

August 4th, 2026

ADDENDUM NUMBER 4

CONTRACT: TOC-DES3 A-D
EPIN: 82626P0024

This addendum is issued for the purpose of amending the contents of the Request for Proposal (“RFP”) for the above referenced contract, released on May 26, 2026 and is made part of the RFP to the same extent as if this addendum was originally included.

CORRECTION:

The Addendum document uploaded to PASSPort RFx on Friday, July 31st, 2026 was incorrectly labeled as Addendum #4. The correct label for the document is *Addendum #3*.

Clarification Questions & Answers:

Question No. 1: If we are submitting as a JV, shall we submit 6 projects (3 per firm) or 3 projects in total (not inclusive of the projects from our subconsultants)?

Answer No.1: If submitting a proposal as a JV, three projects in total. should be submitted.

Question No. 2 With 4 firms being awarded, might you be able to share more insight into the rotational process of assigning TO’s to the selected firms? Will it, in part, be based on qualifications/capabilities, or truly a rotational basis?

Answer No.2: Under DEP discretion, the Task Orders are usually assigned on a rotational basis.

Question No. 3: In the RFP, it was mentioned that for those forming a JV, all major participants must be set up in PASSPort. With that said, do you want to see a screenshot of any non-

submitting major participants PASSPort information (alongside the submitting participants), or is that not required based on the PASSPort team set up?

Answer No.3: The proposal can be submitted by one of the entities making up the JV. If the JV is the selected vendor for the procurement, the JV (as well as both entities) must be registered in PASSport for the procurement to move forward.

Question No. 4: Do you want to see firm licenses in our submission also?

Answer No. 4: See Section II E. [Key Personnel Requirements](#) of the RFP.

Question No. 5: Are there any limitations regarding adding more roles that we deem fit based on the proposed scope of work?

Answer No. 5: There are no limitations on adding roles.

Question No. 6: Can DEP provide representative sample Task Orders (scope, fee range, duration) to better understand expected project complexity and staffing needs?

Answer No. 6: A Scope of Work and list of potential projects have been provided in the RFP.

Question No. 7: What is the anticipated number of Task Orders per year per consultant?

Answer No. 7: There is no anticipated number of Task Orders per year. Task Orders will be issued by the terms of the contract until the contract cap is exceeded, or the contract duration has ended.

Question No. 8: Is there any expected minimum Task Order value within the \$5M contract cap?

Answer No. 8: There is no guaranteed minimum value for the contract.

Question No. 9: Are there any programmatic priorities (e.g., CSO, dams, WWTP upgrades) that will take precedence in early Task Orders?

Answer No. 9: The list of potential projects is provided in the RFP.

Question No. 10: Are there any constraints on site access (active facilities, security, operations)?

Answer No. 10: The work may be at or for any DEP site or asset, including operating water/wastewater facilities, in the public right-of-way, on buried infrastructure, at locations with additional security requirements for access.

Question No. 11: Will subconsultants need to be pre-approved at contract level or per Task Order?

Answer No. 11: Subconsultant are approved at contract level.

Question No. 12: Can DEP clarify which permits are consultant-led vs. DEP-led?

Answer 12: This will be determined for each Task Order.

Question No. 13: Are there project categories that are exempt from certain EHS requirements?

Answer No. 13: This will be determined for each Task Order, as applicable.

Question No. 14: Under what specific, objective criteria will a consultant be deemed “unavailable,” allowing DEP to bypass rotation or reassign work?

Answer No. 14: Under DEP discretion, consultant may be deemed “unavailable” based on assignment capacity.

Question No. 15: What specific BIM Level of Development (LOD) is required at each design milestone (Existing Conditions, 30%, 60%, 90%, 100%)?

Answer No. 15: Refer to the BEDC BIM Standards found in the Knowledge Reservoir on Trimble. Document is attached to this Addendum.

All other terms and conditions of the above referenced solicitation remain unchanged.

If you have any questions, please feel free to contact Fiorella Leal via the Discussion Forum tab in PASSPort.

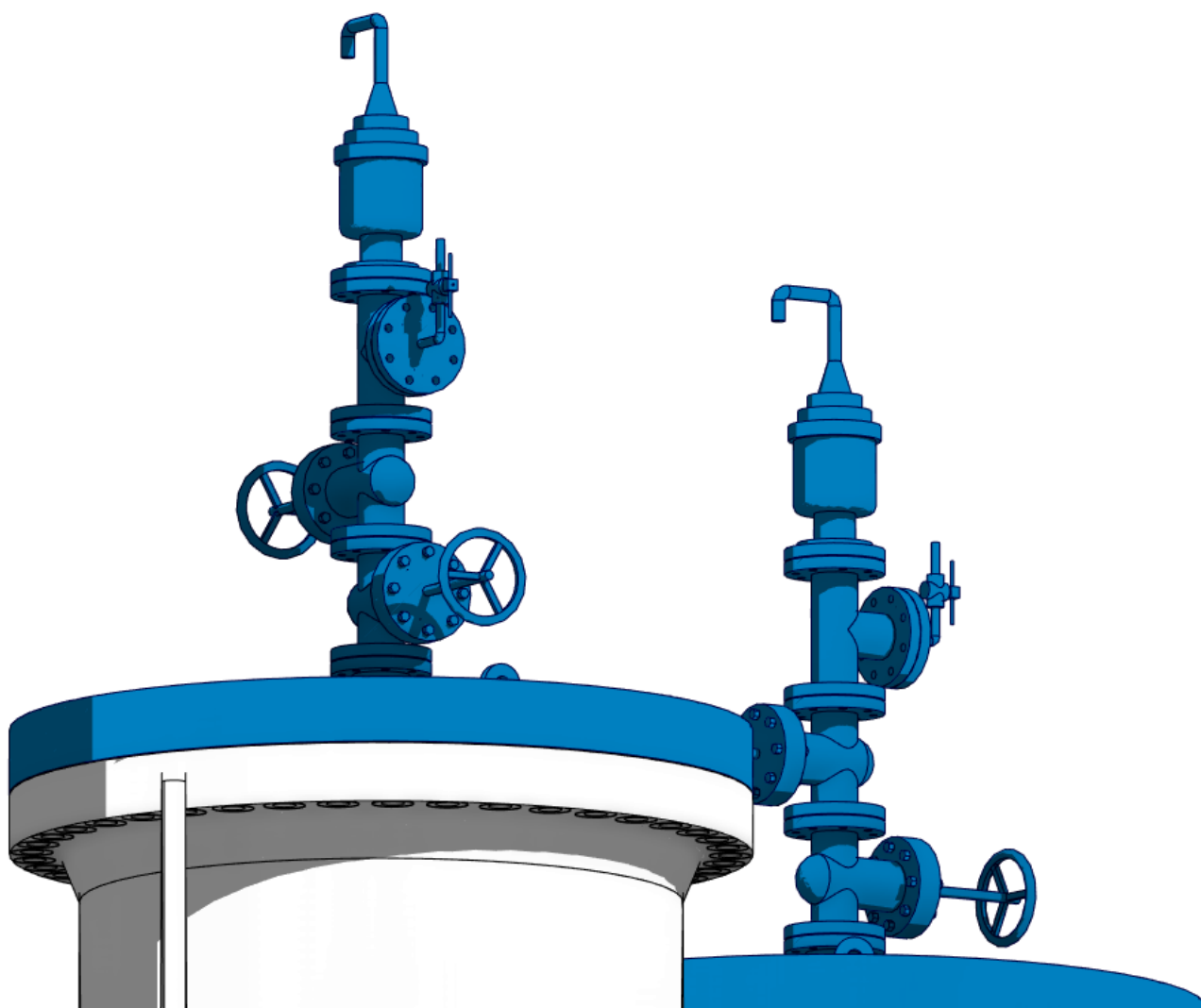
Approved by:  _____



**Environmental
Protection**

Bureau of Engineering
Design and Construction

Computer Aided Design & Building Information Modeling Standards





**Environmental
Protection**

**Bureau of Engineering Design and Construction
In-House Design**

Computer Aided Design (CAD) & Building Information Modeling (BIM) Standards

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1.0	April 12, 2021	Initial Release*	Gamal Ingram Omar Ishak Dennis J. Stanford	Ashkan Rowshanrad
1.1	July 18, 2022	Updated Release*	Ashkan Rowshanrad Omar Ishak Dennis J. Stanford Rafael Pinkhasov	Gamal Ingram

*CAD related materials described in this manual are developed from the *DEP-BEDC CAD Standards Manual* issued on 2/9/2015 by G. Irving. This manual includes CAD and BIM Standards and supersede the 2015 CAD Standard Manual.

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APPENDIX

APPENDIX 1 – DEP Predefined Layers

APPENDIX 2 – DEP Custom Line Types (Line Styles)

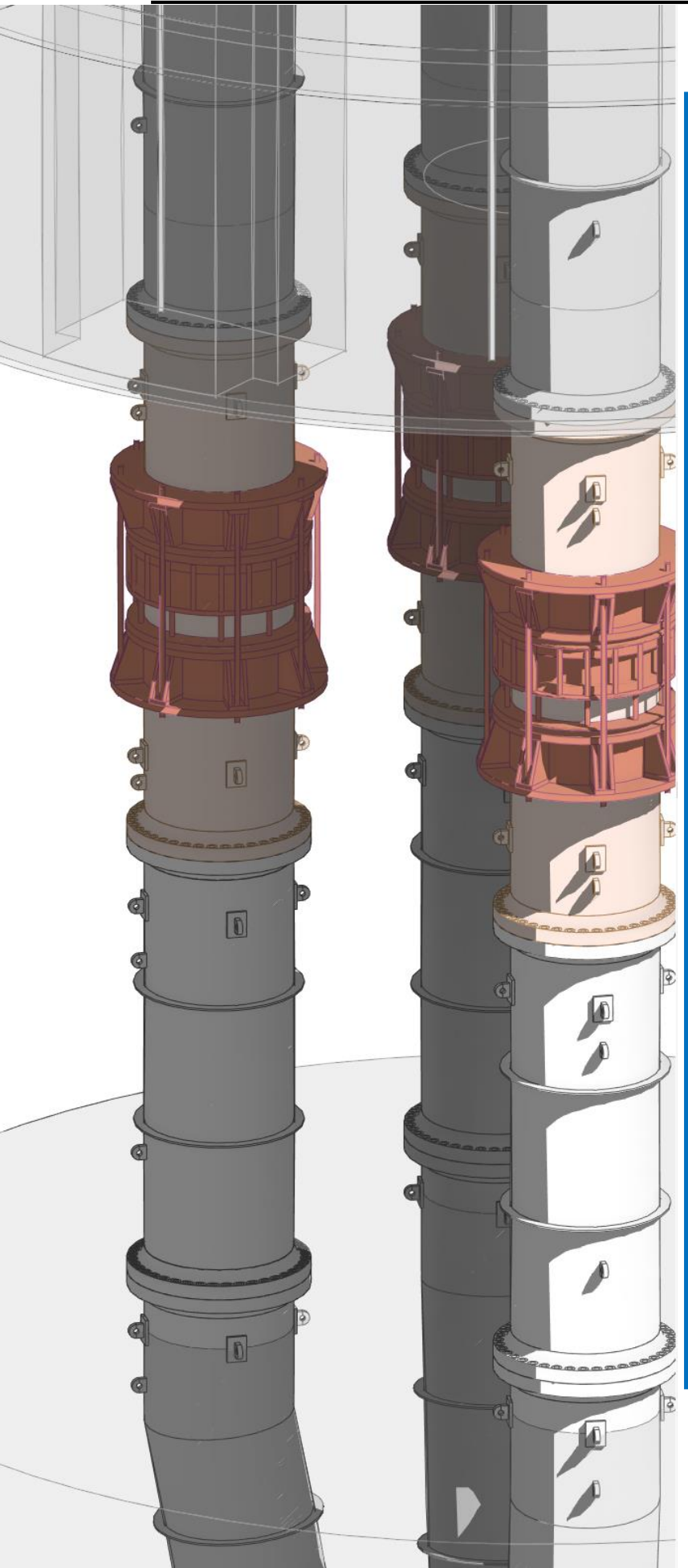
APPENDIX 3 – DEP Plot Style (Line Weights and Plot Colors)

APPENDIX 4 – DEP Sample Sheets

APPENDIX 5 – NAVISWORKS

APPENDIX 6 – 3D Laser Scanning

APPENDIX 7 – Resources



SECTION 1

INTRODUCTION AND SUMMARY

Section 1 Introduction and Summary

The purpose of this manual is to guide CAD/BIM users with the necessary tools to access the BEDC-CAD/BIM system. This manual provides an overview of the file management, drafting/modeling standards and practices to assist with maintaining a consistency throughout engineering drawings/models, along with a more uniform file structure to store related information. The combination of these factors drives a greater efficiency into the development of the ultimate product and a comprehensive set of high-quality construction documents.

This manual seeks to outline the standards and procedures to be used when developing a set of engineering models and drawings. It covers such items as file management conventions, drafting and modeling guidelines, CAD/BIM file composition, common design environment and descriptions of various resources.

This document is developed to be used for CAD only, Revit only, and Hybrid projects. Hybrid projects are the projects for which CAD and Revit platforms are both being used. Since the PDF outcome from CAD and Revit environments must be consistent, the effort is to discuss general topics (Sections 2, 3, and 4) in a way that imply for both environments and for further details in Revit, it refers to Section 5. Section 5 is a guide for Revit users. Section 6 discusses the Autodesk BIM 360 Common Design Environment that may be utilized for some projects.

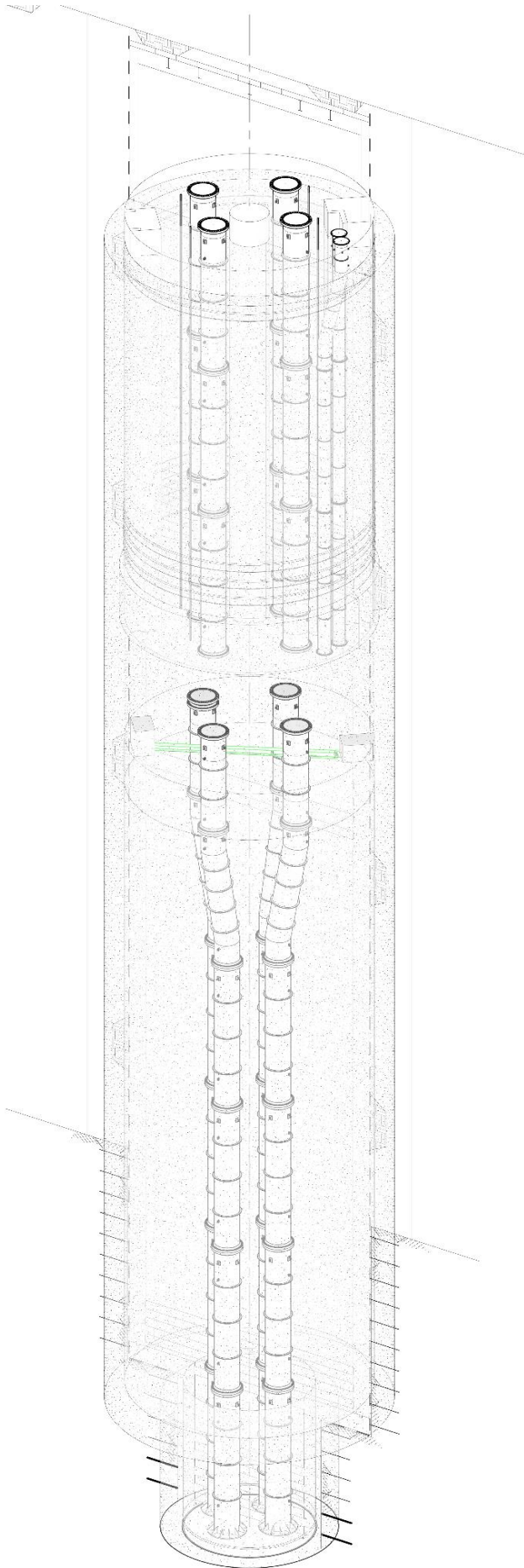
Topics not covered by this document shall be discussed with the BEDC-IHD BIM/CAD Manager prior to inclusion in a project. After a review, a suitable addendum or clarification will be issued for insertion into this manual or to the project CAD/BIM Implementation Plan. Additions and enhancements will be addressed in future releases of this document.

A strong familiarity with the contents of this document is highly beneficial to CAD/BIM software users. Adherence to the following practices and procedures results in professional and uniform drawings and model products, and it leads to consistency throughout BEDC and its consultants. In addition, application of these procedures should result in efficiency and facilitate communication among disciplines involved with preparation of construction documents.

Deviation from the standards outlined in this document is permitted with prior approval by the BEDC-IHD BIM/CAD Manager. A Project-specific CAD/BIM Execution Plan may supersede statements in this document.

This manual refers to drawings and models produced using Autodesk AutoCAD, Civil3D and Revit. Moreover, there are two appendices for Autodesk Navisworks and 3D Laser scanning standards. (Appendix 5 and 6)

CAD/BIM files generated by external resources for BEDC projects shall conform to the guidelines set forth in this document. Questions, comments, or concerns shall be addressed to the BEDC-IHD BIM/CAD Manager.



SECTION 2

FILE MANAGEMENT

Section 2 File Management

The CAD/BIM standards, templates, and file folders paths identified within Section 2 will differ between the DEP IHD Network and non-DEP networks. In-House Design project teams may utilize the DEP IHD Network files located at [\\depmap1\Cad_Data\](#). For ease and consistency, the [\\depmap1\Cad_Data\](#) path may be mapped as “Z:” drive. Non-In-House Design project teams, including Consultant Designers, may utilize these files which are publicly accessible within [e-Builder](#).

For some projects, Autodesk BIM360 Design platform may be utilized as the common design environment. For more information, see Section 6.

2.1 File Location

2.1.1 File Locations for In-House Design Projects

For In-House Design projects, active drawing files are stored on the designated network file server. Projects started prior to 2014 are located at [\\depmap1\Cad_Data\BEDC IHD Projects](#). Projects started in and after the year 2014 are located at [\\depmap1\Cad_Data\IHD Design Projects](#).

Under the “IHD Design Projects” folder, projects are organized in subfolders by Bureau name. Files related to the production of a particular project are saved within their respective project folder. Project folders are named for consistency in the following format:

[\[Contract Number\]_Project Title/Description](#)

2.1.2 File Locations for Consultant Design Projects

For Consultant Design projects, active drawing files may be stored according to the Consultant organization’s internal file storage protocols. These locations should be documented in the Project’s Document Management Plan (see SOP 033 – Document Management Plan).

2.2 Project Folder Template

For each new project, the Template folder must be copied to the designated folder and change the name of folder based on the instruction. Standard subfolders under the root project folders are shown below.

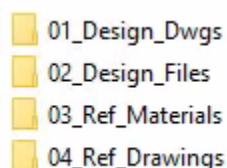


Figure 2.1 - Project Folder Structure

This document addresses content and structure of the first two folders, “01_Design_Dwgs” and “02_Design_Files” in details. The “03_Ref_Materials” would be utilized for reference materials such as point-clouds, site photos, etc. The “04_Ref_Drawings” would be used for project reference

drawings or models. Reference Drawings are drawings that maybe issued as part of construction documents but will not be sealed and signed by the project design team.

2.2.1 Project Folder Template on the DEP Network

Within the DEP Network, the Project Folder Template can be located at:

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\2_File Management](#)

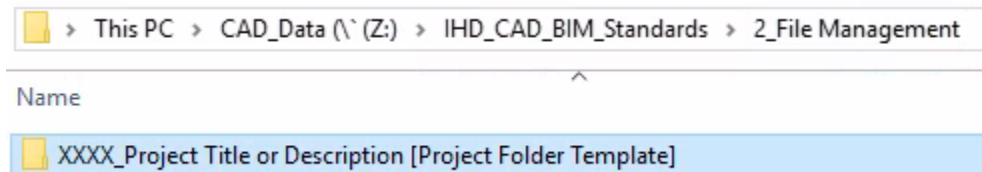


Figure 2.2 - Project Folder Template Location

2.2.2 Project Folder Template for public access

Outside of the DEP Network, the Folder Structure Template can be downloaded from [e-Builder.net](#) for use.

e-Builder Location: [Knowledge Reservoir \ Documents \ 20-Manuals and Guidelines\CAD BIM Standard Manual & Support Files\Folder Structure.zip](#)

2.3 “01_Design_Dwgs” Folder

The “01_Design_Dwgs” folder is where working files are stored, along with XRefs/ links attached to the drawings/ models and specific resources such as Master Drawing List Excel file and Navisworks coordination files. Additionally, progress plots in PDF format are saved here. The folder is broken down into discipline subfolders, with a few subfolders that pertain to that discipline. Most of the folders are self-explanatory; some descriptions are included in the figure below. They may be different for each project based on involved disciplines.

There is a “03_Misc” subfolder under each discipline folder for miscellaneous files. Use that subfolder for those files and avoid making any other subfolders directly under the disciplines folder.

Following shows an example of the folder structure within the “01_Design_Dwgs” folder:

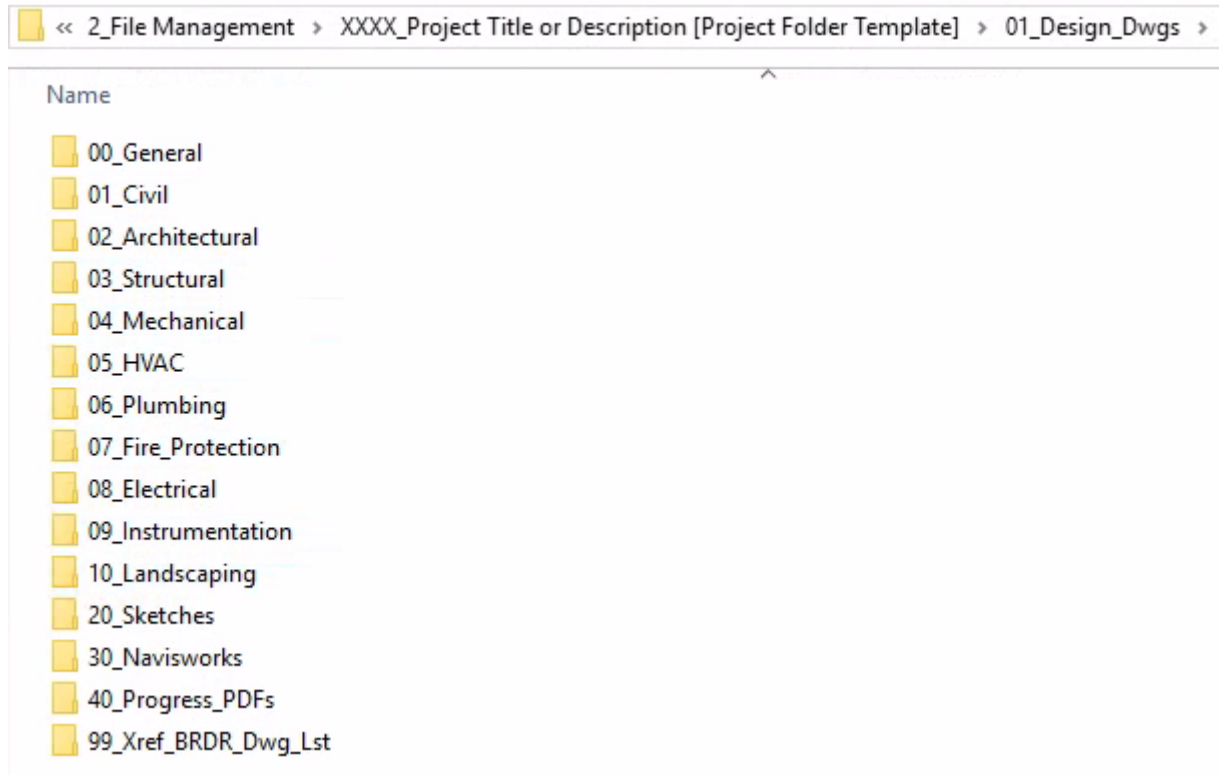


Figure 2.3 – “01_Design_Dwgs” Sample Subfolders

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\2_File Management\\[Project Folder Template\]\01_Design_Dwgs](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20–Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / Folder Structure.zip / 01_Design_Dwgs](#)

2.4 “02_Design_Files” Folder

Where “01_Design_Dwgs” is the working folder, “02_Design_Files” is used for submittals at various stages of production along with subfolders such as incoming files and calculations. See below for an example of the directory structure within the “02_Design_Files” folder:

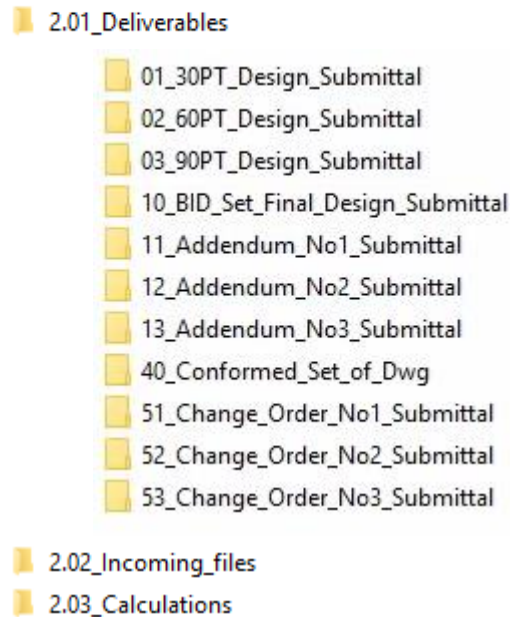


Figure 2.4 – “02_Design_Files” Sample Subfolders

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\2_File Management\\[Project Folder Template\]\02_Design_Files](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20–Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / Folder Structure.zip / 02_Design_Files](#)

2.5 Project Folder and File Naming Conventions

Application of consistent file naming is an important part of efficient project development. This manual sets a standard approach to name drawings and model files. File names should be concise such that they are easily searchable and identifiable at a quick glance. Abbreviate words and avoid spaces in file names since long paths and spaces may cause incompatibility issues.

It is not necessary to include the name of the project in the file name unless it is being transmitted to project team members external to DEP; this information is implied by the name of the DEP folder in which the file is stored.

2.6 Drawing Files

It is imperative to maintain a consistent naming standard for files used in the production of drawings and models. In general, working files are stored under each discipline in the “01_Design_Dwgs” subfolder. See section 2.3.

The file names based on their entity may contain Project Prefix, Area Number or Site Designator, Discipline Designator, and File Descriptor. For Revit File naming conventions see Section 5.

Project Prefix

The Project Prefix is a unique string that contains the job or contract number assigned by DEP. It may vary in length and is composed of letters and/or numbers. It is represented by: XXXX_ (examples: C547B_, DEL397_, KEC_). Underline (_) separates it with the next file name entity.

Area Number or Site Designator

Large projects are typically divided into areas by structure/ process and the areas are numbered in the order of the process flow through the project. Site Designator represent different sites when conducting work on multiple project sites under the same contract. Area Numbers and Site Designator may not apply to smaller projects, in which case they are omitted from the file name.

An Area Number or a Site Designator is a combination of letters and numbers or only one of them assigned by the Project Manager or the BIM/CAD Manager which identifies the different areas, structures, or sites within a complex project. It can be up to 4 characters. It is represented by: ZZZZ- (example: 17B1-, SH5A-, KSCR-). Dash (-) separates it with the next file name entity.

Discipline Designator

The discipline designator is included as part of the file name as either one or two characters. A summary of the abbreviations for discipline designators is shown below. In the Drawing Numbers (Sec. 2.7) it is represented by DD and a dash (-) separates it with the next file name entity.

Discipline	Discipline Sheets	Discipline Demolition* Sheets
General	G	N/A
Civil	C	DC
Landscaping	L	DL
Architectural	A	DA
Structural	S	DS
Mechanical	M	DM
HVAC	H	DH
Plumbing	P	DP
Electrical	E	DE
Instrumentation	I	DI
Fire Protection	F	DF
Security	X	DX

Figure 2.5 - File Discipline Designation

File Descriptor

The file descriptor applies to files which are only used as external references (XRefs) and serves to identify the subject of the file. The following table shows the most used file descriptors.

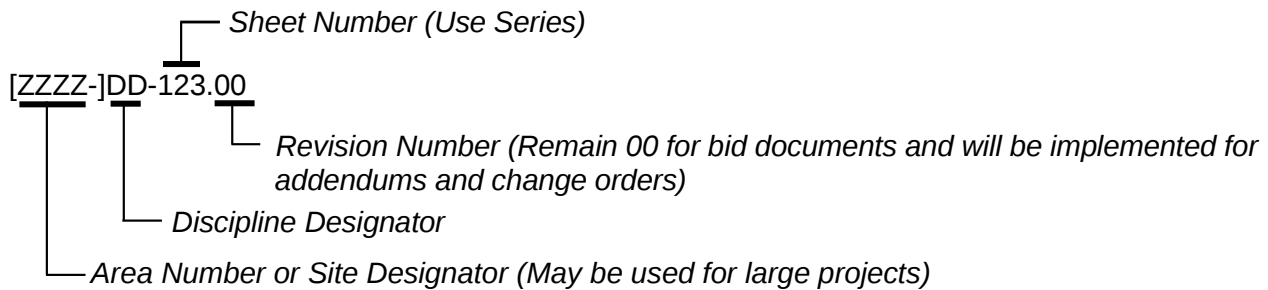
PLAN	Building Plan
ELEV	Elevation
SECT	Section
SITE	Site Plan
TOPO	Topography
UTIL	Utilities
DRAIN	Drainage Plan
ROW	Right-of-Way Plan
BASE	Civil Base Map or Site Plan
YPIPE	Yard Piping Plan
GRADE	Grading or Grading and Drainage Plan
PAVE	Horizontal Control and Paving Plan
PROF	Civil Profile

Figure 2.6 - File Descriptors

Files for existing work have an “EX_” before the file Descriptor. Underline () is used for separation and spacing.

2.7 Drawing Numbers

In AutoCAD and Civil3D, a Drawing Number is the file name that contains that sheet, too. (For AutoCAD and Civil3D each DWG sheet file contains only one sheet.)



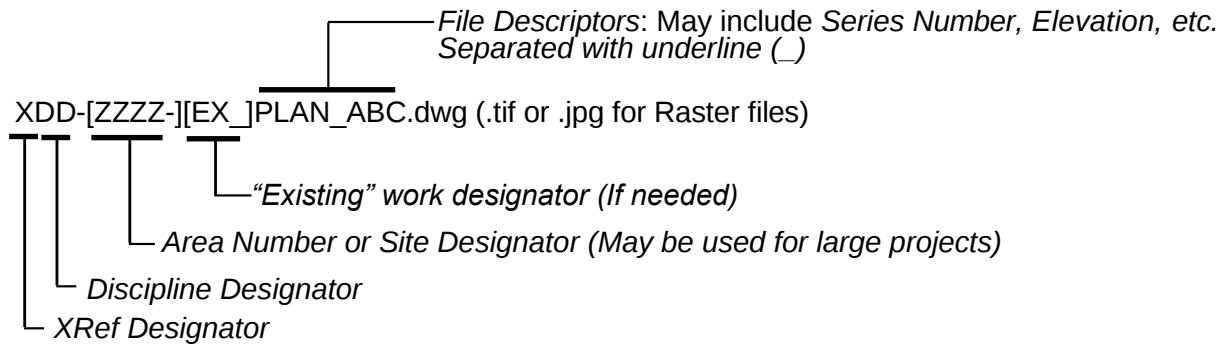
Examples of the standard drawing number convention for a drawing sheet:

“KSCR-A-102.00”, “17B1-C-612.02”, “S-300.00”, “DM-223.01”

The discipline designator is one or two characters as described above. Please note that this file name is separated by dashes, and it does not contain the project prefix. This is intentional, since in CAD Sheet files, the Sheet name is automatically populated based on the file name.

If the drawing has been modified as an addendum or a change order, it is saved as a copy with a two-digit revision number appended to the file name, separated by a period. For CAD files, there is one sheet file for each drawing sheet on any given project.

2.8 External Reference (XREF) Names

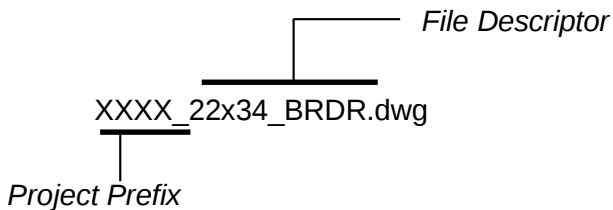


Examples of the standard naming convention for an external reference:

“XS-17B1-SECT_A.dwg”, “XA-EX_PLAN_ELEV+20.50.dwg”, “XC-DECANT_SYS_PLAN.dwg”

Border XRef for CAD files

Border files are external references (XRefs) stored in a subfolder “99_XRef_BRDR_Dwg_List”



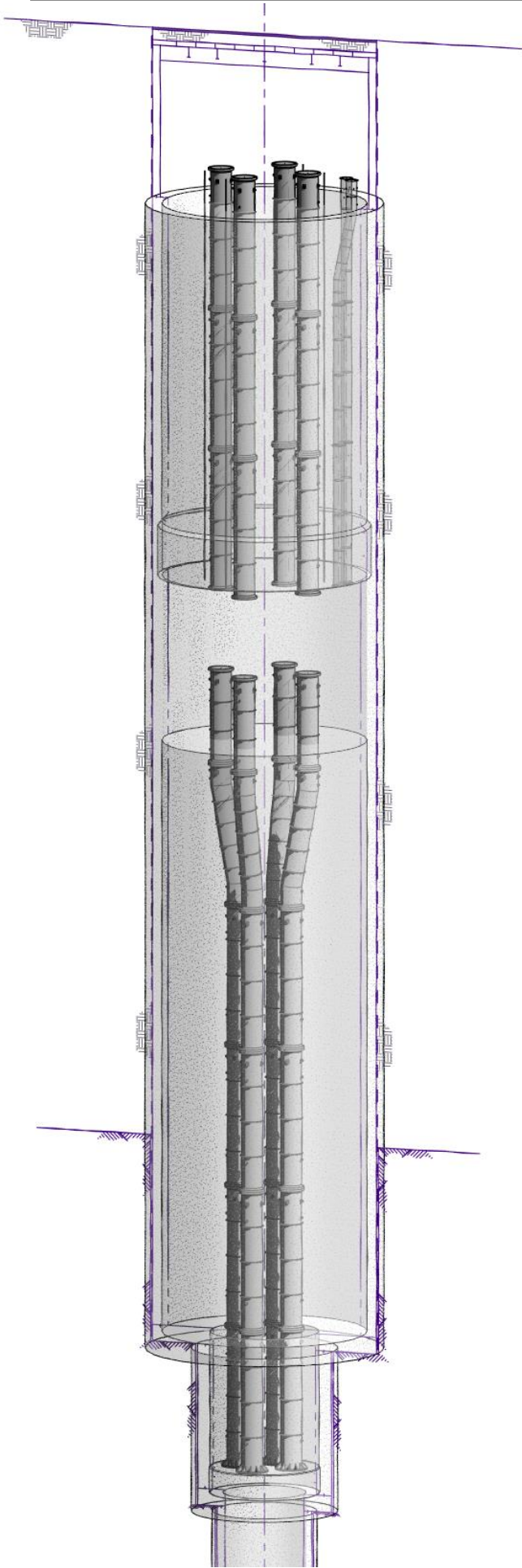
Example standard naming convention for a border: “JPRGH_22x34_BRDR.dwg”

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\01_Design_Dwgs\99_XRef_BRDR_Dwg_List\](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20-Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / Folder Structure.zip / 01_Design_Dwgs / 99_XRef_BRDR_Dwg_List /](#)

SECTION 3

STANDARD PROCEDURE FROM START TO END



Section 3 Standard Procedure from Start to End

With care taken at the beginning of a project to setup files and standards, it goes a long way towards delivering a high-quality final product. This minimizes future confusion and re-work and simplifies the integration of multiple disciplines. It is strongly recommended that unnecessary, extraneous items are not stored and proliferated within the drawing and model files, thus reducing file size, and protecting against potential file corruption.

The general topics discussed on this section will be implied to both CAD and Revit environment; however, it refers to Section 5 for more details in Revit.

3.1 Starting a New Project

At the start of a new project, several actions must be performed prior to the commencement of drawing and model production. Upon the approval by the project manager of an incoming project, a new folder with the appropriate sub-folders is created. A standard set of folders is created and pre-populated with a Title Border file for CAD and templates for the creation of Revit models and drawing sheets.

3.2 Folder Structure Creation

The provided Folder Structure Template shall be used when creating a new project. See section 2.2 for details.

When setting up a new project, copy the folder and contents listed above into the active projects folder. Once it has been copied, rename the folder to reflect the project code and name as described above in Section 2.

The template folder contains a full set of project subfolders. Delete or create sub-folders as needed based on the project scope. The subfolders may be re-numbered.

3.3 Master Drawing List Development

The Master Drawing List is maintained in a MS-Excel file in the “99_XRef_BRDR_Dwg_Lst” subfolder. Each Design Lead generate a list of drawings for their discipline(s) and share them with BIM/CAD Section. The BIM/CAD section is the owner of the file and maintain it throughout the project. Design Leads must inform the BIM/CAD Section with any changes to the Master Drawing List.

The Drawing Sheet Titles and Numbers must be consistent and match between the Master Drawing List and the Layouts. Review shall be considered for each official submittal and any inconsistency must be resolved.

For Drawing Numbering, using Series for different sectors or group of related drawings is recommended. This facilitates the addition or deletion of drawings.

If the project has demolition scope of work and each discipline develops their demolition drawings, Drawing Numbers for layouts that show demolition and proposed design of a specific area/ section, must match. For example, DA-101.00 and A-101.00 must show the same area/ section of the project while DA-101.00 shows the demolition and A-101.00 shows the proposed design.

3.4 Title Border and Cover Sheet Creation

After the creation of the project folder structure, the Title Border need to be configured before production can begin on drawings. The standard border is intended for an ANSI D sized sheet at 22"x34" to allow a true half size plot on 11"x17" paper.

For AutoCAD & Civil3D

A border file is created from a standard template which contains the border elements common to all sheets for CAD files. The template folder set already contains several border files in the "\01_Design_Dwgs\99_XRef_BRDR_Dwg_Lst" subfolder.

Once the project folder has been created, choose the appropriate border file for use as an XREF on the project. Open the proper border folder for the project and copy the contents up one level such that the files appear directly under the "99_XRef_BRDR_Dwg_Lst" sub-folder. Once the files have been moved, delete the unused folders, and rename the border, cover sheet and credit tag files for the project as described in Section 2 of this manual. Avoid overriding the Title Border XREF Layer properties.

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\01_Design_Dwgs\99_XRef_BRDR_Dwg_List\](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20-Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / Folder Structure.zip / 01_Design_Dwgs / 99_XRef_BRDR_Dwg_List /](#)

For Revit

The Title border (22x34_BRDR DEP) and Cover sheet (22x34_COVER SHEET DEP) family is included in the Revit template files.

The border file and cover sheet are generic and require some information to be entered for the particular project. See the figure below for an example of what information should be changed when creating a project border file.

ACCOUNTABLE MANAGER ENTER PROJ. MANAGER NAME	*WARNING-IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW, SECTION, 7209.2, FOR ANY PERSON, UNLESS (S)HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANYWAY. IF ALTERED, THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK EDUCATION LAW, SECTION, 7209.2.*	NEW YORK CITY ENVIRONMENTAL PROTECTION BUREAU OF ENGINEERING DESIGN & CONSTRUCTION 96-05 HORACE HARDING EXPRESSWAY 5th FLOOR CORONA, NEW YORK 11368 www.nyc.gov/dep	CAPITAL PROJECT DESCRIPTION NAME JOB DESCRIPTION LOCATION	DATE: MM/DD/YYYY
PORTFOLIO MANAGER ENTER PROJ. PORTFOLIO MANAGER NAME			TITLE LINE 1 - DISCIPLINE NAME	SHEET NO:
DEPUTY DIRECTOR, IN HOUSE DESIGN ENTER DEPUTY DIRECTOR IHD NAME			TITLE LINE 2 - FACILITY	DRAWING NO.
			TITLE LINE 3 - DESCRIPTION AND SHEET TYPE	XXXX-X-XXX.00

Figure 3.1 - Title Block Example for Border File

There is one border file for the production drawings on a project. If multiple entities are producing drawings which require different logos within the title block, in AutoCAD/Civil3D the logos are placed on different layers within the border file to enable this functionality. In Revit a visibility parameter will be defined for each logo which will be set up by the BIM/CAD Section at the beginning of a Revit Project.

There are two drawing title options. Both formats have the discipline in the Title Line 1. The preferred format has the facility in Title Line 2 and the description and sheet type in Title Line 3. However, the alternative drawing title format includes the facility and description in Title Line 2 if additional space is needed for the description.

PREFERRED DRAWING TITLE	ALTERNATIVE DRAWING TITLE
TITLE LINE 1 - DISCIPLINE NAME	TITLE LINE 1 - DISCIPLINE NAME
TITLE LINE 2 - FACILITY	TITLE LINE 2 - FACILITY - DESCRIPTION
TITLE LINE 3 - DESCRIPTION AND SHEET TYPE	TITLE LINE 3 - DESCRIPTION AND SHEET TYPE

Figure 3.2 – Drawing Titles

3.5 Composing Drawing and Models

Use the standard templates for drawing and modeling production. The standard templates for AutoCAD/Civil3D and Revit are located at IHD Network Drive. In addition, three Zip files, including DEP standard template files, are located on e-Builder.

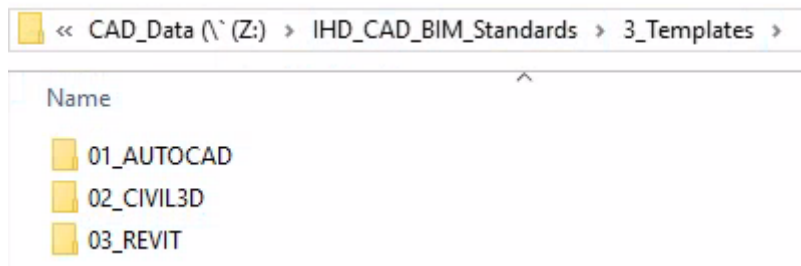


Figure 3.3 – Template Files

The first step to compose drawings and models is to create project file(s) for each discipline. In AutoCAD and Civil3D, sheet files must be created, and each file must contain one sheet/layout. In Revit the sheets will be developed inside the Revit file Project Browser. (See Section 5 for more details.)

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\3_Templates](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20–Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / AutoCAD_Templates.zip](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20–Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / DEP_Revit 20XX_Templates.zip](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20–Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / DEP_Civil3D_Templates.zip](#)

For AutoCAD & Civil3D

To create a sheet file, perform the following steps:

Step 1 - Copy the template file to the Discipline Folder and rename it.

Step 2 - Attach the project border file as an external reference (overlay option) at 1:1 scale in the sheet layout at 0, 0, 0 coordination. The path must be Relative. The XRef is placed on the G-XREF-BRDR layer.

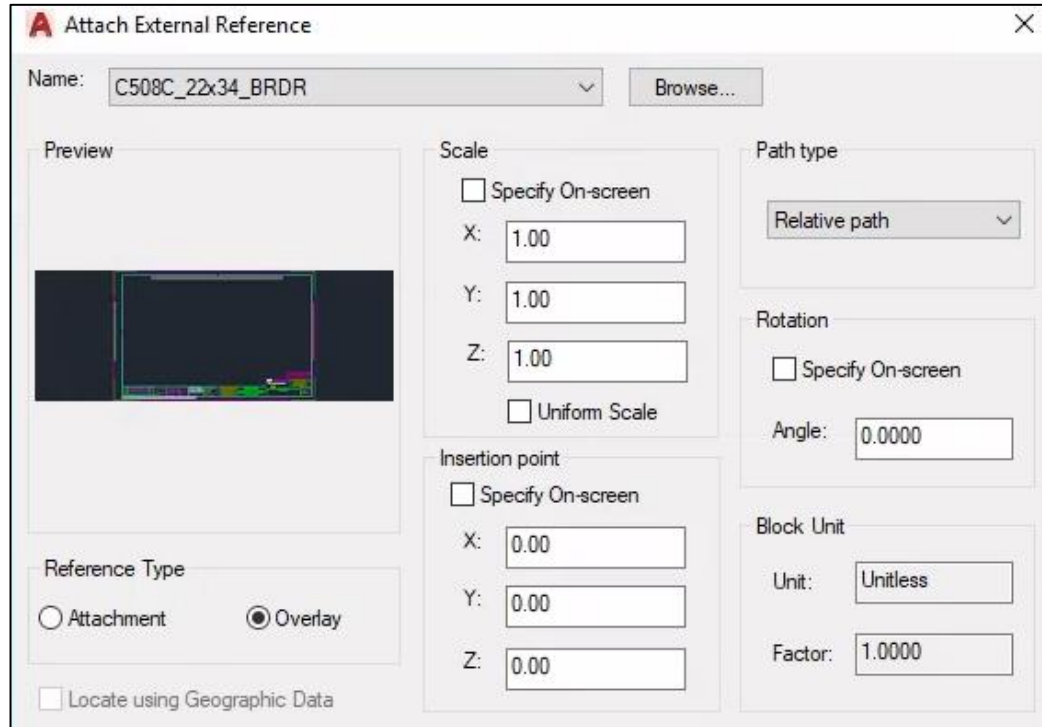


Figure 3.4 – Attach the Title Block as an External Reference

*Step 3 - Insert the title block attribute set (“credits”) into the file as a **block** located on layer G-ANNO-CREDITS at 0,0,0. The attributes are left at their default values at this point in time, as they will be added when the template is used to create a new drawing.*

Following the above three steps makes the Sheet file ready. It can be used as a template for other Sheet files of the discipline.

There are several different types of files and links that may be created and used in the preparation of engineering drawings. The final construction documents are comprised of a set of individual sheets covering one or more disciplines with a consistent border and title block. This section discusses the preferred method of composing drawings in details. Some of the discussions are related to the CAD environment and refers to Section 6 for further details in the Revit environment.

3.6 Attaching Files

A fundamental benefit of working in a CAD/BIM environment is the ability to attach external reference and link files, which display a live copy of other design files within the active design file. It is important to attach references and links in a consistent manner, in order to minimize future re-work, streamline disciplinary coordination, and maintain control over their display preferences. When attaching external reference files or Revit links, use the “overlay” and “relative path” options. There are a few

special cases where the “attachment” option should be used, which allows the nesting of references and links. These are typically limited to civil site plans, where building models from other disciplines are attached and located on the site.

All the external references and link files must be in the project folder. If they are acquired from other projects, copy them to the correct subfolder(s) in the project folder, rename as necessary, and then XRef or link them.

In AutoCAD and Civil3D, external references are attached on the “G-XREF-MODL” layer. When referencing drawings from another discipline, attach only a model file; it is not a good practice to reference a sheet file from one discipline to another. In order to minimize confusion, the layout space of model files must be completely blank (without a viewport or title block.)

In Revit, the links must be inserted into defined Workset(s) if they are being used for the project. For details see Section 5.

It is a good practice to maintain the files clean and with unused attachments being removed.

3.7 Sheet Sizes

Drawing sheet sizes are in accordance with standards established by the American National Standards Institute (ANSI). The three supported sizes shown below are approved for use in BEDC drawings. The standard “full size” construction drawing is a “D” size sheet. Engineering studies, sketches, conceptual design reports, and technical memos use “A” or “B” size sheets. The size of sheets for construction drawings is to be consistent throughout the drawing set.

ANSI Designation	Height (Inches)	Width (Inches)
A (Portrait)	11	8.5
B	11	17
D	22	34

Figure 3.5 – Drawing / Sheet Sizes

Occasionally when doing work for other agencies, it may be required to use a sheet size not listed above. The other sheet sizes that may be encountered include 24”x36” (ARCH D) or 30”x42” (ARCH E1.)

3.8 Drawing Layout

Once the sequence of drawings is established in a Master Drawing List Excel file, attention should be paid to the general layout of each sheet. Careful planning during the initial period of the design saves time and potential rework. By preparing sheets with the major drawings laid out to scale, the entire set of drawings can be organized, the total number of sheets estimated, and the required sections and details noted. Collaboration between disciplines for scale and orientation of common plans and major sections is required and increases production efficiency. The quality and efficiency of production is greatly improved by adequate initial planning.

When drawing sections, details, etc., allow a reasonable amount of open space between the components as well as the border and other information to reduce sheet congestion. Consider additional sheets to reduce congestion.

Place sections, details, elevations, and schematics (in that order) directly below the main plan view when space is available, otherwise place to the right. Display sections and details in sequential order, moving from left to right and top to bottom. Whenever possible, group details and sections that relate to one another on the same drawing. Do not use lines to separate the details, notes, and views on drawing layouts.

Outside the Title Border must be cleaned and no objects should be there.

See Appendix 4 for a DEP Sample Sheet.

3.9 Drawing Scales

The general rule regarding scale selection is to use the smallest possible scale to show the view without obscuring vital details. Care must be taken to maintain clarity when notes and dimensions are added, and the drawing must be legible when plotted at half size. Below are some recommended scales for different types of drawings, along with additional notes to assist with selecting the best scale.

3.10 Site Plans

Preferred Scale	1" = 20'
Acceptable Scale	1" = 40'
Not Desirable	1" = 30' (Avoid as it cannot be halved to a clean scale)

3.11 Building Plans

Preferred Scale	1/4" = 1'-0"
Acceptable Scale	1/8" = 1'-0"

Wherever possible, and particularly where building plans must show a significant amount of detailed dimensioning and callouts, use the preferred scale of 1/4" = 1'-0". Smaller scales, such as 1/8" = 1'-0", are appropriate only if the plan has relatively few complicating features.

The scale carries through to all disciplines on plans to the extent possible and lead disciplines typically set the scale. For example, if there is a significant amount of mechanical detail, and minimal architectural detail, the architectural uses the scale of the mechanical drawings. When a plan is too large to be shown on one drawing at the appropriate scale, use one of the following approaches:

- a) When more detail is needed over most of the plan, create an overall index plan at a smaller scale and section off this plan into partial plans that cover the full plan at a larger scale. The index plan includes gridlines, and references to the large-scale partial plans. The large-scale partial plans include gridlines, labeled matchlines, and a key plan to clearly indicate where the plan continues on another drawing.

- b) When more detail is needed over only a small portion of the plan, the plan may be drawn at a smaller scale and a larger scale partial plan referenced from the main plan to show areas that need more detail.

3.12 Piping and Road Profiles

Acceptable Scales:	1" = 20'-0" Horizontal	1" = 5'-0" Vertical
	1" = 20'-0" Horizontal	1" = 4'-0" Vertical
	1" = 20'-0" Horizontal	1" = 2'-0" Vertical
	1" = 40'-0" Horizontal	1" = 10'-0" Vertical

3.13 Elevations

Preferred Scale:	1/4" = 1'-0"
Acceptable Scale:	1/8" = 1'-0"

The scale of elevations is a judgment arising from the amount of detail and complexity necessary to properly communicate the configuration, dimensional relationships, and materials information. In most cases the elevations should be the same scale as the plans.

3.14 Site Sections

Acceptable Scales:	1" = 20'-0" Horizontal	1" = 5'-0" Vertical
	1" = 40'-0" Horizontal	1" = 10'-0" Vertical

3.15 Building Sections

Acceptable Scales:	1/4" = 1'-0"
	1/8" = 1'-0"
	1/2" = 1'-0"

The scale of sections is a judgment call arising from the amount of detail required. Use 1/2" scale for sections where there is a significant amount of small detail. If a larger scale is needed to show a small area of a section in more detail, blow up the area involved as a detail.

3.16 Details

Acceptable Scales:	3/4" = 1'-0"
	1 1/2" = 1'-0"
	1" = 4'-0" (Civil only)
	1" = 5'-0" (Civil only)

Use the same scale for detailing of similar items throughout the drawings. This makes the process of understanding and comparison between details much easier. Note that this guideline does not preclude the strategic use of larger scales in instances where a higher level of detail is appropriate.

However, such choices are the exception rather than the rule. The scale is chosen to be large enough to show everything clearly.

3.17 Screening

When files are attached as references and links from different disciplines, the line work and information displayed from those external files are screened back on the plotted drawings. This serves to highlight the drawing content for the intended discipline while still showing the background information for points of reference. In a CAD environment, this is accomplished in the Layer Properties Manager, by selecting all levels from the desired reference file and changing their color to one that is set to screen by way of the BEDC Standard Plot Styles CTB file. (See Appendix 3) The following colors may be used as needed.

Color	Screening (as a percentage of black)
8	50%
9	40%
250	75%
251	60%
252	50%
253	40%
254*	30%

Figure 3.6 – CAD Screening Colors

* Color 254 is only to be used in special cases; it is light enough that it can easily wash out on reproduced copies of a drawing. Always use it in combination with a heavier line weight.

In a Revit environment this will apply through Visibility/Graphics Overrides settings. See Section 5 for details.

3.18 Annotating

Annotation is what brings meaning to a drawing - without it, construction would be impossible. Annotation includes the following:

- North Arrow
- Graphic Scale(s)
- Notes/Callouts/Cross References
- Dimensions

For annotation details see *Section 4*.

3.19 Title Block Attributes (“Credits”)

Some fields in the project title border contain a set of information which is unique to that particular drawing that will be managed through a Credit Block in CAD environment and through Sheet Parameters in Revit Environment.

Below snapshot shows the attribute tags in CAD environment:

Tag	Prompt	Value
DRAWING-NO.	Enter Drawing No.# (Example S001)	DEP_TEMPLATE_ARCHITECTUR...
DISCIPLINE-NAME-LINE-1-OF-2	Enter Discipline Name Line 1 of 2	ENTER LINE 1 OF 2 DESCRIPTION
TITLE-DESCRIPTION-LINE-2-OF-2	Enter Title Description line 2 of 2	ENTER LINE 2 OF 2 DESCRIPTION
DISCIPLINE-NAME-LINE-1-OF-3	Enter Discipline Name Line 1 of 3	ENTER LINE 1 OF 3 DESCRIPTION
TITLE-DESCRIPTION-LINE-2-OF-3	Enter Title Description line 2 of 3	ENTER LINE 2 OF 3 DESCRIPTION
TITLE-DESCRIPTION-LINE-3-OF-3	Enter Title Description line 3 of 3	ENTER LINE 3 OF 3 DESCRIPTION
DESIGNED_BY_NAME_1	Enter Designed By: (Name)	ENTER DESIGN BY NAME
CHECKED_BY_NAME_2	Enter Checked By: (Name)	ENTER CHECKED BY NAME
DESIGN_LEAD_NAME_3	Enter Design Lead: (Name)	ENTER DESIGN LEAD NAME
SECTION_CHIEF_NAME_4	Enter Section Chief: (Name)	ENTER SECTION CHIEF NAME
DRAWN_BY_NAME_5	Enter Drawn By: (Name)	ENTER DRAWN BY NAME
REVISION_#1_NUMBER_LINE	Enter Revision Number for Rev Line 1	
REVISION_#1_DATE_LINE	Enter Date for Revision Line 1 (MM/YY)	
REVISION_#1_DESCRIPTION_LINE	Enter Data for Revision Description Line 1	
REVISION_#1_INITIALS_LINE	Enter Revision Initials for Line 1	
REVISION_#2_NUMBER_LINE	Enter Revision Number for Rev Line 2	
REVISION_#2_DATE_LINE	Enter Date for Revision Line 2 (MM/YY)	
REVISION_#2_DESCRIPTION_LINE	Enter Data for Revision Description Line 2	
REVISION_#2_INITIALS_LINE	Enter Revision Initials for Line 2	
REVISION_#3_NUMBER_LINE	Enter Revision Number for Rev Line 3	
REVISION_#3_DATE_LINE	Enter Date for Revision Line 3 (MM/YY)	
REVISION_#3_DESCRIPTION_LINE	Enter Data for Revision Description Line 3	
REVISION_#3_INITIALS_LINE	Enter Revision Initials for Line 3	
REVISION_#4_NUMBER_LINE	Enter Revision Number for Rev Line 4	
REVISION_#4_DATE_LINE	Enter Date for Revision Line 4 (MM/YY)	
REVISION_#4_DESCRIPTION_LINE	Enter Data for Revision Description Line 4	
REVISION_#4_INITIALS_LINE	Enter Revision Initials for Line 4	
REVISION_#5_NUMBER_LINE	Enter Revision Number for Rev Line 5	
REVISION_#5_DATE_LINE	Enter Date for Revision Line 5 (MM/YY)	
REVISION_#5_DESCRIPTION_LINE	Enter Data for Revision Description Line 5	

Value: DEP_TEMPLATE_ARCHITECTURAL_STRUCTURAL

Figure 3.7 – Credit Tag Attributes in CAD Environment

These attributes are filled in as necessary in ALL CAPS. Revision Dates are formatted as ‘MM/YYYY’.

For “DESIGN LEAD:” and “SECTION MANAGER:” name fields use full names. “PE” and “RA” suffixes should be added after a comma and a space. For example, “John Smith, PE”.

For “DESIGNED BY:”, “CHECKED BY:”, and “DRAWN BY:” name fields are comprised of first initial and last initial without any space or comma. For example, the name “John Doe” would be entered “JD”. If there are more than one set of initials, use comma and one space between initials. For example, “AR, DS”.

3.22 Submittals

When it is time to plot a major progress submittal, drafting and modeling work on the project stops momentarily so that a “snapshot” copy of the project files and folders can be made for archiving. The BIM/CAD Manager (or designated appointee) creates this archival copy within the “2.01_Deliverables” folder. Drafting and modeling work may resume immediately after the archive has been performed.

Drawings which are a part of an official submittal set contain a corresponding stamp in the designated area of the title block. This serves as an additional form of document control in order to keep track of different versions of the same drawing. Submittal Stamps have been supplied in the block libraries for CAD environments. For Revit, they are embedded in the Revit templates.

3.23 Revisions/Version Controls

Any changes made to a design drawing after the drawings have been issued for bid must be treated as official revisions. During the bid process, modifications may happen as a result of questions submitted by the bidding contractors. Prior to modifying a drawing in a CAD environment, a copy of the sheet file is saved. In a Revit environment, a copy of the sheet is created. In making the new sheet, the last two digits following the period is incremented to indicate the revision number.

In order to highlight any content on a drawing that is being updated, modifications are “clouded” using the Revision Cloud tool, and each cloud contains a revision triangle denoting the incremental number of the revision. See Section 4.11 for details.

Each revision is noted in the corresponding area of the title block, indicating the revision number, date, short description, and approval initials. If the change is related to a particular addendum or RFI, it is included in the description line. The revision number is an incremental integer starting at 1 (the bid document may be considered revision 0). If multiple drawings are issued as part of an addendum, it is possible that they may not all have the same revision numbers – each drawing’s revision number reflects how many times that individual drawing has been revised and reissued. In the event that a drawing is revised multiple times during the bid process, all previous clouds and triangles are first removed before the next revision is started. In the event that new documents are created via an addendum, the title of the revision should be “Addendum X – New Sheet” where X is the addendum number, but the revision number box should be left blank. Otherwise, if changes are made to existing drawings, the revision title stays as “Addendum X”. If a change needs to be made due to a change order, the same rule would apply and the title would be “Change Order X”.S

Because an addendum is a formal submittal, the ADDENDUM stamp must be used to identify the drawings.

3.24 Conformed Drawings

Once a bid has been accepted and construction begins, a set of “conformed” drawings may be prepared as an aid to the contractor. A conformed set is a complete set that incorporates all of the bid phase revisions shown without clouds or other marks. When preparing conformed drawings, all clouds, triangles, and revision entries in the title block are removed. All drawings in this set receive a stamp indicating that they are being issued as a conformed drawing.

Revisions to drawings during the construction phase of a project resume incrementing from the current version; the revision number is entered in the revision block. Revisions are clouded and noted with triangles as described in the above section.

3.25 Change Orders

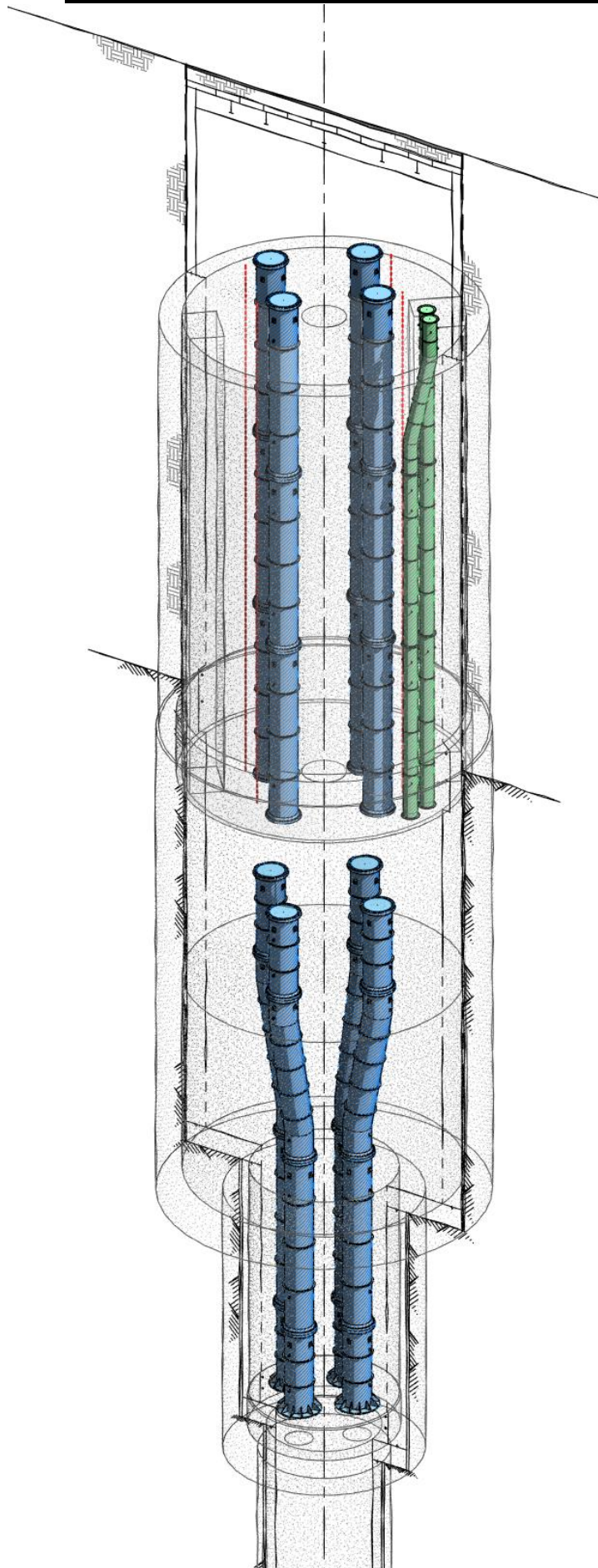
Ideally, a conformed drawing set is the final drawing set that is given to contractor. However, changes could be made after in the form of a change order. Change orders are classified as changes that affect the overall scope and cost of the project. Otherwise, small changes could be made via Revised Drawings.

XRef files could be changed as well. The difference is that there has to be a backup made and each backup has to add ".XX" to the end of it to represent the change number. The copy that will be used will not include the revision number, but only backups will.

3.26 Record Drawings

The responsible entity prepares a set of record drawings (and models) during and after the completion of the construction phase of a project, which is the best representation of what was constructed. When preparing record drawings, all previous clouds, triangles, and revision entries in the title block are removed. Any changes during construction as a result of change orders, along with all contractor red line markups are incorporated into the drawings without clouds or triangles. Each drawing in this set receives a stamp indicating that it is being issued as a record drawing.

DEP refers to record drawings as "As Built Drawings." As Built Drawings should be created after construction with "AB" being added after the drawing number. For example, an as built for E-203.00 would become E-203.00AB.



SECTION 4

DRAWING AND DRAFTING STANDARDS

Section 4 Drawing and Drafting Standards

This section summarizes the contents and elements that make up drawings, how they are presented, and the organization of a drawing set. These items address the quality of a drawing in terms of how well it is understood and how well the intent of the design is conveyed.

Unnecessary work, such as duplications of views, notes, details, ornate borders, lettering, and other features must be avoided. Guidance for the preparation of drawings includes the following:

- Avoid “artistry” by eliminating unnecessary elaboration that adds nothing to the message
- Do not repeat details or information
- Do not repeat dimensions or call outs
- Use DEP Standard CAD Blocks and Revit Families. Standard Revit Families are embedded in Revit Templates.

DEP Network Location: [\\depmap1\Cad_Data\IHD_CAD_BIM_Standards\4_Standard Blocks](#)

e-Builder Location: [Knowledge Reservoir / Documents / 20–Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / Standard Blocks.zip](#)

4.1 Drawing Sheet Order

Sheets must be arranged in a logical manner to minimize confusion. The following sheet sequence is a general guideline for drawing sheet order but may change depending on which disciplines are involved in a given project and which is the lead discipline. Drawing sheets within each discipline are to start with the discipline general sheets, followed by the demolition and project specific drawings arranged in order by area.

Discipline	Designator
1 General	G
2 Demolition*	D*
3 Civil	C
4 Architectural	A
5 Landscaping	L
6 Structural	S
7 (Process) Mechanical	M
8 HVAC	H
9 Plumbing	P
10 Fire Protection	F
11 Electrical	E
12 Instrumentation	I
13 Security	X

Figure 4.1 - Drawing Order by Discipline

* There are two approaches to arranging demolition drawings within the drawing set:

- a. Include demolition drawings within each discipline’s section: This is the preferable approach. When including demolition drawings within each discipline, they are numbered using the demolition designator ‘D’ combined with the discipline designator (in this example ‘M’ for

Mechanical). The following shows an example of Demolition Drawing Numbers included within the discipline drawings:

- **DM-005.00**, or
- **DM-305.00** for projects with areas ('3' is the series/area number.)

It is recommended that the Sheet Numbers of demolition drawings and proposed design drawings match with each other in terms of area and layout. For example, M-305.00 must show the same area and layout that is shown on DM-305.00 and both sheet layouts and organizations must be the same as much as possible.

- b. All demolition drawings put into a "Demolition" section after the "General" section: Dependent upon the specific project's needs, and the complexity of the demolition, all of the demolition drawings may be put into a "Demolition" section after the "General" section. These sheets are numbered using the demolition designator 'D' without any discipline designator. Following shows an example of Demolition Drawing Numbers put in a "Demolition" section:

- **D-005.00**, or
- **D-305.00** for projects with areas ('3' is the series/area number.)

4.2 Drawing Sheet Numbering (Series and Sub-Series)

Drawing sheets are numbered to identify the applicable discipline, sheet number, and the site, if applicable. Sheet numbers always contain three digits, with the final two (tens and ones) being an incremental number as needed to accommodate the total sheet count within a discipline. The first (hundreds) digit is referred to as the "series" number and can be thought of as an area number for larger projects. In some projects, the second (tens) may be referred to as the "sub-series" number to organize different scope of work on the contract drawings.

Distinct areas or facilities within the project are designated with series and sub-series (if being used) numbers in order to have common groupings of drawings for that area or scope of work within each discipline. The series and sub series numbers are determined at the beginning of the project by the BIM/CAD Lead and the Project Manager. Number the series/sub-series in the order of process flow and, if possible, avoid having two or more structures/scope of works under the same series/sub-series number.

4.3 Drawing Sheet Layout

A sample drawing sheet layout is provided as a quick reference on Appendix 4. The rest of this section discusses the drafting standards of different components on drawing sheet layouts.

4.4 Text

Placing text properly is imperative to maintaining a consistent look and feel to drawings. Texts must be outlined with capital letters. Use the "Arial" TrueType font. Text styles have already been configured in the template files that define the following standard sizes for texts.

Type	Size	CAD Text Style	Revit Text Style
Titles	(.1875" or 3/16"), width factor 1.0	DEP_Title	DEP_1/8" Arial
Notes and General Annotation	(.125" or 1/8"), width factor 1.0	DEP_Annotative	DEP_3/16" Arial

Figure 4.2 - Text Sizes & Styles

In CAD environments, the pre-set text styles for Notes and General Annotations are configured to be annotative. Non-annotative, fixed text styles are also provided for typical scales, but these should be avoided if possible. Several annotation layers have been provided for various types of notations; text is placed according to the names of these layers and the type of notes being placed. Most are placed on G-ANNO-TEXT. Text is placed as MText unless there is a specific reason why this does not work.

When it is necessary to place text at an angle, it should be placed such that it can be read from the bottom or right edge of the drawing. See the following figure for guidance.

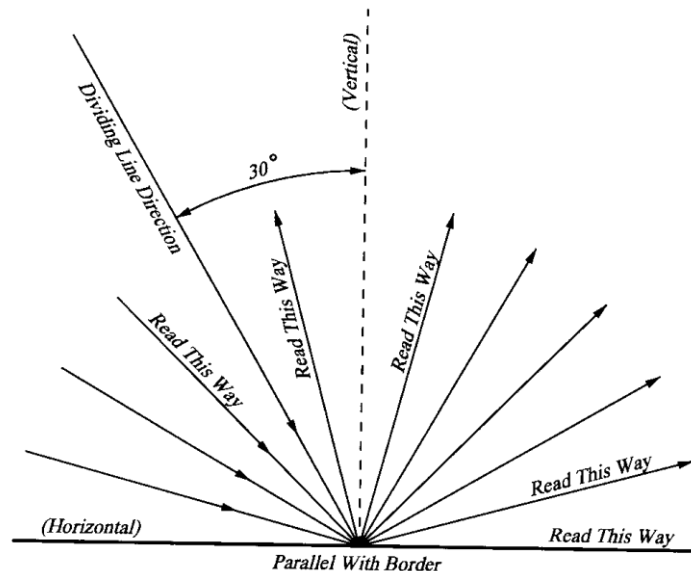


Figure 4.3 - Angled Text Placement

Leaders/Multileaders are used for notes. CAD multileader styles and a Revit Family have been provided in the template files for this purpose. In CAD environments, the pre-set multileader styles are configured to be annotative. Non-annotative, fixed multileader styles are also provided for typical scales, but these should be avoided if possible.

Notes with leader lines are placed in a manner that does not detract from the presentation of the drawing. Avoid leaderlines that are:

- Horizontal or vertical only
- At the same angle as crosshatching
- At very small angle to the terminating surface
- Parallel to extension or dimension lines
- Multiple bends
- Curved
- Crossed
- Too long

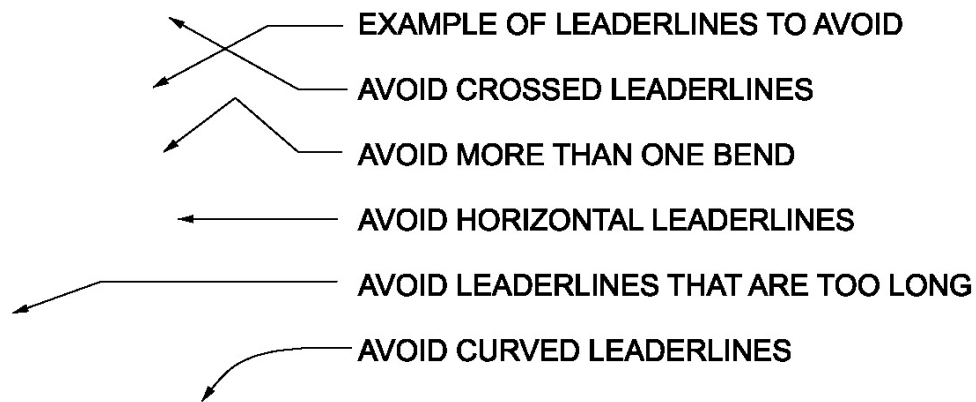


Figure 4.4 - Examples of Bad Leaders

4.5 North Arrow

DEP maintains a standard North Arrow used for all plans, as displayed, which is placed in the upper left corner of each plan drawing (including site plans and key plans.)

The North Arrow is ideally placed pointing toward the top of the sheet. The exception to this is on plan & profile drawings, where a linear flow makes it necessary to change the plan orientation to fit on the sheet and maintain continuity from sheet to sheet.



Figure 4.5 - North Arrow

4.6 Graphic Scale

Drawings to scale have a graphic scale bar(s) located preferably on the bottom right side of the drawing content area.

Two dynamic CAD blocks and Revit families have been provided for this purpose, one for typical architectural scales and the other for typical civil scales. In a CAD environment, once the applicable graphic scale bar has been inserted into the drawing, the visible scale setting can be selected from the properties dialog. In a Revit environment the graphics scales are imbedded into the border. *Figure 4.7* and *Figure 4.8* show the selection of the graphic scales and where they would appear after they are activated.

Up to four scales are allowed per drawing with the first one starting from the lowest position. In *Figure 4.3*, the 1"=40' scale is considered first and scales will proceed to be added above it as needed. In the event that horizontal and vertical scales need to be different, the horizontal scale will be placed first.

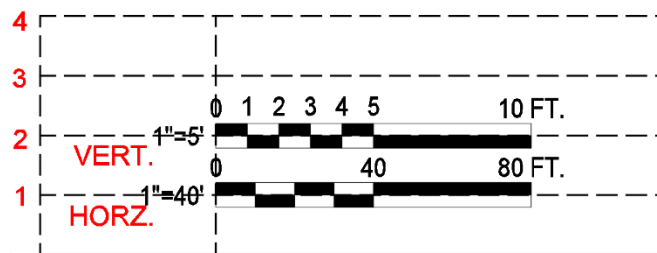


Figure 4.6 - Graphic Scale Bars

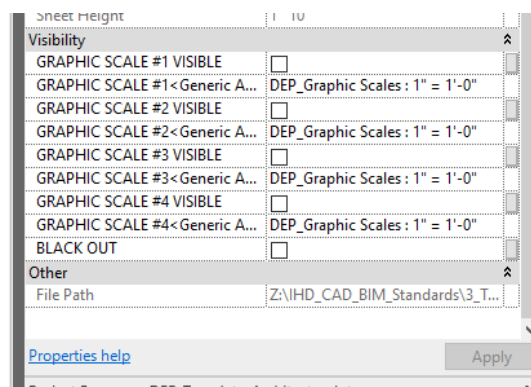


Figure 4.7 – Revit Imbedded Graphic Scale

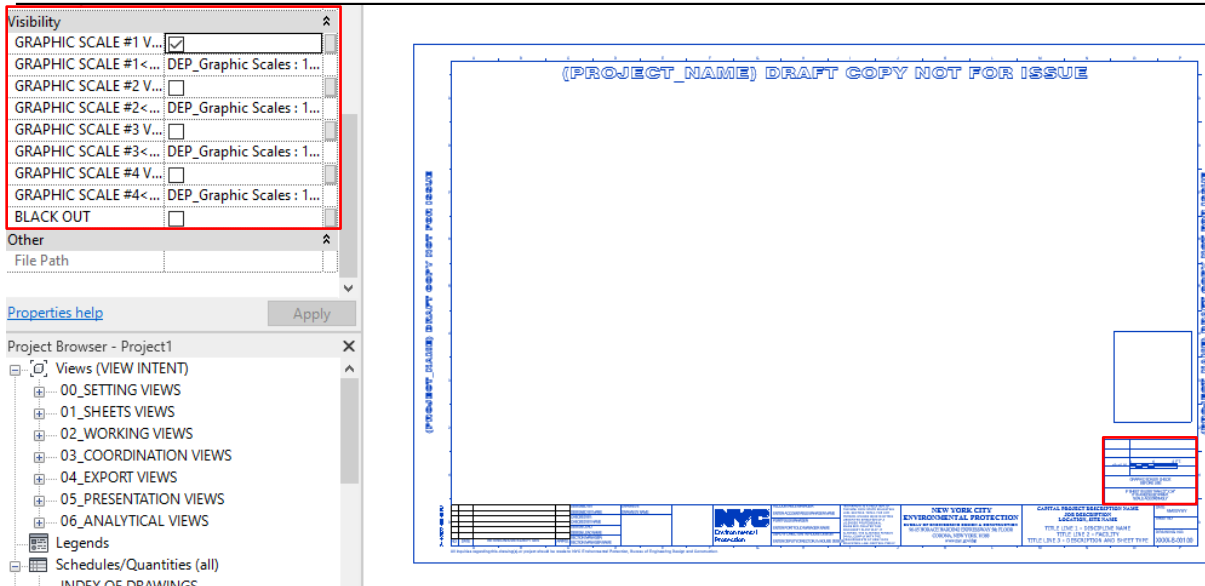


Figure 4.8 – Revit Imbedded Graphic Scale Referencing

4.7 Key Plan

The key plan shows the extents to which the drawing shown is displayed within the entire project. If used, it will be placed in the bottom righthand corner of the drawing, above the scale. The title will remain 1/8", following the naming convention specified in Section 4.4.

The dashed lines in Figure 4.9 are in the "DEFPOINTS" Layer and will not be printed on the actual drawing. They are there for reference in placing certain items.

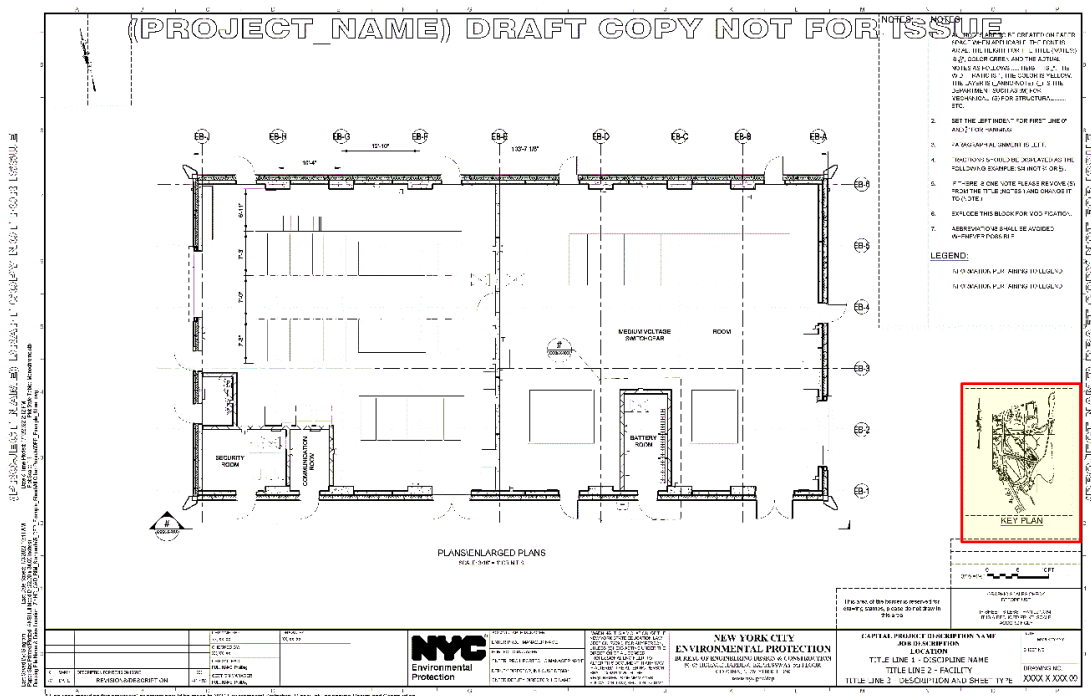


Figure 4.9 - Key Plan

4.8 Legends/General Notes/Keynotes

Legends consisting of general sheet notes, keynotes, or similar, are placed in the upper right corner of the drawing area. General sheet notes are numbered, are more generic in nature, and apply to the entire contents of the drawing. Sheet keynotes are lettered and called out with a bubble in specific spots to which they pertain. Guidelines for notes include the following:

- Minimize the use of abbreviations
- Notes are left justified

Avoid reference to notes on other drawings. CAD blocks are provided in the library to be used as a starting point for these notes, as shown below. They are inserted into drawings and exploded for editing. If there is just one note/legend, change the title to "NOTE:" / "LEGEND:" (Remove "S")

In the event that there is not enough space on the right side of the drawing for Notes, Legends, Key Plan, and Scales, precedent is given to items from the top down. Therefore, the notes are top priority and scale is lowest priority. The items that do not have appropriate space may then be moved to another area on the page.

NOTES:

1. ALL NOTES ARE TO BE CREATED ON PAPER SPACE WHEN APPLICABLE. THE FONT IS ARIAL, THE HEIGHT FOR THE TITLE (NOTES:) IS $\frac{3}{16}$ ", COLOR GREEN AND THE ACTUAL NOTES AS FOLLOWS..... HEIGHT IS $\frac{1}{8}$ ", THE WIDTH RATIO IS 1, THE COLOR IS YELLOW, THE LAYER IS (_ANNO-NOTE). () IS THE DEPARTMENT SUCH AS (M) FOR MECHANICAL, (S) FOR STRUCTURAL..... ETC.
2. SET THE LEFT INDENT FOR FIRST LINE 0" AND 5/8" FOR HANGING.
3. PARAGRAPH ALIGNMENT IS LEFT.
4. IF THERE IS ONE NOTE PLEASE REMOVE (S) FROM THE TITLE (NOTES:) AND CHANGE IT TO (NOTE:)
5. EXPLODE THIS BLOCK FOR MODIFICATION.

LEGENDS:

INFORMATION PERTAINING TO THE LEGEND

INFORMATION PERTAINING TO THE LEGEND

Figure 4.10 - Legend & Notes Blocks

4.9 Callouts & Titles

Detail callouts are placed as a bubble with a standard multileader line pointing to the detailed item. Details are labeled starting from 1 and continue incrementally. The callout bubble includes the detail number on top and sheet reference to the actual drawing on the bottom. Detail titles consist of the same bubble with the number on top and a dash in place of the sheet reference. The title of the

detail is placed above a horizontal line extending to the right from the center of the circle.

Standard CAD blocks and Revit families are included for this purpose in the block libraries and Revit templates, and examples are provided below. In a CAD environment when inserting these blocks to the drawing, they are not to be exploded. The software prompts you to enter the necessary attributes to fill in the references. The callout bubble lists the drawing number where the detail can be found, while the title bubble under the detail lists the drawing number where the detail is referenced. The scale shown under the title is selected from the preset list in the properties dialog.

Detail, Elevation and Section Views have bubbles; plan views do not. Section callouts are placed from right to left and from bottom to top.

Sections shall be called out using sequential numbering, starting at "1". Reference drawing number should be written in full (excluding .00 extension). Text shall always be aligned to be legible, with the arrow and tail rotating accordingly. Details shall also be called out sequential numbering.

General drawings, plan views, enlarged plans views, one line diagrams, and schedules title each sheet shall have a general sheet title block at the bottom of the sheet. Centered location is preferred, with a scale annotated underneath or N.T.S.. Call out extension lines should not extend the past text.

For Civil drawings, the use of an extra scale is allowed if a view requires a vertical and horizontal scale.

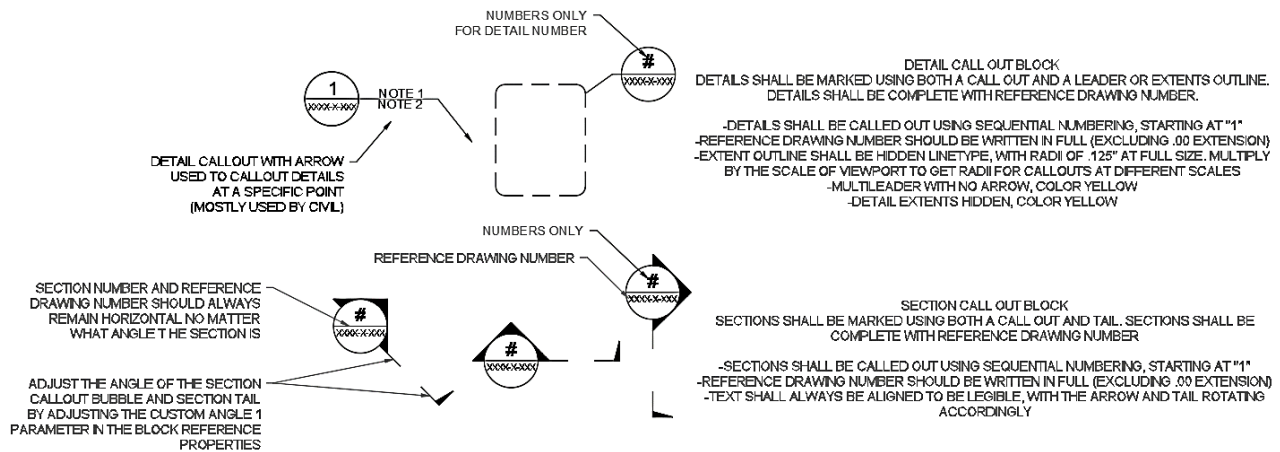


Figure 4.11 - Callouts

	DETAIL\ELEVATION\SECTION\PROFILE PLAN DETAIL CALLOUTS SCALE: 1/4"=1'-0" OR N.T.S. SCALE: 1/4"=1'-0" OR N.T.S.	TITLE CALL OUT BLOCK DETAILS, ELEVATIONS, SECTIONS, PROFILES AND PLAN DETAIL CALLOUTS SHALL HAVE A TITLE CALL OUT COMPLETE WITH REFERENCE DRAWING NUMBER AND SCALE. -SECTIONS SHALL BE CALLED OUT USING SEQUENTIAL NUMBERING, STARTING AT "1" -DETAILS SHALL ALSO BE CALLED OUT SEQUENTIAL NUMBERING. -REFERENCE DRAWING NUMBER SHOULD BE WRITTEN IN FULL (EXCLUDING .00 EXTENSION) -CALL OUT EXTENSION LINE SHOULD NOT EXTEND PAST TEXT -FOR CIVIL USE A EXTRA SCALE WAS ADDED IF A VIEW REQUIRES A VERTICAL AND HORIZONTAL SCALES
	NEW SUB DETAIL CALLOUT SCALE: 1/4"=1'-0" OR N.T.S.	SUB DETAIL CALL OUT BLOCK DETAILS SHALL HAVE A TITLE CALL OUT COMPLETE WITH SCALE. (THE SUB DETAIL CALL OUT IS ONLY USED FOR A DETAIL THAT HAS MULTIPLE DETAILS WITHIN ONE DETAIL)
	PLANS\ENLARGED PLANS SCALE: 1" = 40' OR N.T.S.	GENERAL DRAWINGS, PLAN VIEWS, ENLARGED PLANS VIEWS, ONE LINE DIAGRAMS AND SCHEDULES TITLE EACH SHEET SHALL HAVE A GENERAL SHEET TITLE BLOCK AT THE BOTTOM OF THE SHEET. CENTERED LOCATION IS PREFERRED, WITH A SCALE ANNOTATED UNDERNEATH OR N.T.S.. -CALL OUT EXTENSION LINE SHOULD NOT EXTEND PAST TEXT
	PLANS\ENLARGED PLANS PLANS\ENLARGED PLANS SCALE: 1/2"=1'-0" OR N.T.S.	
	GENERAL DRAWINGS\ONE LINE & BLOCK DIAGRAMS	(SCALES ARE NOT NEEDED FOR GENERAL DRAWINGS, ONE LINE AND BLOCK DIAGRAMS)

Figure 4.12 - Titles

4.10 Matchlines

A matchline is used to denote a cut line between two or more drawings where the area is too large for one drawing because of sheet size limitations. In CAD environments a "MatchLine" block is provided. Insert it on the Paper Space layout, explode the block, and modify the linework and texts.

Following are some guidelines for using Matchlines:

- Do not locate Matchlines on column lines, gridlines, or expansion joints
- Matchlines are shown at the same location within the structure on both sheets containing adjacent segments
- Clip the plan clean to the matchline unless a small amount of overlap is necessary to establish the relationship between adjacent plan segments. An exception to this rule is for plans which are part of a plan & profile drawing, where the matchline may be placed at an angle perpendicular to the pipeline
- Always label matchline with the word **"MATCHLINE"**
- Label matchline with the sheet number that it continues on
- NEVER dimension to a matchline; you may dimension through a matchline to an element on the next section or plan
- Matchline layer name in AutoCAD is G-ANNO-MATC-LINE NEW
- Matchline text shall be arial text at 0.125" full size
- Text shall be oriented as illustrated in *Figure 4.13*.

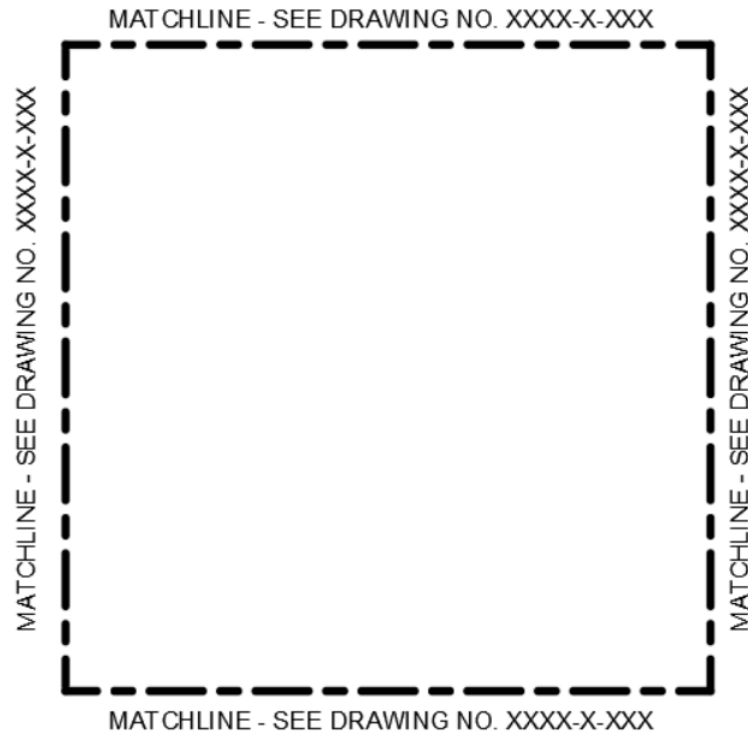


Figure 4.13 - Matchlines

4.11 Gridlines & Bubbles

Plans for structures with columns or more than 4 walls in one direction should have reference gridlines:

- The gridlines are the centerlines of interior walls and columns and the outside face of exterior walls exclusive of any architectural covering
- Gridlines are used for dimensioning and are shown on drawings at each level, partial plans, sections, and details
- Gridlines must match from discipline to discipline. One discipline will take the lead to establish the gridlines.
- Starting at the top right and moving left, vertical gridlines are lettered sequentially across the top of the page. Starting at the bottom right of the drawing, horizontal gridlines are numbered sequentially upwards the right side of the page.

Gridlines in civil discipline projects identify the coordinate grid system that is the basis for locating the project geospatially in the world and providing horizontal controls. The coordinate system can be local, state, country or even longitude/latitude; clarify the coordinate system between disciplines when beginning a project. Northing/Easting coordinates are placed in the plan as callouts at regular intervals to show the horizontal control information.

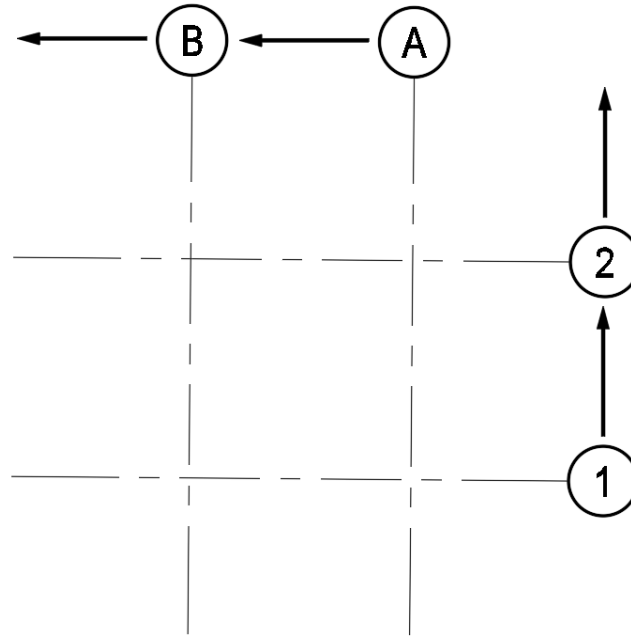


Figure 4.14 - Gridlines

4.12 Centerlines

In CAD environments, road, pipe, shaft, tunnel, or other centerlines are placed on the G-ANNO-CNTR layer. This layer has already been configured in the standard templates with the preferred line weight and style. In Revit environments the style is embedded.

4.13 Revision Marks

When revising a drawing during the bid process or construction, revision marks are placed on the sheet to clearly identify revised areas. Revision marks consist of a “Revision Cloud” (using the built-in CAD and Revit tools) and a Triangle block/family that contains the specific revision number. Revision clouds shall have an arc length of 0.5” in layout space (paper space). If clouds are generated in the model space, multiply the viewport scale by 0.5 to get proper arc length.

In CAD Environments, the clouds and triangles are placed in layout space, on layers G-ANNO-REVISION-CLOUDS & G-ANNO-REVISION-TRIANGLES, with all properties set to “by layer.” A revision triangle (found in the block libraries) is placed within each clouded area and numbered to indicate how many times the drawing has been reissued.

4.14 Dimensions

Placing dimensions on drawings is one of the primary indicators of how something is going to be constructed. Standard dimension styles have been configured in the standard template files and is used whenever placing dimensions.

In CAD environments, the pre-set dimension style is configured to be annotative. Non-annotative, fixed dimension styles are also provided for typical scales, but these should be avoided if possible.

A few key guidelines for placing dimensions are listed below:

- Overall dimensions are provided on the plans
- If a structure is too long to be shown in one sheet, then the overall dimensions are shown across a breakline
- NEVER dimension to breaklines
- Horizontal dimensions are shown on plans and not sections, unless too small or congested to be clear
- Do not repeat dimensions unless necessary to clearly relate one drawing or view to another
- Dimensions 12" and larger is in feet and inches, except pipe diameters, weld dimensions, reinforcing spacing, column sizes, and structural steel are in inches
- Dimensions shown on civil drawings are shown in decimal feet, extended to two decimal places

4.15 Colors in CAD Environments

Colors have been selected for each layer in template files to create easy visual separation between elements on different layers while a CAD file is displayed on the monitor. Colors are used to represent different plotted line weights in CAD environments.

4.16 Line Weights in CAD Environments

Line Weights have been set to Default in the template files and have no bearing on how a drawing is plotted. Appendix 3 summarizes color table plotting thicknesses.

4.17 Line Styles in CAD Environments

Line Styles are used to distinguish certain types of elements from one another in a drawing and show some items in various type of dashed lines. Elements are typically left with the line style set to "by layer", however, it is the responsibility of the user to set the line style in the layer properties manager as needed. They should use one of the standard AutoCAD line styles which are included in the DEP custom line style library. See *Appendix 2*.

The definitions for many of the DEP line styles exist in the standard template. If additional line styles are required to best depict a certain design element, they may be created and imported into the necessary CAD files. If a new custom line style requires a shape file (SHP/SHX), then the corresponding files must be provided along with the CAD files.

4.18 Layers in CAD Environments

Drawing elements are placed on an applicable layer which has already been assigned a color, a default line weight, and a continuous line style. It's the responsibility of the user to set the line style in the layer properties manager as needed. The color setting for a given layer is standardized such that similar information is presented in the same way throughout a drawing set. They should not be changed, unless it is necessary to edit information that has been referenced from other disciplines. DEP standard layers are defined in the provided template files. (See *Appendix 1*)

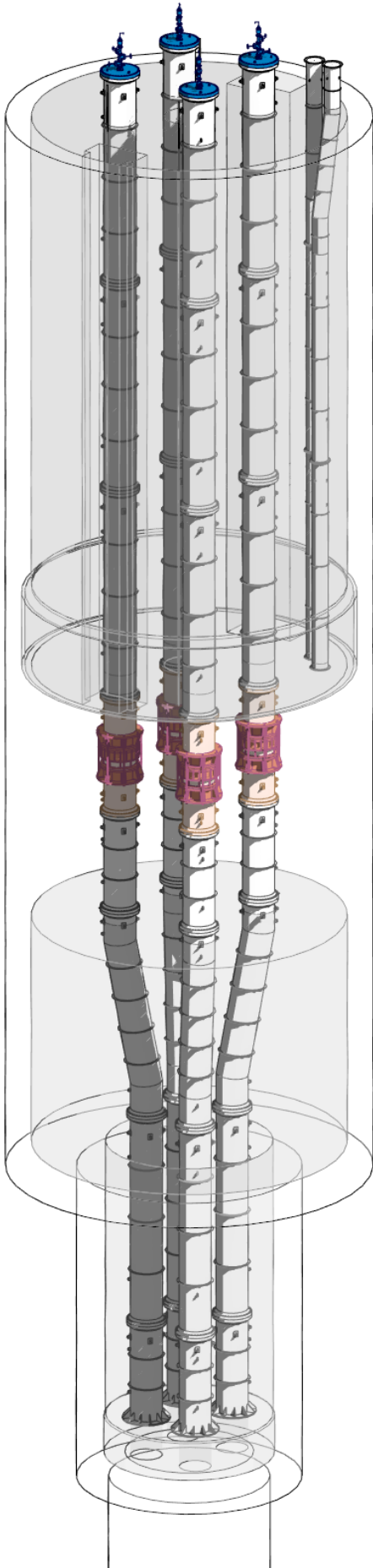
The standard layers are intended to cover all possible drawing content, but it is understood that they may not be sufficient for 100% of scenarios. Best attempts shall be made to place elements on an existing standard layer. If it is necessary to add more layers, they should be named in the same manner as those which are already in the file. These have been preset to closely follow the naming guidelines as set forth in the AIA guidelines and the National CAD Standard. In the event that layers are added, submit the new layer names and properties to the BIM/CAD Manager for future consideration in the standards.

4.19 General Best Practices

- Remove all unused XREFs and Links
- Keep outside of title border clean and do not have any objects (even a point) outside the title border
- Do not draw or place any objects in the areas reserved for the Drawing Stamps and the title border at the bottom
- Use only the provided standard blocks and families
- Organize the views on the sheets without separation lines and do not use any line to separate details, notes, or drawings in the layout
- Each drawing/view on the sheet layout must have a view title callout and cite the scale (can be N.T.S.) by using the provided blocks and families
- Define all Abbreviations, Symbols etc. on the designated Abbreviations and Symbols sheet(s)
- Use “.” after “NOTES:”, “NOTE:”, “LEGEND:”, “ABBREVIATIONS:”, etc.
- Minimize the use of abbreviations
- Place the titles of the tables on top of the tables
- When copying and pasting items from another project, please make sure to bring the pasted items to the standards of the current project
- Place Graphic Scales in the designated area
- When referencing a drawing, use drawing number only without revision extension (“.00”, “.01”, etc.)
- Design leads must run spell check on all sheets prior to submittals
- Design leads must make sure the sheet titles match with Master Drawing List (Excel file)
- Design leads must check cross referencing across the sheets on matchlines or other continuation notes, sections, and detail callouts

In CAD Environment:

- Keep the color and settings of “DEFPOINTS” layer intact and do not change the layer color
- Leave the “DEFPOINTS” Layer on and avoid freezing this layer
- Each file should have only one Layout/Sheet (in paper space). The name of the layout must be the same as the file name/drawing number with the revision extension. Ex. M-100.00, 17B1-S-101.02



SECTION 5

BIM / REVIT GUIDE

Section 5 BIM / Revit Guide

The Building Information Modeling (BIM) / Revit Guide section describes the processes and procedures required for the preparation and submission of BIM/Revit Models and Contract Drawings through Revit for BEDC projects.

BIM Introduction

BIM is an industry standard that is enhancing the lifecycle of projects from early stage of planning and design throughout construction, and facility operations. BIM uses computer-based simulations to study and validate project design and construction before they are built.

BIM is far more than basic 3D modeling; BIM is a process that integrates multiple streams of project-related information. BIM moves users away from the traditional “document-centric” approach, which only addresses the capital construction side of a facility, and toward a “data-centric” approach, which supports the facility lifecycle operation. This results in a more effective holistic approach for the design, estimating, scheduling, and construction phases.

BIM breaks down traditional barriers related to interdisciplinary collaboration, facilitating off-site prefabrication, improving design options, and most importantly, reducing project risks and cost. BIM streamlines construction phasing, quantity/material takeoffs, and green building analysis, among many others.

Purpose

This section ensures that BEDC will produce, release, and receive data in a consistent format with the implementation of BIM. This will maintain an efficient and compatible exchange of data between disciplines and various outside consultants.

How to use this section

This section contains all BEDC wide BIM Requirements, Standards, Best Practices, and is meant to provide an overall understanding of the general requirements for BEDC BIM utilized projects through utilizing Autodesk Revit.

5.1 Autodesk Revit

Autodesk Revit is a building information modeling authoring software supporting multiple disciplines such as Architecture, Structural, Mechanical, Electrical, and Plumbing. The software allows users to design and model structures and its components in 3D, develop interactive 2D design drawings and annotate them, and access objects properties information from the model's database.

5.2 Revit Template Best Practices

The below describes how to use the Revit templates and some suggested best practices.

Project Starting View

The Project Starting View is set to be the default view once you open Revit models. It's a detail view that contains standard information to be shared among modelers and viewers about the model. The information being shared is to inform designers and modelers of what practices are being used within the opened model. Discipline Design Leads should fill out the starting view.

NYC Environmental Protection

REVIT PROJECT INFORMATION

TEMPLATE VERSION: REVIT 2021

PROJECT INFORMATION: PROJECT NAME: PROJECT NUMBER: PROJECT OWNER: PROJECT ISSUE DATE: DISCIPLINE: CAPITAL PROJECT DESCRIPTION NAME: PROJECT LOCATION, SITE NAME: BORDER INFORMATION: ACCOUNTABLE MANAGER NAME: PORTFOLIO MANAGER NAME: DEPUTY DIRECTOR, IN HOUSE DESIGN NAME: DESIGN LEAD: SECTION MANAGER: WATERMARK: PROJECT DIRECTORY: GENERAL PROJECT DIRECTORY: BIM EXECUTION PLAN (BEP): NYCDEP BEDC CAD/BIM STANDARDS V1.0 2021:	JOB DESCRIPTION ENTER PROJECT NUMBER ENTER PROJECT OWNER MM/DD/YYYY ENTER DISCIPLINE CAPITAL PROJECT DESCRIPTION NAME LOCATION, SITE NAME ENTER ACCOUNTABLE MANAGER NAME ENTER PORTFOLIO MANAGER NAME ENTER DEPUTY DIRECTOR, IN HOUSE DESIGN DESIGN LEAD NAME SECTION MANAGER NAME (PROJECT_NAME) DRAFT COPY NOT FOR ISSUE GENERAL PROJECT DIRECTORY LOCATION BIM EXECUTION PLAN (BEP) LOCATION Z:\IHD_CAD_BIM_Standards	PROJECT FEATURE INFORMATION: ☐ WORKSETS ARE BEING USED ☐ PHASING IS BEING USED ☐ OTHER MODELS ARE LINKED TO THIS MODEL BY ☐ AUTO - CENTER TO CENTER ☐ AUTO - INTERNAL ORIGIN TO INTERNAL ORIGIN (ORIGIN TO ORIGIN) ☐ AUTO - BY SHARED COORDINATES ☐ AUTO - PROJECT BASE POINT TO PROJECT BASE POINT ☐ POINT CLOUDS LINKED TO THIS MODEL BY ☐ AUTO - CENTER TO CENTER ☐ AUTO - ORIGIN TO INTERNAL ORIGIN ☐ AUTO - BY SHARED COORDINATES ☐ THIS MODEL IS BEING LINKED TO ANOTHER MODEL(S) ☐ SHARED COORDINATES ARE BEING USED ☐ SYSTEMS ARE BEING USED ☐ DESIGN OPTIONS ARE BEING USED IN THIS MODEL
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DISCLAIMER:
CONTENT IN SHARED MODEL IS FOR INFORMATION ONLY...

Figure 5.1 - Project Starting View

Project Browser

The Project Browser has been grouped by view intent or category as below.

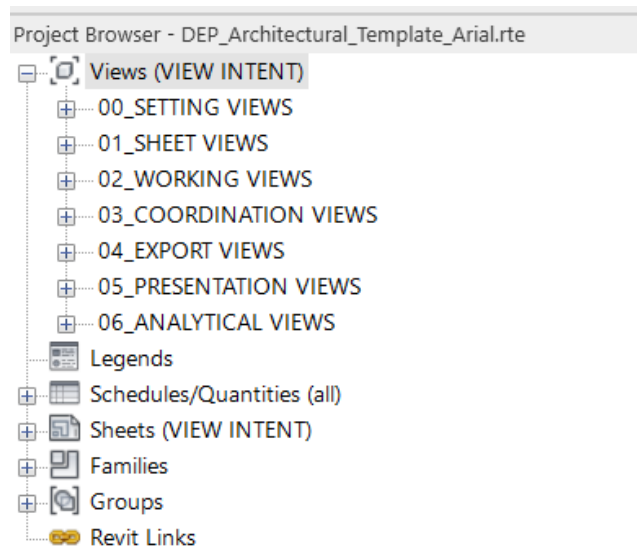


Figure 5.2 - Project Browser

Every new project will contain an information page, as shown in *Figure 5.1*. Updating any parameters here will automatically update the corresponding information on the title blocks of the border.

00 - SETTING VIEWS - This is for Revit settings; for example: grids, levels, scope boxes, etc.

01 - Sheet Views – This is for views with annotations that are used for sheet composition. Do not change the settings of this view. If it needs to be updated contact the Project BIM Manager.

02 - WORKING VIEWS – This is set for working or modeling views. These views are not to be used in the sheet composition.

03 - COORDINATION VIEWS - This is for coordination with other disciplines or linked models.

04 - EXPORT VIEWS - This is for Navisworks exports, model compare PDFs, etc.

05 - PRESENTATION VIEWS – This is for model presentation, like rendered images, animations, 3D_PDFs, etc.

06 - ANALYTICAL VIEWS - This is set for the purpose of running different analyses on the model.

Project Browser View Naming Convention

The table below shows view naming conventions that must be followed for creating views.

View Intent	Prefix	Sample
Sheet View	SV-	SV-LEVEL 01
Working View	WV-	WV-LEVEL 01
Coordination View	CV-	CV-LEVEL 01
Export View	EV-	EV-LEVEL 01

Figure 5.3 – Project Browser Naming Convention

For Drafting Views and Sections, the naming convention will only apply to views that will be in the sheet composition.

Example:

Detail View (Drafting View) = SV-D-101_Description

Section View = SV-S-101_Description

Sheets Folder

The Sheets Folder is divided into 2 categories:

1. Current Set - All drawings for Issue (official drawings)
2. Not for Issue - All drawings that are not for Issue (sketch drawings)

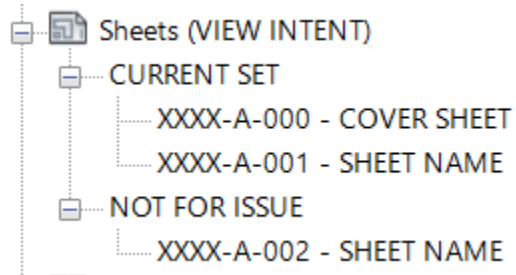


Figure 5.4 – Sheets Folder in Project Browser

By default, when a new sheet is created, it is automatically placed under a "???" folder located in the sheets tab of the project browser. The newly created sheet needs to be moved to the proper folder location. By changing the "VIEW INTENT" type parameter located in the identity data section of the properties palette to either "CURRENT SET" or "NOT FOR ISSUE". See in the Yellow highlight.

NOTE: "Appears in Sheet List" (in the Green highlight) should be checked if the sheet is in the "CURRENT SET" folder, and unchecked if it is in "NOT FOR ISSUE" folder, so it will not appear in the Drawing List schedule.

Identity Data	
Dependency	Independent
Referencing Sheet	
Referencing Detail	
Current Revision Issued	☐
Current Revision Issued By	
Current Revision Issued To	
Current Revision Date	
Current Revision Description	
Current Revision	
Approved By	Approver
Designed By	DESIGNED BY NAME
Checked By	CHECKED BY NAME
Drawn By	DRAWN BY NAME
Sheet Number	XXXX-A-001
Sheet Name	SHEET NAME
Sheet Issue Date	02/25/19
VIEW INTENT	CURRENT SET
Appears In Sheet List	☒
Revisions on Sheet	Edit...

VIEW INTENT	NOT FOR ISSUE
Appears In Sheet List	☐

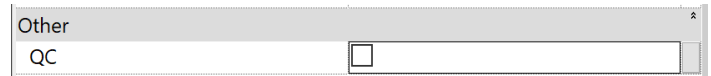
Figure 5.5 – Identity Data Section of Properties Palette

Quality control (QC) Project Parameter

A "QC" project parameter is embedded in each discipline Revit template for main model objects that

can be utilized by design leads or the responsible quality controller. The responsible party uses the QC project parameter located in the *other* section of the properties palette of the object selected. Checking the QC parameter of a selected object indicates that the object was reviewed by the responsible party and meets the correct design criteria and specifications. If the QC parameter is unchecked that means that the object has not yet been reviewed by the responsible party. See below for examples.

An unreviewed object will display as unchecked



A reviewed object will display as checked



Figure 5.6 – QC Project Parameter

5.3 Best Practices and General Requirements

In this section we will discuss best practices, general requirements, and preferred usage for users producing design documents using Revit.

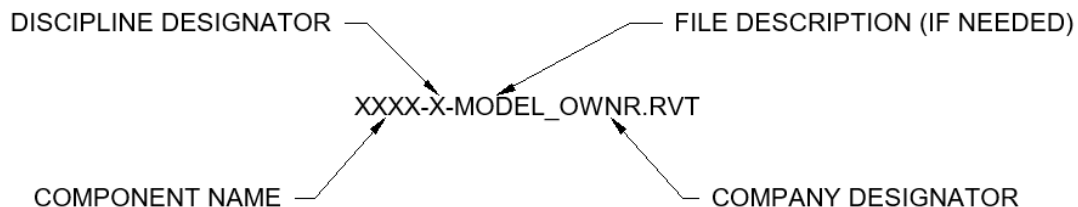
For In-House projects, the BIM Project Manager will setup the Central Revit models and users will create their own Local models. Users should never open the Central files for any reason. Modifications to Local models must be saved back to the Central file via *Synchronize with Central*.

The Project Base Point, Survey Point, and Shared Coordinates will be defined by the Project BIM Manager and users must not modify them.

When working within the 3D environment, it is best to keep the model clear of any objects that are not being used. This would help reduce the file size and ensure optimal interoperability between various programs.

Revit Model Naming

To organize the data, it is imperative to maintain a consistent naming standard for Revit models and families produced within a DEP project. Revit model names should contain the following and in all capital letters:



- Component Name: The component name is a unique string that refers to a major construction

component of the job. The component names are defined by the Project BIM Manager and are represented by four or five characters and a dash after: XXXX- (example: KECT-, C547B-).

- **Discipline Designator:** All drawing files fall within an engineering discipline. The discipline designator is included as part of the file name. See Section 2.6 for more information.
- **Company Designator:** The company designator is used to differentiate models when more than one designer entity is involved in the project (example: IHD). This designator is included at the end of the model name.

Worksets

Worksets assist in the management of content. Utilizing them streamlines model objects sharing and collaboration between disciplines. The number of worksets should be minimized and each must be defined to manage large groups of model elements.

- Worksets will be defined by the Project BIM Manager. If Design Leads need a workset, they must send the request to the Project BIM Manager.
- Standard naming convention for worksets will be defined by the Project BIM Manager.
- Visibility of worksets will be managed through the workset manager. Controlling the visibility of model elements through worksets will affect all views.
- For CAD and Revit links, separate worksets must be defined.
- Worksets set to “not visible” in a project file do not carry over to files which are linked to the project. In other words, that workset will be seen by other disciplines.
- Communicate with team members if a workset should be turned off. Adding the words “NOT USED, TURN OFF OR OFF UNLESS NEEDED” can help but still let the team members know.

Below shows a sample workset names and structure.

Figure 5.7 – Worksets Naming Convention Example

Worksets

Active workset:
STRUCTURAL LINKED MODEL ☐ Gray Inactive Workset Graphics

Name	Editable	Ow	Borrowers	Opened	Visible in all views
ARCHITECTURAL LINKED MODEL	Yes	gin		Yes	☒
DWG FILES (OFF UNLESS NEEDED)	Yes	gin		Yes	☐
ELECTRICAL LINKED MODEL	Yes	gin		Yes	☒
H-S LINKED MODEL	Yes	gin		Yes	☒
HVAC LINKED MODEL	Yes	gin		Yes	☒
MECHANICAL LINKED MODEL	Yes	gin		Yes	☒
MODEL LINES (OFF UNLESS NEEDED)	Yes	gin		Yes	☐
PLUMBING LINKED MODEL	Yes	gin		Yes	☒
SCOPE BOXES (OFF UNLESS NEEDED)	Yes	gin		Yes	☐
SHARED LEVELS AND GRIDS	Yes	gin		Yes	☒
STRUCTURAL LINKED MODEL	Yes	gin		Yes	☒

Show:
☒ User-Created ☐ Project Standards
☐ Families ☐ Views

Buttons: New, Delete, Rename, Open, Close, Editable, Non Editable, OK, Cancel, Help

Levels

Levels must be defined in the early stage of the project before any modeling efforts are started. Levels are finite horizontal planes that act as a reference for level-hosted elements, such as floors, ceiling, roofs, etc. Levels should be established by the lead discipline and copied to other disciplines. Keeping level counts to as few levels as possible is suggested. Level naming should match from discipline to discipline; however, some disciplines may not need the same levels as other disciplines need.

Gridlines

Gridlines are finite planes. You can drag their extents in elevation views so that they do or do not intersect level lines. Gridlines must be created under *Shared Grids and Linked Models* design option and *Shared Levels and Grids* workset to avoid accidental modifications. See section 4.9 for details about gridline standards.

Schedules/Quantities

Through this tool, different types of schedules/quantities can be utilized. Schedules (or Quantities), Annotation Schedules (or Note Blocks), Keynote Schedules, Material Takeoffs, Revision Schedules, View Lists, Drawing Lists, Panel Schedules, Graphical Column Schedules and much more. As a part of the Quality Control process, schedules can be used for validating designs and checking standards. DEP Revit templates contain several predefined schedules such as Sheet list and View list. Sheet list can be used to organize sheets for a submission for issue or not to issue. View list can be used to organize project browser views.

Drawing Border and Cover sheet (Families)

In the Revit templates there are two families for sheets. For contract drawings, use the [22x34 BRDR DEP.rfa](#) and [22x34 COVER SHEET DEP.rfa](#) for the cover sheet.

Keynotes

Users must define keynotes to simplify the notation process in complex drawings. A keynote identifier is a rectangle with a number and a leader with an arrow pointing to the item described in the keynotes. The leader can be removed if space is limited. Keynote numbers will not start over on each sheet, for example keynote 41 on one sheet will be the same as keynote 41 on another sheet.

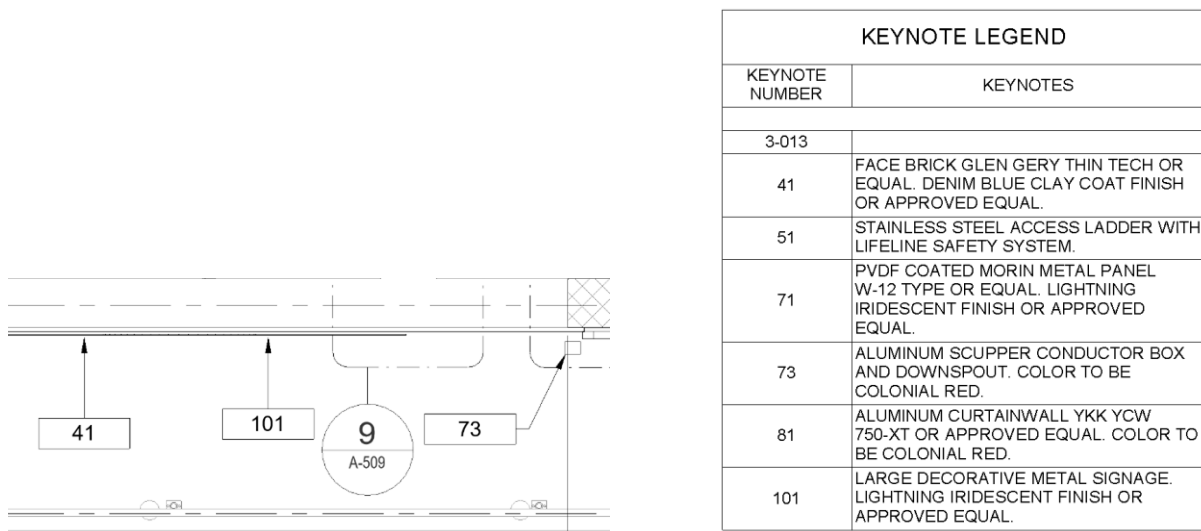


Figure 5.8 – Keynote Example

Revit Drafting Standard Families

Drafting Standard Families are included in the provided Revit templates. Avoid changing them. For families that are created by users, follow below standards:

- Name with the prefix “DEP_”, followed by a description of the family
- Capitalize the leading letters in each portion of the family name
- Keep file names as short as possible to be readable in Type Selector
- Create a Type Catalog for family files that contain three or more types

Examples of naming families:

DEP_Trench_Box_Void
DEP_Graphic_Scales
DEP_Revision_Tag
DEP_Bulkhead

Annotations

Annotation symbols, such as Generic Annotations, Tags, Callouts, and Dimensions, among others, have been pre-loaded within the DEP Revit Discipline Templates. Annotations must be placed within the design views, not the sheet views. If there is a need for any specific Tags, Symbols, Callouts, etc., reach out to the Project BIM Manager to create them.

Phasing

Phasing allows representation of different objects of the model in different time periods in the life of the project. All elements added to a project have Phase Created and Phase Demolished parameters.

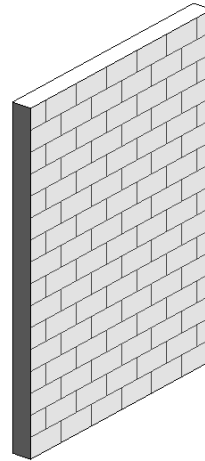
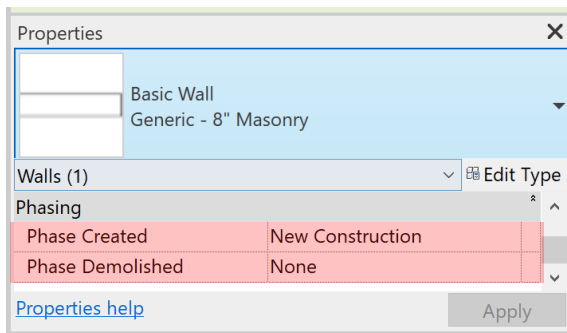


Figure 5.9 – Object Phasing Parameters

Default phases are imbedded in the DEP templates including Existing and New Construction. Other phases can be created to match the project phases as necessary. Note that the order in which project phases are inserted affects how elements are displayed. The Project BIM Manager sets up the phases. The Interim phase in *Figure 5.10* which will be added to future projects to show temporary equipment placed to aid in construction and then removed.

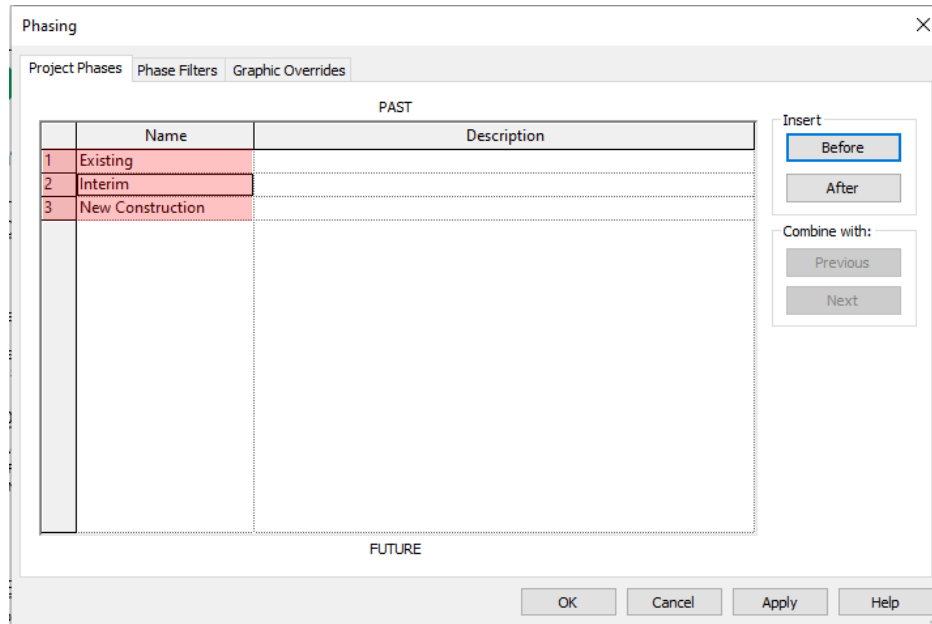


Figure 5.10 – Project Phases Dialog Box

The table below shows four default object phasing parameter settings for different project phases in action that are embedded in DEP Revit templates:

Revit Object Phasing Settings	Project Phase in Action				
Phasing <table> <tr> <td>Phase Created</td><td>Existing</td></tr> <tr> <td>Phase Demolished</td><td>None</td></tr> </table>	Phase Created	Existing	Phase Demolished	None	Existing (Object was created in an earlier phase and continues to exist in the current Phase)
Phase Created	Existing				
Phase Demolished	None				
Phasing <table> <tr> <td>Phase Created</td><td>Existing</td></tr> <tr> <td>Phase Demolished</td><td>New Construction</td></tr> </table>	Phase Created	Existing	Phase Demolished	New Construction	Demolished (Object was created in an earlier phase and to be demolished in the current phase)
Phase Created	Existing				
Phase Demolished	New Construction				
Phasing <table> <tr> <td>Phase Created</td><td>New Construction</td></tr> <tr> <td>Phase Demolished</td><td>None</td></tr> </table>	Phase Created	New Construction	Phase Demolished	None	New (Object to be created in the current phase and not to be demolish in the current phase)
Phase Created	New Construction				
Phase Demolished	None				
Phasing <table> <tr> <td>Phase Created</td><td>New Construction</td></tr> <tr> <td>Phase Demolished</td><td>New Construction</td></tr> </table>	Phase Created	New Construction	Phase Demolished	New Construction	Temporary (Object to be created and to be demolished during the current phase)
Phase Created	New Construction				
Phase Demolished	New Construction				

Figure 5.11 – Object Phasing Settings

Each Phase status has a Graphic Override that is preset in DEP Revit templates and should not be changed:

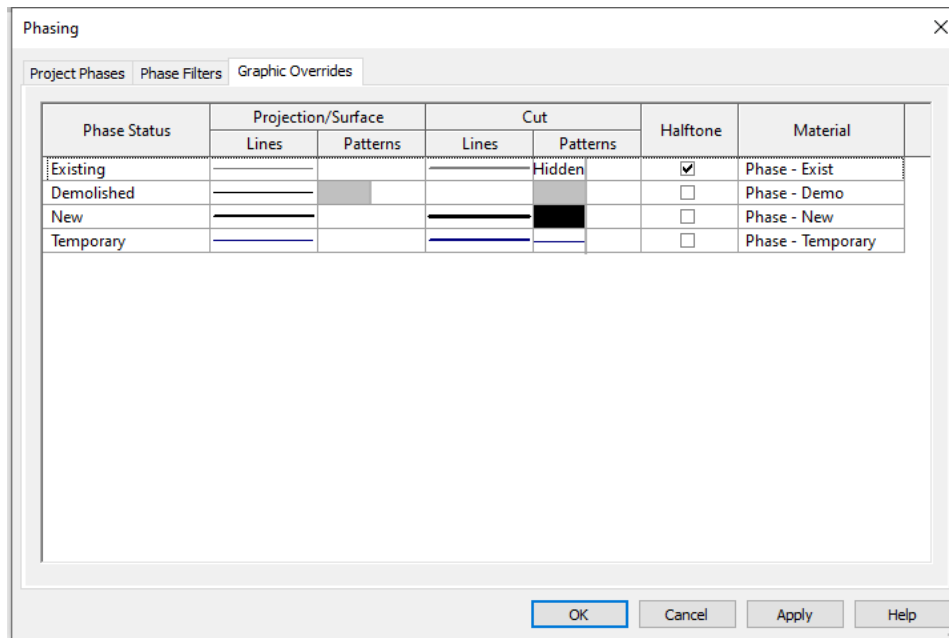


Figure 5.12 – Phasing Graphic Overrides

In order to control the display of objects based on their Phase Status, the Phase Filter parameter is used. The Phase Filter parameter can be applied in properties palette under the phasing section as shown below:

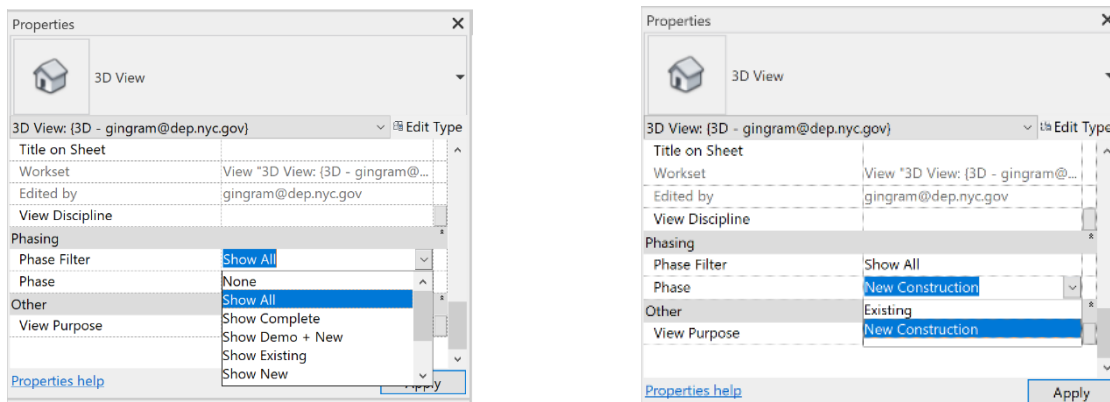


Figure 5.13 – Applying a Phase Filter to a View

Revit tracks the phases that objects are created or to be demolished. Based on the view Phase Filter settings, Revit shows different stages of work. The table below shows different phase filters and the display settings for each phase within that phase filter. The below phase filters are

embedded in the provided Revit templates.

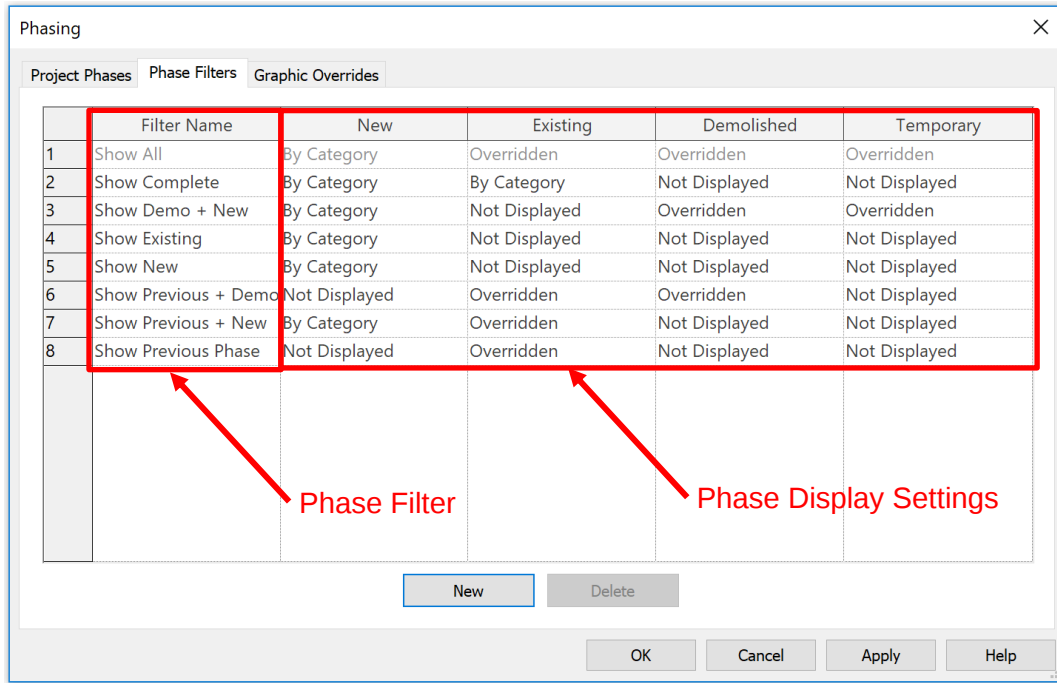


Figure 5.14 – Phasing Filter Display Settings

By default, in all Revit templates Phase Created settings are set to New Construction and Phase Demolished to None.

Examples below show how to apply Phase Filters to views for Existing, Demolished, New, and Temporary phases in action based on the Revit templates phasing settings.

Example 1 - Settings for Displaying New Construction objects:

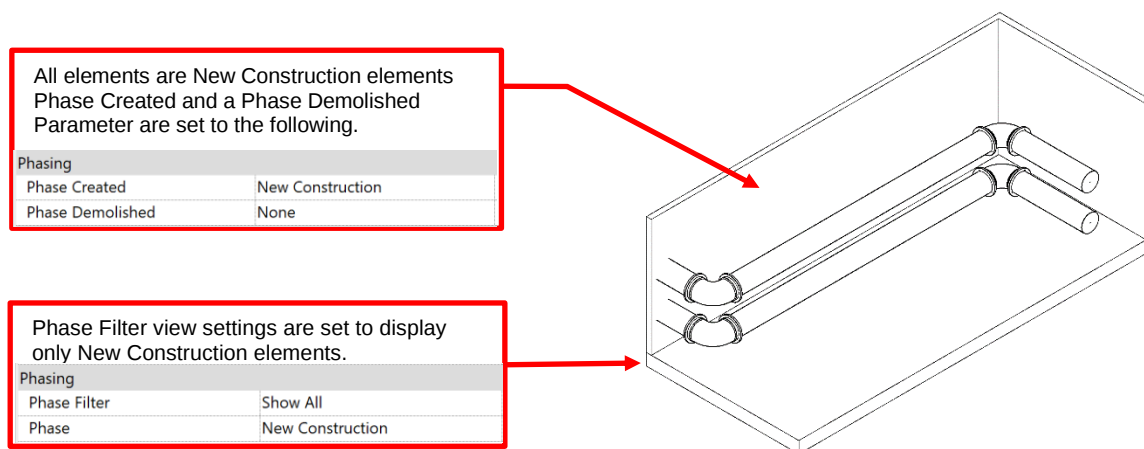


Figure 5.15 – Settings for Displaying New Construction Objects

Example 2 - Settings for Displaying Existing objects:

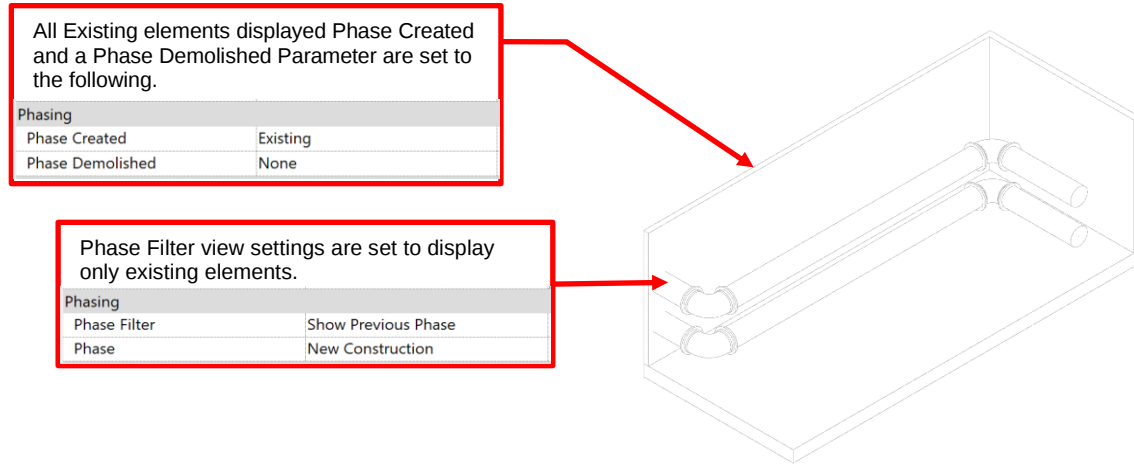


Figure 5.16 – Settings for Displaying Existing Objects

Example 3 - Settings for Displaying Existing and Demolished Objects:

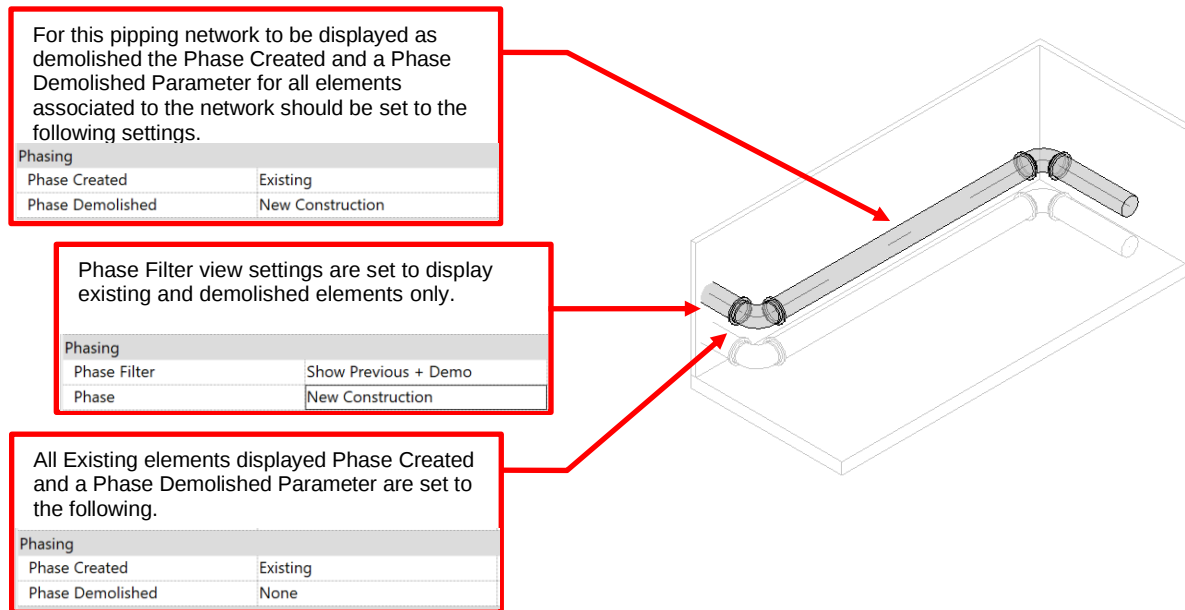


Figure 5.17 – Settings for Displaying Existing and Demolished Objects

Example 4 - Settings for Displaying Existing and New Construction Objects:

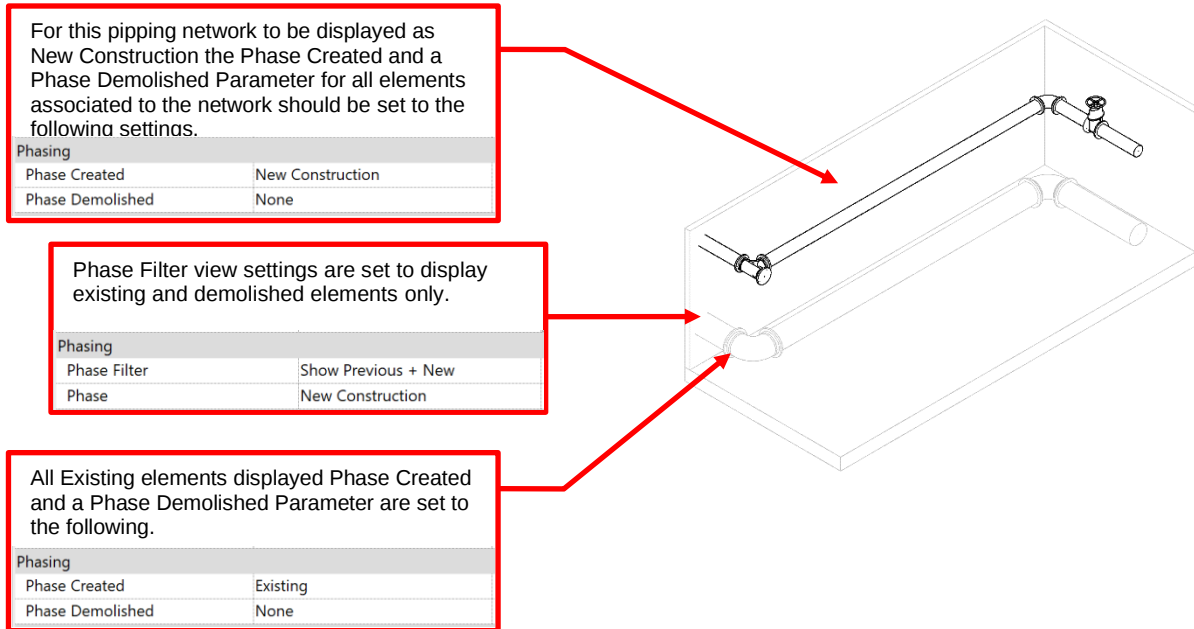


Figure 5.18 – Settings for Displaying Existing and New Construction Objects

5.4 Project Specific BIM Execution Plan (herein referred to as BEP)

For some projects a project specific BEP may be developed. For projects that use BIM 360 as the Common Design Environment (CDE), developing BEP and outlining the workflows of BIM 360 is mandated. The BEP forms part of the Project Management Plan (PMP) and discusses, in detail, about BIM execution for that specific project. The BEP will be complementary to this document or may supersede it.

Once the BEP is approved by the Project BIM Manager, the BEP shall become the ultimate compendium on BIM requirements, methodologies, and workflow for the project. The BEP is considered a “living” document, in the sense that it will likely be updated throughout the project. Situations that may trigger a revision on the BEP include, but are not limited to:

- Changes in Staff, that directly affect the BIM processes and/or deliverables
- Changes in processes
- Changes in requirements
- Changes in project Schedule

5.5 Level of Development (LOD)

Level of Development (LOD) is the overall state of the information model at a particular point in its design process. This includes not only graphical objects, but also the data associated with the objects. The model should develop over time from a very coarse design to the record drawings and

as-builts. This process has been distilled down into six distinct categories as shown below. All model elements should follow the LOD specified in the project BEP.

The LOD is cumulative and should progress along with the design from stage to stage. For design stage and producing contract drawings, LOD 300 or LOD 350 is required based on the decision of the Design Leads and the BIM Project Manager. For LOD specification, adhere to the latest version of the BIM Forum LOD Specification (Part I), publicly available at <https://bimforum.org/loa/>.

Level of Detail (LOD)	
LOD 100	The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements. LOD 100 elements are not geometric representations. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.
LOD 200	The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element. At this LOD elements are generic placeholders. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.
LOD 300	The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs. The project origin is defined and the element is located accurately with respect to the project origin.
LOD 350	The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element. Parts necessary for coordination of the element with nearby or attached elements are modeled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
LOD 400	The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element. An LOD 400 element is modeled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
LOD 500	The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information may also be attached to the Model Elements. Since LOD 500 relates to field verification and is not an indication of progression to a higher level of model element geometry or non-graphic information, this Specification does not define or illustrate it.

Figure 5.19 – Level of Development (Detail)

5.6 Discipline Revit Templates

The Discipline Revit templates should be used for BEDC projects. Templates contain the latest BEDC drafting standards. Revit users and consultants can use the templates to produce high-quality construction documents. Templates are located at:

DEP Network Location: `\\depmap1\Cad_Data\VHD_CAD_BIM_Standards\3_Templates\03 Revit`

e-Builder Location: [Knowledge Reservoir / Documents / 20-Manuals and Guidelines\CAD_BIM Standard Manual & Support Files / Revit 20XX_Templates.zip](#)

5.7 Revit Definitions

Below are described the common term definitions in Revit. Adhering to these definitions is important to streamline the communication between users.

Attached: Loads nested models into the host model and will be displayed in all other files the model is linked into.

Central File: The central model is the master project file used for a server-based workshared project and stores the ownership information for all elements in the project. The user should never open the Central file for any reason.

Families: Are the elements that bring any design to life. They hold the data that, when created correctly, provides more than just a visible indication of an object's placement.

Inserting Files: A static version of a CAD or Image file when placed into Revit. This file will not update to reflect any changes.

Linking Files: An associated Revit, CAD, POINT CLOUD, or IFC file which can be reloaded to reflect any modification without disturbing the location of the file.

Local Copy: A synchronized copy of the Central file saved on the Users local machine. Modifications to this copy must be saved back to the Central file via Synchronize with Central.

Overlay: Does not load nested models into the host model which will not allow them to display.

Shared Coordinates: Internal project/file coordinates shared with linked files.

Synchronize with Central: Allows you to save your changes made on a local file back to the Central file.

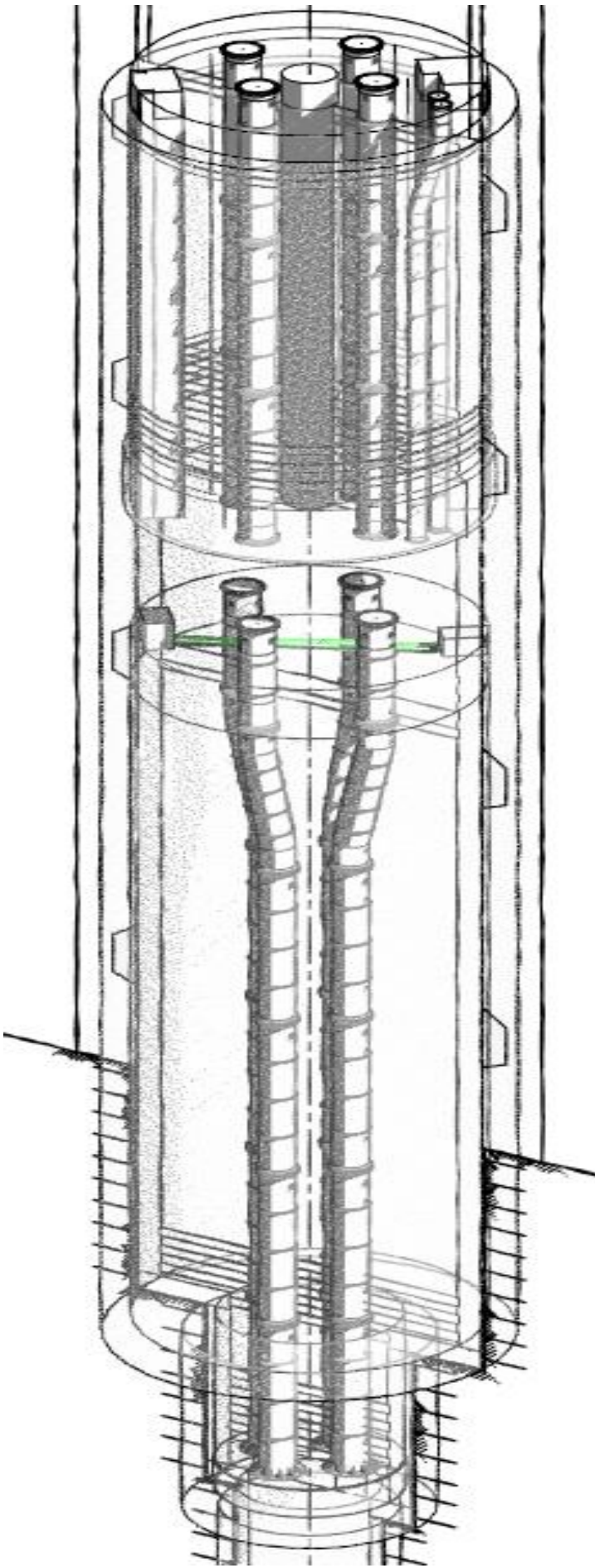
Worksets: A collection of elements in a project which can be checked out by the user.

Worksharing: A design method that allows multiple team members to work on the same project model at the same time. A Revit document can be subdivided into worksets.

Levels: Are finite horizontal planes that act as a reference for level-hosted elements.

SECTION 6

BIM 360 GUIDE



Section 6 **BIM 360 Guide**

BIM 360 Introduction

Autodesk Construction Cloud or BIM 360 is a secured Autodesk cloud-based platform used for design model collaboration and as a Common Design Environment (CDE). CDE is the repository and portal through which the Design Team (internal or external) shares project information.

This section contains information to provide an overall understanding of BIM 360 and its workflows to facilitate users on how to complete certain processes.

BIM 360 has several different workflows of how a project can be set up and coordinated to manage design data throughout the project lifecycle. The different workflows give project teams greater flexibility regarding coordination between different disciplines and design teams. Each workflow requires fundamentally different sharing standards, varying degrees of prior BIM 360 permissions, and team set up. The sharing method and workflows must be outlined in the project specific BEP. (See section 5.3)

6.1 BIM 360 Workflows

The below discusses different workflows of implementing BIM 360. Users must synchronize all their work at the end of each day regardless of using any workflow.

*Workflow 1 – Sharing through **Consumed** folder*

In this workflow sharing will be controlled through consuming published models from other discipline packages. In this workflow, each discipline shall link other models from the discipline *Consumed* folder. For example, in the Architecture model, all other models will be linked from the *Consumed* folder under the Architecture folder. This allows teams to update linked files from other discipline teams when they feel the need to consume a package.

*Workflow 2 – Sharing through **Sharing** folder*

In this workflow, sharing will be controlled through linking from the shared folder. Using this workflow allows teams to automatically receive an updated version of the linked files once other disciplines have shared their packages.

*Workflow 3 – **Live** Sharing*

In this workflow, models are linking directly to another team's model from folders where they're actively working and making changes. This requires giving discipline teams read permissions to other discipline teams' models.

Publishing Revit Models Process in BIM 360

The video linked below will walk through the process of properly “Publishing” Revit models. The term “Publishing” refers to the process of issuing a new version of a model for other users to “consume” or use. Publishing a model will publish it to the Cloud for others to “consume” it, and a new “Package” needs to be created. By clicking on the link, there is a bulletpoint description outlining the actions that need to take place.

Publishing Link: <https://knowledge.autodesk.com/community/screencast/cd0f3650-d364-46d1-87a7-ee604b6d7cd8>

Creating a Package (Discipline Leads Only)

The video linked below shows the process required to properly publish a model on BIM 360 so that other teams will be able to consume it for design. Discipline leads will be responsible for publishing their specific models for project consumption.

Creating Package Link: <https://knowledge.autodesk.com/community/screencast/f6706264-548b-49c3-8a40-1737c1bcfcd8>

Consuming BIM 360 Package Process

The video linked below shows the process of properly “Consuming” a discipline’s Revit model. The term “Consuming” refers to a process of updating the version other discipline model(s). By clicking on the link, there is a bulletpoint description outlining the actions that need to take place.

Consuming Process Link: <https://knowledge.autodesk.com/community/screencast/abf9c6ee-eb00-4952-b0c2-4f18e28a12f7>

Appendix 1 – Predefined Layers

General		
Name	Color	Description
G-ANNO-CNTR	12	Centerlines
G-ANNO-CREDITS	white	For Border Credits & Plot Stamp
G-ANNO-DIMS	yellow	Dimensions
G-ANNO-IDEN	white	Identification Tags, Section Marks, Dwg Title
G-ANNO-LEGN	yellow	Legends
G-ANNO-LIST	white	List of Drawings, Data Tables
G-ANNO-MATC-LINE	magenta	Match Line
G-ANNO-MATC-TEXT	green	Match Line Text
G-ANNO-NOTE	yellow	All Notes
G-ANNO-PATT	8	All Hatching
G-ANNO-REVISION-CLOUDS	183	This layer is for Revision Clouds
G-ANNO-REVISION-TRIANGLES	235	Revision Triangles
G-ANNO-SCRN	8	Screen Solid Hatch
G-ANNO-SUBMITTAL-STAMP	white	This layer is used for the submittal stamp only
G-ANNO-SYMBOL	white	Symbols
G-ANNO-TEXT	yellow	All Annotation Text and Annotation Leaders
G-ANNO-TITL	yellow	Plan/Section/Detail Titles
G-ANNO-TTBL	white	Border/Title Block - Border Xrefn/Detail Titles
G-NYC-DEP Logo	white	New York City Environmental Protection Logo
G-NYC-WFF-Logo	white	NYC Water For The Future Logo
G-Plot-Stamp	white	For Plot Stamp Only
G-VPRT	magenta	This View Port layer is for all View Port Configurations
G-XRAS	white	This layer will be for raster image attachments
G-XREF-BRDR	white	This layer will be Assign to Xref Borders
G-XREF-MODL	white	This layer will be Assign to Xref Models

Civil		
Name	Color	Description
C-BLDG	195	Buildings and Primary Structures; Footprint
C-BLDG-DECK	145	Buildings and Primary Structures; Outdoor Deck
C-BLDG-OVHD	95	Buildings and Primary Structures; Overhead, Overhang
C-BLDG-SITE	45	Building site
C-BLDG-STAIRS	55	Buildings and Primary Structures; Stairs & Ladders
C-BLDG-UTIL	105	Buildings and Primary Structures; Downspouts
C-CHLORINE-PIPE	51	Storm Sewer Piping
C-CSWR-PIPE	magenta	Site: Soil Boring Locations
C-DRAIN-PIPE	green	Water Supply System Piping
C-FLUORIDE-PIPE	71	Storm Sewer Piping
C-FNCE	155	X-Fences
C-FUEL-PIPE	205	Fuel Piping
C-GAS-PIPE	235	Natural Gas Piping
C-MPT-DEVICES	65	Maintenance and Protection of Traffic (Devices)
C-MPT-PVMT	115	Maintenance and Protection of Traffic (Pave. Markings)
C-MPT-SIGNS	165	Maintenance and Protection of Traffic (Signs)
C-MPT-WORK	215	Maintenance and Protection of Traffic (Work Zone Area)
C-PILE	195	Pile
C-POWR-OVHD	145	Power Overhead Lines
C-POWR-POLE	95	Power Box / Pole
C-POWR-STRC	45	Power Manhole
C-POWR-UNDR	55	Power Underground Lines
C-PROP-BNDY	105	Property Boundary
C-PROP-BRNG	155	Property Bearing
C-PROP-ESMT	205	Easements Roadway
C-PROP-LINE	235	Property Parcel Lines
C-PROP-LOTS	135	Property Lots
C-PROP-PATT	85	Property Parcel Hatching
C-PROP-RSRV	35	Property Reserved
C-RAIL-EQMP	165	Railroad Equipment
C-RAIL-TRAK	115	Railroad Tracks
C-REM-ASPH-PATT	65	Removals Asphalt Hatching
C-REM-BLDG-PATT	225	Removals Building Hatching
C-REM-CLRG-PATT	175	Removals Clearing and Grubbing Hatching
C-REM-CONC-PATT	125	Removals Concrete Hatching
C-REM-FNCE	75	Removals Fence
C-REM-SDWK-PATT	25	Removals Sidewalk Hatching
C-REM-TREE	195	Removals Tree
C-REM-WALL	145	Removals Wall

C-ROAD	95	Roads
C-ROAD-ASPH	55	Roadways Asphalt Surface
C-ROAD-ASPH-PATT	105	Roadways Asphalt Surface Pattern
C-ROAD-ASSM	155	Roadways Assemblies and Subassemblies
C-ROAD-ASSM-BLIN	205	Roadways Assembly Baseline
C-ROAD-ASSM-OFFS	235	Roadways Assembly Offset
C-ROAD-BRDG-DECK	135	Bridge Deck
C-ROAD-BRNG	85	Roadways Bearings
C-ROAD-CNTR	35	Roadways Centerline
C-ROAD-CONC	215	Roadways Concrete
C-ROAD-CONC-PATT	165	Roadways Concrete Pattern
C-ROAD-CORR	115	Roadways Corridor
C-ROAD-CORR-BNDY	65	Roadways Corridor Boundary
C-ROAD-CORR-PATT	225	Roadways Corridor Patterns
C-ROAD-CURB-BACK	175	Roadway Back of Curb
C-ROAD-CURB-FACE	125	Roadway Face of Curb
C-ROAD-CURV	195	Roadways Curves
C-ROAD-FEAT	145	Roadways Feature Line
C-ROAD-GRVL	95	Roadways Gravel Surface
C-ROAD-GRVL-PATT	45	Roadways Gravel Surface Pattern
C-ROAD-LABL	155	Roadways Labels
C-ROAD-LINE	205	Roadways Tangent Lines
C-ROAD-LINE-EXTN	235	Roadways PVI Extension Lines
C-ROAD-LINK	185	Roadways Corridor and Section Links
C-ROAD-MARK	85	Roadways Corridor and Section Marks
C-ROAD-PAVT-MRKG	55	Roadways Pavement Markings
C-ROAD-PROF	105	Roadways Profiles
C-ROAD-PROF-ASMC	205	Roadways Profile Asymmetrical Curves
C-ROAD-PROF-CURV	65	Roadways Profile Vertical Curves
C-ROAD-PROF-DIAG	115	Roadways Profile Band Diagrams
C-ROAD-PROF-GRID	165	Roadways Profile Grid
C-ROAD-PROF-GRID-GEOM	215	Roadways Profile Gridline @ Geometry Points
C-ROAD-PROF-GRID-MAJR	25	Roadways Profile Gridline @ Major Stations
C-ROAD-PROF-GRID-MINR	75	Roadways Profile Gridline @ Minor Stations
C-ROAD-PROF-LABL	125	Roadways Profile Label
C-ROAD-PROF-LINE	175	Roadways Profile Vertical Lines
C-ROAD-SAMP	225	Roadways Sample Lines
C-ROAD-SDWK	85	Roadway Sidewalk
C-ROAD-SECT	135	Roadways Grade In Sections
C-ROAD-SECT-DIAG	185	Roadways Section Diagram
C-ROAD-SECT-GRID	235	Roadways Section Grid

C-ROAD-SECT-LABL	45	Roadways Section Labels
C-ROAD-SECT-N	95	Roadways Section, NEW
C-ROAD-SECT-TICK	145	Roadways Section Tick Marks
C-ROAD-SECT-TITL	95	Roadways Section Title
C-ROAD-SECT-TTLB	45	Roadways Section Border
C-ROAD-SHAP	185	Roadways Corridor and Section Shapes
C-ROAD-SHAP-PATT	135	Roadways Corridor and Section Shapes Hatching
C-ROAD-SIGN	35	Roadway Signs
C-ROAD-SPIR	25	Roadways Spirals
C-ROAD-STAN	75	Roadways Stationing
C-ROAD-STAN-MAJR	125	Roadways Major Stationing Labels
C-ROAD-STAN-MINR	225	Roadways Minor Stationing Labels
C-SESC-DIKE	165	Soil Erosion & Sediment Control Dike, Check Dam
C-SESC-FILTER	215	Soil Erosion & Sediment Control Inlet Filter
C-SESC-FNCE-PRO	195	Soil Erosion & Sediment Control Protective Fence
C-SESC-FNCE-SILT	145	Soil Erosion & Sediment Control Silt Fence
C-SESC-LIMITS	95	Soil Erosion & Sediment Control Disrup. /Grading Limits
C-SESC-RIPRAP	45	Soil Erosion & Sediment Control Riprap
C-SSWR-CNTR	55	Sanitary Sewer Centerline
C-SSWR-PIPE	105	Sanitary Sewer Piping
C-SSWR-PIPE-PATT	155	Sanitary Sewer Piping, Hatching
C-SSWR-PROF	235	Sanitary Sewer Profile
C-SSWR-SCTN	185	Sanitary Sewer Section
C-SSWR-STRC	135	Sanitary Sewer Structures
C-SSWR-STRC-PATT	85	Sanitary Sewer Structures, Hatching
C-SSWR-TAG	85	Sanitary Sewer Tag
C-STEM-PIPE	125	Steam System Piping
C-STEM-STRC	175	Steam System Manhole
C-STRM-CNTR	225	Storm Sewer Centerline
C-STRM-PIPE	65	Storm Sewer Piping
C-STRM-PIPE-PATT	115	Storm Sewer Piping, Hatching
C-STRM-PROF	215	Storm Sewer Profile
C-STRM-SCTN	195	Storm Sewer Section
C-STRM-STRC-PATT	145	Storm Sewer Structures, Hatching
C-STRM-TAG	45	Storm Sewer Tag
C-TINN	55	Triangulated Irregular Network
C-TINN-BNDY	155	Triangulated Irregular Network Boundary
C-TINN-VIEW	205	Triangulated Irregular Network Triangle View
C-TOPO-BORE	235	Topography Test Borings
C-TOPO-CONT-TEXT	185	Topography Contours Labels, NEW
C-TOPO-FEAT	135	Topography Feature Line

C-TOPO-GRAD	85	Topography Grading Breakline (High Point)
C-TOPO-GRAD-CNTR	135	Topography Grading Centerline (Ditch, Swale, Etc.)
C-TOPO-GRAD-CUTS	85	Topography Grading Cut Material
C-TOPO-GRAD-FILL	35	Topography Grading Fill Material
C-TOPO-MAJR	75	Topography Major Contours
C-TOPO-MINR	125	Topography Minor Contours
C-TOPO-SPOT	175	Topography Spot Elevations
C-TOPO-TEXT	225	Topography Text
C-TOPO-USER	65	Topography User Contours
C-TOPO-WETL	165	Topography Wet Lands
C-TOPO-WSHD	215	Topography Watershed
C-TOPO-WSHD-TEXT	125	Topography Watershed Text
C-WALL	25	Retaining Wall, Stone Wall
C-WATR-APPT	225	Water Supply Systems Appurtenances
C-WATR-CNTR	175	Water Supply Systems Centerline
C-WATR-FITT	145	Water Supply Systems Fittings
C-WATR-HYDR	45	Water Supply Systems Fire Hydrants
C-WATR-PIPE	195	Water Supply Systems Piping
C-WATR-PIPE-PATT	95	Water Supply Systems Piping, Hatching
C-WATR-PIPE-TEXT	205	Water Supply Systems Pipe Text
C-WATR-PROF	55	Water Supply Systems Profiles
C-WATR-TAG	155	Water Supply Systems Tag
C-WATR-TEXT	105	Water Supply Systems Text

Landscape		
Name	Color	Description
L-ANNO-ALIN	125	Annotation: Alignment Stationing
L-ANNO-ALIN-INFO	25	Annotation: Alignment Stationing: Information
L-ANNO-ALIN-LABL	225	Annotation: Alignment Stationing: Labels
L-ANNO-CURV-LABL	175	Annotation: Curve: Labels
L-ANNO-CURV-TABL	145	Annotation: Curve: Tables
L-ANNO-CURV-TABLBRDR	45	Annotation: Curve: Tables: Border
L-ANNO-CURV-TABLHEDR	195	Annotation: Curve: Tables: Header
L-ANNO-CURV-TABLTEXT	95	Annotation: Curve: Tables: Text
L-ANNO-LINE-LABL	205	Annotation: Line: Labels
L-ANNO-LINE-TABL	55	Annotation: Line: Table
L-ANNO-LINE-TABLBRDR	155	Annotation: Line: Tables: Border
L-ANNO-LINE-TABLHEDR	105	Annotation: Line: Tables: Header
L-ANNO-LINE-TABLTEXT	135	Annotation: Line: Tables: Text
L-IRRG	185	Irrigation
L-IRRG-COVR	235	Irrigation: Coverage
L-IRRG-DRIP	85	Irrigation: Drip Irrigation Tubing
L-IRRG-EQPM	35	Irrigation: Equipment (Pumps, Valves and Controllers)
L-IRRG-LTRL	65	Irrigation: Lateral Pipe
L-IRRG-MAIN	215	Irrigation: Mainline
L-IRRG-PIPE	165	Irrigation: Piping
L-IRRG-SLVE	115	Irrigation: Pipe Sleeve
L-IRRG-SPKL	125	Irrigation: Sprinklers (Rotors, Heads)
L-IRRG-VALV	25	Irrigation: Valves
L-PLNT	225	Plant and Landscape Material
L-PLNT-BEDS	175	Plant and Landscape Material: Perennial & Annual Beds
L-PLNT-BUSH	145	Plant and Landscape Material: Bushes and Shrubs
L-PLNT-CONI	45	Plant and Landscape Material: Coniferous Trees
L-PLNT-CTNR	125	Plant and Landscape Material: Container or Planter
L-PLNT-EDGR	25	Plant and Landscape Material: Planting Bed Edger
L-PLNT-EVGR	225	Plant and Landscape Material: Ev.green Trees-Broadleaf
L-PLNT-GRND	175	Plant and Landscape Material: Ground
L-PLNT-PALM	145	Plant and Landscape Material: Palm Trees
L-PLNT-REMN	195	Plant and Landscape Material: Material to Remain
L-PLNT-REMV	95	Plant and Landscape Material: Material to Be Removed
L-PLNT-SEED	205	Plant and Landscape Material: Seeding Areas
L-PLNT-SHAD	55	Plant and Landscape Material: Shadow Area
L-PLNT-SHRB	155	Plant and Landscape Material: Shrub
L-PLNT-TREE	105	Plant and Landscape Material: Trees
L-PLNT-TURF	55	Plant and Landscape Material: Lawn Areas

L-PLNT-VINE	105	Plant and Landscape Material: Vines
L-SITE	155	Site Improvements
L-SITE WALK	195	Site Improvements: Walks and Steps
L-SITE WALL	145	Site Improvements: Walls
L-SITE WEIR	95	Site Improvements: Pool Weir
L-SITE-BRDG	205	Site Improvements: Bridges
L-SITE-CURB	65	Site Improvements: Curbs
L-SITE-CURB-BACK	115	Site Improvements: Curbs: Back of Curb
L-SITE-CURB-FACE	165	Site Improvements: Curbs: Face of Curb
L-SITE-DECK	215	Site Improvements: Raised Decks (Wood, Typ.)
L-SITE-FENC	25	Site Improvements: Fencing
L-SITE-FENC-LINK	75	Site Improvements: Fencing: Chain Link
L-SITE-FENC-LINK-04FT	125	Site Improvements: Fencing: Chain Link: Four Feet High
L-SITE-FENC-LINK-06FT	175	Site Improvements: Fencing: Chain Link: Six Feet High
L-SITE-FENC-PRVC SITE	35	Improvements: Fencing: Privacy Fence
L-SITE-FENC-WOOD	85	Site Improvements: Fencing: Wood
L-SITE-FURN	135	Site Improvements: Furnishings
L-SITE-PKNG	185	Site Improvements: Parking
L-SITE-PKNG-STRP	235	Site Improvements: Parking: Paint Striping
L-SITE-PLAY	45	Site Improvements: Play Structures
L-SITE-PLAY-EQPM	95	Site Improvements: Play Structures: Equipment
L-SITE-PLAY-ZONE	145	Site Improvements: Play Structures: Fall Zones
L-SITE-POOL	195	Site Improvements: Pools and Spas
L-SITE-POOL-BACK	235	Site Improvements: Pools and Spas: Back Of Pool Wall
L-SITE-POOL-FACE	235	Site Improvements: Pools and Spas: Face Of Pool Wall
L-SITE-PVMT	195	Site Improvements: Pavement Edge
L-SITE-PVMT-ASPH	145	Site Improvements: Pavement Edge: Asphalt
L-SITE-PVMT-BRCK	95	Site Improvements: Pavement Edge: Brick
L-SITE-PVMT-CONC	45	Site Improvements: Pavement Edge: Concrete
L-SITE-PVMT-CONCAGGR	205	Site Improvements: Pavement Edge: Exposed Aggregate
L-SITE-PVMT-GRAV	155	Site Improvements: Pavement Edge: Gravel
L-SITE-PVMT-JNTC	105	Site Improvements: Pavement Edge: Control Joint
L-SITE-PVMT-JNTE	55	Site Improvements: Pavement Edge: Expansion Joint
L-SITE-PVMT-PAVR	35	Site Improvements: Pavement Edge: Unit Pavers
L-SITE-PVMT-RAMP	85	Site Improvements: Pavement Edge: Accessible Ramp
L-SITE-PVMT-STEP	135	Site Improvements: Pavement Edge: Stair Tread
L-SITE-ROAD	185	Site Improvements: Edge of Road Line
L-SITE-RPRP	235	Site Improvements: Riprap
L-SITE-RTWL	75	Site Improvements: Retaining Walls
L-SITE-SPRT	125	Site Improvements: Sports Fields
L-SITE-SPRT-EQPM	175	Site Improvements: Sports Fields: Equipment

L-SITE-SPRT-PRIM	225	Site Improvements: Sports Fields: Perimeter
L-SITE-STEP	165	Site Improvements: Steps
L-SITE-TRAL	115	Site Improvements: Trail Edge
L-SITE-TRAL-ASPH	65	Site Improvements: Trail Edge: Asphalt
L-SITE-TRAL-CONC	215	Site Improvements: Trail Edge: Concrete
L-SITE-TRAL-GRVL	235	Site Improvements: Trail Edge: Gravel
L-TOPO	45	Proposed Grading
L-TOPO-DEPR	205	Proposed Grading: Depression
L-TOPO-INDX	155	Proposed Grading: Index Contour
L-TOPO-INTR	105	Proposed Grading: Intermediate Contours
L-TOPO-LIMI	55	Proposed Grading: Limit of Earthwork
L-TOPO-SPOT	35	Proposed Grading: Spot Elevations

Site Survey		
Name	Color	Description
V-BLDG	235	Survey Buildings Outline
V-BLDG-DECK	195	Buildings and Primary Structures; Outdoor Deck
V-BLDG-OVHD	145	Buildings and Primary Structures; Overhead, Overhang
V-BLDG-STAIRS	95	Buildings and Primary Structures; Stairs & Ladders
V-CTRL-BMRK	45	Survey Control Points Benchmark
V-CTRL-HCPT	205	Survey Control Points Horizontal
V-CTRL-LINE-DIRC	155	Survey Control Points Traverse Lines
V-CTRL-LINE-NETW	105	Survey Control Points Traverse Network
V-CTRL-LINE-SHOT	55	Survey Control Points Traverse Sides Hot
V-CTRL-NODE-KNOW	35	Survey Control Points Known Points
V-CTRL-NODE-SHOT	85	Survey Control Points Side Shots
V-CTRL-NODE-UNKN	135	Survey Control Points Unknown Points
V-CTRL-TRAV	185	Survey Control Points Traverse
V-CTRL-TRAV-ERRO	235	Survey Control Points Traverse Errors
V-CTRL-VCPT	75	Survey Control Points Vertical
V-NODE	125	Survey Node
V-NODE-BNDY	175	Survey Node Baseline
V-NODE-BORE	225	Survey Node Boring
V-NODE-CATV	165	Survey Node Cable TV Box
V-NODE-GUY	115	Survey Node Pole Guy Anchor Points
V-NODE-IRRG	65	Survey Node Irrigation Line and Appurtenances Points
V-NODE-MISC	215	Survey Node Miscellaneous (Mail Box, Post, Etc.)
V-NODE-NGAS	235	Survey Node Gas Line & Appurtenances Points.
V-NODE-POLE	195	Survey Node Pole Points (Power, Telephone, Etc.)
V-NODE-POWR	145	Survey Node Power Manholes, Handholds
V-NODE-ROCK	95	Survey Node Rock Outcrop, Boulder
V-NODE-SIGN	45	Survey Node Sign
V-NODE-SSWR	205	Survey Node Sanitary Sewer and Appurtenances Points
V-NODE-STRM	155	Survey Node Storm Sewer and Appurtenances Points
V-NODE-TELE	105	Survey Node Telephone Manholes, Handholds
V-NODE-TEXT	55	Survey Node Text
V-NODE-TREE	35	Survey Node Tree Points
V-NODE-WATR	85	Survey Node Water Line and Appurtenances Points
V-PROP-BNDY	135	Property Boundary
V-PROP-BRNG	185	Property Bearing
V-PROP-ESMT	235	Easements Roadway, Water, Sewer, Etc.
V-PROP-LINE	75	Property Parcel Lines
V-PROP-LOTS	225	Property Lots
V-PROP-PATT	165	Property Parcel Hatching

V-PROP-RSRV	115	Property Reserved
V-PROP-TEXT	65	Property Label
V-RAIL-EQMP	215	Railroad Equipment
V-RAIL-TRAK	235	Railroad Tracks
V-ROAD-ASPH	195	Roadways Asphalt Surface
V-ROAD-ASPH-PATT	145	Roadways Asphalt Surface Pattern
V-ROAD-BRDG-DECK	95	Roadways Bridge Deck
V-ROAD-CNTR	45	Survey Road Centerline
V-ROAD-CONC	205	Roadways Concrete
V-ROAD-CONC-PATT	155	Roadways Concrete Pattern
V-ROAD-CURB-BACK	105	Roadway Back of Curb
V-ROAD-CURB-FACE	55	Roadway Face of Curb
V-ROAD-GRVL	35	Roadways Gravel Surface
V-ROAD-GRVL-PATT	85	Roadways Gravel Surface Pattern
V-ROAD-MRKG	135	Roadway Pavement Markings
V-ROAD-SDWK	185	Roadway Sidewalk
V-ROAD-STAN-MAJR	235	Roadways Major Stationing Labels
V-ROAD-STAN-MINR	75	Roadways Minor Stationing Labels
V-SITE-BLDG	green	Building Layout
V-SITE-Bollard	green	Bollards on Site
V-SITE-DIKE	125	Survey Site Dike
V-SITE-FNCE	175	Survey Site Fences
V-SITE-PILE	225	Survey Site Pile
V-SITE-TREE-LINE	115	Survey Site Tree Line
V-SITE-VEGE	65	Survey Site Vegetation, Shrubs
V-SITE-WALL	215	Retaining Wall, Stone Wall
V-SURV-LABL	235	Survey Text
V-SURV-LINE	145	Survey Lines
V-TINN	45	Triangulated Irregular Network
V-TINN-BNDY	205	Triangulated Irregular Network Boundary
V-TINN-VIEW	155	Triangulated Irregular Network Triangle View
V-TOPO-CONT-TEXT	105	Topography Contour Labels
V-TOPO-GRAD	55	Topography Grading Break Line
V-TOPO-GRAD-CNTR	35	Topography Grading Centerline (Ditch, Swale, Etc.)
V-TOPO-MAJR	85	Topography Major Contours
V-TOPO-MINR	135	Topography Minor Contours
V-TOPO-MISC	185	Topography Miscellaneous Features
V-TOPO-ROCK	235	Topography Rock Outcrop
V-TOPO-SPOT	75	Topography Spot Elevations
V-TOPO-WATR	125	Topography Edge Of Water
V-TOPO-WETL	175	Topography Wet Lands

V-TOPO-WETL-BUFFER	225	Topography Wet Lands Buffer
V-UTIL-CATV-OVHD	165	Cable TV Overhead Lines
V-UTIL-CATV-UNDR	115	Cable TV Underground Lines
V-UTIL-CCTV	12	Cable TV Underground Lines
V-UTIL-CCTV-MRKO-G	12	Cable TV Underground Lines Markout
V-UTIL-CHLORINE	52	Chlorine Pipes
V-UTIL-CHLORINE-MRKO-G	52	Chlorine Pipes Markout
V-UTIL-DEWATERING FM	142	Dewatering Force Mains
V-UTIL-DFM-MRKO-G	142	Dewatering Force Main Markout
V-UTIL-DRAIN	82	Drainage Pipe & Utilities
V-UTIL-DRAIN-MRKO-G	82	Drainage Pipes & Utilities Markout
V-UTIL-ELEC	242	Electrical Utilities
V-UTIL-ELEC-MRKO-G	242	Electrical Utilities Markout
V-UTIL-FDNY	22	FDNY
V-UTIL-FDNY-MRKO-G	22	FDNY Markout
V-UTIL-FLUORIDE	212	Fluoride Pipes
V-UTIL-FLUORIDE-MRKO-G	212	Fluoride Pipes Markout
V-UTIL-FM	152	Force Main
V-UTIL-FM-MRKO-G	152	Force Main Markout
V-UTIL-FUEL	72	Cable TV Underground Lines
V-UTIL-FUEL-PIPE	65	Fuel Piping
V-UTIL-GAS	42	Gas Pipes
V-UTIL-GAS-MRKO-G	42	Gas Pipe Markout
V-UTIL-GAS-PIPE	215	Natural Gas Piping
V-UTIL-IRRG-PIPE	165	Irrigation System Piping
V-UTIL-MISC	249	Utility Miscellaneous Unknown
V-UTIL-OIL	62	Oil Lines
V-UTIL-OIL-MRKO-G	62	Oil Line Markout
V-UTIL-POLE	222	Utility Poles (Electric, Tele, Etc.)
V-UTIL-POWR-OVHD	195	Power Overhead Lines
V-UTIL-POWR-UNDR	145	Power Underground Lines
V-UTIL-SEWER	102	Sewer Pipes
V-UTIL-SEWER-MRKO-G	102	Sewer Pipes Markout
V-UTIL-SSWR	132	Sanitary Sewer Pipes
V-UTIL-SSWR-MRKO-G	132	Sanitary Sewer Pipes Markout
V-UTIL-SSWR-PIPE	95	Sanitary Sewer Piping
V-UTIL-STEM-PIPE	45	Steam System Piping
V-UTIL-STRM	92	Storm Sewer Pipes
V-UTIL-STRM-MRKO-G	92	Storm Sewer Pipes Markout
V-UTIL-STRM-PIPE	205	Storm Sewer Piping
V-UTIL-TELE	32	Telecommunication Lines

V-UTIL-TELE-MRKO-G	32	Telecommunication Lines Markout
V-UTIL-TELE-OVHD	155	Telephone Overhead Lines
V-UTIL-TELE-UNDR	105	Telephone Underground Lines
V-UTIL-TEXT-PIPE	55	Utility Text Pipe
V-UTIL-TEXT-STRC	35	Utility Text Structure
V-UTIL-WATR	172	Water Pipes
V-UTIL-WATR-MRKO-G	172	Water Pipes Markout
V-UTIL-WATR-NPW	162	Non-Potable Water Pipes
V-UTIL-WATR-NPW-MRKO-G	162	Non-Potable Water Pipes Markout
V-UTIL-WATR-PIPE	85	Water Supply System Piping
V-UTIL-WATR-PW	182	Potable Water Pipes
V-UTIL-WATR-PW-MRKO-G	182	Potable Water Pipes Markout

Architectural		
Name	Color	Description
A-AREA-E	44	Area (Existing)
A-AREA-N	25	Area (New)
A-AREA-OCCP-E	94	Area: Occupant or Employee Names (Existing)
A-AREA-OCCP-N	165	Area: Occupant or Employee Names (New)
A-CASE-E	144	Any Major Group: Casework (Existing)
A-CASE-N	35	Any Major Group: Casework (New)
A-CLNG-ACCS-E	194	Ceiling: Access (Existing)
A-CLNG-ACCS-N	235	Ceiling: Access (New)
A-CLNG-E	244	Ceiling (Existing)
A-CLNG-N	45	Ceiling (New)
A-CLNG-OPEN-E	54	Ceiling: Openings (Existing)
A-CLNG-OPEN-N	125	Ceiling: Openings (New)
A-CLNG-SUSP-E	104	Ceiling: Suspended Elements (Existing)
A-CLNG-SUSP-N	175	Ceiling: Suspended Elements (New)
A-CLNG-TEES-E	214	Ceiling: Main Tees (Existing)
A-CLNG-TEES-N	65	Ceiling: Main Tees (New)
A-COLS-E	204	Columns (Existing)
A-COLS-N	95	Columns (New)
A-CONV-E	34	Conveying Systems (Existing)
A-CONV-N	195	Conveying Systems (New)
A-DEMO	189	Architectural Demolition
A-DOOR-E	84	Doors (Existing)
A-DOOR-FULL-E	134	Doors: Full-Height (Swing and Leaf) (Existing)
A-DOOR-N	135	Conveying Systems (New)
A-DOOR-PRHT-E	184	Doors: Partial Height (Swing and Leaf) (Existing)
A-EQPM-ACCS-E	234	Equipment: Access (Existing)
A-EQPM-ACCS-N	55	Equipment: Access (New)
A-EQPM-E	64	Equipment (Existing)
A-EQPM-FIXD-E	74	Equipment: Fixed Equipment (Existing)
A-EQPM-FIXD-N	215	Equipment (New)
A-EQPM-MOVE-E	164	Equipment: Moveable Equipment (Existing)
A-EQPM-MOVE-N	115	Equipment: Fixed Equipment (New)
A-EQPM-N	45	Equipment (New)
A-EQPM-NICN-E	214	Equipment: Not In Contract (Existing)
A-EQPM-OVHD-E	24	Equipment: Overhead (Existing)
A-EQPM-OVHD-N	25	Equipment: Overhead (New)
A-FIXT-E	74	Any Major Group: Plumbing Fixtures (Existing)
A-FIXT-N	105	Any Major Group: Plumbing Fixtures (New)
A-FLOR-CASE-E	124	Floor: Casework (Existing)

A-FLOR-CASE-N	55	Floor: Casework (New)
A-FLOR-E	174	Floor (Existing)
A-FLOR-EVTR-E	224	Floor: Elevator Cars and Equipment (Existing)
A-FLOR-EVTR-N	105	Floor: Elevator Cars and Equipment (New)
A-FLOR-HRAL-E	44	Floor: Handrails, Guard Rails (Existing)
A-FLOR-HRAL-N	205	Floor: Handrails, Guard Rails (New)
A-FLOR-LEVL-E	94	Floor: Level Changes, Ramps, Pits, Depressions (Existing)
A-FLOR-LEVL-N	65	Floor: Level Changes, Ramps, Pits, Depressions (New)
A-FLOR-N	115	Floor (New)
A-FLOR-OTLN-E	144	Floor: Outline (Existing)
A-FLOR-OTLN-N	165	Floor: Outline (New)
A-FLOR-OVHD-E	194	Floor: Overhead (Objects Above) (Existing)
A-FLOR-OVHD-N	215	Floor: Overhead (Objects Above) (New)
A-FLOR-RAIS-E	244	Floor: Raised (Existing)
A-FLOR-RAIS-N	25	Floor: Raised (New)
A-FLOR-RISR-E	54	Floor: Stair Risers (Existing)
A-FLOR-RISR-N	75	Floor: Stair Risers (New)
A-FLOR-SIGN-N	125	Floor: Signs (New)
A-FLOR-SIGN-E	8	Floor: Signs (Existing)
A-FLOR-SPCL-E	104	Floor: Specialties (Accessories, Display Cases) (Existing)
A-FLOR-SPCL-N	175	Floor: Specialties (Accessories, Display Cases) (New)
A-FLOR-STRS-E	214	Floor: Stair Treads, Escalators, Ladders (Existing)
A-FLOR-STRS-N	225	Floor: Stair Treads, Escalators, Ladders (New)
A-FLOR-TPTN-E	204	Floor: Toilet Partitions (Existing)
A-FLOR-TPTN-N	35	Floor: Toilet Partitions (New)
A-FLOR-WDWK-E	34	Floor: Architectural Woodwork (Existing)
A-FLOR-WDWK-N	85	Floor: Architectural Woodwork (New)
A-FNSH-E	84	Any Major Group: Finishes (Existing)
A-FNSH-N	135	Any Major Group: Finishes (New)
A-FURN-E	134	Furnishings (Existing)
A-FURN-FILE-E	184	Furnishings: File Cabinets (Existing)
A-FURN-FILE-N	185	Floor: Elevator Cars and Equipment (New)
A-FURN-FIXD-E	234	Furnishings: Fixed In Place (Existing)
A-FURN-FIXD-N	235	Furnishings: Fixed In Place (New)
A-FURN-FREE-E	64	Furnishings: Freestanding (Existing)
A-FURN-FREE-N	45	Furnishings: Freestanding (New)
A-FURN-N	95	Floor: Architectural Woodwork (New)
A-FURN-PLNT-E	74	Furnishings: Plants (Existing)
A-FURN-PLNT-N	145	Furnishings: Plants (New)
A-FURN-PNLS-E	164	Furnishings: System Panels (Existing)
A-FURN-PNLS-N	195	Furnishings: System Panels (New)

A-FURN-SEAT-N	165	Furnishings: Seating (New)
A-FURN-SEAT-E	8	Furnishings: Seating (Existing)
A-FURN-STOR-E	214	Furnishings: System Storage Components (Existing)
A-FURN-STOR-N	55	Furnishings: System Storage Components (New)
A-FURN-WKSF-N	105	Furnishings: System Work Surface Components (New)
A-GLAZ-E	24	Glazing (Existing)
A-GLAZ-FULL-E	74	Glazing: Full-Height (Existing)
A-GLAZ-FULL-N	155	Glazing: Full-Height (New)
A-GLAZ-N	205	Glazing (New)
A-GLAZ-PRHT-E	124	Glazing: Partial-Height (Existing)
A-GLAZ-PRHT-N	65	Glazing: Partial-Height (New)
A-GLAZ-SILL-E	224	Glazing: Window Sills (Existing)
A-GLAZ-SILL-N	115	Glazing: window sills (New)
A-GRID-E	44	Any Major Group: Grid (Existing)
A-GRID-N	165	Any Major Group: Grid (New)
A-HVAC-E	94	HVAC (Existing)
A-HVAC-N	215	HVAC (New)
A-HVAC-RDFF-E	144	HVAC: Return Air Diffusers (Existing)
A-HVAC-RDFF-N	25	HVAC: Return Air Diffusers (New)
A-HVAC-SDFF-E	194	HVAC: Supply Diffusers (Existing)
A-HVAC-SDFF-N	75	HVAC: Supply Diffusers (New)
A-LITE-E	244	Lighting Fixtures (Existing)
A-LITE-N	125	Lighting Fixtures (New)
A-ROOF-E	54	Roof (Existing)
A-ROOF-HRAL-E	104	Roof: Handrails (Existing)
A-ROOF-HRAL-N	175	Roof: Handrails (New)
A-ROOF-LEVL-E	214	Roof: Level Changes (Existing)
A-ROOF-LEVL-N	225	Roof: Level Changes (New)
A-ROOF-N	35	Roof (New)
A-ROOF-OTLN-E	204	Roof: Outline (Existing)
A-ROOF-OTLN-N	85	Roof: Outline (New)
A-ROOF-RISR-E	34	Roof: Stair Risers (Existing)
A-ROOF-RISR-N	135	Roof: Stair Risers (New)
A-ROOF-STRS-E	84	Roof: Stair Treads, Ladders (Existing)
A-ROOF-STRS-N	185	Roof: Stair Treads, Ladders (New)
A-SIGN-N	235	Any Major Group: Signs (New)
A-SIGN-E	8	Any Major Group: Signs (Existing)
A-WALL-CAVI-E	134	Walls: Cavity (Existing)
A-WALL-CAVI-N	45	Walls: Cavity (New)
A-WALL-CNTR-E	184	Walls: Centerline (Existing)
A-WALL-CNTR-N	95	Walls: Centerline (New)

A-WALL-E	234	Walls (Existing)
A-WALL-FIRE-E	64	Walls: Fire Wall (Existing)
A-WALL-FIRE-N	145	Walls: Fire Wall (New)
A-WALL-FULL-E	74	Walls: Full-Height (Existing)
A-WALL-FULL-N	195	Walls: Full-Height (New)
A-WALL-HEAD-E	164	Walls: Door and Window Headers (Existing)
A-WALL-HEAD-N	165	Walls: Door and Window Headers (New)
A-WALL-JAMB-E	214	Walls: Door and Window Jambs (Existing)
A-WALL-JAMB-N	55	Walls: Door and Window Jambs (New)
A-WALL-MOVE-E	24	Walls: Moveable Partitions (Existing)
A-WALL-MOVE-N	105	Walls: Moveable Partitions (New)
A-WALL-N	155	Walls (New)
A-WALL-PATT-E	74	Walls: Texture or Hatch Patterns (Existing)
A-WALL-PATT-N	205	Walls: Texture or Hatch Patterns (New)
A-WALL-PRHT-N	65	Walls: Partial-Height (New)

Structural		
Name	Color	Description
S-ABLT-E	124	S-ABLT-E
S-ABLT-N	115	Any Major Group: Reinforcing Bar: Bottom Group 1 (New)
S-BEAM-ALUM-E	174	Beams: Aluminum (Existing)
S-BEAM-ALUM-N	165	Beams: Aluminum (New)
S-BEAM-CONC-E	224	Beams: Concrete (Existing)
S-BEAM-CONC-N	215	Beams: Concrete (New)
S-BEAM-E	44	Beams (Existing)
S-BEAM-N	25	Beams (New)
S-BEAM-STEL-E	94	Beams: Steel (Existing)
S-BEAM-STEL-N	75	Beams: Steel (New)
S-BEAM-WOOD-E	144	Beams: Wood (Existing)
S-BEAM-WOOD-N	125	Beams: Wood (New)
S-BRAC-ALUM-E	194	Bracing: Aluminum (Existing)
S-BRAC-ALUM-HORZ-E	244	Bracing: Aluminum: Horizontal (Existing)
S-BRAC-ALUM-HORZ-N	175	Bracing: Aluminum: Horizontal (New)
S-BRAC-ALUM-N	225	Bracing (New)
S-BRAC-ALUM-VERT-E	54	Bracing: Aluminum: Vertical (Existing)
S-BRAC-ALUM-VERT-N	35	Bracing: Aluminum: Vertical (New)
S-BRAC-E	104	Bracing (Existing)
S-BRAC-N	85	Bracing: Aluminum (New)
S-BRAC-STEL-E	214	Bracing: Steel (Existing)
S-BRAC-STEL-HORZ-E	204	Bracing: Steel: Horizontal (Existing)
S-BRAC-STEL-HORZ-N	135	Bracing: Steel: Horizontal (New)
S-BRAC-STEL-N	185	Bracing: Steel (New)
S-BRAC-STEL-VERT-E	34	Bracing: Steel: Vertical (Existing)
S-BRAC-STEL-VERT-N	235	Bracing: Steel: Vertical (New)
S-BRAC-WOOD-E	84	Bracing: Wood (Existing)
S-BRAC-WOOD-HORZ-E	134	Bracing: Wood: Horizontal (Existing)
S-BRAC-WOOD-HORZ-N	45	Bracing: Wood: Horizontal (New)
S-BRAC-WOOD-N	95	Bracing: Wood (New)
S-BRAC-WOOD-VERT-E	184	Bracing: Wood: Vertical (Existing)
S-BRAC-WOOD-VERT-N	145	Bracing: Wood: Vertical (New)
S-COLS-ALUM-E	234	Columns: Aluminum (Existing)
S-COLS-ALUM-N	195	Columns: Aluminum (New)
S-COLS-CONC-E	64	Columns: Concrete (Existing)
S-COLS-CONC-N	165	Columns: Concrete (New)
S-COLS-E	74	Columns (Existing)
S-COLS-N	55	Columns (New)
S-COLS-STEL-E	164	Columns: Steel (Existing)

S-COLS-STEL-N	105	Columns: Steel (New)
S-COLS-WOOD-E	214	Columns: Wood (Existing)
S-COLS-WOOD-N	155	Columns: Wood (New)
S-DECK-E	24	Structural Deck (Existing)
S-DECK-FLOR-E	74	Structural Deck: Floor (Existing)
S-DECK-FLOR-N	205	Structural Deck: Floor (New)
S-DECK-FLOR-OPNG-E	124	Structural Deck: Floor: Openings (Existing)
S-DECK-FLOR-OPNG-N	65	Structural Deck: Floor: Openings (New)
S-DECK-N	115	Structural Deck (New)
S-DECK-ROOF-E	174	Structural Deck: Roof (Existing)
S-DECK-ROOF-N	165	Structural Deck: Roof (New)
S-DECK-ROOF-OPNG-E	224	Structural Deck: Roof: Openings (Existing)
S-DECK-ROOF-OPNG-N	215	Structural Deck: Roof: Openings (New)
S-DEMO	169	Structural Demolition
S-FNDN-E	44	Foundation (Existing)
S-FNDN-FTNG-E	94	Foundation: Footings (Existing)
S-FNDN-FTNG-N	25	Foundation: Footings (New)
S-FNDN-GRBM-E	74	Foundation: Grade Beams (Existing)
S-FNDN-GRBM-N	75	Foundation: Grade Beams (New)
S-FNDN-N	125	Foundation (New)
S-FNDN-PCAP-E	194	Foundation: Pile Caps (Existing)
S-FNDN-PCAP-N	175	Foundation: Pile Caps (New)
S-FNDN-PIER-E	244	Foundation: Drilled Piers (Existing)
S-FNDN-PIER-N	225	Foundation: Drilled Piers (New)
S-FNDN-PILE-E	54	Foundation: Piles (Existing)
S-FNDN-PILE-N	35	Foundation: Piles (New)
S-FNDN-RBAR-E	104	Foundation: Reinforcing (Existing)
S-FNDN-RBAR-N	85	Foundation: Reinforcing (New)
S-GRAT-E	214	Any Major Group: Grates (Existing)
S-GRAT-N	135	Any Major Group: Grates (New)
S-GRAT-OVHD-E	204	Any Major Group: Grates: Overhead (Existing)
S-GRAT-OVHD-N	185	Any Major Group: Grates: Overhead (New)
S-GRID-E	34	Column Grid (Existing)
S-GRID-EXTR-E	84	Column Grid: Exterior Columns (Existing)
S-GRID-INTR-E	134	Column Grid: Interior Columns (Existing)
S-GRID-INTR-N	235	Column Grid: Interior Columns (New)
S-GRID-N	45	Column Grid (New)
S-GRID-NXTR-N	95	Column Grid: Exterior Columns (New)
S-JNTS-CNTJ-N	145	Joints: Construction (New))
S-JNTS-CTLJ-N	195	Joints: Control (New)
S-JNTS-E	184	Column Grid: Interior Columns (Existing)

S-JNTS-EXPJ-E	234	Joints: Expansion (Existing)
S-JNTS-N	165	Joints (New)
S-JNTS-NXPJ-N	55	Joints: Expansion (New)
S-JOIS-BRGX-E	64	Joists: Bridging (Existing)
S-JOIS-BRGX-N	105	Joists: Bridging (New)
S-JOIS-E	74	Joists (Existing)
S-JOIS-N	155	Joists (New)
S-METL-E	164	Any Major Group: Misc. Metals (Existing)
S-METL-N	65	Any Major Group: Misc. Metals (New)
S-PROP-E	214	Property Lines (Existing)
S-PROP-N	115	Property Lines (New)
S-RBAR-BOT1-E	24	Major Group: Reinforcing Bar: Bottom Group 1 (Existing)
S-RBAR-BOT1-N	165	Major Group: Reinforcing Bar: Bottom Group 1 (New)
S-RBAR-BOT2-E	74	Major Group: Reinforcing Bar: Bottom Group 2 (Existing)
S-RBAR-BOT2-N	215	Major Group: Reinforcing Bar: Bottom Group 2 (New)
S-RBAR-E	124	Any Major Group: Reinforcing Bar (Existing)
S-RBAR-N	25	Any Major Group: Reinforcing Bar (New)
S-RBAR-TOP1-E	174	Any Major Group: Reinforcing Bar: Top Group 1 (Exist.)
S-RBAR-TOP1-N	75	Any Major Group: Reinforcing Bar: Top Group 1 (New)
S-RBAR-TOP2-E	224	Any Major Group: Reinforcing Bar: Top Group 2 (Exist.)
S-RBAR-TOP2-N	125	Any Major Group: Reinforcing Bar: Top Group 2 (New)
S-SLAB-CONC-E	44	Slab: Cast-In-Place Concrete (Existing)
S-SLAB-CONC-N	175	Slab: Cast-In-Place Concrete (New)
S-SLAB-E	94	Slab (Existing)
S-SLAB-EDGE-E	144	Slab: Edge of Slab (Existing)
S-SLAB-N	225	Slab (New)
S-SLAB-NDGE-N	35	Slab: Edge of Slab (New)
S-SLAB-OPNG-E	194	Slab: Openings and Depressions (Existing)
S-SLAB-OPNG-N	85	Slab: Openings and Depressions (New)
S-SLAB-OPNX-E	244	Slab: Opening Indication ("X") (Existing)
S-SLAB-OPNX-N	135	Slab: Opening Indication ("X") (New)
S-SLAB-STEL-E	54	Slab: Steel Slab (Existing)
S-SLAB-STEL-N	185	Slab: Steel Slab (New)
S-SLAB-WOOD-E	104	Slab: Wood (Existing)
S-SLAB-WOOD-N	235	Slab: Wood (New)
S-STRS-E	214	Stairs (Existing)
S-STRS-LADD-E	204	Stairs: Ladders & Ladder Assemblies (Existing)
S-STRS-LADD-N	45	Stairs: Ladders & Ladder Assemblies (New)
S-STRS-N	95	Stairs (New)
S-TRUS-E	34	Trusses (Existing)
S-TRUS-N	145	Trusses (New)

S-WALL-CMUW-E	84	Walls: Concrete Masonry Unit (Existing)
S-WALL-CMUW-N	195	Walls: Concrete Masonry Unit (New)
S-WALL-CONC-E	134	Walls: Cast-In-Place Concrete (Existing)Z
S-WALL-CONC-N	165	Walls: Cast-In-Place Concrete (New)
S-WALL-E	184	Walls (Existing)
S-WALL-MSNW-E	234	Walls: Masonry (Existing)
S-WALL-MSNW-N	55	Walls: Masonry (New)
S-WALL-N	105	Walls (New)
S-WALL-PCST-E	64	Walls: Pre-Cast Concrete (Existing)
S-WALL-PCST-N	205	Walls: Pre-Cast Concrete (New)
S-WALL-SHEA-E	74	Walls: Structural Shear Walls (Existing)
S-WALL-SHEA-N	65	Walls: Structural Shear Walls (New)
S-WALL-STEL-E	214	Walls: Steel Stud (Existing)
S-WALL-STEL-N	115	Walls: Steel Stud (New)
S-WALL-WOOD-E	24	S-WALL-WOOD-E
S-WALL-WOOD-N	215	Walls: Wood (New)

Mechanical		
Name	Color	Description
M-BRIN-EQPM -E	94	Brine Systems: Equipment (Existing)
M-BRIN-EQPM -N	165	Brine Systems (New)
M-BRIN-N	245	Brine Systems: Equipment (New)
M-BRIN-PIPE-E	144	Brine Systems: Piping (Existing)
M-CHIM-E	194	Chimneys and Stacks (Existing)
M-CMPA-E	244	Compressed/Processed Air Systems (Existing)
M-CMPA-EQPM-E	54	Compressed Air Systems: Equipment (Existing)
M-CMPA-PEQP-E	104	Compressed Air Systems: Process Equipment (Existing)
M-CMPA-PEQP-N	195	Compressed Air Systems: Piping (New)
M-CMPA-PIPE-E	214	Compressed Air Systems: Piping (Existing)
M-CMPA-PPIP-E	204	Compressed Air Systems: Process Piping (Existing)
M-CMPA-PPIP-N	145	Compressed Air Systems: Process Equipment (New)
M-CNDW- RENT-N	95	Condenser Water Systems: Return (New)
M-CNDW-CONP-E	34	Condenser Water Systems: Condensate Piping (Existing)
M-CNDW-CONP-N	45	Compressed Air Systems: Process Piping (New)
M-CNDW-E	84	Condenser Water Systems (Existing)
M-CNDW-EQPM-E	134	Condenser Water Systems: Equipment (Existing)
M-CNDW-N	205	Condenser Water systems (New)
M-CNDW-PIPE-E	184	Condenser Water Systems: Piping (Existing)
M-CNDW-RETN-E	234	Condenser Water Systems: Return (Existing)
M-CNDW-RETN-N	155	Condenser Water Systems: Return (New)
M-CNDW-RETN-PIPE-N	105	Condenser Water Systems: Return: Piping (New)
M-CNDW-RETN-SKCH-N	55	Condenser Water Systems: Return: Sketch (New)
M-CNDW-SUPP-N	35	Condenser Water Systems: Supply (New)
M-CNDW-SUPP-PIPE-N	85	Condenser Water Systems: Supply: Piping (New)
M-CNDW-SUPPSKCH-N	135	Condenser Water Systems: Supply: Sketch (New)
M-CONT-N	185	Controls and Instrumentation (New)
M-CONT-THER-N	235	Controls and Instrumentation: Thermostats (New)
M-CONT-WIRE-N	75	Controls and Instrumentation: Low Voltage Wiring (New)
M-CWTR-CONP-N	125	Chilled Water Systems: Condensate Piping (New)
M-CWTR-EQPM-N	175	Chilled Water Systems: Equipment (New)
M-CWTR-N	225	Chilled Water Systems (New)
M-CWTR-PIPE-N	165	Chilled Water Systems: Piping (New)
M-CWTR-RET-N	115	Chilled Water Systems: Return (New)
M-CWTR-RETN-N	65	Chilled Water Systems: Return (New)
M-CWTR-RETN-PIPE-N	215	Chilled Water Systems: Return: Piping (New)
M-CWTR-RETN-SKC-E	64	Chilled Water Systems: Return: Sketch (Existing)
M-CWTR-RETN-SKC-N	245	Chilled Water Systems: Return: Sketch (New)
M-CWTR-SUPP-E	84	Chilled Water Systems: Supply (Existing)

M-CWTR-SUPP-N	195	Chilled Water Systems: Supply (New)
M-CWTR-SUPP-PIPE-E	164	Chilled Water Systems: Supply: Piping (Existing)
M-CWTR-SUPP-PIPE-N	145	Chilled Water Systems: Supply: Piping (New)
M-CWTR-SUPP-SKCH-E	214	Chilled Water Systems: Supply: Sketch (Existing)
M-CWTR-SUPP-SKCH-N	95	Chilled Water Systems: Supply: Sketch (New)
M-CWTR-SYMB-E	24	Chilled Water Systems: Symbols (Existing)
M-CWTR-SYMB-N	45	Chilled Water Systems: Symbols (New)
M-DEMO	49	Mechanical Demolition
M-DOMW-E	74	Domestic Water Systems (Existing)
M-DOMW-MKUP-N	205	Domestic Water Systems: Make-Up Water (New)
M-DOMW-N	155	Domestic Water Systems (New)
M-DOW-MKUP-N	105	Domestic Water Systems: Make-Up Water (Existing)
M-DUAL-E	124	Dual Temperature Systems (Existing)
M-DUAL-N	55	Dual Temperature Systems (New)
M-DUAL-RETN-E	174	Dual Temperature Systems: Return (Existing)
M-DUAL-RETN-N	35	Dual Temperature Systems: Return (New)
M-DUAL-RETN-PIPE-E	224	Dual Temperature Systems: Return: Piping (Existing)
M-DUAL-RETN-PIPE-N	85	Dual Temperature Systems: Return: Piping (New)
M-DUAL-RETN-SKCH-E	44	Dual Temperature Systems: Return: Sketch (Existing)
M-DUAL-RETN-SKCH-N	135	Dual Temperature Systems: Return: Sketch (New)
M-DUAL-SUPP-E	94	Dual Temperature Systems: Supply (Existing)
M-DUAL-SUPP-N	185	Dual Temperature Systems: Supply (New)
M-DUAL-SUPP-PIPE-E	144	Dual Temperature Systems: Supply: Piping (Existing)
M-DUAL-SUPP-PIPE-N	235	Dual Temperature Systems: Supply: Piping (New)
M-DUAL-SUPP-SKCH-E	194	Dual Temperature Systems: Supply: Sketch (Existing)
M-DUAL-SUPP-SKCH-N	75	Dual Temperature Systems: Supply: Sketch (New)
M-DUAL-SYMB-E	244	Dual Temperature Systems: Symbols (Existing)
M-DUAL-SYMB-N	125	Dual Temperature Systems: Symbols (New)
M-DUST-DUCT-E	54	Dust and Fume Collection Systems: Ductwork (Existing)
M-DUST-DUCT-N	175	Dust and Fume Collection Systems: Ductwork (New)
M-DUST-E	104	Dust and Fume Collection Systems (Existing)
M-DUST-EQPM-E	214	Dust and Fume Collection Systems: Equipment (Existing)
M-DUST-EQPM-N	225	Dust and Fume Collection Systems: Equipment (New)
M-DUST-EQUP-E	204	Dust and Fume Collection Systems: Equipment (Existing)
M-DUST-N	165	Dust and Fume Collection Systems (New)
M-ELHT-E	34	Electric Heat(Existing)
M-ELHT-EQPM-E	84	Electric Heat: Equipment (Existing)
M-ELHT-EQPM-N	115	Electric Heat: Equipment (New)
M-ELHT-N	65	Electric Heat (New)
M-ENER-E	134	Energy Management Systems (Existing)
M-ENER-EQPM-E	184	Energy Management Systems: Equipment (Existing)

M-ENER-EQPM-N	215	Energy Management Systems: Equipment (New)
M-ENER-N	245	Energy Management Systems (New)
M-ENER-WIRE-E	234	Energy Management Systems: Wiring (Existing)
M-ENER-WIRE-N	195	Energy Management Systems: Wiring (New)
M-EXHS-CDFF-E	64	Exhaust System: Ceiling Diffusers (Existing)
M-EXHS-CDFF-N	145	Exhaust System: Ceiling Diffusers (New)
M-EXHS-DUCT-E	84	Exhaust System: Ductwork (Existing)
M-EXHS-DUCT-N	95	Exhaust System: Ductwork (New)
M-EXHS-E	164	Exhaust System (Existing)
M-EXHS-EQPM-E	214	Exhaust System: Equipment (Existing)
M-EXHS-EQPM-N	45	Exhaust System: Equipment (New)
M-EXHS-N	205	Exhaust System (New)
M-EXHS-RFEQ-E	24	Exhaust System: Rooftop Equipment (Existing)
M-EXHS-RFEQ-N	155	Exhaust System: Rooftop Equipment (New)
M-FUEL-EQPM-E	74	Fuel Systems: Equipment (Existing)
M-FUEL-EQPM-N	105	Fuel Systems: Equipment (New)
M-FUEL-GGEP-E	124	Fuel Systems: Gas General Piping(Existing)
M-FUEL-GGEP-HPIP-E	174	Fuel Systems: Gas Gen. Piping: High Pressure (Existing)
M-FUEL-GGEP-HPIP-N	55	Fuel Systems: Gas Gen. Piping: High Pressure (New)
M-FUEL-GGEP-LPIP-E	224	Fuel Systems: Gas Gen. Piping: Low Pressure (Existing)
M-FUEL-GGEP-LPIP-N	35	Fuel Systems: Gas Gen. Piping: Low Pressure (New)
M-FUEL-GGEP-LQPG-E	44	Fuel Systems: Gas Gen. Piping: Lqd. Petroleum (Existing)
M-FUEL-GGEP-LQPG-N	85	Fuel Systems: Gas Gen. Piping: Lqd. Petroleum (New)
M-FUEL-GGEP-MPIP-E	94	Fuel Systems: Gas Gen. Piping: Med. Pressure (Existing)
M-FUEL-GGEP-MPIP-N	135	Fuel Systems: Gas Gen. Piping: Med.Pressure (New)
M-FUEL-GGEP-N	185	Fuel Systems: Gas General Piping (New)
M-FUEL-GPRP-E	144	Fuel Systems: Gas Process Piping (Existing)
M-FUEL-GPRP-N	235	Fuel Systems: Gas Process Piping (New)
M-FUEL-N	75	Fuel Systems (New)
M-FUEL-OGEP-DISC-E	194	Fuel Systems: Oil General Piping: Discharge (Existing)
M-FUEL-OGEP-DISC-N	125	Fuel Systems: Oil General Piping: Discharge (New)
M-FUEL-OGEP-E	244	Fuel Systems: Gas Process Piping (Existing)
M-FUEL-OGEP-FLLW-E	54	Fuel Systems: Oil General Piping: Flow (Existing)
M-FUEL-OGEP-FLLW-N	175	Fuel Systems: Oil General Piping: Flow (New)
M-FUEL-OGEP-GAGE-E	104	Fuel Systems: Oil General Piping: Gauge (Existing)
M-FUEL-OGEP-GAGE-N	225	Fuel Systems: Oil General Piping: Gauge (New)
M-FUEL-OGEP-RETN-E	214	Fuel Systems: Oil General Piping: Return (Existing)
M-FUEL-OGEP-RETN-N	165	Fuel Systems: Oil General Piping: Return (New)
M-FUEL-OGEP-SUPP-E	204	Fuel Systems: Oil General Piping: Supply (Existing)
M-FUEL-OGEP-SUPP-N	115	Fuel Systems: Oil General Piping Supply (New)
M-FUEL-OGEP-VENT-E	34	Fuel Systems: Oil General Piping: Vent (Existing)

M-FUEL-OGEP-VENT-N	65	Fuel Systems: Oil General Piping: Vent (New)
M-FUEL-OPRP-E	84	Fuel Systems: Oil General Piping (Existing)
M-FUEL-OPRP-N	215	Fuel Systems: Oil Process Piping (New)
M-FUEL-RPIP-E	134	Fuel Systems: Return Piping (Existing)
M-FUEL-RPIP-N	245	Fuel Systems: Return Piping (New)
M-FUEL-SPIP-E	184	Fuel Systems: Supply Piping (Existing)
M-FUEL-SPIP-N	195	Fuel Systems: Supply Piping (New)
M-FUME-DUCT-E	234	Fume Hood: Exhaust Ductwork (Existing)
M-FUME-DUCT-N	145	Fume Hood: Exhaust Ductwork (New)
M-FUME-E	64	Fume Hood (Existing)
M-FUME-EQPM-E	84	Fume Hood: Equipment (Existing)
M-FUME-EQPM-N	95	Fume Hood: Equipment (New)
M-FUME-N	45	Fume Hood (New)
M-GLYC-E	164	Glycol Systems (Existing)
M-GLYC-N	205	Glycol Systems (New)
M-GLYC-RETN-E	214	Glycol Systems: Return (Existing)
M-GLYC-RETN-N	155	Glycol Systems: Return (New)
M-GLYC-RETN-PIPE-E	24	Glycol Systems: Return: Piping (Existing)
M-GLYC-RETN-PIPE-N	105	Glycol Systems: Return: Piping (New)
M-GLYC-RETN-SKCH-E	74	Glycol Systems: Return: Sketch (Existing)
M-GLYC-RETN-SKCH-N	55	Glycol Systems: Return: Sketch (New)
M-GLYC-SUPP-E	124	Glycol Systems: Supply (Existing)
M-GLYC-SUPP-N	35	Glycol Systems: Supply (New)
M-GLYC-SUPP-PIPE-E	174	Glycol Systems: Supply: Piping (Existing)
M-GLYC-SUPP-PIPE-N	85	Glycol Systems: Supply: Piping (New)
M-GLYC-SUPP-SKCH-E	224	Glycol Systems: Supply: Sketch (Existing)
M-GLYC-SUPP-SKCH-N	135	Glycol Systems: Supply: Sketch (New)
M-GLYC-SYMB-E	44	Glycol Systems: Symbol (Existing)
M-GLYC-SYMB-N	185	Glycol Systems: Symbol (New)
M-HOTW-E	94	Hot Water Heating System (Existing)
M-HOTW-EQPM-E	144	Hot Water Heating System: Equipment (Existing)
M-HOTW-EQPM-N	235	Hot Water Heating System: Equipment (New)
M-HOTW-N	75	Hot Water Heating System (New)
M-HOTW-PIPE-E	194	Hot Water Heating System: Piping (Existing)
M-HOTW-PIPE-N	125	Hot Water Heating System: Piping (New)
M-HOTW-RETN- SKCH-E	244	Hot Water Heating System: Return: Sketch (Existing)
M-HOTW-RETN- SKCH-N	175	Hot Water Heating System: Return: Sketch (New)
M-HOTW-RETN-E	54	Hot Water Heating System: Return (Existing)
M-HOTW-RETN-N	225	Hot Water Heating System: Return (New)
M-HOTW-RETN-PIPE-E	104	Hot Water Heating System: Return: Piping (Existing)
M-HOTW-RETN-PIPE-N	165	Hot Water Heating System: Return: Piping (New)

M-HOTW-SUPP-E	214	Hot Water Heating System: Supply (Existing)
M-HOTW-SUPP-N	115	Hot Water Heating System: Supply (New)
M-HOTW-SUPP-PIPE-E	204	Hot Water Heating System: Supply: Piping (Existing)
M-HOTW-SUPP-PIPE-N	65	Hot Water Heating System: Supply: Piping (New)
M-HOTW-SUPPSKCH-E	34	Hot Water Heating System: Supply: Sketch (Existing)
M-HOTW-SUPPSKCH-N	215	Hot Water Heating System: Supply: Sketch (New)
M-HOTW-SYMB-E	84	Hot Water Heating System: Symbol (Existing)
M-HOTW-SYMB-N	245	Hot Water Heating System: Symbol (New)
M-LGAS-EQPM-E	214	Laboratory Gas Systems: Equipment (Existing)
M-LGAS-EQPM-N	245	Laboratory Gas Systems: Equipment (New)
M-LGAS-PIPE-E	204	Laboratory Gas Systems: Piping (Existing)
M-LGAS-PIPE-N	145	Laboratory Gas Systems: Piping (New)
M-MACH-E	34	Machine Shop (Existing)
M-MACH-N	95	Machine Shop (New)
M-MDGS-CAIR-E	84	Medical Gas: Compressed Air (Existing)
M-MDGS-CAIR-N	45	Medical Gas: Compressed Air (New)
M-MDGS-E	134	Medical Gas (Existing)
M-MDGS-EQPM-E	184	Medical Gas: Equipment (Existing)
M-MDGS-EQPM-N	205	Medical Gas: Equipment (New)
M-MDGS-N	155	Medical Gas (New)
M-MDGS-NITG-E	234	Medical Gas: Nitrogen (Existing)
M-MDGS-NITG-N	105	Medical Gas: Nitrogen (New)
M-MDGS-NOXG-E	64	Medical Gas: Nitrous Oxide (Existing)
M-MDGS-NOXG-N	55	Medical Gas: Nitrous Oxide (New)
M-MDGS-OXYG-E	84	Medical Gas: Pure O2 (Existing)
M-MDGS-OXYG-N	35	Medical Gas: Pure O2 (New)
M-MDGS-PIPE-E	164	Medical Gas: Piping (Existing)
M-MDGS-PIPE-N	85	Medical Gas: Piping (New)
M-MDGS-SAIR-E	214	Medical Gas: Scavenge Air (Existing)
M-MDGS-SAIR-N	135	Medical Gas: Scavenge Air (New)
M-MDGS-VACU-E	24	Medical Gas: Medical Vacuum (Existing)
M-MDGS-VACU-N	185	Medical Gas: Medical Vacuum (New)
M-MKUP-CDFF-E	74	Make-up Air Systems: Ceiling Diffusers (Existing)
M-MKUP-CDFF-N	235	Make-up Air Systems: Ceiling Diffusers (New)
M-MKUP-DUCT-N	75	Make-up Air Systems: Supply Ducts (New)
M-MKUP-E	124	Make-up Air Systems (Existing)
M-MKUP-EQPM-E	174	Make-up Air Systems: Equipment (Existing)
M-MKUP-EQPM-N	125	Make-up Air Systems: Equipment (New)
M-MKUP-N	175	Make-up Air Systems (New)
M-MPIP-E	224	Miscellaneous Piping Systems (Existing)
M-MPIP-IDEN-E	44	Miscellaneous Piping Systems: ID Tags (Existing)

M-MPIP-IDEN-N	225	Miscellaneous Piping Systems: ID Tags (New)
M-MPIP-N	165	Miscellaneous Piping Systems (New)
M-MPIP-PIPE-E	94	Miscellaneous Piping Systems: Piping (Existing)
M-MPIP-PIPE-N	115	Miscellaneous Piping Systems: Piping (New)
M-MPIP-SYMB-E	144	Miscellaneous Piping Systems: Symbols (Existing)
M-MPIP-SYMB-N	65	Miscellaneous Piping Systems: Symbols (New)
M-NGAS-E	194	Natural Gas Systems (Existing)
M-NGAS-EQPM-E	244	Natural Gas Systems: Equipment (Existing)
M-NGAS-EQPM-N	215	Natural Gas Systems: Equipment (New)
M-NGAS-N	245	Natural Gas Systems (New)
M-NGAS-PIPE-E	54	Natural Gas Systems: Piping (Existing)
M-NGAS-PIPE-N	195	Natural Gas Systems: Piping (New)
M-PROC-E	104	Process Systems (Existing)
M-PROC-EQPM-E	214	Process Systems: Equipment (Existing)
M-PROC-EQPM-N	44	Process Systems: Equipment (New)
M-PROC-N	145	Process Systems (New)
M-PROC-PIPE-E	204	Process Systems: Piping (Existing)
M-PROC-PIPE-N	95	Process Systems: Piping (New)
M-RAIR-E	34	Relief Air Systems (Existing)
M-RAIR-N	45	Relief Air Systems (New)
M-RCOV-E	84	Energy Recovery Systems (Existing)
M-RCOV-EQPM-E	134	Energy Recovery Systems: Equipment (Existing)
M-RCOV-EQPM-N	205	Energy Recovery Systems: Equipment (New)
M-RCOV-N	155	Energy Recovery Systems (New)
M-RCOV-PIPE-E	184	Energy Recovery Systems: Piping (Existing)
M-RCOV-PIPE-N	105	Energy Recovery Systems: Piping (New)
M-REFG-DISC-E	234	Refrigeration Systems: Discharge (Existing)
M-REFG-DISC-N	55	Refrigeration Systems: Discharge (New)
M-REFG-E	64	Refrigeration Systems (Existing)
M-REFG-EQPM-E	84	Refrigeration Systems: Equipment (Existing)
M-REFG-EQPM-N	35	Refrigeration Systems: Equipment (New)
M-REFG-N	85	Refrigeration Systems (New)
M-REFG-PIPE-E	164	Refrigeration Systems: Piping (Existing)
M-REFG-PIPE-N	135	Refrigeration Systems: Piping (New)
M-REFG-RETN-E	214	Refrigeration Systems: Return (Existing)
M-REFG-RETN-N	185	Refrigeration Systems: Return (New)
M-REFG-SUPP-E	24	Refrigeration Systems: Supply (Existing)
M-REFG-SUPP-N	235	Refrigeration Systems: Supply (New)
M-SMOK-CDFF-E	74	Smoke Extraction Systems: Ceiling Diffusers (Existing)
M-SMOK-CDFF-N	75	Smoke Extraction Systems: Ceiling Diffusers (New)
M-SMOK-DUCT-E	124	Smoke Extraction Systems: Duct (Existing)

M-SMOK-DUCT-N	125	Smoke Extraction Systems: Duct (New)
M-SMOK-E	174	Smoke Extraction Systems (Existing)
M-SMOK-EQPM-E	224	Smoke Extraction Systems: Equipment (Existing)
M-SMOK-EQPM-N	175	Smoke Extraction Systems: Equipment (New)
M-SMOK-N	225	Smoke Extraction Systems (New)
M-SPCL-EQPM-N	165	Special Systems: Equipment (New)
M-SPCL-N	115	Special systems (New)
M-SPCL-PIPE-E	44	Special Systems: Piping (Existing)
M-SPCL-PIPE-N	65	Special Systems: Piping (New)
M-STEM-BLBD-E	94	Steam Systems: Boiler Blow Down Piping (Existing)
M-STEM-BLBD-N	215	Steam Systems: Boiler Blow Down Piping (New)
M-STEM-BLBD-PIPE-E	144	Steam Systems: Boiler Blow Down Pip.: Piping (Existing)
M-STEM-BLBD-PIPE-N	245	Steam Systems: Boiler Blow Down Pip.: Piping (New)
M-STEM-CONP-E	194	Steam Systems: Condensate Piping (Existing)
M-STEM-CONP-N	195	Steam Systems: Condensate Piping (New)
M-STEM-CONP-PIPE-E	244	Steam Systems: Condensate Piping: Piping (Existing)
M-STEM-CONP-PIPE-N	145	Steam Systems: Condensate Piping: Piping (New)
M-STEM-CONP-SKCH-E	54	Steam Systems: Condensate Piping: Sketch (Existing)
M-STEM-CONP-SKCH-N	95	Steam Systems: Condensate Piping: Sketch (New)
M-STEM-E	104	Steam Systems (Existing)
M-STEM-EQPM-E	214	Steam Systems: Equipment (Existing)
M-STEM-EQPM-N	45	Steam Systems: Equipment (New)
M-STEM-HPIP-E	204	Steam Systems: High-Pressure Steam Piping (Existing)
M-STEM-HPIP-N	205	Steam Systems: High-Pressure Steam Piping (New)
M-STEM-HPIP-PIPE-E	34	Steam Systems: H.-Press. Steam Piping: Piping (Existing)
M-STEM-HPIP-PIPE-N	155	Steam Systems: H.-Press. Steam Piping: Piping (New)
M-STEM-HPIP-SKCH-E	84	Steam Systems: H.-Press. Steam Piping: Sketch (Existing)
M-STEM-HPIP-SKCH-N	105	Steam Systems: H.-Press. Steam Piping: Sketch (New)
M-STEM-LPIP-E	134	Steam Systems: Low-Pressure Steam Piping (Existing)
M-STEM-LPIP-N	55	Steam Systems: Low-Pressure Steam Piping (New)
M-STEM-LPIP-PIPE-E	184	Steam Systems: L.-Press. Steam Piping: Piping (Existing)
M-STEM-LPIP-PIPE-N	35	Steam Systems: L.-Press. Steam Piping: Piping (New)
M-STEM-LPIP-SKCH-E	234	Steam Systems: L.-Press. Steam Piping: Sketch (Existing)
M-STEM-LPIP-SKCH-N	85	Steam Systems: L.-Press. Steam Piping: Sketch (New)
M-STEM-MPIP-E	64	Steam Systems: Med.-Pressure Steam Piping (Existing)
M-STEM-MPIP-N	135	Steam Systems: Med.-Pressure Steam Piping (New)
M-STEM-MPIP-PIPE	14	Steam Systems: Med.-Press. Steam Piping: Piping (New)
M-STEM-MPIP-PIPE-E	84	Steam Systems: Med.-Press. Steam Piping: Piping (Exist.)
M-STEM-MPIP-SKCH-E	164	Steam Systems: Med.-Press. Steam Piping: Sketch (Exist.)
M-STEM-MPIP-SKCH-N	185	Steam Systems: Med.-Press. Steam Piping: Sketch (New)
M-STEM-N	235	Steam Systems (New)

M-STEM-SYMB-E	214	Steam Systems: Symbols (Existing)
M-STEM-SYMB-N	75	Steam Systems: Symbols (New)
M-TEST-E	24	Test Equipment (Existing)
M-TEST-N	125	Test Equipment (New)

HVAC		
Name	Color	Description
HVAC-BOXD-E	44	HVAC Systems: Mixing Box, Dual Duct (Existing)
HVAC-BOXD-N	165	HVAC Systems: Mixing Box, Dual Duct (New)
HVAC-BOXES-E	94	HVAC Systems: Mixing Box, Single Duct (Existing)
HVAC-BOXES-N	115	HVAC Systems: Mixing Box, Single Duct (New)
HVAC-CDFF-E	144	HVAC Systems: Ceiling Diffusers (Existing)
HVAC-CDFF-N	65	HVAC Systems: Ceiling Diffusers (New)
HVAC-CLDA-DUCT-E	194	HVAC Systems: Cold Air: Ductwork (Existing)
HVAC-CLDA-DUCT-N	215	HVAC Systems: Cold Air: Ductwork (New)
HVAC-CLDA-E	244	HVAC Systems: Cold Air (Existing)
HVAC-CLDA-EQPM-E	54	HVAC Systems: Cold Air: Ductwork Equipment (Existing)
HVAC-CLDA-EQPM-N	55	HVAC Systems: Cold Air: Ductwork Equipment (New)
HVAC-CLDA-N	195	HVAC Systems: Cold Air (New)
HVAC-CLDA-SECT-E	214	HVAC Systems: Cold Air: Ductwork Section (Existing)
HVAC-CLDA-SECT-N	95	HVAC Systems: Cold Air: Ductwork Section (New)
HVAC-CLDA-SIZE-E	204	HVAC Systems: Cold Air: Ductwork Size (Existing)
HVAC-CLDA-SIZE-N	45	HVAC Systems: Cold Air: Ductwork Size (New)
HVAC-DEMO	39	HVAC Demolition
HVAC-DMPR-E	84	HVAC Systems: Fire, Smoke, Volume Damper (Existing)
HVAC-DMPR-N	155	HVAC Systems: Fire, Smoke, Volume Damper (New)
HVAC-DOOR-E	134	HVAC Systems: Equipment Doors (Existing)
HVAC-DOOR-N	105	HVAC Systems: Equipment Doors (New)
HVAC-EFAN-E	184	HVAC Systems: Equipment With Electric Fans (Existing)
HVAC-EFAN-N	55	HVAC Systems: Equipment With Electric Fans (New)
HVAC-EPIP-E	64	HVAC Systems: Equip. With Piping and Electricity (Exist.)
HVAC-EPIP-N	85	HVAC Systems: Equip. With Piping and Electricity (New)
HVAC-EQPM-E	84	HVAC Systems: Equipment (Existing)
HVAC-EQPM-N	135	HVAC Systems: Equipment (New)
HVAC-EXHS-DUCT-E	164	HVAC Systems: Exhaust Air: Ductwork (Existing)
HVAC-EXHS-DUCT-N	185	HVAC Systems: Exhaust Air: Ductwork (New)
HVAC-EXHS-E	214	HVAC Systems: Exhaust Air (Existing)
HVAC-EXHS-EQPM-E	24	HVAC Systems: Exhaust Air: Ductwork Equip. (Existing)
HVAC-EXHS-EQPM-N	235	HVAC Systems: Exhaust Air: Ductwork Equip. (New)
HVAC-EXHS-GRIL-E	74	HVAC Systems: Exhaust Air: Grilles (Existing)
HVAC-EXHS-GRIL-N	75	HVAC Systems: Exhaust Air: Grilles (New)
HVAC-EXHS-N	125	HVAC Systems: Exhaust Air (New)
HVAC-EXHS-SECT-E	174	HVAC Systems: Exhaust Air: Ductwork Section (Existing)
HVAC-EXHS-SECT-N	165	HVAC Systems: Exhaust Air: Ductwork Section (New)
HVAC-EXHS-SIZE-N	115	HVAC Systems: Exhaust Air: Ductwork Size (New)
HVAC-HOTA -N	115	HVAC Systems: Hot Air (New)

HVAC-HOTA-DUCT-E	44	HVAC Systems: Hot Air: Ductwork (Existing)
HVAC-HOTA-DUCT-N	215	HVAC Systems: Hot Air: Ductwork (New)
HVAC-HOTA-E	94	HVAC Systems: Hot Air (Existing)
HVAC-HOTA-EQPM-N	55	HVAC Systems: Hot Air: Ductwork Equipment (New)
HVAC-HOTA-SEC-E	194	HVAC Systems: Hot Air: Ductwork Section (Existing)
HVAC-HOTA-SECT-N	155	HVAC Systems: Hot Air: Ductwork Section (New)
HVAC-HOTA-SIZE-E	244	HVAC Systems: Hot Air: Ductwork Size (Existing)
HVAC-HOTA-SIZE-N	205	HVAC Systems: Hot Air: Ductwork Size (New)
HVAC-IDEN-E	104	HVAC Systems: Identification Tags (Existing)
HVAC-IDEN-N	165	HVAC Systems: Identification Tags (New)
HVAC-ODFF-E	214	HVAC Systems: Other Diffusers (Existing)
HVAC-ODFF-N	215	HVAC Systems: Other Diffusers (New)
HVAC-PIPE-E	204	HVAC Systems: Piping (Existing)
HVAC-PIPE-N	25	HVAC Systems: Piping (New)
HVAC-RDFF-E	34	HVAC Systems: Return Air Diffusers (Existing)
HVAC-RDFF-IDEN-E	214	HVAC Systems: Return Air Diffusers: ID. Tags (Existing)
HVAC-RDFF-N	75	HVAC Systems: Return Air Diffusers (New)
HVAC-RETN -N	185	HVAC Systems: Return Air Diffusers: ID. Tags (New)
HVAC-RETN-DUCT-E	204	HVAC Systems: Return Ductwork: Ductwork (Existing)
HVAC-RETN-DUCT-N	125	HVAC Systems: Return Ductwork: Ductwork (New)
HVAC-RETN-E	34	HVAC Systems: Return Ductwork (Existing)
HVAC-RETN-EQPM-E	84	HVAC Systems: Return Ductwork: Equipment (Existing)
HVAC-RETN-EQPM-N	175	HVAC Systems: Return Ductwork: Equipment (New)
HVAC-RETN-SECT-E	184	HVAC Systems: Return Ductwork: Ductwork Sec. (Exist.)
HVAC-RETN-SECT-N	35	HVAC Systems: Return Ductwork: Ductwork Sec. (New)
HVAC-RETN-SIZE-E	234	HVAC Systems: Return Ductwork: Ductwork Size (Exist.)
HVAC-RETN-SIZE-N	85	HVAC Systems: Return Ductwork: Ductwork Size (New)
HVAC-SDFF-E	84	HVAC Systems: Supply Diffusers (Existing)
HVAC-SDFF-IDEN-E	164	HVAC Systems: Supply Diffusers: ID. Tags (Existing)
HVAC-SDFF-IDEN-N	235	HVAC Systems: Supply Diffusers: ID. Tags (New)
HVAC-SDFF-N	45	HVAC Systems: Supply Diffusers (New)
HVAC-SUPP-DUCT-E	214	HVAC Systems: Supply Ductwork: Ductwork (Existing)
HVAC-SUPP-DUCT-N	95	HVAC Systems: Supply Ductwork: Ductwork (New)
HVAC-SUPP-E	24	HVAC Systems: Supply Ductwork (Existing)
HVAC-SUPP-EQPM-E	74	HVAC Systems: Supply Ductwork: Equipment (Existing)
HVAC-SUPP-EQPM-N	145	HVAC Systems: Supply Ductwork: Equipment (New)
HVAC-SUPP-N	195	HVAC Systems: Supply Ductwork (New)

Plumbing		
Name	Color	Description
P-ACID-E	44	Acid Waste Systems (Existing)
P-ACID-EQPM-E	94	Acid Waste Systems: Equipment (Existing)
P-ACID-EQPM-N	175	Acid Waste Systems: Equipment (New)
P-ACID-N	225	Acid Waste Systems (New)
P-ACID-PIPE-E	144	Acid Waste Systems: Piping (New)
P-ACID-PIPE-N	165	Acid Waste Systems: Piping (New)
P-ACID-VENT-E	194	Acid Waste Systems: Vents (Existing)
P-ACID-VENT-N	115	Acid Waste Systems: Vents (New)
P-DEMO	69	Plumbing Demolition
P-DOMW-CPIP-E	244	Domestic Water Systems: Cold Water Piping (Existing)
P-DOMW-CPIP-N	65	Domestic Water Systems: Cold Water Piping (New)
P-DOMW-E	54	Domestic Water Systems (Existing)
P-DOMW-EQPM-E	104	Domestic Water Systems: Equipment (Existing)
P-DOMW-EQPM-N	215	Domestic Water Systems: Equipment (New)
P-DOMW-HPIP-E	214	Domestic Water Systems: Hot Water Piping ((Existing)
P-DOMW-HPIP-N	245	Domestic Water Systems: Hot Water Piping (New)
P-DOMW-N	195	Domestic Water Systems (New)
P-DOMW-RISR-E	204	Domestic Water Systems: Hot/ Cold Water Risers (Exist.)
P-DOMW-RISR-N	145	Domestic Water Systems: Hot/ Cold Water Risers (New)
P-DOMW-RPIP-E	34	Domestic Water Systems: Hot Water Recirc. Pip. (Exist.)
P-DOMW-RPIP-N	95	Domestic Water Systems: Hot Water Recirc. Pip. (New)
P-MDGS-CAIR-E	84	Medical Gas: Compressed Air (Existing)
P-MDGS-CAIR-N	45	Medical Gas: Compressed Air (New)
P-MDGS-E	134	Medical Gas (Existing)
P-MDGS-EQPM-E	184	Medical Gas: Equipment (Existing)
P-MDGS-EQPM-N	205	Medical Gas: Equipment (New)
P-MDGS-N	155	Medical Gas (New)
P-MDGS-NITG-E	234	Medical Gas: Nitrogen (Existing)
P-MDGS-NITG-N	105	Medical Gas: Nitrogen (New)
P-MDGS-NOXG-E	64	Medical Gas: Nitrous Oxide (Existing)
P-MDGS-NOXG-N	55	Medical Gas: Nitrous Oxide (New)
P-MDGS-OXYG-E	84	Medical Gas: Pure O2 (Existing)
P-MDGS-OXYG-N	35	Medical Gas: Pure O2 (New)
P-MDGS-PIPE-E	164	Medical Gas: Piping (Existing)
P-MDGS-PIPE-N	85	Medical Gas: Piping (New)
P-MDGS-SAIR-E	214	Medical Gas: Scavenge Air (Existing)
P-MDGS-SAIR-N	135	Medical Gas: Scavenge Air (New)
P-MDGS-VACU-E	24	Medical Gas: Medical Vacuum (Existing)
P-MDGS-VACU-N	185	Medical Gas: Medical Vacuum (New)

P-SANR-E	74	Sanitary Drainage Systems (Existing)
P-SANR-EQPM-E	124	Sanitary Drainage Systems: Equipment (Existing)
P-SANR-EQPM-N	235	Sanitary Drainage Systems: Equipment (New)
P-SANR-FIXT-E	174	Sanitary Drainage Systems: Plumbing Fixtures (Existing)
P-SANR-FIXT-N	75	Sanitary Drainage Systems: Plumbing Fixtures (New)
P-SANR-FLDR-E	224	Sanitary Drainage Systems: Floor Drains (Existing)
P-SANR-FLDR-N	125	Sanitary Drainage Systems: Floor Drains (New)
P-SANR-N	175	Sanitary Drainage Systems (New)
P-SANR-PIPE-E	44	Sanitary Drainage Systems: Piping (Existing)
P-SANR-PIPE-N	225	Sanitary Drainage Systems: Piping (New)
P-SANR-RISR-E	94	Sanitary Drainage Systems: Risers (Existing)
P-SANR-RISR-N	165	Sanitary Drainage Systems: Risers (New)
P-SANR-VENT-E	144	Sanitary Drainage Systems: Vent Piping (Existing)
P-SANR-VENT-N	115	Sanitary Drainage Systems: Vent Piping (New)
P-STRM-E	194	Storm Drainage Systems (Existing)
P-STRM-N	65	Storm Drainage Systems (New)
P-STRM-PIPE-E	244	Storm Drainage Systems: Piping (Existing)
P-STRM-PIPE-N	215	Storm Drainage Systems: Piping (New)
P-STRM-RFDR-E	54	Storm Drainage Systems: Roof Drains (Existing)
P-STRM-RFDR-N	165	Storm Drainage Systems: Roof Drains (New)
P-STRM-RISR-E	104	Storm Drainage Systems: Risers (Existing)
P-STRM-RISR-N	85	Storm Drainage Systems: Risers (New)

Electrical		
Name	Color	Description
E-1 LIN-E	44	Any Major Group: One-Line Diagrams (Existing)
E-1 LIN-N	245	Any Major Group: One-Line Diagrams (New)
E-AUX-E	94	Auxiliary Systems (Existing)
E-AUXL-N	195	Auxiliary Systems (New)
E-BEL-E	144	Bell System (Existing)
E-BELL-N	145	Bell System (New)
E-CABL-COAX-E	194	Cable System: Coax Cable (Existing)
E-CABL-COAX-N	95	Cable System: Coax Cable (New)
E-CABL-E	244	Cable System (Existing)
E-CABL-FIBR-E	54	Cable System: Fiber Optics Cable (Existing)
E-CABL-FIBR-N	45	Cable System: Fiber Optics Cable (New)
E-CABL-MULT-E	104	Cable System: Multi-Conductor Cable (Existing)
E-CABL-MULT-N	205	Cable System: Multi-Conductor Cable (New)
E-CABL-N	155	Cable System (New)
E-CABL-TRAY-E	214	Cable System: Cable Tray and Wire Ways (Existing)
E-CABL-TRAY-N	105	Cable System: Cable Tray and Wire Ways (New)
E-CCTV-E	204	Closed-Circuit TV (Existing)
E-CCTV-N	55	Closed-Circuit TV (New)
E-CLOK-CIRC-E	34	Clock System: Circuits (Existing)
E-CLOK-CIRC-N	35	Clock System: Circuits (New)
E-CLOK-CLNG-E	84	Clock System: Ceiling-Mounted (Existing)
E-CLOK-CLNG-N	85	Clock System: Ceiling-Mounted (New)
E-CLOK-CNMB-E	134	Clock System: Circuit Numbers (Existing)
E-CLOK-CNMB-N	135	Clock System: Circuit Numbers (New)
E-CLOK-E	184	Clock System (Existing)
E-CLOK-EQPM-E	234	Clock System: Equipment (Existing)
E-CLOK-EQPM-N	185	Clock System: Equipment (New)
E-CLOK-FLOR-E	64	Clock System: Floor-Mounted (Existing)
E-CLOK-FLOR-N	235	Clock System: Floor-Mounted (New)
E-CLOK-N	75	Clock System (New)
E-CLOK-WALL-E	84	Clock System: Wall-Mounted (Existing)
E-CLOK-WALL-N	125	Clock System: Wall-Mounted (New)
E-COMM-CIRC-E	164	Telephone, Communication Outlets: Circuits (Existing)
E-COMM-CIRC-N	175	Telephone, Communication Outlets: Circuits (New)
E-COMM-CLNG-E	214	Telephone, Com. Outlets: Ceiling-Mounted (Existing)
E-COMM-CLNG-N	225	Telephone, Com. Outlets: Ceiling-Mounted (New)
E-COMM-CNMB-E	24	Telephone, Com. Outlets: Circuit Numbers (Existing)
E-COMM-CNMB-N	165	Telephone, Com. Outlets: Ceiling-Mounted (New)
E-COMM-E	74	Telephone, Communication Outlets (Existing)

E-COMM-EQPM-E	124	Telephone, Communication Outlets: Equipment (Exist.)
E-COMM-EQPM-N	115	Telephone, Communication Outlets: Equipment (New)
E-COMM-N	65	Telephone, Communication Outlets (New)
E-COMM-WALL-E	174	Telephone, Com. Outlets: Wall-Mounted (Existing)
E-COMM-WALL-N	215	Telephone, Com. Outlets: Wall-Mounted(New)
E-CTRL-DEVC-E	224	Control Systems: Devices (Existing)
E-CTRL-DEVC-N	175	Control Systems: Device (New)
E-CTRL-E	44	Control Systems (Existing)
E-CTRL-N	245	Control Systems: (New)
E-CTRL-WIRE-E	94	Control Systems: Wiring (Existing)
E-CTRL-WIRE-N	195	Control Systems: Wiring (New)
E-DATA-CIRC-E	144	Data Outlets: Circuits (Existing)
E-DATA-CIRC-N	145	Data Outlets: Circuits (New)
E-DATA-CLNG-E	194	Data Outlets: Ceiling-Mounted (Existing)
E-DATA-CLNG-N	95	Data Outlets: Ceiling-Mounted (New)
E-DATA-CNMB-E	244	Data Outlets: Circuit Numbers (Existing)
E-DATA-CNMB-N	45	Data Outlets: Circuit Numbers (New)
E-DATA-E	54	Data Outlets (Existing)
E-DATA-EQPM-E	104	Data Outlets: Equipment (Existing)
E-DATA-EQPM-N	205	Data Outlets: Equipment (New)
E-DATA-FLOR-E	214	Data Outlets: Floor-Mounted (Existing)
E-DATA-FLOR-N	155	Data Outlets: Floor-Mounted (New)
E-DATA-N	105	Data Outlets (New)
E-DATA-WALL-E	204	Data Outlets: Wall-Mounted (Existing)
E-DATA-WALL-N	55	Data Outlets: Wall-Mounted (New)
E-DEMO	29	Electrical Demolition
E-DIAG-BKRS-E	34	Diagrams: Breakers (Existing)
E-DIAG-BKRS-N	35	Diagrams: Breakers (New)
E-DIAG-BUSS-E	84	Diagrams: Bus Duct (Existing)
E-DIAG-BUSS-N	85	Diagrams: Bus Duct (New)
E-DIAG-E	134	Diagrams (Existing)
E-DIAG-ENCL-E	184	Diagrams: Equipment Enclosures (Existing)
E-DIAG-ENCL-N	135	Diagrams: Equipment Enclosures (New)
E-DIAG-EQPM-E	234	Diagrams: Equipment (Existing)
E-DIAG-EQPM-N	235	Diagrams: Equipment (New)
E-DIAG-FEED-N	185	Diagrams: Feeders (New)
E-DIAG-FEED-E	24	Diagrams: Feeders (Existing)
E-DIAG-FLOR-N	75	Diagrams: Floor Lines (New)
E-DIAG-FLOR-E	24	Diagrams: Floor Lines (Existing)
E-DIAG-GRND-E	64	Diagrams: Grounding (Existing)
E-DIAG-GRND-N	125	Diagrams: Grounding (New)

E-DIAG-N	175	Diagrams (New)
E-DIAG-SWCH-E	84	Diagrams: Switches (Existing)
E-DIAG-SWCH-N	225	Diagrams: Switches (New)
E-DIAG-XFMR-E	164	Diagrams: Transformers (Existing)
E-DIAG-XFMR-N	165	Diagrams: Transformers (New)
E-DICT-CIRC-E	214	Central Dictation System: Circuits (Existing)
E-DICT-CIRC-N	115	Central Dictation System: Ceiling Mounted (New)
E-DICT-CLNG-E	24	Central Dictation System: Ceiling Mounted (Existing)
E-DICT-CLNG-N	65	CENTRAL Dictation System: Ceiling Mounted (New)
E-DICT-CNMB-E	74	Central Dictation System: Circuit Numbers (Existing)
E-DICT-CNMB-N	215	Central Dictation System: Circuit Numbers (New)
E-DICT-E	124	Central Dictation System (Existing)
E-DICT-EQPM-E	174	Central Dictation System: Equipment (Existing)
E-DICT-EQPM-N	75	Central Dictation System: Equipment (New)
E-DICT-N	245	Central Dictation System: Circuits (New)
E-DICT-WALL-E	224	Central Dictation System: Wall Mounted (Existing)
E-DICT-WALL-N	195	Central Dictation System: Wall Mounted (New)
E-FIRE-CIRC-E	44	Fire Alarm, Fire Extinguishers: Circuits (Existing)
E-FIRE-CIRC-N	145	Fire Alarm, Fire Extinguishers: Circuits (New)
E-FIRE-CLNG-E	94	Fire Alarm, Fire Extinguishers: Ceiling Mounted (Existing)
E-FIRE-CLNG-N	95	Fire Alarm, Fire Extinguishers: Ceiling Mounted (New)
E-FIRE-CNMB-N	45	Fire Alarm, Fire Extinguishers: Wall Mounted (New)
E-FIRE-CNMB-E	24	Fire Alarm, Fire Extinguishers: Circuit Numbers (Existing)
E-FIRE-EQPM-E	144	Fire Alarm, Fire Extinguishers: Equipment (Existing)
E-FIRE-EQPM-N	205	Fire Alarm, Fire Extinguishers: Equipment (New)
E-FIRE-N	155	Fire Alarm, Fire Extinguishers (New)
E-FIRE-E	24	Fire Alarm, Fire Extinguishers (Existing)
E-FIRE-WALL-E	194	Fire Alarm, Fire Extinguishers: Wall Mounted (Existing)
E-FIRE-WALL-N	105	Fire Alarm, Fire Extinguishers: Wall Mounted (New)
E-GRND-CIRC-E	244	Ground System: Circuits (Existing)
E-GRND-CIRC-N	95	Ground System: Circuits (New)
E-GRND-CLNG-E	54	Ground System: Ceiling-Mounted (Existing)
E-GRND-CLNG-N	145	Ground System: Ceiling-Mounted (New)
E-GRND-CNMB-E	104	Ground System: Circuit Numbers (Existing)
E-GRND-CNMB-N	45	Ground System: Circuit Numbers (New)
E-GRND-DIAG-E	214	Ground System: Diagram (Existing)
E-GRND-DIAG-N	105	Ground System: Diagram (New)
E-GRND-E	204	Ground System (Existing)
E-GRND-N	205	Ground System (New)
E-GRND-EQPM-E	34	Ground System: Equipment (Existing)
E-GRND-EQPM-N	185	Ground System: Equipment (New)

E-GRND-REFR-E	134	Ground System: Reference (Existing)
E-GRND-REFR-N	35	Ground System: Reference (New)
E-GRND-WALL-E	184	Ground System: Wall-Mounted (Existing)
E-GRND-WALL-N	85	Ground System: Wall-Mounted (New)
E-INST-CIRC-E	234	Instrumentation System: Circuits (Existing)
E-INST-CIRC-N	135	Instrumentation System: Circuit (New)
E-INST-CLNG-N	185	Instrumentation System: Ceiling Mounted (New)
E-INST-CLNG-E	34	Instrumentation System: Ceiling Mounted (Existing)
E-INST-CNMB-E	64	Instrumentation System: Circuit Numbers (Existing)
E-INST-CNMB-N	235	Instrumentation System: Circuit Numbers(New)
E-INST-E	84	Instrumentation System (Existing)
E-INST-EQPM-E	164	Instrumentation System: Equipment (Existing)
E-INST-EQPM-N	75	Instrumentation System: Equipment (New)
E-INST-N	125	Instrumentation System (New)
E-INST-WALL-E	214	Instrumentation System: Wall-Mounted (Existing)
E-INST-WALL-N	175	Instrumentation System: Wall mounted (New)
E-INTC-E	24	Intercom System (Existing)
E-INTC-N	225	Instrumentation System: (New)
E-LEGN-E	74	Legend of Symbols (Existing)
E-LEGN-N	165	Legend of Symbols (New)
E-LITE-CIRC-CRIT-E	124	Lighting: Circuits: Critical (Existing)
E-LITE-CIRC-CRIT-N	115	Lighting: Circuits: Critical (New)
E-LITE-CIRC-E	224	Lighting: Circuits (Existing)
E-LITE-CIRC-EMER-E	44	Lighting: Circuits: Emergency (Existing)
E-LITE-CIRC-EMER-N	65	Lighting: Circuits: Emergency (New)
E-LITE-CIRC-N	215	Lighting: Circuits (New)
E-LITE-CIRC-NUMB-E	94	Lighting: Circuits: Numbers (Existing)
E-LITE-CIRC-NUMB-N	85	Lighting: Ceiling-Mounted: Critical (New)
E-LITE-CLNG-CRIT-E	144	Lighting: Ceiling-Mounted: Critical (Existing)
E-LITE-CLNG-CRIT-N	245	Lighting: Circuit Numbers (New)
E-LITE-CLNG-E	194	Lighting: Ceiling-Mounted (Existing)
E-LITE-CLNG-EMER-E	244	Lighting: Ceiling-Mounted: Emergency (Existing)
E-LITE-CLNG-EMER-N	195	Lighting: Ceiling-Mounted: Emergency (New)
E-LITE-CLNG-EXIT-E	54	Lighting: Ceiling-Mounted: Exit (Existing)
E-LITE-CLNG-EXIT-N	145	Lighting: Ceiling-Mounted: Exit (New)
E-LITE-CLNG-N	95	Lighting: Ceiling-Mounted: Emergency (New)
E-LITE-CNMB-CRIT-E	104	Lighting: Circuit Numbers: Critical (Existing)
E-LITE-CNMB-CRIT-N	45	Lighting: Circuit Numbers: Critical (New)
E-LITE-CNMB-E	214	Lighting: Circuit Numbers (Existing)
E-LITE-CNMB-EMER-E	204	Lighting: Circuit Numbers: Emergency (Existing)
E-LITE-CNMB-EMER-N	205	Lighting: Circuit Numbers: Emergency (New)

E-LITE-CNMB-N	155	Lighting Circuit(New)
E-LITE-E	34	Lighting (Existing)
E-LITE-EMER-E	84	Lighting: Emergency (Existing)
E-LITE-EMER-N	105	Lighting: Equipment: Emergency (New)
E-LITE-EQPM-CRIT-E	134	Lighting: Equipment: Critical (Existing)
E-LITE-EQPM-CRIT-N	55	Lighting: Equipment: Critical (New)
E-LITE-EQPM-E	184	Lighting: Equipment (Existing)
E-LITE-EQPM-EMER-E	234	Lighting: Equipment: Emergency (Existing)
E-LITE-EQPM-EMER-N	35	Lighting: Equipment: Emergency(New)
E-LITE-EQPM-N	85	Lighting: Equipment (New)
E-LITE-EXIT-E	64	Lighting: Exit (Existing)
E-LITE-EXIT-N	135	Lighting: Exit (New)
E-LITE-EXTR-E	84	Lighting: Exterior and Site (Existing)
E-LITE-EXTR-N	185	Lighting: Exterior(New)
E-LITE-FLOR-E	164	Lighting: Floor-Mounted (Existing)
E-LITE-FLOR-N	235	Lighting: Floor-Mounted (New)
E-LITE-JBOX-E	214	Lighting: Junction Box (Existing)
E-LITE-JBOX-N	75	Lighting: Junction Box (New)
E-LITE-N	125	Lighting:(New)
E-LITE-OTLN-E	24	Lighting: Outline for Background (Existing)
E-LITE-OTLN-N	175	Lighting: Outline for Background (New)
E-LITE-ROOF-E	74	Lighting: Roof Lighting (Existing)
E-LITE-ROOF-N	225	Lighting: Roof Lighting (New)
E-LITE-SPCL-E	124	Lighting: Special (Existing)
E-LITE-SPCL-N	165	Lighting: Special (New)
E-LITE-SWCH-CRIT-E	174	Lighting: Switches: Critical (Existing)
E-LITE-SWCH-CRIT-N	115	Lighting: Switches: Critical (New)
E-LITE-SWCH-E	224	Lighting: Switches (Existing)
E-LITE-SWCH-EMER-E	44	Lighting: Switches: Emergency (Existing)
E-LITE-SWCH-EMER-N	65	Lighting: Switches: Emergency (New)
E-LITE-SWCH-N	215	Lighting: Switches (New)
E-LITE-WALL-CRIT-E	94	Lighting: Wall-Mounted: Critical (Existing)
E-LITE-WALL-CRIT-N	155	Lighting: Wall-Mounted: Critical (New)
E-LITE-WALL-E	144	Lighting: Wall-Mounted (Existing)
E-LITE-WALL-EMER-E	194	Lighting: Wall-Mounted: Emergency (Existing)
E-LITE-WALL-EMER-N	245	Lighting: Wall-Mounted: Emergency (New)
E-LITE-WALL-EXIT-E	244	Lighting: Wall-Mounted: Exit (Existing)
E-LITE-WALL-EXIT-N	195	Lighting: Wall-Mounting: Exit(New)
E-LITE-WALL-N	145	Lighting: Wall-Mounted (New)
E-LRM-E	54	Alarm System (Existing)
E-LRM-N	95	Alarm System (New)

E-LTNG-CIRC-E	104	Lightning Protection System: Circuits (Existing)
E-LTNG-CIRC-N	45	Lightning Protection System: Circuits (New)
E-LTNG-CLNG-E	214	Lightning Protection System: Ceiling Mounted (Existing)
E-LTNG-CLNG-N	205	Lightning Protection System: Ceiling Mounted (New)
E-LTNG-CNMB-E	204	Lightning Protection System: Circuit Numbers (Existing)
E-LTNG-CNMB-N	155	Lightning Protection System: Wall Mounted (New)
E-LTNG-E	34	Lightning Protection System (Existing)
E-LTNG-EQPM-E	84	Lightning Protection System: Equipment (Existing)
E-LTNG-EQPM-N	55	Lightning Protection System: Equipment (New)
E-LTNG-N	35	Lighting Protection System:(New)
E-LTNG-WALL-E	134	Lightning Protection System: Wall Mounted (Existing)
E-LTNG-WALL-N	85	Lighting: Wall-Mounting: Exit(New)
E-NURS-CIRC-E	184	Nurse Call System: Circuits (Existing)
E-NURS-CIRC-N	135	Nurse Call System: Circuit Numbers (New)
E-NURS-CLNG-E	234	Nurse Call System: Ceiling-Mounted (Existing)
E-NURS-CLNG-N	185	Nurse Call System: Ceiling-Mounted (New)
E-NURS-CNMB-E	64	Nurse Call System: Circuit Numbers (Existing)
E-NURS-CNMB-N	235	Nurse Call System: Circuits (New)
E-NURS-E	84	Nurse Call System (Existing)
E-NURS-EQPM-E	164	Nurse Call System: Equipment (Existing)
E-NURS-EQPM-N	75	Nurse Call System: Equipment (New)
E-NURS-FLOR-E	214	Nurse Call System: Floor-Mounted (Existing)
E-NURS-FLOR-N	125	Nurse Call System: Floor-Mounted (New)
E-NURS-N	175	Nurse Call System (New)
E-NURS-WALL-E	24	Nurse Call System: Wall-Mounted (Existing)
E-NURS-WALL-N	225	Nurse Call System: Wall-Mounted (New)
E-PGNG-E	74	Paging System (Existing)
E-PGNG-N	165	Paging System (New)
E-POWR-BUSW-E	74	Power: Bus Ways (Existing)
E-POWR-BUSW-N	115	Power: Bus Ways (New)
E-POWR-CABL-E	124	Power: Cable Trays (Existing)
E-POWR-CABL-N	65	Power: Cable:(New)
E-POWR-CIRC-CRIT-E	224	Power: Circuits: Critical (Existing)
E-POWR-CIRC-CRIT-N	215	Power: Circuits: Critical (New)
E-POWR-CIRC-E	44	Power: Circuits (Existing)
E-POWR-CIRC-N	175	Power: Circuits (New)
E-POWR-CIRC-NUMB-E	94	Power: Circuits: Numbers (Existing)
E-POWR-CIRC-NUMB-N	245	Power: Circuits: Numbers (New)
E-POWR-CLNG-CRIT-E	144	Power: Ceiling-Mounted: Critical (Existing)
E-POWR-CLNG-CRIT-N	195	Power: Circuit Numbers (New)
E-POWR-CLNG-E	194	Power: Ceiling-Mounted (Existing)

E-POWR-CLNG-N	145	Power: Ceiling-Mounted: Critical (New)
E-POWR-CNMB-CRIT-E	244	Power: Circuit Numbers: Critical (Existing)
E-POWR-CNMB-CRIT-N	95	Power: Equipment (New)
E-POWR-CNMB-E	54	Power: Circuit Numbers (Existing)
E-POWR-CNMB-N	45	Power: Circuit Numbers: Critical (New)
E-POWR-DEVC-E	104	Power: Devices (Existing)
E-POWR-DEVC-N	205	Power: Devices (New)
E-POWR-E	214	Power (Existing)
E-POWR-EQPM-CRIT-E	204	Power: Equipment: Critical (Existing)
E-POWR-EQPM-CRIT-N	155	Power: Equipment: Critical (New)
E-POWR-EQPM-E	34	Power: Equipment (Existing)
E-POWR-EQPM-N	105	Power: Equipment (New)
E-POWR-EXTR-E	84	Power: Exterior (Existing)
E-POWR-EXTR-N	55	Power: Exterior(New)
E-POWR-FEED-E	134	Power: Feeders (Existing)
E-POWR-FEED-N	35	Power: Feeders (New)
E-POWR-FLOR-CRIT-E	184	Power: Floor-Mounted: Critical (Existing)
E-POWR-FLOR-CRIT-N	85	Power: Floor-Mounted: Critical (New)
E-POWR-FLOR-E	234	Power: Floor-Mounted (Existing)
E-POWR-FLOR-N	135	Power: Floor (New)
E-POWR-JBOX-E	64	Power: Junction Box (Existing)
E-POWR-JBOX-N	185	Power: Junction Box (New)
E-POWR-N	235	Power (New)
E-POWR-PANL-E	84	Power: Panels (Existing)
E-POWR-PANL-N	75	Power: Panels (New)
E-POWR-ROOF-E	164	Power: Roof (Existing)
E-POWR-ROOF-N	125	Power: Roof (New)
E-POWR-SWBD-E	214	Power: Switchboards (Existing)
E-POWR-SWBD-N	175	Power: Switchboards (New)
E-POWR-UCPT-E	24	Power: Under-Carpet Wiring (Existing)
E-POWR-UCPT-N	225	Power: Under-Carpet Wiring (New)
E-POWR-URAC-E	74	Power: Under Floor Raceways (Existing)
E-POWR-URAC-N	165	Power: Under Floor Raceways (New)
E-POWR-WALL-CRIT-E	124	Power: Wall-Mounted: Critical (Existing)
E-POWR-WALL-CRIT-N	115	Power: Wall-Mounted: Critical (New)
E-POWR-WALL-E	174	Power: Wall-Mounted (Existing)
E-POWR-WALL-N	65	Power: Wall-Mounted (New)
E-RISR-E	224	Any Major Group: Riser Diagram (Existing)
E-RISR-N	215	Any Major Group: Riser Diagram (New)
E-SERT-CIRC-E	44	Security: Circuits (Existing)
E-SERT-CIRC-N	245	Security: Circuit Numbers (New)

E-SERT-CLNG-E	94	Security: Ceiling-Mounted (Existing)
E-SERT-CLNG-N	195	Security: Ceiling-Mounted (New)
E-SERT-CNMB-E	144	Security: Circuit Numbers (Existing)
E-SERT-CNMB-N	145	Security: Circuits (New)
E-SERT-E	194	Security (Existing)
E-SERT-EQPM-E	244	Security: Equipment (Existing)
E-SERT-EQPM-N	95	Security: Equipment (New)
E-SERT-FLOR-E	54	Security: Floor-Mounted (Existing)
E-SERT-FLOR-N	45	Security: Floor-Mounted (New)
E-SERT-N	205	Security (New)
E-SERT-WALL-E	104	Security: Wall-Mounted (Existing)
E-SERT-WALL-N	155	Security: Wall-Mounted (New)
E-SITE-E	214	Site (Existing)
E-SITE-N	105	Site (New)
E-SITE-OVHD-E	34	Site: Overhead Lines (Existing)
E-SITE-OVHD-N	55	Site: Overhead Lines (New)
E-SITE-POLE-E	84	Site: Electric Poles (Existing)
E-SITE-POLE-N	35	Site: Electric Poles (New)
E-SITE-UNDR-E	134	Site: Underground Lines (Existing)
E-SITE-UNDR-N	85	Site: Underground Lines (New)
E-SOUN-E	184	Sound/PA System (Existing)
E-SOUN-N	135	Sound/PA System (New)
E-TVAN-CIRC-E	234	TV Antenna System: Circuits (Existing)
E-TVAN-CIRC-N	185	TV Antenna System: Circuit Numbers (New)
E-TVAN-CLNG-E	64	TV Antenna System: Ceiling-Mounted (Existing)
E-TVAN-CLNG-N	235	TV Antenna System: Ceiling-Mounted (New)
E-TVAN-CNMB-E	84	TV Antenna System: Circuit Numbers (Existing)
E-TVAN-CNMB-N	75	TV Antenna System: Circuit Numbers (New)
E-TVAN-E	164	TV Antenna System (Existing)
E-TVAN-EQPM-E	214	TV Antenna System: Equipment (Existing)
E-TVAN-EQPM-N	125	TV Antenna System: Equipment (New)
E-TVAN-N	175	TV Antenna System (New)
E-TVAN-WALL-M-E	24	TV Antenna System: Wall-Mounted (Existing)
E-TVAN-WALL-N	225	TV Antenna System: Wall-Mounted (New)

Instrumentation		
Name	Color	Description
I-BELL-SYST-E	24	Bell System (Existing)
I-BELL-SYST-N	25	Bell System (New)
I-CCTV-SYST-E	44	Closed-Circuit TV (Existing)
I-CCTV-SYST-N	45	Closed-Circuit TV (New)
I-CLOK-SYST-E	54	Clock System: Circuits (Existing)
I-CLOK-SYST-N	55	Clock System: Circuits (New)
I-CODE-PLAN-E	64	Code Plan (Existing)
I-CODE-PLAN-N	65	Code Plan (New)
I-COMM-SYST-E	74	Communication System: Circuits (Existing)
I-COMM-SYST-N	75	Communication System: Circuits (New)
I-CTRL-DEVC-E	84	Control Systems: Devices (Existing)
I-CTRL-DEVC-N	85	Control Systems: Device (New)
I-CTRL-SYST-E	94	Control Systems (Existing)
I-CTRL-SYST-N	95	Control Systems (New)
I-DATA-OUTL-E	104	Data Outlet (Existing)
I-DATA-OUTL-N	105	Data Outlet (New)
I-DICT-SYST-E	124	Dictation Systems (Existing)
I-DICT-SYST-N	115	Dictation Systems (New)
I-EART-SYST-E	134	Earth Systems (Existing)
I-EART-SYST-N	125	Earth Systems (New)
I-EVAC-PLAN-E	144	Evacuation Plan (Existing)
I-EVAC-PLAN-N	135	Evacuation Plan (New)
I-FIRE-PLAN-E	164	Fire Protection Plan (Existing)
I-FIRE-PLAN-N	145	Fire Protection Plan (New)
I-GRND-CIRC-E	174	Ground System: Circuits (Existing)
I-GRND-CIRC-N	155	Ground System: Circuits (New)
I-GRND-EQPM-E	184	Ground System: Equipment (Existing)
I-GRND-EQPM-N	165	Ground System: Equipment (New)
I-GRND-SYST-E	194	Ground System (Existing)
I-GRND-SYST-N	175	Ground System (New)
I-LITE-CIRC-E	214	Lighting: Circuits (Existing)
I-LITE-CIRC-N	195	Lighting: Circuits (New)
I-LITE-CLNG-E	224	Lighting: Ceiling-Mounted (Existing)
I-LITE-CLNG-N	205	Lighting: Ceiling-Mounted (New)
I-LITE-EMER-E	234	Lighting: Emergency (Existing)
I-LITE-EMER-N	215	Lighting: Emergency (New)
I-LITE-EXIT-E	244	Lighting: Exit (Existing)
I-LITE-EXIT-N	225	Lighting: Exit (New)
I-LITE-EXTR-E	24	Lighting: Exterior and Site (Existing)

I-LITE-EXTR-N	235	Lighting: Exterior(New)
I-LITE-FLOR-E	34	Lighting: Floor-Mounted (Existing)
I-LITE-FLOR-N	245	Lighting: Floor-Mounted (New)
I-LITE-FXTR-E	44	Lighting Fixture (Existing)
I-LITE-FXTR-N	25	Lighting Fixture (New)
I-LITE-IDEN-E	54	Lighting Identification (Existing)
I-LITE-IDEN-N	35	Lighting Identification (New)
I-LITE-JBOX-E	64	Lighting: Junction Box (Existing)
I-LITE-JBOX-N	45	Lighting: Junction Box (New)
I-LITE-ROOF-E	84	Lighting: Roof Lighting (Existing)
I-LITE-ROOF-N	65	Lighting: Roof Lighting (New)
I-LITE-SPCL-E	94	Lighting: Special (Existing)
I-LITE-SPCL-N	75	Lighting: Special (New)
I-LITE-SWCH-E	104	Lighting: Switches (Existing)
I-LITE-SWCH-N	85	Lighting: Switches (New)
I-LITE-SYST-E	124	Lighting System (Existing)
I-LITE-SYST-N	95	Lighting System (New)
I-LITE-WALL-E	134	Lighting: Wall-Mounted (Existing)
I-LITE-WALL-N	105	Lighting: Wall-Mounted (New)
I-LTGN-EQPM-E	144	Lightning Protection System: Equipment (Existing)
I-LTGN-EQPM-N	115	Lightning Protection System: Equipment (New)
I-LTGN-SYST-E	164	Lightning Protection System (Existing)
I-LTGN-SYST-N	125	Lightning Protection System (New)
I-POWR-BUSW-E	184	Power: Bus Ways (Existing)
I-POWR-BUSW-N	145	Power: Bus Ways (New)
I-POWR-CABL-E	194	Power: Cable Trays (Existing)
I-POWR-CABL-N	155	Power: Cable:(New)
I-POWR-CIRC-E	214	Power: Circuits (Existing)
I-POWR-CIRC-N	175	Power: Circuits (New)
I-POWR-DEVC-E	224	Power: Devices (Existing)
I-POWR-DEVC-N	185	Power: Devices (New)
I-POWR-EQPM-E	244	Power: Equipment (Existing)
I-POWR-EQPM-N	205	Power: Equipment (New)
I-POWR-FEED-E	24	Power: Feeders (Existing)
I-POWR-FEED-N	215	Power: Feeders (New)
I-POWR-HVOL-E	34	Power: High Voltage (Existing)
I-POWR-HVOL-N	225	Power: High Voltage (New)
I-POWR-JBOX-E	44	Power: Junction Box (Existing)
I-POWR-JBOX-N	235	Power: Junction Box (New)
I-POWR-LVOL-E	54	Power: Low Voltage (Existing)
I-POWR-LVOL-N	245	Power: Low Voltage (New)

I-POWR-MHOL-E	64	Power: Manhole (Existing)
I-POWR-MHOL-N	25	Power: Manhole (New)
I-POWR-OVHD-E	84	Power: Overhead (Existing)
I-POWR-OVHD-N	45	Power: Overhead (New)
I-POWR-PANL-E	94	Power: Panels (Existing)
I-POWR-PANL-N	55	Power: Panels (New)
I-POWR-POLE-E	104	Power: Poles (Existing)
I-POWR-POLE-N	65	Power: Poles (New)
I-POWR-SWBD-E	124	Power: Switchboards (Existing)
I-POWR-SWBD-N	75	Power: Switchboards (New)
I-POWR-SYST-E	134	Power System (Existing)
I-POWR-SYST-N	85	Power System (New)

Appendix 2: DEP Custom Line Types (Line Styles)

MOST COMMONLY USED CUSTOM LINSTYLES

LINETYPE

APPEARANCE

DEP Cold Water Supply	—— CW ———— CW ———— CW ————
DEP Dewatering Force Main	—— DFM ———— DFM ———— DFM ————
DEP Drain	—— DR ———— DR ———— DR ————
DEP Electrical	—— E ———— E ———— E ————
DEP Force Main	—— FM ———— FM ———— FM ————
DEP Highway Boundary	—— HB ———— HB ———— HB ————
DEP Hot Water Supply	—— HW ———— HW ———— HW ————
DEP Oil Line	—— OIL ———— OIL ———— OIL ————
DEP Overhead Lines	—— O/H ———— O/H ———— O/H ————
DEP Perimeter Dike	—— PD ———— PD ———— PD ————
DEP Property Line	—— PL ———— PL ———— PL ————
DEP Protective Fence	—— PF ———— PF ———— PF ————
DEP Sewer	—— S ———— S ———— S ————
DEP Sewer - Sanitary	—— SAN ———— SAN ———— SAN ————
DEP Sewer - Storm	—— STRM ———— STRM ————
DEP Silt Fence	—— SF ———— SF ———— SF ————
DEP Steam Line	—— ST ———— ST ———— ST ————
DEP Telephone	—— T ———— T ———— T ————
DEP Television	—— TV ———— TV ———— TV ————
DEP Tree Protection	—— TP ———— TP ———— TP ————
DEP Water - Non Potable	—— NPW ———— NPW ———— NPW ————
DEP Water - Potable	—— PW ———— PW ———— PW ————

Appendix 3: DEP Plot Style (Line Weights and Plot Colors)

Plot Style File Name: BEDC_ACAD_2021.CTB

AUTOCAD COLOR NUMBER:						AUTOCAD COLOR NUMBER:						AUTOCAD COLOR NUMBER:					
		Thickness (mm)	Screening (%)					Thickness (mm)	Screening (%)					Thickness (mm)	Screening (%)		
RED	1	0.10	100%		TEXT	51	0.10	100%		TEXT		101	0.10	100%		TEXT	
YELLOW	2	0.30	100%		TEXT	52	0.20	100%		TEXT		102	0.20	100%		TEXT	
GREEN	3	0.30	100%		TEXT	53	0.30	100%		TEXT		103	0.30	100%		TEXT	
CYAN	4	0.40	100%		TEXT	** 54	0.40	30%		TEXT		** 104	0.40	30%		TEXT	
BLUE	5	0.50	100%		TEXT	55	0.50	100%		TEXT		105	0.50	100%		TEXT	
MAGENTA	6	0.60	100%		TEXT	56	0.60	100%		TEXT		106	0.60	100%		TEXT	
WHITE	7	0.70	100%		TEXT	57	0.70	100%		TEXT		107	0.70	100%		TEXT	
	8	0.20	50%		TEXT	58	0.80	100%		TEXT		108	0.80	100%		TEXT	
	9	0.30	40%		TEXT	59	0.90	100%		TEXT		109	0.90	100%		TEXT	
	10	O/LW	100%		TEXT	60	O/LW	100%		TEXT		110	O/LW	100%		TEXT	
	11	0.10	100%		TEXT	61	0.10	100%		TEXT		111	0.10	100%		TEXT	
	12	0.20	100%		TEXT	62	0.20	100%		TEXT		112	0.20	100%		TEXT	
	13	0.30	100%		TEXT	63	0.30	100%		TEXT		113	0.30	100%		TEXT	
** 14	0.40	70%		TEXT		** 64	0.40	30%		TEXT		114	0.40	100%		TEXT	
15	0.50	100%		TEXT		65	0.50	100%		TEXT		115	0.20	100%		TEXT	
16	0.60	100%		TEXT		66	0.60	100%		TEXT		116	0.60	100%		TEXT	
17	0.70	100%		TEXT		67	0.70	100%		TEXT		117	0.70	100%		TEXT	
18	0.80	100%		TEXT		68	0.80	100%		TEXT		118	0.80	100%		TEXT	
19	0.90	100%		TEXT		69	0.90	100%		TEXT		119	0.90	100%		TEXT	
20	O/LW	100%		TEXT		70	O/LW	100%		TEXT		120	O/LW	100%		TEXT	
21	0.10	100%		TEXT		71	0.10	100%		TEXT		121	0.10	100%		TEXT	
22	0.20	100%		TEXT		72	0.20	100%		TEXT		122	0.20	100%		TEXT	
23	0.30	100%		TEXT		73	0.30	100%		TEXT		123	0.30	100%		TEXT	
** 24	0.40	50%		TEXT		** 74	0.40	30%		TEXT		** 124	0.40	30%		TEXT	
25	0.50	100%		TEXT		75	0.50	100%		TEXT		125	0.50	100%		TEXT	
26	0.60	100%		TEXT		76	0.60	100%		TEXT		126	0.60	100%		TEXT	
27	0.70	100%		TEXT		77	0.70	100%		TEXT		127	0.70	100%		TEXT	
28	0.80	100%		TEXT		78	0.80	100%		TEXT		128	0.80	100%		TEXT	
29	0.90	100%		TEXT		79	0.90	100%		TEXT		129	0.90	100%		TEXT	
30	O/LW	100%		TEXT		80	O/LW	100%		TEXT		130	O/LW	100%		TEXT	
31	0.10	100%		TEXT		81	0.10	100%		TEXT		131	0.10	100%		TEXT	
32	0.20	100%		TEXT		82	0.20	100%		TEXT		132	0.20	100%		TEXT	
33	0.30	100%		TEXT		83	0.30	100%		TEXT		133	0.30	100%		TEXT	
** 34	0.40	30%		TEXT		** 84	0.40	30%		TEXT		** 134	0.40	30%		TEXT	
35	0.50	100%		TEXT		85	0.50	100%		TEXT		135	0.50	100%		TEXT	
36	0.60	100%		TEXT		86	0.60	100%		TEXT		136	0.60	100%		TEXT	
37	0.70	100%		TEXT		87	0.70	100%		TEXT		137	0.70	100%		TEXT	
38	0.80	100%		TEXT		88	0.80	100%		TEXT		138	0.80	100%		TEXT	
39	0.90	100%		TEXT		89	0.90	100%		TEXT		139	0.90	100%		TEXT	
40	O/LW	100%		TEXT		90	O/LW	100%		TEXT		140	O/LW	100%		TEXT	
41	0.13	100%		TEXT		91	0.10	100%		TEXT		141	0.10	100%		TEXT	
42	0.20	100%		TEXT		92	0.20	100%		TEXT		142	0.20	100%		TEXT	
43	0.30	100%		TEXT		93	0.30	100%		TEXT		143	0.30	100%		TEXT	
** 44	0.40	30%		TEXT		** 94	0.40	30%		TEXT		** 144	0.40	30%		TEXT	
45	0.50	100%		TEXT		95	0.50	100%		TEXT		145	0.50	100%		TEXT	
46	0.60	100%		TEXT		96	0.60	100%		TEXT		146	0.60	100%		TEXT	
47	0.70	100%		TEXT		97	0.70	100%		TEXT		147	0.70	100%		TEXT	
48	0.80	100%		TEXT		98	0.80	100%		TEXT		148	0.80	100%		TEXT	
49	0.90	100%		TEXT		99	0.90	100%		TEXT		149	0.90	100%		TEXT	
50	O/LW	100%		TEXT		100	O/LW	100%		TEXT		150	O/LW	100%		TEXT	

AUTOCAD COLOR NUMBER:

	Thickness (mm)	Screening (%)			
151	0.10	100%			TEXT
152	0.20	100%			TEXT
153	0.30	100%			TEXT
154	0.40	100%			TEXT
155	0.50	100%			TEXT
156	0.60	100%			TEXT
157	0.70	100%			TEXT
158	0.80	100%			TEXT
159	0.90	100%			TEXT
160	O/LW	100%			TEXT
161	0.10	100%			TEXT
162	0.20	100%			TEXT
163	0.30	100%			TEXT
** 164	0.40	30%			TEXT
165	0.50	100%			TEXT
166	0.60	100%			TEXT
167	0.70	100%			TEXT
168	0.80	100%			TEXT
169	0.90	100%			TEXT
170	O/LW	100%			TEXT
171	0.10	100%			TEXT
172	0.20	100%			TEXT
173	0.30	100%			TEXT
** 174	0.40	30%			TEXT
175	0.50	100%			TEXT
176	0.60	100%			TEXT
177	0.70	100%			TEXT
178	0.80	100%			TEXT
179	0.90	100%			TEXT
180	O/LW	100%			TEXT
181	0.10	100%			TEXT
182	0.20	100%			TEXT
183	0.30	100%			TEXT
** 184	0.40	30%			TEXT
185	0.50	100%			TEXT
186	0.60	100%			TEXT
187	0.70	100%			TEXT
188	0.80	100%			TEXT
189	0.90	100%			TEXT
190	O/LW	100%			TEXT
191	0.10	100%			TEXT
192	0.20	100%			TEXT
193	0.30	100%			TEXT
** 194	0.40	30%			TEXT
195	0.50	100%			TEXT
196	0.60	100%			TEXT
197	0.70	100%			TEXT
198	0.80	100%			TEXT
199	0.90	100%			TEXT
200	O/LW	100%			TEXT

AUTOCAD COLOR NUMBER:

	Thickness (mm)	Screening (%)			
201	0.10	75%			TEXT
202	0.20	75%			TEXT
203	0.30	75%			TEXT
** 204	0.40	30%			TEXT
205	0.50	100%			TEXT
206	0.60	100%			TEXT
207	0.70	100%			TEXT
208	0.80	100%			TEXT
209	0.90	100%			TEXT
210	O/LW	100%			TEXT
211	0.10	100%			TEXT
212	0.20	100%			TEXT
213	0.30	100%			TEXT
** 214	0.40	30%			TEXT
215	0.50	100%			TEXT
216	0.60	100%			TEXT
217	0.70	100%			TEXT
218	0.80	100%			TEXT
219	0.90	100%			TEXT
220	O/LW	100%			TEXT
221	0.10	100%			TEXT
222	0.20	100%			TEXT
223	0.30	100%			TEXT
** 224	0.40	30%			TEXT
225	0.50	100%			TEXT
226	0.60	100%			TEXT
227	0.70	100%			TEXT
228	0.80	100%			TEXT
229	0.90	100%			TEXT
230	O/LW	100%			TEXT
231	0.10	100%			TEXT
232	0.20	100%			TEXT
233	0.30	100%			TEXT
** 234	0.40	30%			TEXT
235	0.50	100%			TEXT
236	0.60	100%			TEXT
237	0.70	100%			TEXT
238	0.80	100%			TEXT
239	0.90	100%			TEXT
240	O/LW	100%			TEXT
241	0.10	100%			TEXT
242	0.20	100%			TEXT
243	0.30	100%			TEXT
** 244	0.40	30%			TEXT
245	0.50	100%			TEXT
246	1.25	100%			TEXT
247	1.50	100%			TEXT
248	1.75	100%			TEXT
249	2.00	100%			TEXT

AUTOCAD COLOR NUMBER:

	Thickness (mm)	Screening (%)			
250	0.20	75%			TEXT
251	0.20	60%			TEXT
252	0.20	50%			TEXT
253	0.20	40%			TEXT
254	0.20	30%			TEXT
NO PLOT 255	0.15	0%			

ALL OF THE 10'S STARTING FROM COLOR NUMBER 20
PLOT IN THEIR TRUE COLOR AND BY OBJECT
LINEWEIGHT:
EX: 20, 30, 40, ETC...

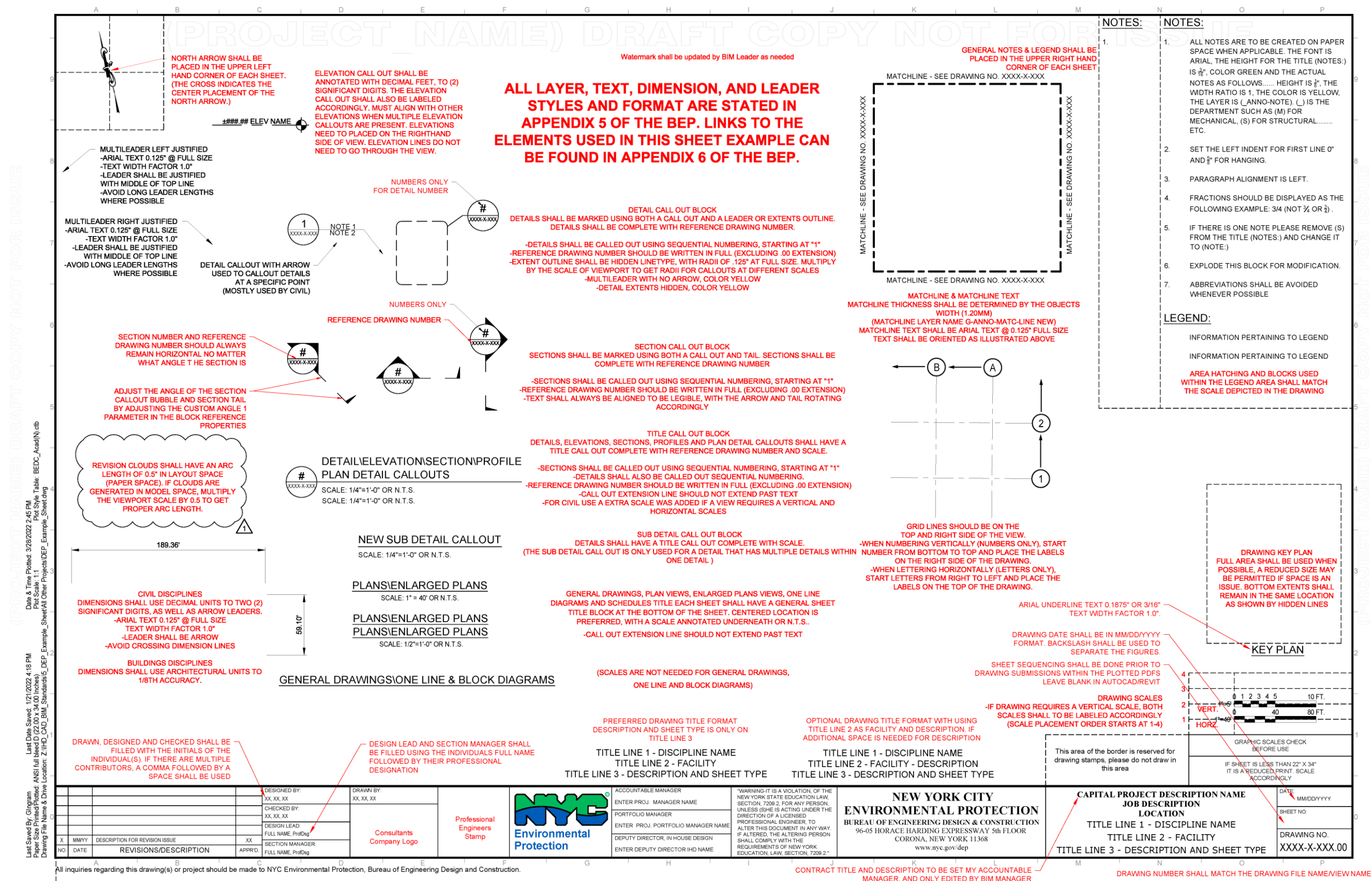
COLOR 255 IS NO PLOT COLOR

** LAYERS USED FOR EXISTING CONDITION AND PRINT
IN GRAYSACLE.

LEGEND:



Appendix 4: DEP Sample Sheets



(PROJECT NAME) DRAFT COPY NOT FOR ISSUE

1. ALL ABBREVIATIONS, SYMBOLS, AND LINETYPES ARE TO BE CREATED ON PAPER SPACE WHEN APPLICABLE. THE FONT IS ARIAL, THE HEIGHT FOR THE TITLE (NOTES) IS $\frac{3}{16}$ ", COLOR GREEN AND THE ACTUAL NOTES AS FOLLOWS HEIGHT IS $\frac{5}{8}$ ", THE WIDTH RATIO IS 1, THE COLOR IS YELLOW, THE LAYER IS (_ANNO-NOTE). (_) IS THE DEPARTMENT SUCH AS (M) FOR MECHANICAL, (S) FOR STRUCTURAL..... ETC.

2. SET THE LEFT INDENT FOR FIRST LINE 0" AND $\frac{5}{8}$ " FOR HANGING.

3. PARAGRAPH ALIGNMENT IS LEFT.

4. IF THERE IS ONE ABBREVIATION, SYMBOL OR LINETYPE PLEASE REMOVE (S) FROM THE TITLE (ABBREVIATIONS:, SYMBOLS: OR LINETYPES:) AND CHANGE IT TO (ABBREVIATION:, SYMBOL: OR LINETYPE:).

5. ABBREVIATIONS/SYMBOLS/LINETYPES LIST MUST BE IN ALPHABETICAL ORDER.

6. EXPLODE THIS BLOCK FOR MODIFICATION.

7. ABBREVIATIONS/SYMBOLS/LINETYPES SHOULD START IN AREA 1 AND CONTINUE IN AREAS 2, 3, 4 AND 5 IF NEEDED AND IN THAT ORDER.

8. ABBREVIATIONS/SYMBOLS/LINETYPES MUST STAY WITHIN THE FOLLOWING MARGINS.

9. NO LINES SHOULD BE USED TO DIVIDE AREAS.

AC ACRE

ASPH ASPHALTIC CONCRETE

BLDG BUILDING

B/ BOTTOM

BC BOTTOM OF CURB

CB CATCH BASIN

CLF CHAIN LINK FENCE

CY CUBIC YARD

DWLS DOWELS

EL ELEVATION

EOH EAST OF HUDSON

ENGR ENGINEERING

EX EXISTING

FA FIRE ALARM

FT FOOT, FEET

G GAS

GV GAS VALVE

LEC LOWER EFFLUENT CHAMBER

LF LINEAR FOOT

MON MONUMENT

NIC NOT IN CONTRACT

#NO NUMBER

OD OUTER DIAMETER

PR PROPOSED

PVC POLY VINYL CHLORIDE

PW POTABLE WATER

RQD REQUIRED

RW RAW WATER

S SLOPE, SOUTH

SAN SWR SANITARY SEWER

S.F. SILT FENCE

SMP STORMWATER MANAGEMENT PRACTICE

SWPPP STORM WATER POLLUTION PREVENTION PLAN

SC SCREEN CHAMBER

SQ SQUARE

SS SANITARY SEWER

SPEC SPECIFICATION

T/C TOP OF CONCRETE

TBR TO BE REMOVED

TC TOP OF CURB

THK THICKNESS

TW TOP OF WALL

UEC UPPER EFFLUENT CHAMBER

V VALVE

W WATER, WEST

WW WATER VALVE

WWF WELDED WIRE FABRIC

ACRE

ASPHALTIC CONCRETE

BUILDING

BOTTOM

BOTTOM OF CURB

CATCH BASIN

CHAIN LINK FENCE

CUBIC YARD

DOWELS

ELEVATION

EAST OF HUDSON

ENGINEERING

EXISTING

FIRE ALARM

FOOT, FEET

GAS

GAS VALVE

LOWER EFFLUENT CHAMBER

LINEAR FOOT

MONUMENT

NOT IN CONTRACT

NUMBER

OUTER DIAMETER

PROPOSED

POLY VINYL CHLORIDE

POTABLE WATER

REQUIRED

RAW WATER

SLOPE, SOUTH

SANITARY SEWER

SILT FENCE

STORMWATER MANAGEMENT PRACTICE

STORM WATER POLLUTION PREVENTION PLAN

SCREEN CHAMBER

SQUARE

SANITARY SEWER

SPECIFICATION

TOP OF CONCRETE

TO BE REMOVED

TOP OF CURB

THICKNESS

TOP OF WALL

UPPER EFFLUENT CHAMBER

VALVE

WATER, WEST

WATER VALVE

WELDED WIRE FABRIC

ASPHALT

BERM SLOPE (HORZ TO VERT)

BORING LOCATION AND ID NO.

CENTERLINE

CLEARING AND GRUBBING

COMPACTED EARTH (IN SECTION)

CONCRETE

CONCRETE BARRIER

CRUSHED STONE

DRAWING SCOPE SPLIT

EARTH (IN SECTION)

EXISTING

EXISTING TO BE REMOVED OR DEMOLISHED

GRASS

GRASS PAVER TYPE I

GRASS PAVER TYPE II

NEW

POST HYDRANT

RIPRAP

ROCK

SAND/ BACKFILL

SLOPE ON PAVED SURFACE

BLDG LINE/HATCH

CONS. FENCE

CURB LINE

DEMOLITION LINE

DIVERSION SWALE

EX. CONTOUR

GUIDE RAIL

HAY BALE

LIMIT OF DISTURBANCE

LOT LINE/ROW

NEW CONTOUR

PERIMETER DIKE

PROPERTY LINE

PROTECTIVE FENCE

SILT FENCE

WALL LINE

WETLANDS

SYMBOLS & MATERIALS COLUMN

SYMBOLS & MATERIALS DESCRIPTION COLUMN

LINETYPE COLUMN

LINETYPE DESCRIPTION COLUMN

ABBREVIATIONS/SYMBOLS/LINETYPES SHEET AREA 1

ABBREVIATIONS/SYMBOLS/LINETYPES SHEET AREA 2

ABBREVIATIONS/SYMBOLS/LINETYPES SHEET AREA 3

ABBREVIATIONS/SYMBOLS/LINETYPES SHEET AREA 4

ABBREVIATIONS/SYMBOLS/LINETYPES SHEET AREA 5

DESIGNED BY: XX.XX.XX

CHECKED BY: XX.XX.XX

DESIGN LEAD: FULL NAME: ProDwg

SECTION MANAGER: FULL NAME: ProDwg

DRAWN BY: XX.XX.XX

ACCOUNTABLE MANAGER: ENTER PROJ. MANAGER NAME

PORTFOLIO MANAGER: ENTER PROJ. PORTFOLIO MANAGER NAME

DEPUTY DIRECTOR, IN HOUSE DESIGN: ENTER DEPUTY DIRECTOR/ID NAME

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NEW YORK CITY

ENVIRONMENTAL PROTECTION

BUREAU OF ENGINEERING DESIGN & CONSTRUCTION

96-05 HORACE HARDING EXPRESSWAY 5th FLOOR

CORONA, NEW YORK 11368

www.nyc.gov/dep

CAPITAL PROJECT DESCRIPTION NAME

JOB DESCRIPTION

LOCATION

TITLE LINE 1 - DISCIPLINE NAME

TITLE LINE 2 - FACILITY

TITLE LINE 3 - DESCRIPTION AND SHEET TYPE

DATE: MMDDYYYY

SHEET NO.

DRAWING NO. XXXX-X-XXX.00

GRAPHIC SCALES CHECK BEFORE USE

IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT. SCALE ACCORDINGLY

All inquiries regarding this drawing(s) or project should be made to NYC Environmental Protection, Bureau of Engineering Design and Construction.

(PROJECT NAME) DRAFT COPY NOT FOR ISSUE

Figure 4.3 - Abbreviations, Symbols, and Linetypes

A-50

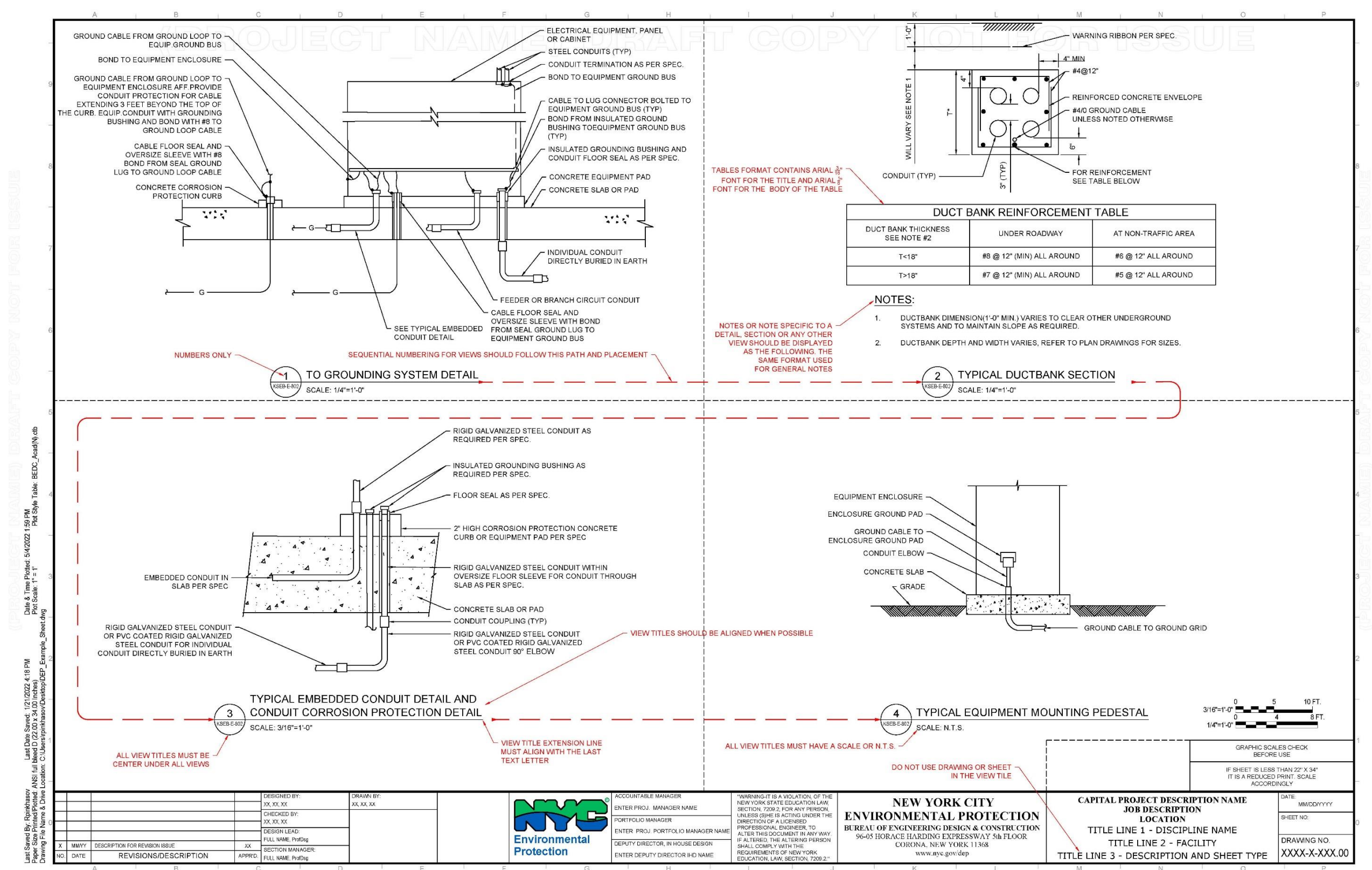


Figure 4.4 - Detail Sheet 1

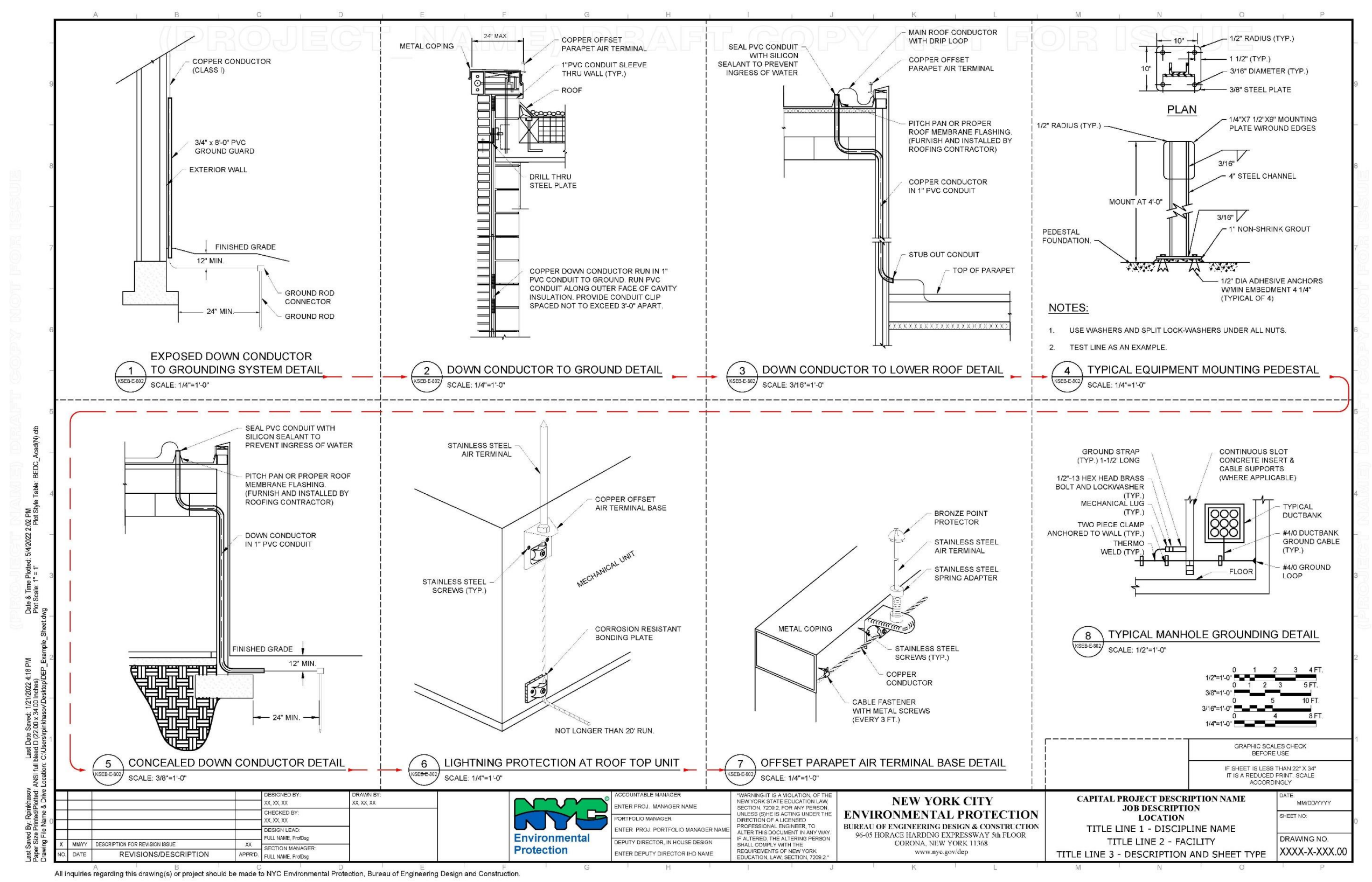
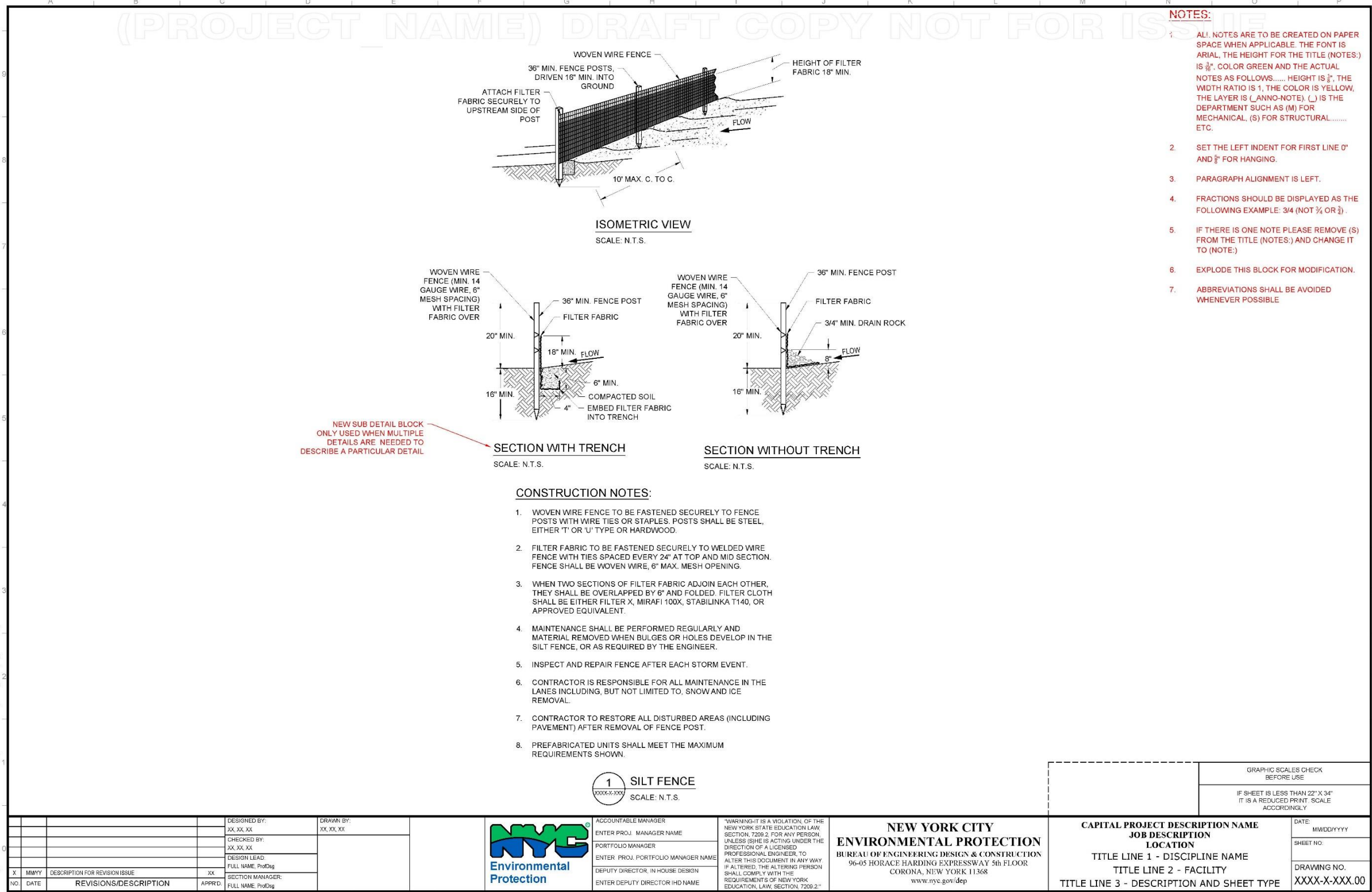


Figure 4.5 - Detail Sheet 2

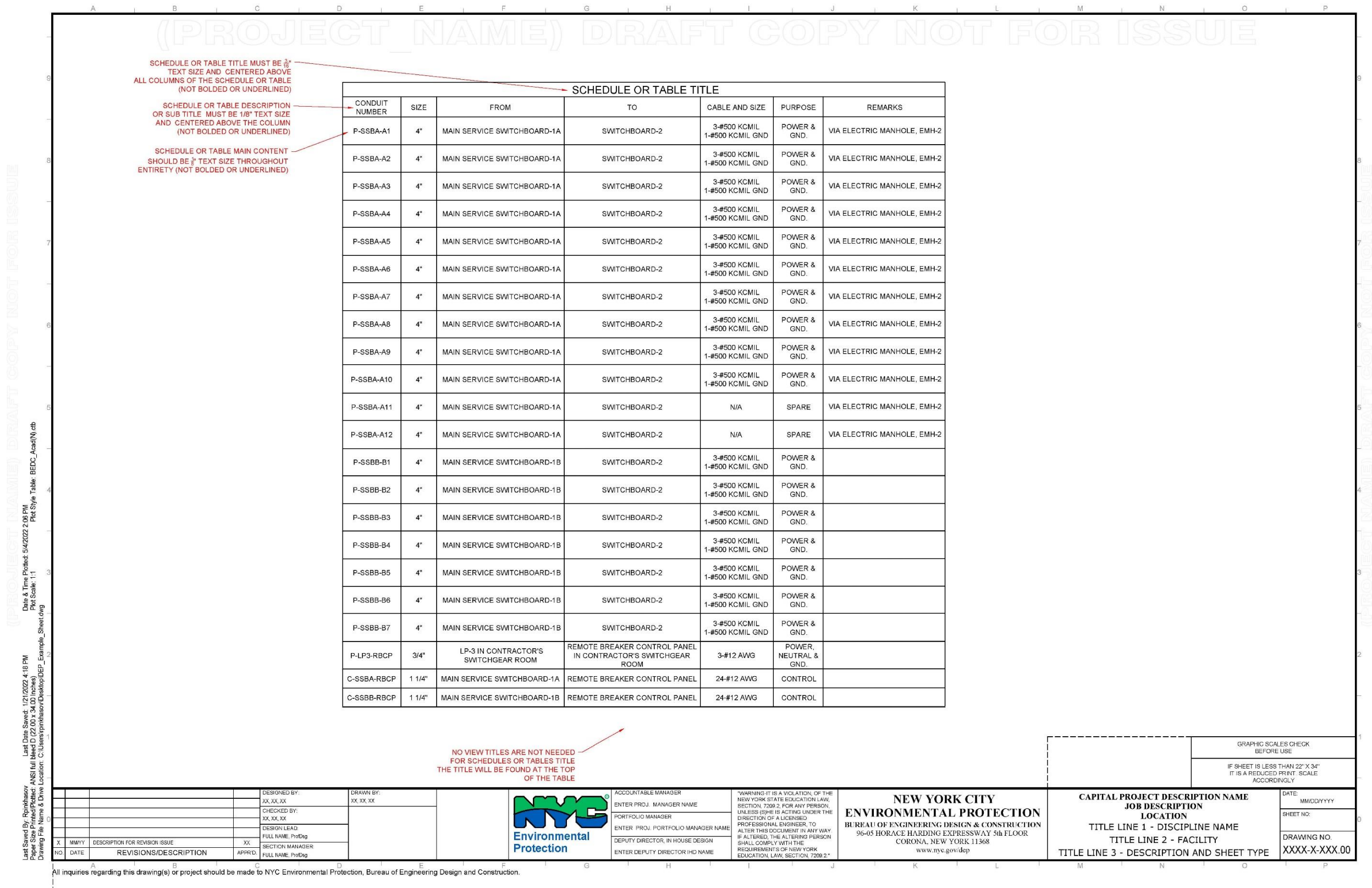
(PROJECT NAME) DRAFT COPY NOT FOR ISSUE

Last Date Saved: 1/21/2022 4:18 PM
Paper Size: Printed/Plotted: ANSI full bleed D (22.00 x 34.00 inches)
Drawing File Name & Drive Location: C:\Users\prakashv\Desktop\DEP_Example_Sheet.dwg
Date & Time Plotted: 5/4/2022 2:04 PM
Plot Style Table: BEDC_Acad(Plt).ctb
Plot Scale: 1:1



All inquiries regarding this drawing(s) or project should be made to NYC Environmental Protection, Bureau of Engineering Design and Construction.

Figure 4.6 - Detail Sheet 3



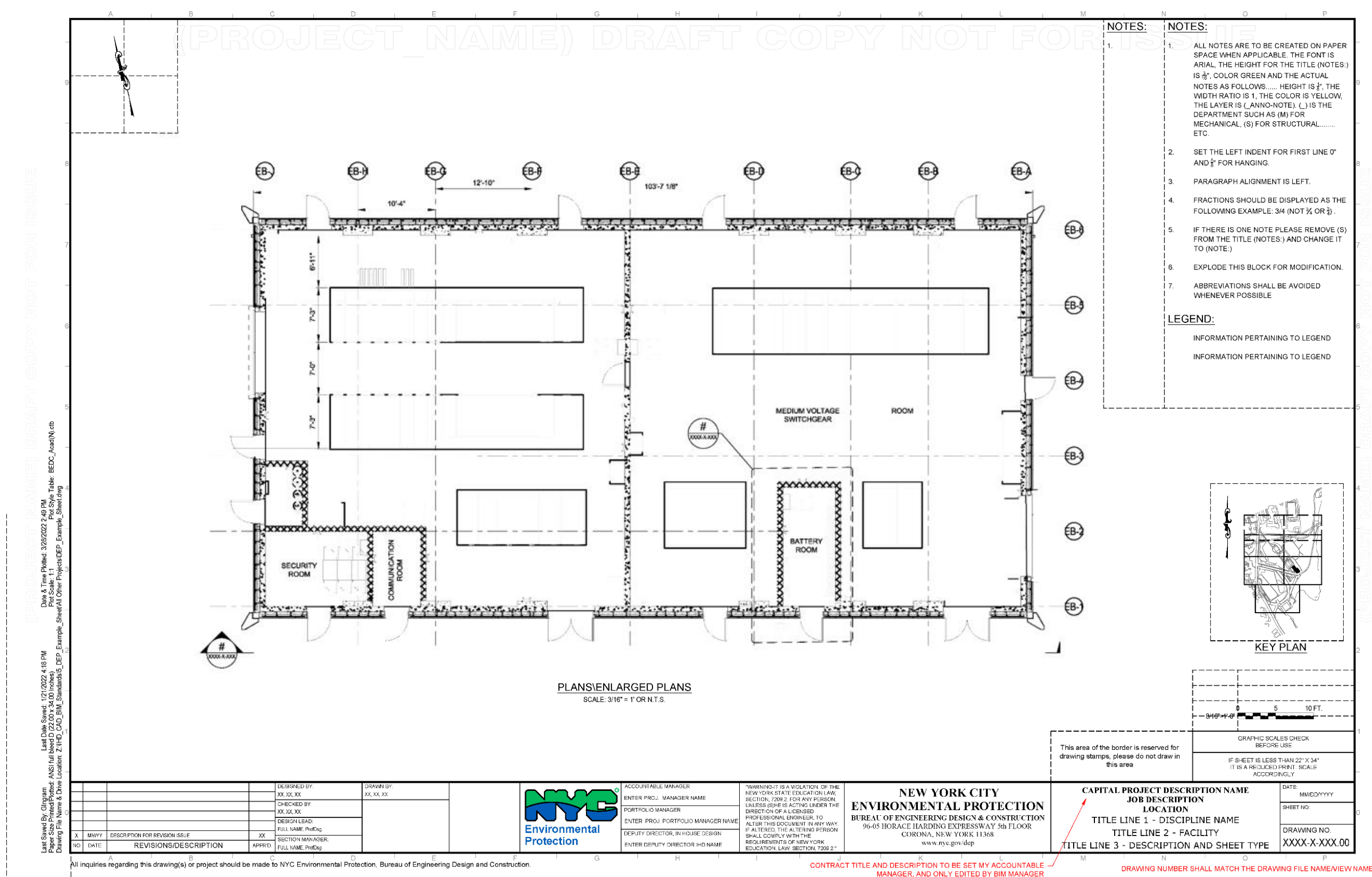


Figure 4.8 - Plan

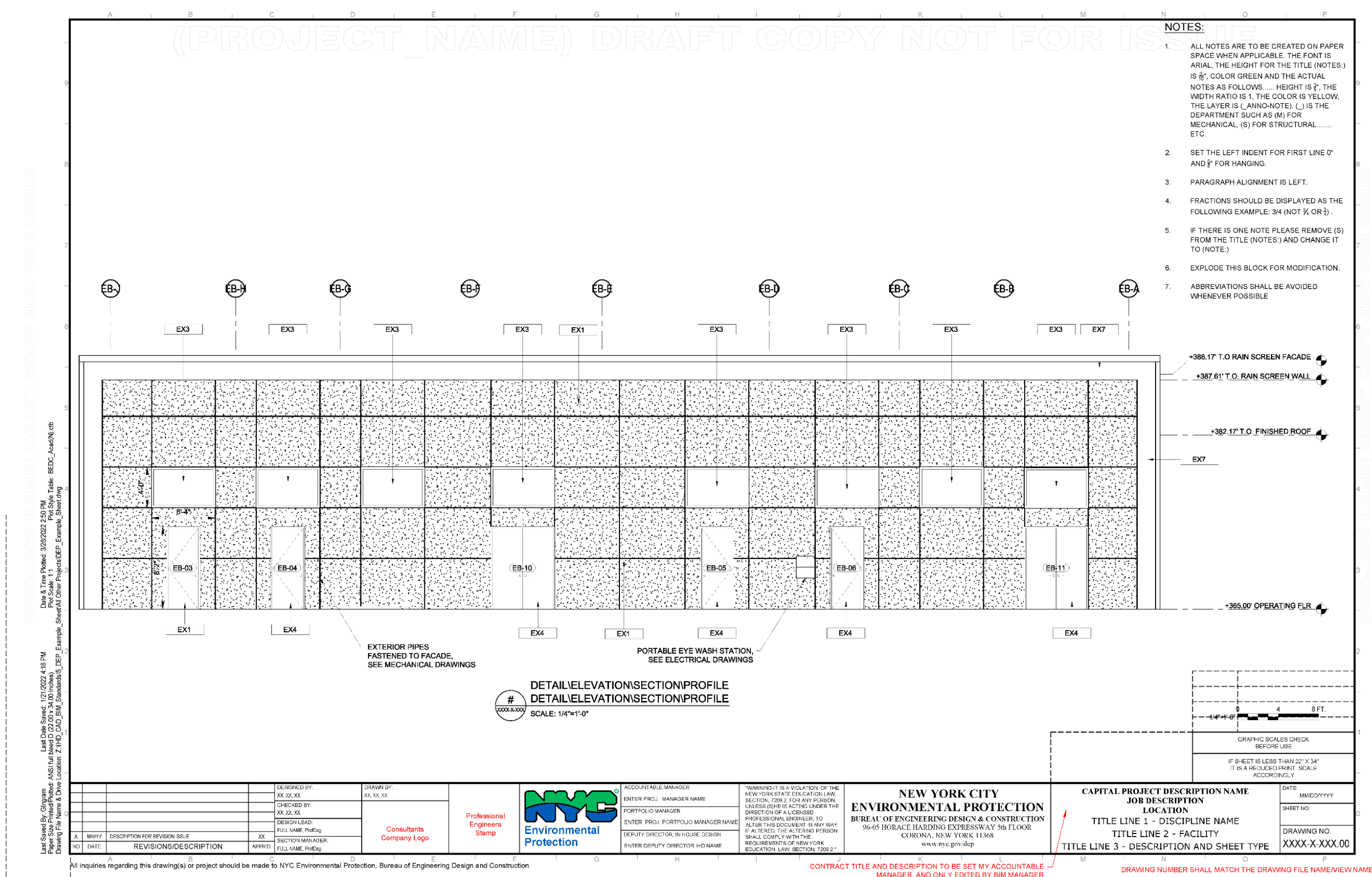


Figure 4.9 - Elevation

A-56

Appendix 5: Navisworks

Autodesk Navisworks Manage (Navisworks) can be utilized for multidisciplinary model spatial coordination, construction simulation, and walk/fly through. It helps with streamlining the communication and collaboration among the design team.

Navisworks primary use is for spatial coordination of the multidisciplinary model objects. Navisworks enables users to combine 3D models from different authoring software packages into a single workspace for viewing, analysis and reporting on the relations between the model elements.

Below outline and illustrate the high-level workflow to bring Revit, AutoCAD, Civil3D model files (.RVT and .DWG) files into the Navisworks workspace to perform Virtual Design Reviews (VDR). This process will be coordinated and managed by Project BIM Manager or assigned 3D coordinator. The details and specifics must be discussed in the Project Specific BEP.

- Create the collector model (.NWF)
- Export design model files into .NWC files using the NWC Export features. The setting can be shared through an .XML file for each project by the Project BIM Manager or 3D Coordinator
- Place the Navisworks cache files (.NWC) of the design models in the specified location
- Collate and append Navisworks cache files (.NWC) to Navisworks collector file (.NWF)
- Import design team viewpoints and comments
- Create required search sets and clash tests
- Execute clash tests for the project areas
- Produce weekly/biweekly spatial coordination reports in PDF format

The video links below show:

- How Navisworks Manage plays a vital role in coordinating projects
- How to create and navigate around a merged model
- How to manipulate data coming from various 3D formats to facilitate coordination
- How to explore the key features of the software, such as the Clash Detective, Timeliner, and Quantity Takeoff tools

Navisworks Tutorial for Beginners

<https://www.youtube.com/watch?v=ZIMTAk1SFqE>

An Introduction to Navisworks

<https://youtu.be/RvdqtCz-aUo>

Appendix 6: DEP 3D Laser Scanning Protocol

3D Laser Scanning

3D Laser scanning may be utilized to capture the existing condition of a structure. It is always recommended that laser scanning be conducted with traditional surveying and control points are being used for both horizontal and vertical datum as necessary.

Before starting the field work, consider the following steps:

1. The type of the scanner must be approved by BEDC-IHD BIM/CAD Section Manager in advance
 - a. Preferred scanners are Faro X330, S350 (these two scanners are pre-approved)
 - b. The scanner must have the capability to store the captured data directly on a SD card
2. The job hazard analysis must be developed and approved by NYCDEP in advance
3. The consultant must coordinate with NYCDEP to access to the project site for the field works

Methodology:

There are three methods for registration of scans:

1. Using artificial targets (like checkerboards or spheres)
2. Targetless or using natural components of the environment
3. Hybrid (Combination of two above methods)

Before starting the field work, the scan plan must be developed and define the registration method. The registration method must be defined based on the site condition. For outdoor scanning using artificial targets is recommended. For targetless registration, at least 50% overlap between scans is recommended.

Guide for using artificial targets:

Install paper, sphere, or any other type of artificial targets properly for scans:

1. The targets must be installed in a way that each two sequential scans, have at least 3 common targets in proper distance with proper distribution (at different elevations, not closer than 3 ft. from each other, and on different planes)
2. The paper targets should be numbered, and the numbers must be readable in the related software (such as Recap or Scene)
3. The targets must be detected automatically with the registration software
4. All targets (and tapes if used) must be removed from the site unless they are marked to be surveyed. Those targets must be removed after survey is done

Guide for scanning work in the field:

Perform scanning with multiple setup stations starting from one end and finish at the other end of the areas of interest

1. The resolution settings of the scanner must be set that the distance between points in 10 meters from the scanner (mm/10m) be between 6mm to 10mm
2. Based on the scanned areas, the resolution may be varied for different setups but must be within the above range

3. Define a proper rule to name sequential raw scan files. Each file name shall indicate the area of the scan and for multilevel structures must include the level/ floor. The file names of the stations in the stairs, stair landings, and ramps must follow the name of the area that the scanner traveled from and must be changed to the new area file name when the scanner traveled and landed on the that area
4. During the process operator(s) must update the predefined scan plan(s) by indicating scan file names on the plan drawing(s)
5. If a scan plan or a drawing is not available for any area, the operator must create a hand sketch plan and use the sketch for indicating the scan locations and scan file names
6. Quantity of scan stations and setups must be adequate to capture all visible objects in detail in the areas of interest including but not limited to Structural, Architectural, and MEP components
7. The scanner elevation may be varied between different setups to enable capturing more details with different edges /surfaces of the components
8. The combination of targets and scan stations must be in a way that the processing software can register all interiors and exteriors scans into one project file/ cluster automatically

Appendix 7: Resources

Level of Development (LOD) Specification

<https://bimforum.org/lof/>

Autodesk University (A learning community that connects many of today's design and engineering experts from industries across architecture and construction, manufacturing, media, entertainment, and so much more.)

<https://www.autodesk.com/autodesk-university/>

<https://www.youtube.com/user/AutodeskUniversity>

Autodesk Design Academy (Helps professionals in the world of design with free, hands-on supplementary projects and course materials.)

<https://academy.autodesk.com/>

Autodesk Health check (View current status and upcoming maintenance schedule for the Autodesk Cloud Services.)

<https://health.autodesk.com/>

Linking Revit Model in BIM 360 Design

<https://knowledge.autodesk.com/support/bim-360/getting-started/caas/simplecontent/content/understanding-revit-model-linking-bim-360-design.html>

BIM Objects (Download manufacturer specific BIM object files in different format such as Revit, AutoCAD, SketchUp, etc.)

<https://www.bimobject.com/en/product>

Autodesk Applications (Apps that extend the power of Autodesk software for end users.)

<https://apps.autodesk.com/en>