Standard Table Style* and shall be inserted at the insertion point marked in the top left corner of the Sheet on *layer C-ANNO-TABL*. Complete appropriate cells while leaving the remaining cells for the contractor to fill in with As-Built information.

11.9 POINTS

11.9.1 Road CL & Profile Intersection Points

COGO points shall be manually created where new pipes intersect with road centerlines. These points shall then be inserted into the profile views to depict where the intersecting road crosses in the profile (see [Article 11.15 Profiles](#) for more information). Use the *DCW_CL Road Profile Intersection Point Style* and the default *Point Label Style*.

11.10 SURFACES

11.10.1 Existing Surface Reference

Water Design Drawings shall reference an existing surface via a *Data Shortcut* reference of the *EXISTING FIELD SEG XX-XX surface* found in the *...Design Data\Shortcuts folder* in the project folder. For information about *Data Shortcuts*, see [Article 3.6 Data Shortcuts](#). The surface is not referenced for display, rather it is referenced for use with *pipe networks* and *pressure pipe networks*.

For information about creation of the existing surface see [Paragraphs 6.13.1](#) and [6.13.2](#).

11.10.2 Existing Surface Display

Surfaces are not displayed on Watermain Replacement sheets; the Surface Style shall be set to DCW_No Display Surface Style.

Surfaces are displayed on the Watermain Profile sheets; the surface style shall be set to DCW_Existing Surface.

11.10.3 New Surfaces

Water Design Drawings do not require creation or display of surfaces that will be constructed as part of the project unless the project includes major grade changes. Most projects are in roadways or public right-of-way and the existing grade is usually restored to existing.

CAD Standards for projects with significant changes to site grading are not included in this LCM. The

LCM assumes slopes and elevations will be predominantly restored to existing or near-existing conditions. If a project requires significant regrading, contact DC Water for guidance and requirements.

11.11 DESIGN ALIGNMENTS

Street alignments created earlier (see [Article 10.11](#)) shall be modified by moving the alignment from the centerline of the roadway to the centerline of new linear assets. This modified alignment is referred to as “design alignment.” View frames, Sheets, and match lines are created as part of the street alignment process (see [Article 10.11](#)). Match lines stays in same place, but the automatic label with the station callout will updates. View frames, Sheets, and match lines shall maintain their layout from the street alignment. Design alignments shall be used to create pressure pipe networks (see [Paragraph 11.14.1 Pressure Pipe Networks](#)) and profiles (see [Paragraph 11.15.1 Profile Creation](#)).

See [Article 10.11](#) for requirements and guidelines regarding the data shortcut, stationing, naming, and settings of alignments.

11.12 VIEW FRAMES

See [Article 4.3 Sheet Coordination](#) and [Article 10.12 View Frames](#) for requirements.

11.13 MATCH LINES

See [Article 10.13 Match Lines](#) for requirements.

11.14 PIPE NETWORKS AND PRESSURE PIPE NETWORKS

11.14.1 Pressure Pipe Networks for New Water Assets

Pressure pipe networks shall be created for all water assets to be installed or replaced as part of the project. *Data shortcuts* shall be added to the *shortcuts* folder for these *pressure pipe networks*, for more information see [Article 3.6 Data Shortcuts](#).

The design shall be completed using the *pressure network catalog file* named *DC_Water_SDWMMR.sqlite* and the *parts list* named *DCW_SDWMMR.Pressure Pipe Networks* shall reference a design *alignment* based on the centerline of the network for labelling purposes.

11.14.2 Pressure Pipe Network Styles

The pressure network styles named *DCW_New...* shall be applied to the pressure pipe network objects.

11.14.3 Pipe Networks for Utility Crossings

Small pipe networks are also created for utility crossings (see [Article 8.8 Pipe Network](#) for requirements).

11.15 PROFILES

11.15.1 Profile Creation

Profiles shall be created for all new water pipes eight inches and greater in diameter requiring excavation. Data shortcuts shall be added to the shortcuts folder for these profiles, for more information see [Article 3.6 Data Shortcuts](#).

11.15.2 Profile Surface Reference

The profile shall reference the existing surface. The Profile Style shall be set to *DCW_Existing Surface*.

Profiles in the Civil Design Drawing shall not show a new surface in areas where grading is predominantly restored to existing or near-existing conditions. Instead, a leader with text “RESTORE SURFACE TO EXISTING GRADE” shall be inserted pointing to the existing grade line. If a project requires significant regrading, contact DC Water for CAD requirements/guidance.

11.15.3 Profile Views

The profile view shall depict the following:

- existing surface over the centerline of the pipeline (see [Paragraph 11.15.2 Profile Surface Reference](#))
- new pipe including any crossing pipe to be installed new (see [Paragraph 11.14.1 Pressure Pipe Networks for New Water Assets](#) and [Article 12.14 Pipe Networks](#))
- pipe network parts associated with the alignment
- existing utility crossings (see [Article 8.8 Pipe Network](#) for additional requirements)
- crossing road centerlines (see [Paragraph 11.9.1 Road CL & Profile Intersection Points](#))

The profile style named *DCW_Water Design Style* shall be assigned to all profile views. All profile views shall include the following:

- Existing surface elevation over the centerline of the pipeline, including existing elevation callout in the profile grid.
- Final surface over the centerline of the pipeline if different from the existing surface, including a finish elevation callout in the profile grid.
- Station and elevation callout of the pipeline at all changes of vertical alignment.
- Station and elevation at every low and high point on the pipeline.
- Station and elevation of the tee to fire hydrants.
- Long hydrant leads may include a profile.
- Limits of restrained joints when the pressure pipeline is not fully restrained.
- Concrete thrust restraints, pipe anchors, cut off walls, and all appurtenances necessary to show the complete design of the pipeline.

All profile views shall include the associated streets and alignment stations in the profile title.

11.16 SHEETS

11.16.1 Watermain Replacement Sheets

The Sheets shall be created from the referenced view frame groups using layout *C-# 1* from the *UTILITY_DESIGN_TEMPLATE.dwt template*. Use the minimum number of Sheets necessary to produce a clean *Sheet Set*.

See [Article 4.3 Sheet Coordination](#) and [Article 11.12 View Frames](#), [Article 10.12 View Frames](#), [Paragraph 10.14.2 Existing Conditions Sheets](#), [Paragraph 11.5.3 Civil Detail Outline](#), and [Paragraph 11.16.3 Civil Detail Sheets](#) for additional requirements and information.

Watermain Replacement Sheets shall include:

- Station callout of the pipeline at all changes of horizontal alignment.
- Limits of restrained joints when the pressure pipeline is not fully restrained.
- Concrete thrust restraints, pipe anchors, cut off walls, and all appurtenances necessary to show the complete design of the pipeline.

11.16.2 Watermain Profile Sheets

Separate Watermain Profile Sheets are only used on water projects and shall be created using layout *CP-# 1* from the *template* named *UTILITY_DESIGN_TEMPLATE.dwt*. Only the minimum number of profile Sheets necessary to produce a clean design set shall be created.

All horizontal information is shown on plans and vertical information is shown on profiles. Exceptions to this may be required and/or authorized based on the complexity of the project and other project specific needs. See [Article 11.15 Profiles](#) for more information.

11.16.3 Civil Detail Sheets

Civil Details shall be created to depict congested areas more clearly. Civil Details shall be placed on Sheets created using layout *CD-# 1* from the *UTILITY_DESIGN_TEMPLATE.dwt*. Typically, two to four Civil Details can be shown on a Civil Detail Sheet. Only the minimum number of Civil Detail Sheets necessary to produce a clean design set shall be created. Coded notes shown on the Civil Detail shall not be shown on the Civil Design Sheet. All Civil Details shall have a scale bar and north arrow.

Civil Details shall be called out as described in [Paragraph 2.9.5.1 Callouts for Civil Details](#). The callout on a Civil Detail Sheet, shown in Figure 22 below, includes a circle with the Civil Detail number on top and the Civil Design Sheet number on bottom. On the Civil Design Sheet, similar symbology is shown with the Civil Detail number on top and the Civil Detail Sheet number on bottom.



Figure 22: Civil Detail Callout Example

11.16.4 Hydrant and Valve Table Sheets

The Hydrant and Valve Table Sheets are only used on water projects and shall be created using layout *CT-# 1* from the *UTILITY_DESIGN_TEMPLATE.dwt* as the *template*. Only the minimum number of Hydrant and Valve Table Sheets necessary to provide tables for all new valves and hydrants shall be created.

11.16.5 Water Service Table Sheets

The Water Service Table Sheets are only used on water projects and shall be created using layout *CT-# 2* from the *UTILITY_DESIGN_TEMPLATE.dwt* as the *template*. Only the minimum number of Water Service Table Sheets necessary to provide the water service data for all affected properties shall be created.

12. SEWER DESIGN DRAWING AND SHEETS

12.1 PURPOSE

This purpose of the Sewer Design Drawings and Sheets is to depicts the rehabilitation, replacement, or installation of new DC Water linear sewer assets.

The Sewer Design Drawing shall be created from the *UTILITY_DESIGN_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate Sewer Design Drawing shall be created for each neighborhood.

Use of the term “sewers” includes the following sewer types:

- Sanitary sewers
- Storm sewers
- Combined sewers

12.2 LAYERS

See [Article 11.2 Layers](#) for requirements.

12.3 EXTERNAL REFERENCES

See [Article 11.3 External References](#) for requirements.

12.4 LABELS

12.4.1 Pipe Networks

There shall be one pipe label for each pipe per Sheet. All pipes shown in Plan eight inches and greater shall be labeled using the *DCW_NEW_Sewer Rehab Pipe Label Style*. All pipes shown in Plan smaller than eight inches shall be labeled using the *DCW_NEW_Sewer Rehab [Slope] Pipe Label Style*. All *Pipe Network Structures* shall be labeled in Plan using the *Structure Label Style* named *DCW_NEW_Sewer Rehab*. The *structure labels* shall be dragged away from the Structure to an appropriate location. A leader shall be automatically created, and a border shall appear around the text.

12.4.2 Crossing Utilities

For pipes smaller than eight inches, place design note labels at the intersection of the pipe and any crossing utilities. The design note label shall state the type of crossing utility and clearance above or below the new pipe design.

12.5 LINEWORK

12.5.1 Sewer Laterals

Polylines shall be drawn at elevation zero on *layer CI-SSWR-LTRL-Q* to represent new or rehabilitated sewer laterals when they are part of the scope of work to be constructed. The sewer laterals shall be drawn perpendicular from the new watermain to the building, lot line, or existing cleanout. Do not draw this linework if the lateral work to be constructed is limited to the connection or the first couple feet.

12.5.2 Abandoned Sewers

Existing sewers being abandoned shall be traced with a polyline at elevation zero on *layer CD-SSWR-PIPE-ABND*.

12.5.3 Civil Detail Outline

See [Paragraph 11.5.3 Civil Detail Outline](#) for requirements.

12.5.4 Limits of Disturbance

See [Paragraph 11.5.4 Limits of Disturbance](#) for requirements.

12.6 KEY MAP

See [Article 11.6 Key Map](#) for requirements.

12.7 BLOCKS

The *UTILITY_DESIGN_TEMPLATE.dwt* has the following blocks preloaded for use.

12.7.1 Match Lines

See [Paragraph 11.7.1 Match Lines](#) for requirements.

12.7.2 North Arrows

See [Paragraph 10.7.2 North Arrows](#) for requirements.

12.7.3 Graphic Scale

See [Paragraph 10.7.3 Graphic Scale](#) for requirements.

12.7.4 Maintenance Hole Stamp

All new sewer maintenance holes in the project shall have a *Maintenance Hole Stamp* inserted on the *Maintenance Hole Table Sheet* (see [Paragraph 12.16.6 Sewer Maintenance Hole Table Sheets](#) for more information). The *CT-3S* layout tab within the *UTILITY_DESIGN_TEMPLATE* contains several *DCW-SSWR-MH-STMP Blocks* (see an example Maintenance Hole Stamp in [Figure 23: Example Maintenance Hole Stamp \[Block Name: DCW-SSWR-MH-STMP\]](#)). The appropriate information shall be manually entered into each *block* as needed. Create copies of the *CT-3S* tab if additional *blocks* are needed. Remove additional *blocks* that are not needed. Complete appropriate cells while leaving the remaining cells for the contractor to fill in with As-Built information.

Clock position shall be identified with the 12 o'clock position set at the outgoing sewer pipe (see [Figure 24: Clock Position for inflow and outflow pipes](#)). If there is fewer than four inflow pipes, the extra cells may be left blank. If there are more than four, then create a duplicate maintenance hole stamp for the maintenance hole, but leave duplicate values for size, rim, and material blank. If there is more than one outgoing sewer, ie: the maintenance hole includes a flow split, contact DC Water for guidance. Liner material may be left blank or "NA" if no liner is present. Rows starting with "AB" are left blank for the construction contractor to fill in with AsBuilt values.

MH DATA		123-345-567-789
SIZE (OPENING)		22
SIZE (BASE)		48
RIM EL.		195.68
INV. IN		189.02 @ 3 o'CLOCK
INV. IN		
INV. IN		
INV. IN		
INV. OUT		189.17
MH MATERIAL		RCP
LINER MATERIAL		RCP
AB INV. IN		
AB INV. IN		
AB INV. IN		
AB INV. IN		
AB INV. OUT		
AB LINER MATERIAL		
AB MH MATERIAL		
AB RIM EL.		

Figure 23: Example Maintenance Hole Stamp [Block Name: DCW-SSWR-MH-STMP]

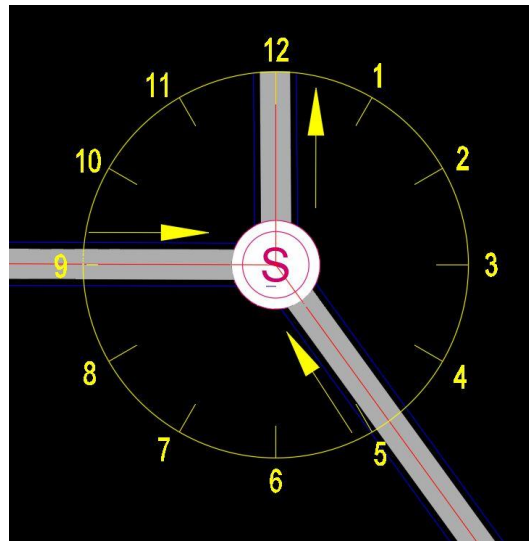


Figure 24: Clock Position for inflow and outflow pipes

12.8 TABLES

12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule

Each Sewer Rehabilitation Sheet shall include one Pipe Rehabilitation Schedule and one Maintenance Hole Rehabilitation Schedule identifying which pipe rehabilitation and maintenance hole rehabilitation methods are to be used on each pipe segment / maintenance hole. These tables shall be inserted in *model space* as *Pipe and Structure Tables* using the *DCW_Sewer Rehabilitation* Style. These tables shall be displayed through viewports below the plan view on each Sheet.

12.8.1.1 Pipe Rehabilitation Schedule

Most of the rows and columns in the table are populated using data from the *Pipe Network* (not a *Data Link* from excel as is the case for sewer lateral tables). The columns to be manually entered are service, rehabilitation method, asbuilt information, inverts, and CCTV direction. Service shall be completed with sanitary, storm, or combined. The columns labeled “Dimension (WxH)” is shown with question marks and will auto-populate with the appropriate values; include two values for non-circular pipe and one value for the diameter of a circular pipe. The shape field is automatically completed based on the pipe shape from the catalog. If any shapes are not included in the catalog, please contact DC Water.

12.8.1.2 Maintenance Hole Rehabilitation Schedule

Maintenance holes are included in the Maintenance Hole Rehabilitation Schedule if they are to receive any rehabilitation. Maintenance holes are also included in the Maintenance Hole Schedule if they are listed as the upstream or downstream maintenance holes in the Pipe Rehabilitation Schedule. In cases where a maintenance hole is included in the Maintenance Hole Rehabilitation Schedule only because it is listed in the Pipe Rehabilitation Schedule, the Rehabilitation Method shall be listed as “A” per the Maintenance Hole Rehabilitation Legend. The column labeled “Rehabilitation Method” shall be entered manually.

12.8.1.3 Sheet Crowding

Occasionally a Sewer Rehabilitation Sheet will include so many pipe segment and maintenance holes that a standard size viewport and both schedules will not fit on a single Sheet. In these cases, the schedules may be moved to a CT Sheet called Pipe and Maintenance Hole Rehabilitation Schedule Sheet (see [Paragraph 12.16.7 Pipe and Maintenance Hole Rehabilitation Schedule Sheets](#)). When this happened, include Sheet Notes with cross references between both Sheets.

12.8.1.4 Distance between Maintenance Holes (Sources and Inclusion in Sheets)

The distance between two existing maintenance holes is included in three different ways throughout the Plan Set:

1. The Pipe Rehabilitation Schedule on the Sewer Rehabilitation Sheets (see [Paragraph 12.8.1.1](#)) explicitly states the distance. The preferred source of this information is the length based on the CCTV inspection. If the CCTV data is not available (such as when a blockage prevented complete inspection), use the calculated distance from survey data described in the next paragraph. If no survey was completed, use the distance between maintenance holes from the GIS data. The schedule shall include documentation of the source of this distance, either in the table itself or via a sheet note, or both.
2. The Maintenance Hole Rehabilitation Schedule includes coordinates for each maintenance hole. These coordinates are based on field survey (if available) or GIS data (if field survey is not available). An implied distance can be calculated from the maintenance hole coordinates; this calculated distance will often be different from the footage of CCTV available. This calculated distance is not called out anywhere on the drawings unless CCTV inspection data was not available (per paragraph above). The length calculated from survey or GIS is not preferred when describing the distance of rehabilitation in the Pipe Rehabilitation Schedule because the length overestimates the length of rehabilitation because rehabilitation of the pipe stops at the edge of the maintenance hole, not the center of the maintenance hole. It is also worth noting the maintenance hole coordinate is usually based on the center of the lid, not the center of the maintenance hole bottom; these locations in 2D space are unlikely to be the same unless the maintenance hole is concentric. Additionally, the pipe lengths in AutoCAD Civil 3D are calculated based, in part, on the parts used for the maintenance hole; if properly selected

AutoCAD Civil 3D should calculate this distance correctly, but the designer shall confirm AutoCAD Civil 3D provides an accurate and desired result. When a pipe segment to be rehabilitated includes an external point repair, refer to [Paragraph 10.11.2 Alignment Stationing](#) and [Paragraph 12.11.2.1 Alignment Creation and Stationing](#) for additional requirements.

3. Civil Detail Sheets showing external point repairs include the distance between maintenance holes by the nature of the stationing. See [Paragraph 10.11.2 Alignment Stationing](#) and [Paragraph 12.11.2.1 Alignment Creation and Stationing](#) for more information and additional requirements for stationing. The distance based on stationing shall be coordinated with the distance listed on the Pipe Rehabilitation Schedules.

12.8.1.5 Documentation of the Distance between Maintenance Holes

Because the three distances listed in the preceding section can be based on CCTV, field survey, and/or GIS, include notes that describes the source of the distances, stationing, and maintenance hole coordinates. Any discrepancies between the footages shall be described with a note. Furthermore, the maintenance hole coordinates will be identified as center of lid or other based on the point from the field survey. This may require a single sheet note, multiple design notes, or a variety of other possible combination of notes. See [Paragraph 12.11.2.1 Alignment Creation and Stationing](#) for more information and requirements.

12.9 POINTS

12.9.1 Road CL & Profile Intersection Points

When profiles are required for Sewer Design Sheets comply with the requirements of [Paragraph 11.9.2 Road CL & Profile Intersection Points](#) to show the roadway crossing in the profile view. Where profiles are not required, this is not required.

12.10 SURFACES

12.10.1 Existing Surface Reference

Sewer Design Drawings shall reference an existing surface via a Data Shortcut reference of the *EXISTING FIELD SEG XX-XX Surface* found in the ...Design Data\Shortcuts folder in the project folder. For information about Data Shortcuts, see [Article 3.6 Data Shortcuts](#).

For information about creation of the existing surface see [Paragraphs 6.13.1 and 6.13.2 Existing Surfaces for Sewer Rehabilitation Sheets](#).

12.10.2 Existing Surface Display

Surfaces are displayed in the Sewer Design Drawings. For surfaces created from survey data the *Surface Style* shall be set to *DCW_Contours 2' and 10' (Existing Surveyed) Surface Style*. For surfaces created from GIS/similar sources the *Surface Style* shall be set to *DCW_Contours 2' and 10' (Existing Digital)*. The Sewer Rehabilitation Sheets shall display the surface created from dtms or contours (see [Paragraph 6.13.2](#)). The Civil Details showing the external point repair shall display the *surface* created from survey data (see [Paragraph 6.13.1](#)). Use *Viewport Layer Freeze* to show the different contours in different viewports. The layers of the contours are defined by the surface display style; *VI-TOPO-MINR* and *VI-TOPO-MAJR* for GIS/similar sources and *VF-TOPO-MINR* and *VF-TOPO-MAJR* for survey sources.

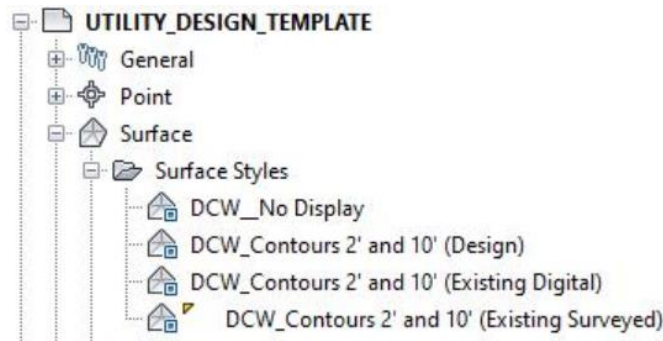


Figure 25: Surface Styles

12.10.3 Surfaces for External Point Repairs

Surfaces shall be created for each point repair. The surface represents the excavated trench; it is not used for display in the Sewer Design Drawing, rather to establish the limits of excavation which can, in turn, be used to establish the limits of the work zone for TCPs.

12.10.3.1 Surface Creation

Feature lines shall be used to create *grading objects*. *Feature lines* shall be placed on *layer C-TOPO-FEAT* and shall be assigned the *DCW_Basic Feature Line Feature Line Style*.

Feature line and *grading objects* shall account for the invert of the pipe, bottom and top of bedding material, pipe wall thickness, width, and length of the trench to be excavated for the point repair, slopes of the trench walls, thickness of the trench box or other shoring, daylight lines, and other relevant features. The PDE may choose distances, dimensions, slopes, etc as they see fit. The primary goal of creating this surface is to make sure the work zone around the external point repair is large enough to account for daylight lines, shoring, construction access, TCP features, etc.

The profile on the Civil Detail shall show the area of the pipe to be repaired including a note on the existing grade that says, "Existing grade shall be restored."

After creating the *grading object*, create a surface called *NEW EPR XXXX-YY*, where *XXXX* represents the street name and *YY* counts each external point repair in that street. For example, if there were two external point repairs in Trinidad Ave, NE, the surfaces would be named *NEW_EPR_TRINIDAD_AVE_NE_01* and *NEW_EPR_TRINIDAD_AVE_NE_02*.

12.10.3.2 Data Shortcuts

A *Data Shortcut* of the *surface(s)* created for external point repairs shall be added to the *shortcuts* folder of the associated project. For more information on *Data Shortcuts* and *Data Shortcut Project Folders*, please refer to [Article 3.6 Data Shortcuts](#).

12.10.3.3 Surface Display for External Point Repairs

The *Surface Style* shall be set to *DCW_No Display*. The *grading objects* shall be assigned the *DCW_Cut Slope Display* and *DCW_Fill Slope Display Styles*.

12.11 DESIGN ALIGNMENTS

12.11.1 Sewer Rehabilitation Sheets

Alignments are not used on Sewer Rehabilitation Sheets except as created earlier (see [Article 10.11 Street Alignments](#)) for external point repairs and shown on Civil Details (see next section).

1

View frames, Sheets, and match lines are created as part of the street alignment process (see [Article 10.11 Street Alignments](#)); these items maintain the layout from the street alignment. Stationing is not shown on Sewer Rehabilitation Sheets, but the distance between maintenance holes is included in the Pipe Rehabilitation Schedule (see [Paragraph 12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule](#)). Other requirements for data shortcuts, naming, and settings are described in [Article 10.11 Street Alignments](#).

12.11.2 Civil Details showing External Point Repairs

12.11.2.1 Alignment Creation and Stationing

Alignments shall be created for all external point repairs. The alignment shall run from the maintenance hole downstream of the external point repair to the next maintenance hole upstream. The stationing of the alignment shall be set to match the footage of the CCTV; this usually requires starting the alignment with STA 0+00 at the edge of the existing maintenance hole base where the existing pipe starts (not a point on the block used to represent the maintenance hole, but the actual location in space where the CCTV started. This will usually yield an end station at the edge of the upstream maintenance hole that matches the footage from the CCTV, but this may not be the case in all situations. For coordination of this distance with the distance included on the Pipe Rehabilitation Schedule, see [Paragraph 12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule](#).

The alignment shall be used to create a profile (see [Article 12.15](#)) and pipe networks (see [Article 12.14](#)).

12.11.2.2 Alignment Data Shortcut

See [Paragraph 10.11.1](#) for requirements.

12.11.2.3 Alignment Naming

See [Paragraph 10.11.3](#) for requirements.

12.11.2.4 Alignment Settings

See [Paragraph 10.11.4](#) for requirements.

12.11.3 New Sewers & Sewer Replacement

See [Article 11.11](#) for requirements. Design alignments shall be used to create profiles (see [Article 12.15](#)) and pipe networks (see [Article 12.14](#)).

12.12 VIEW FRAMES

See [Article 4.3 Sheet Coordination](#) for requirements.

For Sewer Replacement Plan and Profile Sheets and Civil Detail Sheets see [Article 10.12 View Frames](#) for additional requirements.

For Sewer Rehabilitation Sheets, view frames are not used. Instead use manual polylines on *layer CI-SHET-VFRM* and viewports. Follow the guidelines in [Article 10.12 View Frames](#) as closely as possible

when creating an area to be shown on a Plan. Viewports are then zoomed to the limits of that viewport. Coordination of layouts between different Sheet designations (as described in [Article 4.3 Sheet Coordination](#)) is limited to V, SR, and C Sheets; ES Sheets (if required) shall be cut at 20-scale per DCRA requirements. Coordination on Sewer Rehabilitation applies to V, C, and SR Sheets - but probably not ES

12.13 MATCH LINES

See [Article 10.13 Match Lines](#) for requirements.

12.14 PIPE NETWORKS

12.14.1 Pipe Networks for New Sewer Assets

Pipe networks shall be created for all sewer pipes to be rehabilitated, replaced, relocated, or installed new, including external point repairs. Pipe networks shall be created from maintenance hole to maintenance hole. Pipe networks may be a single pipe segment (usually the case for external repairs) or several continuous pipe segments (usually the case for sewer relocations). Data shortcuts shall be created for these pipe networks. Pipe networks shall include

- all pipe segments being installed, rehabilitated, replaced, or relocated (including external point repairs),
- connected upstream and downstream manholes, as well as
- next adjacent pipe segment (including work plus one pipe run in all directions).

The design shall be completed using the pipe network catalog and parts list in the template files. *Pipe Networks* shall reference a design *alignment* based on the centerline of the *network* for labelling purposes.

12.14.2 Pipes

The *pipe styles* named *DCW_New Sewer Pipe* shall be applied to the *pipe network objects*.

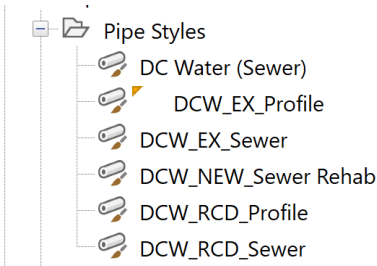


Figure 26: Pipe Styles

12.14.3 Structures

Maintenance holes shown in Plan view shall be assigned the structure style named *DCW_NEW_Sewer_MH*. Storm drain inlet Structures shown in Plan view shall be assigned the structure style named *DCW_NEW_Sewer_Rect*.

12.14.4 Pipe Networks for Utility Crossing

Small pipe networks are also created for utility crossings (see [Article 8.8 Pipe Network](#) for requirements).

12.15 PROFILES

12.15.1 Profile Creation

Profiles shall be created for all new pipes eight inches and greater in diameter. This includes new sewers, replacement sewers, and external point repairs. A profile shall be created for all alignments that represent work requiring excavation. Profiles are not required for sewer rehabilitation that does not require excavation or when the excavation is very minor (such as resetting a frame and cover).

12.15.2 Profile Surface Reference

See [Paragraph 11.15.2 Profile Surface Reference](#) for requirements.

12.15.3 Profile Views

See [Paragraph 11.15.3 Profile Views](#) for requirements.

12.16 SHEETS

12.16.1 Sewer Replacement Plan and Profile Sheets

Sewer Replacement Plan and Profile Sheets are used for all sewer assets that are replaced, relocated, or installed new and shall be created using layout *C-#.1(SReplacement)* from the *UTILITY_DESIGN_TEMPLATE.dwt* template. They shall include a plan view on the top half of the sheet and a profile view on the bottom half of the sheet. Generally, vertical information shall only be labeled in profile view. Stationing shall be aligned at the left end of the view on each Sheet such that the station of the profile is directly below the same station in the plan view. The plan view shall be rotated to keep the sewer aligned in plan and profile where reasonably possible (angle points make this impossible and Sheets need not be broken to maintain alignment of the stationing). Only the minimum number of Sheets necessary to produce a clean design set shall be created.

12.16.1.1 Plan view

See [Paragraph 10.14.2 Existing Conditions Sheets](#) for plan view requirements.

12.16.1.2 Profile view

Sewer replacement projects shall show the profile directly under the plan view with view ports adjusted such that stationing lines up and the left end of the Sheet.

12.16.2 Sewer Rehabilitation Sheets

Sewer Rehabilitation Sheets contain plan views at 50 scale, Pipe Rehabilitation Schedules, Maintenance Hole Rehabilitation Schedule, and related information. They shall be created using layout *C-#.1(SRehab)* from the *template* named *UTILITY_DESIGN_TEMPLATE.dwt*.

See [Article 4.3 Sheet Coordination](#), [Paragraph 10.14.2 Existing Conditions Sheets](#), and [Article 4.4 Sheet Order](#) for additional requirements about Sheet coordination. See [Paragraph 12.8.1.1 Pipe Rehabilitation Schedule](#) and Maintenance Hole Rehabilitation Schedule for additional requirements about the Tables to be inserted. See [Paragraphs 11.5.3 Civil Detail Outline](#) and [Paragraph 12.16.3 Civil Detail Sheets](#) for requirements related to Civil Details for external point repairs.

12.16.3 Civil Detail Sheets

Civil Details shall be created to depict external point repairs. Congested areas may also be depicted with Civil Details. See [Paragraph 11.16.3 Civil Detail Sheets](#) for additional requirements.

See [Paragraph 12.16.1 Sewer Replacement Plan and Profile Sheets](#) and [Paragraph 12.8.1.5 Documentation of the Distance between Maintenance Holes](#) for additional requirements.

12.16.4 Sewer Lateral Rehabilitation Schedule Sheets

The Sewer Lateral Rehabilitation Schedule Sheet is only used on sewer projects. They shall be created using layout *CT-#.1S* from the *template* named *UTILITY_DESIGN_TEMPLATE.dwt*. This sheet is populated with a linked table. The linked table can be found in the *Design Data* folder. Complete appropriate cells while leaving the remaining cells for the contractor to fill in with As-Built information. This table shall be inserted using *Data Links*, at the insertion marker in the top left corner of *CT-## Sheets* and placed on the *C-ANNO-TABL Layer*. Additional Sheets and data links may need to be created. For more information see [Article 3.7 Data Links](#) for more information about data links and [Appendix I](#) for more information on the Table Style.

12.16.5 Sewer Bypass Table Sheets

On large diameter sewers (18 inches in diameter and greater) rehabilitation project include a Sheet that indicates flow rates for sewer bypass. This Sheet is not Issued for the Bid, rather included as additional project information. The Sewer Bypass Table Sheet is only used on sewer projects. They shall be created using layout *CT-#.2S* from the *template* named *UTILITY_DESIGN_TEMPLATE.dwt*. The data is entered in a spreadsheet with a data link included in Drawing template

12.16.6 Sewer Maintenance Hole Table Sheets

The Maintenance Hole Table Sheets are only used on sewer projects with new maintenance holes and shall be created using layout *CT-#.3S* from the *UTILITY_DESIGN_TEMPLATE.dwt* as the *template*. Only the minimum number of Maintenance Hole Table Sheets necessary to provide tables for all new maintenance holes shall be created.

12.16.7 Pipe and Maintenance Hole Rehabilitation Schedule Sheets

In cases where a Sewer Rehabilitation Sheet cannot fit a standard size viewport and both rehabilitation schedules (as described in [Paragraph 12.8.1 Pipe Rehabilitation Schedule and Maintenance Hole Rehabilitation Schedule](#)) the schedule may be moved to a new Sheet called Pipe and Maintenance Hole Rehabilitation Schedule Sheet which is part of the CT Sheet designation.

13. SURFACE RESTORATION PLANS

13.1 PURPOSE

The purpose of the Surface Restoration Plan (SRP) is to document the assumed limits of all surface restoration that will be included in the Schedule of Prices or opinion of probable construction cost. This includes limits of full depth reconstruction, mill and overlay, sidewalk, curb and gutter for each different material type, and other similar DDOT assets. SRPs also include a quantity takeoff table on each Sheet to document the quantity of each type of surface restoration on each Sheet.

The SRPs shall be created from the *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate Surface Restoration Drawing shall be created for each neighborhood.

SRPs are only prepared in areas of excavation. Sewer rehabilitation projects with no excavation do not include SRPs. But SRPs are required on sewer rehabilitation project in areas of excavation (common examples include external point repairs, removal of the upper portion of a maintenance hole for CIPP access and resetting a maintenance hole frame).

If the limits of excavation are very small relative to the other work, then the excavation and surface restoration may be considered incidental with DC Water's approval. If the surface restoration is considered incidental, the SRPs showing the limits or restoration are still required, but the quantity takeoffs tables on the SRPs need not be completed.

SRPs are distributed within DC Water but are not included in the *Sheet Set* provided to contractors for bidding. Nor are they submitted to DDOT, DCRA, or DOEE. SRPs are used for internal calculation, checking, and to facilitate communication between design and construction regarding the quantity of surface restoration work.

13.2 LAYERS

See [Article 11.2 Layers](#) for requirements.

13.3 EXTERNAL REFERENCES

See [Article 11.3 External References](#) for requirements.

13.4 LINEWORK

13.4.1 Water Service Lines

Polylines shall be used to depict the locations of water service lines in the contracted area. These can be copied from the Water Design Drawing and shall be placed on on layer *CI-WATR-SERV-PBLC-Q* to represent new water service lines in public space and *CI-WATR-SERV-PRVT-Q* to represent new water service lines on private property.. Note the water service lines are copied from the Water Design Drawing to allow functionality of the quantity takeoff functions.

13.4.2 Curb Repair/Replacement

Polylines shall be used to depict the locations of curb repair. These polylines shall be drawn along the existing curb. The minimum length of a curb replacement is 20 feet. When a fire hydrant lead crosses under the curb, the 20-foot length shall be centered such that the curb is replaced 10 feet on either side of the lead. The curb *polylines* shall be on layer *CI-PVMT-CURB-Q* and shall have a global width of 1.0.

13.4.3 Pavement Restoration

Closed polylines shall be created to outline the extents of pavement restoration areas using the appropriate

CI-PVMT-OTLN... layers. Refer to the Drawing templates for hatching used to designate different types of pavement restoration such as full depth reconstruction, mill and overlay, replace PCC Pavement, or bus pads.

13.4.4 Sidewalk Restoration

Closed polylines shall be created to outline the extents of sidewalk restoration areas using the appropriate CI-SWLK-OTLN... layers.

13.4.5 Grass Restoration

Closed polylines shall be created to outline the extents of grass restoration areas using the CI-TURF-OTLN-Q layer.

13.5 HATCHING

Hatching shall be created to fill the outlined restoration areas. Different hatching is used to designate different types of pavement restoration such as full depth reconstruction, mill and overlay, replace PCC Pavement, or bus pads. Refer to the SRP Legend in the Drawing template.

13.6 KEY MAP

All SRPs shall include a Key Map near the bottom right corner. See [Paragraph 2.11.3 Key Map](#) for more information.

13.7 BLOCKS

The *UTILITY_DESIGN_TEMPLATE.dwt* has the several blocks preloaded for use.

13.7.1 Match Lines

See [Paragraph 10.7.1 Match Lines](#) for requirements.

13.7.2 North Arrows

See [Paragraph 10.7.2 North Arrows](#) for requirements.

13.7.3 Graphic Scale

See [Paragraph 10.7.3 Graphic Scale](#) for requirements.

13.8 TABLES

Quantity takeoff tables are required for each takeoff report using the SRP.xls Style Sheet that is stored in the ...\\CAD Standards\\PayItems\\Takeoff Report Style Sheets folder. These tables shall use the *QUANTITIES Table Style*. The tables shall be placed in model space and displayed through a viewport on the appropriate SRP. For more information about this *table style*, please refer to [Appendix D](#).

Adjust the width and height of columns of the table as follows:

- Column A shall be adjusted to a width of 35.
- Column B shall be adjusted to a width of 95.
- Column C shall be adjusted to a width of 30.
- Column D shall be adjusted to a width of 20.
- The overall table height shall then be adjusted to 1, which will shorten the rows to the minimum

height.

13.9 DESIGN ALIGNMENTS

Design alignment data shortcuts shall be referenced and displayed using the *DCW_Water and Sewer Design Alignment Style*.

Additional alignments shall be created for the SRP beginning and ending at the edge of each sheet. These shall be used to create sheet specific corridors and trench quantity calculations.

13.10 VIEW FRAMES

See [Article 4.3 Sheet Coordination](#) and [Article 10.12 View Frames](#) for requirements.

Use layout SR-#.1 from the *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt* to create Sheets using the same view frames established for Existing Conditions Sheets. Default settings are included within the *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt* template.

13.11 MATCH LINES

See [Article 10.13 Match Lines](#) for requirements.

13.12 SUBASSEMBLIES

DC Water has created and uses two custom *subassemblies*. One is for the design of the trench under PCC pavement, and the other is for the design of the trench under flexible pavement. These *subassemblies* are used in the *assemblies* as noted below and are stored in the ...*\CAD Standards\Subassemblies* folder.

13.13 ASSEMBLIES

DC Water has created several custom *assemblies* for specific pipe sizes and pavement types. These assemblies are available in the *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt*.

13.14 CORRIDORS

Corridors shall be created to calculate trench and pavement base layer quantities. The *corridor* shall be assigned the *Trench Corridor Style*. It shall be created using the *alignment* and *surface* associated with the corresponding *pressure pipe network* along with the *assembly* with the appropriate pipe size and pavement type.

13.15 PAY ITEMS

Pay items have been assigned to *link and shape codes* within the *subassemblies* and *assemblies* present in the *SURFACE_RESTORATION_PLAN_TEMPLATE.dwt*. *Pay items* shall be manually assigned to some of the *polylines* and hatching/areas. For a list of *pay items* and associated settings, please refer to [Appendix I](#).

13.16 QUANTITY TAKEOFFS

Quantity takeoffs shall be completed for the entire project and by Sheet for all the surface restoration items. The only setting that shall be changed during the *Compute Quantity Takeoff* process is the *Report Extents*. The *Report Extents* shall be set to *Drawing* for the *entire project report* and *Selection Set* to select the *Pay Items* for a report on each Sheet.

13.17 SHEETS

See [Paragraph 10.14.2 Existing Conditions Sheets](#) for requirements. Layouts used for Civil Details do not require an SRP if the limit of surface restoration is depicted on a 20-scale Water or Sewer Sheet. Layouts used for 50-scale Sewer Rehabilitation Sheets require a corollary SRP if the work being done requires any surface restoration. [Figure 27: Example SRP and TCP Sheets shown in Sheet Set Manager](#)

below shows a listing of SRPs from the *Sheet Set Manager*.

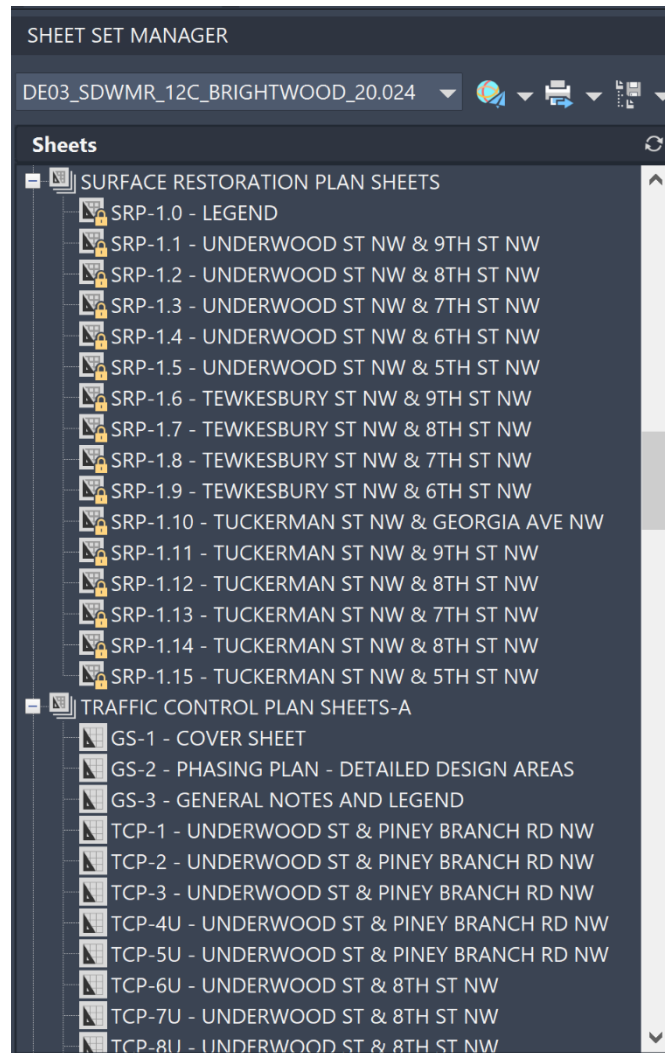


Figure 27: Example SRP and TCP Sheets shown in Sheet Set Manager

The default *layout* name *SR-1.<[Next Counter(CP)]>* shall be used along with the *DCW-NORTH ARROW Block*. The Sheets shall be added to the existing project *Sheet Set*.

SRPs are not part of the Plan Set issued for bid.

14. EROSION AND SEDIMENT CONTROL PLANS

14.1 PURPOSE

The purpose of the ESC Plan is to obtain permits from DDOT, DCRA, and DOEE. Apply the appropriate design criteria established by the permitting agency. The sections below outline the tools available for depiction of the ESC Plans.

The ESC Plans are created from the *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate ESC Drawing shall be created for each neighborhood.

ESC Plans are only created for projects in DC. Projects located in Maryland or Virginia usually exclude ESC Plans, deferring ESC Plans to the construction contractor. Projects in Maryland or Virginia only include ESC Plans during design when the local/state jurisdiction requires they be completed during design. This is sometimes the case on NPS land or in wetland areas.

14.2 LAYERS

See [Article 11.2 Layers](#) for requirements.

14.3 EXTERNAL REFERENCES

14.3.1 Drawings

The following Drawings shall be referenced into the ESC Plans and are already referenced in the drawing template *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt*:

- *KeyMap*
- *ExUtil*
- *GIS*
- *Survey*
- *SURFACE_RESTORATION_PLAN*

14.3.2 PDFs

The template *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt* includes the most commonly used 3rd Party Details. Any details not needed for the project shall be detached. The PDFs shall then be rearranged to show six details per Sheet. Additional PDFs may be required from DOEE's standards.

14.4 DIMENSIONS

Aligned dimensions shall depict the distance between trees and the watermain trench for all trees within twelve feet of the trench. See [Paragraph 2.6.5 Dimensions](#) for additional requirements.

14.5 LINEWORK

Limits of surface restoration shall be referenced from the SRPs; this reference is already in the template.

14.6 KEY MAP

All ESC Plans shall include a Key Map near the bottom right corner. See [Paragraph 2.11.3 Key Map](#) for more information.

14.7 BLOCKS

The *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt* contains the necessary *blocks* to produce an ESC Plan. These *blocks* shall be placed in *model space* unless otherwise noted. Ensure the limits of ESC practices accurately represent work areas. *Blocks* shall be inserted and exploded to outline tree protection and chain link fence.

14.7.1 Match Lines

See [Paragraph 10.7.1 Match Lines](#) for requirements.

14.7.2 North Arrows

See [Paragraph 10.7.2 North Arrows](#) for requirements.

14.7.3 Graphic Scale

See [Paragraph 10.7.3 Graphic Scale](#) for requirements.

14.7.4 Inlet Protection

Inlet protection shall be shown for every inlet shown on the Plans. The *DCW-AGIP-SMLL* block shall be placed on grates and at grade inlets. The *DCW-CIP-SMLL* block shall be placed on curb inlets. The inlet protection blocks shall be placed in model space.

14.7.5 Tree Protection

Use the *DCW-VEGE-TREE-PROT* block to depict planned tree protection for all trees shown within 12' of the trench. The tree protection blocks shall be placed in model space.

14.7.6 Advertisement Note

THE *DCW-ADV-NOTE-DOEE* BLOCK SHALL BE SHOWN ON EVERY ESC SHEET WHEN PREPARING SUBMISSIONS TO DOEE. THIS BLOCK IS REQUIRED BY DOEE. 14.8 DESIGN ALIGNMENTS

See [Article 13.9](#) for requirements.

14.9 VIEW FRAMES

See [Article 4.3 Sheet Coordination](#) and [Article 10.12 View Frames](#) for requirements.

Use layout *ES-#.1* from the *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt* to create Sheets using the same view frames established for Existing Conditions Sheets. Default settings are included within the *EROSION_SEDIMENT_CONTROL_TEMPLATE.dwt* template.

14.10 MATCH LINES

See [Article 10.13 Match Lines](#) for requirements.

14.11 SHEETS

14.11.1 ESC General Sheets

The ESC General Sheets include the following:

- ESC Cover

- ESC Stormwater Warning Sign and General Notes Sheet
- ESC Legend and Tree Protection Sheet
- DOEE 3rd Party Details

Figure 28: Example ESC Sheets shown in Sheet Set Manager

below shows a listing of ESC General Sheets from the *Sheet Set Manager* for the ESC Plans. Appendix I

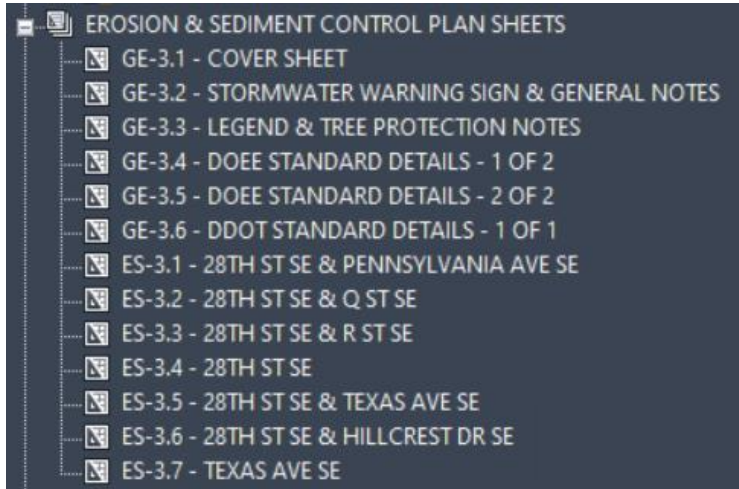


Figure 28: Example ESC Sheets shown in Sheet Set Manager

includes example ESC General Sheets. See Article 2.10 Legends for more information.

14.11.2 ESC Plans

See Paragraph 10.14.2 Existing Conditions Sheets for requirements. Figure 28: Example ESC Sheets shown in Sheet Set Manager

above shows a listing of ESC Plans from the *Sheet Set Manager*.

The default layout name ES-1.<[Next Counter(CP)]> shall be used along with the *DCW-NORTH ARROW Block*. The Sheets shall be added to the existing project *Sheet Set*.

15. TRAFFIC CONTROL PLANS

15.1 PURPOSE

The purpose of the Traffic Control Plan (TCP) is to 1) depict practices to be used by a construction contractor to meet regulatory requirements for controlling traffic flow around and/or through the project site and 2) obtain permits by showing how vehicles and pedestrians can safely maneuver around the construction site. Apply the appropriate design and criteria established by the permitting agency.

The TCP shall be created from the *TCP_MOT_TEMPLATE.dwt*. When a project includes multiple neighborhoods, a separate TCP Drawing shall be created for each neighborhood.

This Section and the associated support files have been created from the perspective of obtaining permits from DDOT. Projects located in Maryland or Virginia rarely require TCPs be developed or submitted during design. For projects requiring traffic control permits from other jurisdictions, the TCPs shall be prepared as needed to meet the requirements of the appropriate jurisdiction. Compliance with this Section or any individual components within this Section is optional for projects outside DC.

TCPs are not plotted with the Plan Set issued for bid. They are provided to potential bidders as available project information.

This Section describes requirements when using AutoCAD Civil 3D to produce TCPs.

15.2 LAYERS

See [Article 11.2 Layers](#) for requirements.

15.3 EXTERNAL REFERENCES

15.3.1 Drawings

The following Drawings shall be referenced into the TCP and are already referenced in the drawing template *TCP_MOT_TEMPLATE.dwt*:

- *KeyMap*
- *ExUtil*
- *GIS*
- *Survey*
- *UtilityDesign*
-

The Drawing names shall remain unchanged, but when the TCP is created from the template, the referenced drawing paths shall be changed to point to the associated project folder.

15.3.2 PDFs

The template *TCP_MOT_TEMPLATE.dwt* includes the most used 3rd Party Details. Any details not needed for the project shall be detached. The PDFs shall then be rearranged to show six details per Sheet. Additional PDFs may be required from DDOT's standards.

15.4 LABELS

Label the following:

- Streets
- Phases

- Sidewalks, driveways, alleys
- Start/end of construction work zones
- Construction work zone entrance and exit
- Traffic control devices

15.5 DIMENSIONS

Aligned dimensions shall depict the following:

- length of the work zone
- width of the existing roadway (face of curb to face of curb)
- width of temporary travel lanes
- distance between temporary traffic control devices
- point of intersection ties (from curb return to work zone)
- nominal width of right-of-way (based on GIS shapefile)
- temporary parking restrictions
- any other dimensions required to obtain permit approval from DDOT

See [Paragraph 2.6.5 Dimensions](#) for additional requirements.

15.6 HATCHING

The only hatching used in the TCP Drawing is DOTS at 20' scale; this hatching is used to highlight the TCP work zones on the TCPs and Phasing Plans

15.7 BLOCKS

15.7.1 Traffic Control

Traffic Control Blocks can be found in the *DCW MOT Block Library.dwg*. These blocks are available for insert through the *Tool Palettes* and the *drawings insert* as well. For a list of blocks with associated images, please refer to [Appendix J](#).

15.7.2 North Arrows

The *TCP_MOT_TEMPLATE* has a *DCW-NORTH ARROW Block* on the *G-SHET-NRTH layer* outside of the upper left corner of every Plan viewport and every Phasing Plan.

15.7.3 Graphic Scale

The *TCP_MOT_TEMPLATE* has a *DCW-GRAPHIC-SCALE Block* on *G-TITL-TEXT layer* centered below every TCP and Phase.

15.7.4 Advertisement Note

See [Paragraph 14.7.6 Advertisement Note](#) for requirements.

15.8 VIEWPORTS

TCPs do not require use of coordinated view frames as required for the other drawing types. Instead a *viewport* showing the limits of each phase (as defined in the Phasing Plans, see [Paragraph 15.10.2 TCP Phasing Plan](#)) shall be created.

Use layout *TCP-#.1* from the *TCP_MOT_TEMPLATE.dwt* to create TCPs. Default settings are included within the *TCP_MOT_TEMPLATE.dwt* template.

15.9 MATCH LINES

TCPs rarely use match lines, because the phases defined in the Phasing Plans must be short enough to meet DDOT requirements (see [Paragraph 15.10.2 TCP Phasing Plan](#) for a description of Phasing Plans). DDOT requirements usually prevents match lines from being needed.

The *DCW-MATCH LINE-NO STA Block* is included in the template for the rare instance that a match line would be needed. See [Paragraph 10.7.1 Match Lines](#) for information about creating manual match lines in paper space with this block.

15.10 SHEETS

The TCP Sheets include Traffic Control Plan General Sheets (GT Sheets) and the TCP Sheets; both are described below. When a project requires multiple TCP packages be submitted to DDOT, each package shall include GT Sheets for that DDOT submission.

Figure 27: Example SRP and TCP Sheets shown in Sheet Set Manager

shows a listing of TCPs from the *Sheet Set Manager*.

15.10.1 TCP General Sheets

The TCP General Sheets include the following:

- TCP Cover
- TCP Phasing Plan
- TCP General Notes
- TCP Typical

15.10.1.1 TCP Cover Sheet

The TCP Cover Sheet identifies the project title, roadway classification schedule, and includes a Site Map. See the LCM support files for an example TCP Cover Sheet.

15.10.1.2 TCP Phasing Plan

Phasing Plans depict sequencing of different TCPs located in the same project area. Phasing Plans are analogous to Key Maps but are created in such a manner as to comply with DDOT's requirements. The TCP Phasing Plan depicts each TCP work zone phase in sequence for its TCP package. See the LCM support files for an example Phasing Plan.

15.10.1.3 TCP General Notes Sheet

The TCP General Notes Sheet include the TCP General Notes, TCP Legend, a note section labeled "Scope of Work" with a high-level bullet list of the project scope, and images of a traffic cone and a traffic barrel. The LCM support files include an example TCP General Notes Sheet. The notes included in the template are common notes. For more information about the TCP Legend see [Article 2.10 Legends](#) and [Appendix I](#).

15.10.1.4 TCP Typical

DDOT publishes 21 approved Utility Work Zone Traffic Control Plan Typical on their website (<https://ddot.dc.gov/page/utility-work-zone-traffic-control-plan-tcp-typicals>). These are referred to as DDOT "Typicals." Use of the Typical, when done within the constraints provided by DDOT, can speed the permit process, and make drawing production more efficient. Unfortunately, due to the nature of DC

Water infrastructure and design alignments, DDOT Typical are unable to be used frequently. In the rare cases when they are used, they shall be included in the GT Sheets.

15.10.2 Traffic Control Plans

The default layouts TCP-#.1 through TCP-#.14 are provided in the TCP_MOT_Template.dwt. The layer state settings for each phase is assigned to the plan viewport of each layout. Layout TCP-#.1 shall be copied to create additional Sheets as needed. The Sheets shall be added to the existing project *Sheet Set*. Create the minimum number of TCPs necessary to produce a clean design set.

16. AS-BUILTS AND RECORD DRAWINGS

16.1 PURPOSE

Prior to reviewing this section, please review the definitions of As-Built, As-Built Drawings, and Record Drawing under Definitions. Reviewing the latest specifications may also be helpful.

The purpose of an As-Built Drawing is to certify as-constructed conditions.

The purpose of a Record Drawing is to serve as the final record of a project for future reference.

Prior Sections in the LCM describe CAD work that is used to depict a design prior to or during construction. This Section describes requirements for As-Builts and Record Drawings that shall be created after construction to document the actual as-constructed condition of the project. Use of As-Built documents and/or Record Drawings to research and define existing conditions prior to design are not the subject of this Section.

16.2 SHEET DESIGNATOR

When Record Drawings are created as part of a traditional project, they use traditional sheet designators (described in Table 4: Sheet Groups & Designations). Most, if not all, projects that are constructed as part of DC Water's CIP shall have Record Drawings created shortly after construction is complete. DC Water has included creation of Record Drawings in the Standards Scopes of Work for the PDE.

When Record Drawings are produced outside the traditional project design/construction lifecycle, they are rarely based on design Drawings that were compiled using the CAD Standards in the LCM (usually because the design Drawings are paid for by a party other than DC Water). These Record Drawings are based on As-Builts and/or field survey information and represent an existing condition state, therefore these Record Drawings use the V sheet designator. This is most common on developer and DDOT projects. It also occurs when creating a Record Drawing from historical documents (more than a year after construction was complete) to improve the accuracy of DC Water's record information stored in the GIS and other systems.

16.3 REQUIREMENTS FROM OTHER DRAWING TYPES

All requirements described previously in this LCM apply to Record Drawings. None of the requirements are eliminated because a Drawing or Sheet has evolved into a Record Drawing.

16.4 FILE MANAGEMENT

As-Builts and As-Built information exists in several possible formats, including redline markups from the contractor. As-Built documents shall be stored in the *CAD Project Folder* under *Submittals* in a folder called *As-Builts*.

Record Drawings shall be created by modifying the Drawings used for the design. The modifications to the Drawings shall be based on the markups from the As-Built Drawings and other As-Built information. Record Drawings use the same folder structure as the Drawings used for the design process; the files used to produce Record Drawings shall not be a duplicate version of the Drawings used during design, they shall be the same Drawings. Record Drawings in pdf format shall be stored in the *Submittals* folder under *Record Drawings*.

16.5 STAMPS, SCHEDULES, AND TABLES

Several stamps, schedules, and tables are inserted throughout the design process with blanks for the contractor to complete based on As-Built information. When creating Record Drawings these cells and attributes shall be completed. The stamps and tables to be completed when creating Record Drawings include the following:

- Fire Hydrant Stamp (see [Paragraph 11.7.5 Fire Hydrant Stamp](#) for more information)
- Valve Stamp (see [Paragraph 11.7.6 Valve Stamp](#) for more information)
- Water Service Table (see [Paragraph 11.8.2 Water Service Tables](#) for more information)
- Maintenance Hole Stamp (see [Paragraph 12.7.4 Maintenance Hole Stamp](#) for more information)
- Pipe Rehabilitation Schedule (see [Paragraph 12.8.1.1 Pipe Rehabilitation Schedule](#))
- Maintenance Hole Rehabilitation Schedule (see [Paragraph 12.8.1.2 Maintenance Hole Rehabilitation Schedule](#))
- Sewer Lateral Rehabilitation Schedule

16.6 TITLE BLOCK AND LAYERS

The title block included in the templates and LCM support files include a layer called *G-TITL-TEXT-SUBM*. When creating the Record Drawing this *layer* color shall be changed to 242. The *SUBMITTAL_TITLE Attribute* in the sheet set shall be changed to *Record Drawing*.

16.7 RECORD DRAWING DISCLAIMER

The Drawing templates included a block called *DCW-RECORD DRAWING STAMP*. Insert the block and update the attributes on each Sheet..

17. SUBMISSION AND AUDIT PROCESS

17.1 CAD STANDARDS CHECKLIST

Include the Linear CAD Standards Checklist with each submission. The latest checklist is included with the LCM support files.

17.2 EXTERNAL REFERENCES

All previous *xref* paths shall be maintained. The *xrefs* shall not be bound. The reference path shall remain relative.

17.3 E-TRANSMIT

Use eTransmit to produce a zip file with all referenced Drawings, tables, pressure catalogs, pay items, etc. Submit the zip file with a pdf version of the Record Drawing. The zip file shall be named per the requirements in [Paragraph 3.3.8 Milestone Submissions](#).

- All PDF's must be flattened before submissions.

17.4 SUBMISSION

The eTransmit zip file submission shall be delivered to DC Water.

DC Water will then

- update the GIS,
- upload the files to DC Water's enterprise document management software (at the time of publication this is OpenText, aka Livelink).
- create links from the GIS to Livelink, and
- file the submission for long-term storage.

17.5 CAD STANDARDS CHECKER

The CAD Supervisor or a delegate will run the *CAD Standards Checker* to identify any variances from the LCM. This process uses a *Standards File* (.dws extension). The Designer may run the checker before submission if they choose. See the LCM support files for the latest version of the Standards File and the Configuration Standards Settings.

18. BIM 360

18.1 PURPOSE

The section describes how to work with DC Water's in-house CAD and Survey groups, when collaborating on CIP design projects. In this section collaboration on CIP design projects mean, that a consulting group has been asked to perform supplemental activities that contribute site data or CAD drawings that contribute to the CIP project or one of the project areas.

18.2 BIM 360 MANAGEMENT

DC Water will host all sites associated with collaborative CIP design projects.

18.3 BIM 360 ACCESS

DC Water will manage all access to the sites. To gain access to project cloud sites, you must provide the following information to the DC Water Supervisor, CAD:

- Name
- Email Address
- Company Name
- Project Role – CAD Production, Project Manager, etc...
- Project Name –

18.4 BIM 360 COLLABORATION

18.4.1 Uploads/Submittals

BIM 360 sites have identical folder structures as shown in [Article 3.1 File Structure](#). In addition to the project folders. There will be specific submittal folders to upload pdfs for each consultant. Every upload must be accompanied by a BIM 360 Transmittal.

When a consultant is prepared to make a submittal, DC Water CAD Staff will assist in preparing the first submittal and transmittal.

Figure 29: Example of a BIM 360 Project and a Submittal folder are shown below. Shown is the general structure and a deliverables folder. The CAD group staff will review and distribute the .dwg's and pdf to the correct folder locations.

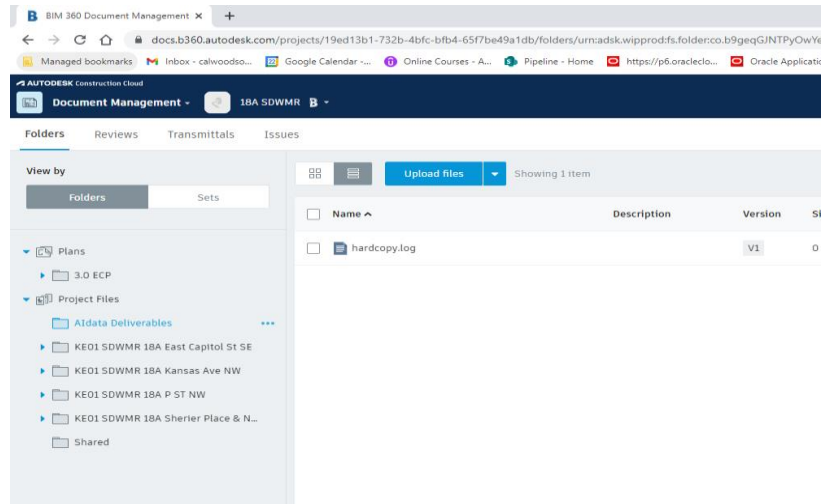


Figure 29: Example BIM 360 Deliverables Folder

18.4.2 BIM 360 Transmittals

All submittals/uploads must be accompanied by a BIM 360 Transmittal. When a consultant is prepared to make a submittal, DC Water CAD Staff will assist in preparing the first submittal and transmittal.

Figure 29: Example Documents Management Dashboard, displaying (4) four tabs shows available, one of which is Transmittals.

Figure 30: Example of the Transmittal Tab and transmissions, shown below.

Figure 31: Example Transmittal Dialog Box

The screenshot shows the Autodesk Construction Cloud Document Management interface with the 'Transmittals' tab active. The interface includes a search bar, a filter dropdown, and a table of transmittals with columns for Status, ID, Title, Sent by, Recipients, Created on, and Documents.

Status	ID	Title	Sent by	Recipients	Created on	Documents
TRANSMITTAL SENT	7	21039-01-18A - KANSAS AVENUE NW	ken shiple	Calwood Somers, Aidan Burfield, Mark Reid	Apr 28, 2022 1:59 PM	3
TRANSMITTAL SENT	6	18A - P STREET NW-Submittal	ken shiple	Calwood Somers, Aidan Burfield, Mark Reid	Mar 10, 2022 1:56 PM	3
TRANSMITTAL SENT	5	18A - KANSAS AVENUE NW	ken shiple	Calwood Somers, Aidan Burfield, Mark Reid	Feb 23, 2022 12:19 PM	3
TRANSMITTAL SENT	4	Submittal-CV-AIDATA	ken shiple	Calwood Somers, Aidan Burfield, Mark Reid	Jan 31, 2022 1:56 PM	1
TRANSMITTAL SENT	3	18A - EAST CAPITOL STREET-Submittal	ken shiple	Calwood Somers, Aidan Burfield, ken shiple, Mark Reid	Jan 6, 2022 1:53 PM	3
TRANSMITTAL SENT	2	East capitol_PRELIM	Calwood Somers	Olivia Jamison, ken shiple, Gretel Zwick	Aug 12, 2021 7:33 AM	1
TRANSMITTAL SENT	1	SUE CAD Examples	Calwood Somers	ken shiple, Gretel Zwick	Jun 22, 2021 7:49 AM	2

Figure 30: Example BIM 360 Transmittal Tab

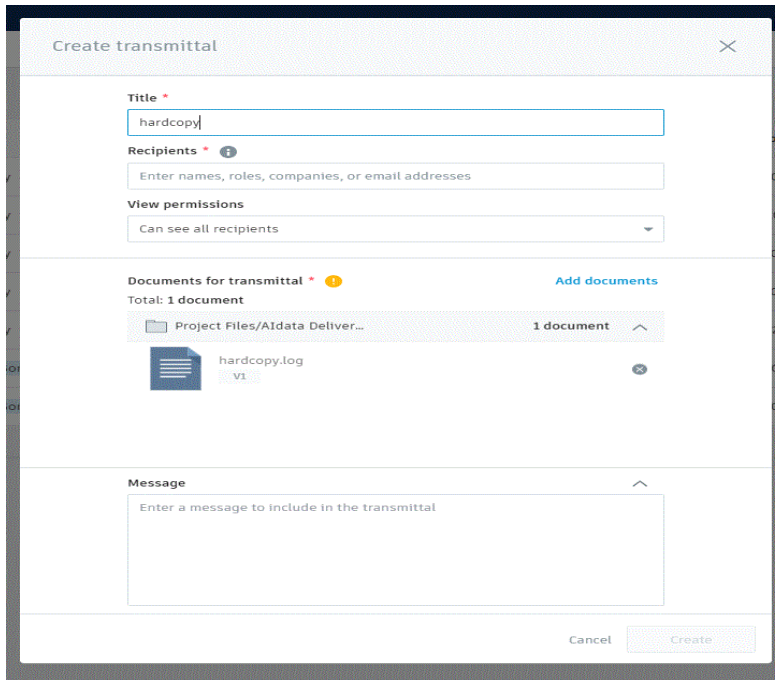


Figure 31: Example BIM 360 Transmittal Dialog Box

18.5 BIM 360 CAD STANDARDS SITE

Consultants may be invited to a BIM 360 CAD Standards site. This site contains folders that will allow the consultant to download templates, support files, examples and more.