

THE SANITARY VAULT PRIVY

***A planning Guide and Minimum Requirements For the
Construction of Vault Privies***

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I. GENERAL CONDITIONS AND SCOPE

A sanitary privy is one so located, constructed, and maintained

1. that users do not contact waste matter deposited;
2. that flies, insects, rats, and other animals cannot gain access to the privy interior or vault;
3. that surface or ground water cannot enter the vault;
4. that the waste material in the privy cannot contaminate a water supply, stream, or body of water; and
5. that odors are minimized both inside and outside the privy structure.

The purpose of this bulletin is to establish standards for the sanitary features of privies and provide guidelines for their construction. It is not intended to provide fully-detailed construction drawings and the information contained herein should be considered only as a minimum planning guide.

The standards contained on the following pages establish the minimum features of single or multiple seat, vault-type privies which, when properly constructed and maintained, constitute an acceptable sanitary privy.

II. PREPARATION, SUBMITTAL, AND APPROVAL OF PLANS AND SPECIFICATIONS

Complete plans and specifications for sanitary privies to serve public and semi-public facilities (camps, schools, mass gatherings, etc.) must be submitted to the State Board of Health prior to construction.

The local health department must be consulted and a permit obtained prior to any construction of sanitary privies to serve private homes, parks, public gathering places, or any other facility or location.

Wherever sanitary privies are considered, adequate preliminary investigation must be made to determine if a water-carriage sewage disposal system is possible for the use intended and the location contemplated. The installation of sanitary privies should be considered only where special circumstances warrant such an installation.

The circumstances under which construction of a sanitary privy may be considered are few:

1. Locations or dwellings where a water carriage sewage disposal system is not possible because of:
 - a. lack of a water supply to transport wastes to sanitary sewers or a septic tank;

- b. rugged terrain which prevents the installation of sanitary sewers or septic tank absorption fields; or
 - c. soil types which do not permit the absorption of wastewaters from septic tank absorption fields.
2. Recreational areas or campgrounds where it is not possible to install modern conveniences, or it is desirable to install sanitary privies to preserve the natural environment and provide an opportunity for temporary outdoor primitive recreation.
 3. Places or special events which are open on a temporary or seasonal basis only and which serve a limited number of persons.

Many proposed locations and installations of sanitary privies may not be approved because of:

1. inadequate separation distances;
2. high groundwater;
3. the area being subject to flooding;
4. watershed sanitation considerations,
5. availability of water-carriage sewage disposal systems;
6. requirements of local zoning, building, or health ordinances; or
6. other health, sanitation, or safety considerations.

Under no circumstances should a privy be located where it could create or maintain a condition which could result in or cause a potential health or safety hazard.

Some Items to be Included on Plans

The following items are representative of some of the location and construction information to be supplied on plans and specifications for projects to be submitted to the State Board of Health. These items should also be considered in the planning of those facilities which are not subject to State Board of Health review and approval.

1. Topography, property lines, and roads on the property
2. Adjoining lakes, streams, or ditches.
3. Location of any water supply sources or structures and water lines on the property and adjacent to the property.
4. Information concerning the ground water table and soil types
5. Location of any existing public sewers or sewage treatment facilities in the vicinity of the subject property.

6. Location and identification of any housing or buildings including those for food service.
7. Location and description of land uses on the site including campsites, picnic areas, and playgrounds.
8. Number of persons of each sex projected to be using the sanitary privy-both normal and peak.
9. Type of users to be serviced by the sanitary privy -permanent employees or transients.
10. Show the vault material and construction.
11. Provide details of the floor slab and sill construction,
12. Show the privy risers, number of seats, type of seat lids, and vault vent pipe.
13. Detail the privy housing structure, including how it will be ventilated.
14. Show how the privy housing will be maintained fly-tight and rodent-proof.
15. Show the privy features which will be installed to ensure privacy.

III. LOCATION OF SANITARY PRIVY

Selecting a proper location for the sanitary privy is necessary to protect the water supply, prevent disease transmission, and preserve the environment.

Table I relates the minimum separation distances for sanitary privies designed to serve public and semi-public facilities including organizational camps, recreational areas, campgrounds, agricultural labor camps, and places of public assembly.

See Table II for the recommended minimum distances to be maintained for sanitary privies designed to serve private residences.

Table I.
Minimum Separation Distances for Sanitary Privies Serving Public or Semi-Public Facilities

<u>Facility</u>	<u>Separation Distances</u>
Public Water Supply	200 feet
Kitchen or Food Service Area	200 feet
Semi-Public Water Supply	100 feet
Pump Suction Line	100 feet
Stream, Lake or Ditch	100 feet
Sleeping Area (Campsite)	50 feet
Sleeping Quarters (Building)	50 feet
Building or Residence (General Use)	50 feet
Property Lines	25 feet
Water Supply Lines	10 feet
Other Buildings (Storage)	5 feet

Table II.
Minimum Separation Distances for Sanitary Privies Serving Private Residences

<u>Facility</u>	<u>Separation Distances</u>
Public Water Supply	200 feet
Private Water Supply	50 feet
Stream or Lake	50 feet
Pump Suction Line	50 feet
Place of Business	50 feet
Property Line	25 feet
Dwelling	15 feet
Water Supply Lines	10 feet
Other Buildings	5 feet

Several additional considerations are essential in selecting a satisfactory location for the sanitary privy. These include the following:

1. The sanitary privy should be located downgrade or downstream from the water supply well or source;
2. The privy must not be located in areas subject to flooding;
3. Privies installed in fissured or creviced water-bearing formations or in soils classified as poor filters may necessitate greater separation distances and other precautions to minimize the chance for water contamination;
4. The sanitary privy should be situated on a site which can be easily maintained so that the adjacent area is free of weeds and noxious plants; and
5. In general, the privy must be so located that it is convenient and easily accessible to those persons who utilize the facility.

IV. GENERAL FEATURES OF THE SANITARY PRIVY

A sanitary privy, regardless of size or seating capacity, must incorporate the following features:

1. A vault of sufficient capacity to serve the daily and long term needs of users;
2. The vault must be inaccessible to rodents and insects
3. A concrete floor slab, base, or vault lid on which the privy housing or superstructure can be erected; wood floors cannot be utilized;
4. An earth mound around the privy base to divert surface water away from the vault;
5. Seat risers extending directly from the concrete base, or floor slab, and constructed of impervious material;

6. Comfortable seats with tight-fitting lids which completely cover the privy seat hole when not in use;
7. A privy housing structure which affords privacy and shelter, and is fly-tight. The enclosing walls and roof must have no openings or cracks which are not sealed or screened;
8. A tight-fitting door which is equipped with a self-closing device;
9. Vents, windows, or openings which are completely screened
10. A vertical pipe or enclosed moisture-proof vent duct which extends from the privy vault to a point above the roof peak and is screened at the outlet and capped to divert precipitation;
11. A properly sloped roof of impervious material, with an overhang to prevent ponding of water and leakage into the structure;
12. Adequate illumination of the privy interior from natural or artificial sources; and
13. User privacy, through the installation of privacy partitions around the structure or by use of inside door latches.

V. INTERIOR DESIGN OF THE SANITARY PRIVY

The size and design of the sanitary privy is dependent on the number of risers, seats, and urinals to be provided. A minimum of 16 square feet of floor space must be provided for a single seat sanitary privy. Multiple-seat privies must provide 12 square feet of floor space for each seat or urinal to be installed.

Sanitary privies with five or more seats can be constructed, but should be designed by a professional engineer or registered architect due to the structural problems involved.

Sanitary privies designed to serve other than private dwellings must provide separate facilities for men and women. If the facilities for each sex are to be located in the same building, they must be separated by solid walls or partitions extending from the floor slab to the ceiling.

Sanitary privies must provide an adequate number of seats to serve the number of visitors and the type of activity at the site. A ratio of one privy seat for each 15 visitors of each sex, with a minimum of one unit for each sex in common use facilities, is normally adequate. Sanitary privies designed to serve agricultural labor camps or campgrounds must comply with the more specific sanitary facility ratios required by the rules governing those establishments.

Urinals may be substituted for men's privy seats on the basis of one urinal for one toilet seat up to a minimum of one-third of the required toilet seats.

The risers to support the privy seats must extend at least 13 inches above the privy floor slab, but should not have a height of greater than 18 inches.

In multiple-seat privies the seats must have a center-to-center separation of not less than 2.5 feet.

Provision for the installation of privy risers, urinal drains, and a vent should be made during the process of forming and pouring the floor slab to serve the privy structure. A hole 2 inches in diameter should be formed in the privy floor slab for use as a drain entrance if a urinal is to be installed. A hole should also be formed to accommodate the vent pipe from the privy vault; the hole should be at least 4-inch diameter. The vent pipe may extend up from the rear of a riser. Each separate vault or compartment must have its own vent pipe to atmosphere.

VI. CONSTRUCTION OF THE SANITARY VAULT PRIVY

The initial steps in the construction of the subsurface and ground level features of the sanitary vault privy include:

1. excavation for the vault;
2. selection of a precast vault, or in-place vault construction;
3. construction of floor slab and risers; and
4. cleanouts, for removal of accumulated waste

A. Excavation

A pit of sufficient length and width must be excavated to accommodate the vault and to allow casting or setting of the vault. The depth of the pit should be such that the vault will extend at least 4 inches above the ground surface. Place the excavated dirt away from the edge of the pit and uniformly around it.

When the excavation is to contain a prefabricated vault, care must be taken to ensure that the bottom of the pit is level prior to setting the vault. A 6-inch layer of sand should be spread evenly on the pit bottom before installing the vault.

In areas with high groundwater tables, a perimeter drain may have to be installed around the base of the vault to prevent the vault from floating when empty. This drain must be located 5 feet from the privy vault and extend around the perimeter of the vault. The drain tile must outlet at an elevation lower than the drain area.

B. Vault Installation or Construction

Tanks to be used as privy vaults maybe purchased as a unit from a commercial manufacturer or be constructed on the site. In all cases, the vault must be completely closed and watertight to prevent any seepage of sewage to the soil or ground surface. The vault lid or floor slab must be able to accommodate the weight of users.

A vault capacity of 6 cubic feet per person is normally adequate for one year.

Pre-Cast Vaults- Prefabricated reinforced concrete septic tanks are available commercially which may be utilized as sanitary privy vaults. The outside dimensions of the tank are available from the manufacturer to determine the size of the excavation needed. These reinforced tanks must be

constructed of at least 4000 p.s.i. compressive strength concrete, or else have walls with a minimum thickness of 4 inches. In no case should the wall thickness be less than 2.5 inches.

Vault Construction - Sanitary privy vaults to be constructed on-site may be either (1) cast-in-place or (2) constructed of concrete blocks:

1. Cast-in-place concrete vaults should have the walls and floor poured in one operation, and constructed in accordance with the requirements for pre-cast vaults, listed above. The walls and floor may be cast separately, however, if water stops are incorporated in the castings to ensure that the vault is watertight.
2. Concrete block tanks shall have at least 8-inch walls with the cores filled with concrete, and be reinforced at the corners. Blocks shall be laid with tight mortar joints. The walls shall be set on a concrete slab at least 6 inches thick and the wall-to-floor junction must be satisfactorily sealed.

C. Concrete Floor Slab and Risers

Pre-cast vaults are constructed with an attached lid which may serve as the floor slab of the privy. In the case of multiple-seat privies, it may be necessary to utilize more than one prefabricated septic tank to provide sufficient floor space for the privy interior. In other designs, it may be possible to pour additional floor slab to increase the space available for construction of the privy housing, while still locating the risers directly over the vault area.

If a pre-cast vault is utilized, it may be necessary to knock holes in the vault cover to allow the installation of the privy risers, urinal drains, and vent pipes. Many manufacturers can make provisions for the installation of the risers, vent stacks, and clean-outs in the process of forming the tank lid.

Vaults constructed on-site require the additional construction of a reinforced concrete floor slab incorporating risers, clean-outs, and vent stack holes to serve as the lid of the vault and the base of the privy structure. Reinforce the floor slab and risers with steel rods, welded wire mesh, or heavy wire.

The floor slab or privy base must be poured as a unit and should be formed with 2 x 4-inch boards. The outer dimensions of the floor slab must coincide with the size of the concrete sill surrounding the privy vault.

Eyebolts may be cast into each end of the slab as hitching points for moving the floor slab. The eyebolts should be cut off once the slab has been positioned.

The concrete floor slab should be poured and finished to a thickness of at least 3 1/2 inches at the risers and 3 inches at the edges of the slab. The concrete floor should have a non-skid surface. The floor slab should slope toward the door to allow ease of cleaning the privy interior. A curb may be cast as part of the floor slab perimeter to use as the base for the housing structure.

Several thickness of newspaper and some cement grout or other suitable sealant should be placed uniformly along the perimeter of the concrete sill before the floor slab is set on it.

Risers to support the privy seats must be incorporated into the floor slab. If the risers are to be of reinforced concrete construction, the riser forms should be constructed from 1 x 4-inch boards. Extend the reinforcing rods or wire from the floor slab into the concrete riser for at least 4 inches.

The top of concrete risers should be carefully troweled and leveled. Coat the top of the riser with a sealing compound to eliminate any possible openings between the riser and the seat.

Prefabricated Seat Risers

Prefabricated risers of stainless steel or porcelain are available, the bases of which are designed to be attached to the concrete floor slab. Whatever material is used, it must be non-absorbent.

D. Clean-Outs

All vaults designed to serve sanitary privies must be equipped with a clean-out or removable access slab for the removal of accumulated waste. The clean-out port must be equipped with a safely secured, water-tight and gas-tight lid or cover. The clean-out opening should be at least 24 inches in diameter or width to allow for the efficient and sanitary removal of the waste.

The privy structure must be designed so that access to the vault clean-out is from outside the privy housing.

VII. INSTALLATION OF RISER SEATS LIDS, AND URINALS

The installation of seats and lids on the privy riser and the installation of urinals must be done correctly if a sanitary privy is to be properly maintained. Prefabricated seat risers normally include an attached seat and lid. Risers constructed on-site, however, require the construction of tight-fitting seats and lids.

A. Seats

The seat may or may not be hinged, but must cover the top of the riser completely and fit tightly around the edges. The privy seat hole may be an oval shape and should begin approximately 2 1/2 inches from the front of the riser seat. The normal hole dimensions are 10 inches long and 8 inches wide measured through the center of the oval hole.

The seat may be constructed with 1 x 4-inch number 1 tongue and groove flooring or from 2 inch x 10 inch dressed boards which are free of knots and holes. Other materials, if used, must be smooth finished and durable. Cleats should be installed on the underside of the seat to provide additional support.

A separate seat may be provided with a smaller opening for the use by young children. This seat need not be permanently attached to the riser but may be placed on top of the standard seat when needed.

B. Lids

The privy seat must be covered by a hinged lid. The lid should be self-closing to ensure that the seat hole is covered when not in use. The seat hole must be completely covered by the lid and it should project one-half inch beyond the seat at the front, or else incorporate a handle to allow opening of the lid for use.

The lid may be constructed of 1 x 4-inch number 1 tongue and groove flooring with cleats on the upper side. If other materials are used to construct the lid, they must be durable, light of weight, and smooth finished.

The constructed lid should be attached to a hinge cleat affixed to the seat with 3-inch strap hinges. Allow one-fourth inch clearance between the hinge cleat and the back of the lid. A board should then be nailed to the top of the hinge cleat so that the lid will be self-closing. The board should project far enough forward to prevent the lid from standing open when the seat is not in use.

Prefabricated or "waterless" risers are often equipped with a lid which is not self-closing. These and other lids can be made self closing by attaching a piece of material on the lid hinge or behind the lid which will prevent the lid from opening completely and cause it to close when not in use.

The privy seat and lid, if of wood construction, should be finished with at least two coats of clear, waterproof varnish or white enamel to provide a smooth, easily cleaned surface.

The use of standard water closet seats is not acceptable. These seats and lids are not tight-fitting and would allow vermin and insects access to the vault interior.

C. Urinals

Where urinals are to be installed, they must be constructed of approved material and discharge through a rigid drain pipe directly into the vault. The use of rain gutters is not acceptable because the width and depth of the guttering is not adequate. Wooden urinal troughs are absorbent and may not be used.

The urinal must be constructed of stainless steel, galvanized iron, tin, porcelain, or other smooth surfaced non-absorbent material. The bottom should slope evenly to the drain. The urinal drain must be covered by a proper fly-tight drain cover or be fitted with 16 mesh copper or bronze screening. The drain pipe must be metal or rigid plastic pipe with a minimum diameter of 1 1/2-inch. Prefabricated "waterless" urinals which meet these requirements are available commercially.

If water under pressure is available at the site, a very low flow, quick shut-off valve maybe installed to flush the urinal. This should add very little water to the vault and will substantially reduce odors from the urinal.

VIII. DESIGN OF THE PRIVY HOUSING

The privy structure must be constructed of substantial material and be of sound design. The housing may be constructed of concrete blocks, but is more often composed of wood or metal siding around a wood frame.

The privy structure should afford reasonable privacy to the occupants. Privacy barriers must be erected to prevent a direct view of the interior where screen doors are used and for multi-seat facilities. Sanitary privies with only one seat or single-seat compartments may provide an interior door lock in place of the privacy barrier. Within the privy housing, privacy partitions should be installed if two or more seats are provided.

The privy housing may be installed on cast-in-place concrete curbing or on concrete blocks with tight mortar joints set on top of the floor slab. This will protect the wood frame and make interior cleaning and floor maintenance easier.

The privy structure should be framed with not less than 2 x 4-inch boards. The wood frame to floor junction must be tight to prevent the access of vermin, and be well secured to support the structure. Privy structures are still a favorite target for vandalism on Halloween.

If the wood housing frame is not set on a curb, but is anchored directly to the concrete floor, non-absorbent covering should be installed along the wood frame to floor junction to prevent damage to the wood from moisture and to enhance cleaning.

The vent pipe serving the privy vault must extend through the roof and preferably 2 feet above the peak of the roof. The vent stack must be at least 4 inches in diameter. Privies housing two or more seats must have at least a 6-inch diameter vent pipe. Vent flashing should be installed where the vent pipe passes through the roof. The top of the vent pipe should be equipped with a proper cap to divert precipitation and be screened to prevent vermin access.

The roof serving the structure should have an adequate slope, preferably a minimum of 1 to 4, to permit proper drainage and should be sized to provide at least a 12-inch overhang on all sides to divert water away from the privy structure and surrounding mound. If a pitched roof is used, a ridge beam of not less than 2 x 4-inch should be installed. Composition roofing or shingles on solid sheathing, or metal roofing on open sheathing, may be used. To allow better illumination in the privy structure, high light transmission translucent fiberglass sheets may be used as roofing.

Windows or vents should be installed to allow adequate ventilation of the privy structure. Ventilation is often provided by omitting the wall siding immediately beneath the roof soffit and just above the floor slab. These areas are then screened. The screening must have not less than 16 meshes to the inch. Hardware cloth with 4 meshes to the inch is often installed over the 16 mesh screening to provide support and to prevent damage to the vent screening. Alternatively, screened windows may be provided, taking care to ensure privacy.

The walls of the privy housing may be constructed of wood, sheet metal, or fiberglass siding. The resultant structure must be completely enclosed and all joints must be sealed.

The privy door must be of durable construction, tight fitting, and equipped with a self-closing device. The door must open outward, and may be screened if additional ventilation is needed and adequate privacy barriers are provided.

Additional considerations in designing and constructing the sanitary privy housing include the following:

1. Where electricity is reasonably available, artificial lighting should be provided.
2. Receptacles for toilet paper must be installed convenient to each privy seat.
3. Partitions installed within the structure should be of smooth surfaced non-absorbent material. Waterproof splash plates should be installed adjacent to the urinal fixtures.

4. Where electricity is available, an exhaust fan can be installed in the vault vent pipe. This will greatly reduce privy odors. The fan can be wired to turn on with the light switch or can be controlled by a timer.

Painting the building is a necessary part of the construction for wood buildings. The exterior of the privy housing, if of wood construction, should receive at least two coats of paint to prevent weathering. Wood or other absorbent materials in the privy interior should be painted or covered with moisture-resistant material to enhance cleaning.

Some of the earth removed during excavation for the privy vault should be used for mounding around the floor slab. The mound should be thoroughly tamped and should extend out a distance of 2 feet from the floor slab before tapering off to the original ground surface.

IX. MAINTENANCE

Without routine maintenance, properly constructed and located privies will soon become insanitary. The following measures are necessary to maintain a sanitary privy and prolong its life:

1. The vault must be kept fly-tight by keeping the seat lid closed. Ensure that the hinges are in good condition and the lid is tight-fitting.
2. Fill in any openings to the vault visible from the outside of the structure. Check for burrows in the surrounding earth mound.
3. Seal completely any openings or cracks in the privy wall structure.
4. Repair any torn or loose screening at the privy vents or door
5. Ensure that the door remains tight-fitting and that the self closing device is operational.
6. Keep the privy seat, the floor, and the grounds adjacent to the building clean.
7. Provide a waste receptacle for the deposit of articles not to be thrown into the vault.
8. Replace the toilet paper when needed
9. If flies get into the vault or housing, spray an insecticide into the vault and in and around the building, or suspend a no-pest strip. Repeat applications at necessary intervals.
10. Paint the interior and exterior of the building as needed.
11. To prevent mosquito or fly breeding, suspend a no-pest strip into the privy vault during warm weather.
12. If excessive odors develop, add a deodorant such as chlorinated lime, pine oil, or activated carbon to the vault.

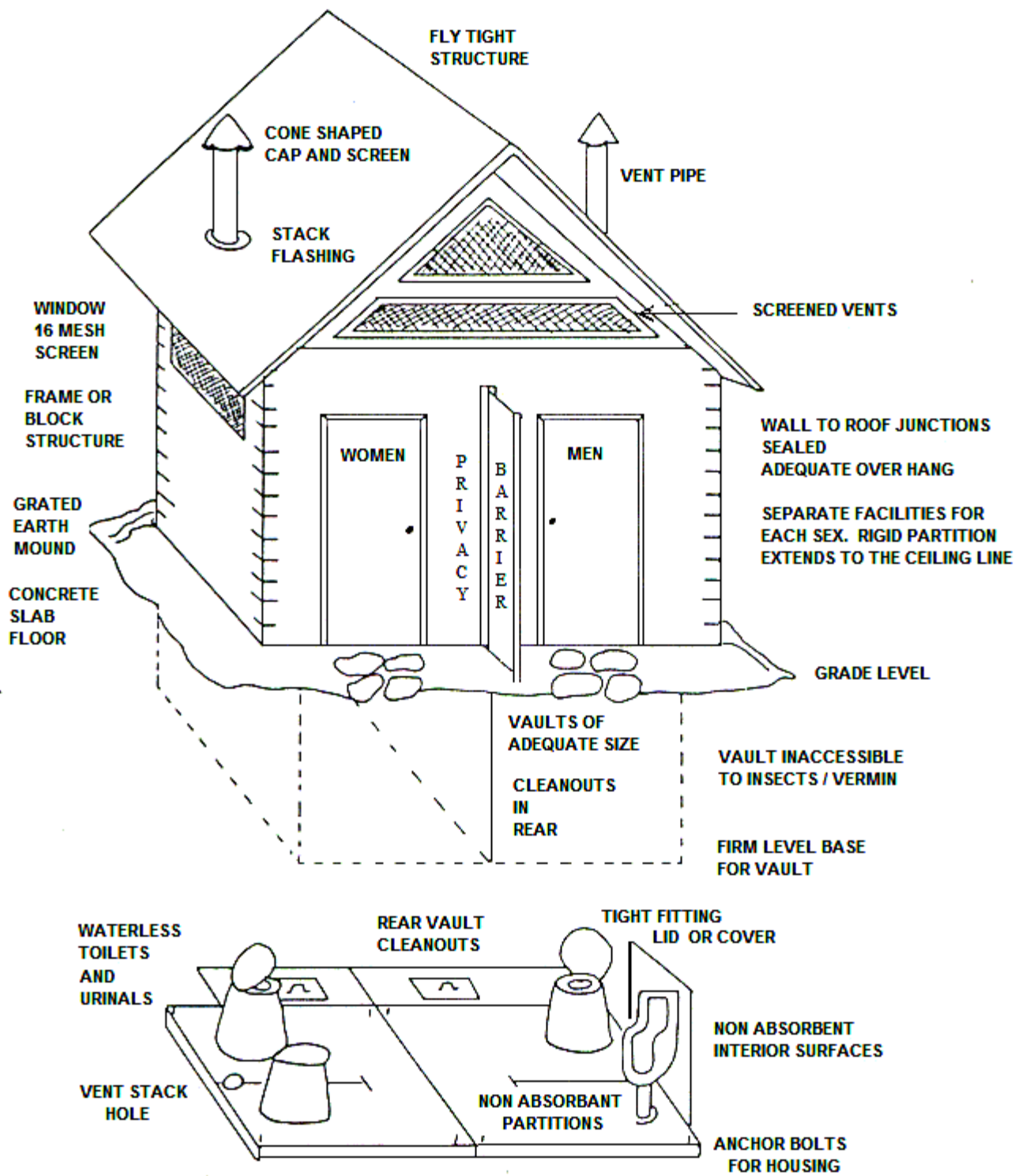
X. REMOVAL OF ACCUMULATED WASTE

When the vault is filled within 18 inches of the floor slab, it is then necessary to remove the accumulated waste from the vault.

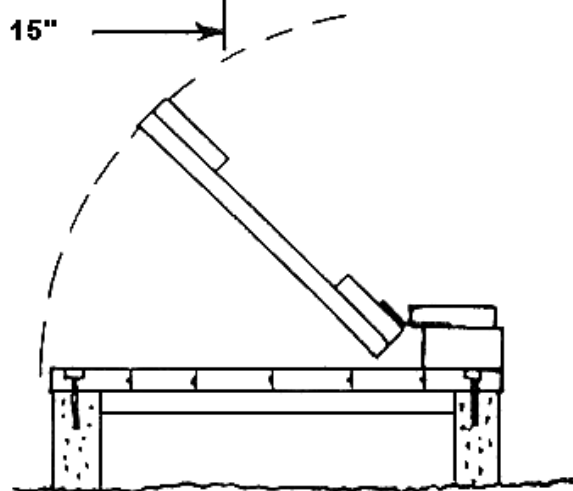
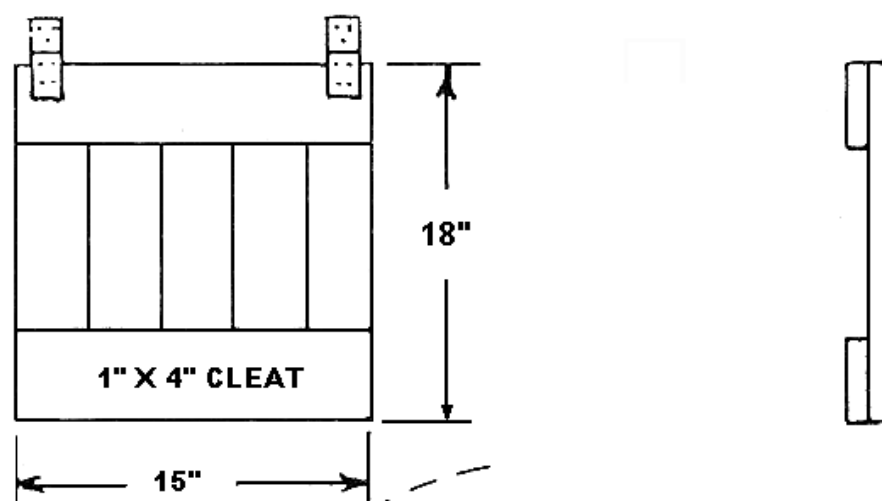
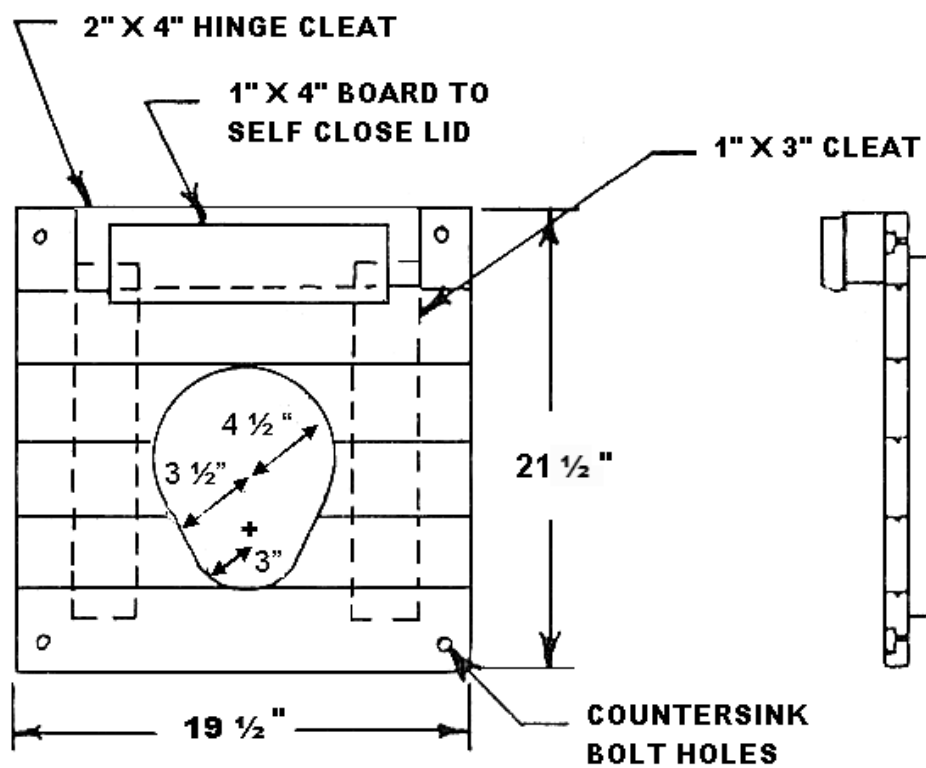
Arrangements should be made with a permitted wastewater management business (septic tank cleaner) to remove and dispose of the accumulated waste when the vault is full.

XI. DISPOSITION OF ABANDONED PRIVIES

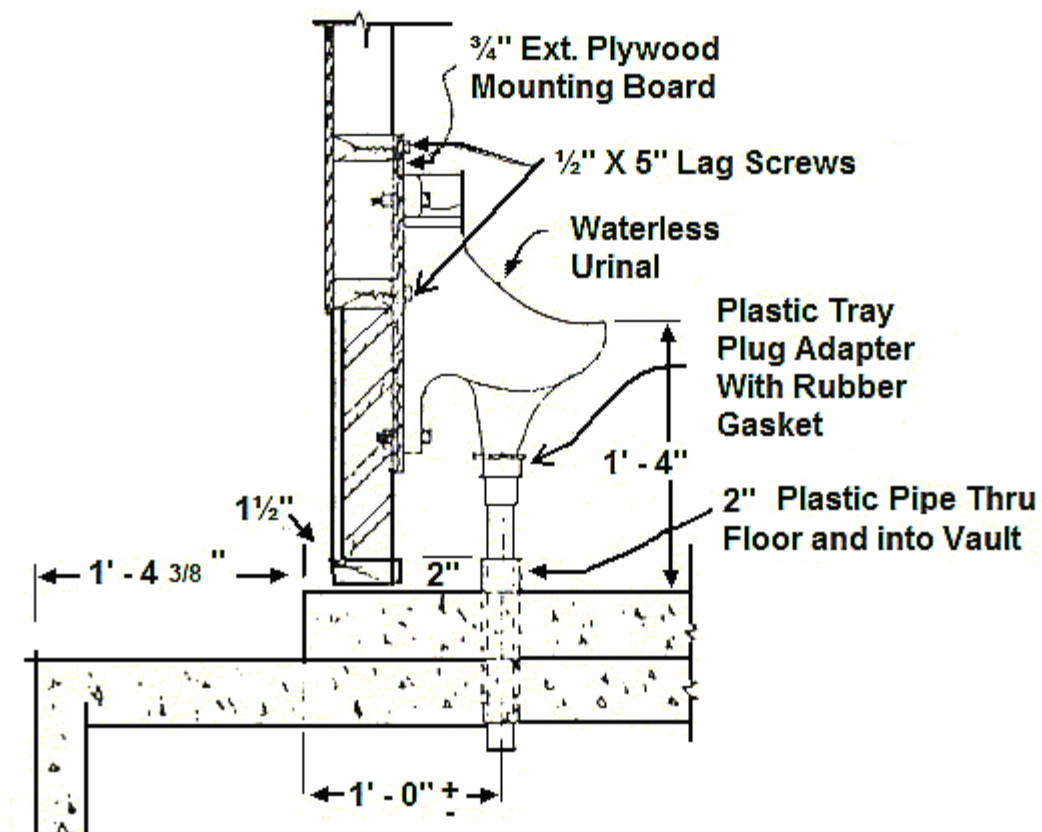
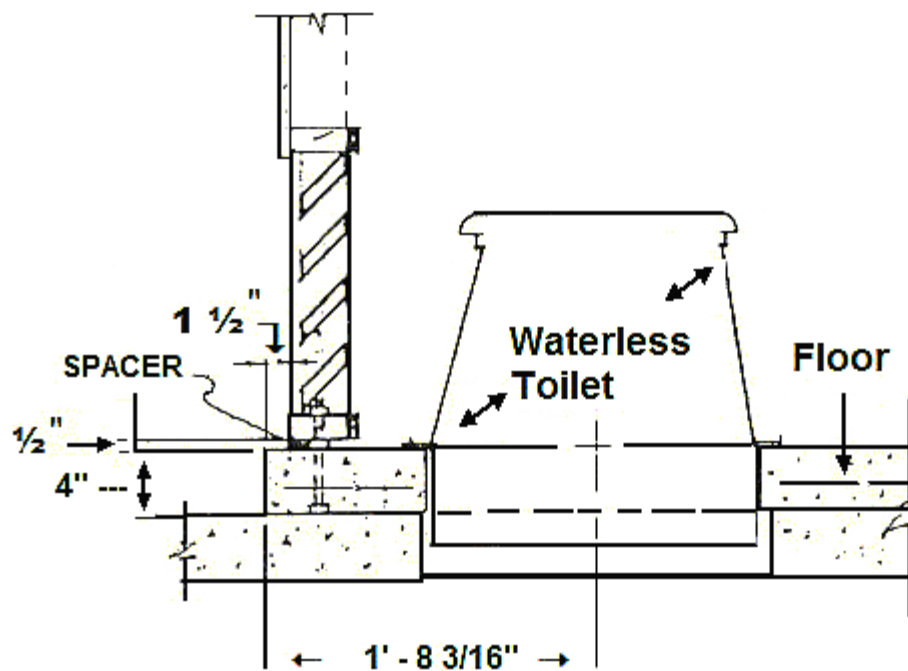
Obviously all the care and expense of building a new sanitary privy will become a total loss from a public health viewpoint if any existing, improperly constructed privies are allowed to remain on the property. Tear down the structures to be abandoned and use what materials you can to construct the new privy building. All wastes should then be removed from the old pit by a permitted wastewater management business (septic tank cleaner). Finally, fill the pit with earth, mounding the fill to allow for settling.



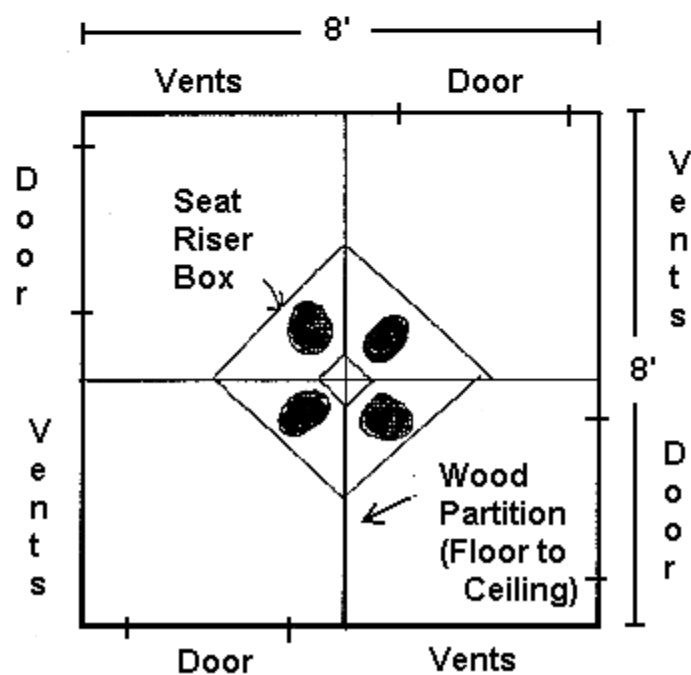
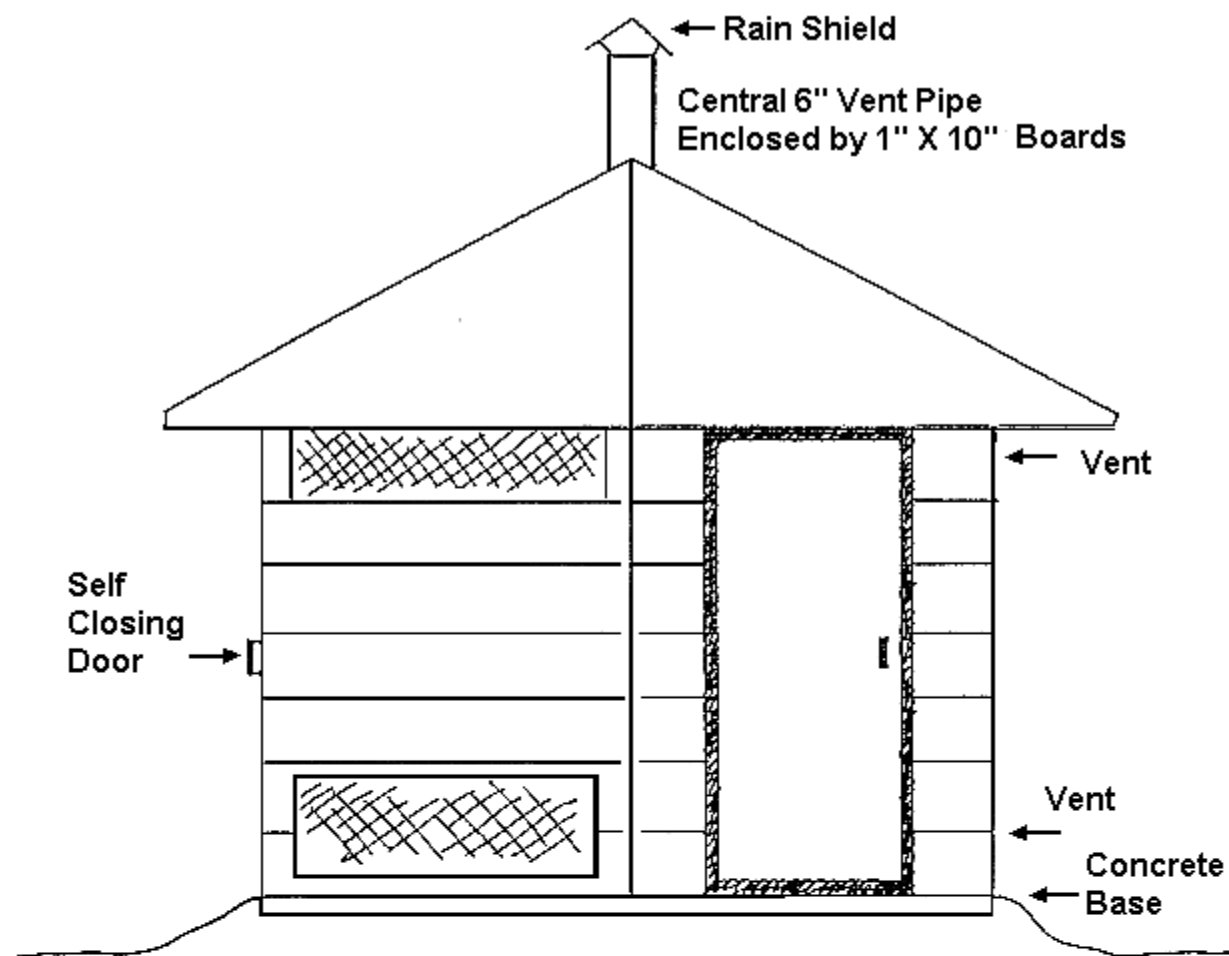
Sanitary Privy Features



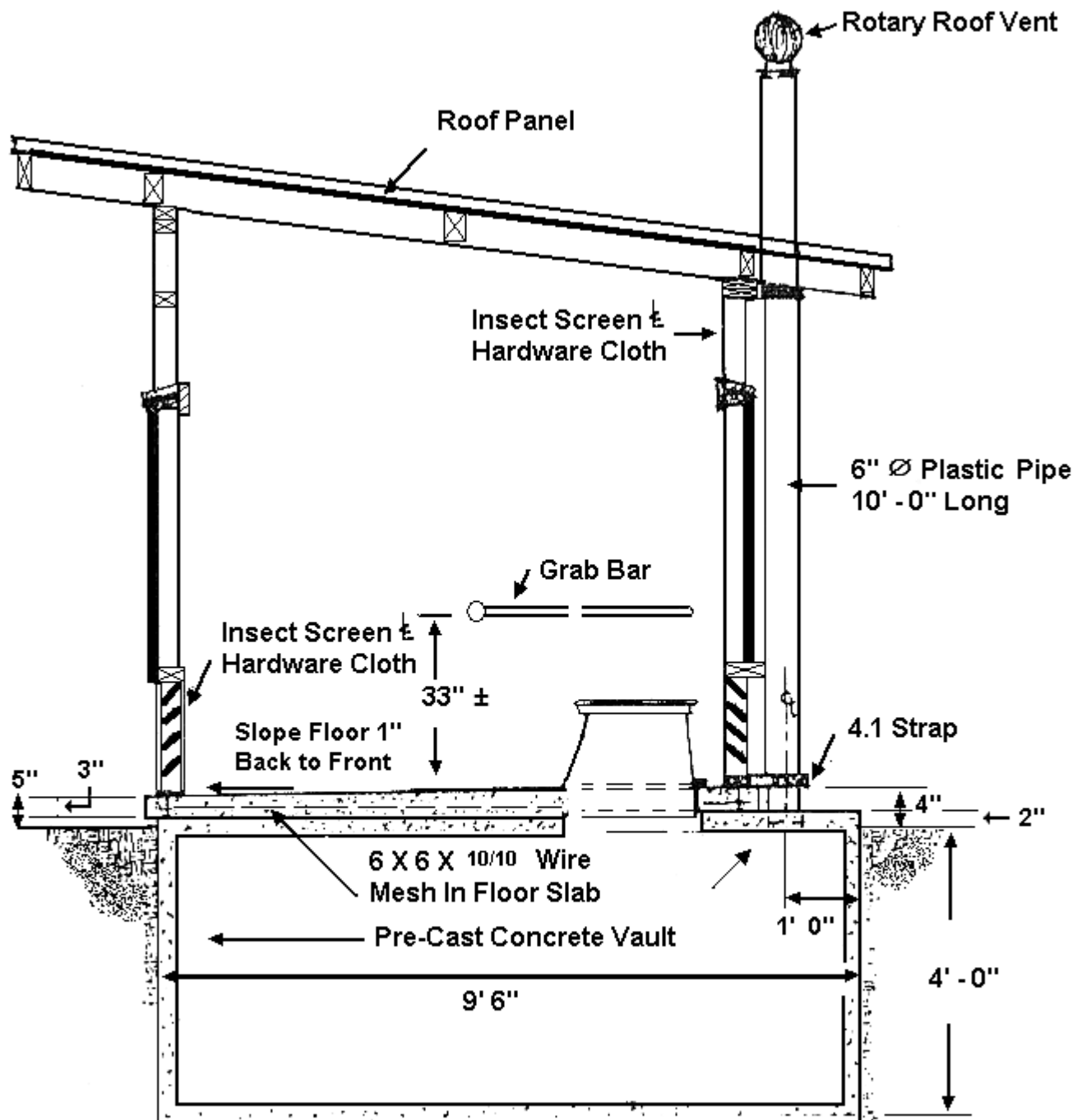
Details of Seat and Self Closing Lid



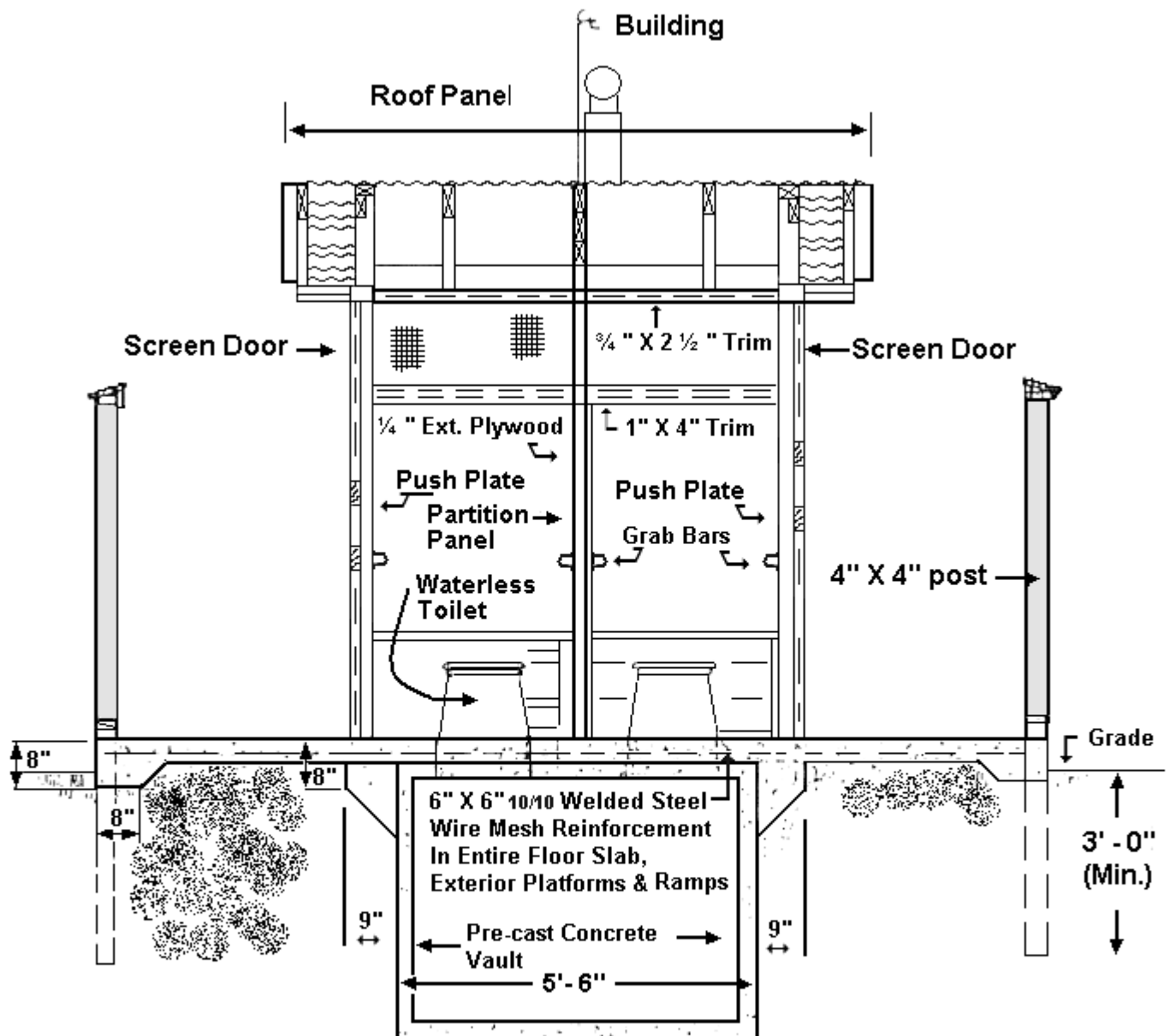
Details of Toilet Stool and Urinal Installation



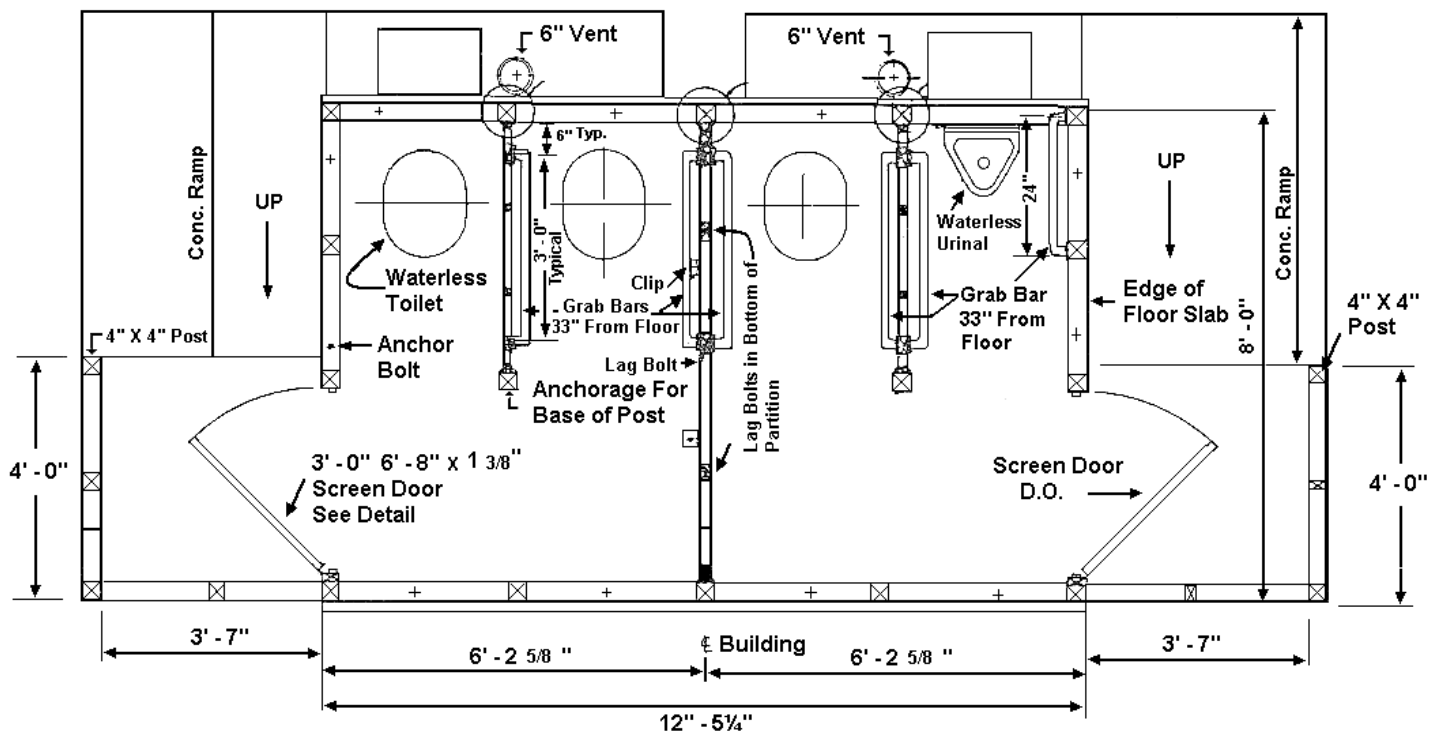
Four Seat Multiple Use Sanitary Privy



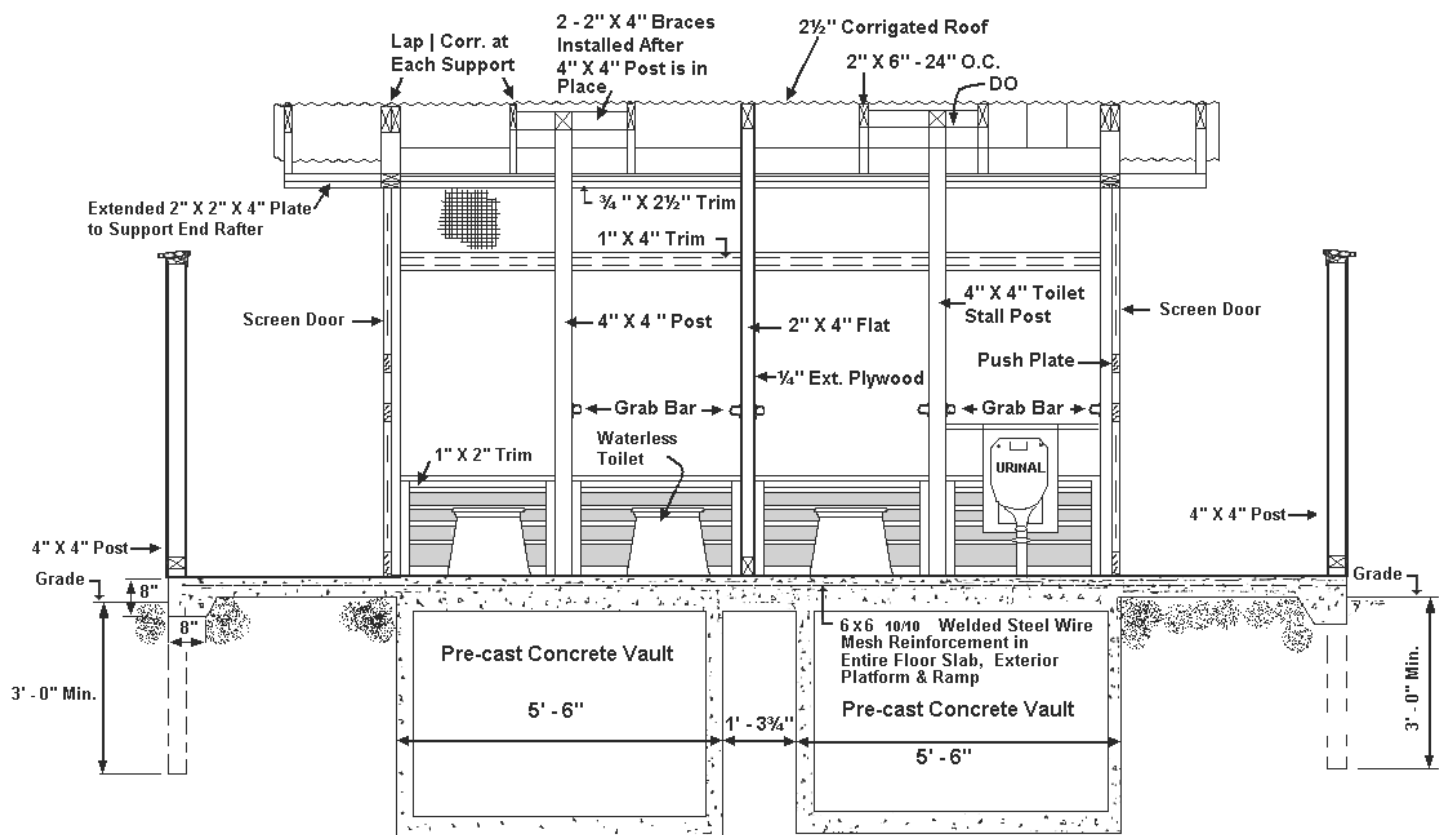
Two Seat Style Vault Privy, Side View



Two Seat Style Vault Privy, Front View



Four Fixture Style Vault Privy, Floor Plan



Four Fixture Style Vault Privy, Cross Section