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Process and Procedure for

CAD Standards for Facility Documents

REVISION

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Prior revision history, if applicable, is available from the Document Control Office.

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1 INTRODUCTION

To maximize usability of all NY CREATES Facility Drawings, standards must be clearly defined, and a consistent workflow created, to allow for organized accumulation work. In order for these standards to work effectively, they must be strictly adhered to on every development project from its inception. Receipt of compliant and accurate drawings are essential to Facility planning. Standards and quality must be consistent and reproducible; the standards and procedures in this document apply to all submitted materials, both hard copies and electronic files.

2 PURPOSE

This procedure establishes the minimum requirements for creation of all NY CREATES Facility drawings.

3 FILE FORMAT

- 3.1 **Design Application Requirement**
- 3.1.1 NY CREATES requires all submittals and final documents to be in AutoCAD (DWG) format.





3.1.2 If any aspect of a drawing is created using any program other than AutoCAD, please provide all native files in original format upon final issuance.





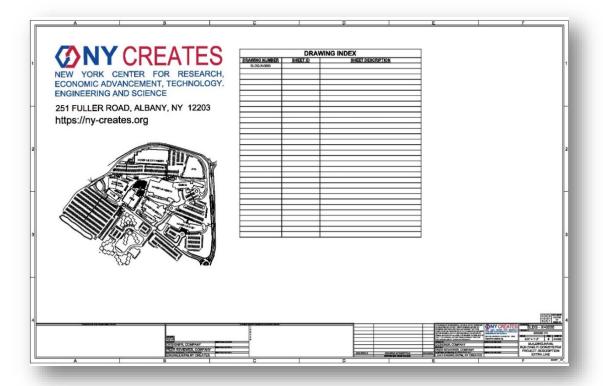
3.1.3 Any applications that result in the export to a CAD file must be fully functional and have no significant loss of drawing entities / data that could result in drawing complications during future revision.

4 NY CREATES FORMAT

4.1 Title Block

Unless otherwise approved by NY CREATES, the standard D-size (24" X 36") sheet size shall be used for all issued drawings. The NY CREATES format must be present on every sheet, with all attributes filled to completion.

Do not reproduce, alter, and/or explode the title block.



4.1.1 **Drawing Number**

BLDG-A-0001-(XX)

a) Buildings

Work performed outside of a building is relative to site work. In this case, the "NY CREATES" acronym is appropriate. (Ex: NYCR-A-XXXX)

- NFE NanoFab East
- NFC NanoFab Central
- NFN NanoFab North
- NFS NanoFab South
- NFS NanoFab South
- CESTM
- Zen
- NFX NanoFab Extension
- TVHS Tech Valley High School
- HPM, GEN
- CT Cooling Tower

b) Discipline Designators

Please consult National CAD Standards for a full list of Discipline Designators. Common examples are shown below:

- A Architectural
- **B** Geotechnical
- C Civil
- **D** Demolition
- E Electrical
- Fire Protection
- **G** General
- **H** Hazardous Materials
- Information
- L Landscape
- M Mechanical

- O Operations
- **Plumbing**
- **Q** Equipment
- **S** Structural
- T Telecommunications
- V Survey/Mapping

c) Unique Number

This number will be provided by NY CREATES. This number must NEVER be duplicated.

d) Issuance Designator

Used for preliminary issuance; this is not an issued document. It should not be used as the sole source of information out in the field. The technical content is either outdated, inaccurate, or unconfirmed.

SK Sketch

NFC Not for Construction

ARC Archive

FRO For Reference Only

OBS Obsolete

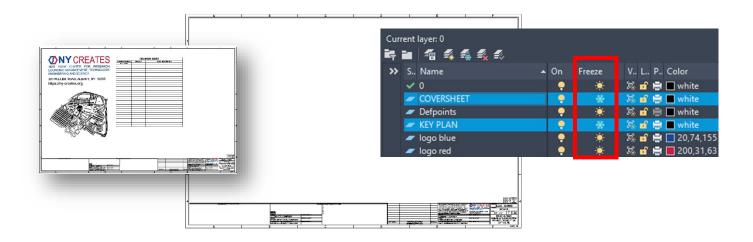
4.1.2 Which Documents Receive a Drawing Number?

Essentially, every sheet within every drawing set generated for the site should have a drawing number present somewhere for filing purposes. The following documents require drawing numbers:

- New Drawings: Drawings numbers will be provided once development begins.
- Old Drawings: They may be outdated, but they still hold historical value. They will receive a number in order to be archived appropriately.
- Paper Drawings that have no electronic information: Documenter will write the number on the drawing, then scan it and save to a PDF.

4.1.3 <u>Numbering System for Multi-Discipline Drawing Packages</u>

- a) Cover Sheet All projects that encompass multiple disciplines will have a coversheet. A cover sheet will communicate the entire drawing package in a drawing index and will be represented by its own drawing number. Its discipline designator will be classified as "G."
 - Depending on the sheet's purpose, the cover sheet information can be turned off by freezing 2 layers, COVERSHEET and KEY PLAN.
 - If more room is required for the drawing index, proceed to sheet 2.
 - Key plan is on its own layer and can be used as needed.



b) Number Sequence – When an initial job is created, it is appropriate to reserve a group of numbers in the Numbers Log, so that all numbers related to the project are part of a sequence. For example:

*Unused numbers can be redistributed or canceled.

- BLDG-G-0240
- BLDG-V-0241
- BLDG-C-0242
- BLDG-A-0243
- BLDG-F-0244
- BLDG-P-0245

4.2 Attributes Editor



NOTE: This information, once issued at Revision 0, will reaming for the life of the drawing and will NEVER be altered. For all future revisions, refer to Section 4.5.

4.2.1 Drawing Number

Refer to Section 4.1.1 for instruction.

4.2.2 Project Number

Number provided by FEG Lead Engineer / Project Manager.

4.2.3 <u>Scale</u>

Used as reference.

NOTE: Disclaimer attached to the title block requires confirmation of all measurements.

4.2.4 Revision Number

Represents the number of times a facility drawing has been altered.

This number is imperative to document control, as it confirms that the user is using the most accurate information.

4.2.5 Sheet ID

Unique identifier for each sheet.

Structure → (X) Discipline designator – (000) Sheet Number

4.2.6 <u>Drawing Title</u>

- a) Building Name NFE, NFN, NFC, NFS, NFSX, CUB, TVHS, HPM, CESTM, ZEN, NFX, and NFR
- b) Floor / System Specify floor level and/or system
- c) Plan Description Description of work (e.g.: Floorplan, System Reroute)
- d) Extra Line Any pertinent keywords that will help in the search of the drawing

4.2.7 Drawn By

- a) Type the designers name and the Company for which they reside
- b) The name and date will remain for the life of the drawing
- c) Signature required upon issuance

4.2.8 Checker

- a) Independent peer review
- b) This name and date will remain for the life of the drawing
- c) Signature required upon issuance

4.2.9 <u>Additional Approvals</u>

- Name, title, and department of NY CREATES employee leading the project. (Ex: Mary DoGooder, FEG-Eng or Joe DoesItRight, FEG-PM)
- b) Any additional contacts pertinent to the project
- c) Signatures required upon issuance (digital signatures are acceptable)

4.2.10 Sheet Location within a Sheet Set (e.g., SHEET OF)

- a) Please provide information by sheet.
- b) First blank is the specific sheet in work.
- c) Second blank is the total sheets in sheet-set.

4.3 Reference Drawing Box

4.3.1 Guidelines for Use

- a) Not required on Cover Sheet (G)
- b) Only represented on first sheet of each drawing number. Layer can be turned off at sheet 2.



c) If more space is required, continue the table upwards.



4.3.2 List Drawings Used in Development

- a) Site maps
- b) Floorplans
- c) Related disciplines
- d) Files used to create external reference block (XREF)

4.4 Revision Status of Sheets

4.4.1 Guidelines for Use

a) Only represented on 1st sheet of each drawing. Layer can be turned off at sheet 2.

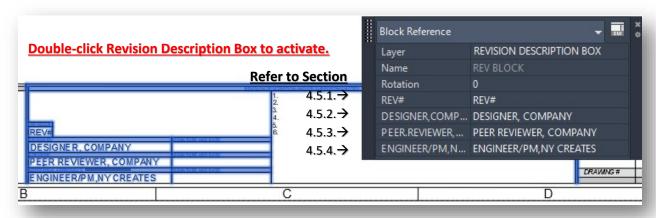


- b) The first sheet will always be revised when a drawing is altered.
- c) With the exception of the 1st sheet, only sheets touched will be revised. It is typical that a drawing package has individual sheets at different revisions.



4.5 **Revision Description Box**

The Revision Description Box documents all changes to the current revision. The original title block information at Rev 0 will remain for the life of the drawing, and the Revision description Box will document all changes from Revision 1 to the end of its life.



NOTE: This box is located on its own layer for design convenience. However, it should remain turned on as a placeholder at Rev 0, due to its requirement at Revision 1.



4.5.1 Revision Number

- a) This attribute should NEVER read at Revision 0.
- b) Represents the number of times a facility drawing has been altered.
- c) This number is imperative to document control, as it confirms that the user is using the most accurate information.

4.5.2 <u>Drawn By</u>

- a) Type the designers name and the company for which they reside.
- b) The name and date will change upon EVERY revision.
- c) Signature required upon issuance.

4.5.3 Checker

- a) Independent peer review.
- b) The name and date will change upon EVERY revision.
- c) Signature required upon issuance.

4.5.4 <u>Additional Approvals</u>

- a) Name, title, and department of NY CREATES employee leading the project (e.g.: Mary DoGooder, FEG-Eng or Joe DoesltRight, FEG-PM).
- b) Any additional contacts pertinent to the project.
- c) The name and date will change upon EVERY revision.
- d) Signatures required upon issuance (digital signatures are acceptable).

4.6 **Vendor Block**

Location for all relevant vendor information:

- a) Engineering stamp
- b) Project Number
- c) Contact information and logo

5 DRAWING STANDARDS

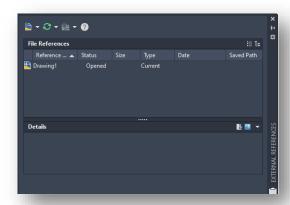
5.1 External References (XREF) and Imported Images

5.1.1 Insertion

- a) Use the 0,0,0 reference point for all plans as block insertions and/or XREFs in model space. This allows a consistent process from one drawing to the next.
- b) Use the 0,0,0 reference point in paper space for the NY CREATES title block.

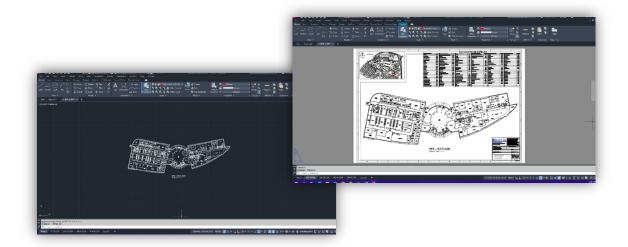
5.1.2 Binding and Retention

- a) Upon completion of the project, all external references shall be bound and retained as a block within the master drawing file.
- b) This includes the title block and all image files.



NOTE: NY CREATES will not accept final submissions of CAD files that are not bound as one file. The File Reference box must be clear of attachments.

5.2 Model Space Vs. Paper Space



5.2.1 Model Space

- a) Only one representation of a floorplan and/or site (key) plan in model space.
- b) Upon issuance, model space should be clean of all alternate and/or repetitive information including extra section views, elevations, base plans, details, and furniture blocks such as cubicles and chairs, etc.

NOTE: The "Zoom All" function highlights the area of work in model space.

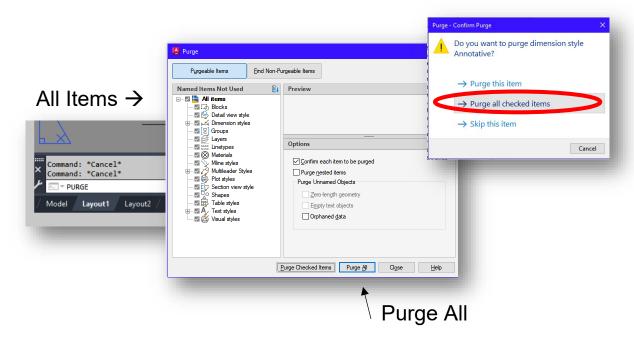
5.2.2 Paper Space

- a) Viewports, title block, and sheet information should only be included in Paper Space.
- b) No technical development, associated text, labels, or dimensioning in Paper Space.
- c) Label all tabs by sheet number represented in the title block of each sheet (e.g., A-100).

5.3 Layering Requirements

5.3.1 AIA Standards for Layering (AIA std.)

- a) NY CREATES follows the US National CAD standards for layering template creation.
- b) Only use the minimum number of layers necessary to separate entities within a drawing.
- c) The final CAD file must remove all redundant layers such as layers involved with block insertion.
- d) The final CAD file must be purged of ALL unused layering information. Use the "PURGE ALL" function prior to final submission.



5.3.2 Effective Layering Process

- a) Allows user to isolate / separate systems as needed for clarity and/or to eliminate clutter (e.g.: Section grid).
- b) Allows for effective print capabilities that are reproducible and manipulable.
- c) A consistent layering process allows for a smooth transition when sharing information with multiple stakeholders, such as engineering firms and engineering professionals within the organization.

5.4 **Drawing Requirements**

5.4.1 Legibility and Reproducibility

- a) Line weights should be in accordance with National CAD Standards and reproducible.
- b) Lines should be broken (mask function) to avoid overlap of text.
- c) Text size must be legible and free of spelling errors, including text embedded in line types. Please maintain a minimum text height of 1/8" = 1'-0" scale (1:1), unless otherwise noted.

5.4.2 <u>Legend</u>

- a) A legend shall appear on the 1st sheet of each disciplined sheet set where symbols are used.
- b) All acronyms used in drawing must be clearly define in legend.

5.4.3 <u>Drawing Scale</u>

Dimensioning eliminates the need for a scale, and is preferred. When it is inappropriate to dimension, a bar scale shall be placed on the drawing for reference only.

5.4.4 North Arrow Must be Present

5.4.5 Blocks, Details, Hatch Patterns, etc.

- a) Avoid using nested blocks.
- b) All pre-defined entities (blocks, hatch patterns, symbols, etc.) shall be created on the Layer 0.
- c) Entity colors shall be defined by layer, not the entity.
- d) Detailed callouts and section views are accurately represented, and all associated locations / information relating to these entities are confirmed accurate.

5.4.6 Notes Defined

Shall use Arial font and be numbered. Minimum text size shall be 1/8" (.125), left justified.

- a) <u>General Notes</u>: Apply to entire drawing set and multiple drawing numbers. See cover sheet for reference.
- b) <u>General Facility Discipline Notes</u>: Apply to all sheets within a specific drawing number.
- c) <u>General Sheet Note</u>: Apply to only one sheet within a drawing number.
- d) <u>Keyed Notes</u>: Apply to an element located within the technical information. Hexagon shall be used to denote sheet keynotes embedded in technical information.



5.4.7 3D Model Export

NY CREATES requires that all drawing plans shall be clean and clear of erroneous additional lines created from the exportation of a 3D model to a 2D file.

For example, NY CREATES prefers that a wall is drawn using two lines, one depicting the outer most wall and the inner most wall. If more lines are needed in wall creation, the lines must be associated to an appropriate layer that represents the various construction materials of the wall.

Layered lines affect print quality and will not be accepted.

5.4.8 Dimensioning

- a) All dimensioning shall be completed in model space.
- b) Precision units shall be a minimum of 1/8" (.125).

6 FORMAL ISSUANCE

6.1 **Preliminary Review (30%, 60%, 90%)**

6.1.1 Technical Review

Performed by NY CREATES subject matter expert leading the project (Project Manager or System Engineer).

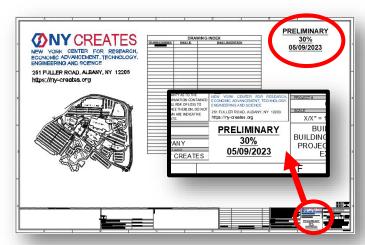
6.1.2 Drafting Review

- a) Performed by Drafting and Design Services.
- b) Review does not include any technical content.
- c) Issued Process and Procedure document will be used as reference to ensure standards are being followed.

6.1.3 Preliminary State (30%, 60%, 90%)



- a) Preliminary stamp is located on a layer that can be turned on and off. Please type design state (%) and current date upon submission for review.
- b) Markings must exist on drawing to warn user the drawing is not ready for construction, and is for **Design Purposes Only**. This drawing must NOT be used for construction.



6.2 Final for Construction (100%)

6.2.1 Final Issuance at Revision 0

- a) Preliminary stamp is removed
- b) Final for Construction typed in extra line
- c) Signatures for issuance (digital signature allowed)
 - DRAWN BY Designer, Company Name
 - CHECKER Peer Reviewer, Company Name
 - ADDITIONAL APPROVALS NY CREATES Project Lead Representative (ENG., PM)
- d) Vendor Box Stamp placed, signed, and dated (if applicable)
 - Vendor logo, contact info, etc.
- e) Hard Copies Required
 - Two (2) complete sets D-size (24x36)
 - Two (2) complete sets B-size (11x17)
- f) Thumb Drive clearly labeled with Project # and Building Name
 - Include all files associated with the project (.dwg, .rvt, .rfa, .pdf, .skp)



6.2.2 Quality Assurance Checklist (FEI-00023-F1)

Filled to completion and expectations met.

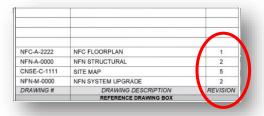
6.3 **As-Built**

6.3.1 Final Issuance at Revision 2+

- a) Text removed from extra line and "AS-BUILT" typed in its place.
- b) Title Block
 - Signatures for issuance DO NOT change from Rev 0's original issuance.
 - The only change to this attribute box is the Revision and the fourth line of the title.



- c) Reference Drawing Box
 - Update all relative drawings to current revisions.
 - Add any necessary drawings utilized during the development of the revision.



- d) Revision Description Box
 - Update Revision #
 - Approvals and signatures must be updated upon every revision.
 - Empty space can be used as needed for Revision Notes.



- e) Vendor Box Stamp placed, signed and dated (if applicable)
 - Vendor logo, contact info, etc.

6.3.2 Quality Assurance Checklist (FEI-00023-F1)

Filled to completion and expectations met.

6.4 Revision

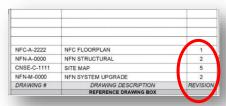


6.4.1 Final Issuance at Revision 2+

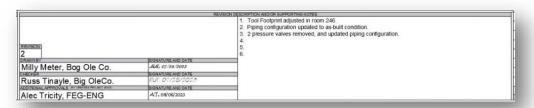
- a) Text removed from extra line
- b) Title Block
 - Signatures for issuance do not change from Rev 0's original issuance.
 - The only change to this attribute box is the Revision, and the fourth line of the title that can be used as needed. Keep empty if no information is provided.



- c) Reference Drawing Box
 - Update all relative drawings to current revisions.
 - Add any necessary drawings utilized during the creation of the revision.



- d) Revision Description Box
 - Update Revision #
 - Approvals and signatures must be updated upon every revision.



- Empty space can be used as needed for Revision Notes.
- e) Vendor Box Stamp placed, signed, and dated (if applicable)
 - Vendor logo, contact info, etc.
- f) Hard Copies Required
 - Two (2) complete sets D-size (24x36)
 - Two (2) complete sets B-size (11x17)
- g) Thumb Drive clearly marked with Project # and Building Name
 - Include all files associated with the project (.dwg, .rvt, .rfa, .pdf, .skp)

6.4.2 Quality Assurance Checklist (FEI-00023-F1)

Filled to completion and expectations met.

6.5 **Professional Engineer / Architect Certification**

6.5.1 New York State Certification of Drawings

It is the responsibility of our vendors producing NY CREATES facility drawings to certify all work with a New York State Seal stamp. This stamp must include the engineer's certification number, signature, and the date of drawing release.

7 CONTACTS

Juliana Ellsworth-Howe, CAD Support Specialist: 518-956-7212

Heather Fariello, Associate Vice President of Facility Engineering and

Infrastructure: 518-888-4881

Mary Kochan, Document Control: 518-956-7212

Caitlin Treacy, Document Control: 518-956-7231

8 ASSOCIATED FORMS

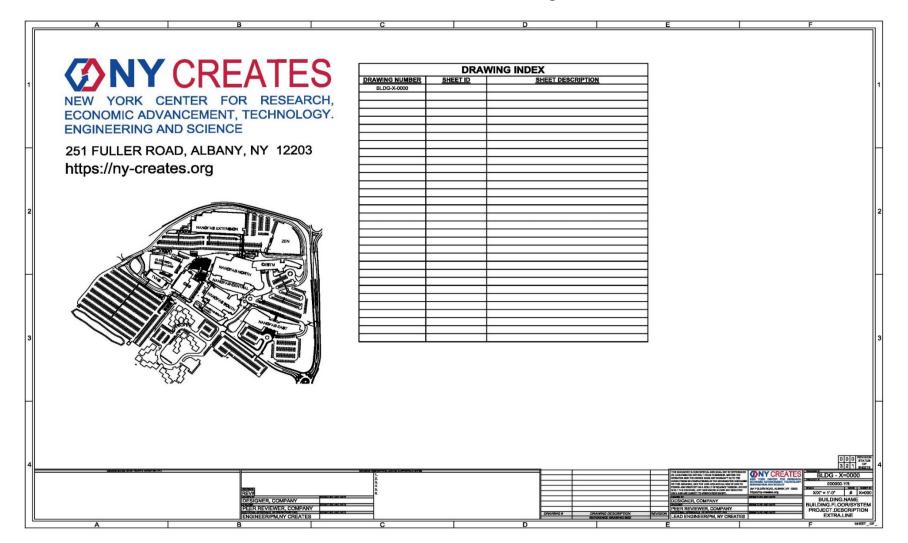
8.1 **FEI-00023-F1**: NY CREATES Facility Drawing Quality Checklist

9 ATTACHMENTS

Attachment A: Cover Page

Attachment B: D-Size Format

ATTACHMENT A: Cover Page



ATTACHMENT B: D-Size Format

