5 AWESOME BUNKER PLANS ON A BUDGET

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Contents

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Introduction:

The world has reached a point unlike any other in history. Population density and growth has created not just one but several environmental crisis, of which we have already begun to see the effects of, such as radiation and animal die-offs from Fukushima, sink holes in Oregon and the chemical spill in Colorado which has contaminated a major river. Agriculture has reached an all-time low with less people participating in food production than ever before in history and American

agriculture shrinking each year. Things just aren't as safe as they used to be which has you thinking it's time to create a few extra options.

"I know that having a nuclear bunker might sound like too much, even for the most dedicated preppers. But this is only because things are going well now. In a time of war, having access to a nuclear bunker won't sound weird at all. And in times of peace, it can be used as a tornado shelter, a hideout, or a root cellar."

Before you build your bunker you will need to sit down and consider your needs very carefully. A bunker can be a safe refuge to protect you from the big "event" or it could be just end up being an elaborate coffin. You will need to ask yourself the following questions:

- How long do I anticipate sheltering? With how many people?
- Does my environment have issues like salt corrosion, flooding, harsh winters, or extreme temperatures?
- How much space will I need in relation to anticipated time spent inside?
- How will I communicate with the outside world?
- How defensible is my position? Will I be vulnerable to outside intrusion? And, do I have a secondary fallback or escape plan?
- How will I defend against seismic events such as volcanoes or earthquakes?

- What kind of survival culture will I need in the event that the disaster leads to a long term survival situation? Food cultivation, foraging and hunting may become necessary.

You can never rely 100% on any one plan for the disaster which may hit you. For each primary choice you should have a secondary and tertiary option. Safety features such as fire control and emergency escape hatches should be planned ahead of time. A bunker is primarily for a short term storm or event. Long term survival will eventually at some point require you to venture outward for food or even defense. Once your bunker is finished you should do a dry-run practice with your family to see if everything you need is available. Spend a day, a few nights or even a week inside your bunker to get a feel for how things are going to pan out. Don't forget entertainment options either. A few decks of playing cards, pencils and paper and a few books can go a long way in occupying your time for the duration of your stay.

Glossary of Items Common to Bunker Plans

Sump Pump: A small 1/3 horsepower pump installed in homes with basements, underground storage or underground buildings. Any structure underground will need to have drainage or a sump pump to keep them dry. Place a 30-gallon barrel in the lowest point of your hole nestled down in the pea gravel. Ensure that you have an uninterruptable power source such as a generator, solar or batteries to run this pump for the expected duration of an emergency event.

Cost: Between $300 - $2,500 Dollars

French Drain: A gravity fed drain used to move standing water away from problem areas like buildings or garden areas. A great off-grid solution to high water table issues like standing water and seepage.

1. Find a run-off point that is lower than the lowest point of your basement or underground structure. This is where you want the groundwater to go via gravity.

2. Create a trench from the problem area to the run-off spot. You should slope down one inch for every 10 inches of run. (1”/10”)

3. Line with landscape fabric or anything which will retain mud/earth without breaking down over time.

4. Line with 2-3 inches of gravel.

5. Place a pvc pipe with holes in it, downward towards the gravel on top of your cloth or mesh retaining fabric.

6. Fold any additional retaining fabric or mesh over the top of the pipe and backfill dirt.

Now your French Drain is ready to move the water out of the problem area and into the nearest runoff area.

Average Cost: $25/foot

Pea Gravel Base: In most bunker/underground spaces you will need to lay down a 6” bed of pea gravel to help lend to

drainage and stability. Shipping will add more expense unless you have your own truck. This is much cheaper than pouring a concrete slab. Check local building supply stores for local costs. This can work into your French drain system and provide a base to build on top of.

Average Cost: $3-4/ton

Gabion Basket: Any structure which you plan to bury or create must have walls which can withstand hydraulic force on the sides and varying amounts of pressure on top based on depth and local geology. A Gabion basket is a wire mesh basket measuring 2' wide and as long as your hole/walls. When filled with river rock the basket creates a contained wall which can be backfilled with sand/concrete to further stabilize the fortification.

Average Cost: $35/cubic yard

Faraday Cage: This should be a consideration for any type of bunker you construct. A faraday cage is basically a shielded garage, cabinet, barrel or box, which you can use to store electronics. In the event of an EMP detonation over North America or your respective country you won't just lose your cell phone signal, your unshielded electronics will be permanently fried.

1. The basic idea is to build it from non-conductive materials (wood, cardboard) and then wrap or seal it on all sides

with a conductive material (aluminum foil or silver, for example)

2. Note: a Faraday cage/shield, will not protect against solar coronal mass injections (or solar flare).
3. Don't forget to put aluminum tape around all of your door seams as that is the weakest point.
4. Once you have finished your Faraday cage, test it by placing a radio signal inside. An easy test is to place your cell phone inside and then call it. If it rings you aren't shielded properly.

Average Cost: Free up to thousands of dollars. It is impossible to predict the cost effectively because you can create a small one from items found around your home, to a medium size cabinet or even the size of your entire bunker facility.

Plan #1: The Low-Cost Budget Bunker

A bunker can be made out of anything which is strong, stackable and will retain dirt. If your dirt is stable enough you can dig a hole and pack your walls with river stones. The most inexpensive material is cinderblock. Cinderblock is almost everywhere in the world that buildings are built. In the developing nations you may see concrete poured over bamboo or rebar with bricks making up the wall and even mud/straw/cow dung/bamboo combinations which can be adapted for below ground fortifications. If you have a house with a basement you can make a few simple modifications to

create an in-home bunker/shelter space. Your cost is directly proportional to the size of the room you will build and the accessories you want to have inside. This is where the location comes into play the most. Each region of the world has regional craft and culture adapted to the landscape and geology combined with available materials. Try to find a local handicraftsman or even eco-building classes which can give you valuable advice and tips which will save you time and money. A few of these ecologically sound, but dirt cheap methods may include: tires, recycled bottles, and pounded dirt. Remember, it must be able to withstand moisture and pressure. If you live in a tropical, high humid or rainy area, you need something which will breathe but withstand high moisture, over a period of time, against corrosion.

Here is a planning flow for a simple cinderblock shelter / bunker. You can adapt these guidelines to your space and needs.

The biggest job is digging a hole or using a natural feature to create a shelter. Your cost is directly proportional to the size of the room you will build and the accessories you want to have inside. The basic box itself will be fairly standard. Start with a hole 9 to 12 feet deep for a shelter, 8 feet wide, 8 feet tall, and 10 feet long, then you will have a 4-foot cover. (8 ft. x 8ft. x 10ft.) In a real pinch, even a foot and a half of cover will be ok and you won't have to dig as deep either. Digging by hand is

free, but time consuming. Hiring an excavator is more costly but very time-efficient.

Dimensions to Plan for and Be Aware of:

Hole depth: 12 ft.

Total length: 12 ft.

Width: 10 ft.

The standard cinderblock block is 8” wide x 8” tall x 16” long, you must build to accommodate that size. For example, you want a 10’ long room but you must actually make it almost 12’ long to account for that 8” of width on either end where you will be placing your bricks or cinderblocks for the wall.

Foundation/Floor:

A cement slab if you can afford it, packed dirt with wood or gravel surface if you can’t. The main thing for the floor level is drainage. Use a French drain and/or a sump pump for this.

Walls:

Cinderblock. Two important things to remember about walls and foundation: drainage and access. It won’t be zombie proof but it will do in a pinch. As you lay your block you can pour it full of concrete and put rebar inside each hole and pack with sticky mud, sand or sand/cement powder mix and then backfill it. This will create a pretty strong and resistant wall. See Image 1.1 for dimensions and basic layout. Be sure to equip the structure with a strong inward opening door.

Ceiling Structure:

Four feet of dirt above ceilings is best, but in a pinch you can do one and a half foot (1 ½ ft.) Be sure to pick a location which if it starts raining it won't just fill with water. The idea is to get some wood for your rafters and overlay it with anything which will support weight. For the ceiling you should use 4 in. x 6 in. timbers a foot apart and a 1 1/8-inch plywood to support 4 feet of dirt. This is not recommended for extreme depths. Be sure to plan for ventilation. You can add an ordinary filter like the one which comes in a shop vacuum to help keep out dust and particulate matter from entering. Be sure to account for tubing running up one side of the other to allow that air in, plus an easy way to clean it and prevent blockages. To prevent erosion, be sure to have your topside seeded with grass or native plants according to natural landscape.

Interior:

You must have some way to keep your room dry, moisture breeds mold and can create bigger problems inside than those outside. You also need storage. The minimalist solution is a room for sitting/sleeping and one for food/water/medicine storage. You will need a bucket with a detachable toilet seat and a lid for 1-2 days at a time. For more people, more buckets, or more trips to the outside. Be sure to stock water (7 liters per person/per day), MRE's (Meals Ready to Eat), dehydrated foods and canned foods. This bunker plan may or may not include the ability to cook or heat water. Beef jerky,

peanut butter and nuts are great, inexpensive options for protein and fat, but can store for long periods of time. Be sure to consult expiration dates on packaging. Plan for shelves to store food, blankets, water, a weather radio, flashlight/lantern, batteries and a first aid kit. Folding chairs and cots, or pull down bunks are good space saving options for overnight, multiple day use. Wet wipes are a great item to store for basic hygiene. See Image 1.2.

Estimated cost:

$1,000+ depending on what you already have to work with or use, and labor for making it happen. With a bit of creativity you can repurpose most of the interior items from second hand stores or whatever you have in storage. Look around the house for ways to reuse old stuff which you don't "need."

Pea Gravel will cost you $3 to $4 dollars per ton. A standard full size pickup truck bed will hold up to 1,500 lbs if you use your own vehicle or rent one. Check costs against delivery prices.

A sump pump will cost $300-500 dollars if you stay on the low end of the scale.

French Drain is free or quite inexpensive if you have the materials or can find recycled items. Otherwise you will pay $25 dollars per foot on the average.

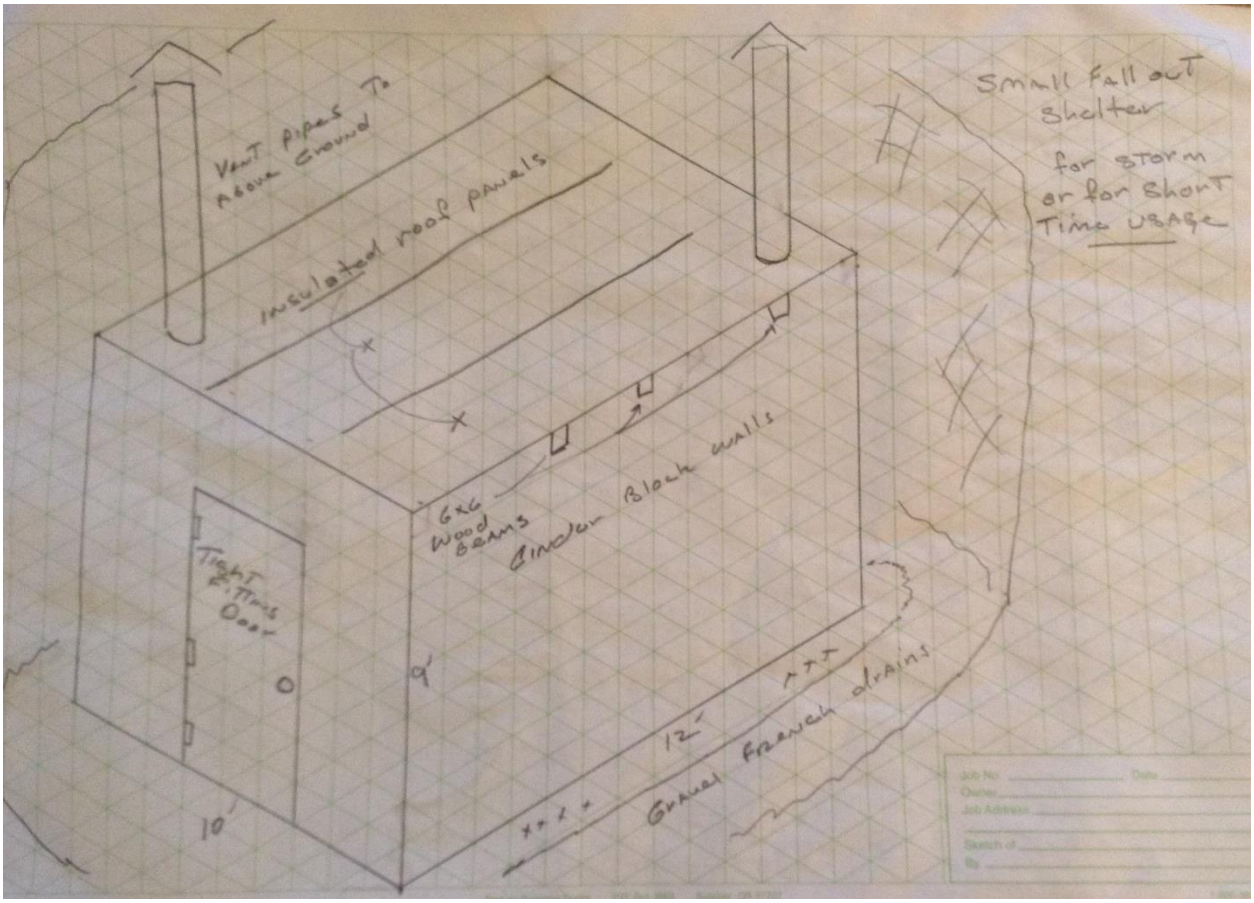

Figure 1: Basic Bunker

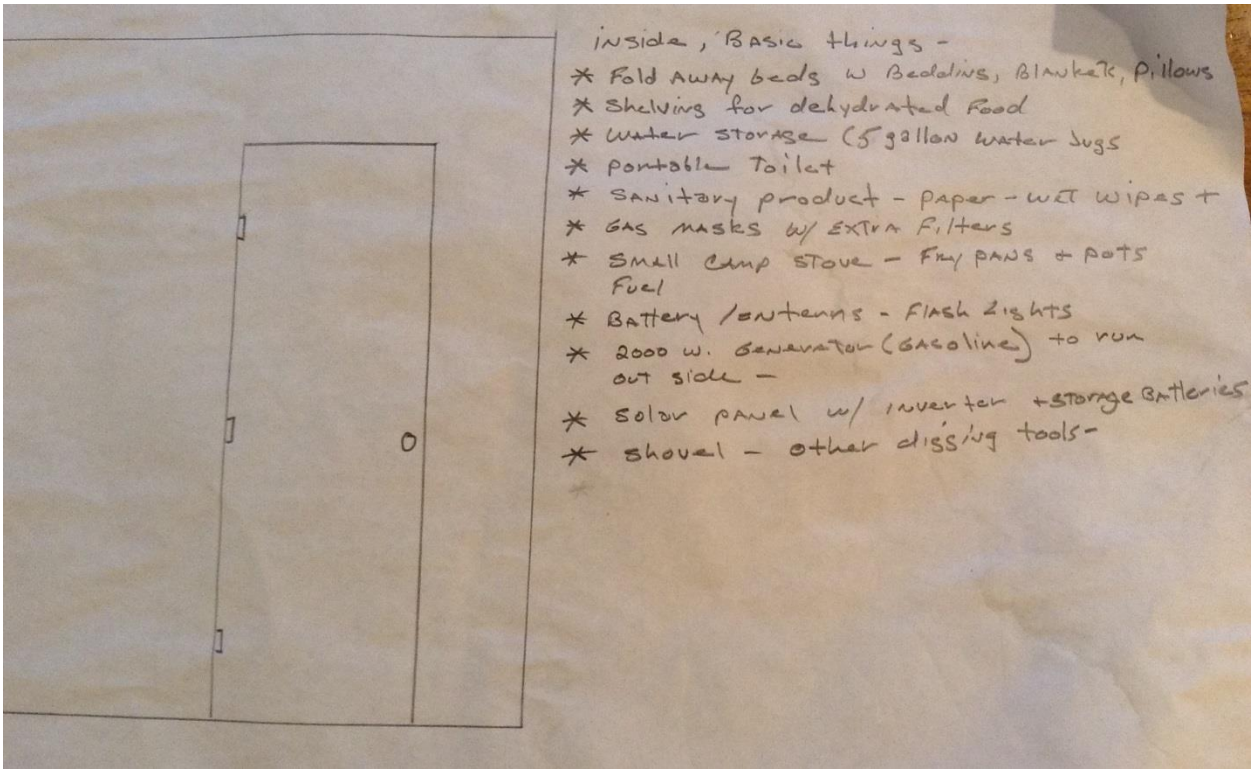

Figure 2: Things to consider

Plan #2: The Cheap Bunker

If you have a little bit of savings put back and want to get the most out of it, then I recommend something fairly simple like this idea. Storage containers are revolutionizing green construction in so many ways. From store's, to homes, to animal sheds, a container is a great pre-fab structure which can be cut up and modified to fit your needs quickly. On a side note however, you will need to plan very carefully for water drainage, structural stability and humidity if you decide to put one of these in the ground in order to prevent bigger problems. Keep in mind that for a similar cost you can also do a larger

cinderblock structure. As the Baltic Dry Index continues to collapse, shipping containers may end up going down even further in cost. Something to pay attention to.

Here is a planning flow for a simple underground storage container shelter/bunker:

Your standard shipping container, is going to be 8 feet wide and 10 feet tall. Containers will come in lengths of 20 feet or 40 feet, which will give you more space. Additionally, these containers are made with ¼" plate steel and ¼" C-channel which can buckle under very little pressure so reinforcement will be a concern during the planning phase. If you go with the longer container then your total costs will double. It is absolutely essential that you create Gabion Baskets (See Glossary) to reinforce the sides or you and your family can end up buried alive.

Before you bury the container:

1. Seal the main doors and cut a smaller door which opens inward on the opposite end. If you aren't concerned about nuclear/bio/EMP then you can put the ceiling flush with the top, simple forms, concrete slab, and then backfill some dirt over it or incorporate into a building, storage shed or garage.
2. Be sure to install a sump pump on a UPS, (or uninterruptable power supply), to prevent the risk of it filling with water. The low-tech way to do this is install a

French drain and ensure that the water has a place to go or you will be back to having to use a sump pump. If you can create your shelter in a hillside you will have the ideal situation for drainage. See **Glossary** for information on how to create a French drain.

3. Use a sealant and paint on the outside of the container to help prevent rust from corroding your structure. It might even be a good idea to put a stucco such as Shotcrete ($5-$8/square foot).

Preparing Your Hole:

1. Dig 2' deeper than your ceiling height (10 feet). And 3' wider and longer than your structure to allow room for placing Gabion baskets which are 2' wide.
2. Prepare 6" of pea gravel as a bed to place your container onto. The hole should be big enough to set a 30-gallon barrel in the gravel bed for your sump pump. You will need a minimum of 20 yards to cover this area.
3. Be sure to plan your entrance by building a slope and pouring concrete steps or building wooden and/or metal steps. Two I-beams extending from the top of the container outwards will help create the support you need for your entrance. Then you can build forms on top of those for your exit tunnel and the concrete which will be poured on top.
4. Don't forget to run a septic pipe into your existing septic tank or to another septic tank and outflow for waste. If

you live in an area with a high water table, you may want to consider a composting toilet instead of the extra plumbing. Waste removal is vital to prevent disease.

Ceiling Structure:

1. Four feet (4 ft.) is the premium depth for any bunker to resist radiation if you can afford it. You also need a ceiling which will support 4' of dirt. This is the part which can get expensive based on how deep you do it. Ventilation. You need one vent on each end to allow air to enter and exit. This is where filtering comes in handy. Human breathing creates moisture and you need a way to expel that. Each vent is a 6" diameter pipe attached to the top upper corner of the structure and its corresponding opposing diagonal corner.
2. You will build forms over everything and then pour a cement cap. This is overall the most advantageous way to do it. Over the top of the container and sides of the Gabion baskets you will lay down some corrugated metal and basic 6" concrete forms. Cost of concrete will depend on how many yards of area you are filling which will be roughly 7-8 yards. Once you have your concrete slab you can either build another building on top or backfill dirt and then plan to have a few trees and bushes planted for erosion control.
3. Don't forget to install your ventilation pipes, electrical conduit pipe and water/sewage during this phase. Be sure

to plan water storage as city water can become contaminated or shut off in the event of an ongoing disaster.

Walls:

1. You don't have to add insulation but if you want it to last longer, then it might be a good idea. Just paint it with roofing repair paste and overlay with 2" Styrofoam sheets, then backfill against it with your Gabion basket. This will create a vapor barrier and keep ground moisture away from the metal container. If Gunite is available, it is the better situation. Tar and Styrofoam will be cheaper though.

Interior:

1. Should have ventilation pipes of 6" in diameter on two corners diagonally to allow air to enter, circulate and then exit, plus a stove pipe connected to your exhaust/output to permit cooking. Be sure to have your intake capped off with a screen and a basic air filter to prevent rain and dust from entering.
2. For waste removal, consider a composting toilet or simple buckets with lids if this space is only for short term purposes.
3. If you can afford the extra cost, a solar panel can help provide for basic electrical needs to charge phones, flashlights, lanterns, etc.

4. A weather radio is a must. A ham radio is a good addition. Contact your local ham radio club to learn more.

Expenses:

8 ft. x 10 ft. x 20 ft. Shipping Container @

$2,500 USD

8 ft. x 10 ft. x 40 ft. Shipping Container @

$3,200 to $4,500 USD for a good one.

Container prices may change by region and availability to shipping lanes where these containers are passed around frequently.

For digging your hole, most excavation companies hire out a machine and operator on an hourly basis ($40-$150 or more an hour) for a wide variety of work. They typically bid on residential excavation for the entire project based on the number of yards of dirt to be moved $50-$200 per yard. 4 yards x 3 yards approximately =

$2,000 for excavation.

For a 20’ shipping container you will need about 10 yards or a full dump load of peat gravel. 2 full dump truck loads should be enough. This is much cheaper than pouring a concrete slab. Pea gravel is $3-4 per ton x 26 tons = $78 dollars

Other costs: Wood costs, Plumbing supplies for intake/output vents, sewage, running water/gray water. ($1,000 +) Interior based on furniture costs, supplies and quantity. ($1000 +)

Concrete: Full cement truck is about $300 USD and holds 10 cubic yards.

Total Estimated Cost for Shipping Container Bunker Project: ~ $7,000 to $12,000

Plan #3: A Cheap and Easy Travel Trailer/Bus Bunker

There is one cheap bunker idea which is an awesome solution if you are on a budget with very little wiggle room, yet feeling needful of something more than a root cellar. Take a travel trailer or a bus and bury it. Any vehicle with living space can be buried as long as you plan appropriately for wall fortification and ceiling structure. The basic excavation is the same as the shipping container substituting a travel trailer/bus set on blocks inside your hole. This option won't last as long as the shipping container but it will be at least 1/3rd less in cost because the interior is mostly finished. Travel trailers are a good solution for low budget preppers who may already have a vehicle in their possession. With a travel trailer or bus you might already have a small, space-saving interior equipped with a bed, shower, toilet and social/eating space. If you are short on time or money then this might be your best option. Note: This is

ideal for dry, arid climate with low water tables. Extra precautions must be taken to seal and insulate the walls of your travel trailer in order to prevent humidity from seeping in.

Here is a planning flow for a buried bus or travel trailer shelter/bunker. You can adapt these guidelines to your space and needs:

Review **Plan # 2** for the excavation requirements. Once again you will need strong, reinforced sides that prevent pressure from collapsing the walls of the travel trailer. It is absolutely essential that you create Gabion Baskets to reinforce the sides or you and your family can end up buried alive. Place these boxes around the sides of the travel trailer and you will have the reinforcement you need. You may also want to replace all existing windows with a solid insert. Your hole will once again have a pea gravel base and the trailer will have to be mounted on blocks to prevent movement and stabilize the foundation. Additional insulation can be added to wheel wells or close them or convert them to extra storage space.

Before You Bury:

1. Review **Plan #2** for base and wall requirements. Measure the height of your trailer/bus then plan the hole to be a foot and a half to two feet deeper than that height. You can apply tar and insulation the same way we did for the storage container to help seal the walls and create something that will help your shelter to stay a constant temperature.

2. This is a great project if you are working with recycled materials. Aside from the basic structural details you can get pretty creative in finding ways to get lengths of PVC pipe, pieces of wood, insulation sheets etc.

Preparing Your Hole:

Again, **review Plan #2** for the requirements of the bottom of your hole with **one exception**: Plan a wider hole with a side entrance where the natural door of the bus or trailer is located. Sump pump and/or French drain will be required for any climate which has a ground water table close to the surface. Test your ground water table by digging a bucket sized hole with a shovel. When you reach a depth where your hole starts filling with water you have arrived at the ground water table. Also keep in mind that this can change according to seasons. You should know what the ground water does in both winter and summer when planning a shelter.

A travel trailer is going to be similar to the storage container structurally. This is a great tornado/storm shelter. You will not be able to protect from Nuclear or Bio-weapons with this type but you can at least avoid any high stress/danger event as needed. Leave yourself at least a foot and a half extra in depth for the pea gravel and a wood or concrete roof structure to cap it all off. Be sure to plan for erosion control after you finish by planting trees or shrubs on top.

Setting The Trailer:

1. There are couple ways you can do this. If you are using a hillside or natural dip you can roll the vehicle into the slot and then fill in around it once you have placed your gabion baskets. Or you can get a septic tank company to lower it in there and set it down on the base you have prepared for it.

Ceiling:

1. Four feet (4 ft.) is the premium depth for any bunker to resist radiation if you can afford it. You also need a ceiling which will support 4' of dirt. This is the part which can get expensive based on how deep you do it. Ventilation. You need one vent on each end to allow air to enter and exit. This is where filtering comes in handy. Human breathing creates moisture and you need a way to expel that. Each vent is a 6" diameter pipe attached to the top upper corner of the structure and its corresponding opposing diagonal corner.
2. You will build forms over everything and then pour a cement cap. This is overall the most advantageous way to do it. Over the top of the container and sides of the Gabion baskets you will lay down some corrugated metal and basic 6" concrete forms. Cost of concrete will depend on how many yards of area you are filling which will be roughly 7-8 yards. Once you have your concrete slab you can either build another building on top or backfill dirt and

then plan to have a few trees and bushes planted for erosion control.

3. Don't forget to install your ventilation pipes, electrical conduit pipe and water/sewage during this phase. Be sure to plan water storage as city water can become contaminated or shut off in the event of an ongoing disaster.

Finishing the Hole:

By now you should have your hole excavated, your base and structural issues resolved, and the vehicle you plan to bury all in place. Now you need to cap the hole off and finish your entrance. This is fairly straightforward as you will use the exact same process to cap your hole for this that you used for the storage unit. Be sure you have planned the following:

1. Air Ventilation: two 6" pipes on opposite corners. A good way to set this up would be to use the windows of the bus/trailer to run your intake and output on opposite ends.
2. Electrical/power supply: Another pipe brings your electrical connection in. This should be pretty easy since the travel trailer will have a connection that you can just plug into without having to run electrical to the areas you need to have power.
3. Sewage: Run a pipe to your existing septic tank or devise a method to pump the existing sewage tank out periodically

after each storm event. You may just want to have a simple bucket with lid to haul out by hand.

4. Entrance. Since most busses and trailers have a side entrance you will need to plan this hole differently. Consider making it wider instead of longer with a ladder, staircase or tunnel which will take you from point A to point B.

Estimated Cost For Project:

Travel Trailer or Bus: This number can vary wildly. You might already have a vehicle, you might find an old one to renovate for free or you may go out and buy one that is new or used. In the US/Canada you can get a pretty nice one for about $5000 dollars.

For digging your hole, most excavation companies hire out a machine and operator on an hourly basis ($40-$150 or more an hour) for a wide variety of work. They typically bid on residential excavation for the entire project based on the number of yards of dirt to be moved $50-$200 per yard. 4 yards x 3 yards approximately =

$2,000 for excavation.

Same thing as the shipping container, you will need about 10 yards or a full dump load of peat gravel. 2 full dump truck loads should be enough. This is much cheaper than pouring a concrete slab. Pea gravel is $3-4 per ton x 26 tons = $78 dollars

Other costs: Wood costs, Plumbing supplies for intake/output vents, sewage, running water/gray water. ($1,000 +) Interior based on furniture costs, supplies and quantity. ($1000 +)

Total Estimated Cost for Travel Trailer/Bus Bunker Project: ~ $5,000 to $12,000

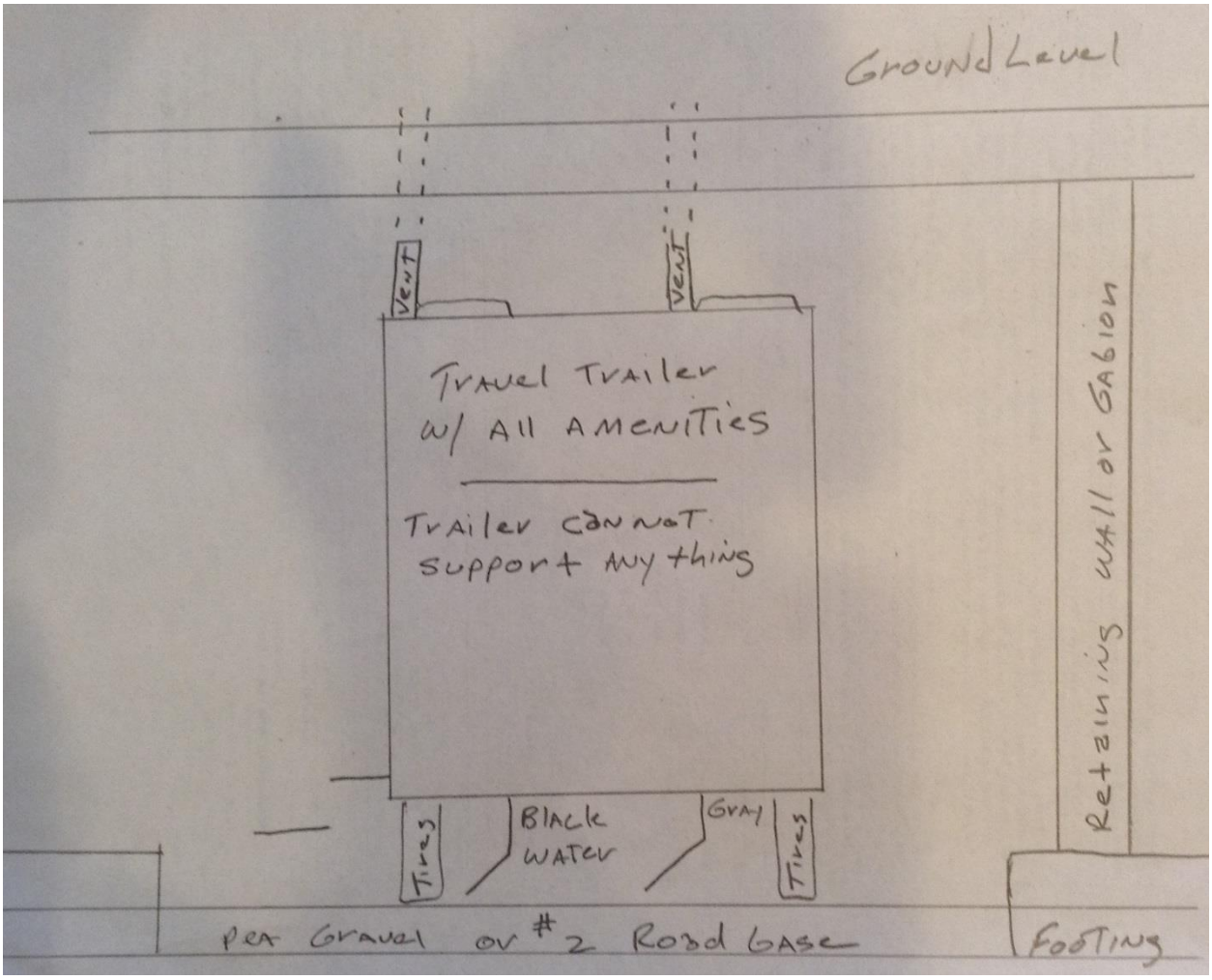

Figure 3: Cross-Section of Travel Trailer Bunker

Plan #4: The Above Ground Bunker

If you have ever passed through Hawthorne Nevada on your way to Reno from Las Vegas you may have seen the many mounds of dirt located in the Army Depots back yard. Not unlike a village of giant prairie dog mounds, these are anti-missile hardened bunkers used to store supplies and munitions in classic cold war era style. This is actually one of the best doomsday options because you won't run the risk of being buried alive, drowning, and with a bit of planning you can see what is happening outside and maybe even be ready to defend your family if Martians or other Earthlings happen upon your little refuge.

If you took a cross section of one of these bunkers you would see a concrete and rebar fortified structure, anchored by concrete pilings, covered in dirt, and seeded with grass to help control erosion. This is a great storm shelter if you have natural property features which you can use to integrate your shelter into the natural landscape. Hillsides which naturally cascade into each other or large amounts of dirt available from a previous excavation are just a couple examples of cost-favorable conditions and easily hidden from plain view. Watch out for land features which naturally attract or retain water runoff. If possible try to build into a hillside. This is a good option if you are in an area with a high water table, hurricanes or earthquakes. An above ground bunker will not need a French grate or sump pump either.

Here is a planning flow for an above ground shelter/bunker. You can adapt these guidelines to your space and needs.

Planning

You will need to plan your foundation. You can drive rebar pilings into the ground or pour concrete pilings. You don't need to go too deep, set down some cement forms or pour your own form using the characteristics of your hole. This could get costly depending on excavation and forms needed. If you are building in the side of the hill you may only need pilings on the front side if you are anchored into something like bedrock which is a natural shelter condition. Make sure you talk to a local builder for area specific information.

Laying Your Foundation:

Pilings and Concrete base: If you are on sand or shale you will need to plan this carefully. The best way to do it is pour a slab but have rebar reinforcement in the corners and 2-foot-thick walls. The building should be capable of lifting a bit without coming apart basically. Especially in coastal regions, the earth tends to shift and change over time. You can drive ¾" rebar into the ground and pour concrete over it. A 6" concrete slab can be poured for everything to sit on top of. Just like the ceiling, you will have the rebar criss-crossed every 6" for optimum strength.

Walls:

1. You will need to build your wall forms. Once you have your gravel or concrete base you will set the wall forms.
2. Minimum thickness to protect against fallout is 12". You can either stack a double row of cinderblock or have a cinderblock layer with a brick layer and the whole thing filled in with sand or concrete to fortify it further.
3. The ramping of the dirt can even be a benefit if you have a preexisting barn, garage or even a side of your home structure to build against you can help to save time and money while using your space more efficiently. For stability your dirt slope must be a minimum of a 45 degree angle.
4. The bare concrete walls in dry country can be backfilled with dirt. In wet country you will need to apply a sealant to protect from excessive humidity like Henry's Bar Repair, a concrete wall sealant which is commonly used and readily available.

Ceiling:

If you plan to create, or add onto a freestanding structure which isn't buried, you will need a concrete ceiling and then you can put a simple wood roof over the top for aesthetic appeal. In the event of a tornado or high winds you might lose the roof but that concrete ceiling will stay put.

1. Build your roof forms with wood, corrugated iron and rebar then pour the concrete over the top of the form you have created.
2. Like your walls you will need 12” of concrete to protect from nuclear fallout adequately.
3. For bioweapon attacks you will need to seal everything off and have an off-grid air filtration system with an exhaust system for output ventilation.

Exterior:

The exterior will depend on whether you are going to bury it in dirt or leave it as a freestanding structure. If you bury it with dirt, make sure your slope is a minimum of 45 degrees to prevent erosion and ensure you have enough cover.

Interior:

1. Air Ventilation: The simple way to do it would be to allow air to enter in by the front door and then allow natural convection to take its course. Otherwise, you can buy an industrial exhaust system and install that for the bio-weapon scenario. Either way, even in an above ground building, this will be a concern.

2. Electrical/power supply: Solar panels or a wind turbine would be ideal methods to generate off-grid electricity. If you have running water nearby you can even devise a simple water wheel to generate electricity.

3. Sewage: Run a pipe to your existing septic tank or devise a method to compost or remove human waste after the big

event. You may just want to have a simple bucket with lid to haul out by hand.

4. Entrance. You can buy a storm door which is specially built for shelters or you can make your own door which will seal and lock from the inside in the event of a tornado, nuclear attack or EMP. Just make sure you have devised a foolproof way to be able to see out in order to help determine safety for exit and intruders.

Total Estimated Costs: $15,000+ Depending on size and land features.

For backfilling the dirt. Most excavation companies hire out a machine and operator on an hourly basis ($40-$150 or more an hour) for a wide variety of work. They typically bid on residential excavation for the entire project based on the number of yards of dirt to be moved $50-$200 per yard.

Rebar: ½" (#4) 20 ft costs $3-4. 5/8" (#5) a bit more. One rebar every 12" for walls. For the foundation/ceiling or the floor of the second structure you will create a lattice with the rebar crossing every 6". If your ground is unstable, like sand or shale, you will need more.

PVC pipe: Small stuff can run 3-4 dollars per length (20 feet).

ABS black plastic pipe for sewer $3-4 dollars for 3" or $30/length (20 feet).

Pex: a flexible, new design for water supply, all the connections snap together with a push/pull fitting which is fast and easy to

do. 100 ft roll might cost about $60 dollar depending on location and availability. Blue: water. Red: hot etc

Electrical wiring: 100 ft roll of romex copper #12 is about $80, and will cover all the electrical needs for lights, plug in etc.

Mikes Bar Repair: $60 for 5 gallon bucket.

Cinderblock: $1.50/block

Concrete: Full cement truck is about $300 USD and holds 10 cubic yards.

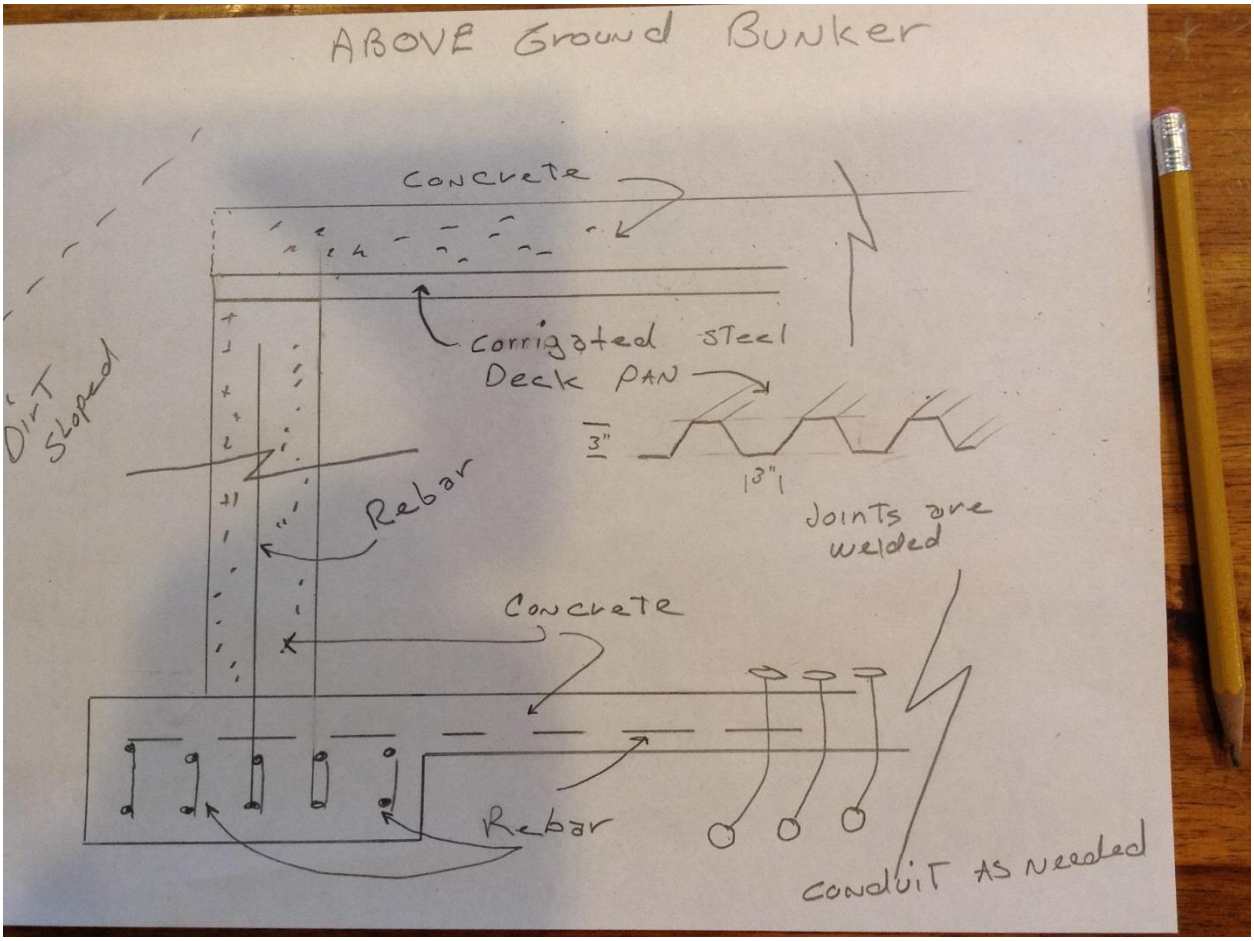

Figure 4.1: Cross-Section of Above Ground Bunker

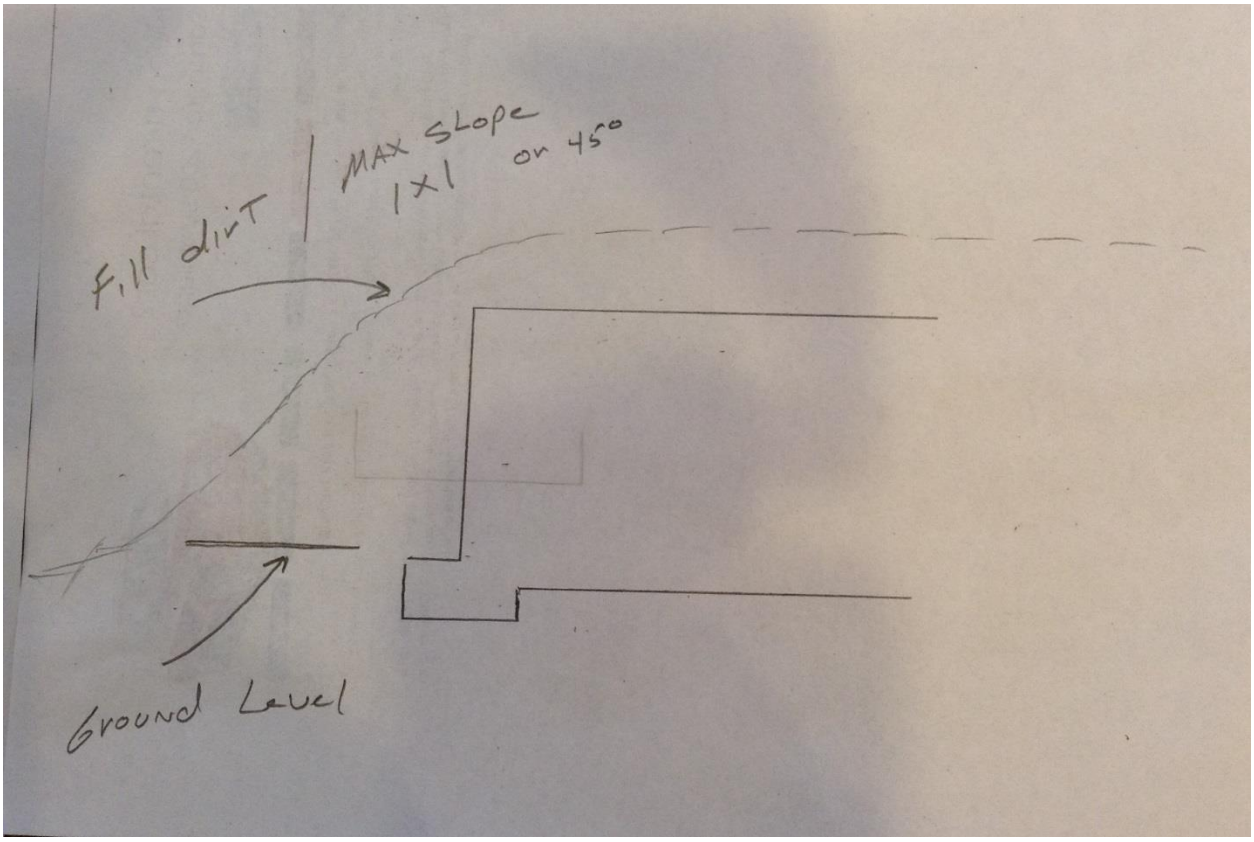

Figure 4.2 1Cross Section & Slope for Above Ground Bunker

Plan #5: A Long Term, High Tech, Nuclear/EMP/Bio-Weapon Hardened Bunker

This is the most expensive and complex bunker but it's the best option in a long-term, extreme circumstance situation. You will be planning a much bigger space for food storage, water storage, water filtration and pumping, habitat areas for people and even pets. Interior can be outfitted in any way which serves the size and complexity of your family. Be sure to plan

space efficient but functional exercise and entertainment options. An interior decorator can help you devise the best use of space when installing the furniture and storage features. Whether you are planning for a week, 6 months or several years, this plan should give you the basic elements in getting you started, from there this design can be modified or integrated with existing/future land features and structures. Be sure to plan tactical security for obscuring the location from zombie invasions or pandemic outbreaks where you might have survivors knocking on your door or throwing smoke grenades down your ventilation pipes.

Here is a planning flow for a long term, sophisticated cinderblock or concrete shelter/bunker. You can adapt these guidelines to your space and needs:

Planning

You will need to prepare for long term water needs by storing, pumping from underground aquifers or purifying water from an existing above-ground uninterruptable water source. In the event of a bio-weapon or nuclear attack you will need oxygen filtration/air purification equipment which can run on solar and batteries in the event of a grid-down scenario. You will need a special system in regards to cooking food and heating water from underground. You may need the ability to not emit smoke which could give away your location. Waste disposal will also be a bigger issue requiring a special output or recycling system. Food sources must be accounted for. This may include small

farm animals, hydroponics, aquaponics or earth boxes. Finally be sure to have training and preparation in the event you must defend from intruders should your exterior defenses be breached. Obviously at some point you will need to consult a professional builder for design and structure specifications. I will try to point out the items of importance and things to keep in mind with planning along with a basic sketch to inspire your imagination. At this point the sky is the limit of your budget so plan carefully and efficiently.

Items to Note:

1. Nuclear Events: You will need to shield against the initial blast and then the radioactive fallout following the explosion. Minimum shielding to protect against radiation is 4 inches of soil, this will provide a minimal layer protection. 4 feet of earth over your head is the best scenario. Underground sheltering will increase your chances by 90% compared to other types of shelters. Don't forget to have a detection device to measure radiation over time after the event.
2. EMP Blasts: Included in your construction you should have a faraday cage to protect electronics from being fried. See **Glossary** for instructions. However, your Faraday shielding is only really needed for any wires or electronics which may be running from the inside to the outside, this is easily avoided if the electrical source is self-contained, like a generator.

3. Bio-chemical Protection: For this you will need air purification and/or an oxygen supply readily available. Gas masks will work for the short term but it's hard to function when wearing them over extended periods. Costs will vary depending on what system you use. Check out this site: here, for an air filter system with a manual back up power feature (the only one of its type), and government quality filtration.

Building the Deluxe Survive-All Bunker

Excavation:

1. If possible use an existing basement, if money isn't a concern you will be digging a pretty big hole to create a two level structure with a storage/production level and a living area upper level. Plan 4-5 feet in addition to the height of your structure for backfilling and then erosion control on top of that.
2. You will need a sump pump with a much larger capacity due to the size of your hole and the groundwater levels.
3. In this plan we are going to pour a 6" concrete slab base for everything to sit on top of and to build your walls upward from.

Foundation:

1. Each corner is going to be either a pre-cast or poured form which will penetrate at least 2 feet deep. These “feet” will have rebar inside and will serve to stabilize the whole structure while still allowing the ground around or underneath to shift and the structure with it. This is important in earthquake prone areas where ground elevation and location may change suddenly.
2. You can create 2’ stem walls by pouring concrete into forms or stacking cinderblocks with rebar inside of them and then pouring concrete inside. Once you have your foundation laid you can either continue to build upwards using cinderblock, brick or metal. Don’t forget to plan your sewage/gray water run-off prior to pouring concrete. Plastic conduit pipe is helpful to be included in your stem walls and for any current or future expansion and to run all your electrical wires.

Walls:

This is mostly your preference. A standard 12” cinderblock thickness is sufficient since you are going to be shielded by dirt on all sides. You may need to apply a sealant to prevent water seepage.

1. Bearing Load of lowest compartment. You will need to fortify the lower structure according to the weight which will be above it. This may require more rebar and/or more

cinderblock cells depending on how big it is. The wider you go the more consideration for internal columns.

2. Every 8 to 10 feet wide or long you will need a column or support. If you go 15' wide, you will need to consider a column every few feet.
3. Insulation. The temperature will typically stabilize at 50 degrees underground. This will save you money on heating and air conditioning since in a crisis you won't need either one.

Ceiling:

This is going to be pretty standard. We discussed corrugated iron, rebar and concrete. This is a great method to build a strong floor and ceiling.

Corrugated steel, rebar and concrete. Just like a parking garage. This is the type of structure which you will be building. It will be the strongest material and the most resistant. Decking contractors carry the corrugated metal which is thick enough and strong enough to support the weight you need.

Interior:

This is going to be mostly your preference. It would take too much time to adequately cover interior needs/ideas/suggestions in this report so I am just going to mention a few ideas to keep in mind when planning your interior floor plan.

Lighting: If you are planning for long term be sure to put back spares, candles and/or flashlights.

Storage: Check with an interior decorator or California closet professional to plan your storage with the best strategy regarding what you will need and when.

Food: You will need to not only put back food that you actually want to eat, but you will also need a system for tracking expiration dates and rotation. Don't forget to pack plenty of salt and spices! In a long-term situation you may even want to have a way to grow your own food via hydroponics/aquaponics/container gardening etc.

Water: Plan for 7 liters per day per person, minimum. Try to devise water-less cleaning options to help conserve supplies. If your water is stored in a tank you will need to add appropriate purification tablets to prevent algae growth.

Supplies: Don't forget a med kit, which may include a suture kit, blood transfusion kit, snakebite/bee sting kit, antibiotics and bandages. Be sure to take appropriate training classes for treating and caring for emergency situations.

Estimated Cost for High End Sophisticated Bunker: $60,000

For digging your hole, most excavation companies hire out a machine and operator on an hourly basis ($40-$150 or more an hour) for a wide variety of work. They typically bid on

residential excavation for the entire project based on the number of yards of dirt to be moved $50-$200 per yard.

To calculate total yardage: Depth x Width x Length

Rebar: ½" (#4) 20 ft long costs $3-4. 5/8" (#5) a bit more. One rebar every 12" for walls. For the foundation/ceiling or the floor of the second structure you will create a lattice with the rebar crossing every 6". If your ground is unstable you will need more.

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Mikes Bar Repair: $60 for 5 gallon bucket.

Cinderblock: $1.50/block

Concrete: Full cement truck is about $300 USD and holds 10 cubic yards.

Conclusion

Hopefully this report will give you a glimpse of the elements necessary for short or long-term survival situations. Be sure to read each plan even if you are going to build the most humble budget bunker or the most elaborate survival retreat, as each one helps to fill in gaps in the others by highlighting important pieces of information. Always check with local zoning ordinances before you dig to ensure that you won't run into legal issues halfway through your project. If other people are working on your bunker besides you and your family it probably isn't going to stay secret, so plan appropriately. Don't forget to call your country inspector before you dig to mark off the location of electrical, gas and sewer.

On a final note there is two more items which is the most important of all. Your mindset and proper training.

The biggest disaster or the smallest issue, is nothing without a resilient mindset. The survivalist mindset is an attitude of "I can do it," no matter what comes. It's the ability to stay positive, and help others around you do the same, even when you want to give up. This attitude is cultivated through patience and practice. Some will call on their personal faith, others will rely on science and logic. Whatever it is that keeps you going, make sure you have plenty of it. Studies have shown again and again, that cancer patients who stay optimistic are more likely to overcome their disease and survive than those who can't. Don't be that person who creates a grand plan for

you and your family without having the mental training to back it up. Meditation, yoga and karate are all activities which focus not just on physical, but mental strength and control. This leads into the second item: proper training.

The eve of destruction is too late to start practicing your suture skills. That being said, be sure you have the training to go along with your preparations. Any prepper who is truly serious about survival must have his mind and body trained and ready to respond at all times. Much of this training doesn't even require much of an investment thanks to the many websites, videos, and books available. Be sure you and your family have a minimum of emergency medical and self-defense. It's also a good idea to have a trade which you can use to feed, protect and provide for your family, in a doomsday scenario. Blacksmithing, farming, and construction, are just a few examples. From here the rest is in the details.