Opening, Closing, and Maintenance of a Green Burial Grave

Obviously, each green burial ground will have region-specific soil, water, plant, animal habitat, and cultural differences and concerns. Forests, meadows, prairie, desert and more all have their own challenges and strategies for how best to dig and fill a grave. The following are basic suggestions that may be useful when developing your cemetery's procedures and protocols. You may want to consider photographing before, during and after for liability, for a recorded history of what worked and what didn't to improve upon in the future, or to document the physical properties, including plant growth.

Best Safety Practices

The Green Burial Council places high value on worker safety as one of the major reasons for supporting cemetery reform. Along with embalmers who experience higher risk of contracting leukemia and ALS, groundskeepers risk COPD and other respiratory and neurological diseases through repeated exposure to toxic pesticides and herbicides in conventional lawn cemeteries. Natural burial virtually removes all of these hazards.

Basic safety precautions and ergonomic solutions and practices are necessary in green cemeteries of course, whether using contemporary or traditional hand methods when opening and closing graves, maintaining trails, woods, and open space, operating machinery such as modified carts or working with animals such as goats for grazing or horses for pulling the carts — and the list goes on.

Ensuring a safe and reliable experience to families and friends during and after interment is also essential. Here are some specific suggestions for best practices applicable to the public as well as staff.

Grave Preparation

Grave preparation (digging) in some instances is done by hand, in other instances a backhoe is used. If a backhoe is used, safety issues are mostly addressed by having an experienced backhoe operator and by restricting the area from anyone other than the operator and his experienced assistant(s). In the case of hand digging a gravesite, here are some key safety guidelines to consider:

- Are the selected gravediggers experienced? If not they should read safety guidelines prior to participation as well as be given an oral safety overview (onsite) prior to grave digging.
- There should always be an experienced gravedigger in charge of any grave digging group. That person should always provide a safety overview to all present before beginning to dig.

General Safety Guidelines for Grave Digging

1. Develop a list of proper equipment, clothing and shoes for grave digging.
2. Establish regulations / rules in regard to how tools are to be handled and where and how they will be placed (at the grave site) while not being used.
3. Have a ladder, stool or some other helpful tool to help facilitate a gravedigger's transition in and out of a grave.
4. Have adequate water available for hydration.
5. Have a first aid kit available and consider having an automated external defibrillator (AED) on hand.
6. Hold at least an annual safety review in regard to gravesite preparation and burials, so that any lessons learned are incorporated into safety regulations.

Burial procedures

Because green burials often provide attendees with an intimate and participatory experience, it is important for each green burial cemetery to evaluate their particular situation, policies and procedures from a safety point of view. Some important areas to be considered are:

1. Integrity of the grave and surrounding area. Whether staff, volunteers or family and friends, the weight of people around the proximity of a grave can sometimes create some degree of cave in. Some methods of reducing the risks of such occurrences are: careful evaluation *before* time of burial, using grave frame techniques that reduce the impact of weight around the edge of the grave and using "side boards" (possibly plywood) to secure the sides of the grave (to be pulled out after lowering but before closing).
2. It seems prudent to limit the number of people who are near an open grave's edges to reduce the risk of an accident involving the grave. Also it is important to make sure that children and pets that are present are under strict supervision in this regard.
3. All participatory tasks related to the burial (such as the carrying and placement of the body over the gravesite & lowering the body) should be done by screened individual that meet the necessary strength and mobility standards required for the task. Clear instructions with demonstration (as much as possible) should be given prior to all such tasks.

Opening the Grave

Begin by assessing the suitability of the potential site for burial, including conducting a micro inventory of plants and sign of animal use, comparing it to the master inventory or ecological assessment for any discrepancies. If there has been significant change in a natural or conservation cemetery, or if there is something such as a rare plant species or a new animal migration corridor that was not noted or present when the site was chosen and sold, either take steps in advance to make the area useable or move the site (this option should be stated clearly in your contract agreement as a possibility). In the case of a hybrid cemetery, perhaps a water line for plant irrigation has been added, or some other type of structure for improved drainage.

This may include digging up eligible plants and incubating them until they can be replanted. You may consider having a nursery for both holding and propagating locally sourced native plants. Properly cultivated plant material supported by appropriately amended mediums will have a greater chance of transplant success, and afford the operator the opportunity to plan and document the locations and results of restoration efforts.

The grounds crew will determine the best route in and out for the crew and visitors both for safety and aesthetics, and where they will be expected to stand during the ceremony and/or burial. This information will need to be relayed clearly to the person(s) in charge of directing the funeral.

The crew will also have to decide where the soil and grave material will be stored. This may be in piles near the grave, on top of a tarp, or removed to a less sensitive area to avoid damaging the floor around the grave. Best practices call for the soil strata to be removed in succession and piled separately, to be returned in reverse order, subsoil to topsoil to surface material. If the removed soil mounds are nearby, greens may be used to cover them to make the area more attractive for visitors. The grave floor may also be prepared with native organic materials.

In the case of a forest site dug by hand, it may be possible to remove the top root mat layer intact, cut in roles or squares, and carefully store it for reintegration when the final layer in reinstalled. It will not fit precisely because of the mound created,

so be sure to install some edges adjacent to the existing root structure for better results as it knits itself back together over time.

Knowing the specific dimensions of the casket may be helpful, but a general rule is to dig as little as possible to accommodate the casket or shroud while still meeting the requirements for depth and width. Depth may vary slightly, but 3.5 feet is optimal in encouraging natural decomposition as well as creating an odor barrier deep enough from the top of the body to the ground surface. The more soil removed, the more potential obstacles there are to overcome, and the greater the risk of the sides collapsing either naturally or due to a person's weight — not a desired occurrence.

To reduce the chance of that happening, wide boards may be placed around the outside edges, and covered with evergreen boughs if desired. Some soils may require that a plywood form be temporarily installed to keep the walls from crumbling, and can be removed once the body has been lowered.

Even when situated beyond the recommended distances from a known source such as a stream or pond, it is still possible to encounter water when digging the grave. Sometimes recent rainfall will cause groundwater to pool. This is not a problem in terms of the burial, but it can be disturbing to the family. Stop digging as soon as moisture is encountered, and wait 2-3 hours. Depending upon how quickly water percolates through the soil, it is common for water to recede 6-8 inches in that time. Go slowly, giving it time to settle. Just before interment, dig a 12-inch reservoir at the foot of the grave and fill or cover it with greens, sawdust, straw, or other organic material. If necessary, use a sump pump or bail by hand. Be sure to inform the person in charge of the possibility that water may be visible.

Some cemeteries require or offer the use of a lowering device that ensures a gentle and smooth lowering into the grave. The entire body moves into the grave at an even pace rather than the head and chest reaching the bottom of the grave before the feet, for example. No one strains their back or other muscles while lowering the body.

Typically, the lowering device is set up on a metal framework around the edges of the grave ensuring it sits parallel to the ground. The framework provides a firm surface to stand on, and in areas where the soil is sandy or slippery, it helps prevent someone from slipping into the grave. It is a quiet mechanical system where the weight of the body allows the canvas straps to slowly unfurl and lower the body. The straps may be buried with the body, although they are usually removed after the body has been lowered.

Family members can still be involved by turning or unlocking the handle that begins the lowering process. This takes approximately two minutes depending upon the weight of the body and the depth of the grave. The lowering device may be used with caskets, coffins or even for a shrouded body. A shrouding board is recommended when a shrouded body is lowered.

Winter snow burial may present a challenge that is not insurmountable, depending on frost levels and snow depth. The depth of frost may be reduced if snow comes before the ground freezes and then piles up to insulate, making it relatively easy to remove first the snow and then the frost layer.

One method of opening the site is coal burning, where the grave is cleared of snow and half covered with the coals from a wood fire or briquettes. The coals are allowed to heat the ground, then moved to the other half while digging the thawed portion. This continues until the frost layer has been breached and loose soil is removed as usual.

Some cemeteries may use a frost claw attached to a backhoe to dig through the frozen layer of soil instead of using coal or other warming methods that may produce mud that can be difficult to transfer into a pile. And some hybrid cemeteries use tents and high efficiency, electric generator powered lamps.

Another effective and desirable means of thawing the ground quickly is to apply concrete curing blankets. These are very affordable, reusable, and available online.

Closing the Grave

Without permanent monuments or other structures, some people may become anxious about recording the location of the burial of a loved one. Some cemeteries use a GPS tracking system to identify where the bodies are buried. A dime-sized, plastic covered GPS tracker may be sewn into or attached to clothing or a shroud, or a transmitter diskette the size of a hockey puck may be buried with the body so that family members may find their loved one with an app on their phone. Some systems are satellite based, while others use RFID electronic tags. In lieu of high tech devices, some cemeteries may elect to simply record coordinates on the plat kept by the cemetery operator.

Rocks and stones set aside during the digging should be reintegrated into the grave surface. These are important for a variety of reasons, including moisture retention and permeability, which encourages ants and other insect life, which in turn help spread seeds.

Sticks gathered from the area may be placed vertically in the grave as the soil is restored in order to encourage the creation of micro corridors for mycorrhizae to travel. These fungal filaments are part of the root system of 90% of all vascular plant species and are more effective in nutrient and water absorption than the roots themselves, creating symbiotic relationships between the plants and surrounding flora possible.

One technique for aiding in the natural process of decomposition is to mix lime and mulch into the soil as the grave is filled.

Greens may be repurposed to cover the grave mound, or other native material, such as leaves or pine needles, may be spread as a final step once the grave has been filled. The family is encouraged to participate by filling the grave as part of their ceremony.

Markers and Plant Material

Families may express the wish to bring non-native plants and other memorial objects to the grave, either during the funeral or later. Your written agreement should state the prohibition of non-native plants and artificial materials of any sort, and should be described clearly by the cemetery operator during the purchase and arrangement interview.

Cemeteries will have established what markers and memorial items are acceptable. Engraved fieldstone is a popular and environmentally acceptable way of marking a grave. Because fieldstone is laid on the ground or slightly recessed without anchors or any other permanent structure, theft or movement is possible. Be sure to include a clause in the agreement that releases liability for markers or other items removed from the cemetery.

Families should be made aware of the cemetery's right to replace inappropriate plant material with native plants at any time.

Maintenance

In hybrid cemeteries where there may be managed efforts to maintain the area, additional soil may be added as the grave sinks to raise the top level. Trails

need maintenance for ease of access and for visitor safety. Removal of leaves and fallen trees or limbs on a regular basis is prudent. Depending on the specific hybrid cemetery, other management techniques may be employed.

Natural cemeteries may choose to provide some noninvasive maintenance, such as fallen limb removal and trail maintenance as mentioned for hybrid cemeteries. Other minimal intervention may be desired until the site has naturalized.

Conservation grounds may continue with preserve-wide or site-specific restoration efforts. Some old growth supporters advocate for doing nothing and letting nature take its course, while others plan for sustainable harvesting and forest management.

Conservation assessments are recommended for exploring existing environmental assets and deficits, updated every 3-5 years to address any emerging issues in the environment. These can be performed, often for a nominal fee, through conservation organizations and university programs. Both conservation and natural burial grounds are required to have Ecological Assessments to be certified by the GBC.

Some other management concerns may include:

- *Integrated Pest Management (IPM)*
  An IPM is mostly used in agricultural settings to promote the health of a monoculture ad ensure a high crop yield with more responsible pesticide use. Green burial areas strive to preserve and restore natural biodiversity rather than eradicate unpleasant or unwanted pests such as mosquitos or ticks. A compatible approach may be to develop a management plan that prioritizes threats and balances that with good IPM practices. For instance, control of winter moth with pesticides is aimed at saving whole stands of beech trees, while horticultural oil used on the hemlocks controls wooly adelgid. Both are acceptable and effective in supporting other critical species.
- *Invasive Species Management*
  Non-native plant and insect species that threaten native populations may require a long term management plan. Invasive species are of global concern, spanning geographical and jurisdictional boundaries and potentially altering ecosystem processes, transporting diseases, interfering with natural reproductive processes, or interfering with other species' habitats. It is advantageous to partner and coordinate with local, state or federal agencies to develop a monitoring and mapping plan specific regionally and compatible with catchment areas, feeding and watering routes, vegetation communities, soils, transitional zones, and travel corridors.
- *Nuisance Management*
  Species that are native yet troublesome, such as deer, raccoon, squirrels or prairie dogs, may be on the green cemetery operator's radar. The most effective and safe for both animals and humans is habitat modification, where the area is made unattractive to the specific species. Other management techniques may include using non-damaging traps and relocation, natural repellents such as chili pepper, glue traps that can be dissolved using vegetable oil, sonic nets, and in specific situations possible fencing, though this is problematic for the natural flow of other species.
- *Mowing and Grazing Management*
  Rotational grazing by sheep or goats is a successful management technique in some cemeteries, while others mow or brush hog. Prescribed burns may be used to maintain a meadow with approval and/or assistance from the local fire department. Not all grasses are equal, so the grazing and mowing calendar will differ regionally. While managing foliage in a green cemetery may seem contradictory, planned programs

enhance the quality of habitat that grass and other foliage provide, creating a robust environment for both plant and animal life.

- *Visitation Management*
  Careful attention must be paid walking pathways and graveside gathering spaces to minimize damage to sensitive flora during a funeral event. This includes planning where mourners will gather, what avenue will be used for a processional, where people will stand during the service, and what needs to be designed to allow for visits to the grave in the future.

See also the Green Burial Council's list of resources, including:
What Every Funeral Director Needs to Know About Green Burial
On the Way to the Green Burial Cemetery: A Guide for Families
Basic Tenets of Green Burial Cemeteries
Conservation Ecological Assessment
Natural Ecological Assessment

Resources

Green Burial Council	www.greenburialcouncil.org
National Home Funeral Alliance	www.homefuneralalliance.org
Funeral Consumers Alliance	www.funerals.org
National Funeral Director Association	www.nfda.org

This guide was prepared by Lee Webster for the GBC with assistance from green burial operators Freddie Johnson of Prairie Creek Conservation Cemetery in Gainesville, FL, Candace Currie of Mt Auburn Cemetery in Cambridge, MA, Dyanne Matzkevich of Pine Forest Memorial Gardens in Wake Forest, NC, and Sara Brink of Foxfield Preserve in Wilmot, OH.