APPENDIX J
VENDOR DRAWING TRANSMITTAL / CAD REQUIREMENTS

The purpose of this document is to specify the procedures and method of transmittal of Computer Aided Drafting (CAD) electronic files and other design file requirements for drawings generated by vendors/architectural engineering firms working for Ameren Missouri.

PROCEDURES FOR TRANSMITTING FILES

A/E-Vendor Originated Drawings:
When engineering a project for Ameren Missouri, the Ameren engineer responsible for the project shall contact the Drafting and Document Control Supervisor of Power Operations Services to coordinate the transmittal and submittal of electronic CAD drawing files and other records for the project.

CAD SOFTWARE DESIGN REQUIREMENTS
Ameren Missouri will provide a workspace to utilize when creating or modifying drawings. This can be obtained by contacting DLMODrawingControl@ameren.com. Ameren Missouri utilizes Autodesk AutoCAD. As built drawings are required to be submitted in the latest version of AutoCAD, not to exceed two previous releases. (Example AutoCAD 2014 is acceptable).

DELIVERABLES
Vendor shall provide electronic CAD files via the external SharePoint site maintained by the Ameren Missouri Drafting Department. Hardcopies of as-built drawings shall be produced on an as-needed basis determined by the Engineer.

Questions regarding drafting deliverables or standards shall be addressed to:

Drafting and Document Control Supervisor
Ameren Missouri
3700 S. Lindbergh Blvd.
St. Louis, MO 63127

Vendor shall enclose all necessary documentation associated with as-built CAD files as applicable (i.e., file names, reference files and any other necessary information). All original drawings sent to vendors, all voided drawings and all manual drawings that have been redrawn are to be returned to Ameren Missouri.

Electronic files for all CAD drawings shall be delivered to Drafting and Document Control Supervisor by one of the following transmittal methods:

- CD-ROM
- Ameren approved file transfer site – Microsoft SharePoint 365
    - https://aueamerenmicrosoftonlinecom-2.sharepoint.microsoftonline.com/default.aspx

Virus protection is paramount with any of the above methods. All corporate procedures will be followed to ensure transmittals will be free of viruses. All files supplied to Ameren Missouri shall be compatible in format and file structure as outlined in these requirements. Incompatible or incomplete files will be returned for further refinement before acceptance will be granted.

Samples of CAD files in an intermediate state can be submitted for approval of conformance to Ameren Missouri's drafting standards and is encouraged in the early stages of project development. Ameren Template files are available and are recommended to ensure compliance to Ameren Missouri drafting standards.

RESERVING NUMBERS FOR NEW AMEREN MISSOURI DRAWINGS
Power Operations Services Drafting and Document Control Department is responsible for reserving numbers for vendors to use for new drawings for construction projects. The drawing class will be necessary to assign new numbers. See Attachment C. An Ameren Service Request shall be completed and submitted to the Ameren Missouri approved File Transfer Site mentioned above. One drawing number will be assigned for each class of drawing needed. Sheet numbers shall be utilized in lieu of additional drawing numbers in the same class up to 999 sheets.

RESERVING FOREIGN PRINT DRAWING AND FOREIGN PRINT MANUAL NUMBERS
Power Operations Services is responsible for reserving numbers for vendors to use for new foreign print drawings and manuals for construction projects. It will be necessary to request the number of foreign prints by class, drawing or manual. An Ameren Service Request, shall be completed and submitted to the Ameren Missouri approved File Transfer Site mentioned above

FILE NAMING CONVENTIONS
To properly identify files it is necessary to adhere to several rules. The drawing file extensions shall be **.dwg** as the CAD system default file extensions.

The following special characters shall not be used in file names or titles: ! * / ({ < > }) & ? $ # @ ” ’ + [ ] ~

Ameren Drawings Numbers
- The CAD file naming convention shall adhere to the following format:
    - <site>-DWG-<drawing class>-<seq ######>-<sheet ###>.dwg
        - <site> – Refers to a two-digit abbreviation for each generation site.
        - DWG – Refers to a three-digit abbreviation used to indicate the file is a drawing class type.
        - <drawing class> – Refers to a four-digit abbreviation for each drawing class.
        - <seq ######> – refers to a six-digit drawing number provided by Ameren Missouri.
        - <sheet ###> – refers to a three-digit sheet number associated with the drawing number.
    - See Attachment C for name convention abbreviations.
    - Example of file name LB-DWG-ELEC-000000111.dwg

Foreign Prints Manuals
- The CAD file naming convention shall adhere to the following format:
    - <site>-FPM-<seq ######>-<sheet ###>.dwg
        - <site> – Refers to a two-digit abbreviation for each generation site.
        - FPM – Refers to a three-digit abbreviation used to indicate the file is a drawing class type. All foreign print manuals are listed as FPM.
        - <seq ######> – refers to a six-digit drawing number provided by Ameren Missouri.
        - <sheet ###> – refers to a three-digit sheet number associated with the drawing number.
    - See Attachment C for name convention abbreviations.
    - Example of file name LB-FPM-000000111.dwg

Foreign Prints Drawings
- The CAD file naming convention shall adhere to the following format:
    - <site>-FPD-<seq ######>-<sheet ###>.dwg
        - <site> – Refers to a two-digit abbreviation for each generation site.
        - FPD – Refers to a three-digit abbreviation used to indicate the file is a drawing class type. All foreign print drawings are listed as FPD.
        - <seq ######> – refers to a six-digit drawing number provided by Ameren Missouri.
        - <sheet ###> – refers to a three-digit sheet number associated with the drawing number.
    - See Attachment C for name convention abbreviations
    - Example of file name LB-DWG-FPD-000000111.dwg

DRAWING REQUIREMENTS:

Titling – The title shall begin on the second line. The first line of the drawing title shall be drawing classification. . The second line shall be system description. See desktop instruction in the external SharePoint site, Ameren AutoCAD Drawing template for further instruction and details. Abbreviations when necessary shall follow the ANSI standard of abbreviations and Acronyms for Use on Drawings and Related Documents. Do not use special characters in the titles. See File Naming Conventions for list of special characters.

Fraction display – stacked (i.e., 1½")

Dimension readout – feet and inches (not metric or in decimal form)

Angular Measurement – decimal degrees

Line weight – 1, or to match existing drawing for bold lines and good drafting practice

Patterning – as specified on each drawing

Revision number and date are required in title block area of each drawing. Revisions to existing drawings are numeric and increase by one each revision (i.e., Revision 2 would increase to 3). **All new drawings are issued at zero "0", revision. New drawings when revised increase to "1" for the first revision**. For vendors wanting to do multiple revisions to drawings prior to returning to Ameren Missouri, it is preferred that an alphanumeric numbering series is used. (i.e., if a Drawing is sent to vendor at revision "1". Vendor creates "1A0", "1A2", "1A3" revisions and then submits final revision to Ameren labeled as "As Built". Ameren will determine the latest revision number according to the system).

Scoping – All revisions to existing drawings will have a revision balloon (scoping) placed around the areas revised. Vendors are to use a stream curve, line code = 7, line weight = 3, level = 63, and color = 7. This shall be left on drawing upon final submittal, except in the case the drawing is a new drawing.

Reference files – Vendors are requested to supply any reference file that is attached to the set of AutoCAD drawings to be delivered to Ameren Missouri.

Drawing layers – Layers are part of the Ameren AutoCAD template, see Attachment D. Any new levels added by a vendor are required to be named wit the vendor initials in the beginning of the layer name.

Operating Diagram – See Attachment E Instructions for Operating Diagram Issuance.

Drawing Standards – Contractor shall comply with the following drawings standard layouts listed below:

- AUE-STND-ELEC-000019 – Electrical Drawing Standard – 480V Motor Operated Valve Sh. 1
- AUE-STND-ELEC-000020 – Electrical Drawing Standard – 480V Motor Operated Valve Sh. 2
- AUE-STND-ELEC-000021 – Electrical Drawing Standard – 480V Motor Operated Valve – DCS Sh. 1
- AUE-STND-ELEC-000022 – Electrical Drawing Standard – 480V Motor Operated Valve – DCS Sh. 2
- AUE-STND-ELEC-000023 – Electrical Drawing Standard – 480V Motor MCC
- AUE-STND-ELEC-000024 – Electrical Drawing Standard – Medium Voltage Motor Sh. 1
- AUE-STND-ELEC-000025 – Electrical Drawing Standard – Medium Voltage Motor Sh. 2
- AUE-STND-ELEC-000025 – Electrical Drawing Standard – Medium Voltage Switchgear

Electronic copies of these drawing standards are available on the Ameren Missouri, Drafting and Document Control external SharePoint site.

CELL LIBRARIES and TEMPLATE FILES:
These files are located on the Ameren Missouri Drafting and Document Control external SharePoint site. Access to this external SharePoint site may be requested from the Drafting and Document Control Supervisor as described above

CABLE/CONDUIT/EQUIPMENT AND VALVE INFORMATION
Cable schedule, conduit, equipment and valve numbers are maintained in databases. Requests for new numbers shall be made through the external SharePoint site. Submittal of these numbers shall be in the format of Microsoft Excel or in Microsoft Access data files and submitted on the external SharePoint site. .

Questions concerning the transmittal of files shall be directed to:

Drafting and Document Control Supervisor
Ameren Missouri
3700 S. Lindbergh Blvd.
St. Louis, MO 63127
DLMODrawingControl@ameren.com

ATTACHMENTS

A – Border Size Chart and Lettering Convention for Wire/Cable
B – Drawing Class Types
C – Drafting Manual, Drawing Level Scheme (mechanical/structural)
D – Instructions of Operating Diagram Issuance
E – Drawing Naming Convention Abbreviation Reference Table
F – Design Drawing Standard Examples

ATTACHMENT A: BORDER SIZE CHART

Border	(ANSI)	Drawing Size
A	(A)	8½ x 11
G	(B)	11 x 17
J		23¼ x 11½
Z	(C)	17 x 22
O		11½ x 36
P		11½ x 44
X	(E)	44 x 34
Y	(D)	36 x 24
W*	(Custom)	Up to 36 x 144

***W is no longer used and is for historic purposes only**

ATTACHMENT B: LETTERING CONVENTION FOR WIRE/CABLE

WH = White

BK = Black

BR = Brown

RD = Red

GN = Green

BL = Blue

VI = Violet

OR = Orange

GR = Gray

YL = Yellow

RD/BK = Red – Black

GN/BK = Green – Black

BL/BK = Blue – Black

BL/RD = Blue – Red

BL/GN = Blue – Green

OR/GN = Orange – Green

RD/YL = Red – Yellow

RD/BR = Red – Brown

YL/BK = Yellow – Black

YL/BL = Yellow – Blue

BR/YL = Brown – Yellow

BR/GN = Brown – Green

GN/YL = Green – Yellow

VI/YL = Violet – Yellow

BL/BR = Blue – Brown

ATTACHMENT C AMEREN MISSOURI DOCUMENTS AND DRAWING ABBREVIATIONS

Technical Documents and Drawings Site Abbreviations			
<site>	**Site**	**<site>**	**Site**
AU	Audrain	MB	Moberly
FG	Fairgrounds	MO	Moreau
GC	Goose Creek	OS	Osage
KK	Keokuk	PC	Peno Creek
KM	Kinmundy	PV	Pinckneyville
KV	Kirksville	RC	Raccoon Creek
LB	Labadie	RI	Rush Island
MR	Meramec	SX	Sioux
MC	Meramec CTG	TS	Taum Sauk
MX	Mexico	VN	Venice

Technical Documents	
Types	**Description**
AMAN – Ameren Manual (Change Controlled)	• CDM – Component Design Manual • DBM – Design Basis Manual • DFT – Drafting Manual • OMM – Operations and Maintenance Manual
CALC – Calculation Calculation Type (Change Controlled)	• Civil/Structural • Electrical • Mechanical
FPD – Foreign Print Drawing (Change Controlled)	• N/A
FPM - Foreign Print Manual (Change Controlled)	• N/A
SFTW – Software **Software Type** (Change Controlled)	• DCS • PLC • Wonderware
SPEC – Specification **Specification Type** (Change Controlled)	• Construction • Equipment • Functional Requirement • Material • Software • System / Subsystem
STND – Standard **Specification Type** (Change Controlled)	• Architechral (ARCH) • Drafting (DRFT) • Electrical (ELEC) • Instrument (INST) • Mechanical (MECH)

ATTACHMENT C (CONTINUED)

Drawings	
Class: <drawing class>	**Types**
BLDG – Building Drawing Building Type (Change Controlled)	• Architectural Plans • Building Services • Concrete, Brick, Stone & Reinforcing • General • Piling, Foundations, Excavation • Roofing, Flashing • Stairs, Walkways, Floors, Partitions, Elevators, Grating • Steel Framing & Details, Column Schedules • Stress, Clearance Loading Diagrams
CNDT – Conduit; Tray; Cable Drawing Conduit; Tray; Cable Type (Change Controlled)	• Boxes • General • Hangers • Installation, Details & B/M • Plans • Schedules
DUCT – Ducts Drawing Ducts Type (Change Controlled)	• General • Installation, Details • Plans
ELEC – Schematic Wiring Drawing Schematic Wiring Type (Change Controlled)	• General • One Line & Meter-Relay Diagrams • Panel Wiring Diagrams • S.D. – 11 KV and above • S.D. – 2.3 KV. To 11 KV • S.D. – Below 2.3 KV • Schematic & Logic Diagrams • W.D. – 11 KV. And above • W.D. – 2.3 KV. To 11 KV • W.D. – Below 2.3 KV • Wiring & Interconnection Diagrams
EQPT – Equipment Drawing Equipment Type (Change Controlled)	• Brush Specifications • General • Installation, Details, Assembly & B/M • Plans and Arrangements
GRND – Grounding Drawing Grounding Type (Change Controlled)	• General • Installation, Details & B/M • Plans
LINE – Line Construction Drawing Line Construction Type (Change Controlled)	• Configuration Diagrams • Data Sheets • Foundations Concrete • Foundations Steel Frame • Foundations Steel Tripods • General • Grounding • Guying and Staking • Insulator & Hardware Details • Maps • Phasing Diagrams • Plan & Profiles • Steel Poles • Stress Diagrams • Tower Lighting & Painting • Towers Steel Framing & Details

Drawings	
Class: <drawing class>	**Types**
PANL – Panel Drawing Panel Type (Change Controlled)	• General • Installation, Details & B/M • Layout – Front or Rear View • Nameplate Bill of Material
PIPE – Piping Drawing Piping Type (Change Controlled)	• Control • Flow Diagrams, Isometrics, Composites, P&ID • General • Hangers, Anchors • Installation – Details – Air • Installation – Details – Misc. • Installation – Details – Oil • Installation – Details – Steam • Installation – Details – Water • Plans
PROP – Property - Site Drawing Property – Site Type (Change Controlled)	• Engineering Records, Engineering Data, Organization Charts, Forms and General Drawings • Plats, Sewers, Yard Plans, Grading Levees, Roadways, Surveys, Fences
STRU – Structure Drawing Structure Type (Change Controlled)	• Assembly & Details • Concrete, Reinforcing, Inserts • General • Lighting, Yard Lighting & Piping • Piling, Excavation • Plans • Steel Framing & Details

ATTACHMENT D: DRAWING LEVEL SCHEME

- _1 AS BUILT
- _2 CONSTRUCTION
- _3 FOR BIDDING ONLY
- _4 OPERATING DIAGRAM
- _5 BORDER
- _6 BORDER-TEXT
- _7 NOLR
- _8 Ameren Missouri Logo
- _9 TEXT-BORDER
- _10 TEXT-TITLE BLOCK
- _11 ABANDON
- _12 REVISION CLOUD
- _13 VIEWPORT
- _TEXT
- 0
- BUILDING-1-Existing Concrete 03060
- BUILDING-2-New Concrete 03060
- BUILDING-3-Steel Column Lines 03050
- BUILDING-4-Existing Exterior Walls 03020
- BUILDING-5-New Exterior Walls 03020
- BUILDING-6-Existing Interior Walls 03020
- BUILDING-7-New Interior Walls 03020
- BUILDING-8-Fixtures Sink Water Closet Lavatory 03020
- BUILDING-9-HVAC 03080
- BUILDING-10-Plumbing Waste & Vent 03080
- BUILDING-11-Plumbing Hot & Cold 03080
- BUILDING-12-Heating Baseboard 03080
- BUILDING-13-Heating Piping 03080
- BUILDING-14-Motors 03080
- BUILDING-15-Power & Receptacles 03080
- BUILDING-16-Lighting 03080
- BUILDING-17-Architecural Elevations 03020
- BUILDING-18-Architectural Details 03020 03090
- BUILDING-19-Furniture 03020
- BUILDING-20-Patterning
- BUILDING-21-Dimensions
- BUILDING-22-Notes
- CABLE & CONDUIT-1-Plans 11020
- CABLE & CONDUIT-2-Installation & Details 11030
- CABLE & CONDUIT-3-Bill of Materials Item Numbers 11030
- CABLE & CONDUIT-4-Notes
- ELECTRICAL-1-Schematic & Wiring
- ELECTRICAL-2-Box
- ELECTRICAL-3-Text
- EQUIPMENT-1-Plans & Arrangements 07020
- EQUIPMENT-2-Assembly Installation & Definitions 07030
- EQUIPMENT-3-Bill of Materials Item Numbers 07030
- EQUIPMENT-4-Notes
- GROUNDING-1-Plans 10020
- GROUNDING-2-Installation & Details 10030
- GROUNDING-3-Bill of Materials Item Numbers 10030
- GROUNDING-4-Notes
- PANEL-1-Installation-Details-BOM-08030
- PANEL-2-Layout Front or Rear View- 08020
- PANEL-3-Nameplate Bill of Material-08040
- PANEL-4-Notes
- PIPE-1-Steam Plan 05031
- PIPE-2-Steam Elevations & Details 05031
- PIPE-3-Water Plan 05032
- PIPE-4-Water Elevations & Details 05032
- PIPE-5-Air Plan 05033
- PIPE-6-Air Elevations & Details 05033
- PIPE-7-Oil Plan 05034
- PIPE-8-Oil Elevations & Details 05034
- PIPE-9-Miscellaneous Plans 05030
- PIPE-10-Miscellaneous Elevations & Details 05030
- PIPE-11-Hangers & Anchors 05040
- PIPE-12-Piping & Instrument Diagram 05050
- PIPE-13-Dimensions
- PIPE-14-Notes
- PROPERTY-1-Sewers-02010
- PROPERTY-2-Grading-02010
- PROPERTY-3-Plats-02010
- PROPERTY-4-Roadways-02010
- PROPERTY-5-Property Lines-Street Survey-02010
- PROPERTY-6-Fence-02010
- PROPERTY-7-Grading Surfacing Contours-02010
- PROPERTY-8-Parking and or Easement-02010
- PROPERTY-9-Dimensions
- PROPERTY-10-Notes
- STRUCTURE-1-Piling & Excavation
- STRUCTURE-2-Concrete 04050
- STRUCTURE-3-Reinforcing 04050
- STRUCTURE-4-Structural Location Plan 04020
- STRUCTURE-5-Steel Framing 04060
- STRUCTURE-6-Yard Lighting 04070
- STRUCTURE-7-Patterning
- STRUCTURE-8-Dimensions
- STRUCTURE-9-Notes

ATTACHMENT E: INSTRUCTIONS FOR OPERATING DIAGRAM ISSUANCE

OPERATING DIAGRAMS (Ameren Drawings and Vendor/Foreign Prints):

After field installation and drawings are corrected to an “As-Built” condition, the following classifications of drawings are designated as “Operating Diagrams.” Activate layer _4 Operating Diagram to turn on.

The drawings are identified with this “Operating Diagrams Sticker”

END OF APPENDIX J