

# COMMERCIAL GRADE SHELTER(S)

The Naval Research Laboratory (NRL) has a requirement for a contractor to provide three commercial grade shelters in support of the Advanced Multi-Functioned RF- Concept (AMRFC) Program. This addition will be known as the Multi-Function Electronic Warfare Facility (MFEW). The 3 shelters of the MFEW facility, will be co-located at NRL, Chesapeake Bay Section, Chesapeake Beach, MD. with the AMRFC program which consists of 8 trailers and a power pallet, chiller and dry air system, which are all connected together both electrically and mechanically. MFEW is the next stage of the AMRFC program. It will add three trailers to the facility and considerable electronic capability. The construction for the AMRFC program is shown below in figure A. The contractor will deliver these shelters to the MFEW site at NRL's Chesapeake Bay Section, Chesapeake Beach, MD. but will not be required to install them as depicted in the following drawings and as outlined below. A full set of all written documentation customarily provided to the public with a commercial item shall be provided. The contractor shall offer the Government at least the same warranty terms, including offers of extended warranties, offered to the general public in customary commercial practice. These warranty terms must be included in the system price. The period of the warranty shall begin upon acceptance.

AMRFC

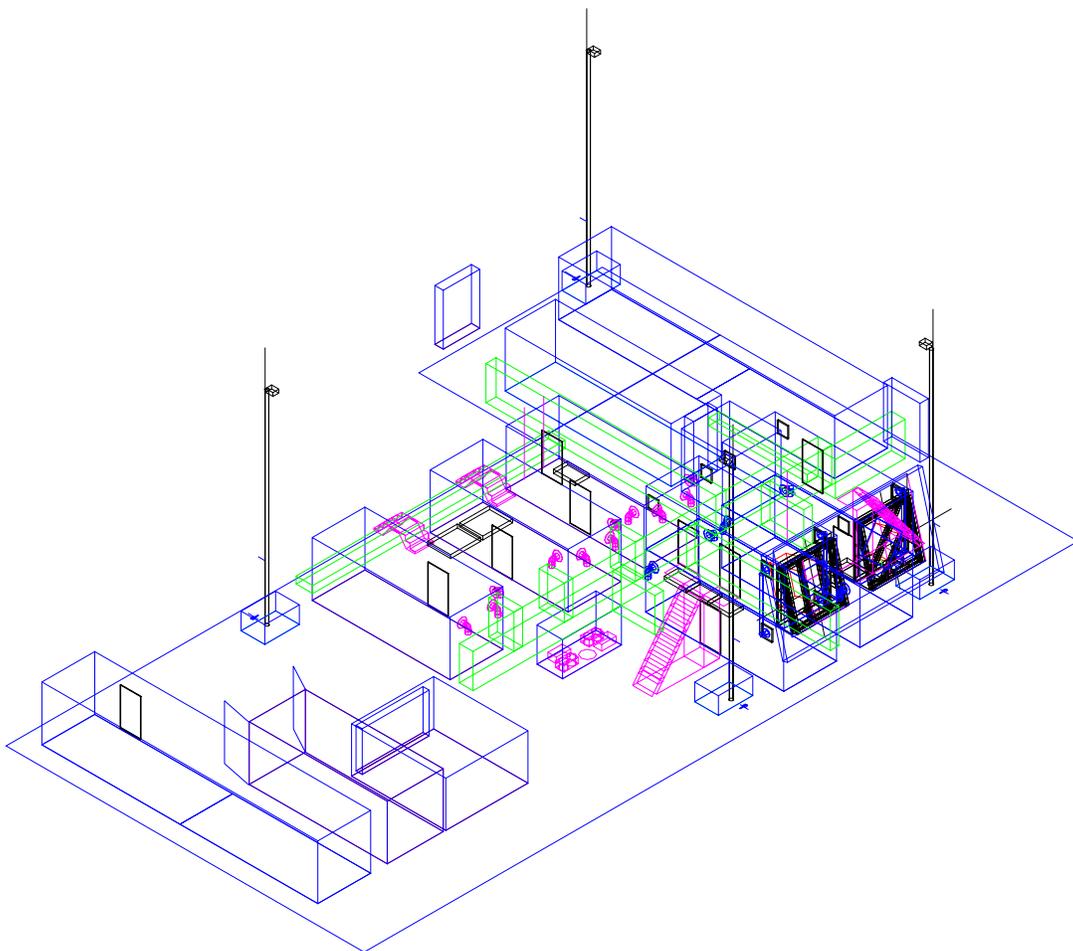


FIGURE A

MFEW ESSENTIALLY SITS ON AMERFC IN THREE SHELTERS WHEN ADDED TO THE FACILITY IS DEPICTED BELOW IN FIGURE B.

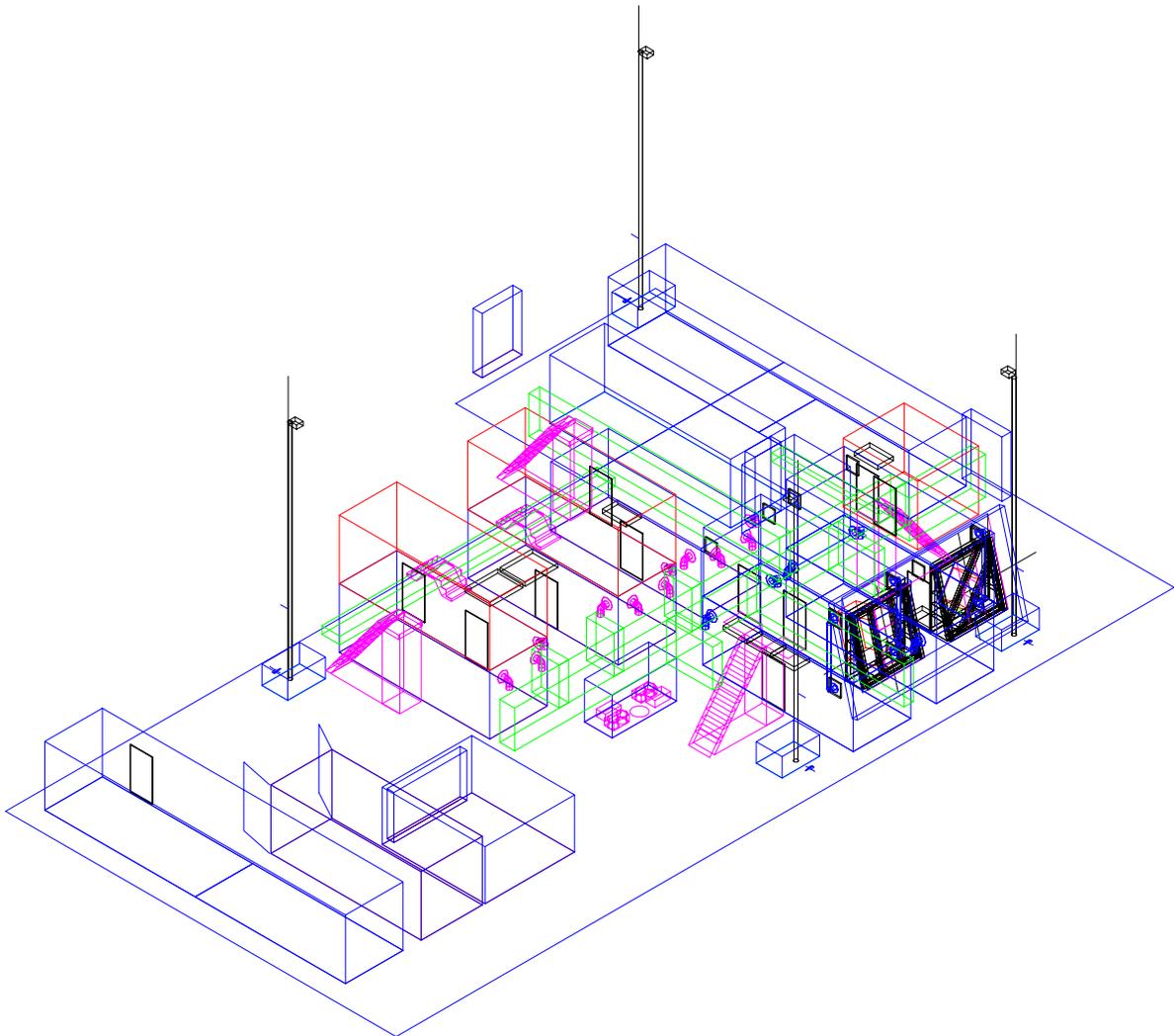


FIGURE B

THE SHELTER INTERFACE DETAILS OF MFEW – AMFRC SHOWN BELOW  
IN RED OF FIGURE C

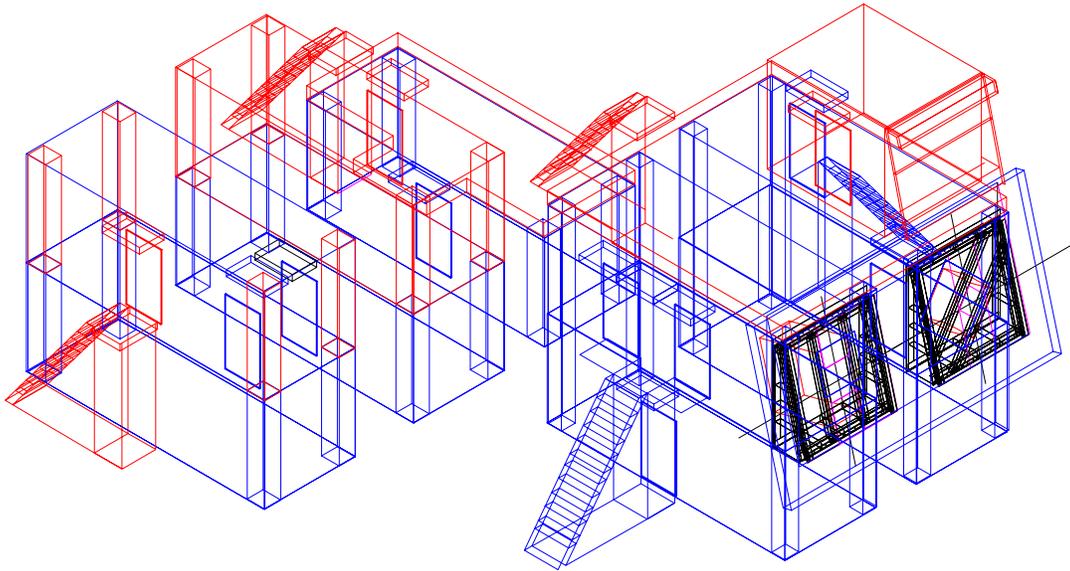


FIGURE C

The Contractor shall provide three commercial grade shelters as follows:

**BASIC UNIT 1: BELOW DECK ELECTRONIC TRAILER, FIGURE 1**

**THE COMPONENTS FOR THIS SHELTER MUST BE OF A COMERCIAL GRADE, MEET THE FOLLOWING CRITERIA AND BE SEA WORTHY<sup>1</sup> AFTER ASSEMBLY.**

1. NON-EXPANDABLE 20 FT ISO TYPE SHELTER: NOMINAL EXTERNAL DIMENSIONS OF 20 FT X 8 FT X 8 FT
  
2. EMI PROTECTION: THE SHELTER IS TO PROVIDE EMI PROTECTION GREATER THAN 40 dB OF SHIELDING EFFECTIVENESS AT FREQUENCIES BETWEEN 150 kHz AND 10 GHz (18 GHz PREFERABLE) WHEN COMPLETELY MANUFACTURED AND FULLY ASSEMBLED INCLUDING ANY PENETRATION OF THE SHELTER SKIN FOR ELECTRICAL WIRING, ITS BREAK OUT PANELS, AC UNIT, TRANSFORMER, DOOR, EMI FILTER, SURGE SUPPRESSOR, SPECIAL MODIFICATIONS, PALLET, ETC. A FACTORY FLOOR TEST OF THIS REQUIREMENT MUST BE PERFORMED AND DOCUMENTATION OF THE RESULTS MUST BE PROVIDED TO NRL.
  
3. HEATING AND AIR CONDITIONING UNIT MEETING (2) ABOVE: END MOUNTED AS SHOWN IN THE ATTACHED SKETCH, NOMINAL CAPACITY OF 2 TON HEATING, 4 TON COOLING, AND DEHUMIDIFICATION CIRCUIT (FOR AT SEA CLIMACTIC CONDITIONS), HUMIDISTAT, TEMPERATURE AND MODE CONTROL, 440 TO 480 Vac, 3 PHASE, 60 Hz PROVIDED BY AN EXTERNAL POWER LINE WITH A WEATHERPROOF, PIN AND SLEEVE, BREAKABLE RECEPTACLE ASSEMBLY (MALE ONLY) WITH LOCAL DISCONNECT. DUCTING TO BE

---

<sup>1</sup> SEA WORTHY IS DEFINED AS STRUCTURALLY CAPABLE OF SURVIVAL, IN A NON-OPERATIONAL STATUS, WITH LOAD FACTORS AS FOLLOWS:

$$\begin{aligned}G(\text{LONGITUDINAL}) &= 0.3 \\G(\text{PORT OR STARBOARD}) &= 0.8 \\G(\text{VERTICAL}) &= 1.67 \text{ DOWN} / .3 \text{ UP}\end{aligned}$$

CEILING MOUNTED BETWEEN THE LIGHTS AND LONGITUDINAL WALLS AS SHOWN IN FIGURE 1.

4. ALL SHELTERS ARE TO BE STACKABLE, SKID MOUNTED / FORKLIFT MANEUVERABLE AND CRANE LIFTABLE.

5. LIGHTING: 8 FIXTURES IN TWO ROWS, EACH FIXTURE CONTAINS (4) 40 WATT, 48 INCH FLORESCENTS, TWO RED AND TWO WHITE. THE 8 FIXTURES ARE TO BE WIRED TO TWO SWITCHES SUCH THAT ALL RED OR ALL WHITE FLORESENTS CAN BE ILLUMINATED OR TURNED OFF SEPARATELY, THE FIXTURES WILL BE EVENLY SPACED, LOCATED APPROXIMATELY ONE FOOT TOWARDS THE CENTER OF THE SHELTER FROM THE LONGITUDINAL WALLS AS SHOWN IN FIGURE 1. EACH FLORESCENT WILL BE EQUIPPED WITH AN RF FILTER FOR EMI SUPPRESSION.

6. EXTERIOR / INTERIOR WALLS AND FLOOR FINISH: MANUFACTURERS STANDARD

7. CABLE TROUGH: LADDER STYLE, "DOG BONE" SHAPED, NOMINALLY 4 IN X 24 IN X 19 FT LONG, MOUNTED 24 INCHES FROM THE WALL OPPOSITE THE DOOR, 4 INCHES BELOW THE CEILING AS SHOWN IN FIGURE 1.

8. DOOR, MEETING 2 ABOVE: A STANDARD WEATHER TIGHT DOOR, OPENING OUTWARD, WITH A NOMINAL OPENING OF 48" X 76" IS TO BE SIDE MOUNTED ON THE SHELTER AS SHOWN IN FIGURE 1.

9. ELECTRICAL / FIBER OPTIC BREAK OUT PANELS: (6) REMOVABLE 2 FT X 2 FT PANELS LOCATED ON THE INSIDE OF THE WELDED FRAME (SEE APPENDIX) IN THE POSITION SHOWN ON FIGURE 1. ALL SIX PANELS ARE TO HAVE "ELEPHANT TRUNK" WEATHER PROTECTORS WITH TIE OFF'S INSTALLED AT EACH PANEL. EACH PANEL AND EVERY SUB-PANEL AS SHOWN IN APPENDIX 1 AS BREAKOUT PANEL 1, ARE TO MEET 2 ABOVE.

10. EQUIPMENT POWER LINE TRANSFORMER: THIS SHELTER WILL HAVE AN END MOUNTED "ISOLATION" TRANSFORMER CAPABLE OF HANDLING 45 kVa, 440 TO 480 Vac, 3 PHASE DELTA INPUT, 120/208 VAC 3 PHASE WYE OUTPUT, 60 HZ WITH A WEATHERPROOF, PIN AND SLEEVE, BREAKABLE, RECEPTACLE ASSEMBLY (MALE ONLY). THE MINIMUM SPECIFICATION IS NOTED BELOW:

EQUIPMENT POWER LINE

45 kVa TRANSFORMER IS A SOLA #3H13T2H45S WITH A NEMA 3R WEATHER TIGHT, SHIELDED ENCLOSURE.

11. SURGE SUPPRESSOR FOR THE TRANSFORMER: THIS SHELTER WILL HAVE AN END MOUNTED SURGE SUPPRESSOR FOR THE TRANSFORMER (DEFINED IN 10 ABOVE) POWER LINE PENETRATION LEADING TO ITS DISTRIBUTION BOX. THE MINIMUM SPECIFICATION FOR THE SUPPRESSOR IS NOTED BELOW

#### TRANSFORMER POWER LINE

45 kVa 120/208V 3 PHASE wye SURGE SUPPRESSOR, ITD OF DESTIN INC., MODEL # ITD80-120/208-USN.

12. POWER DISTRIBUTION BOX: PROVIDES CIRCUIT BREAKERS FOR ALL INTERNAL CIRCUITS WITHIN THE SHELTER INCLUDING, BUT NOT LIMITED TO LIGHTS, FANS, OUTLETS, ETC. AS SHOWN IN FIGURE 1.

13. INTERNAL EQUIPMENT POWER DISTRIBUTION: (8) 30 AMP 120/208 Vac 60 Hz TWIST LOCK OUTLETS (L5-30R RECEPTICLES), EVENLY SPACED LONGITUDINALLY, CEILING MOUNTED OFF CENTER BETWEEN THE CABLE TROUGH AND THE LIGHTS AS SHOWN IN FIGURE 1.

ADDITIONALLY, THERE SHALL BE 8 STANDARD DUAL PLUG OUTLETS FOR 20 AMP SERVICE, TWO ON EACH SIDE OF THE CENTER MOUNTED DOOR, WALL MOUNTED, EVENLY SPACED LONGITUDINALLY, 16 INCHES FROM THE FLOOR AND 4 ON THE OPPOSITE WALL MOUNTED SIMILARLY AS SHOWN IN FIGURE 1. EACH OUTLET WILL HAVE A GROUND FAULT INTERRUPT (GFI)

14. GROUNDING: ONE GROUND BUS BAR, CEILING MOUNTED OFF CENTER, 19 FEET LONG, PARALLEL AND ADJACENT TO THE TWIST LOCK OUTLETS AS SHOWN IN FIGURE 1.

15. FLOOR: ¼" STEEL, WELDED CONTINUOUSLY AROUND ITS PERIFERY TO MEET 2 ABOVE. THE FLOOR IS TO BE ATTACHED TO THE WOOD BASE SO THAT IT MEETS THE "SEA WORTHY" REQUIREMENT ABOVE. THE ATTACHMENT POINTS ARE TO BE WELDED OVER AND GROUND FLAT TO MEET 2 ABOVE.

16. WALL MOUNTED RACK STABILIZATION SYSTEM<sup>2</sup>: CONTINUOUS 18 FT LONG UNISTRUT, ATTACHED TO THE LONGITUDINAL WALL OPPOSITE THE DOOR, 72 INCHES FROM THE FLOOR TO HORIZONTALLY AND LONGITUDINALLY SUPPORT STANDARD RACKS (24" W X 30" D X 70" H) AND EQUIPMENT WEIGHING 500 LBS. THE ATTACHMENT SYSTEM MUST MEET 2 ABOVE.

FLOOR MOUNTED RACK STABILIZATION SYSTEM<sup>2</sup>: 2 UNISTRUT LENGTHS CONTINUOUS 18 FT LONG, TO SUPPORT STANDARD RACKS AND EQUIPMENT WEIGHING 500 LBS. IN THE VERTICAL AND LOGITUDINAL DIRECTION, THE FIRST UNISTRUT LENGTH WILL BE ATTACHED TO THE WALL 24" FROM THE LONGITUDINAL WALL OPPOSITE THE DOOR. THE SECOND IS TO BE ATTACHED TO THE FLOOR TBD<sup>3</sup> FROM THE FIRST UNISTRUT, PARALLEL TO IT. THE ATTACHMENT SYSTEM MUST MEET 2 ABOVE.

17. SAFETY EQUIPMENT: FIRE EXTINGUISHER, BATTERY POWERED EMERGENCY LIGHTING AND FIRST AID KIT.

18. FOLD UP WORK / WRITING SHELF, 2 EACH SHELTER: 12 INCHES WIDE, 42 INCHES LONG, EVENLY SPACED, ONE EACH SIDE OF THE DOOR, MOUNTED 29 INCHES FROM THE FLOOR.

19. SECURITY: A KNOB TYPE CIPHER LOCK WITH A KEY PASS THROUGH AND A PROTECTIVE SYSTEM CONSISTING OF FLANGING FOR AND A LOCKING BAR AND PAD LOCK ON THE SHELTER DOOR AS WAS DONE ON AMRFC. (APPENDIX 4)

20. COOLANT AND COMPRESSED AIR ENTRY PANEL: A 1' X 2' X ¼" STEEL PANEL, POSITIONED AS SHOWN IN FIGURE 1. THE PANEL MOUNTING WILL MEET 2 ABOVE.

21. SHELTER INSULATION: TO PROVIDE A HEAT TRANSFER COEFFICIENT OF .25 BTU/HR\*FT<sup>2</sup>/°F FOR OPERATION BETWEEN -40 °F AND 125 °F PLUS A SOLAR LOAD.

22. WIRING INTER-CONNECTION: ALL WIRING BETWEEN THE TRANSFORMER AND ITS SURGE SUPPRESSOR, THE SURGE SUPPRESSOR AND ITS DISTRIBUTION BOX, BETWEEN THE EMI FILTERS AND THE DISTRIBUTION BOXES OR BETWEEN THE DISTRIBUTION BOX AND THE INTERNAL OUTLETS, LIGHTS, ETC., I.E., WHETHER INSIDE OR OUTSIDE, SHALL MEET ALL COMMERCIAL STANDARD CODE

---

<sup>2</sup> The wall and floor mounting system are to meet the 'sea worthy' criteria with seven racks attached to both the wall mounted and floor mounted stabilization system. Analytical documentation must be provided.

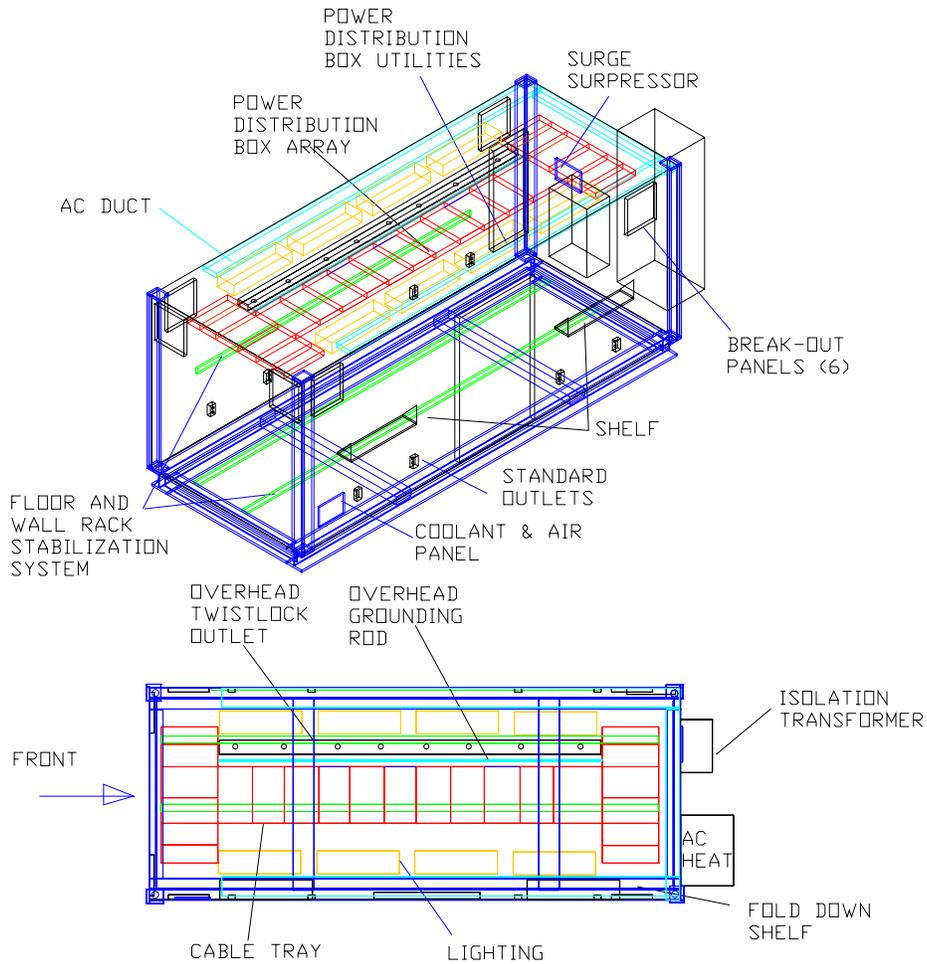
<sup>3</sup> The distance depends on the rack selected.

APPLICABLE FOR WEATHER TIGHTNESS, EMI (AS SPECIFIED IN 2 ABOVE), SAFETY, ETC. PROTECTION.

23. MANUFACTURING PRACTICES: BEST COMMERCIAL MANUFACTURING PRACTICES ARE TO BE USED UNLESS OTHERWISE SPECIFIED. ALL MATERIALS USED IN CONSTRUCTION OF THE SHELTERS, WHICH ARE PRONE TO DETERIORATION DUE TO ENVIRONMENTAL CORROSIVES, ARE TO BE PROTECTED.

24. MATERIAL / PROCESS CONTAMINATION: THE MANUFACTURER IS TO CERTIFY THAT ALL THE MATERIALS USED AND OR PROCESSES INVOLVED IN THE CONSTRUCTION OF THE SHELTERS RENDER THE SHELTERS FREE OF TOXINS, CARCINOGENS OR ANY OTHER FOREIGN AGENT WHICH COULD CAUSE HARM TO ANY OCCUPANT OF THE SHELTERS UNDER NORMAL USE AND THAT NONE OF THE MATERIALS USED AND OR PROCESSES INVOLVED IN THE CONSTRUCTION OF THE SHELTERS RENDER THE SHELTERS FREE OF GALVANTIC ACTION.

---



**FIGURE 1: BASIC UNIT 1**

**BASIC UNIT 2: SECURE TRAILER, FIGURE 2**

**THE COMPONENTS FOR THIS SHELTER MUST BE OF A COMERCIAL GRADE, MEET THE FOLLOWING CRITERIA AND BE SEA WORTHY<sup>4</sup> AFTER ASSEMBLY.**

<sup>4</sup> SEA WORTHY IS DEFINED AS STRUCTURALLY CAPABLE OF SURVIVAL, IN A NON-OPERATIONAL STATUS, WITH LOAD FACTORS AS FOLLOWS:

$$\begin{aligned} G(\text{LONGITUDINAL}) &= 0.3 \\ G(\text{PORT OR STARBOARD}) &= 0.8 \\ G(\text{VERTICAL}) &= 1.67 \text{ DOWN} / .3 \text{ UP} \end{aligned}$$

1. NON-EXPANDABLE 20 FT ISO TYPE SHELTER: NOMINAL EXTERNAL DIMENSIONS OF 20 FT X 8 FT X 8 FT
2. EMI PROTECTION: THE SHELTER IS TO PROVIDE EMI PROTECTION GREATER THAN 40 dB OF SHIELDING EFFECTIVENESS AT FREQUENCIES BETWEEN 150 kHz AND 10 GHz (18 GHz PREFERABLE) WHEN COMPLETELY MANUFACTURED AND FULLY ASSEMBLED INCLUDING ANY PENETRATION OF THE SHELTER SKIN FOR ELECTRICAL WIRING, ITS BREAK OUT PANELS, AC UNIT, TRANSFORMER, DOOR, EMI FILTER, SURGE SUPPRESSOR, SPECIAL MODIFICATIONS, PALLET, ETC. A FACTORY FLOOR TEST OF THIS REQUIREMENT MUST BE PERFORMED AND DOCUMENTATION OF THE RESULTS MUST BE PROVIDED TO NRL.
3. HEATING AND AIR CONDITIONING UNIT MEETING 2 ABOVE: END MOUNTED AS SHOWN IN THE ATTACHED SKETCH, NOMINAL CAPACITY OF 2 TON HEATING, 3 TON COOLING, AND DEHUMIDIFICATION CIRCUIT (FOR AT SEA CLIMACTIC CONDITIONS), HUMIDISTAT, TEMPERATURE AND MODE CONTROL, 440 TO 480 Vac, 3 PHASE, 60 Hz PROVIDED BY AN EXTERNAL POWER LINE WITH A WEATHERPROOF, PIN AND SLEEVE, BREAKABLE RECEPTACLE ASSEMBLY (MALE ONLY) WITH LOCAL DISCONNECT. DUCTING TO BE CEILING MOUNTED BETWEEN THE LIGHTS AND LONGITUDINAL WALLS AS SHOWN IN FIGURE 2.
4. ALL SHELTERS ARE TO BE STACKABLE, SKID MOUNTED / FORKLIFT MANEUVERABLE AND CRANE LIFTABLE.
5. LIGHTING: 8 FIXTURES IN TWO ROWS, EACH FIXTURE CONTAINS (4) 40 WATT, 48 INCH FLORESENTS, TWO RED AND TWO WHITE. THE 8 FIXTURES ARE TO BE WIRED TO TWO SWITCHES SUCH THAT ALL RED OR ALL WHITE FLORESENTS CAN BE ILLUMINATED OR TURNED OFF SEPARATELY, THE FIXTURES WILL BE EVENLY SPACED, LOCATED APPROXIMATELY ONE FOOT TOWARDS THE CENTER OF THE SHELTER FROM THE LONGITUDINAL WALLS AS SHOWN IN FIGURE 2. EACH FLORESCENT WILL BE EQUIPPED WITH AN RF FILTER FOR EMI SUPPRESSION.
6. EXTERIOR / INTERIOR WALLS AND FLOOR FINISH: MANUFACTURERS STANDARD
7. CABLE TROUGH: LADDER STYLE, "DOG BONE" SHAPED, NOMINALLY 4 IN X 24 IN X 19 FT LONG, MOUNTED 24 INCHES FROM THE WALL OPPOSITE THE DOOR, 4 INCHES BELOW THE CEILING AS SHOWN IN FIGURE 2.

8. DOOR, MEETING 2 ABOVE: A STANDARD WEATHER TIGHT DOOR, OPENING OUTWARD, WITH A NOMINALLY OPENING OF 48" X 76" IS TO BE SIDE MOUNTED ON THE SHELTER AS SHOWN IN FIGURE 2.

9. ELECTRICAL / FIBER OPTIC BREAK OUT PANELS: (4) REMOVABLE 2 FT X 2 FT PANELS LOCATED ON THE INSIDE OF THE WELDED FRAME (SEE APPENDIX) IN THE POSITION SHOWN ON FIGURE 2. ALL SIX PANELS ARE TO HAVE "ELEPHANT TRUNK" WEATHER PROTECTORS WITH TIE OFF'S INSTALLED AT EACH PANEL. EACH PANEL AND EVERY SUB-PANEL AS SHOWN IN THE APPENDIX: AS BREAKOUT PANEL 2, ARE TO MEET 2 ABOVE.

10. EQUIPMENT POWER LINE TRANSFORMER: THIS SHELTER WILL HAVE AN END MOUNTED "ISOLATION" TRANSFORMER CAPABLE OF HANDLING 45 kVa, 440 TO 480 Vac, 3 PHASE DELTA INPUT, 120/208 VAC 3 PHASE WYE OUTPUT, 60 HZ WITH A WEATHERPROOF, PIN AND SLEEVE, BREAKABLE, RECEPTACLE ASSEMBLY (MALE ONLY). THE MINIMUM SPECIFICATION IS NOTED BELOW:

#### EQUIPMENT POWER LINE

45 kVa TRANSFORMER IS A SOLA #3H13T2H45S WITH A NEMA 3R WEATHER TIGHT, SHIELDED ENCLOSURE.

11. SURGE SUPPRESSOR FOR THE TRANSFORMER: THIS SHELTER WILL HAVE AN END MOUNTED SURGE SUPPRESSOR FOR THE TRANSFORMER (DEFINED IN 10 ABOVE) POWER LINE PENETRATION LEADING TO ITS DISTRIBUTION BOX. THE MINIMUM SPECIFICATION FOR THE SUPPRESSOR IS NOTED BELOW

#### TRANSFORMER POWER LINE

45 kVa 120/208V 3 PHASE wye SURGE SUPPRESSOR, ITD OF DESTIN INC., MODEL # ITD80-120/208-USN.

12. POWER DISTRIBUTION BOX: PROVIDES CIRCUIT BREAKERS FOR ALL INTERNAL CIRCUITS WITHIN THE SHELTER INCLUDING BUT NOT LIMITED TO LIGHTS, FANS, OUTLETS, ETC. AS SHOWN IN FIGURE 2.

13. INTERNAL EQUIPMENT POWER DISTRIBUTION: (8) 30 AMP 120/208 Vac 60 Hz TWIST LOCK OUTLETS (L5-30R RECEPTICLES), EVENLY SPACED LONGITUDINALLY, CEILING MOUNTED OFF CENTER BETWEEN THE CABLE TROUGH AND THE LIGHTS AS SHOWN IN FIGURE 2.

ADDITIONALLY, THERE SHALL BE 8 STANDARD DUAL PLUG OUTLETS FOR 20 AMP SERVICE, TWO ON EACH SIDE OF THE CENTER MOUNTED DOOR, WALL MOUNTED, EVENLY SPACED LONGITUDINALLY, 16 INCHES FROM THE FLOOR AND 4 ON THE OPPOSITE WALL MOUNTED SIMILARLY AS SHOWN IN FIGURE 2. EACH OUTLET WILL HAVE A GROUND FAULT INTERRUPT (GFI).

14. GROUNDING: ONE GROUND BUS BAR, CEILING MOUNTED OFF CENTER, 19 FEET LONG, PARALLEL AND ADJACENT TO THE TWIST LOCK OUTLETS AS SHOWN IN FIGURE 2.

15. FLOOR: ¼" STEEL, WELDED CONTINUOUSLY AROUND ITS PERIFERY TO MEET 2 ABOVE. THE FLOOR IS TO BE ATTACHED TO THE WOOD BASE SO THAT IT MEETS THE "SEA WORTHY" REQUIREMENT ABOVE. THE ATTACHMENT POINTS ARE TO BE WELDED OVER AND GROUND FLAT TO MEET 2 ABOVE.

16. WALL MOUNTED RACK STABILIZATION SYSTEM<sup>5</sup>: CONTINUOUS 18 FT LONG UNISTRUT, ATTACHED TO THE LONGITUDINAL WALL OPPOSITE THE DOOR, 72 INCHES FROM THE FLOOR TO HORIZONTALLY AND LONGITUDINALLY SUPPORT STANDARD RACKS (24" W X 30" D X 70" H) AND EQUIPMENT WEIGHING 500 LBS. THE ATTACHMENT SYSTEM MUST MEET 2 ABOVE.

FLOOR MOUNTED RACK STABILIZATION SYSTEM<sup>2</sup>: 2 UNISTRUT LENGTHS CONTINUOUS 18 FT LONG, TO SUPPORT STANDARD RACKS AND EQUIPMENT WEIGHING 500 LBS. IN THE VERTICAL AND LOGITUDINAL DIRECTION, THE FIRST UNISTRUT LENGTH WILL BE ATTACHED TO THE WALL 24" FROM THE LONGITUDINAL WALL OPPOSITE THE DOOR. THE SECOND IS TO BE ATTACHED TO THE FLOOR TBD<sup>6</sup> FROM THE FIRST UNISTRUT, PARALLEL TO IT. THE ATTACHMENT SYSTEM MUST MEET 2 ABOVE.

17. SAFETY EQUIPMENT: FIRE EXTINGUISHER, BATTERY POWERED EMERGENCY LIGHTING AND FIRST AID KIT.

18. FOLD UP WORK / WRITING SHELF, 2 EACH SHELTER: 12 INCHES WIDE, 42 INCHES LONG, EVENLY SPACED, ONE EACH SIDE OF THE DOOR, MOUNTED 29 INCHES FROM THE FLOOR.

---

<sup>5</sup> The wall and floor mounting system are to meet the 'sea worthy' criteria with seven racks attached to both the wall mounted and floor mounted stabilization system. Analytical documentation must be provided.

<sup>6</sup> The distance depends on the rack selected.

19. SECURITY: A KNOB TYPE CIPHER LOCK WITH A KEY PASS THROUGH AND A PROTECTIVE SYSTEM CONSISTING OF FLANGING FOR AND A LOCKING BAR AND PAD LOCK ON THE SHELTER DOOR AS WAS DONE ON AMRFC. (APPENDIX 4)

20. COOLANT AND COMPRESSED AIR ENTRY PANEL: A 1' X 2' X ¼" STEEL PANEL, POSITIONED AS SHOWN IN FIGURE 1. THE PANEL MOUNTING WILL MEET 2 ABOVE.

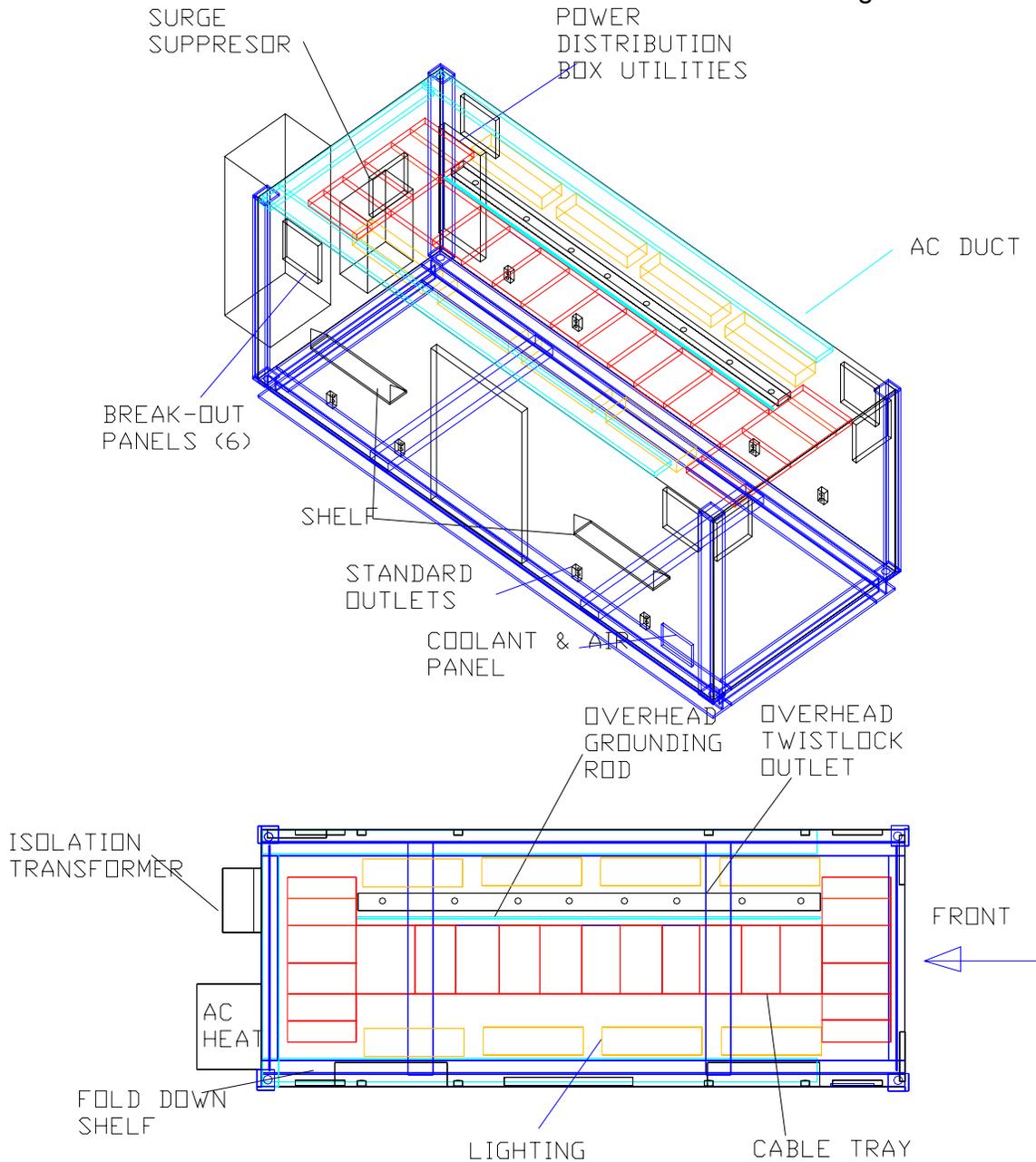
21. SHELTER INSULATION: TO PROVIDE A HEAT TRANSFER COEFFICIENT OF .25 BTU/HR\*FT<sup>2</sup>/°F FOR OPERATION BETWEEN -40 °F AND 125 °F PLUS A SOLAR LOAD.

22. WIRING INTER-CONNECTION: ALL WIRING BETWEEN THE TRANSFORMER AND ITS SURGE SUPPRESSOR, THE SURGE SUPPRESSOR AND ITS DISTRIBUTION BOX, BETWEEN THE EMI FILTERS AND THE DISTRIBUTION BOXES OR BETWEEN THE DISTRIBUTION BOX AND THE INTERNAL OUTLETS, LIGHTS, ETC., I.E., WHETHER INSIDE OR OUTSIDE, SHALL MEET ALL COMMERCIAL STANDARD CODE APPLICABLE FOR WEATHER TIGHTNESS, EMI (AS SPECIFIED IN 2 ABOVE), SAFETY, ETC. PROTECTION.

23. MANUFACTURING PRACTICES: BEST COMMERCIAL MANUFACTURING PRACTICES ARE TO BE USED UNLESS OTHERWISE SPECIFIED. ALL MATERIALS USED IN CONSTRUCTION OF THE SHELTERS, WHICH ARE PRONE TO DETERIORATION DUE TO ENVIRONMENTAL CORROSIVES, ARE TO BE PROTECTED.

24. MATERIAL / PROCESS CONTAMINATION: THE MANUFACTURE IS TO CERTIFY THAT ALL THE MATERIALS USED AND OR PROCESSES INVOLVED IN THE CONSTRUCTION OF THE SHELTERS RENDER THE SHELTERS FREE OF TOXINS, CARCINOGENS OR ANY OTHER FOREIGN AGENT WHICH COULD CAUSE HARM TO ANY OCCUPANT OF THE SHELTERS UNDER NORMAL USE AND THAT NONE OF THE MATERIALS USED AND OR PROCESSES INVOLVED IN THE CONSTRUCTION OF THE SHELTERS RENDER THE SHELTERS FREE OF GALVANTIC ACTION.

---



**FIGURE 2 BASIC UNIT 2**

**BASIC UNIT 3: ABOVE DECK ARRAY TRAILER, FIGURE 3**

**THE COMPONENTS FOR THIS SHELTER MUST BE OF A COMERCIAL GRADE, MEET THE FOLLOWING CRITERIA AND BE SEA WORTHY<sup>7</sup> AFTER ASSEMBLY.**

<sup>7</sup> SEA WORTHY IS DEFINED AS STRUCTURALLY CAPABLE OF SURVIVAL, IN A NON-OPERATIONAL STATUS, WITH LOAD FACTORS AS FOLLOWS:

1. NON-EXPANDABLE 20 FT ISO TYPE SHELTER: NOMINAL EXTERNAL DIMENSIONS OF 10 FT X 8 FT X 8 FT
2. EMI PROTECTION: THE SHELTER IS TO PROVIDE EMI PROTECTION GREATER THAN 40 dB OF SHIELDING EFFECTIVENESS AT FREQUENCIES BETWEEN 150 kHz AND 10 GHz (18 GHz PREFERABLE) WHEN COMPLETELY MANUFACTURED AND FULLY ASSEMBLED INCLUDING ANY PENETRATION OF THE SHELTER SKIN FOR ELECTRICAL WIRING, ITS BREAK OUT PANELS, AC UNIT, TRANSFORMER, DOOR, EMI FILTER, SURGE SUPPRESSOR, SPECIAL MODIFICATIONS, PALLET, ETC. A FACTORY FLOOR TEST OF THIS REQUIREMENT MUST BE PERFORMED AND DOCUMENTATION OF THE RESULTS MUST BE PROVIDED TO NRL.
3. HEATING AND AIR CONDITIONING UNIT MEETING (2) ABOVE: END MOUNTED AS SHOWN IN THE ATTACHED SKETCH, NOMINAL CAPACITY OF 2 TON HEATING, 3 TON COOLING, AND DEHUMIDIFICATION CIRCUIT (FOR AT SEA CLIMACTIC CONDITIONS), HUMIDISTAT, TEMPERATURE AND MODE CONTROL, 440 TO 480 Vac, 3 PHASE, 60 Hz PROVIDED BY AN EXTERNAL POWER LINE WITH A WEATHERPROOF, PIN AND SLEEVE, BREAKABLE RECEPTACLE ASSEMBLY (MALE ONLY) WITH LOCAL DISCONNECT. DUCTING TO BE CEILING MOUNTED BETWEEN THE LIGHTS AND LONGITUDINAL WALLS AS SHOWN IN FIGURE 3.
4. ALL SHELTERS ARE TO BE STACKABLE, SKID MOUNTED / FORKLIFT MANEUVERABLE AND CRANE LIFTABLE.
5. LIGHTING: 4 FIXTURES IN TWO ROWS, EACH FIXTURE CONTAINS (4) 40 WATT, 48 INCH FLORESCENTS, TWO RED AND TWO WHITE. THE 8 FIXTURES ARE TO BE WIRED TO TWO SWITCHES SUCH THAT ALL RED OR ALL WHITE FLORESENTS CAN BE ILLUMINATED OR TURNED OFF SEPARATELY, THE FIXTURES WILL BE EVENLY SPACED, LOCATED APPROXIMATELY ONE FOOT TOWARDS THE CENTER OF THE SHELTER FROM THE LONGITUDINAL WALLS AS SHOWN IN FIGURE 3. EACH FLORESCENT WILL BE EQUIPPED WITH AN RF FILTER FOR EMI SUPPRESSION.
6. EXTERIOR / INTERIOR WALLS AND FLOOR FINISH: MANUFACTURERS STANDARD

7. CABLE TROUGH: LADDER STYLE, " T " SHAPED, NOMINALLY 4 IN X 24 IN X9 FT LONG, MOUNTED 24 INCHES FROM THE WALL OPPOSITE THE DOOR, 4 INCHES BELOW THE CEILING AS SHOWN IN FIGURE 1.

8. DOOR, MEETING (2) ABOVE: A STANDARD WEATHER TIGHT DOOR, OPENING OUTWARD, WITH A NOMINALLY OPENING OF 48" X 76" IS TO BE SIDE MOUNTED ON THE SHELTER AS SHOWN IN FIGURE 3.

9. ELECTRICAL / FIBER OPTIC BREAK OUT PANELS: (2) REMOVABLE 2 FT X 2 FT PANELS LOCATED ON THE INSIDE OF THE WELDED FRAME (SEE APPENDIX) IN THE POSITION SHOWN ON FIGURE 3. ALL SIX PANELS ARE TO HAVE "ELEPHANT TRUNK" WEATHER PROTECTORS WITH TIE OFF'S INSTALLED AT EACH PANEL. EACH PANEL AND EVERY SUB-PANEL AS SHOWN IN THE APPENDIX 1: AS BREAKOUT PANNEL 1, ARE TO MEET 2 ABOVE..

10. EQUIPMENT POWER LINE TRANSFORMER: THIS SHELTER WILL HAVE AN END MOUNTED "ISOLATION" TRANSFORMER CAPABLE OF HANDLING 45 kVa, 440 TO 480 Vac, 3 PHASE DELTA INPUT, 120/208 VAC 3 PHASE WYE OUTPUT, 60 HZ WITH A WEATHERPROOF, PIN AND SLEEVE, BREAKABLE, RECEPTACLE ASSEMBLY (MALE ONLY). THE MINIMUM SPECIFICATION IS NOTED BELOW:

#### EQUIPMENT POWER LINE

45 kVa TRANSFORMER IS A SOLA #3H13T2H45S WITH A NEMA 3R WEATHER TIGHT, SHIELDED ENCLOSURE.

11. SURGE SUPPRESSOR FOR THE TRANSFORMER: THIS SHELTER WILL HAVE AN END MOUNTED SURGE SUPPRESSOR FOR THE TRANSFORMER (DEFINED IN 10 ABOVE) POWER LINE PENETRATION LEADING TO ITS DISTRIBUTION BOX. THE MINIMUM SPECIFICATION FOR THE SUPPRESSOR IS NOTED BELOW

#### TRANSFORMER POWER LINE

45 kVa 120/208V 3 PHASE wye SURGE SUPPRESSOR, ITD OF DESTIN INC., MODEL # ITD80-120/208-USN.

12. POWER DISTRIBUTION BOX: PROVIDES CIRCUIT BREAKERS FOR ALL INTERNAL CIRCUITS WITHIN THE SHELTER INCLUDING, BUT NOT LIMITED TO LIGHTS, FANS, OUTLETS, ETC. AS SHOWN IN FIGURE 3.

13. INTERNAL EQUIPMENT POWER DISTRIBUTION: (4) 30 AMP 120/208 Vac 60 Hz TWIST LOCK OUTLETS (L5-30R RECEPTICLES), EVENLY SPACED LONGITUDINALLY, CEILING MOUNTED OFF CENTER BETWEEN THE CABLE TROUGH AND THE LIGHTS AS SHOWN IN FIGURE 3.

ADDITIONALLY, THERE SHALL BE 4 STANDARD DUAL PLUG OUTLETS FOR 20 AMP SERVICE, TWO ON EACH SIDE OF THE CENTER MOUNTED DOOR, WALL MOUNTED, EVENLY SPACED LONGITUDINALLY, 16 INCHES FROM THE FLOOR AND 4 ON THE OPPOSITE WALL MOUNTED SIMILARLY AS SHOWN IN FIGURE 3. EACH OUTLET WILL HAVE A GROUND FAULT INTERRUPT (GFI).

14. GROUNDING: ONE GROUND BUS BAR, CEILING MOUNTED OFF CENTER, 9 FEET LONG, PARALLEL AND ADJACENT TO THE TWIST LOCK OUTLETS AS SHOWN IN FIGURE 3.

15. FLOOR:  $\frac{1}{4}$ " STEEL, WELDED CONTINUOUSLY AROUND ITS PERIFERY TO MEET 2 ABOVE. THE FLOOR IS TO BE ATTACHED TO THE WOOD BASE SO THAT IT MEETS THE "SEA WORTHY" REQUIREMENT ABOVE. THE ATTACHMENT POINTS ARE TO BE WELDED OVER AND GROUND FLAT TO MEET 2 ABOVE.

STRUCTRUAL END MODIFICATION: STEEL AS SHOWN IN THE APPENDIX 1.

16. WALL MOUNTED RACK STABILIZATION SYSTEM<sup>8</sup>: CONTINUOUS 9 FT LONG UNISTRUT, ATTACHED TO THE LONGITUDINAL WALL OPPOSITE THE DOOR, 72 INCHES FROM THE FLOOR TO HORIZONTALLY AND LONGITUDINALLY SUPPORT STANDARD RACKS (24" W X 30" D X 70" H) AND EQUIPMENT WEIGHING 500 LBS. THE ATTACHMENT SYSTEM MUST MEET 2 ABOVE.

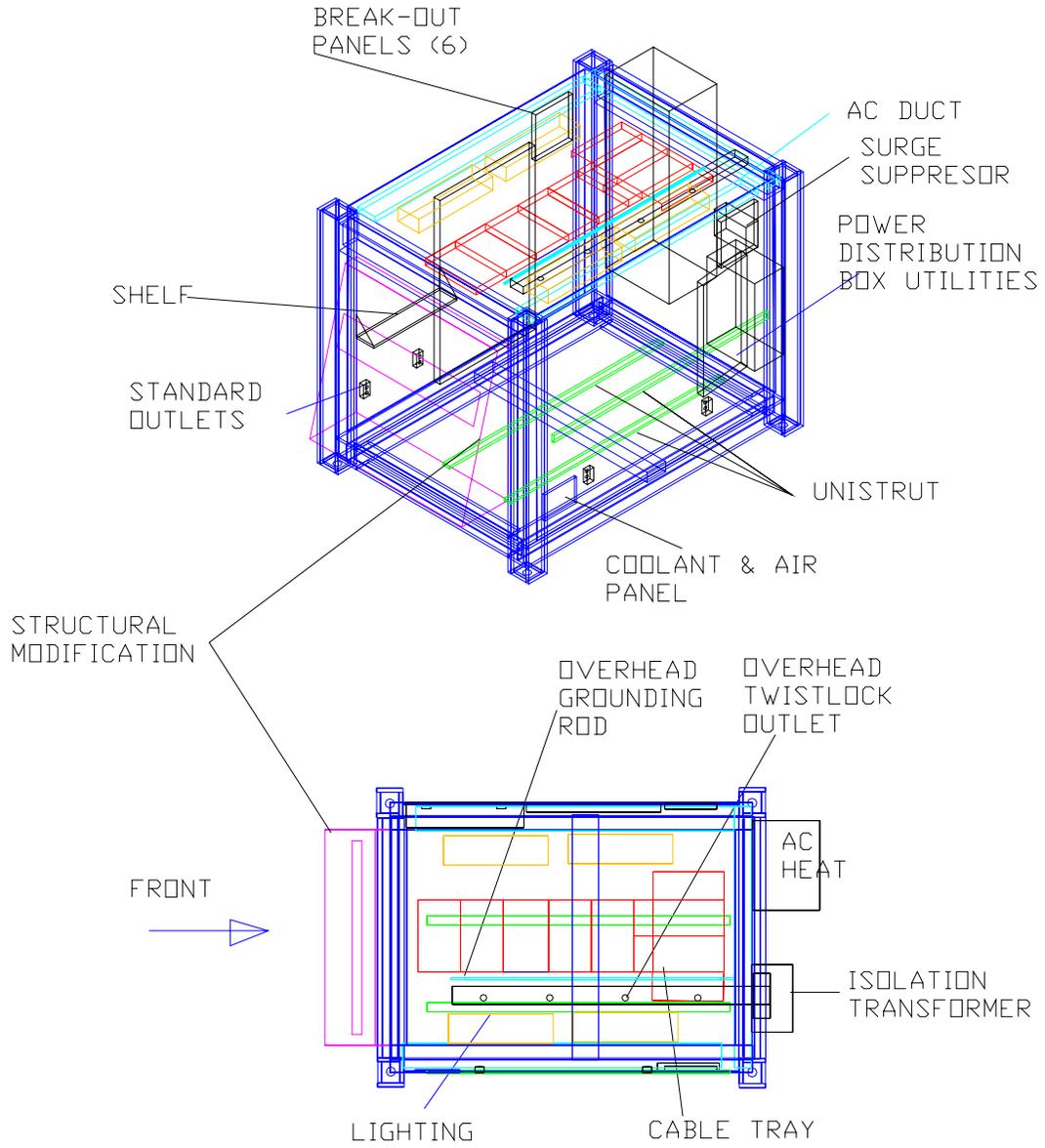
FLOOR MOUNTED RACK STABILIZATION SYSTEM<sup>2</sup>: 2 UNISTRTR LENGTHS CONTINUOUS 9 FT LONG, TO SUPPORT STANDARD RACKS AND EQUIPMENT WEIGHING 500 LBS IN THE VERTICAL AND LOGITUDINAL DIRECTION, THFIRST UNISTRUT LENGTH WILL BE ATTCHED TO THE WALL 24" FROM THE LONGITUDINAL WALL OPOSITE THE DOOR. THE SECOND IS TO BE ATTCHED TO THE FLOOR TBD<sup>9</sup> FROM THE FIRST UNISTRUT, PARALLEL TO IT. THE ATTACHMENT SYSTEM MUST MEET 2 ABOVE.

---

<sup>8</sup> The wall and floor mounting system are to meet the 'sea worthy' criteria with seven racks attached to both the wall mounted and floor mounted stabilization system. Analytical documentation must be provided.

<sup>9</sup> The distance depends on the rack selected.

17. SAFETY EQUIPMENT: FIRE EXTINGUISHER, BATTERY POWERED EMERGENCY LIGHTING AND FIRST AID KIT.
18. FOLD UP WORK / WRITING SHELF, 2 EACH SHELTER: 12 INCHES WIDE, 42 INCHES LONG, EVENLY SPACED, ONE EACH SIDE OF THE DOOR, MOUNTED 29 INCHES FROM THE FLOOR.
19. SECURITY: A KNOB TYPE CIPHER LOCK WITH A KEY PASS THROUGH AND A PROTECTIVE SYSTEM CONSISTING OF FLANGING FOR AND A LOCKING BAR AND PAD LOCK ON THE SHELTER DOOR AS WAS DONE ON AMRFC. (APPENDIX 4)
20. COOLANT AND COMPRESSED AIR ENTRY PANEL: A 1' X 2' X 1/4" STEEL PANEL, POSITIONED AS SHOWN IN FIGURE 3. THE PANEL MOUNTING WILL MEET 2 ABOVE.
21. SHELTER INSULATION: TO PROVIDE A HEAT TRANSFER COEFFICIENT OF .25 BTU/HR\*FT<sup>2</sup>/°F FOR OPERATION BETWEEN -40 °F AND 125 °F PLUS A SOLAR LOAD.
22. WIRING INTER-CONNECTION: ALL WIRING BETWEEN THE TRANSFORMER AND ITS SURGE SUPPRESSOR, THE SURGE SUPPRESSOR AND ITS DISTRIBUTION BOX, BETWEEN THE EMI FILTERS AND THE DISTRIBUTION BOXES OR BETWEEN THE DISTRIBUTION BOX AND THE INTERNAL OUTLETS, LIGHTS, ETC., I.E., WHETHER INSIDE OR OUTSIDE, SHALL MEET ALL COMMERCIAL STANDARD CODE APPLICABLE FOR WEATHER TIGHTNESS, EMI (AS SPECIFIED IN 2 ABOVE), SAFETY, ETC. PROTECTION.
23. MANUFACTURING PRACTICES: BEST COMMERCIAL MANUFACTURING PRACTICES ARE TO BE USED UNLESS OTHERWISE SPECIFIED. ALL MATERIALS USED IN CONSTRUCTION OF THE SHELTERS, WHICH ARE PRONE TO DETERIORATION DUE TO ENVIRONMENTAL CORROSIVES ARE TO BE PROTECTED.
24. MATERIAL / PROCESS CONTAMINATION: THE MANUFACTURER IS TO CERTIFY THAT ALL THE MATERIALS USED AND OR PROCESSES INVOLVED IN THE CONSTRUCTION OF THE SHELTERS RENDER THE SHELTERS FREE OF TOXINS, CARCINOGENS OR ANY OTHER FOREIGN AGENT WHICH COULD CAUSE HARM TO ANY OCCUPANT OF THE SHELTERS UNDER NORMAL USE AND THAT NONE OF THE MATERIALS USED AND OR PROCESSES INVOLVED IN THE CONSTRUCTION OF THE SHELTERS RENDER THE SHELTERS FREE OF GALVANIC ACTION.
-

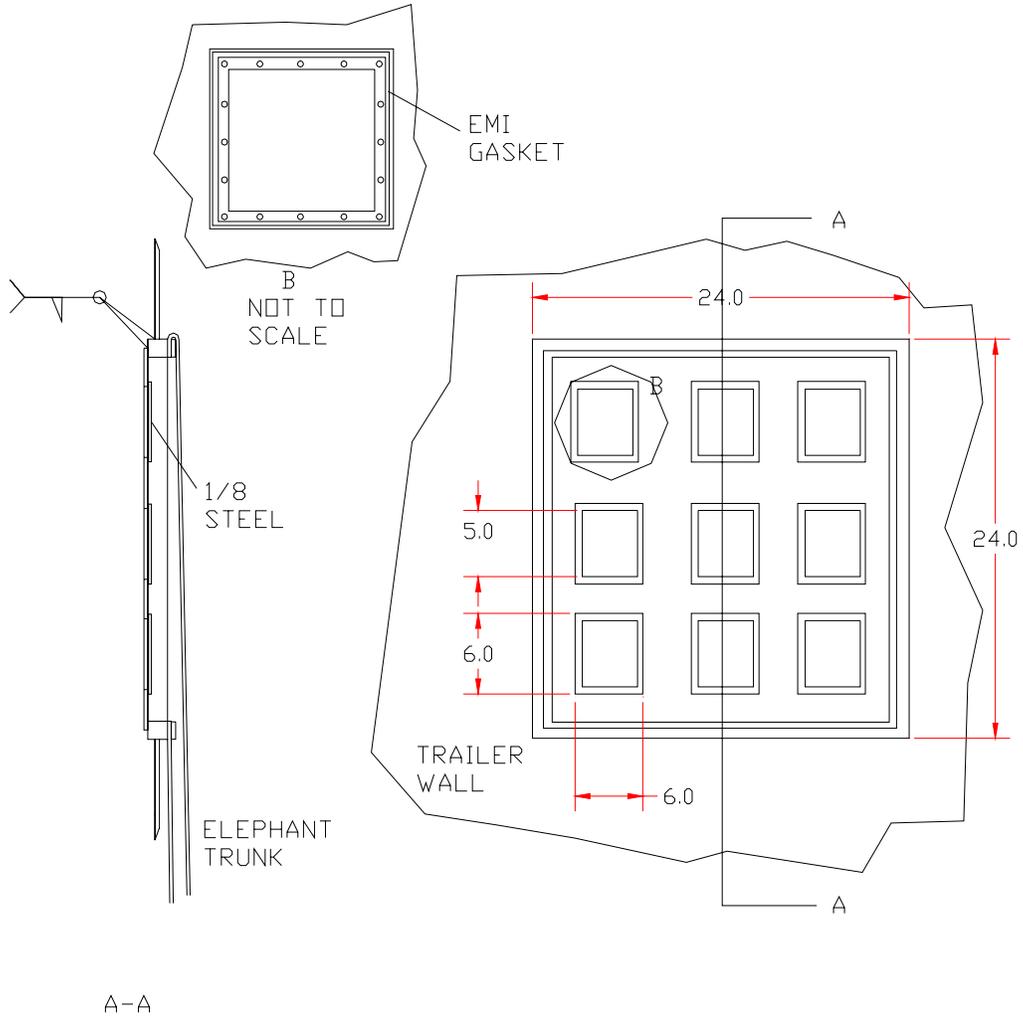


**FIGURE 3 BASIC UNIT 3**

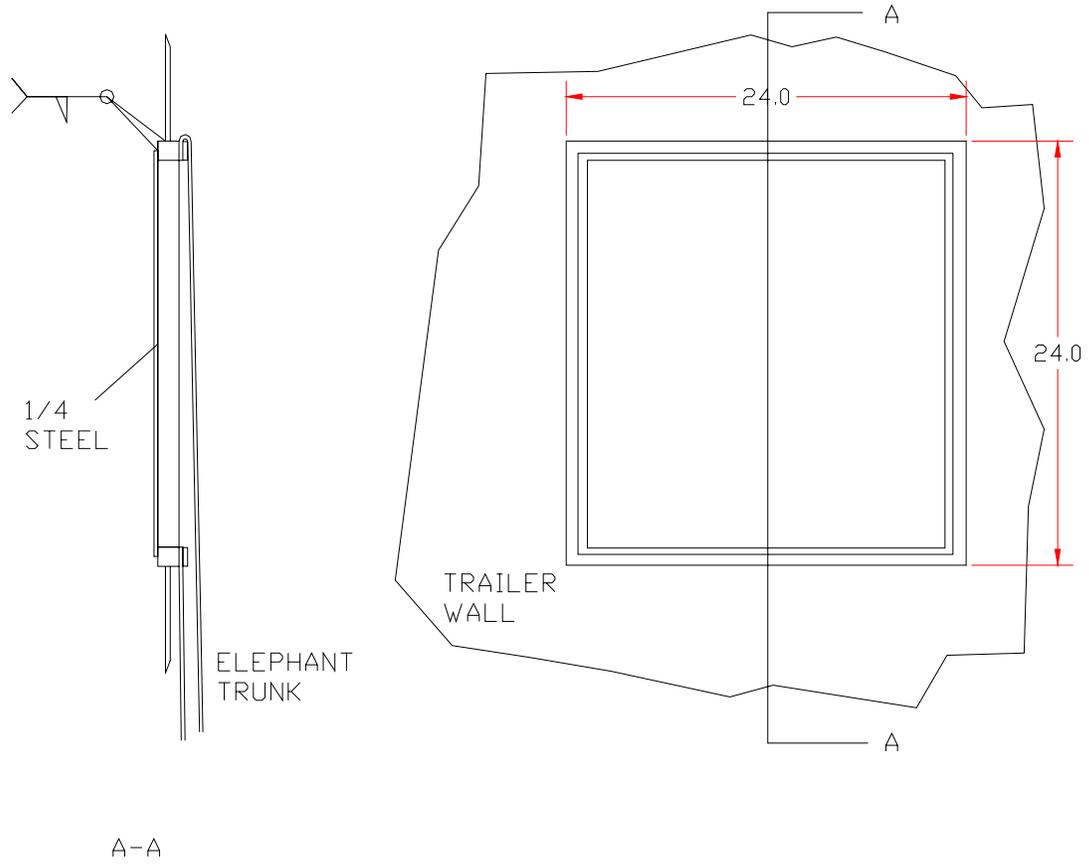
APPENDIX

1. BREAK OUT PANEL 1
2. BREAK OUT PANEL 2
3. ARRAY TRAILER STRUCTURAL MODIFICATION
4. LOCKING SYSTEM

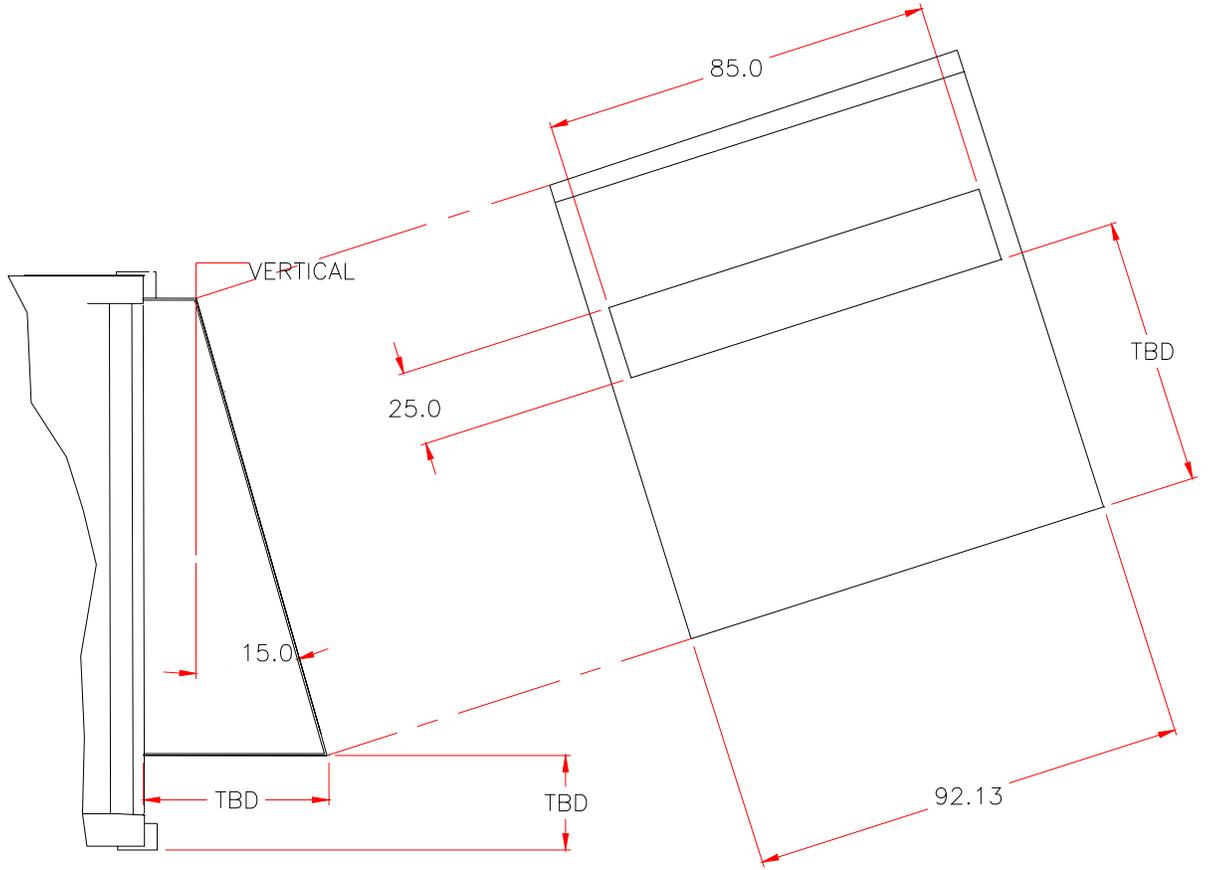
1. BREAK OUT PANEL 1



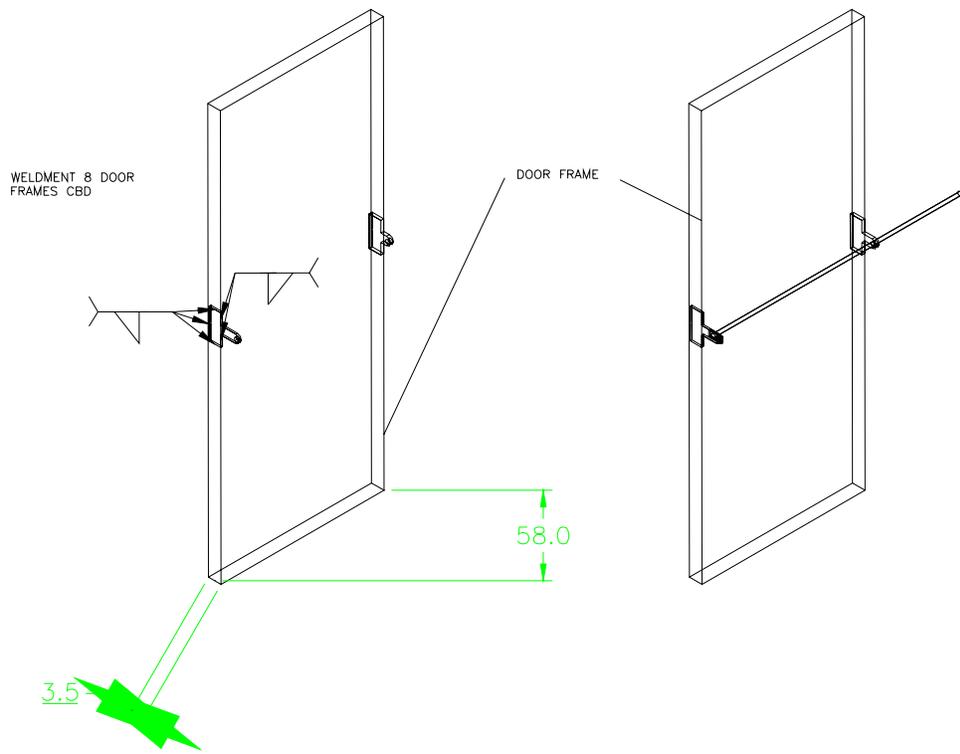
2. BREAK OUT PANEL 2

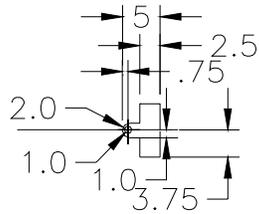


3. ARRAY TRAILER STRUCTURAL MODIFICATION

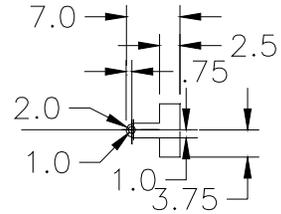


4 LOCKING SYSTEM

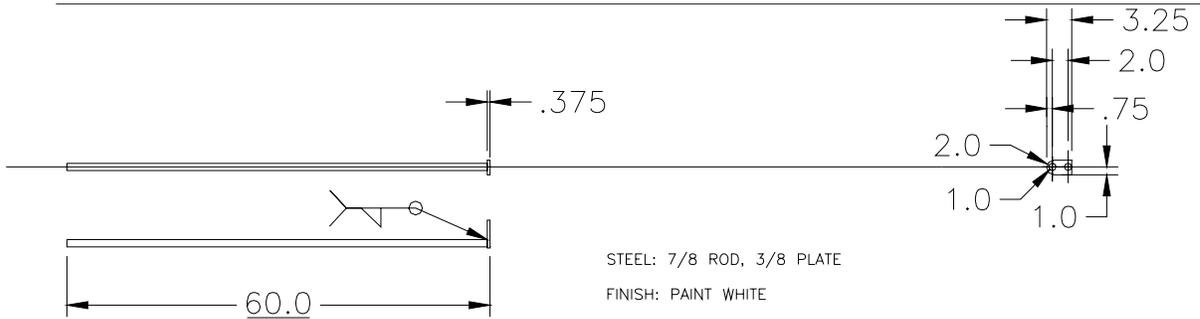




STEEL, 3/8 THICK  
 FINISH AFTER WELDING  
 ON DOOR FRAME AT CBD  
 PAINT WHITE  
 ONE REQUIRED PER TRAILER DOOR  
 8 DOORS



STEEL, 3/8 THICK  
 FINISH AFTER WELDING  
 ON DOOR FRAME AT CBD  
 PAINT WHITE  
 ONE REQUIRED PER TRAILER DOOR  
 8 DOORS



STEEL: 7/8 ROD, 3/8 PLATE  
 FINISH: PAINT WHITE

ONE REQUIRED PER TRAILER DOOR  
 3 DOORS