STRUCTURAL SUBMITTAL PACKAGE

for

Eurostage Mobile Stages

Model EZ-20

Project Location: Varies

Event Dates: Varies

Submittal Date: 4/4/2025

Clark Reder Project Number: 24.501.113

Reviewed by:

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CA Registration #:C70581

Prepared by:

Tyler Fannin, P.E.

Table of Contents for Structural Submittal Package

Project Information

Project Summary

The project referenced by this submittal consists of a temporary mobile stage roof. Mobile stage roof consists of trailer with a deployable stage deck and roof structure. Trailer is a steel built chasis with jacks to level system. Stage deck is an aluminum frame system that rolls onto the outrigger trailer structure. The end of the deck system is supported by (4) screw jack legs.

Scope of Review

Clark Reder Engineering reviewed the gravity and lateral loading. Gravity loading includes self-weight of structure and rigging loads. Lateral loading includes wind loading. A high wind action plan is to be enforced and strictly followed. See operation management plan for additional information.

See RIGGING PDF for allowable loading plan.

Conclusions

Our review has concluded that the temporary stage roof meets the structural requirements of the 2021 International Building Code, ASCE 7-16, and ASCE 37-14.

Limitations and Exceptions

The scope of review for this submittal is limited to the items listed above. All other temporary or permanent structures on site not specifically referenced above under “Scope of Review” are the responsibility of others.

Where the items covered by this submittal are attached to existing structures, it is the responsibility of the engineer of record for those existing structures to review the impact of the elements referenced in this submittal.

GENERAL STRUCTURAL NOTES

CODES

1. 2021 INTERNATIONAL BUILDING CODE
2. ASCE 7-16: MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES
3. ASCE 37-14: DESIGN LOADS ON STRUCTURES DURING CONSTRUCTION
4. 2015 ALUMINUM DESIGN MANUAL
5. AISC 360-16: SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS

REFERENCES

1. ANSI E1.21-2013 ENTERTAINMENT TECHNOLOGY, "TEMPORARY GROUND-SUPPORTED OVERHEAD STRUCTURES USED TO COVER THE STAGE AREAS AND SUPPORT EQUIPMENT IN THE PRODUCTION OF OUTDOOR ENTERTAINMENT EVENTS"
2. ANSI E1.2-2012 ENTERTAINMENT TECHNOLOGY, "DESIGN, MANUFACTURE AND USE OF ALUMINUM TRUSSES AND TOWERS"

DESIGN LOADS

1. DEAD LOAD: SELF-WEIGHT OF STRUCTURE
2. LIVE LOADS:
   - A. PERFORMANCE STAGES: 75 PSF
3. RIGGING LOADS: SEE ATTACHED SHOW SPECIFIC RIGGING PLOT
4. WIND LOADS:
   - A. WIND RISK CATEGORY: II
   - B. BEFORE HIGH WIND ACTION PLAN IS ACTIVATED:
     1. DESIGN SERVICE-LEVEL WIND SPEED: 40 MPH
     2. EXPOSURE: C
   - C. AFTER HIGH WIND ACTION PLAN IS ACTIVATED:
     1. DESIGN SERVICE-LEVEL WIND SPEED: 67 MPH
        - a. REQUIRED WIND SPEED HAS BEEN REDUCED IN ACCORDANCE WITH ASCE 37-14 DUE TO THE TEMPORARY NATURE OF STRUCTURE
     2. EXPOSURE: B
   - D. SITE ELEVATION: 0 FT
   - E. REFERENCE THE HIGH WIND ACTION PLAN FOR SPECIFIC ACTIONS THAT SHALL BE TAKEN TO ENSURE STABILITY OF THE TEMPORARY STRUCTURE IN HIGH WINDS.
5. SEISMIC LOADS DO NOT CONTROL THE DESIGN OF THIS STRUCTURE.

CONSTRUCTION AND SAFETY

1. ENGINEER SHALL NOT BE RESPONSIBLE FOR MEANS, METHODS, OR SEQUENCE OF CONSTRUCTION UNLESS SPECIFICALLY STATED ON THE DRAWINGS.
2. ENGINEER HAS DESIGNED THE STRUCTURES FOR THEIR FINAL AS-BUILT CONDITION. ENGINEER IS NOT RESPONSIBLE FOR TEMPORARY STABILITY OF STRUCTURES DURING ERECTION UNLESS SPECIFICALLY STATED ON THE DRAWINGS.
3. STRUCTURE HAS BEEN DESIGNED AS A TEMPORARY STRUCTURE THAT SHALL BE IN PLACE FOR LESS THAN SIX WEEKS.

FOUNDATIONS

1. THE STRUCTURE IS ASSUMED TO BE FOUNDED ON LEVEL GROUND (CONCRETE, ASPHALT, GRASS, ETC) WITH A MINIMUM NET ALLOWABLE BEARING CAPACITY OF 1500 PSF.

RIGGING

1. ALL POINTS SHALL BE DEAD HUNG POINTS.
2. BRIDLES SHALL NOT BE USED UNLESS SPECIFICALLY ALLOWED BY THE ENGINEER OF RECORD.

ALUMINUM

1. ALUMINUM SHALL CONFORM TO THE FOLLOWING UNLESS NOTED OTHERWISE ON THE DRAWINGS:
   - A. MEMBER ALLOY: 6082
   - B. CHANNELS, PLATES AND SHEETS: 6082
   - C. WELD FILLER ALLOY: 4043 OR EQUIVALENT
2. ALL DETAILING, FABRICATION AND ERECTION SHALL CONFORM TO THE ALUMINUM ASSOCIATION ALUMINUM DESIGN MANUAL, CURRENT EDITION.

3. WELDING SHALL BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY LATEST EDITION.
4. FIELD CONNECTIONS SHALL BE BOLTED UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS.
5. WHERE THE CONTACT OF DISSIMILAR METALS MAY CAUSE ELECTROLYSIS, MEANS SHALL BE PROVIDED TO SEPARATE THE DISSIMILAR METALS WITH A NON-CONDUCTIVE MATERIAL.

STRUCTURAL STEEL

1. ALL STEEL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THE LATEST VERSION OF THE FOLLOWING SPECIFICATIONS UNLESS NOTED OTHERWISE ON THE DRAWINGS:
   - A. AISC 360: SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS
   - B. AISC 303: CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES
   - C. RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS
   - D. AWS D1.1: STRUCTURAL WELDING CODE-STEEL
2. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING CRITERIA UNLESS NOTED OTHERWISE ON THE DRAWINGS:
   - A. MISC PLATE, BAR, ANGLES AND CHANNELS: S355 FY = 50 KSI
   - B. PIPE SHAPES: S355 FY = 50 KSI
   - C. HSS TUBES: S355 FY = 50 KSI
   - D. HSS ROUND: S355 FY = 50 KSI
   - E. BOLTS: ASTM A325-N
   - F. HARDENED WASHERS: ASTM F436
   - G. NUTS: ASTM A563
   - H. FIELD WELDS: AWS E70XX, LOW HYDROGEN ELECTRODES

INSPECTIONS

1. ALL UNITS AND OTHER RIGGING EQUIPMENT SHALL BE VISUALLY INSPECTED PRIOR TO ERECTION. DAMAGED OR CORRODED EQUIPMENT SHALL NOT BE USED. FIELD MODIFICATIONS SHALL BE APPROVED BY THE ENGINEER OF RECORD PRIOR TO INSTALLATION.

OPERATIONS MANAGEMENT PLAN

IMPLEMENTATION OF PLAN

1. PRIOR TO EACH INSTALLATION, THE STAGING COMPANY IN CONJUNCTION WITH THE VENUE/PROMOTER SHALL DESIGNATE A RESPONSIBLE PERSON IN CHARGE OF IMPLEMENTING ALL PHASES OF THE OPERATIONS MANAGEMENT PLAN.
2. A MEETING SHALL BE HELD AT THE VENUE WITH THE PROMOTER, OWNER OR STAGE MANAGER TO DISCUSS THE HIGH WIND ACTION PLAN AND OTHER OPERATIONAL ITEMS.
3. THE METHOD OF INITIATING EVENT CANCELLATION MUST BE OUTLINED EXPLICITLY PRIOR TO THE EVENT ALLOWING FOR IMMEDIATE ACTION IF NECESSARY.
4. A COPY OF THIS PLAN SHOULD BE PROVIDED TO LOCAL POLICE OR FIRE DEPARTMENTS IN ORDER TO HELP USHER PATRONS IN THE EVENT OF AN EVACUATION.

DAILY OPERATIONS PLAN

1. CHECK WEATHER EACH MORNING AND PERIODICALLY THROUGHOUT THE DAY.
2. CHECK TOWER BASES DAILY TO ENSURE ALL REMAIN LEVEL AND PLUMB
3. CHECK GUY WIRES AND BALLAST ASSEMBLIES DAILY TO VERIFY LINES ARE TENSIONED.
4. PROVIDE A DAILY LOG OF THE ABOVE CHECKS FOR EACH INSTALLATION.

HIGH WIND ACTION PLAN

1. THE HIGH WIND ACTION PLAN SHALL BE IN EFFECT FOR THE ENTIRETY OF THE EVENT. AN EVENT SHALL BE DEFINED AS STARTING AT THE INITIAL COMMENCEMENT OF THE STRUCTURE INSTALLATION AND ENDING ONCE THE STRUCTURE IS COMPLETELY DISMANTLED.
2. A COMPETENT RESPONSIBLE PERSON FROM THE STAGING COMPANY SHALL BE PRESENT FOR THE DURATION OF THE EVENT TO IMPLEMENT THE HIGH WIND ACTION PLAN (SEE ABOVE).
3. A REGULAR LIAISON WITH LOCAL AIRPORTS AND/OR WEATHER INFORMATION CENTERS SHALL BE MAINTAINED TO ASCERTAIN IF ANY SIGNIFICANT WEATHER EVENTS ARE EXPECTED IN THE IMMEDIATE VICINITY OF THE STRUCTURE
4. AN ANEMOMETER SHALL BE PLACED ON THE STRUCTURE TO MONITOR WIND SPEEDS. THE ANEMOMETER SHALL BE PLACED AT THE TOP OF A TOWER OR AN ADJACENT STRUCTURE AT A HEIGHT EQUIVALENT TO THE HEIGHT OF THE TOWER. THE ANEMOMETER SHALL BE LOCATED WITHIN 50 YARDS OF THE STRUCTURE.
5. NOTED WIND SPEEDS ARE 3-SECOND GUSTS IN ACCORDANCE WITH ASCE 7
6. **WHEN WIND SPEEDS ARE EXPECTED TO EXCEED 20 MPH**:
   a. A TEAM OF QUALIFIED PERSONNEL SHALL BE PUT ON ALERT. ALL NECESSARY PERSONNEL SHALL BE IN PLACE AND PUT ON STANDBY.
7. **WHEN WIND SPEEDS ARE EXPECTED TO EXCEED 30 MPH**:
   a. ALL PERSONNEL SHALL BE EVACUATED FROM THE ROOF GRID, SPOT TOWERS OR OTHER ELEVATED POSITIONS WITHIN THE ROOF STRUCTURE AND OTHER TEMPORARY STRUCTURES LOCATED ON SITE.
8. **WHEN WIND SPEEDS ARE EXPECTED TO EXCEED 40 MPH**:
   a. ALL SHOW OPERATIONS SHALL BE SUSPENDED, AND THE IMMEDIATE AREA SHALL BE EVACUATED OF ALL PATRONS AND NON-ESSENTIAL PERSONNEL.
   b. ALL SIDEWALL SCRIM SHALL BE LOWERED AND/OR REMOVED FROM THE SYSTEM.
   c. ALL VIDEO WALLS AND LARGE SPEAKER CLUSTERS SHALL BE LOWERED TO THE DECK AND/OR GROUND AND SECURED.
   d. LOWERING OF SCRIM OR EQUIPMENT SHALL BE DONE FROM THE GROUND BY MEANS OF REMOTELY ACTIVATED EQUIPMENT SUCH AS MOTORS OR MECHANICAL RELEASES.
9. **AT WINDS SPEEDS IN EXCESS OF 67 MPH**:
   a. ALL PERSONNEL SHOULD MAINTAIN SAFE DISTANCE FROM THE ROOF SYSTEM.
10. THE HIGH WIND ACTION PLAN SHALL BE POSTED AT A CONSPICUOUS AREA ON SITE. IT MUST BE AVAILABLE AT ALL TIMES TO VENUE OPERATORS AND CREW.
11. FAILURE TO FOLLOW THE HIGH WIND ACTION PLAN MAY RESULT IN COLLAPSE OF THE ROOF SYSTEM, DAMAGE TO EQUIPMENT AND INJURY TO PERSONS.
12. IN THE EVENT OF A HURRICANE OR TROPICAL STORM, THE STRUCTURE IS REQUIRED TO BE COMPLETELY DISMANTLED AND REMOVED FROM THE SITE IF TIME PERMITS. IF ADEQUATE TIME IS NOT AVAILABLE THEN ALL SKINS, INCLUDING ROOF SKIN SHALL BE REMOVED FROM THIS STRUCTURE AND THE GRID SHALL BE LOWERED TO THE DECK.

WHEN THE SYSTEM IS NOT IN USE OR LEFT UNSUPERVISED

1. ALL VIDEO WALLS ARE REQUIRED TO BE LOWERED TO THE GROUND AND SECURED WHERE POSSIBLE.
2. ALL LARGE SPEAKER CLUSTERS SHALL BE LOWERED TO THE GROUND AND SECURED ONLY WHEN INCLEMENT WEATHER IS ANTICIPATED.

SNOW/RAIN REMOVAL

1. THE ROOF SKIN HAS NOT BEEN DESIGNED TO SUPPORT PONDED WATER OR SNOW. REMOVE ANY AND ALL SUCH ACCUMULATIONS.

SEISMIC LOADS

1. IN THE EVENT OF AN EARTHQUAKE, THE EVENT SHALL BE SUSPENDED UNTIL SUCH TIME THAT THE ROOF STRUCTURE HAS BEEN INSPECTED BY A COMPETENT PERSON ON SITE.

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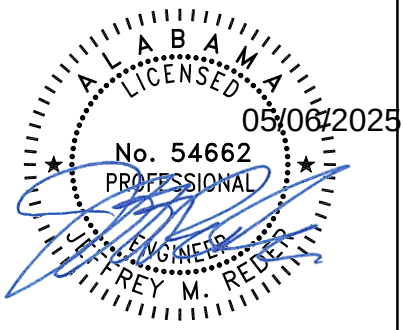	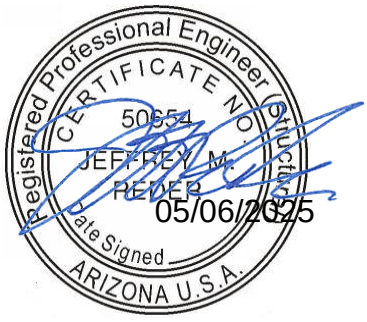	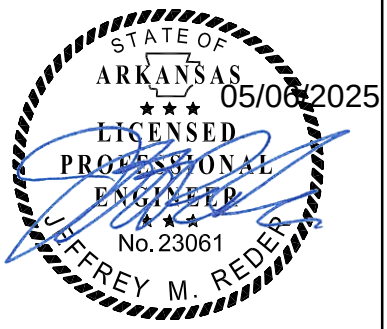
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		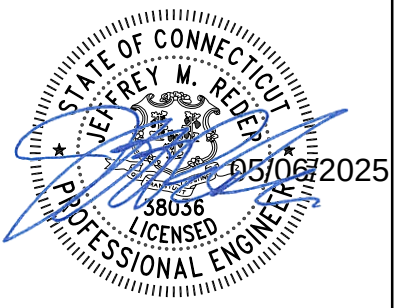
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	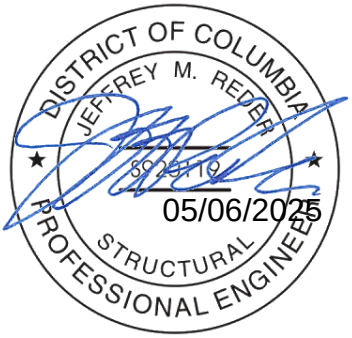	
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Project: EZ-20
Client: Eurostage

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Engineer: TPF

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	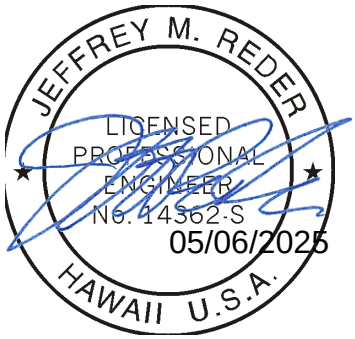	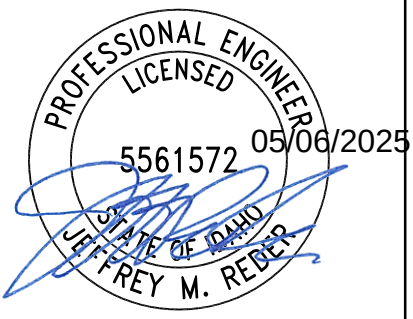
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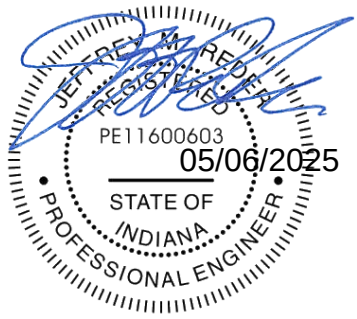
 Clark Reder Engineering, Inc. is a professional design firm registered in Illinois #184.006693		
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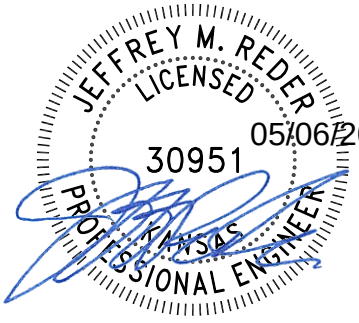	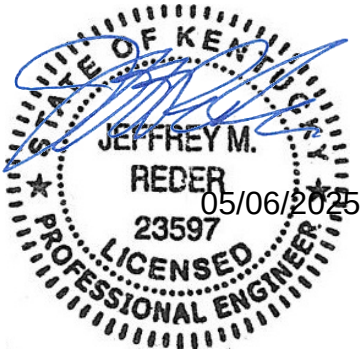	
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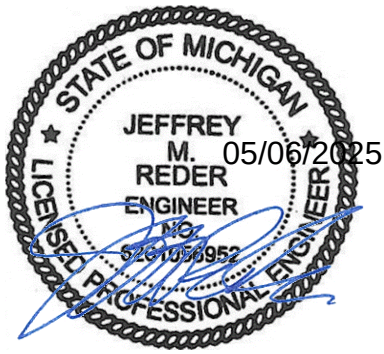

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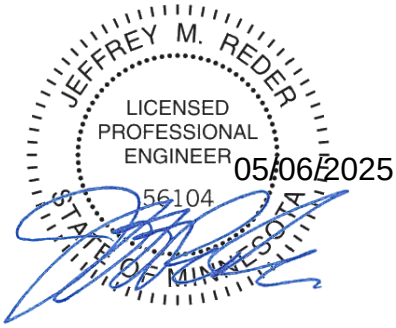

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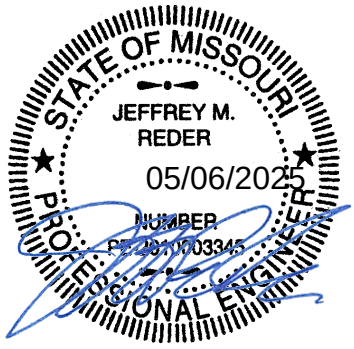

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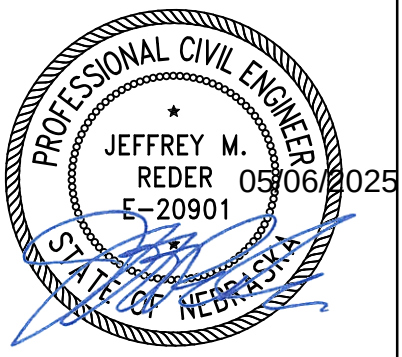

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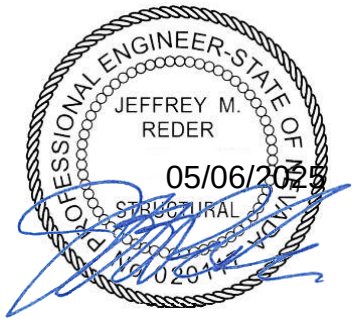	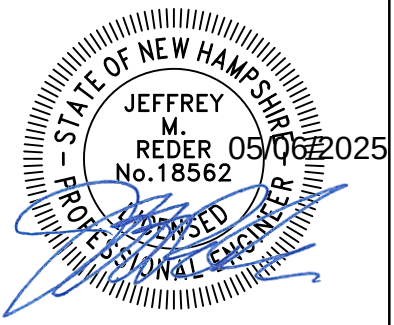	
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	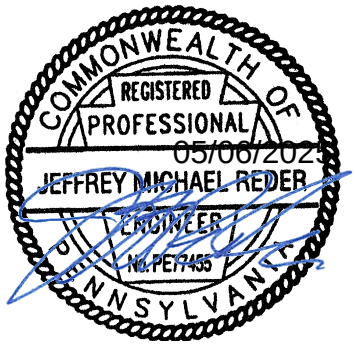	
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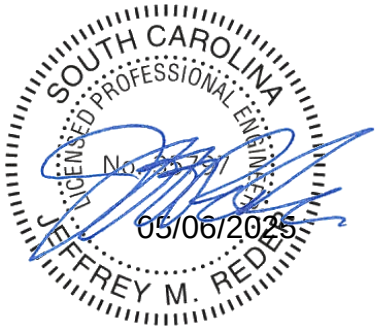		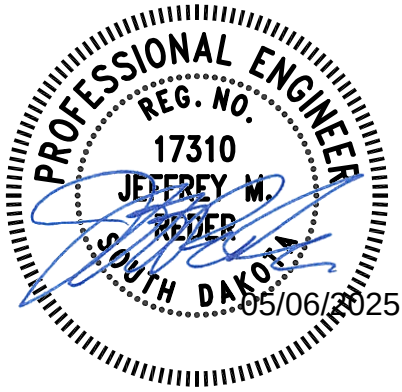
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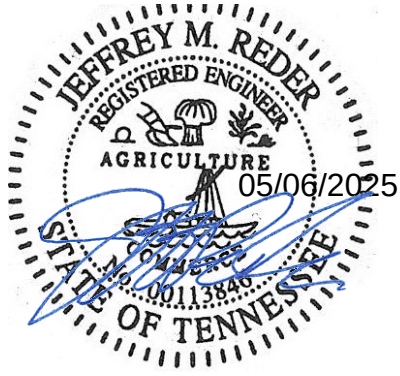
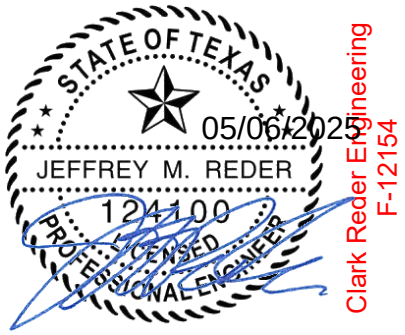
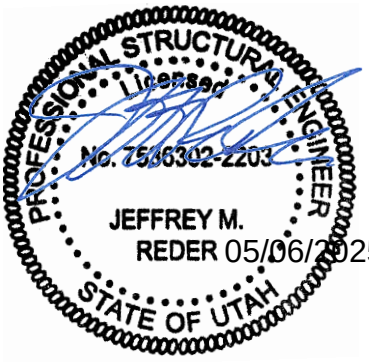
	 Clark Reder Engineering F-12154	
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Vermont	Virginia	Washington
		
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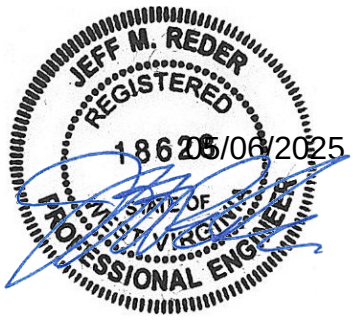
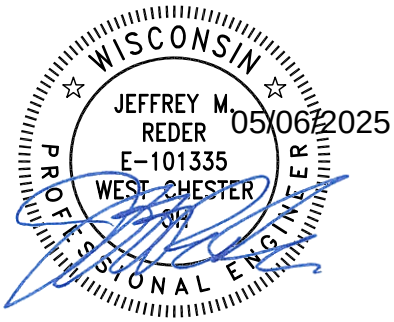
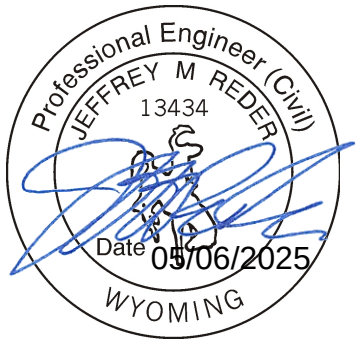
West Virginia	**Wisconsin**	**Wyoming**
		
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