

**SITE PLANNING  
AND  
INSTALLATION  
FOR  
GENERAL ELECTRIC  
48' MOBILE PET/CT  
E&W MODEL VE500  
REV. B USED ON VE504 & UP**

LIST OF AFFECTED PAGES

Revision	Date
Rev. 0	10/9/03
Rev. A	11/9/04
Rev B	11/15/06

\* Asterisk reflects pages with actual content change:

Page	Rev.	Rev. Page	Page	Rev.	Rev. Page
1	B	*	16	B	
2	B	*	17	B	
3	B		18	B	
4	B		19	B	
5	B		20	B	
6	B	*	21	B	
7	B	*	22	B	*
8	B				
9	B				
10	B				
11	B				
12	B				
13	B				
14	B				
15	B				

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
	LIST OF AFFECTED PAGES.....	2
	TABLE OF CONTENTS .....	3
	LIST OF ILLUSTRATIONS .....	4
1	INTRODUCTION	
1.1	Introduction .....	5
1.2	Division of Responsibilities.....	5
2	SITE PLANNING	
2.1	Location.....	7
2.2	Support Pad .....	8
2.3	Power.....	8
2.4	Water .....	15
2.5	Telephones .....	15
2.6	Air Conditioners.....	15
2.7	Local Codes.....	16
2.8	Ancillary Space Modules.....	16
3	INSTALLATION	
3.1	General .....	17
3.2	Packaging .....	17
3.3	Tractor .....	17
3.4	Permits.....	17
3.5	Locating the Mobile PET System.....	18
3.6	Power Hook-Up .....	22
3.7	Telephone Hook-Up .....	22
3.8	Water Hook-Up.....	22
3.9	Radiation Field Warnings .....	22

**LIST OF ILLUSTRATIONS**

<b>NUMBER</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	Shore Power Cable & Telephone Line Receptacle .....	12
2.3	Hospital Receptacle Wiring Configuration .....	13
2.4	Hospital & Van Power Supply Configuration.....	14
3.1	Site Clearances Required .....	19
3.2	Exterior .....	20
3.3	Turn Radius Requirements .....	21

## SECTION 1 INTRODUCTION

- 1.1 The following is set up to assist in the preparation of a site for the Ellis & Watts Model VE5XX. For additional instructions on set-up, transport, operation and maintenance, please refer to the Ellis & Watts Service Manual, Document #93F.SE1 and to the Ellis & Watts Operator's Manual, Document #93F.OP1.

The Site Planning section includes that portion of the PET/CT project in which the location and orientation of the Mobile PET/CT System is selected. Also referenced are the concrete pad, power, telephone and water requirements necessary prior to installation.

The Installation section looks at all activities which take place once the Mobile PET/CT System has been prepared for shipment, through power hook up at the site.

### 1.2 **Division of Responsibilities**

The following shows the division of responsibilities between Ellis & Watts and the customer. Any exceptions should be communicated to Ellis & Watts in writing as early in the planning stages as possible to avoid delays in the schedule.

Ellis & Watts will provide:

- Service Technician to familiarize owner/operator with features and operation of unit.
- Standard price does not include transportation from Ellis & Watts to site, but Ellis & Watts can provide this service for additional cost.

Customer to provide:

- Transportation of unit to site including required permits.
- Foundation constructed in compliance with this document and attached drawings including plumbing and electrical. Depth of foundation below grade shall meet applicable local and national codes.
- A reasonable means of entry and exit for the unit. Approximate total length of Mobile PET/CT System transport trailer and its tractor is sixty-six feet (66').
- Labor to connect plumbing, telephone and electrical power.

- Any local or state building permits. (For both the Pad & the Mobile Unit)
- Any connecting corridor or walkway.
- Permits to comply with local and/or national codes with regard to the radiation field and its surrounding environment. The mobile PET/CT unit is constructed with lead shielding in the scan room and the front room.

**Note:**

**To power up and operate your Mobile PET/CT System, consult the Operator's Manual, Ellis & Watts Document #93F.OP1.**

Please contact our Mobile PET/CT System Site Planner at (513) 752-9000 for any questions that you may have.

## SECTION 2 SITE PLANNING

### 2.1 **Location**

Locating your Mobile PET/CT System is a function of the criteria you have developed for your operation. A list of criteria might include:

- A) Proximity of personnel who might be continuously exposed to low level radiation which is not contained by the lead shielding in the van. It is the customer's responsibility to ensure that appropriate radiation protection exists for persons in proximity to the PET/CT operation.
- B) Length of walkway to hospital or other facility.
- C) Side of building for best patient access.
- D) Adaptability to landscaping.
- E) Compatibility between air conditioners and surrounding facility.
- F) Acceptable clearances for expanding sides and ventilation for generator and air conditioner airflow. (See Illustration 3.1)
- G) Flat level areas for patient lift operation, and for personnel platform set-up. (See Illustration 3.1)
- H) PET/CT trailer must be sited outside of the 1 gauss line exclusion zone of any adjacent MRI installation.

For the new mobile GE Shielded Systems (CXK4 magnet), the 1 gauss line is located approximately 8' from the MR van walls.

The Mobile PET/CT System houses a PET/CT Gantry at the rear (above the wheels) with patient and personnel doors toward the front. (See Illustration 3.2)

The air suspension on the trailer is designed for normal highway service. Operation off-road, over the breaks at the beginning and end of steep inclines or on otherwise irregular surfaces is strongly advised against. The pneumatic leveling and load compensation system is limited and excessive displacements can cause severe axle/suspension overloading.

Whenever possible, it is wise to consider the approach of a 65'-75' tractor and trailer

combination will have to make in order to reach the designated parking site. (See illustration 3.3)

## 2.2 Support Pad

It is necessary to consult with the architect designing the job with regard to soil conditions and local building codes prior to designing the support pad for the Mobile PET/CT System.

The top of the patient access doorsill is located 49.25" (the finished floor is 48.5") from the ground when the trailer is in the sited position. Walkways, if any, should be structured accordingly. A patient lift is available as well as stairs for patient/operator access. (See Illustration 3.1)

The patient lift, platform, stairs and expanding sides must have adequate space on the pad for both service and operations.

Pad to be level within 1/8" over 10 ft.

## 2.3 Power

The Mobile PET/CT System utilizes 120 amp, 480 volt, 3 phase, 3 wire power (A,B,C configuration) with ground for the PET/CT system and HVAC system.

A standard 35' shore power cable is located in the rear belly compartment. (See Illustration 2.1) This cable can be accessed from either the roadside or curbside. One end is already hardwired into the trailer's electrical system. The free end of this cable has a 200 Amp Russellstoll connector attached for compatibility with the site's 480 volt, 3-phase receptacle. **Connection of shore power is to be performed by local, qualified electricians only.**

### 2.3.1 Power Distribution Requirements

In Ellis & Watts continuing efforts to establish compatibility at all hospitals and to have instant interchangeability with the many systems we now offer in the mobile medical fields, it is our recommendation that all sites supply 480 volt, 3 phase, 5 wire WYE with ground and neutral, and 150 kVA dedicated power. However, the following are the actual power requirements for General Electric PET/CT Mobile Systems:

Receptacle Voltage (Nominal)	480 VAC, 3-phase, 3-wire with ground
------------------------------	--------------------------------------

Maximum Allowable Daily Line Voltage Variations	414 to 517 VAC
kVA Dedicated Power (Note: nothing else is to be connected to this circuit)	100 kVA
Supply Circuit Breaker/Fuses	150 AMPS
Line Voltage Balance	All lines within 2% of lowest line voltage.
Frequency	60 Hertz $\pm$ .5 Hz
Regulation	4% Max at 60 kVA max power demand
Feeder Size	Less than 2% voltage drop at max power demand of 100 kVA.
Transients	Transients, other than those created by the PET/CT System, shall not be more than 800 volts peak (on a 480V line) with a duration of less than 75 micro seconds.
Ground Conductor	An insulated copper ground conductor, sized in accordance with national and local codes, but not less than AWG #1/0, shall be installed between the facility vault and the Russellstoll receptacle. This ground shall not have a resistance to earth of more than 2 ohms. A separate ground lug is provided.

2.3.2 Installation of Mobile PET/CT System To Existing Hospital Power Distribution System

For installation of a Mobile General Electric PET/CT Unit at a hospital where the mobile unit will be furnished electrical power from an existing hospital power distribution system through a power distribution panel, the Mobile PET/CT unit must be provided power through a dedicated branch circuit having no less than 100 kVA (112.5 kVA if MR unit is to be used) available power. Refer to Illustration 2.3 and 2.4 for electrical hook-up and phase rotation.

2.3.3 Installation of Mobile PET/CT System To

Dedicated Hospital Power Distribution Transformer

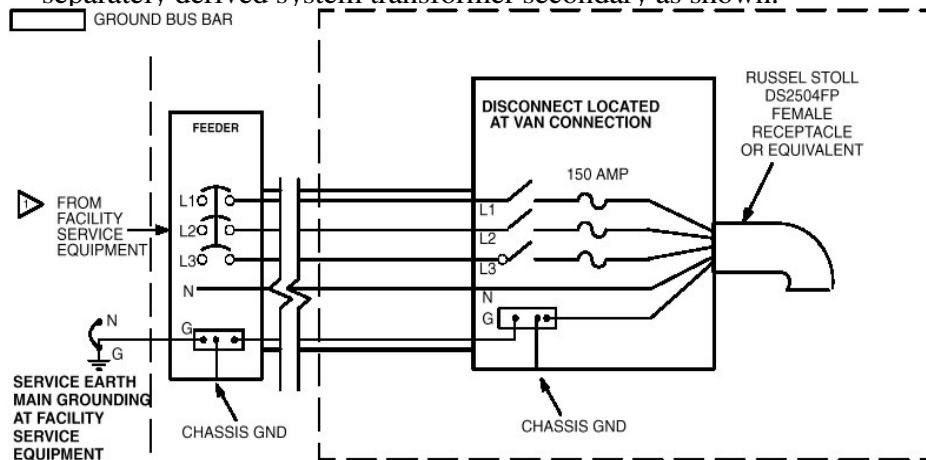
For installation of a Mobile General Electric PET/CT Unit, where the hospital power distribution transformer will feed only the Mobile Unit System, the minimum recommended size power distribution transformer is 100 kVA (112.5 kVA if MR is to be used). Refer to Illustration 2.3 and 2.4 for electrical hook-up and phase rotation.

2.3.4 Mobile Grounding Requirements

Note:

- All work to be done in accordance with national and local electric codes. Information shown here is only a recommendation and must be verified for site national and local codes.
- Ground wires inside enclosures to be taped green for entire visual length for identification.

▷ Main bonding jumper between grounded (neutral) conductor and equipment grounding conductor to be provided in facility service equipment and downstream at separately derived system transformer secondary as shown.



GROUNDING

The ground for our system shall originate at the system power source, i.e., transformer or first access point of power into a facility, and be continuous to our system power disconnect in the trailer. This ground can be spliced with “High Compression Fittings” and should be terminated at each distribution panel it passes through. When it is broken for a connection to a panel, it shall be connected into an approved grounding block with the incoming and outgoing ground in this same grounding block, which is then connected to the steel panel. Never use the steel panel or other material of the panel as the block.

The connection at the power source shall be at the grounding point of the “Neutral-Ground”

if a "Wye" transformer is used, or typical grounding points of a separately derived system. In the case of an external facility, it shall be bonded to the facility ground point at the service entrance.

#### GROUND WIRE

The ground wire shall be copper wire with a minimum of AWG 1/0 or the same size as the power feeders whichever is larger. This means that if there is a primary feeder to a distribution panel of 500 MCM with a secondary feeder to our system of AWG 1/0 wire, the ground to the distribution panel shall be 500 MCM with an AWG 1/0 to our system. The ground wire impedance from our system disconnect, including the ground rod, shall not have an impedance greater than 2 ohms to earth as measured by one of the applicable techniques described in Section 4 of ANSI/IEEE Standard 142 – 1982.

#### **Special Notes:**

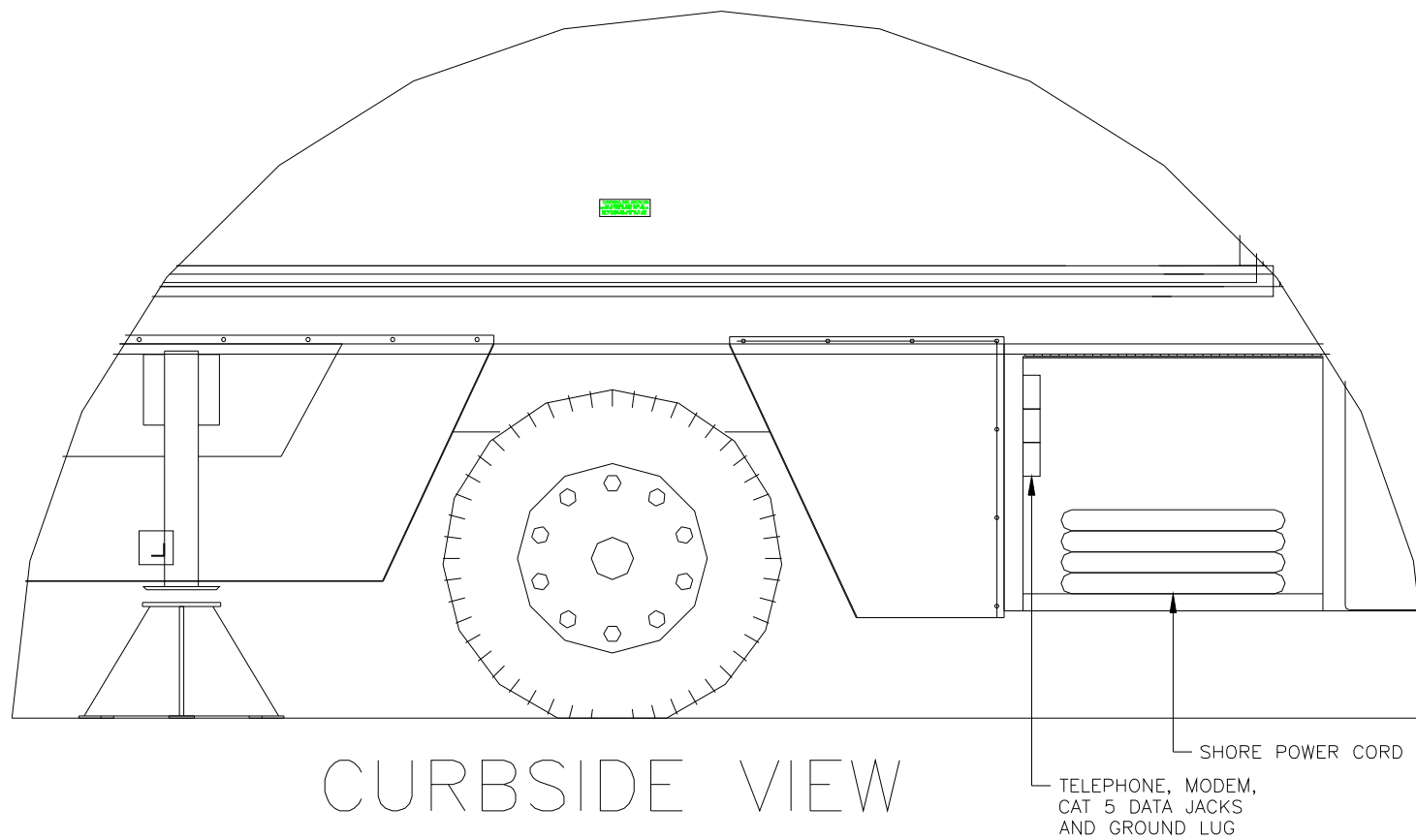
**It is also recommended that a separate (#6 minimum copper) grounding conductor be installed from the main trailer ground lug in the rear curbside belly compartment to a driven ground rod as a supplemental grounding conductor for the trailer. When running (scanning) on generator (NOT RECOMMENDED) the copper wire from the earth ground rod to the trailer ground lug must be installed and used at all times per the NEC.**

**All specifications apply to measurements at the receptacle pins. Line voltage drops from the facility mains to the receptacle must be included in all power calculations.**

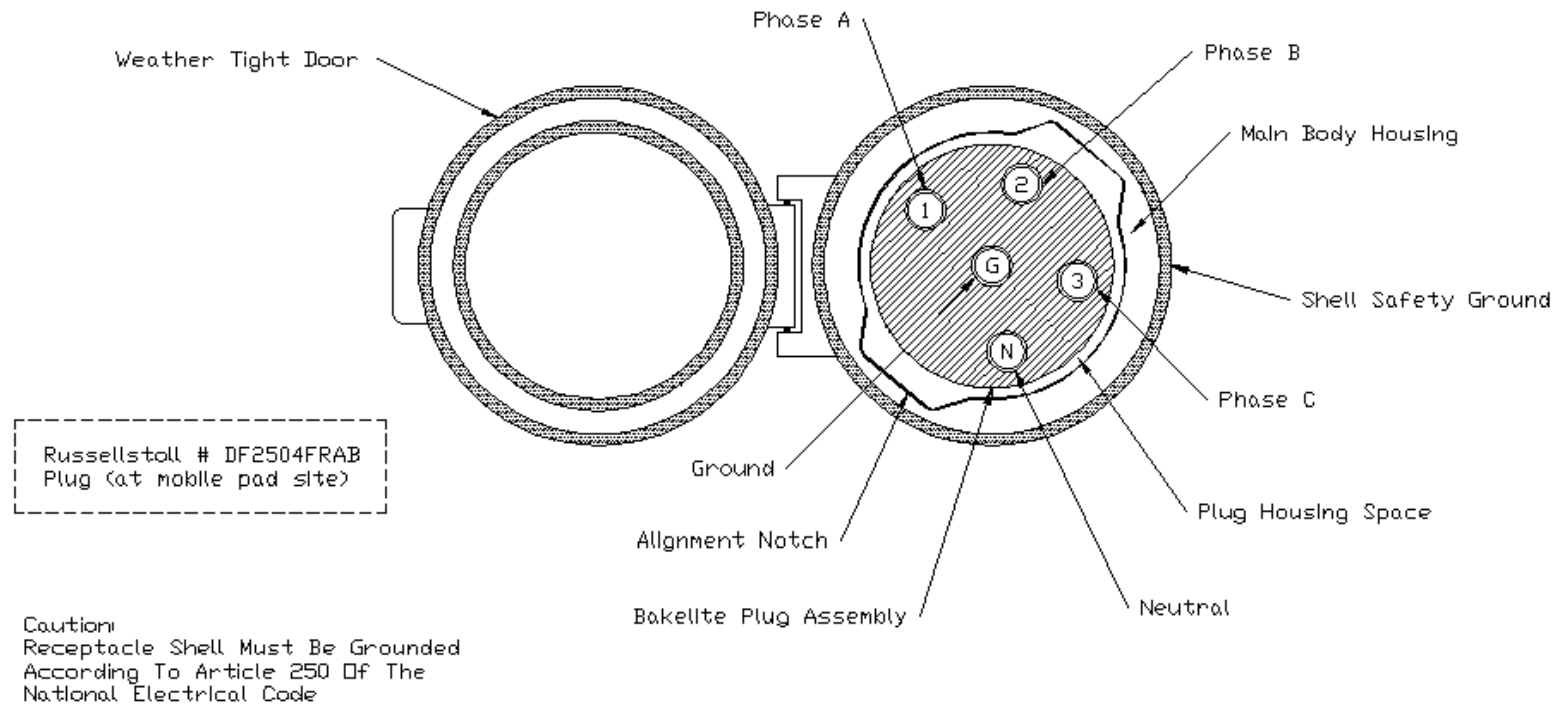
**Instantaneous fluctuations in the line voltage caused by loads other than this Mobile PET/CT Unit must not exceed  $\pm 5\%$ , have a duration in excess of five (5) cycles, and frequency of their occurrence must not be more than ten (10) times per hour.**

**Power lines from the site source to the trailer are not to be run underneath or above the scan room. If it is necessary to run the wires underneath or above the unit, route them so as to avoid the area underneath or above the scan room.**

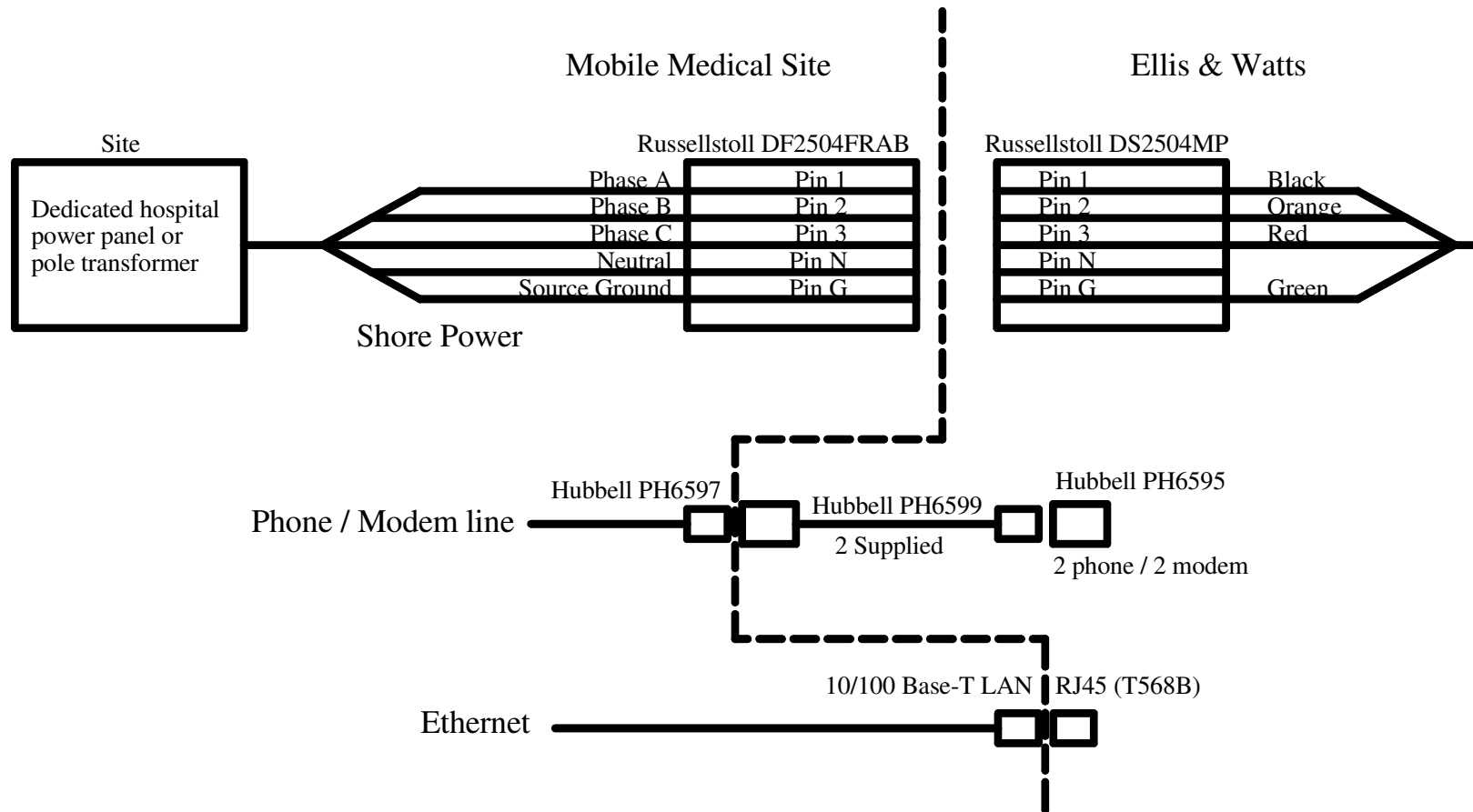
**Customer must install a label stating: "SERVICE DISCONNECT FOR MOBILE MRI/CT/PET UNIT" at hospital power source.**



**Illustration 2.1**  
**Shore Power Cable & Telephone Line Receptacle**



**Illustration 2.3**  
**Hospital Receptacle Wiring Configuration**



**Illustration 2.4**  
**Hospital & Van Power Supply Configuration**

## 2.4 Water

Water is necessary to supply the Mobile PET/CT System humidifier and optional sink. The water supply tank is located in the third belly compartment on the roadside. The 40-gallon tank has a full load capacity for 24-36 hours. The tank is filled via a standard 3/4" hose connection located on the belly post rearward the third belly compartment door. The standard 3/4" hose connection can also be used as a direct supply to humidifier for convenience.

**Note:**

**In cold weather conditions, an optional heated water hose is required.**

## 2.5 Telephones/Data

Two separate telephone lines, two modem lines and one cat 5 data line are terminated in a rear curbside belly compartment. (See Illustration 2.1) The two telephones and two modem receptacles are Hubbell PH6595. There are two 50' Hubbell cables PH6599 supplied with the trailer. The cat 5 receptacle is a Leviton 41108-RWS.

Hospital and local phone lines are to be brought to these lines by the local phone service company.

The category 5 jacks in the trailer are wired to meet T568B color code wiring pattern.

## 2.6 Air Conditioners

The air conditioning/heating system is comprised of one 5ton/9kw and one 5ton/18kw Bard unit mounted to the front of the trailer.

The air grills around the air conditioner units must remain clear of obstructions to permit adequate air flow.

**2.7 Local Codes**

Although the Mobile PET/CT System is manufactured according to stringent quality engineering standards, it is wise to consult local and/or state building code authorities well in advance of installation to avoid any unnecessary delays in the event that special permits are required. Ellis & Watts can produce structural and schematic drawings when necessary, for most of these cases. In many states and localities, approval has already been granted.

**2.8 Ancillary Space Modules**

When connected to the PET/CT Mobile System, the use of ancillary space modules or weather seals require special consideration.

To prevent vibration of any sort being transmitted from the ancillary space module, no hard connection should be made between the two "Soft" connections. "Soft" connections must ensure safe passage from one space to the other, and allow movement of support materials. Weather protection must be taken into consideration around the doors as well. Consult with your architect before proceeding with such a design.

### SECTION 3 **INSTALLATION**

#### 3.1 **General**

The Mobile PET/CT System represents a substantial investment and should be handled with a representative amount of care and expertise. Therefore, Ellis & Watts offers a service option which accounts for all aspects of installation from obtaining permits to leveling the unit on its final resting pad. For those who prefer to manage these details, the following subsections are indicative of the steps to be taken for a successful installation.

#### 3.2 **Packaging**

The Mobile PET/CT System is released from the factory only after it has met the PET/CT system manufacturers and Ellis & Watts' specifications. All portions of the PET/CT system are in place. No articles are loose in the unit. Therefore, once installation of the Mobile PET/CT System is complete, only activities typically associated with final calibrations, customer customization and options will remain.

#### 3.3 **Tractor**

An air ride tractor must be used with the mobile PET/CT trailer. Tractors range from 12,000 - 20,000 pounds and are usually provided by the shipper.

#### 3.4 **Permits**

As with other forms of ground transportation, certain local, state and federal permits are required to move the Mobile PET/CT System.

It is the responsibility of the trucking firm involved to obtain such permits, and a confirmation prior to the move is recommended to avoid unnecessary delays.

Approximate weight of system (without tractor) is 58,500 pounds.

Sited: Approximately 27,400 pounds on rear stanchions, 1700 pounds on each axle (3400 pounds total suspension deflated) and 27,700 pounds on front jack support legs.

Transport: Approximately 23,000 pounds on kingpin and 35,500 pounds on rear axles.

It is the responsibility of the customer to obtain any permits or approvals with regard to radiation exposure and/or radioactive materials.

### **3.5 Locating the Mobile PET/CT System**

An Ellis & Watts service technician accompanies the Mobile PET/CT System for consultation.

When the trailer arrives on site, the driver will view the particular access situation. He will then be able to determine the best possible approach strategy to the final resting location of the Mobile PET/CT System.

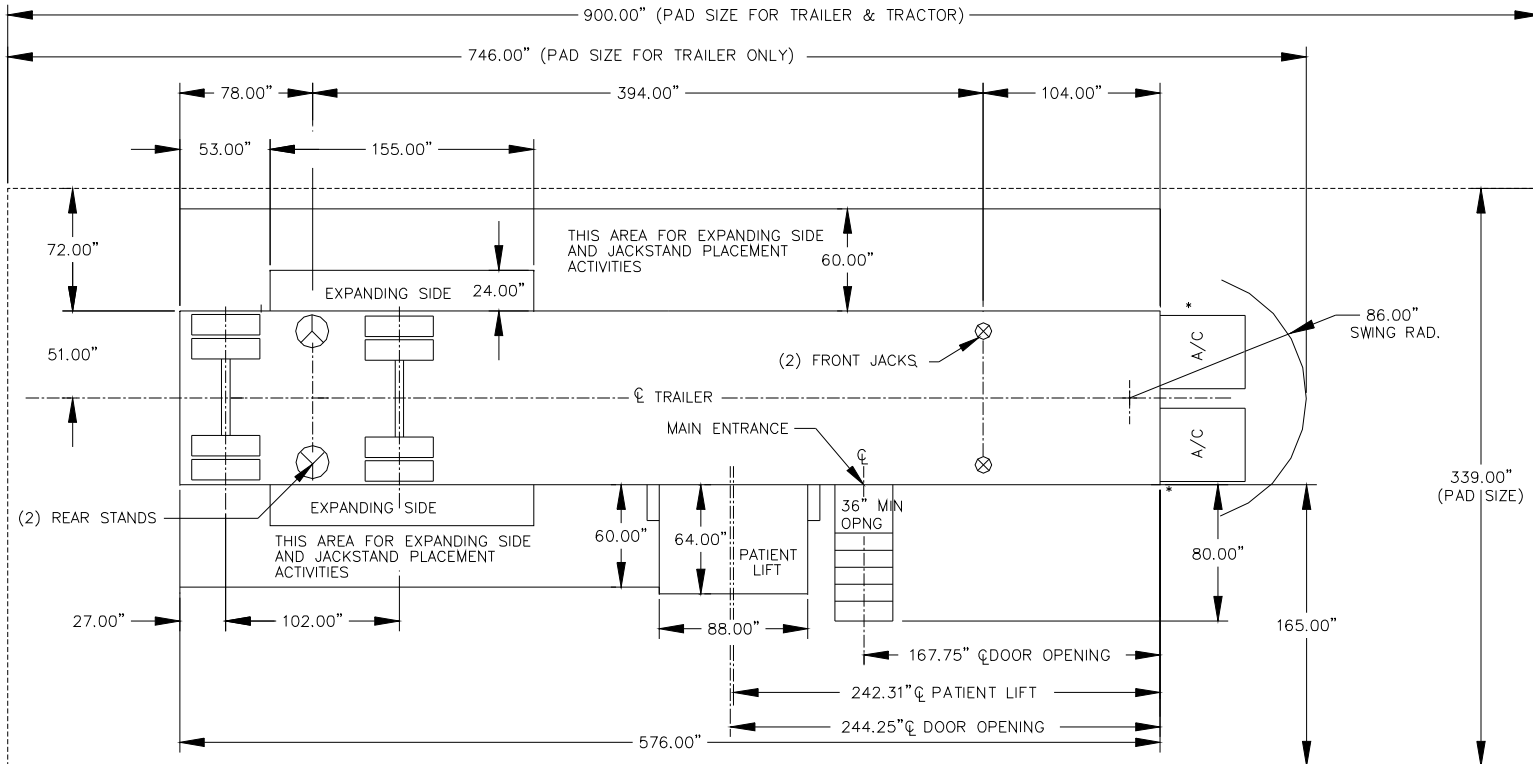
The trailer will usually be backed into place. Depending on the length of the approach and number of turns, this can be done in an hour; or require several hours. Painted or taped markings on the pavement help to guide the driver. Refer to Illustration 3.1 for clearances required.

The air suspension on the trailer is designed for normal highway service. Operation off-road, over the breaks at the beginning and end of steep inclines or on otherwise irregular surfaces is strongly advised against. The pneumatic leveling and load compensation system is limited and excessive displacements can cause severe axle/suspension overloading.

Whenever possible, it is wise to consider the approach of a 65'-75' tractor and trailer combination will have to make in order to reach the final resting-place (See illustration 3.3).

If the pad is not within the levelness requirements of 1/8" over 10', aluminum shims may be necessary at the rear stands. Note that wood is not to be used for shims.

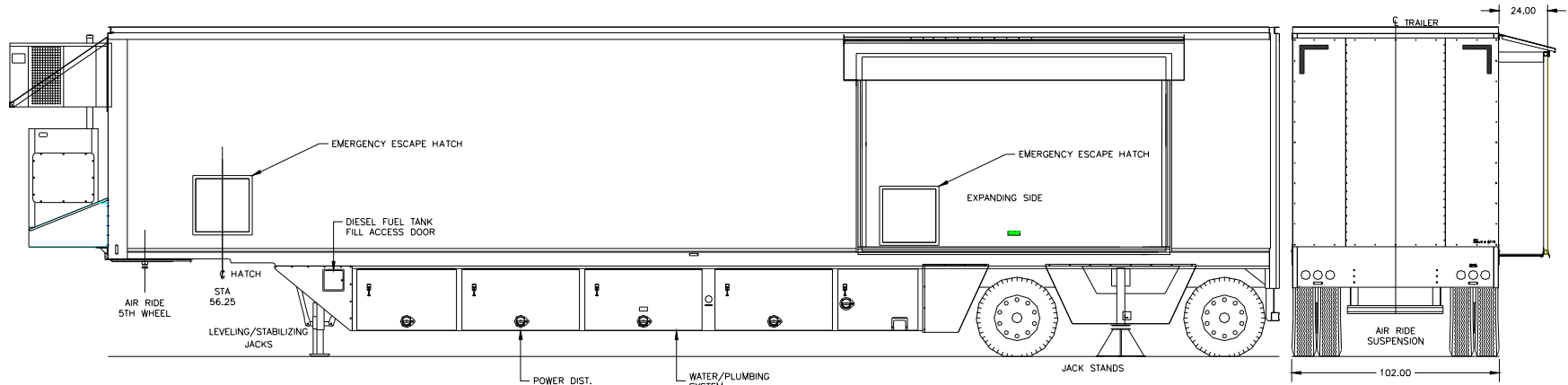
Refer to the Ellis & Watts Operator's Manual #93F.OP1 for details on system set-up.



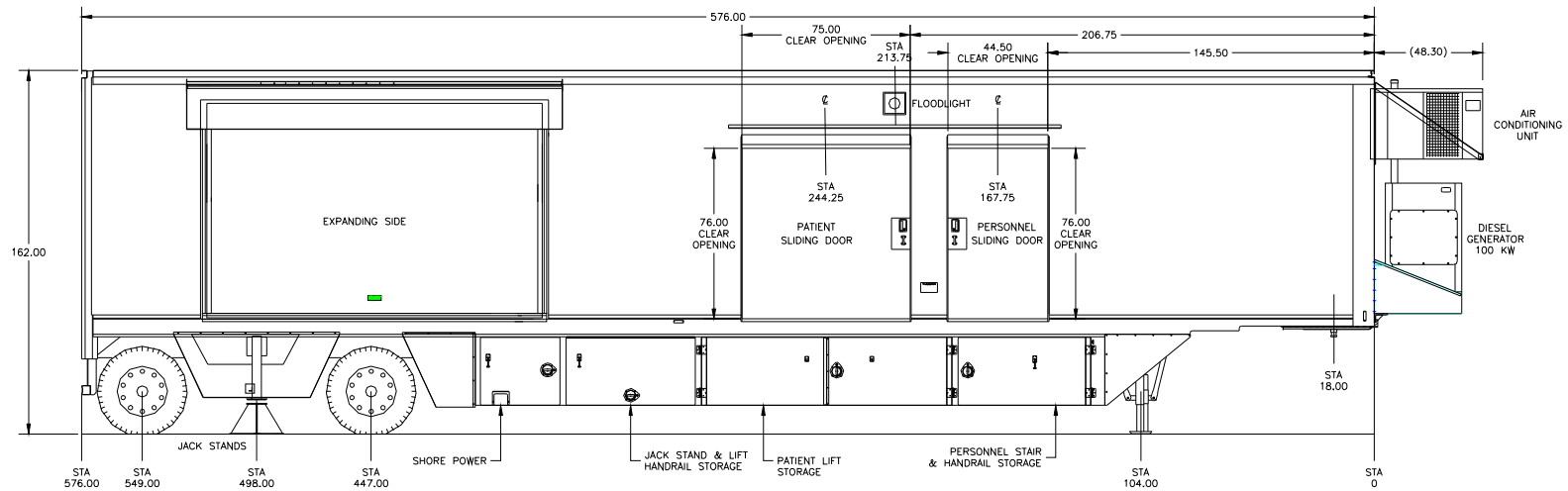
NOTE: 1  
 LOUVERS LOCATED AT FRONT MOUNTED  
 GENERATOR (AS SHOWN BY \*) MUST BE  
 FREE OF OBSTRUCTION TO WITHIN 3 FEET  
 TO ALLOW AIR FLOW.

NOTE: 2  
 REAR STANCHIONS TO BE LOCATED WITH  
 SINGLE LEG POINTED AWAY FROM CENTER OF TRAILER

**Illustration 3.1**  
**Site Clearances Required**



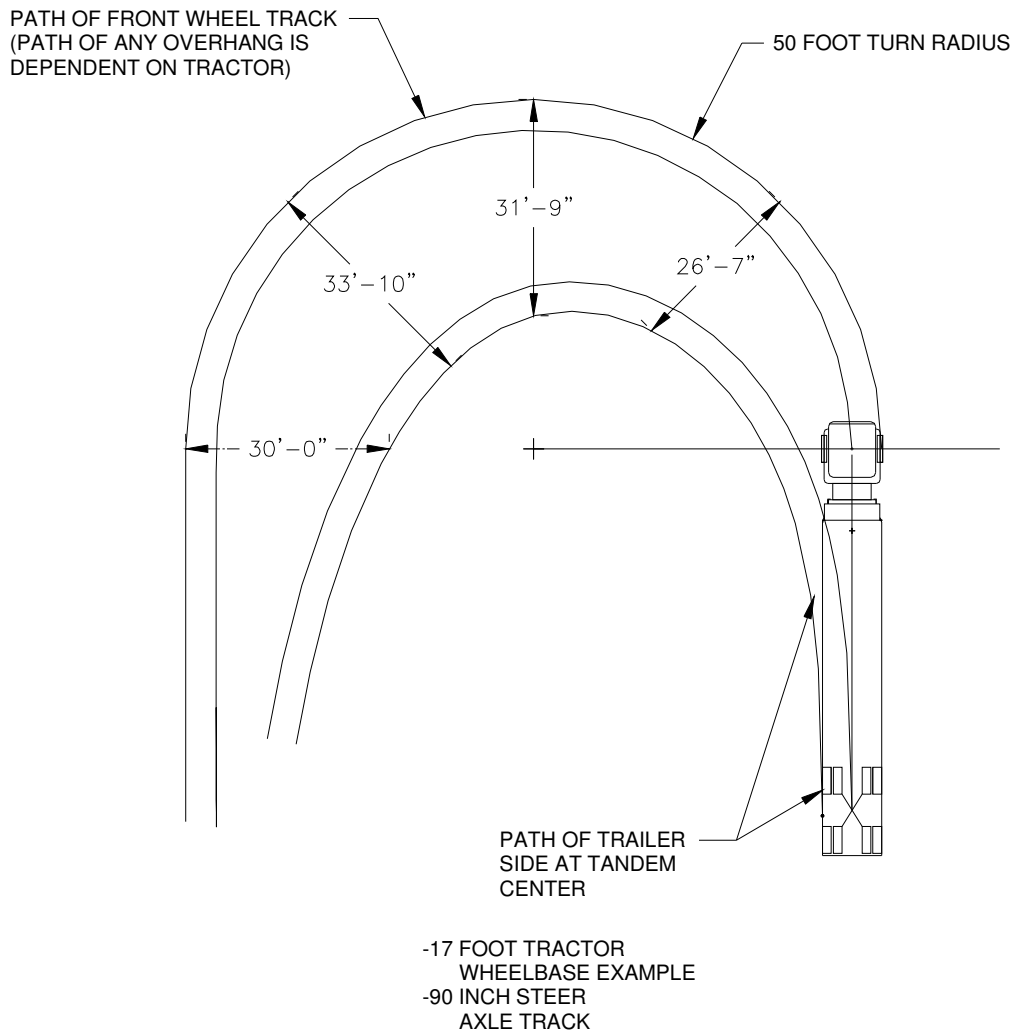
ROADSIDE VIEW



CURBSIDE VIEW

**Illustration 3.2**  
**Exterior View**

### TYPICAL TRACTOR/TRAILER TURN RADIUS REQUIREMENTS 180° TURN PET/CT



**Illustration 3.3**  
**Turn Radius Requirements**

### 3.6 Power Hook-up

The 35' shore power cord is located in the rear belly compartment and can be accessed from either the roadside or curbside. The free end of this cable is to be attached to the site's 480V, 3-phase receptacle. **Connection of shore power is to be done by a qualified electrician.** (See Section 2.3.4)

### 3.7 Telephone Hook-Up

The two separate telephone lines, two separate modem lines and one cat 5 data line for the Mobile PET/CT System are terminated in the rear curbside belly compartment. The two telephone and two modem receptacles are Hubbell PH6595. There are two 50' Hubbell cables PH6599 supplied with the trailer. The cat 5 receptacle is a Leviton 41108-RWS. The hospital and local phone service company should determine the best route and connection location for the incoming service.

### 3.8 Water Hook-Up

Sink/Humidifier plumbing: The plumbing contractor will bring the incoming water and drain to the Mobile PET/CT System alongside the water supply tank located at the third roadside belly compartment. The supply water hook up is located in the post rearward of the third roadside belly compartment.

**Note:**

**In cold weather conditions, an optional heated water hose is required.**

The waste water tank (with sink option) can be drained by connecting a garden hose to the drain tank valve with the other end connected to an approved sewage system.

### 3.9 Radiation Field Warnings

Care should be taken when selecting the site for the PET/CT with relationship to occupied areas. The customer will be responsible for radiation site survey and additional site barriers/warnings.