City of Grand Rapids

CAD Standards Guide

2019

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City of Grand Rapids
Engineering Department
300 Monroe Ave NW
Grand Rapids, MI 49503

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City of Grand Rapids **CAD Standards**

Introduction

The *City of Grand Rapids CAD Standards* has been maintained in order to provide consistency in record drawings for City of Grand Rapids projects. The drawing consistency allows internal, as well as external CAD users to be more productive in working with the drawings required for City projects, as well as private development projects. Standardization ensures that produced drawings provide engineers, contractors and City staff with a consistent product that is more easily understood. Consultants' efforts to follow these standards will result in a more efficient project design and approval process with projects within the City limits or that involve City utilities within outlying service areas (projects funded by the City of Grand Rapids, private developers or other municipalities).

CAD Software

The City of Grand Rapids Engineering Department is currently using ***Autodesk's Civil 3D*** software. Any project files that are required to be submitted electronically (source files) to the City Engineer's Office for City staff use, must be created using Autodesk Civil 3D and submitted in the AutoCAD drawing format (dwg). In addition, any field software used in data collection with the submittals must be fully compatible with AutoCAD.

Consultants under contract with the City for the design of City-funded projects, as well as consultants hired by independent developers for private development projects, are not required to submit electronic drawing files to the City. Only hard-copy drawing sets are submitted for review and approval concerning City utilities and activity within the City right-of-way (ROW). In this case, applicable standards, including title block and border, symbols, line types and notes are reviewed for compliance. However, use of Autodesk software and adherence to City CAD Standards is highly recommended. Previous experience has shown that the use of alternate CAD software (e.g. MicroStation) has made the approval of drawings difficult and time-consuming. In the case of using alternate software, it is the responsibility of the submitting consultant to adhere to the applicable standards, as visually presented in drawings. See the sections "Design Projects (by Consultants)" and "Private Development Projects" for more information.

Drawing Submittal

When electronic drawing files are required for submittal (e.g. survey base drawings), they must be in AutoCAD file format (dwg). *Drawings (electronic or hard-copy) submitted which do not meet the current City Of Grand Rapids Engineering Department CAD Standards will be returned to the consultant for correction and re-submittal.* All necessary templates and other support files are available at the City of Grand Rapids web site (*grandrapidsmi.gov*). Using the search feature, enter "CAD Standards" to access a link to the correct page. Details concerning drawing submittals are included under each drawing category identified in the following paragraph.

Drawing Categories

This guide has been divided into five sections: *Survey Projects*, *Design Projects (by Consultants)*, *Design Projects (by City Staff)*, *Private Development Projects*, and *Other Projects*. The Survey section is for consultants, contracted by the City to provide a survey only, including support data, for projects within the Grand Rapids city limits. The consultant design section is for consultants contracted by the City to provide design only, or survey *and* design, for projects within the Grand Rapids city limits. The City design section is for projects designed by City staff (survey provided by City or consultant). The Private Development section is for consultants, contracted by developers. Finally, the Other Projects section is to allow for various City projects other than road reconstruction, utility construction, etc., which are submitted to the City Engineer's Office. This section includes City facility projects.

SURVEY PROJECTS

This section is intended for consultants contracted by the City of Grand Rapids to provide a base survey in accordance with the RFP for Survey and Drafting Services and the project special specifications, outlined in the *Survey, Drafting, and Construction Staking Services for Various Projects* (Request for Base Survey) document. The provided base survey must also meet the applicable CAD Standards described herein.

A single electronic drawing file (dwg) shall be included with the survey project submittal. The file should be named as follows:

<*City five-digit project file number*> Base.dwg

If necessary, contact Jack Stegehuis (jstegehuis@grcity.us or (616) 456-3715) for the project file number.

The base survey drawing is to be created in Model Space at 1:1 scale and shall include the survey plan view, with associated existing dimensions and labels. The plan view should be in the correct state plane coordinate orientation. All section lines and section corners should be shown that totally surround the entire area of the project. Section corners and all section line bearings and distances shall be labeled in model space. Street names and a north arrow should be included in the base drawing for reference. Also, benchmark, witness and control point note text should be included in model space at the S08 text size (1.6' height). The consultant's company logo, including company name, address and phone numbers, etc. should be provided as part of this file also and designed to fit in a 1" x 4" rectangular area in paper space, when scaled at the planned drawing scale.

Dimensions should include ROW and roadway widths/splits, centerline, survey line and section line locations (as applicable), and all City utility locations, referenced to ROW centerline (preferred) or section line, for each street shown, including cross-streets (those parallel to centerline). Similarly, "private" utilities (e.g. DTE, Consumers Energy, etc.) must be located in the base drawing. Every section of existing utilities in the plan view shall be labeled as to the size and type (see Table F). Labels should be placed above the utility line, near the center of each section (if possible without conflict with other text or line work). Leaders should be used only when deviating from this convention. Sanitary and storm sewer manhole reference numbers should be labeled in the plan view (e.g. "SAN MH #100") to establish a correlation between the drawing and field data notes for quick reference.

A single continuous base drawing must be submitted which includes all survey points (COGO), with two-decimal precision for all data. In addition, an electronic version of the point list should be submitted, separate from the drawing file (txt or csv file extensions). Easily understood, raw description labels must be included with all points. Full descriptions should be included with the field data notes. Survey points for the complete topographical portion of the survey and appropriate cross-section shots are to be included. Inverts at all sewer manholes and catch basins, as well as pipe elevations in water chambers, should be included in the field data notes. Sewer manholes and all chambers and vaults should be described as to construction materials and size in the field data notes also.

The following elevations should be included in survey cross-sections.

- Crown of road (typically same as road centerline)
- Edge of metal (if accessible)
- Gutter (low point)
- Top of curb
- Front of sidewalk
- Back of sidewalk
- Retaining walls (top of wall and bottom of front and back at 25' intervals)*
- Steps (top and bottom at each end of each flight – not every step)* (ground elevation at both sides of top step should be included when ground not at top step level)
- Ground-level doors (ground level and first floor level at each end)*

* These topo items are to be included as applicable and should be represented pictorially in the plan view.

Cross-section measurements should be taken at intervals appropriate to intersections, grades or other special conditions. In addition, elevations related to items of special interest such as catch basins, drive approaches or other curb dub-downs should be included to reflect true topographical conditions.

City staff should be able to set contour intervals such that an appropriate set of contours would result which are not so dense or spread out so as to prevent an effective analysis of the topography of the project area. Requirements for cross-section intervals for survey projects are provided as part of the Request for Survey Quote (RFQ) issued by the Engineer's Office for each individual project.

Oversized Manholes

Any existing sanitary, storm or combined manholes, that are field-verified to be larger than four feet in (inside) diameter during survey data gathering, shall be identified in the plan view. The diameter must be noted in the survey field notes and pictorially in the plan view drawing. In the drawing, a circle should be added at the appropriate diameter and correctly located in relation to the manhole casting. The HIDDEN4 line type should be shown at the manhole diameter and the object placed on the same layer as the existing manhole.

Label and Dimension Text

There are situations where label or dimension text shows up on a sheet drawing upside-down or at an angle that is difficult to read. This typically occurs when a common intersection is shown on two or more separate sheet drawings representing each of the cross-streets. Because the drawings are presented at an orientation that is up to 90° different in relationship to each other, some base text may be seen as improperly oriented on one or more of the sheets. Label and dimension text should read from the bottom or right of drawing sheets, whenever possible. To accomplish this, the text and dimensions in the base drawing should face south (or southerly) or east (or easterly). This practice will help produce the desired result in most cases.

Street Naming and Abbreviation Conventions

Street names show up in many places on drawings including labels in the plan view, notes and various other locations. The way that the street names are represented, including whether the suffixes are abbreviated, depends on their location on the drawings. Listed below are summaries of the conventions to be used for numbered street names, plan view labeling and miscellaneous note applications.

Numbered Street Name Conventions

- For First Street through Twelfth Street, spell-out the number.
- For 28th Street and above (e.g. 44th Street), use numbers.
- For Three Mile Road, Four Mile Road, etc., spell-out the number.

Street Names in Notes and Other Miscellaneous Locations

- Address labels in plan view should include the number and name with no suffix, when needed for clarification with corner properties at intersections (e.g. #1200 MAIN).
- Street names in plan views, pick-up notes, bench marks, witnesses and various other locations are shown with name and abbreviated suffix (e.g. MAIN ST.).

Drawing Submittal and Approval

Survey drawings are submitted along with various support data. The requirements for the submittal of this "survey package" are covered in the *Survey Package Submittal Checklist* (see Checklist section), available on the City web site. One (1) copy of the *preliminary* survey drawing shall be submitted on bond sheets for review, as well as the source survey base file (dwg), scanned company logo image and point file electronically on CD, DVD or by email. The base drawing should be configured for 20 scale sheet drawings. The overall base hard-copy drawing should be broken down into 22"x34" layouts to provide a format that is convenient for review. Include street names and a north arrow in the base drawing for reference. Bench marks, control points and witness information should also be included within the base drawing.

The following reviews will be performed by various City staff members:

- Drawing standards review (based on current City CAD Standards) which covers criteria involving layering, line types, symbols (blocks), text standards, good drafting practices and other standards-related issues.
- A cursory review of survey-related items including ROW's, plats, easements, benchmarks, witnesses, control points, etc., in regard to their inclusion and correct labeling/notation*.
- A cursory review of City utilities, in regard to their inclusion and correct labeling*.

- Electronic review of survey points and project data as to their general validity and completeness*.
- Street Lighting review to verify locations of existing street lighting and traffic signal manholes, hand-holes, poles and other related topographical items. The underground street lighting infrastructure (direct buried and encased conduit) is added by City Street Lighting staff.

  * The accuracy and completeness of the representation of these items in the base drawing is the responsibility of the consultant's licensed surveyor.

Following the City's review, red-lined copies (scanned images) of the drawings are returned to the consultant (via email) with required changes noted. Any corrections noted by City staff must be made or an explanation for why the change was not made should be noted on the red-lined drawing or summarized within an email. When all comments have been addressed, a corrected set of drawings shall be re-submitted on bond sheets for follow-up review. Only one (1) bond drawing set and an electronic copy (PDF) are necessary for all subsequent submittals. Hard-copy is not required for final submittal. Please note that for all subsequent submittals, any support data (e.g. field data notes, point file) affected by the requested changes, must be re-submitted with the revised base drawing (dwg base file and sheet layout images).

The review process will typically be performed only twice prior to approval. The City expects that the consultant will be diligent in addressing all review comments and performing quality checks to assure the accuracy of the drawing and data prior to the second submittal. However, the City Engineer's Office reserves the right to require corrections to survey drawings or related data (by the consultant) for up to one (1) year following the submittal of final (approved) survey packages.

Grand Rapids CAD Standards Files

Templates for standard model space drawings, including all required layers, line types, text styles and dimension styles for existing and proposed items are available on the City web site. Separate files containing standard line types, blocks, and other related files are also available. These items can be downloaded from the City of Grand Rapids web site. Go to *grandrapidsmi.gov* and use the search feature by entering "CAD Standards" and selecting the appropriate link from the search results. Below is a list of CAD Standards-related files available for download (or as an integral part of another file). Prior to beginning a new project, check this on-line location for current template files as they are revised occasionally.

GR Base 20 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 20 scale in paper space.

GR Base 40 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 40 scale in paper space. Note that 40 scale drawings are typically only allowed in private development projects, or with permission from the Engineer's Office.

GR.lin
This is an AutoCAD line type file including custom line types (also included in GR Base 20 and GR Base 40 templates).

GR Blocks.zip
This file is a compressed file (Zip) containing all standard blocks.

EXIST DIM 20-1 EXT, -2 EXT, -NO EXT
Dimstyles for use with existing dimensions in model space and intended for a 20 scale drawing in paper space (included in GR Base 20.dwt file). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

EXIST DIM 40-1 EXT, -2 EXT, -NO EXT
Dimstyles for use with existing dimensions in model space and intended for a 40 scale drawing in paper space (included in GR Base 40.dwt file). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

-FLIPPED
An additional version of each of the above dimstyles is included that is configured with the dimension text flipped 180 degrees. This offers an alternate way to display the text, based on the orientation needed.

NOTE:

A Civil 3D template file which includes City standard styles, settings, layers, etc. for City projects is in continual development. Contact the Engineer's Office to check the current availability of this file.

Checklist

The Survey Package Submittal Checklist shall be completed and included with the survey consultant's submittal package. This checklist serves a dual purpose. First, it provides a guide for the consultant to make sure drawings are complete and that required standards are followed when submitting drawing sets. Secondly, City staff may refer to the checklists during review of drawing sets and to assure that drawings from various consultants are consistent. The checklist is available on-line at the City web site. Go to *grandrapidsmi.gov* and use the search feature by entering "CAD Standards" and selecting the appropriate link from the search results.

For any questions concerning SURVEY PROJECTS for consultants, contact Jack Stegehuis of the City Engineer's Office at *jstegehuis@grcity.us*, or at (616) 456-3715.

DESIGN PROJECTS (by Consultants)

This section is intended for consultants contracted by the City of Grand Rapids to provide the design for a project within the City of Grand Rapids. The design drawings provided must be in accordance with the RFP for Professional/Technical Engineering Services (or other service under Engineering Department term contract) and the related project special specifications, as well as the current City CAD Standards and requirements described herein.

An electronic version of the project drawings (dwg) is not currently required as a submittal. However, upon determination by the Engineering Office that an electronic version is required as part of any or all submittals (including final), the following requirements will apply.

The electronic version of the drawings submitted shall include the project "base" drawing in *Model Space* (provided by separate survey consultant) and individual "sheet" drawings, each with layout tabs for the related sheets of the drawing set (e.g. Removal, Reconstruction, Water Main). The base drawing typically includes only existing condition line work and related labels and dimensions. However, sanitary sewer and storm sewer proposed line work may be included in the base drawing for convenience when using Civil 3D pipes functionality. Design drawing (proposed) line work files shall be set up with common utility content in single drawing files. Miscellaneous sheets such as the title sheet, cross-section sheets and detail sheets shall be submitted as separate files as indicated in Attachment 1.

In the event that the consultant is to provide the base survey as part of the contract, requirements for the base survey must be met as described in the *Survey Projects* section of this guide. In addition, the base drawing shall contain existing profiles and applicable Autodesk Civil 3D-produced, proposed items such as proposed surface, grade lines, elevations and Pipes feature objects. Proposed contours shall be included when specifically requested.

Proposed utility line work, structures, topographical items and associated labeling should be created in separate Model Space drawings, by category, and externally referenced into the individual associated sheet drawings (in Model Space) on the appropriate layer (X MISC X-REFS). All proposed notes are to be in Paper Space in the individual sheet drawings on the appropriate layers. Note that base drawing pick-up notes are not required, but if added, need only be included with Removal sheets and not on Reconstruction or proposed utility sheets.

Existing centerline (or survey line) horizontal alignments and resulting profiles should be included with the survey base plan. Existing profiles <u>are not required</u> on Removal sheets in the project drawing set. Any proposed horizontal alignments created that involve a re-alignment of a road centerline should be used to generate revised <u>existing</u> centerline profiles which are to be shown in the profile view of all proposed sheets (e.g. Reconstruction, Sanitary Sewer, Water Main) of the drawing set. This methodology clarifies the relationship between the existing profile and the proposed vertical alignment.

Oversized Manholes

Any proposed oversized (greater than 4' diameter) sanitary or storm manholes shall be identified in the plan and profile views. The diameter must be noted in the plan view drawing. A circle should be added to the plan view and on the appropriate proposed layer (CONTINUOUS line type) and correctly located in relation to the manhole casting. In addition, oversized proposed manholes must be noted and represented pictorially in the profile according to the inside diameter.

Label and Dimension Text

There are situations where labels or dimension text show up on a sheet drawing upside-down or at an angle that is difficult to read. This typically occurs when a common intersection is shown on two or more separate sheet drawings representing each of the cross-streets. Because the drawings are presented at an orientation that is up to 90° different in relationship to each other, some base text may be seen as improperly oriented on one or more of the sheets. Text and dimensions should read from the bottom or right of drawing sheets, whenever possible. To accomplish this, the text and dimensions in a drawing should face south (southerly) or east (easterly). This practice will help avoid the situation in most cases.

Street Naming and Abbreviation Conventions

Street names show up in many places on drawings including labels in the plan view, notes and various other locations. The way that the street names are represented, including whether the suffixes are abbreviated, depends on their location on the drawings. Listed below are summaries of the conventions to be used for numbered street names, plan view labeling and miscellaneous note applications.

Numbered Street Name Conventions

- For First Street through Twelfth Street, spell-out the number.
- For 28th Street and above (e.g. 44th Street), use numbers.
- For Three Mile Road, Four Mile Road, etc., spell-out the number.

Street Names in Notes and Other Miscellaneous Locations

- Address labels in plan view should include the name with no suffix, when needed for clarification with corner properties at intersections (e.g. #1200 MAIN).
- Street names in plan views, pick-up notes, bench marks, witnesses and various other locations are shown with name and abbreviated suffix (e.g. MAIN ST.).
- Primary street name in main title on title sheet and in title blocks are shown with suffix spelled out (e.g. MONROE AVENUE).
- Limit street names in main title on title sheet and in title blocks are shown with suffix abbreviated (e.g. FROM FIRST ST. TO SECOND ST.)

Multiple Proposed Public Utilities

When more than one proposed public utility (e.g. sanitary sewer and water main) is included in a project, a few items should be noted concerning the way they are presented on drawings. In a given proposed utility drawing (e.g. sanitary sewer), each of the other proposed utilities or items included in the project (e.g. water main, storm sewer, curb lines, sidewalks) should appear also. These other items should show up with lighter line work (.014” line width), with block fill/hatching frozen and labeled as proposed in both the plan and profile views (only sanitary sewer, storm sewer, and in some cases, water main are shown in profile). The line width change can be made to the appropriate attached proposed utility layer setting in the Layers Properties Manager. The additional labels can be added in Paper Space on applicable sheets, on the appropriate layer (e.g. P UTIL SANITARY NOTE 2). This practice aids in the design and construction processes by illustrating the relative locations of the various proposed items.

Multiple Occurrences of a Portion of a Proposed Public Utility

There are situations when a portion of a proposed utility shows up on more than one sheet of a drawing set. Typically, this occurs when an intersection appears on both plan views of each of two cross-streets involved. For example, a section of a proposed water main is within the viewports for two different sheets. When this happens, the line work may be left alone (i.e. line widths remain heavy and block hatching remains on). However, proposed boxed notes directed at the common areas of the water main must only appear in one of the two sheets (e.g. PLACE 8" WATER MAIN, or PLACE 8" 45º BEND). The opposite sheet shall include alternate unboxed notes that identify only the proposed utility pipe (e.g. PROP. 8" WATER MAIN). These alternate notes should be lighter (.014") and in smaller text (S08).

Drawing Submittal and Approval

The first official review of the design drawing set is termed the "check-print" and should represent a 90-100% complete set. A hard-copy version of the design drawing set shall be submitted on bond sheets for review. Contact the Engineer's Office for the appropriate number of drawing sets (hard-copy) along with a PDF version. Involved City departments will review the drawing(s) and a package of all returned red-lined comments will be emailed to the consultant. Corrections and additions noted in these red-lines must be made or an explanation for why specific changes were not made should be summarized in an email. When all comments have been addressed, a corrected set of drawings should be re-submitted on bond sheets for final review and approval. Again, the involved City departments will perform a final review of the drawing(s) to verify all requested changes have been made. If any issues remain, a summary of comments will be returned to the consultant. Please note that preliminary drawings during any point of production can be sent informally for a cursory review and feedback, to assure that drawings are being presented as expected.

Once the drawing set is approved by the involved City departments and the City Engineer's Office, the final title sheet shall be submitted on Mylar, (22" x 34"). Mylar title sheets submitted must be produced using an ink-jet plotter – no toner-based plots will be accepted. Remaining sheets may be submitted on bond (22" x 34"). The City Engineer will sign the title sheet upon drawing set approval, which will become the original copy of record and is never replaced. Revision data, as-built information and other reference data will be hand-written on this original, when necessary. All remaining bond sheets of the final approved drawing set will be replaced (with Mylar copies) following the addition and approval of as-built information. In addition, an electronic version of all related drawings shall be submitted (PDF format) on electronic media or via email.

Sheet Order in Drawing Sets

When project drawing sets are published and submitted, sheets should be presented within the drawing set in the following order, as applicable:

1. Title Sheet
2. Cross-sections (existing and proposed)
3. Removal (no profile required)
4. Sanitary Sewer (including force mains and lift stations)
5. Sanitary Sewer Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
6. Water Main
7. Water Main Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
8. Storm Sewer (separated from Reconstruction sheets only if major work involved or if drawing congestion is an issue)
9. Storm Sewer Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
10. Reconstruction/Improvements/Resurfacing (typically including Storm Sewer)
11. Reconstruction Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
12. Road Geometry and Grading Plan (can be integrated with Reconstruction drawings if space allows)
13. Landscaping/Streetscaping (can be integrated with Reconstruction drawings if space allows)
14. Landscaping/Streetscaping Details
15. Street Lighting
16. Street Lighting/Electrical Details
17. Traffic Signals
18. Traffic Signal Details
19. Pavement Marking & Signage
20. Miscellaneous Details
21. ROW/Easement/Vacation Descriptions (includes plan view)

Record Drawing As-Built Process

When final measurements and data are available for a completed project, the associated drawings may be “As-built” to achieve the final record drawing. The as-built procedure for projects involving City sanitary sewer, water main or improvements (within City ROW) is outlined in Attachment 3. These as-built modifications are to be made using CAD and a Mylar original(s) shall be produced and replace the previously submitted bond for the associated sheet(s). The Mylar submitted must be produced using an ink-jet plotter (no toner-based plots will be accepted). All as-built line work, notation and other required steps involved in submitting as-built drawings to the Engineer’s Office is to be in accordance with Attachment 3 of this guide.

Grand Rapids CAD Standards Files

Templates for standard model space drawings, including all required layers, line types, text styles and dimension styles for existing and proposed items are available on-line. Separate files containing standard line types, blocks, and other related files are also available. These items can be downloaded from the City of Grand Rapids web site. Go to *grandrapidsmi.gov* and use the search feature by entering “CAD Standards” and selecting the appropriate link from the search results. Below is a list of CAD Standards-related files available for download (or as an integral part of another file). Prior to beginning a new project, check this on-line location for current template files as they are revised occasionally.

GR Base 20 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 20 scale in paper space.

GR Base 40 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 40 scale in paper space. Note that 40 scale drawings are typically only allowed in private development projects, or with permission from the Engineer’s Office.

GR.lin
This is an AutoCAD line type file including custom line types (also included in GR Base 20 and GR Base 40 templates).

GR Blocks.zip
This file is a compressed file (Zip) containing all standard blocks.

GR Plot Style.ctb
Plot Style Table settings for all projects.

GR Title 2013.dwg
Standard City project title sheet template (includes base location map in Model Space).

MDOT Title 24x36 2013.dwg
Standard MDOT project title sheet template with 24” x 36” layout (includes base location map in Model Space). A 22”x34” version is available for convenient half-size reduction if 11”x17” format drawing sets are to be submitted to the MDOT.

GR Sheets 2013.dwg
Standard paper space template, including border, title block, standard layers, etc., for sheets other than the title sheet.

MDOT Sheets 24x36 2013.dwg
Standard MDOT project paper space template, including border, title block, standard layers, etc., for sheets other than the title sheet, with 24” x 36” layout. For 22” x 34” layout, use the GR Sheets template.

PROPOSED-1 EXT, -2 EXT, -NO EXT
Dimstyles for use with proposed dimensions in paper space (included in GR Sheets.dwt file). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

DETAILS-1 EXT, -2 EXT, -NO EXT
Dimstyles for dimensions used with details in paper space drawings (included in GR Sheets.dwt and MDOT Sheets 24x36.dwt files). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

-FLIPPED
An additional version of each of the above dimstyles is included that is configured with the dimension text flipped 180 degrees. This offers an alternate way to display the text, based on the orientation needed.

NOTE:

A Civil 3D template file which includes City standard styles, settings, layers, etc. for City projects is in on-going development. Contact the Engineer's Office to check the current availability of this file.

Checklist

The Design Package Submittal Checklist provides a guide for the consultant to make sure drawings are complete and that required standards are followed when submitting drawing sets. The checklist is available on-line at the City web site. Go to *grandrapidsmi.gov* and use the search feature by entering "CAD Standards" and selecting the appropriate link from the search results.

For any questions concerning DESIGN PROJECTS for consultants, contact Jack Stegehuis of the City Engineer's Office at *jstegehuis@grcity.us*, or at (616) 456-3715.

DESIGN PROJECTS (by City Staff)

This section is intended for City staff to provide the design for a project within the City of Grand Rapids. The design drawings must be in accordance with the current CAD Standards.

The project survey base drawing is typically produced by a contracted consultant, but in some cases the survey is completed by City staff. The drawing is completed as described in the earlier section titled *SURVEY PROJECTS* and approved by the City Engineer's Office. Prior to design work, City staff is required to process the submitted survey base drawing in the following way:

- Create sheet layouts covering the extents of the project
- Add base profiles to the project and in sheet layouts
- Add City public utility services to the base drawing

Based on the created sheet layouts, individual "type" drawings are to be added to the project drawing set (e.g. Removal, Reconstruction, Water Main), with associated layout tabs for each related sheet of the drawing type. Design drawing "type" files shall be set up with common plan sheets in single drawing files. For example, all the Removal sheets will be included in one file, with a separate layout (named by the related sheet number) for each sheet of the Removal hard-copy plan sub-set. Miscellaneous sheets such as the title sheet, cross-section sheets and detail sheets shall be created as separate files as indicated in Attachment 1.

Existing profiles and applicable Civil 3D-produced proposed items such as proposed surface, grade lines, elevations and Pipes feature objects shall be placed in the base drawing. Note that profiles are not required on Removal sheets.

All other miscellaneous proposed utility line work, structures, topographical items and associated labeling should be created in separate Model Space drawings, by category, and externally referenced into the individual sheet drawings (in Model Space) on the appropriate layer (X MISC X-REFS). All proposed notes are to be in Paper Space in the individual sheet drawings on the appropriate layers. Note that base drawing pick-up notes (typically not required) should be placed in model space and need only be included with Removal sheets and not on Reconstruction or proposed utility sheets.

Existing centerline (or survey line) horizontal alignments and resulting profiles should be placed in the survey base drawing. Any proposed horizontal alignments created that involve a re-alignment of a road centerline should be used to generate revised existing centerline profiles which are to be shown in the profile view of all applicable sheets (e.g. Reconstruction, Sanitary Sewer, Water Main) of the drawing set. This methodology clarifies the relationship between the existing profile and the proposed vertical alignment.

Oversized Manholes

Any proposed oversized (greater than 4' diameter) sanitary or storm manholes shall be identified in the plan and profile views. The diameter must be noted in the plan view drawing. A circle should be added to the plan view and on the appropriate proposed layer (CONTINUOUS line type) and correctly located in relation to the manhole casting. In addition, oversized proposed manholes must be noted and represented pictorially in the profile according to the inside diameter.

Street Naming and Abbreviation Conventions

Street names show up in many places on drawings including the title sheet, title blocks, proposed notes and various other locations. The way that the street names are represented, including whether the suffixes are abbreviated, depends on their location on the drawings. Listed below are summaries of the conventions to be used for numbered street names, main title and title block street name suffix abbreviations, plan view labeling and miscellaneous note applications.

Numbered Street Name Conventions

- For First Street through Twelfth Street, spell-out the number.
- For 28th Street and above (e.g. 44th Street), use numbers.
- For Three Mile Road, Four Mile Road, etc., spell-out the number.

Street Names in Notes and Other Miscellaneous Locations

- Primary street name in main title on title sheet and in title blocks are shown with suffix spelled out (e.g. MONROE AVENUE).
- Limit street names in main title on title sheet, in title blocks and street labels in plan view are shown with suffix abbreviated (e.g. FROM FIRST ST. TO SECOND ST.)

Multiple Proposed Public Utilities

When more than one proposed public utility (e.g. sanitary sewer and water main) is included in a project, a few items should be noted concerning the way they are presented on drawings. In a given proposed utility drawing (e.g. sanitary sewer), each of the other proposed utilities or items included in the project (e.g. water main, storm sewer, curb lines, sidewalks) should appear also. These other items should show up with lighter line work (.014" line width), with block fill/hatching frozen and labeled as proposed in both the plan and profile views (only sanitary sewer, storm sewer, and in some cases, water main are shown in profile). The line width change can be made to the appropriate attached proposed utility layer setting in the Layer Properties Manager. The additional labels can be added in Model Space of the proposed utility base drawing on the appropriate layer (e.g. P UTIL SANITARY NOTE 2). This practice aids in the design and construction processes by illustrating the relative locations of the various proposed items.

Multiple Occurrences of a Portion of a Proposed Public Utility

There are situations when a portion of a proposed utility shows up on more than one sheet of a drawing set. Typically, this occurs when an intersection appears on both plan views of each of two cross-streets involved. For example, a section of a proposed water main is within the viewports for two different sheets. When this happens, the proposed line work may be left alone (i.e. line widths remain heavy and block hatching remains on). However, proposed boxed notes directed at the common areas of the water main must only appear in one of the two sheets (e.g. PLACE 8" WATER MAIN, or PLACE 8" 45º BEND). The other related sheet shall include alternate unboxed notes that identify only the proposed utility pipe (e.g. PROP. 8" WATER MAIN). These alternate notes should be lighter (.014") and in smaller text (S08).

Drawing Submittal and Approval

The first official review of the design drawing set is termed the “check-print” and should represent a 90-100% complete set. A hard-copy version of the design drawing set shall be submitted on bond sheets for review. Involved City departments will review the drawing(s) and a summary of red-lined comments will be returned to the project engineer. The project engineer will review the comments returned and pass approved changes on to the project CE-I. When all comments have been addressed, a corrected set of drawings will be redistributed on bond sheets for final review. Again, the involved City departments will perform a final review the drawing(s) and a summary of any remaining comments will be returned to the project engineer.

Once the drawing set is approved by involved City staff, the final project title sheet can be plotted on Mylar using an ink-jet plotter. Remaining sheets may be produced on bond (22” x 34”). The City Engineer will sign the approved title sheet, which will become the original copy of record and is never replaced. Revision data, as-built information and other reference data will be hand-written on this original, when necessary. All remaining bond sheets of the final approved drawing set will be replaced (with Mylar copies) following the addition and approval of as-built information. In addition, an electronic version of all related drawings shall be submitted (PDF format) on electronic media or via email.

For state-funded projects, follow the sequence of project submittals and approvals as required by the MDOT. All sheets are typically plotted on bond for the initial submittal to the state. Subsequent submittals to the state are typically uploaded to the state FTP site in 11” x 17” PDF format. All sheets, other than the title sheet of the drawing set, will be replaced with Mylar copies following the addition and approval of as-built information.

Sheet Order in Drawing Sets

When project drawing sets are assembled, sheets should be presented within the drawing set in the following order, as applicable:

1. Title sheet
2. Cross-sections (existing and proposed)
3. Removal
4. Sanitary Sewer (including force mains and lift stations)
5. Sanitary Sewer Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
6. Water Main
7. Water Main Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
8. Storm Sewer (separated from Reconstruction sheets only if major work involved; including force mains and lift stations)
9. Storm Sewer Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
10. Reconstruction/Improvements/Resurfacing (typically including Storm Sewer)
11. Reconstruction Details (other than Standard Details)
12. Road Geometry and Grading Plan (can be integrated with Reconstruction drawings if space allows)
13. Landscaping/Streetscaping (can be integrated with Reconstruction drawings if space allows)
14. Landscaping/Streetscaping Details
15. Street Lighting
16. Street Lighting/Electrical Details
17. Traffic Signals
18. Traffic Signal Details
19. Pavement Marking & Signage
20. Miscellaneous Details
21. ROW/Easement Descriptions

Profile Format

Project existing and finished ground, and utility profiles may be presented as formatted by Civil 3D Pipes commands, using the applicable City standard drawing styles template. The rules below should be followed for special situations involving profiles.

- When the crown of an existing road does not coincide with the surveyed centerline (or survey line), the crown line should also be shown and labeled in the profile.
- When public utility work is to be done outside the roadway, an additional profile of the existing and proposed ground over the associated proposed utility should be represented in the profile and labeled accordingly.

CAD File Naming Guidelines

See *Drawing File Naming* on page 27 for guidelines concerning file naming.

Record Drawing As-Built Process

When final measurements and data are available for a completed project, the associated drawings may be “As-built” to achieve the final record drawing. The as-built procedure for projects involving City sanitary sewer, water main or improvements (within City ROW) is outlined under *As-Built Procedure* on page 30. These as-built modifications are to be made using CAD and a Mylar original(s) shall be produced and replace the previously submitted bond copy for the associated sheet(s). The Mylar record copy must be produced using an ink-jet plotter (no toner-based plots will be accepted). All as-built line work, notation and other required steps involved in submitting as-built drawings to the Engineer’s Office is to be in accordance with the *As-Built Procedure*, as referenced above.

Grand Rapids CAD Standards Files

Templates for standard sheet drawings and model space drawings including all required layers, line types, text styles and dimension styles for existing and proposed items are available on the City server. Separate files containing standard line types, blocks, drawing plot files and other related files are also available.

Below is a list of CAD Standards-related files available for use. They may be found on the City server in the *CAD Standards 2019* folder (or as an integral part of another file). Prior to beginning a new project, check this location for current template files as they are revised occasionally.

GR Base 20 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 20 scale in paper space.

GR Base 40 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 40 scale in paper space. Note that 40 scale drawings are not typically used for City projects, except in specifically approved situations.

GR.lin
This is an AutoCAD line type file including custom line types (also included in GR Base 20 and GR Base 40 templates).

GR Blocks.zip
This file is a compressed file (Zip) containing all standard blocks.

GR Plot Style.ctb
Plot Style Table settings for all projects.

GR Title 2013.dwg
Standard City project title sheet template (includes base location map in Model Space).

MDOT Title 24x36 2013.dwg
Standard MDOT project title sheet template with 24” x 36” layout (includes base location map in Model Space). A 22”x34” version is available also in the event that reduced 11”x17” format drawing sets are to be submitted to the MDOT.

GR Sheets 2013.dwg
Standard paper space template, including border, title block, standard layers, etc., for sheets other than the title sheet.

MDOT Sheets 24x36 2013.dwg
Standard MDOT project paper space template, including border, title block, standard layers, etc., for sheets other than the title sheet, with 24” x 36” layout. For 22” x 34” layout, use the GR Sheets template.

PROPOSED-1 EXT, -2 EXT, -NO EXT
Dimstyles for use with proposed dimensions in paper space (included in GR Sheets.dwt file). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

DETAILS-1 EXT, -2 EXT, -NO EXT
Dimstyles for dimensions used with details in paper space drawings (included in GR Sheets.dwt and MDOT Sheets 24x36.dwt files). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

NOTE:

A Civil 3D template file which includes City standard styles, settings, layers, etc. for City projects is in on-going development. This template is available on the City server in the current version of Civil 3D used by the City Engineer’s Office staff.

Checklist

The Design Package Submittal Checklist provides a guide for staff to make sure drawings are complete and that required standards are followed when completing drawing sets. The checklist is available on the City server.

For any questions concerning DESIGN PROJECTS for City staff, you can see Jack Stegehuis of the City Engineer’s Office, or contact him via email or at extension 3715.

PRIVATE DEVELOPMENT PROJECTS

This section is intended for consultants involved in private development projects within the City of Grand Rapids limits and outlying City sanitary sewer and water main service areas (e.g. City of Walker, Grand Rapids Township, etc.). The consultant typically provides the design for the extension of City public utilities and related work within the City of Grand Rapids right-of-way or public utility easements in order to get approval for this work. The design drawings must be in accordance with the current CAD Standards for Private Development Projects and the project public utility (Grand Rapids) design and construction must be approved by the involved City departments and the Grand Rapids City Commission.

Street Naming and Abbreviation Conventions

Street names show up in many places on drawings including the title sheet, title blocks, labels in the plan view, notes and various other locations. The way that the street names are represented, including whether the suffixes are abbreviated, depends on their location on the drawings. Listed below are summaries of the conventions to be used for numbered street names, main title and title block street name suffix abbreviations, plan view labeling and miscellaneous note applications.

Numbered Street Name Conventions

- For First Street through Twelfth Street, spell-out the number.
- For 28th Street and above (e.g. 44th Street), use numbers.
- For Three Mile Road, Four Mile Road, etc., spell-out the number.

Street Names in Notes and Other Miscellaneous Locations

- Address labels in plan view should include the name with no suffix, when needed for clarification with corner properties at intersections (e.g. #1200 MAIN).
- Street names in plan views, pick-up notes, bench marks, witnesses and various other locations are shown with name and abbreviated suffix (e.g. MAIN ST.). In the event that the street is private, add (PVT.) (e.g. BROOK DR. (PVT.)).
- Primary street name in main title on title sheet and in title blocks are shown with suffix spelled out (e.g. MONROE AVENUE).
- Limit street names in main title on title sheet and in title blocks are shown with suffix abbreviated (e.g. FROM FIRST ST. TO SECOND ST.)

Multiple Proposed Public Utilities

When more than one proposed public utility (e.g. sanitary sewer and water main) is included in a project, a few items should be noted concerning the way they are presented on drawings. In a given proposed utility drawing (e.g. sanitary sewer), each of the other proposed utilities or items included in the project (e.g. water main, private storm sewer, curb lines, sidewalks) should appear also. These other items should show up with lighter line work (.014” line width), with block fill/hatching frozen and labeled as proposed in both the plan and profile views (only sanitary sewer, storm sewer and water main are shown in profile). This practice aids in the design and construction processes by illustrating the relative locations of the various proposed items

Multiple Occurrences of a Portion of a Proposed Public Utility

There are situations when a portion of a proposed utility shows up on more than one sheet of a drawing set. Typically, this occurs when an intersection appears on both plan views of each of two cross-streets involved. For example, a section of a proposed water main is within the viewports for two different sheets. When this happens, the line work may be left alone (i.e. line widths remain heavy and block hatching remains on). However, proposed boxed notes directed at the common areas of the water main must only appear in one of the two sheets (e.g. PLACE 8" WATER MAIN, or PLACE 8" 45º BEND). The opposite sheet shall include alternate unboxed notes that identify only the proposed utility pipe (e.g. PROP. 8" WATER MAIN). These alternate notes should be lighter (.014") and in smaller text (S08).

Oversized Manholes

Any existing sanitary, storm or combined manholes, that are field-verified to be larger than four feet in (inside) diameter during survey data gathering, shall be identified in the plan view. The diameter must be noted and shown pictorially in the plan view drawing. In the drawing, a circle should be added at the appropriate diameter and correctly located in relation to the manhole casting. The HIDDEN4 line type should be used and the object placed on the same layer as the existing manhole. Likewise, for proposed manholes, a circle should be added to the plan view at the appropriate diameter (CONTINUOUS line type). In addition, oversized manholes, both existing and proposed, must be noted and represented pictorially in the profile according to the diameter (CONTINUOUS line type).

Drawing Submittal and Approval

A Preliminary Utility Plan (PUP) is the initial submittal for a private development project. Full-sized, color hard-copies (four copies) and an electronic copy (PDF) are submitted for review and approval for all private development projects and an accompanying project summary letter from the associated municipality for projects outside the City of Grand Rapids (within service areas). Following the approval of the PUP, a City utility engineering design drawing set is submitted.

A hard copy version of the design drawing set shall be submitted on bond sheets for review (90-100%). Involved City departments will review the drawing(s) and a package of all returned red-lined comments will be emailed to the consultant. When all comments have been addressed, a corrected set of drawings shall be submitted on bond sheets (and PDF) for final review. Any corrections noted by City staff must be made or an explanation for why the change was not made should be summarized in an email. Again, the involved City departments will perform a final review of the drawing set and, if necessary, a summary of any remaining comments will be returned to the consultant.

Once the drawing set is approved by the involved City departments and the City Engineer's Office, the final title sheet shall be submitted on Mylar, cut to 22" x 34". Mylar title sheets submitted must be produced using an ink-jet plotter – no toner-based plots will be accepted. Revision data, as-built information and other reference data will be hand-written on this original, when necessary. Remaining sheets may be submitted on bond (22" x 34"). The City Engineer will sign the title sheet upon drawing set approval, which will become the original copy of record and is never replaced. Revision data, as-built information and other reference data will be hand-written on this original, when necessary. All remaining bond sheets of the final approved drawing set will be replaced (with Mylar copies) following the addition and approval of as-built information. In addition, an electronic version of all related drawings shall be submitted (PDF format) on electronic media or via email.

This drawing set submittal shall be included as part of the *Project Package* submittal. This package includes all required project documentation (e.g. construction agreement, public utility easements, etc.) for City staff review and approval. For additional information regarding the submittal of private development project packages, see the City of Grand Rapids Private Development page of the Engineering Department web site. Go to *grandrapidsmi.gov* and use the search feature by entering "Private Development" and selecting the appropriate link from the search results.

Sheet Order in Drawing Sets

When project drawing sets are submitted, sheets should be presented within the drawing set in the following order, as applicable:

1. Title sheet
2. Cross-sections*
3. Removal*
4. Sanitary Sewer (including force mains and lift stations)*
5. Sanitary Sewer Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)*
6. Water Main
7. Water Main Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)
8. Storm Sewer (separated from Reconstruction sheets only if major work involved; including force mains and lift stations)*
9. Storm Sewer Details (when very few details are required, these details can be combined with other types of details and included in Miscellaneous Details)*
10. Reconstruction/Improvements (typically including Storm Sewer)*
11. Reconstruction Details (other than Standard Details)*
12. Landscaping/Streetscaping (can be integrated with Reconstruction drawings)*
13. Landscaping/Streetscaping Details*
14. Street Lighting*
15. Street Lighting/Electrical Details*
16. Traffic Signals*
17. Traffic Signal Details*
18. Pavement Marking & Signage*
19. Miscellaneous Details*
20. Easement Descriptions

* Only included when the project is within Grand Rapids City limits and involves public utilities and work within the public right-of-way.

Drawing Configuration

For Private Development projects, the use of City standard drawing layers and configurations are recommended, but not required. However, it is required that in hard copy, the appearance of standard line types, text styles, dimension styles, standard blocks and other attributes shall be in accordance with the *City of Grand Rapids CAD Standards* as described herein (see Tables A through G).

Record Drawing As-Built Process

When final measurements and data are available for a completed project, the associated drawings may be "As-built" to achieve the final record drawing. The as-built procedure for projects involving City improvements (within City ROW only), sanitary sewer and water main is outlined in the *As-Built Procedure* on page 30. These as-built modifications are to be made using CAD and a Mylar original(s) shall be produced and replace the previously submitted bond copy for the associated sheet(s). The Mylar submitted must be produced using an ink-jet plotter – no toner-based plots will be accepted. All as-built line work, notation and other required steps involved in submitting as-built drawings to the Engineer's Office is to be in accordance with the *As-Built Procedure*, as referenced above.

Grand Rapids CAD Standards Files

Templates for standard model space drawings, including all required layers, line types, text styles and dimension styles for existing and proposed items are available on-line. Separate files containing standard line types, blocks, and other related files are also available. These items can be downloaded from the City of Grand Rapids web site. Go to *grandrapidsmi.gov* and use the search feature by entering "CAD Standards" and selecting the appropriate link from the search results. Below is a list of CAD Standards-related files available for download (or as an integral part of another file). Prior to beginning a new project, check this on-line location for current template files as they are revised occasionally.

GR Base 20 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 20 scale in paper space.

GR Base 40 2013.dwg
This is a standard model space template, including standard layers, line types, text and dim styles, and other settings for drawings intended for 40 scale in paper space. Note that 40 scale drawings are allowed for private development projects, except in situations where 20 scale is necessary for clarity.

GR.lin
This is an AutoCAD line type file including custom line types (also included in GR Base 20 and GR Base 40 templates).

GR Blocks.zip
This file is a compressed file (Zip) containing all standard blocks.

GR Plot Style.ctb
Plot Style Table settings for all projects.

GR PD Title 2013.dwg
Standard private development project title sheet template (includes base location map in Model Space).

GR Sheets PD 2013.dwg
Standard paper space template for private development projects, including border, title block, standard layers, etc., for sheets other than the title sheet.

EXIST DIM 40-1 EXT, -2 EXT, -NO EXT
Dimstyles for use with existing dimensions in model space and intended for a 40 scale drawing in paper space (included in GR Base 40.dwt file). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

PROPOSED-1 EXT, -2 EXT, -NO EXT
Dimstyles for use with proposed dimensions in paper space (included in GR Sheets.dwt file). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

DETAILS-1 EXT, -2 EXT, -NO EXT
Dimstyles for dimensions used with details in paper space drawings (included in GR Sheets.dwt and MDOT Sheets 24x36.dwt files). 1 EXT includes one dim extension line, both are included with 2 EXT and NO EXT includes neither.

NOTE:

A Civil 3D template file which includes City standard styles, settings, layers, etc. for City projects is in on-going development. Contact the Engineer's Office to check the current availability of this file.

Checklists

Several checklists are available for reference for private development projects. The checklists include the Private Development Title Checklist, the Sanitary Sewer Checklist, and the Water Main Checklist. These checklists serve a dual purpose. First, they provide a guide for the consultant to make sure drawings are complete and that required standards are followed when submitting drawing sets. Secondly, City staff may refer to the checklists during review of drawing sets to assure that required items have been addressed and therefore maintain consistency with all consultants. The checklists are available on-line at the City web site. Go to *grandrapidsmi.gov* and use the search feature by entering "CAD Standards" and selecting the appropriate link from the search results.

For any questions concerning PRIVATE DEVELOPMENT PROJECTS for consultants, contact Jack Stegehuis of the City Engineer's Office at *jstegehuis@grcity.us* or at (616) 456-3715.

OTHER PROJECTS

The City of Grand Rapids CAD Standards are tailored specifically for street and public utility-related construction or reconstruction projects within the public right-of-way and public utility easements. Other miscellaneous projects such as sewer lift stations, buildings and parks do not generally relate completely to these standards. However, when drawings for these type projects are being submitted, many basics of the standards will still apply.

When applicable, the line types, text standards and blocks should be consistent with the City standards. The “rule-of-thumb” will be that a plotted version of the drawing continues to look appropriate according to the City standard format. Details relating to layering, trade-specific blocks, scaling, etc. may be handled using “best-practice” methods. If there are any questions as to the application of the City of Grand Rapids CAD Standards in non-street type projects, please contact Jack Stegehuis of the City Engineer’s Office at *jstegehuis@grcity.us* or (616) 456-3715.

SUPPLEMENTAL INFORMATION AND TABLES

The pages that follow include miscellaneous information and tables relating to various aspects of the City CAD Standards. Included are Drawing File Naming, Drawing Guidelines and As-built Procedure. Tables are also included that summarize standards involving layers, blocks, line types, text, hatch scaling, labeling and dimensioning.

The Drawing File Naming summary provides a list of the standard file-naming formats for the drawing types utilized and submitted (when applicable). The Drawing Guidelines summarizes many of the basic “rules” to be used in producing drawings for the City Engineer’s Office. The As-Built Procedure describes the methodology for adding as-built information to project drawings when submitting drawings for final record retention.

The Layers table (Table A) is sorted into various existing and proposed categories and includes the line type, color and line width assigned to each standard layer (optional for Private Development projects). The Blocks table (Table B) is divided into various application categories, with associated layers and insertion scales given for all standard blocks. The Line Types table (Table C) lists many standard and several custom line types created for City projects. The Text table (Table D) includes all standard text names with their appropriate applications and associated height and font style. The Hatch Scaling table (Table E) includes standard scaling for each hatching application. The Labeling table (Table F) lists the appropriate abbreviations used for standard existing and proposed utility labeling, as well as other miscellaneous labeling applications. The Dimension Styles table (Table G) lists the appropriate dimension style to be used in various applications within drawings.

SUPPORT

For comments, questions, suggestions or additional information, please contact the City of Grand Rapids Engineering Office at (616) 456-3060 or at *engineering@grcity.us*. Experience has shown that open communication throughout the project drawing process shortens the learning curve and improves accuracy and efficiency. This will typically reduce the cost of the drawing production process from first draft to final approval.

In the event that you are new to the Grand Rapids CAD Standards as they apply to the submittal, review and approval of survey drawings, design drawings or private development projects, you can contact our office and request a meeting to discuss in detail. We will provide an overview and answer any questions you may have. In-person meetings will shorten the learning curve and open up communication, thus making the approval process more efficient and cost effective.

You may contact either of the individuals listed below for assistance.

Jack Stegehuis	Phone: (616) 456-3715	E-mail: *jstegehuis@grcity.us*
Dustin Besteman	Phone: (616) 456-3052	E-mail: *dbesteman@grcity.us*

Your input is valued and appreciated. As a user, your suggestions will provide an important resource for improvements and additions to the next version of the City of Grand Rapids CAD Standards. The City of Grand Rapids will continue to strive for a high level of drawing consistency and accuracy in our engineering project drawing sets. Our Engineering staff will continue to work to attain and maintain this goal and we will appreciate support from all project team members.

DRAWING FILE NAMING

The following table illustrates the standard file-naming format for the drawing types utilized. These formats will apply for all projects in which electronic files are submitted to the City of Grand Rapids. For drawing types not covered below, names may be created that follow the same format scheme.

Drawing Type	Filename Format	Comments
Base	*File#* Base.dwg	Example: 14100 Base.dwg
Title Sheet	*Sheet#_File#* Title.dwg	Example: 01_14100 Title.dwg
Cross-sections	*Sheet#_File#* Xsec.dwg	Example: 02_14100 Xsec.dwg
Removal Sheets	*Sheet#_File#* Rem Sheet.dwg	Example: 03_14100 Rem Sheet.dwg
Removal Base	*File#* Rem Base.dwg	Example: 14100 Rem Base.dwg
Sanitary Sewer Sheets	*Sheet#_File#* San Sheet.dwg	Example: 04_14100 San Sheet.dwg
Sanitary Base	*File#* San Base.dwg	Example: 14100 San Base.dwg
Water Main Sheets	*Sheet#_File#* Wat Sheet.dwg	Example: 05_14100 Wat Sheet.dwg
Water Main Base	*File#* Wat Base.dwg	Example: 14100 Wat Base.dwg
Storm Sewer Sheets	*Sheet#_File#* Stm Sheet.dwg	When Storm Sewer sheets separate
Storm Sewer Base	*File#* Stm Base.dwg	When Storm Sewer sheets separate
Reconstruction Sheets	*Sheet#_File#* Rec Sheet.dwg	With or without Storm Sewer
Reconstruction Base	*File#* Rec Base.dwg	With or without Storm Sewer
Road Geometry & Grading Sheets	*Sheet#_File#* Grd Sheet.dwg	Grades sometimes included with Reconstruction base & sheets
Road Geometry & Grading Base	*File#* Grad Base.dwg	Only if separate RG&G sheets
Landscaping/Irrigation Sheets	*Sheet#_File#* Ldscp Sheet.dwg	Landscaping sometimes included with Reconstruction sheets
Landscaping/Irrigation Base	*File#* Land Base.dwg	Only if separate Landscp/Irr sheets
Streetscaping Sheets	*Sheet#_File#* Stscp Sheet.dwg	Streetscaping sometimes included with Reconstruction or Landscaping sheets
Streetscaping Base	*Sheet#_File#* Base.dwg	Only if separate Streetscaping sheets
Street Lighting Sheets	*Sheet#_File#* StL Sheet.dwg	Example: 10_14100 Stlg Sheet.dwg
Street Lighting Base	*File#* Stlg Base.dwg	Example: 14100 Stlg Base.dwg
Traffic Signal Sheets	*Sheet#_File#* Trf Sheet.dwg	Example: 12_14100 Traf Sheet.dwg
Traffic Signals Base	*File#* Traf Base.dwg	Example: 14100 Traf Base.dwg
Pavement Marking & Signage	*Sheet# File#* Pavt Mark.dwg	Example: 14100 Pavt Mark.dwg 15
Pavement Marking & Signage Base	*File#* Pavt Base.dwg	Example: 14100 Pavt Base.dwg
Detail Sheets (various types)	*Sheet#_File#* Det Sheet.dwg	Example: 20_14100 Det Sheet.dwg 20

Note: Base drawing types above represent drawings in Model Space and those designated as sheet drawings represent Paper Space drawings with attached (externally referenced) base drawings. The *File* # referenced is the City of Grand Rapids 5-digit number assigned by the Engineer's Office. You can contact Jack Stegehuis at (616) 456-3715 for this number.

DRAWING GUIDELINES

1) Use appropriate model space template for base plans when contracted by City for survey or design project (*GR Base 20 2013.dwg, or GR Base 40 2013.dwg*).
2) Use appropriate standard title sheet template for first sheet of drawing sets (*GR Title 2013.dwg, GR PD Title .dwg or MDOT Title 24x36 2013.dwg*).
3) Use alternate sheet template (*GR Sheets 2013.dwg or GR Sheets PD 2013.dwg*) on all subsequent sheets of drawing sets, other than the title sheet.
4) All text on drawing sets shall be in uppercase (except some non-project-specific text in title block).
5) For dimension text, utility labels, station labels, etc., text should be oriented to be read from the south or east. This orientation will allow text to be read properly in most sheet configurations.
6) When multiple electrical utilities exist in a common duct run, one line shall be shown with each utility labeled above the line (example of duct run with multiple applications: "PWR, STL, TFS"). If multiple ducts are encased in concrete, the width of the encasement should be represented in the drawing, using two lines or screened wide polyline.
7) A location map is shown on the title sheet of a drawing set only. A base map (Project Location) is included with the title sheet template and a blow-up map (Job Site) should be created to illustrate the job site in detail. The map frames shall be configured as shown in the title sheet template, but can be enlarged or reshaped, if necessary.
8) All pen colors are plotted as BLACK.
9) Existing and proposed utilities less than 42" diameter (for water main, less than 24” diameter) are shown as single line in PLAN view.
10) Existing and proposed utilities 42" and larger in diameter (for water main, diameters 24” and larger) are shown as double line at actual pipe diameter, in PLAN view. This includes concrete encased duct runs, which are to be shown at the width of the encasement (if not known, use diameter/width of utility).
11) For PRIVATE DEVELOPMENT projects, <u>all proposed water main</u> shall be shown in the profile, as well as the plan view.
12) For PUBLIC projects, proposed water main is shown in the profile only when it is to be at a depth OTHER THAN the standard 5'-9" depth (i.e. deflections or standard W-10 offsets), or if the diameter of the proposed water main is 24" or greater.
13) For all utility pipes shown in <u>profile</u>, double lines (at pipe diameter) are shown.
14) In the case of a deflection or offset of a proposed water main, the starting, midpoint and ending stations are to be labeled in the profile. In addition, the top (or bottom) of water main elevation and the invert elevation (or top) of the crossing utility are to be labeled at the midpoint of the deflection, representing the clearance (18” minimum between sewers and water main, typically).
15) Show water main tees and in-line valves (i.e. standard blocks) on all existing and proposed main branches or services of 4" or greater (plan view only).
16) Show water service curb boxes (no tees) on all existing and proposed services of 2” or less (plan view only).
17) Trim all utility lines at associated in-line blocks/symbols (i.e. lines should not go through the symbol).
18) A line segment endpoint is to be placed at each in-line water main tee, bend and cross (not at water services, 2” or less) in order to avoid a line type gap at or near these locations.
19) Aerial (overhead) utility lines are typically not shown on project drawings. However, these type lines should be included as part of the survey base drawing and frozen to hide, as required. Occasionally, aerial lines will need to be visible when fiber optics are involved or for clearance/safety reasons.
20) All <u>existing</u> public utility easements shall not be hatched and must be labeled as to the type of easement and include the recorded Liber and page numbers or Instrument number.
21) All <u>proposed</u> public utility easements shall not be hatched, except as indicated in item 22.

22) For all projects, it is required that a separate “EASEMENT DESCRIPTIONS” sheet be included with drawing sets, when applicable. This sheet typically shows the entire job site (at the same or smaller scale than design sheets), with proposed easements hatched and existing easements labeled. The proposed easement descriptions, all distance and bearing labels, and hatching are shown exclusively on this sheet.
23) The following settings should be verified for all drawing files:
    - LTSCALE is set to 20 or 40 in accordance with the appropriate drawing scale
    - PSLTSCALE is set to zero (0)
    - The LIMITS of the drawing are set appropriately
    - VISRETAIN is set to one (1)
    - MEASUREMENT is set to zero (0)
    - INSUNITS is set to two (2)
    - INSUNITSDEFSOURCE is set to two (2)
    - INSUNITSDEFTARGET is set to two (2)
    - TASKBAR is set to one (1)
24) For existing pavement, sidewalk, parking areas, etc., identify/label the surface material (e.g. hot mix asphalt (HMA), concrete (CONC), gravel (GRAV), etc.). For existing landscaped areas, including parkways, identify/label the general content (e.g. grass (GRASS), landscaped area (LANDSCAPED AREA), etc.).
25) Identify/label existing retaining walls, including wall material, height and any other pertinent information.

AS-BUILT PROCEDURE

Purpose

The as-built process is a method of recording accurate construction information on engineering permanent record drawings. The information is gathered during construction by field inspectors to verify or reflect changes from original design drawings. The “as-built” record drawings therefore become an accurate representation of site conditions for future reference.

As-built versus Revision

As-built information is intended to reflect adjustments to the proposed design that are a result of actual field construction imperfections. When significant changes involving unforeseen issues or obstacles (i.e. field modifications) occur, they must be handled as as-built issues when these changes happen following the onset of the construction of the affected utility. These changes must be approved by the associated City department(s).

Modifications necessitated by a variety of reasons (e.g. extensions, grade changes, and alignment changes) that occur prior to the onset of construction of the related utility, must be handled as revisions in accordance with the current City of Grand Rapids engineering design revision procedures.

Steps in the As-built Process

Please follow the steps below when completing a project “As-built” drawing set.

1) Add information to title sheet “As-built Record” table.
2) Add the DNRE permit numbers to the title sheet “Permits” table, as applicable (e.g. # W991234).
3) On the title sheet, record the City Proceeding number and pertinent information related to any special agreements associated with the project.

Note: Items 1-3 above will be performed by City staff. Consultants must provide the necessary data. The original Mylar title sheet, with signatures, will not be allowed to be removed from the City Engineer’s Office.

4) Insert LEGEND AS-BUILT STAMP block on all sheets of project, except the cover sheet and “Information Only” sheets, with attribute information added, as prompted.
5) For As-built notes added to sheet drawings, all related notes (e.g. pipe lengths) and blow-up details shall be placed on the P MISC AS-BUILT layer, in Paper Space. All line work is to be placed on the related proposed utility layer (e.g. P UTIL WATER MAIN), in Model Space (in proposed utility base drawing). In addition, any proposed utility items or sections not actually placed during construction are to be removed from the drawing. No X-outs or cross-outs are to be used on drawings. It should be noted that all remaining proposed line work, including structures, should be at or near the final constructed locations following the as-built process.

6) For Sanitary Sewer drawings, the guidelines below should be followed.
   a) Note As-built length between manholes (center to center) in the plan view. Place an oval around each as-built length recorded and include a line (no arrowhead) to the associated section of pipe in the plan view. In the profile, delete the proposed length noted for each section of pipe (between manholes) and place actual As-built length. Place an oval around each as-built length recorded. Also delete any modified proposed elevations and pipe slope (%) in the profile and place as-built invert elevations and pipe slopes. Place an oval around all As-built information recorded, including those that match the proposed information.
   b) Redraw all proposed sanitary sewer laterals in their as-built locations in Model Space. The relocated laterals should remain on the P UTIL SANITARY LATERAL layer. Make sure to delete the laterals shown in the original locations. Also, any laterals eliminated should be deleted.
   c) If any existing sanitary sewer laterals were identified as being improperly located on the original survey, you should relocate them as noted. The relocated laterals should remain on the X UTIL SANITARY SEWER layer and the originally located existing laterals should be deleted.
   d) Show "Y", "E" and "L" distances near all proposed sanitary laterals on the plan view, where:
      Y = Distance from low manhole to sewer lateral "wye" or "tee".
      E = Distance from low manhole to the point on the trunk sewer perpendicular to the end of the sewer lateral
      L = Length of sewer lateral placed
7) For Water Main drawings, the guidelines below should be followed.
   a) Note As-built lengths between all major connections (i.e. tees, crosses, bends, sleeves, etc.) in plan view. Include the connections referenced with each length recorded (e.g. "TEE TO SLEEVE"). Place an oval around each As-built length recorded and include a line (no arrowhead) to the associated section of pipe in the plan view. If necessary, note any As-built lengths in profile that cannot be shown in the plan view (e.g. water main offset). Place an oval around each As-built length recorded and include a leader to the associated section of pipe in the profile. Delete modified proposed dimensions and place As-built dimensions in their place. Also, tie-in the new water main with the existing by providing the distance from the nearest existing structure (e.g. in-line valve, hydrant, etc.) to a new structure at the end of the new water main.
   b) Redraw all proposed water services in their as-built locations. The relocated services should remain on the P UTIL WATER SERVICE layer. Make sure to delete the services shown in the original locations. Also, any eliminated water services should be deleted.
   c) If any existing water services were identified as being improperly located on the original survey, you should relocate them as noted. The relocated services should remain on the X UTIL WATER MAIN layer and the originally located existing services should be deleted.
   d) Provide two witnesses to each key water main item not visible (e.g. horizontal bend) that will be helpful in locating horizontal changes in the water main alignment in the future. Use nearby topo items like hydrants, valve boxes, manholes, etc. for reference.
   e) For 1", 1½" and 2" water services, show all dimensions on taps (distance along water main from nearest valve box or hydrant), main to curb boxes distances and tail lengths. 4" and larger water services should be dimensioned as a) above.
   f) Show in a detail drawing any hydrant, bend, water main offset (W-10), or other crowded water main arrangements that cannot be clearly dimensioned in the plan or profile views (locate the detail in reference to the plan view by listing the approximate station or using a leader). In this case, place a rectangle (with radius corners) around the detail.
8) For sanitary sewer and water main projects outside the City limits, the additional guidelines below should be followed.
   a) Verify that the sanitary sewer review disclaimer note (standard block: LEGEND SAN REVIEW) is included on each sanitary sewer sheet.
   b) Verify that the water main review disclaimer note (standard block: LEGEND WAT REVIEW) is included on each water main sheet.
   c) The easement description sheet should include the general review disclaimer note (standard block: LEGEND GEN REVIEW).

9) For public improvement, including public storm sewer (within the City of Grand Rapids) drawings, the guidelines below should be followed.
   a) Note As-built length between manholes in the plan view. Place an oval around each As-built length recorded and include a line (no arrowhead) to the associated section of pipe in the plan view. In the profile, delete the proposed length noted for each section of pipe (between manholes) and place as-built length. Place an oval around each As-built length recorded. Also delete any modified proposed invert elevations in the profile and place As-built elevations. Place an oval around all new As-built invert elevations recorded.
   b) If City Street Lighting is involved, add As-built dimensions and notes to locate and describe items such as streetlight poles, hand holes, transformers, etc.
10) If not already done, insert any soil boring data on sheets where soil-boring locations are shown. This data is typically placed along the top border of the sheets.
11) Check all item placement notes. For each note, verify the item lengths and quantities actually placed during construction. For items eliminated, delete the item in the plan view (and profile, if applicable) and as listed in the "PLACE" note. For changed items, modify the item in the plan view (and profile, if applicable) and delete the original length or quantity in the note and add the actual value. Place an oval around all new As-built lengths or quantities recorded.
12) Indicate the recorded Instrument numbers next to any proposed easement descriptions on the drawings (if available).
13) Add "Drawn by", "Field" and "Office" check initials to all new Mylars using CAD (refer to original drawings). Note that Field and Office initials should be those on City staff that were project reviewers.

Submittals

After completing the As-built process on a project drawing set, please submit the following to the Engineering Department (As-built by others) or plot a new hard-copy original for the Engineering flat file (As-built by City) for review and approval:

- Bond plots (or emailed PDF files) of the drawing set with As-built information added by CAD. The As-built drawing set must be reviewed by City staff and any required changes must be made before final approval is given.
- Following approval, Mylar plots may be produced of all sheets (other than the title sheet) and submitted to the Engineer's Office. All new Mylars (4 mil, double matte) submitted MUST be produced using an ink-jet type plotter – no toner-based plots will be accepted.

For City Staff Only

All completed As-built drawings must be processed as follows:

1) Source files to be edited with as-built information must be from the Working Files sub-folder of the associated project folder on the City server.
2) For drawings As-built by City staff, the new electronic (dwg) As-built CAD drawings should be filed in the appropriate AutoCAD Files project "As-Builts" sub-folder on the City server. Also, make sure all other final drawing files are copied to this folder.
3) Review the Working Files folder (and sub-folders) of the project on the City server and make sure all final versions of required drawings are named in accordance with our current CAD Standards and are in the appropriate folders. Delete all extraneous files (e.g. backup files) from project folders and purge remaining files.
4) If not already done, fill in the correct GPF number (same number as original drawing), by CAD, on all drawings except the original title sheet.
5) Add the "Recorded Date" in the upper right-hand corner of the sticker on the inspector's folder indicating the date that the As-built drawing and related work was completed.
6) Return all completed as-built Mylar drawings to the As-Built Manager for final processing and filing.

For Consultants

Consultants will complete the As-built process on all Private Development Division 27 projects and on public projects for which they have performed the design on behalf of the City. This As-built process must be completed as described herein.

TABLE A

LAYERS

EXISTING UNDERGROUND UTILITIES

Layer Name	Description	Linetype	Color	Linewidth
X UTIL AERIAL 1	Overhead lines (fiber optics, electric, cable TV, etc.) and text within project area (this layer is typically frozen)	UTILITY4	Set color by associated utility	.010"
X UTIL AERIAL 2	Overhead lines (fiber optics, electric, cable TV, etc.) and text within project area (this layer is typically used if it is necessary to show a particular overhead line)	UTILITY4	Set color by associated utility	.010"
X UTIL CABLE TV	Underground cable television lines, structures, dimensions and text	UTILITY4	8	.010"
X UTIL COMB SEWER	Combined sewer lines, structures, dimensions and text (plan and profile)	CONTINUOUS	14	.010"
X UTIL DATA-COM	Miscellaneous underground data lines, structures, dimensions and text (plan and profile)	UTILITY4	212	.010"
X UTIL ELECTRIC	Underground electrical lines, structures, dimensions and text (plan and profile)	UTILITY4	54	.010"
X UTIL FIBER OPTICS	Underground fiber optic lines, dimensions and text	UTILITY4	212	.010"
X UTIL GAS	Natural gas lines, structures, dimensions and text	GAS4	30	.010"
X UTIL SAN FORCEMAIN	Sanitary sewer forcemain (plan and profile)	DASHED	14	.010"
X UTIL SANITARY SEWER	Sanitary sewer lines, laterals, structures, dimensions and text (plan and profile)	CONTINUOUS	14	.010"
X UTIL STEAM	Steam lines, structures, dimensions and text (plan and profile)	UTILITY4	8	.010"
X UTIL STEEL CASING	Protective steel casing in place for any City utility (sanitary sewer, water main, etc.)	HIDDEN4	Set color by associated utility	.010"
X UTIL STM FORCEMAIN	Storm sewer forcemain (plan and profile)	DASHED	94	.010"
X UTIL STORM SEWER	Storm sewer lines, structures, dimensions and text (plan and profile)	STORM4	94	.010"
X UTIL STREET LIGHTING	City Street Lighting underground lines, structures, dimensions and text	UTILITY4	54	.010"
X UTIL STREET LIGHTING OH	City Street Lighting overhead lines and lights (only shown on Street Lighting plans)	CONTINUOUS	54	.010"
X UTIL TELEPHONE	Underground telephone lines, structures, dimensions and text (plan and profile)	UTILITY4	212	.010"
X UTIL TRAFFIC SIGNAL	City Traffic Signal underground lines, structures, dimensions and text	UTILITY4	20	.010"
X UTIL TRAFFIC SIGNAL OH	City Traffic Signal overhead spans, signals and boxes (only shown on Traffic Signal plans)	DASHED	20	.010"
X UTIL WATER MAIN	Water mains, water services, structures, dimensions and text (plan and profile)	WATER	134	.010"

EXISTING TOPO

Layer Name	Description	Linetype	Color	Linewidth
X TOPO BITUMINOUS EOP	Edge of bituminous roads, drives and paths	CONTINUOUS	252	.014"/.007" *
X TOPO BRICK EDGE	Edge of brick pavement areas (use for brick pavement boundary)	CONTINUOUS	252	.014"/.007" *
X TOPO BRIDGE	Bridges and related structures	CONTINUOUS	8	.010"
X TOPO BUILDING	Buildings, houses, garages and related structures (footprint)	CONTINUOUS	8	.010"
X TOPO CONC SWK-DWY	Sidewalks, concrete approaches and driveways	SIDEWALK	252	.014"/.007" *
X TOPO CONCRETE EDGE	Edge of concrete pavement (use for concrete pavement boundary)	SIDEWALK	252	.014"/.007" *
X TOPO CULVERT	Drainage culverts	DASHED2	252	.014"/.007" *
X TOPO CURB AND GUTTER	Curb and gutter (show face and edge of metal only) and straight curbs (show face only)	HIDDEN2	252	.014"/.007" *
X TOPO FENCE	Fence lines (chain-link, stockade)	CHAINLINK_X STOCKADE_X	252	.014"/.007" *
X TOPO GRAVEL EDGE	Edge of gravel roads, drives, paths and gravel areas	HIDDEN4	252	.014"/.007" *
X TOPO GUARDRAIL	Guardrails	GUARD_L GUARD_R	252	.014"/.007" *
X TOPO LANDSCAPE AREA	Boundary of landscaped areas (trees, shrubs, hedges, etc.)	TREELINE_L TREELINE_R	252	.014"/.007" *
X TOPO MISC ITEM	Posts, signs, mail boxes, and other miscellaneous topographical items	CONTINUOUS	252	.014"/.007" *
X TOPO MONITOR WELL	Monitoring wells	CONTINUOUS	8	.010"
X TOPO RR TRACKS	Railroad tracks and related structures	TRACKS	8	.010"
X TOPO TREELINE	Tree or woods boundary (used in large wooded areas)	TREELINE_L TREELINE_R	252	.014"/.007" *
X TOPO TREES-SHRUBS	Trees, shrubs, hedges, etc.	CONTINUOUS	252	.014"/.007" *
X TOPO UTILITY POLE	Utility poles and guy wires/anchors (includes light posts)	CONTINUOUS	252	.014"/.007" *
X TOPO WALL	Retaining walls, head walls, etc.	CONTINUOUS	252	.014"/.007" *

* Line width is .014" for 20 scale drawings and .007" for 40 scale drawings.

EXISTING TERRAIN

Layer Name	Description	Linetype	Color	Linewidth
Contour Layers (Civil 3D Defaults)	Civil 3D default layer names shall be used for existing contours. Line types, colors and line widths are to be in accordance with the City's style templates. For further information concerning City style templates, contact the Engineering Department (see Support on page 26 for contact information).	(Per styles)	(Per styles)	(Per styles)
X TERR TOE OF SLOPE	Toe of slope (bottom of bank)	HIDDEN2	252	.014"/.007"*
X TERR TOP OF BANK	Top of bank	DASHED2	252	.014"/.007"*
X TERR WETLAND OR DITCH	Wetland, ditches, shoreline or any edge of water	DITCH2	252	.014"/.007"*

* Line width is .014" for 20 scale drawings and .007" for 40 scale drawings

EXISTING SURVEY

Layer Name	Description	Linetype	Color	Linewidth
Surface Layers (Civil 3D Defaults)	Civil 3D default layer names shall be used for existing surfaces. Line types, colors and line widths are to be in accordance with the City's style templates. For further information concerning City style templates, contact the Engineering Department (see Support on page 26 for contact information).	(Per styles)	(Per styles)	(Per styles)
X SURV BENCHMARK	Benchmark identification/location	CONTINUOUS	54	.010"
X SURV BSMT ELEVATION	Basement elevations (profile only, as needed)	CONTINUOUS	54	.010"
X SURV CORP LINE	City or township corporation line	BORDER	7	.028"
X SURV EASEMENT	Easement boundaries and associated text and dimensions	DASHED2	9	.010"
X SURV HIGHWAY ROW	Highway easement right-of-way (MDOT)	DASHED2	7	.028"
X SURV MONUMENT	Section corner/center monuments	CONTINUOUS	9	.010"
X SURV PLATTED LINE	Platted lines	CONTINUOUS	9	.010"
X SURV PTS-GENERAL	Point tick marks, numbers, elevations and descriptions associated with general items	CONTINUOUS	7	.010"
X SURV PTS-LANDSCAPE	Point tick marks, numbers, elevations and descriptions associated with landscape items	CONTINUOUS	3	.010"
X SURV PTS-SEWER	Point tick marks, numbers, elevations and descriptions associated with sewer items	CONTINUOUS	1	.010"
X SURV PTS-SURFACE DATA	Point tick marks, numbers, elevations and descriptions associated with surface shots	CONTINUOUS	2	.010"
X SURV PTS-WATER	Point tick marks, numbers, elevations and descriptions associated with water items	CONTINUOUS	4	.010"
X SURV PROPERTY IRON	Property irons	CONTINUOUS	9	.010"
X SURV PROPERTY LINE	Property lines	DASHED2	9	.010"
X SURV ROW CENTERLINE	Right-of-way centerlines (plan view only)	CENTER4	8	.010"
X SURV ROW LINE	Existing right-of-way lines	CONTINUOUS	7	.028"
X SURV RR ROW	Existing railroad right-of-way lines	CONTINUOUS	7	.028"
X SURV SECTION CORNER	Section corner	CONTINUOUS	9	.014"
X SURV SECTION LINE	Section lines	DASHDOT	8	.010"
X SURV SETUP POINTS	Survey instrument set-up points (a.k.a. traverse points or control points))	CONTINUOUS	8	.010"
X SURV SURVEY LINE	Survey lines	CENTER4	9	.010"
X SURV TIN BOUNDARY	Boundaries (Outer and Hide types) used with TIN correction	CONTINUOUS	7	.028"
X SURV TRAVERSE LINE	Traverse line (hidden layer)	CENTER4	8	.010"
X SURV VACATED ROW	Vacated street or alley	DASHED2	7	.028"

MISCELLANEOUS EXISTING

Layer Name	Description	Linetype	Color	Linewidth
X MISC CROSS-SECTION	Cross-sections, notes and dimensions	CONTINUOUS	54	.010"
X MISC GEN DIMENSIONS	All miscellaneous dimensions on base drawing (other than utility location dimensions)	CONTINUOUS	8	.007"
X MISC GENERAL NOTES	General notes and miscellaneous base data in Model Space (scales, benchmark data, witnesses data, soil boring data, curve data, etc.)	CONTINUOUS	52	.010"
X MISC GENERAL TEXT	All miscellaneous text on plan view not identified on other layers	CONTINUOUS	8	.007"
X MISC HATCHING	All hatching on base drawing	CONTINUOUS	252	.014"/.007"*
X MISC PICK UP NOTES	Standard survey pick-up notes for topo items in Model Space (typically not required)	CONTINUOUS	9	.007"
X MISC PVMT MARKING	Pavement marking symbols and striping	CONTINUOUS	252	.014"
X MISC SOIL BORING	Soil boring block including soil boring number	CONTINUOUS	54	.010"
X MISC X-REFS	All external reference attachments (this layer should be current when attaching xref's)	CONTINUOUS	8	.010"

* Line width is .014" for 20 scale drawings and .007" for 40 scale drawings.

GENERAL PAPER SPACE

Layer Name	Description	Linetype	Color	Linewidth
PS BORDER AND TITLEBLOCK	Border, titleblock and standard titleblock text	CONTINUOUS	52	.010"
PS GENERAL NOTES	General notes	CONTINUOUS	52	.014"
PS LEGENDS	Miscellaneous legends and related items	CONTINUOUS	52	.010"
PS MAPS	Job Site map, map borders and related text and symbols (large Location Map is in model space)	CONTINUOUS	52	.010"
PS MATCHLINE	Match lines	CONTINUOUS	9	.035"
PS MATCHLINE TEXT	Match line text	CONTINUOUS	9	.010"
PS NORTH ARROW	North arrow and scales	CONTINUOUS	52	.014"
PS PROJECT TEXT	Project specific titleblock text (title, limits, etc.)	CONTINUOUS	7	.014"
PS REVISION NOTE	All revision notes in revision block area (City formal revisions only)	CONTINUOUS	2	.010"
PS STREET NAME	Street names in plan view and street names and limits in title block	CONTINUOUS	7	.014"
PS TITLEBLOCK TEXT	General non-project specific titleblock text	CONTINUOUS	2	.010"
PS TITLESHEET	Miscellaneous items on titlesheet not otherwise specified	CONTINUOUS	Varies	.010"
PS VIEW PORT	View ports (hidden layer)	CONTINUOUS	6	.010"

PROPOSED UNDERGROUND UTILITIES

Layer Name	Description	Linetype	Color	Linewidth
P UTIL CABLE TV	Cable television lines (does not include overhead lines)	UTILITY4P	9	.020"
P UTIL CABLE TV NOTE	Cable television notes and dimensions in Paper Space	CONTINUOUS	9	.014"
P UTIL CABLE TV STRUCT	Cable television structures (e.g. pedestals)	CONTINUOUS	9	.020"
P UTIL ELECTRIC	Electrical lines (not including City street lighting)	UTILITY4P	20	.020"
P UTIL ELECTRIC NOTE	Electrical notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	20	.014"
P UTIL ELECTRIC STRUCT	Electrical structures (plan and profile) (e.g. transformer, manhole)	CONTINUOUS	20	.020"
P UTIL GAS	Natural gas lines	GAS4P	2	.020"
P UTIL GAS NOTE	Natural gas notes and dimensions in Paper Space	CONTINUOUS	2	.014"
P UTIL GAS STRUCT	Natural gas structures (e.g. valves, vaults)	CONTINUOUS	2	.020"
P UTIL SAN FORCEMAIN	Sanitary sewer forcemain (plan and profile)	DASHED	1*	.035"
P UTIL SAN SEWER LINING	Sanitary sewer lining (plan view only)	HIDDEN	1*	.028"
P UTIL SAN SEWER LINING P	Sanitary sewer lining (in profile view only)	HIDDEN	1*	.020"
P UTIL SANITARY ABANDON	Abandon symbols (blocks) indicating sanitary sewer to be abandoned	CONTINUOUS	7	.028"
P UTIL SANITARY CASING	Steel casing placed in bore and jack applications to protect sanitary sewer	HIDDEN2	1*	.020"
P UTIL SANITARY HATCH	Sanitary sewer structure hatching/fill	CONTINUOUS	1	.010"
P UTIL SANITARY LATERAL	Sanitary sewer lateral lines (typically in plan view only)	CONTINUOUS	1*	.028"
P UTIL SANITARY NOTE	Sanitary sewer notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	1	.020"
P UTIL SANITARY NOTE 2	Alternate layer for sanitary sewer notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	1	.014"
P UTIL SANITARY SEWER	Sanitary sewer lines in plan view only	CONTINUOUS	1*	.035"
P UTIL SANITARY SEWER P	Sanitary sewer lines and structures in profile view using a line thickness (.028) which is less than in the plan view (.035") to provide a clearer representation	CONTINUOUS	1*	.028"
P UTIL SANITARY STRUCT	Sanitary sewer structures in plan view only	CONTINUOUS	1	.028"
P UTIL ST LGT REMOVAL	Street lighting structures to be removed	HIDDEN2	2	.020"
P UTIL STEAM	Steam lines and structures (plan and profile)	UTILITY4P	9	.020"
P UTIL STEAM NOTE	Steam notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	9	.014"
P UTIL STM FORCEMAIN	Storm sewer forcemain (plan and profile)	DASHED	3*	.035"
P UTIL STM SEWER LINING	Storm sewer lining (plan view only)	HIDDEN	3*	.028"
P UTIL STM SEWER LINING P	Storm sewer lining (in profile view only)	HIDDEN	3*	.020"
P UTIL STORM ABANDON	Abandon symbols (blocks) indicating storm sewer to be abandoned	CONTINUOUS	7	.028"
P UTIL STORM CASING	Steel casing placed in bore and jack applications to protect storm sewer	HIDDEN2	3	.020"
P UTIL STORM HATCH	Storm sewer structure hatching	CONTINUOUS	3	.010"
P UTIL STORM NOTE	Storm sewer notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	3	.020"

* These utility lines should be reduced to .014" line thickness in opposing plans (example: proposed water main lines shown in sanitary sewer plan)
** Proposed duct polylines are shown screened (color 252) on other proposed utility sheets.

PROPOSED UNDERGROUND UTILITIES (continued)

Layer Name	Description	Linetype	Color	Linewidth
P UTIL STORM NOTE 2	Alternate layer for storm sewer notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	3	.014"
P UTIL STORM SEWER	Storm sewer trunk lines, catch basin leads and culverts in plan view only	STORM4P	3*	.035"
P UTIL STORM SEWER P	Storm sewer lines and structures in profile view using a line thickness (.028") which is less than in the plan view (.035") to provide a clearer representation	STORM4P	3*	.028"
P UTIL STORM STRUCT	Storm sewer structures in plan view only	CONTINUOUS	3*	.028"
P UTIL STREET LGT DUCT	Underground street lighting electrical duct (use polyline at width of duct)	UTILITY4P	2**	.010"
P UTIL STREET LGT HATCH	Street lighting structure hatching	CONTINUOUS	2	.010"
P UTIL STREET LGT NOTE	Street lighting notes and dimensions in Paper Space	CONTINUOUS	2	.020"
P UTIL STREET LGT NOTE 2	Alternate layer for street lighting notes and dimensions in Paper Space	CONTINUOUS	2	.014"
P UTIL STREET LGT STRUCT	Street lighting structures (e.g. poles, handholes, pad-mounted transformers, vaults)	CONTINUOUS	2*	.028"
P UTIL STREET LIGHTING	Underground or overhead street lighting electrical lines (label accordingly if overhead lines)	UTILITY4P	2*	.035"
P UTIL TELE STRUCT	Telephone structures (e.g. pedestals, vaults)	CONTINUOUS	6	.020"
P UTIL TELEPHONE	Underground or overhead telephone lines (label accordingly if overhead lines)	UTILITY4P	6	.020"
P UTIL TELEPHONE NOTE	Telephone notes and dimensions (plan and profile) in Paper Space	CONTINUOUS	6	.014"
P UTIL TRAF SIG HATCH	Traffic Signal structure hatching	CONTINUOUS	4	.010"
P UTIL TRAFFIC SIG NOTE	Traffic Signal notes and dimensions in Paper Space	CONTINUOUS	4	.020"
P UTIL TRAF SIG OH	Traffic Signal overhead items (e.g. traffic signals, spans, case signs)	CONTINUOUS	4	.028"
P UTIL TRAF SIG REM-SLV OH	Traffic Signal overhead items to be removed or salvaged (e.g. traffic signals, case signs)	HIDDEN	4	.020"
P UTIL TRAF SIG STRUCT	Traffic Signal ground-mounted structures (e.g. control cabinets, detector loops)	CONTINUOUS	4	.028"
P UTIL TRAFFIC SIGNAL	Underground traffic signal electrical lines	UTILITY4P	4	.035"
P UTIL WATER ABANDON	Abandon symbols (blocks) indicating water main to be abandoned	CONTINUOUS	7	.028"
P UTIL WATER CASING	Steel casing placed in bore and jack applications to protect water main	HIDDEN2	150	.020"
P UTIL WATER HATCH	Water main/water service structure hatching	CONTINUOUS	150	.010"
P UTIL WATER SERVICE	Water service lines	WATERP	150	.028"
P UTIL WATER STRUCT	Water main and water service structures in plan view only	CONTINUOUS	150	.028"
P UTIL WATER MAIN	Water mains in plan view only	WATERP	150	.035"
P UTIL WATER MAIN NOTE	Water main notes and dimensions including water services (plan and profile) in Paper Space	CONTINUOUS	150	.020"
P UTIL WATER MAIN NOTE 2	Alternate layer for water main notes and dimensions including water services (plan and profile) in Paper Space	CONTINUOUS	150	.014"
P UTIL WATER MAIN P	Water main lines and structures in profile view using a line thickness (.028") which is less than in the plan view (.035") to provide a clearer representation	WATERP	150	.028"
P UTIL FUTURE UTILITY	Utility in drawing that will be constructed in the future and not part of the current proposed plan	HIDDEN2	9	.010"

* These utility lines should be reduced to .014" line thickness in opposing plans (example: proposed water main lines shown in sanitary sewer plan)
** Proposed duct polylines are shown screened (color 252) on other proposed utility sheets.

PROPOSED TOPO

Layer Name	Description	Linetype	Color	Linewidth
P TOPO BRIDGE	Bridges and related structures	CONTINUOUS	9	.020"
P TOPO BUILDING	Buildings, houses, garages and related structures	CONTINUOUS	9	.020"
P TOPO BUILDING HATCH	Hatching for buildings	CONTINUOUS	9	.014"
P TOPO CONC HATCH 4 INCH	Hatching for concrete outside roadway (4" depth)	CONTINUOUS	9	.010"
P TOPO CONC HATCH 6 INCH	Hatching for concrete outside roadway (6 " depth)	CONTINUOUS	9	.010"
P TOPO CONC PVMT HATCH	Hatching for concrete pavement in roadway (full depth)	CONTINUOUS	9	.010"
P TOPO CONC SWK-DWY	Sidewalk and concrete drive approach boundaries	CONTINUOUS	7	.020"
P TOPO CONCRETE LIMIT	Concrete pavement boundaries (full depth)	CONTINUOUS	7	.020"
P TOPO CULVERT	Drainage culverts	DASHED2	3	.020"
P TOPO CURB AND GUTTER	Concrete curb and gutter	CONTINUOUS	7	.020"
P TOPO ELEVATIONS	Elevation labels for top of curb, back of walk, centerline, catch basin casting, etc., in Paper Space	CONTINUOUS	4	.020"
P TOPO FENCE	Fence lines (chain-link, stockade - use correct line type)	CHAINLINK_P STOCKADE_P	9	.020"
P TOPO GRADING LIMIT	Temporary grading limits (a.k.a. slope stake line)	HIDDEN4	9	.014"
P TOPO GRAVEL EDGE	Gravel roads, drives, paths and edge of gravel areas	HIDDEN4	9	.014"
P TOPO GUARDRAIL	Guardrails	GUARD_L GUARD_R	9	.020"
P TOPO LND BOUNDARY	Landscape boundary	CONTINUOUS	9	.020"
P TOPO LND HATCH	Landscape hatching	CONTINUOUS	9	.007"
P TOPO LND NOTE	Landscape notes and dimensions in Paper Space	CONTINUOUS	9	.020"
P TOPO MISC HATCH	Hatching associated with micellaneous topographical items	CONTINUOUS	9	.010"
P TOPO MISC ITEM	Posts, signs, mailboxes and other miscellaneous topographical items	CONTINUOUS	9	.020"
P TOPO MONITOR WELL	Monitoring wells	CONTINUOUS	9	.014"
P TOPO PAVEMENT	Curb and HMA pavement boundaries (includes HMA pavement outside roadway)	CONTINUOUS	7	.020"
P TOPO PAVEMENT HATCH	Boundary hatching at HMA pavement limits (full depth)	CONTINUOUS	7	.020"
P TOPO REC NOTE	Miscellaneous reconstruction notes and dimensions in Paper Space	CONTINUOUS	7	.020"
P TOPO ROTO CONC HATCH	Hatching for concrete pavement in roadway (white top)	CONTINUOUS	9	.010"
P TOPO ROTO CONC LIMIT	Concrete pavement boundaries (white top)	CONTINUOUS	7	.020"
P TOPO ROTO HMA HATCH	Hatching for HMA pavement in roadway (rotomill depth)	CONTINUOUS	9	.010"
P TOPO ROTO HMA LIMIT	HMA pavement boundaries (rotomill depth)	CONTINUOUS	7	.020"
P TOPO TREES	Trees (all types)	CONTINUOUS	101	.020"
P TOPO SHRUBS	Shrubs and hedges (all types)	CONTINUOUS	101	.014"
P TOPO WALL	Retaining walls, head walls, etc.	CONTINUOUS	7	.020"

PROPOSED TERRAIN

Layer Name	Description	Linetype	Color	Linewidth
P TERR MAJOR CONTOUR	Major contour lines and labels	CONTINUOUS	41	.028"
P TERR MINOR CONTOUR	Minor contour lines and labels	CONTINUOUS	40	.020"
P TERR TOE OF SLOPE	Toe of slope (bottom of bank)	HIDDEN2	9	.028"
P TERR TOP OF BANK	Top of bank	DASHED2	9	.028"
P TERR WETLAND OR DITCH	Wetland, ditches, shoreline or any edge of water	DITCH2	9	.020"

PROPOSED SURVEY

Layer Name	Description	Linetype	Color	Linewidth
P SURV ESMT BOUNDARY	Public utility easement boundaries	DASHED2	7	.028"
P SURV ESMT HATCH	Public utility easement hatching	CONTINUOUS	9	.010"
P SURV HIGHWAY ROW	Proposed highway (MDOT) easement right-of-way (as part of current project)	DASHED2	7	.028"
P SURV HORZ ALIGNMENT	Horizontal alignment and labels	CENTER4	9	.014"
P SURV MONUMENT	Property monument	CONTINUOUS	7	.014"
P SURV PI AND PT LABELS	Stationing PI and PT labels	CONTINUOUS	6	.014"
P SURV PLAT LINE	Plat boundaries	BORDER	92	.028"
P SURV PROPERTY IRON	Property irons	CONTINUOUS	7	.014"
P SURV PROPERTY LINE	Property lines	CONTINUOUS	7	.020"
P SURV PVMT CENTER	Pavement centerline (if different from right-of-way centerline)	CENTER4	7	.020"
P SURV ROW LINE	Proposed right-of-way lines (as part of current project)	CONTINUOUS	7	.028"

PROPOSED TRAFFIC SIGNAL

Layer Name	Description	Linetype	Color	Linewidth
P TFS CONTRACT	Traffic signal notes and dimensions associated with contracted work in Paper Space	CONTINUOUS	4	.020"
P TFS FORCE ACCT	Traffic signal notes and dimensions associated with Force Account work in Paper Space	CONTINUOUS	7	.020"
P TFS HATCH	Traffic signal item hatching	CONTINUOUS	4	.010"
P TFS NEW-RELO OH	Traffic signal overhead items to be installed (new or relocated)	CONTINUOUS	4	.028"
P TFS NEW-RELO UG	Traffic signal underground items to be installed (new or relocated)	UTILITY4P	4	.028"
P TFS REMOVAL	Traffic signal structures to be removed	HIDDEN2	7	.020"
P TFS SALV-REPL OH	Traffic signal overhead items to be salvaged and replaced	CONTINUOUS	4	.028"
P TFS SALV-REPL UG	Traffic signal underground items to be salvaged and replaced	UTILITY4P	4	.028"
P TFS SIGNS	Proposed traffic signal signage	CONTINUOUS	4	.028"
P TFS SIGNS NOTE	All proposed traffic signal signage notes and dimensions in Paper Space	CONTINUOUS	4	.020"
P TFS STRUCTURE	Traffic signal structures (e.g. pedestrian signals, poles, etc.)	CONTINUOUS	4	.028"
P TFS UG-OH LINES	Traffic signal electrical and data lines including those for overhead traffic signals	UTILITY4P	4	.035"

PROPOSED PAVEMENT MARKING & SIGNAGE

Layer Name	Description	Linetype	Color	Linewidth
P PMK 4 WHITE STRIPING	Pavement marking 4" white striping (lane striping)	CONTINUOUS	7	.75'
P PMK 6 WHITE STRIPING	Pavement marking 6" white striping (standard crosswalk)	CONTINUOUS	7	1'
P PMK 12 WHITE STRIPING	Pavement marking 12" white striping (stop bar, RR crossing)	CONTINUOUS	7	2.0'
P PMK 24 WHITE STRIPING	Pavement marking 24" white striping (stop bar)	CONTINUOUS	7	3.0'
P PMK 4 YELLOW STRIPING	Pavement marking 4" yellow striping (center lane striping, turn lanes)	CONTINUOUS	2	.75'
P PMK NOTE	Pavement marking notes and dimensions in Paper Space	CONTINUOUS	2	.020"
P PMK SYMBOL	Pavement marking symbol (legend) outlines	CONTINUOUS	7	.014"
P PMK SIGNAGE	All proposed pavement marking signage	CONTINUOUS	2	.020"
P PMK SIGNAGE NOTE	All proposed pavement marking signage notes and dimensions in Paper Space	CONTINUOUS	2	.020"

MISCELLANEOUS PROPOSED

Layer Name	Description	Linetype	Color	Linewidth
P MISC AS-BUILT	As-built notes, dimensions and special blow-up details in Paper Space	CONTINUOUS	200	.020"
P MISC CONC JOINT	All linework associated with concrete joints in joint plan	CONTINUOUS	9	.020"
P MISC CONC JOINT NOTE	All notes associated with concrete joint plan in Paper Space	CONTINUOUS	9	.020"
P MISC REM AREA	Removal area boundaries (e.g. pavement, sidewalk)	CONTINUOUS	7	.028"
P MISC REM HATCH	All removal hatching	CONTINUOUS	9	.010"
P MISC REM ITEM	Removal item "X"-outs (e.g. curbs, catch basins, trees)	CONTINUOUS	7	.028"
P MISC REM NOTE	Removal notes and dimensions in Paper Space	CONTINUOUS	7	.020"
P MISC REVISION NOTE	All revision notes in revision block area in Paper Space	CONTINUOUS	2	.010"
P MISC X-SEC	Cross-section, notes and dimensions	CONTINUOUS	2	.020"
P MISC X-SEC HATCH	All cross-section hatching	CONTINUOUS	52	.010"

PROFILE

Layer Name	Description	Linetype	Color	Linewidth
Profile Layers (Civil 3D Defaults)	Civil 3D default layer names shall be used for profiles, including the Pipes feature. Line types, colors and line widths are to be in accordance with the City's style templates. For further information concerning City style templates, contact the Engineering Department (see Support on page 26 for contact information).	(Per styles)	(Per styles)	(Per styles)

TABLE B
BLOCKS
GENERAL BLOCKS

				Insert Scale	
Symbol	**Filename**	**Description**	**Layer**	**1"=20'**	**1"=40'**
	X LND SHRUB	Existing shrub or bush	X TOPO TREES AND SHRUBS	20	30
	P LND SHRUB	Proposed shrub or bush	P TOPO SHRUBS	20	30
	X LND CONIFEROUS TREE 6'	Existing coniferous tree (up to 6' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 12'	Existing coniferous tree (7' to12' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 18'	Existing coniferous tree (13' to18' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 24'	Existing coniferous tree (19' to 24' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 30'	Existing coniferous tree (25' to 30' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 36'	Existing coniferous tree (31' to 36' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 42'	Existing coniferous tree (37' to 42' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 48'	Existing coniferous tree (43' to 48' height tree)	X TOPO TREES AND SHRUBS	1	1
	X LND CONIFEROUS TREE 49'	Existing coniferous tree (49' or more height tree)	X TOPO TREES AND SHRUBS	1	1
	P LND CONIFEROUS TREE 1	Proposed coniferous tree - Type 1 (2' to 6' height tree)	P TOPO TREES	20	25
	P LND CONIFEROUS TREE 2	Proposed coniferous tree - Type 2 (2' to 6' height tree)	P TOPO TREES	20	25
	X LND DECIDUOUS TREE 6 IN	Existing deciduous tree (Up to 6" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 12 IN	Existing deciduous tree (7" to 12" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 18 IN	Existing deciduous tree (13" to 18" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 24 IN	Existing deciduous tree (19" to 24" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 30 IN	Existing deciduous tree (25" to 30" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 36 IN	Existing deciduous tree (31" to 36" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 42 IN	Existing deciduous tree (37" to 42" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 48 IN	Existing deciduous tree (43" to 48" diameter tree)	X TOPO TREES AND SHRUBS	1	1
	X LND DECIDUOUS TREE 49 IN	Existing deciduous tree (49" or larger diameter tree)	X TOPO TREES AND SHRUBS	1	1
	P LND DECIDUOUS TREE 1	Proposed deciduous tree - Type 1 (2" to 6" diameter tree)	P TOPO TREES	20	25
	P LND DECIDUOUS TREE 2	Proposed deciduous tree - Type 2 (2" to 6" diameter tree)	P TOPO TREES	20	25
	P LND DECIDUOUS TREE 3	Proposed deciduous tree - Type 3 (2" to 6" diameter tree)	P TOPO TREES	20	25
	P LND DECIDUOUS TREE X	Proposed deciduous tree (use when more than three types of trees are proposed - prompts for tree type number)	P TOPO TREES	20	25
	X LND HEDGE	Existing hedges/groundcover	X TOPO TREES AND SHRUBS	20	30
	P LND HEDGE	Proposed hedges/groundcover	P TOPO SHRUBS	20	30

GENERAL BLOCKS (continued)

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	X LND SPRINKLER HEAD	Existing sprinkler head	X TOPO MISC ITEM	20	30
	X LND STUMP	Tree stump	X TOPO TREES & SHRUBS	20	30
	X MISC SOIL BORING	Soil boring (prompts for SB number)	X MISC SOIL BORING	20	40
	X SURV BSMT ELEVATION	Existing basement elevation (prompts for address and elevation)	X SURV BSMT ELEVATION	20	40
	X SURV BENCHMARK	Benchmark (prompts for BM number)	X SURV BENCHMARK	20	40
	X SURV SECTION CENTER	Center of section	X SURV SECTION CORNER	20	40
	X SURV SECTION CORNER	Section corner (1/4 Lines)	X SURV SECTION CORNER	20	40
	X SURV IRON	Existing property iron	X SURV PROPERTY IRON	20	40
	P SURV SET IRON	Set property iron	P SURV PROPERTY IRON	20	40
	X SURV PROPERTY HOOK	Common property tie	X SURV PROPERTY LINE	20	40
	X SURV MONUMENT	Property monument	X SURV MONUMENT	20	40
	X SURV SETUP POINT	Survey instrument set-up points (a.k.a. traverse points or control points)	X SURV SETUP POINTS	20	40
	X TER MARSH	Existing marsh or swamp area (scatter thoughout area)	X TERR WETLAND OR DITCH	20	40
	X TER FLOW DIRECTION	Direction of flow/drainage	X TERR WETLAND OR DITCH	20	40
	X TOPO YARD LIGHT	Existing yard light (private lights outside ROW only)	X TOPO MISC ITEM	20	30
	X TOPO SIGN	Existing sign	X TOPO MISC ITEM	20	30
	P TOPO SIGN	Proposed sign	P PMK SIGNAGE	20	30
	P TOPO SILT FENCE	Proposed temporary silt fence (use with polyline)	P TOPO FENCE	20	30
	X TOPO MAILBOX	Existing mailbox	X TOPO MISC ITEM	20	30
	X TOPO MISC POST	Miscellaneous existing posts (e.g. flag poles, bollards, parking meters)	X TOPO MISC ITEM	20	30
	P TOPO MISC POST	Miscellaneous proposed posts within ROW (e.g. bollards, parking meters)	P TOPO MISC ITEM	20	30
	X TOPO MISC BOX	Miscellaneous existing object (prompted for 2-letter abbrev	X TOPO MISC ITEM	20	30
	X TOPO HEX LIGHT POST	Existing concrete or ornamental light post	X TOPO UTILITY POLE	20	30

GENERAL BLOCKS (continued)

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	X TOPO GUY ANCHOR	Existing guy anchor (line must be added at length required)	X TOPO UTILITY POLE	20	30
	X TOPO UTILITY POLE	Existing utility pole (includes wood, steel, aluminum and fiberglass poles)	X TOPO UTILITY POLE	20	30
	X TOPO PEDESTAL	Existing pedestal for private utility (e.g. AT&T, Comcast)	Applicable Utility Layer	20	30
	X TOPO GAS VALVE	Existing gas valve & box	X UTIL GAS	20	30
	X TOPO MANHOLE	Existing manhole for private utilities (e.g. Consumers Energy) (See other tables for specific public utilities)	Applicable Utility Layer	20	30
	X TOPO MONITOR WELL	Monitoring well	X TOPO MISC ITEM	20	30
	X TOPO RR SIGNAL	Existing railroad signal	X TOPO MISC ITEM	20	30

WATER MAIN BLOCKS

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	X WAT 11 BEND	Existing 11º bend	X UTIL WATER MAIN	20	30
	P WAT 11 BEND	Proposed 11º bend	P UTIL WATER STRUCT	20	30
	X WAT 22 BEND	Existing 22½º bend	X UTIL WATER MAIN	20	30
	P WAT 22 BEND	Proposed 22½º bend	P UTIL WATER STRUCT	20	30
	X WAT 45 BEND	Existing 45º bend	X UTIL WATER MAIN	20	30
	P WAT 45 BEND	Proposed 45º bend	P UTIL WATER STRUCT	20	30
	X WAT 90 BEND	Existing 90º bend	X UTIL WATER MAIN	20	30
	P WAT 90 BEND	Proposed 90º bend	P UTIL WATER STRUCT	20	30
	X WAT CROSS	Existing cross	X UTIL WATER MAIN	20	30
	P WAT CROSS	Proposed cross	P UTIL WATER STRUCT	20	30
	X WAT CURB BOX	Existing curb stop & box	X UTIL WATER MAIN	20	30
	P WAT CURB BOX	Proposed curb stop & box	P UTIL WATER STRUCT	20	30
	P WAT CBOX ADJUST	Existing curb box adjust to grade	P UTIL WATER STRUCT	20	30
	X WAT HYDRANT	Existing hydrant	X UTIL WATER MAIN	20	30
	P WAT HYDRANT	Proposed hydrant	P UTIL WATER STRUCT	20	30
	P WAT HYDRANT ALT#1	Proposed hydrant, tee, valve and bend assembly (Alt #1)	P UTIL WATER STRUCT	20	30
	P WAT HYDRANT (SWIVEL)	Proposed hydrant, tee, valve and bend assembly (Swivel)	P UTIL WATER STRUCT	20	30
	X WAT REDUCER	Existing reducer	X UTIL WATER MAIN	20	30
	P WAT REDUCER	Proposed reducer	P UTIL WATER STRUCT	20	30
	X WAT TEE	Existing tee	X UTIL WATER MAIN	20	30
	P WAT TEE	Proposed tee	P UTIL WATER STRUCT	20	30
	X WAT VALVE	Existing valve & box	X UTIL WATER MAIN	20	30
	P WAT VALVE	Proposed valve & box	P UTIL WATER STRUCT	20	30
	P WAT VB CASTING	Proposed valve box casting only or adjust existing valve box to grade	P UTIL WATER STRUCT	20	30
	X WAT VALVE CHAMB	Existing valve chamber	X UTIL WATER MAIN	20	30
	P WAT VALVE CHAMB	Proposed valve chamber	P UTIL WATER STRUCT	20	30
	X WAT METER PIT	Existing meter pit	X UTIL WATER STRUCT	20	30
	P WAT METER PIT	Proposed meter pit (per Detail W-11)	P UTIL WATER STRUCT	20	30
	X WAT SLEEVE	Existing sleeve	X UTIL WATER STRUCT	20	30

WATER MAIN BLOCKS (continued)

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	P WAT SLEEVE	Proposed sleeve	P UTIL WATER STRUCT	20	30
	P WAT THRUST BLOCK	Proposed thrust block (in lieu of joint restraint)	P UTIL WATER STRUCT	20	30
	*<Drawn>*	Proposed water service lead (drawn with .028" line width)	P UTIL WATER STRUCT	20	30
	X WAT PLUG	Existing plug	X UTIL WATER MAIN	20	30
	P WAT TEST PT	Proposed water test and chlorination reference point	P UTIL WATER MAIN NOTE	1	1
	P WAT PLUG	Proposed plug	P UTIL WATER STRUCT	20	30
	P WAT REM VALVE BOX	Proposed removal of valve box	P UTIL WATER MAIN NOTE	1	1

SANITARY AND STORM SEWER BLOCKS

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	X STM CATCH BASIN	Existing standard catch basin	X UTIL STORM SEWER	20	30
	P STM CATCH BASIN	Proposed standard catch basin	P UTIL STORM STRUCT	20	30
	P STM CB CASTING	Proposed standard catch basin casting only or adjust existing casting to grade only	P UTIL STORM STRUCT	20	30
	X STM DITCH BASIN	Existing ditch basin	X UTIL STORM SEWER	20	30
	P STM DITCH BASIN	Proposed ditch basin	P UTIL STORM STRUCT	20	30
	X STM GRATE BASIN	Existing flat-grate basin	X UTIL STORM SEWER	20	30
	P STM GRATE BASIN	Proposed flat-grate basin	P UTIL STORM STRUCT	20	30
	P STM GB CASTING	Proposed flat-grate catch basin casting only or adjust existing casting to grade only	P UTIL STORM STRUCT	20	30
	X STM END SECTION	Existing storm sewer flared end section	X UTIL STORM SEWER	20	30
	P STM END SECTION	Proposed storm sewer flared end section	P UTIL STORM STRUCT	20	30
	P STM PLUG	Proposed storm sewer plug/cap	P UTIL STORM STRUCT	20	30
	X STM MANHOLE	Existing storm sewer manhole	X UTIL STORM SEWER	20	30
	*<Drawn>*	Existing oversized (> 4' dia.) storm sewer manhole (draw at diameter of manhole)	X UTIL STORM SEWER	N/A	N/A
	P STM MANHOLE	Proposed storm sewer manhole	P UTIL STORM STRUCT	20	30
	*<Drawn>*	Proposed oversized (> 4' dia.) storm sewer manhole (draw at diameter of manhole)	P UTIL STORM STRUCT	N/A	N/A
	P STM MH CASTING	Proposed storm manhole casting only or adjust existing casting to grade only	P UTIL STORM STRUCT	20	30
	X SAN MANHOLE	Existing sanitary sewer manhole	X UTIL SANITARY SEWER	20	30
	*<Drawn>*	Existing oversized (> 4' dia.) sanitary sewer manhole (draw at diameter of manhole)	X UTIL SANITARY SEWER	N/A	N/A
	P SAN MANHOLE	Proposed sanitary sewer manhole	P UTIL SANITARY STRUCT	20	30
	*<Drawn>*	Proposed oversized (> 4' dia.) sanitary sewer manhole (draw at diameter of manhole)	P UTIL SANITARY STRUCT	N/A	N/A
	P SAN MH CASTING	Proposed sanitary manhole casting only or adjust existing casting to grade only	P UTIL SANITARY STRUCT	20	30
	P SAN PLUG	Proposed sanitary sewer plug/cap	P UTIL SANITARY STRUCT	20	30
	*<Drawn>*	Proposed sanitary sewer lateral (drawn using .028" line wid	P UTIL SANITARY LATERAL	20	30
	X SAN LAT CLEANOUT	Existing sanitary sewer lateral cleanout	X UTIL SANITARY SEWER	20	30
	P SAN LAT CLEANOUT	Proposed sanitary sewer lateral cleanout	P UTIL SANITARY LATERAL	20	30
	X SAN FM CLEANOUT	Existing sanitary forcemain cleanout manhole	X UTIL SAN FORCEMAIN	20	30
	P SAN FM CLEANOUT	Proposed sanitary forcemain cleanout manhole	X UTIL SAN FORCEMAIN	20	30
	X SAN FM GATE VALVE	Existing sanitary forcemain gate valve chamber	X UTIL SAN FORCEMAIN	20	30
	P SAN FM GATE VALVE	Proposed sanitary forcemain gate valve chamber	X UTIL SAN FORCEMAIN	20	30

TRAFFIC SIGNAL AND STREET LIGHTING BLOCKS

Symbol	Filename	Description	Layer	Insert Scale 1"=20'	Insert Scale 1"=40'
	X TFS PED SIGNAL	Existing pedestrian signal (attach to existing utility or pedestrian signal pole)	X UTIL TRAFFIC SIGNAL	20	30
	P TFS PED SIGNAL	Proposed pedestrian signal (attach to existing or proposed utility or pedestrian signal pole)	P UTIL TRF SIG STRUCTURE	20	30
	X TFS PED SIGNAL POLE	Existing pedestrian signal pole	X UTIL TRAFFIC SIGNAL	20	30
	P TFS PED SIGNAL POLE	Proposed pedestrian signal pole	P UTIL TRF SIG STRUCTURE	20	30
	P TFS GUY ANCHOR	Proposed traffic signal guy anchor (line must be added at length required)	P UTIL TRF SIG STRUCTURE	20	30
	X TFS POLE	Existing traffic signal pole	X UTIL TRAFFIC SIGNAL	20	30
	P TFS POLE	Proposed traffic signal pole	P UTIL TRAF SIG STRUCT	20	30
	P TFS TRAFFIC SIGNAL	Proposed traffic signal	P UTIL TRAF SIG OH	20	30
	P TFS TRAFFIC SIGNAL (LV)	Proposed traffic signal with louvers	P UTIL TRAF SIG OH	20	30
	P TFS REM TRAFFIC SIGNAL	Traffic signal to be removed	P UTIL TRAF SIG REM-SLV OH	20	30
	P TFS SALV TRAFFIC SIGNAL	Traffic signal to be removed and salvaged	P UTIL TRAF SIG REM-SLV OH	20	30
	P TFS 2W CASE SIGN	Proposed illuminated case sign (2-way)	P UTIL TRAF SIG OH	20	30
	P TFS REM 2W CASE	Illuminated case sign (2-way) to be removed	P UTIL TRAF SIG REM-SLV OH	20	30
	P TFS 4W CASE SIGN	Proposed illluminated case sign (4-way)	P UTIL TRAF SIG OH	20	30
	P TFS REM 4W CASE	Existing illluminated case sign (4-way) to be removed	P UTIL TRAF SIG OH	20	30
	X TFS CONTROL CABINET	Existing traffic signal control cabinet	X UTIL TRAFFIC SIGNAL	20	30
	P TFS CONTROL CABINET	Proposed traffic signal control cabinet	P UTIL TRAF SIG STRUCT	20	30
	X STL HANDHOLE-PED	Existing handhole or pedestal	X UTIL STREET LIGHTING	20	30
	P STL HANDHOLE-PED	Proposed handhole or pedestal	P UTIL STREET LGT STRUCT	20	30
	X STL MANHOLE	Existing manhole	X UTIL STREET LIGHTING	20	30
	P STL GUY ANCHOR	Proposed street lighting guy anchor (line must be added at length required)	P UTIL STREET LGT STRUCT	20	30
	P STL EXIST LUMINAIRE	Existing street light to be removed (this is normally shown only on the street lighting plan)	X UTIL STREET LIGHTING	20	30
	P STL STANDARD ST LGT-ARM	Proposed street light (Cobra/standard with mast arm)	P UTIL STREET LGT STRUCT	20	30
	P STL STANDARD STREET LIGHT	Proposed street light (Cobra/standard without mast arm)	P UTIL STREET LGT STRUCT	20	30
	P STL POST STREET LIGHT	Proposed street light (Post/decorative type)	P UTIL STREET LGT STRUCT	20	30
	P STL SHOEBOX STREET LIGHT	Proposed street light (Shoebox type with mast arm)	P UTIL STREET LGT STRUCT	20	30
	P STL RISER	Proposed conduit riser (shown with existing utility pole)	P UTIL STREET LGT STRUCT	20	30
	P STL POLE	Proposed street lighting pole	P UTIL STREET LGT STRUCT	20	30

TRAFFIC SIGNAL AND STREET LIGHTING BLOCKS (continued)

				Insert Scale	
Symbol	**Filename**	**Description**	**Layer**	**1"=20'**	**1"=40'**
	P STL VAULT E25	Proposed street lighting vault (type E-25)	P UTIL STREET LGT STRUCT	1	N/A
	P STL VAULT E25A-D-E	Proposed street lighting vault (type E-25A, E-25D, or E-25E)	P UTIL STREET LGT STRUCT	1	N/A
	P STL VAULT E25B	Proposed street lighting vault (type E-25B)	P UTIL STREET LGT STRUCT	1	N/A
	P STL VAULT E25C	Proposed street lighting vault (type E-25C)	P UTIL STREET LGT STRUCT	1	N/A
	P STL VAULT E3A	Proposed street lighting vault (type E-3A)	P UTIL STREET LGT STRUCT	1	N/A
	X STL TRANSFORMER	Existing street lighting pad-mounted transformer	X UTIL STREET LIGHTING	20	30
	P STL TRANSFORMER	Proposed street lighting pad-mounted transformer	P UTIL STREET LGT STRUCT	20	30

PAVEMENT MARKING BLOCKS

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	P PMK BIKE	Pavement marking bike lane marking including arrow	P PMK SYMBOL	1	1
	P PMK BIKE SHARROW	Pavement marking bike lane marking with sharrow	P PMK SYMBOL	1	1
	P PMK LANE DASH	Pavement marking striping dash (use 30' to 50' spacing)	P PMK 4 WHITE STRIPING	1	1
	P PMK LEGEND (STOP)	Pavement marking "STOP" legend	P PMK SYMBOL	1	1
	P PMK LEGEND (LEFT)	Pavement marking "LEFT" legend	P PMK SYMBOL	1	1
	P PMK LEGEND (RIGHT)	Pavement marking "RIGHT" legend	P PMK SYMBOL	1	1
	P PMK LEGEND (LANE)	Pavement marking "LANE" legend	P PMK SYMBOL	1	1
	P PMK LEGEND (ONLY)	Pavement marking "ONLY" legend	P PMK SYMBOL	1	1
	P PMK LEGEND (TURN)	Pavement marking "TURN" legend	P PMK SYMBOL	1	1
	P PMK LEGEND (SCHOOL)	Pavement marking "SCHOOL" legend	P PMK SYMBOL	1	1
	P PMK ARROW TURN	Pavement marking turn arrow (left or right) legend	P PMK SYMBOL	1	1
	P PMK ARROW THRU	Pavement marking thru arrow legend	P PMK SYMBOL	1	1
	P PMK ARROW THRU TURN	Pavement marking thru/turn (left or right) arrow legend	P PMK SYMBOL	1	1
	P PMK RR CROSSING	Railroad crossing legend	P PMK SYMBOL	20	40
	<*Drawn*>	12" stop bar (use polyline with width of 1.5')	P PMK SYMBOL	N/A	N/A
	<*Drawn*>	24" stop bar (use polyline with width of 2')	P PMK SYMBOL	N/A	N/A
	<*Drawn*>	Cross-walk lines (use polyline with width of .75' and offset of 6')	P PMK 6 WHITE STRIPING	N/A	N/A
	P PMK CROSSWALK	Zebra-type cross-walk lines (block only includes one stripe - repeat block as necessary to cover width of road; use 2' spacing)	P PMK SYMBOL	20	40
	<*Drawn*>	Centerline striping (single or double) (use polyline with width of .5' and offset of 1.5' for double lines)	P PMK 4 YELLOW STRIPING	N/A	N/A

NOTE: the X MISC PVMT MARKING layer is used with the pavement marking symbols above to indicate existing markings.

MISCELLANEOUS BLOCKS

Symbol	Filename	Description	Layer	Insert Scale	
				1"=20'	1"=40'
	MISC MATCHLINE	Match line (only partially shown) - the match line length can be adjusted as needed, but maintain the same dash pattern at each end of the line - text is included	PS MATCHLINE / PS MATCHLINE TEXT	1	1
	MISC NORTH ARROW	North arrow	PS BORDER & TITLEBLOCK	1	1
AS-BUILT 8/1/2004	LEGEND AS-BUILT STAMP	As-built stamp (prompts for date)	P MISC AS-BUILT NOTE	1	1
<legend>	LEGEND CONC JOINT LABELS	Legend including standard concrete joint labeling	PS LEGEND	1	1
<legend>	LEGEND DETOUR SIGN KEY	Key for detour signage	PS LEGEND	1	1
<legend>	LEGEND GEN PM-SIGNAGE NOTES (MDOT)	Legend for MDOT pavement marking/signage notes	PS GENERAL NOTES	1	1
<legend>	LEGEND GEN RECON NOTES (GR)	Standard notes for all proposed reconstruction sheets (City projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND GEN RECON NOTES (MDOT)	Standard notes for all proposed reconstruction sheets (MDOT projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND GEN REMOVAL NOTES (GR)	Standard notes for all proposed removal sheets (City projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND GEN REMOVAL NOTES (MDOT)	Standard notes for all proposed removal sheets (MDOT projects)	PS GENERAL NOTES	1	1
	LEGEND GEN REVIEW	Disclaimer label indicating general GR review only	PS LEGEND	1	1
<legend>	LEGEND HMA APP EST (TABLE)	HMA application table (modify as needed)	PS LEGEND	1	1
INFORMATION ONLY	LEGEND INFO ONLY STAMP	Disclaimer label indicating for GR information only	PS LEGEND	1	1
<legend>	LEGEND LEAD WAT REPL	Legend for lead water service replacement to meter	PS LEGEND	1	1
<legend>	LEGEND RECON (GR)	Legend for reconstruction sheets (City projects)	PS LEGEND	1	1
<legend>	LEGEND RECON (MDOT)	Legend for reconstruction sheets (MDOT projects)	PS LEGEND	1	1
<legend>	LEGEND REMOVAL (GR)	Legend for removal sheets (City projects)	PS LEGEND	1	1
<legend>	LEGEND REMOVAL (MDOT)	Legend for removal sheets (MDOT projects)	PS LEGEND	1	1
<legend>	LEGEND RESURFACING (MDOT)	Legend for resurfacing sheets (MDOT projects)	PS LEGEND	1	1
	LEGEND SAN REVIEW ONLY	Disclaimer label indicating GR sanitary sewer review only	PS LEGEND	1	1
<legend>	LEGEND STD SAN REM (GR)	Standard notes for sanitary sewer removal items (GR projects)	PS LEGEND	1	1
<legend>	LEGEND STD STM REM (GR)	Standard notes for storm sewer removal items (GR projects)	PS LEGEND	1	1
<legend>	LEGEND STD WAT REM (GR)	Standard notes for water main removal items (GR projects)	PS LEGEND	1	1
<legend>	LEGEND STD WAT REM (MDOT)	Standard notes for water main removal items (MDOT projects)	PS LEGEND	1	1
<legend>	LEGEND STD SAN NOTES (GR)	Standard notes for all proposed sanitary sewer sheets (City projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND STD SAN NOTES (MDOT)	Standard notes for all proposed sanitary sewer sheets (MDOT projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND STD STM NOTES (GR)	Standard notes for all proposed storm sewer sheets (City projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND STD STM NOTES (MDOT)	Standard notes for all proposed storm sheets (MDOT projects)	PS GENERAL NOTES	1	1

				Insert Scale	
Symbol	**Filename**	**Description**	**Layer**	**1"=20'**	**1"=40'**
<legend>	LEGEND STD WAT NOTES (GR)	Standard notes for all proposed water main sheets (City projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND STD WAT NOTES (MDOT)	Standard notes for all proposed water main sheets (MDOT projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND STD WAT NOTES (MDOT)	Standard notes for all proposed water main sheets (MDOT projects)	PS GENERAL NOTES	1	1
<legend>	LEGEND STD STL NOTES (GR)	Standard notes for all proposed street lighting sheets (GR projects)	PS GENERAL NOTES	1	1
	LEGEND STM REVIEW ONLY	Disclaimer label indicating GR public storm sewer review only	PS LEGEND	1	1
<legend>	LEGEND STD WAT NOTES (MDOT)	Standard notes for all proposed water main sheets (MDOT projects)	PS GENERAL NOTES	1	1
	LEGEND STM REVIEW ONLY	Disclaimer label indicating GR public storm sewer review only	PS LEGEND	1	1
<legend>	LEGEND TRAFFIC SIGN KEY	Key for traffic signs	PS LEGEND	1	1
	LEGEND UNDERGROUND HAZARD	Warning label for underground gas, electric, etc. hazard (modify as needed)	PS LEGEND	1	1
	LEGEND WAT REVIEW ONLY	Disclaimer label indicating GR water main review only	PS LEGEND	1	1
	P REM ITEM	Removal symbol for hydrant, CB, tree or other topo item	P MISC REM ITEM	20	30
	P REM CURB	Removal symbol for curb or curb & gutter	P MISC REM ITEM	20	30
	P REM ABANDON UTILITY	Abandon utility (e.g. sanitary/storm sewer, water main)	P MISC REM ITEM	20	30

TABLE C
LINE TYPES

Line Type Name	Sample	Application
BORDER		City and township corporation lines
CENTER, CENTER2, CENTER4		Centerlines and survey lines with small (CENTER), minimum (CENTER2) or large (CENTER4) spans between break patterns
CHAINLINK_X		EXISTING chain-link fence (set the LTSCALE for this object to 0.4)
CHAINLINK_P		PROPOSED chain-link fence (LTSCALE must be set to 0.4)
CONTINUOUS		EXISTING sanitary sewer lines (shown), combined sewer lines, edge of pavement, building footprints, fence lines, guardrail lines, platted lines, contour lines (except top of bank and toe of slope), existing plat boundaries, property lines and secondary voltage overhead lines
CONTINUOUS		ROW lines and PROPOSED sanitary sewer lines (shown), combined sewer lines, edge of pavement, building footprints, contour lines (except top of bank and toe of slope), fence lines, guardrail lines, curb & gutter, sidewalk, lot lines, profile centerline grade line, plat/property lines, railroad ROW lines and secondary voltage overhead lines
DASHDOT		EXISTING ground right grade in profile (shown) and section lines (when section line coincides with the centerline, the centerline linetype is used and labeled as a specific section line)
DASHDOT		PROPOSED ground right grade in profile
DASHED		EXISTING sanitary and storm sewer forcemains
DASHED		PROPOSED sanitary and storm sewer forcemains
DASHED2		EXISTING top of bank lines, easement lines, plat lot lines and profile centerline grade line
DASHED2		Highway (MDOT) ROW lines, vacated street/alley lines and PROPOSED top of bank lines and easement lines
DITCH, DITCH2, DITCH4		EXISTING ditch lines, wetlands, shorelines, swales and other water lines with small (DITCH), medium (DITCH2) or large (DITCH4) spans between break patterns
DITCH, DITCH2, DITCH4		PROPOSED ditch lines, swales or other related type lines with small (DITCH), medium (DITCH2) or large (DITCH4) spans between break patterns
DOT2		EXISTING ground left grade in profile
DOT2		PROPOSED ground left grade in profile
GAS, GAS2, GAS4		EXISTING gas main lines with short (GAS), medium (GAS2) or long (GAS4) spans between break patterns
GASP, GAS2P, GAS4P		PROPOSED gas main lines with short (GASP), medium (GAS2P) or long (GAS4P) spans between break patterns
GUARD_L, GUARD_R		EXISTING guardrails (LTSCALE must be set to 0.5)
GUARD_L, GUARD_R		PROPOSED guardrails (LTSCALE must be set to 0.75)

LINE TYPES (continued)

Linetype Name	Sample	Application
HIDDEN		EXISTING profile over proposed sanitary sewer or water main and existing culverts
HIDDEN		PROPOSED profile over proposed sanitary sewer or water main and proposed culverts
HIDDEN		PROPOSED sanitary (red) and storm (green) sewer lining (in plan view shown 1' offset below existing sanitary sewer line and in profile in the center of the existing pipe)
HIDDEN2		EXISTING straight curb (representing the face of curb), toe of slope, steel casing pipe (bore and jack applications) and contours
HIDDEN2		EXISTING curb or curb & gutter (single line for straight curb which represents the face of curb and double lines for curb & gutter representing the face of curb and the front of the gutter pan/edge of metal)
HIDDEN2		PROPOSED toe of slope and steel casing pipe (bore and jack applications)
HIDDEN4		EXISTING edge of a gravel surface and underground vaults/chambers and areaways
HIDDEN4		PROPOSED edge of a gravel surface and temporary grading limits
SIDEWALK		EXISTING concrete sidewalk and concrete approaches and driveways
STLGX		EXISTING street lighting primary voltage overhead wires
STOCKADE_X		EXISTING stockade fence (LTSCALE must be set to 0.17)
STOCKADE_P		PROPOSED stockade fence (LTSCALE must be set to 0.17
STORM, STORM2, STORM4		EXISTING storm sewer lines with short (STORM), medium (STORM2) or long (STORM3) spans between break patterns
STORMP, STORM2P, STORM4P		PROPOSED storm sewer lines with short (STORMP), medium (STORM2P) or long (STORM4P) spans between break patterns
TRACKS		EXISTING railroad tracks (set the LTSCALE for this object to 0.75)
TREELINE_L, TREELINE_R		EXISTING tree line bordering woods (left and right facing)
UTILITY, UTILITY2, UTILITY4		Various EXISTING underground public and private utilities such as telephone (shown) and electric lines with short (UTILITY), medium (UTILITY2) or long (UTILITY4) spans between break patterns
UTILITYP, UTILITY2P, UTILITY4P		Various PROPOSED underground public and private utilities such as telephone (shown) and electric lines with short (UTILITYP), medium (UTILITY2P) or long (UTILITY4P) spans between break patterns
WATER		EXISTING water main line
WATERP		PROPOSED water main line

NOTE:
LTSCALE must be set in model space and paper space to desired scale for sheet drawings (20 or 40) and PSLTSCALE set to zero (default).

TABLE D
TEXT

Style	Shape File	Application	Text Height		
			Paper Space	Model Space	
				1"=20'	1"=40'
S06	SIMPLEX	Pick-up notes, existing utility labels, ROW angles, lot/parcel dimensions, address and parcel labels, all existing text on profile (except station labels and base elevation)	0.06"	1.2'	2.4'
S08	SIMPLEX	General note body text, plan and profile station labels, benchmark, witness and control point notes, easement descriptions, note and dimension text on details, and dimensions and notes in as-built details	0.08"	1.6'	3.2'
S10	SIMPLEX	General note headings, scale text, ROW text on profile, proposed construction notes, proposed text on profile, proposed dimensions, profile base elevation text and as-built dimensions (plan view and profile)	0.1"	2'	4'
S12	SIMPLEX	Large headings for notes, title block ("Drawn by", "Notes in", "Check:Field" and "Office" blanks), and plat names in plan view.	0.12"	2.4'	4.8'
A10	ARIAL (Bold)	Minimum bold text size for small notes or text in Arial (Bold) font	0.1"	2'	4'
A12	ARIAL (Bold)	Alternate size for small title block or miscellaneous text in Arial (Bold) font	0.12"	2.4'	4.8'
A14	ARIAL (Bold)	Alternate size for small title block or miscellaneous text in Arial (Bold) font	0.14"	2.8'	5.6'
A16	ARIAL (Bold)	Preferred size for small titleblock text (typically project type and street limits) and for street name and matchline text on 40 scale drawings	0.16"	3.2'	6.4'
A18	ARIAL (Bold)	Miscellaneous text, as required	0.18"	3.6'	7.2'
A20	ARIAL (Bold)	Preferred size for street name and matchline text on 20 scale drawings	0.2"	4'	8'
A22	ARIAL (Bold)	Alternate size for for large title block text (when width of title block limits long street name)	0.22"	4.4'	8.8'
A24	ARIAL (Bold)	Alternate size for large title block text (typically street name)	0.24"	4.8'	9.6'
A28	ARIAL (Bold)	Preferred size for large title block text (typically street name)	0.28"	N/A	N/A
A30	ARIAL (Bold)	Minimum size for street limits and project type text on main title of title sheet	0.3"	N/A	N/A
A35	ARIAL (Bold)	Preferred size for street limits and project type text on main title of title sheet	0.35"	N/A	N/A
A40	ARIAL (Bold)	Miscellaneous large text, as required on title sheet	0.4"	N/A	N/A
A45	ARIAL (Bold)	Miscellaneous large text, as required on title sheet	0.45"	N/A	N/A
A50	ARIAL (Bold)	Miscellaneous large text, as required on title sheet	0.5"	N/A	N/A
A55	ARIAL (Bold)	Minimum size for street or project name on main title of title sheet	0.55"	N/A	N/A
A60	ARIAL (Bold)	Alternate size for street or project name on main title of title sheet	0.6"	N/A	N/A
A65	ARIAL (Bold)	Preferred size for street or project name on main title of title sheet	0.65"	N/A	N/A
A70	ARIAL (Bold)	Maximum size for street or project name on main title of title sheet	0.7"	N/A	N/A

TABLE E
HATCHING

Hatching Application	Pattern	Scale			Angle*
		1"=20'	1"=40'	1"=5'	
Pavement removal in roadway	ANSI37	75	100	N/A	0º*
Concrete sidewalk and drive approach removal	ANSI37	20	30	N/A	0º*
Bituminous drive, approach and walk removal (outside roadway)	HOUND	20	30	N/A	0º*
Asphalt surface area in roadway to be cold milled (all depths)	ZIGZAG	50	75	N/A	0º*
Existing and proposed buildings, houses, etc. (hatch area width = 3' [20 scale] or 6' [40 scale])	ANSI31	20	30	N/A	0º**
Proposed bituminous paving limits (hatch area width = 3' [20 scale] or 6' [40 scale])	ANSI31	15	22	N/A	0º**
Proposed brick pavement, walkway, or any decorative bricked area (use one of the many brick-type hatching patterns available and scale accordingly for the type and size of brick proposed)	Varies	Varies	Varies	N/A	Varies
Proposed bituminous pavement over area which was rotomilled or concrete pavement, fiber reinforced (specify in legend)	ANCHORLK	2	3	N/A	45º*
Proposed concrete pavement, non-reinforced	HONEY	40	50	N/A	90º*
Proposed bituminous pavement outside roadway (e.g. drive approach, drive, parking area, walkway)	NET3	15	20	N/A	45º*
Proposed easements for public utilities	ANSI31	20	40	N/A	0º
Proposed concrete sidewalk and drive approach (4" depth)	AR-CONC	0.6	1.2	N/A	0º
Proposed concrete sidewalk and drive approach (6" or 7" depth)	AR-CONC	0.3	0.6	N/A	0º
Proposed sidewalk ramp with ADA warning device installed	HEX	5	7.5	N/A	0º
Proposed grass seed, hydromulch or general landscaping, and existing wetlands	GRASS	1	2	N/A	0º
Proposed areas of fill in profile	ANSI31	20	40	N/A	0º
Proposed rip-rap	GRAVL1	5	10	10	0º
Existing cross-section - removal area (asphalt/HMA)	ANSI31	N/A	N/A	7	0º
Existing cross-section - removal area (concrete)	ANSI37	N/A	N/A	7	0º
Proposed cross-section - sand layer	AR-SAND	N/A	N/A	0.2	0º
Proposed cross-section - gravel layer	DOTS	N/A	N/A	4	20º
Proposed cross-section - concrete layer	AR-CONC	N/A	N/A	0.1	0º
Proposed cross-section - asphalt layers (alternate angle by 90º for adjacent layers)	ANSI31	N/A	N/A	3	0º/90º
Proposed cross-section - top soil	EARTH	N/A	N/A	4	45º

* Angle is in reference to centerline ** Angle is in reference to the building front or paving limit

TABLE F
LABELING

EXISTING UTILITIES

The following abbreviations are to be used to label existing utilities on both the plan and profile views on drawings (S06 text style).

Utility Type	Format Example
Sanitary Sewer	8" SAN
Combined Sewer	12" CMB
Storm Sewer	30" STM
Culvert	12" CULV
Forcemain	16" SAN FM or 16" STM FM
Water Main	12" WAT
Street Lighting	STL
Traffic Signal	TFS
Electrical Conduit/Duct	PWR
Natural Gas	4" GAS
Steam	12" STEAM
Telephone	TEL
Data & Communications	DATA/COM
Fiber Optics	FIBER OPT
Cable TV	CTV
Aerial Utility	FIBER OPT (AERIAL)
Abandoned Utility	8" WAT (ABAN)

PROPOSED UTILITIES

The following abbreviations are to be used to label proposed underground public utilities on alternate drawings (e.g. proposed sanitary sewer labeling on proposed water main drawings) and in the profile view of related utility drawing (e.g. proposed sanitary sewer labeling in profile of sanitary sewer drawings) using S08 size style and .014" line thickness, unless noted otherwise.

Utility Type	Format Example
Sanitary Sewer (plan view)	PROP 8" SAN
Sanitary Sewer (profile view)*	PLACE 100' OF 8" SANITARY SEWER @ 2.0%
Water Main (plan and profile views)*	PROP 12" WAT
Public Storm Sewer (plan view)	PROP 36" STM
Public Storm Sewer (profile view)*	PLACE 150' OF 36" STORM SEWER @ 1.0%
Private Storm Sewer (plan view)	PROP 24" STM (PVT.)
Private storm Sewer (profile view)	PLACE 200' OF 12" STORM SEWER @ 1.5% (PVT.)

* In profile view, these notes are typically S10 text style and .020" line width on like sheets (e.g. proposed sanitary sewer label on sanitary sheets).

MISCELLANEOUS LABELS

The following conventions are to be used to label items shown on project drawings using S06 text style and .010" line width when associated with existing conditions/survey, and S10 text style and .020" line width for items related to proposed project items, unless noted otherwise.

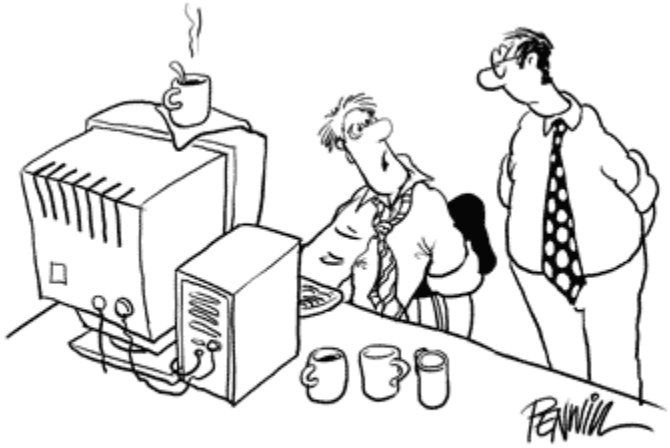
Label Type	Comments	Format Example
Residential Property	Label the property address (include street name for corner lots) and last six digits of parcel number (use S06 text style). Place label inside building footprint if the building is within 50' of the ROW. If no building on property or if not within 50', place label in property area near ROW.	#1000 BENJAMIN 100-001
Business Property	For properties that include an operating business, add the business name above the address and parcel number (use S06 text style). See above for placement.	FRED & ETHEL'S RESTAURANT #1000 BENJAMIN 100-001
Property Lot Dimension	Label lot width along ROW line for each property/parcel (use S06 text style).	150'
Plat name	Label plat name along properties shown, with text on slight angle (use S10 text style and .010" line width).	JACKSON'S ADDITION
Lot number	Label plat lot number within lot boundaries (use S08 text style).	24
Right-of-way angle	Label angles at ROW intersections (use S06 text style). Angle label between ROW lines.	89°39'44"
Section Lines	Label all section lines including bearings and distances surrounding the project area (use S06 text style). For any section lines within the survey area, label both sides of section line as shown.	S LINE SEC 30-7-11 N LINE SEC 31-7-11
Section Corner	Label all section corners/centers within the project area (use S06 text style).	SOUTH 1/4 COR., SEC. 29, T7N, R11W
Control Point	Label all control points within the survey area (use S06 text style).	CP #12
Surface Type	Label all pavement, walkway and ground surfaces on plan view (use S06 text style).	BIT., CONC., BRICK, GRASS, etc.
Topo item	You may label any miscellaneous topo features in plan view when practical (use S06 text style).	RET. WALL or LANDSCAPED AREA
Existing public utility easements	Label all existing public utility easements within the survey area (use S06 text style).	PUBLIC UTIL. ESMT. (L. 1958, PGS. 10-14) or (INSTR. NO. 20140000-0000000)
Vacation Record	Label all vacated streets/alleys within the survey area (use S06 text style).	VACATED IN 1927 (L. 1958, PGS. 10-14)
C/L-C/L Location	Label C/L-C/L location in profile for each intersecting street (use S08 text). Label vertically above profile and include station (use CENTER2 linetype).	C/L OTTAWA AVE. STA. 10+00
Manholes	Label all sanitary and storm sewer manholes for reference with regard to profile and field data (use S06 text style).	SAN MH #102

TABLE G
DIMENSION STYLES

Dimstyle Name*	Application
EXIST DIM 20 - 2 EXT	Existing dimensions in MODEL SPACE where both extension lines are needed (20 scale drawing)
EXIST DIM 20 - 2 EXT - FLIPPED	Existing dimensions in MODEL SPACE where both extension lines are needed and text must be flipped 180 degrees (20 scale drawing)
EXIST DIM 20 - 1 EXT	Existing dimensions in MODEL SPACE where only one extension line is needed (20 scale drawing)
EXIST DIM 20 - 1 EXT - FLIPPED	Existing dimensions in MODEL SPACE where only one extension line is needed and text must be flipped 180 degrees (20 scale drawing)
EXIST DIM 20 - NO EXT	Existing dimensions in MODEL SPACE where no extension lines are needed (20 scale drawing)
EXIST DIM 20 - NO EXT - FLIPPED	Existing dimensions in MODEL SPACE (20 scale drawing) (No extension lines displayed and text flipped 180 degrees)
EXIST DIM 40 - 2 EXT	Existing utility locations, ROW splits, curb splits, amd other miscellaneous dimensions in MODEL SPACE (40 scale drawing) (Both extension lines displayed)
EXIST DIM 40 - 2 EXT - FLIPPED	Existing utility locations, ROW splits, curb splits, amd other miscellaneous dimensions in MODEL SPACE (40 scale drawing) (Both extension lines displayed and text fipped 180 degrees)
EXIST DIM 40 - 1 EXT	Existing utility locations, ROW splits, curb splits, amd other miscellaneous dimensions in MODEL SPACE (40 scale drawing) (One extension line displayed only)
EXIST DIM 40 - 1 EXT - FLIPPED	Existing utility locations, ROW splits, curb splits, amd other miscellaneous dimensions in MODEL SPACE (40 scale drawing) (One extension line displayed only and text flipped 180 degrees)
EXIST DIM 40 - NO EXT	Existing utility locations, ROW splits, curb splits, amd other miscellaneous dimensions in MODEL SPACE (40 scale drawing) (No extension lines displayed)
EXIST DIM 40 - NO EXT - FLIPPED	Existing utility locations, ROW splits, curb splits, amd other miscellaneous dimensions in MODEL SPACE (40 scale drawing) (No extension lines displayed and text flipped 180 degrees)
PROPOSED - 2 EXT	Proposed public utility locations, restoration limits, pipe material limits in profile and other miscellaneous dimensions in PAPER SPACE (Both extension lines displayed)
PROPOSED - 1 EXT	Proposed public utility locations, restoration limits, pipe material limits in profile and other miscellaneous dimensions in PAPER SPACE (One extension line displayed only)
PROPOSED - NO EXT	Proposed public utility locations, restoration limits, pipe material limits in profile and other miscellaneous dimensions in PAPER SPACE (No extension lines displayed)
DETAILS - 2 EXT	Proposed detail notes, dimensions and associated leaders in MODEL SPACE** or PAPER SPACE (Both extension lines displayed)
DETAILS - 1 EXT	Proposed detail notes, dimensions and associated leaders in MODEL SPACE** or PAPER SPACE (One extension line displayed only)
DETAILS - NO EXT	Proposed detail notes, dimensions and associated leaders in MODEL SPACE** or PAPER SPACE (No extension lines displayed)

***** The above Dimstyles are included with the template files provided with the City of Grand Rapids CAD Standards. The Proposed and Detail Dimstyles are loaded in the standard sheet templates. All the Dimstyles include the necessary attribute settings.

** When complete details are created in Model Space, text sizes and Dimstyle should be set according to zoom factor used in Paper Space viewport (plotted result should be .08" height text and .12" length arrowheads). When detail linework is created in Model Space and text and dimensions in Paper Space (viewport used), provide all text and dimensioning in Paper Space using the appropriate text size and Dimstyle to achieve these results.



"FOR SIMPLICITY I'VE REDUCED THE NUMBER OF LAYERS TO 386,239"

"EITHER THE CAD SOFTWARE IS CORRUPT OR IT'S THE UPGRADE SUBSCRIPTION"