Appendix M  Roadwaste

ODOT Roadwaste Management Chart

ODOT Deer and Animal Carcass Composting Plan
Composting Guidance and Instructions for ODOT Maintenance Crews
ODOT Animal Carcass Composting Trail (2010) – Project and Cost Summary
<table>
<thead>
<tr>
<th>Material or Waste</th>
<th>Compliance issues</th>
<th>Concerns</th>
<th>Sample Management or Disposal Options</th>
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</thead>
<tbody>
<tr>
<td>Litter</td>
<td>Litter may not be stored, stockpiled, or landfilled at non-permitted waste disposal sites.</td>
<td>Stockpiling, storing, or landfilling litter can create human health hazards and negatively impact the environment. Public complaints drive DEQ enforcement actions. If litter contaminated material is temporarily stockpiled (before litter is disposed or recycled), screen it from public view. Be sure all stockpiles are contained and appear well managed.</td>
<td>• Separate litter from other highway waste through litter patrol, screening, or other means. Landfill or recycle litter and trash as appropriate. &lt;br&gt;• All roadwaste contaminated with litter must be disposed of as waste at a permitted disposal facility. Roadwaste (sweepings, vactor waste, landscape debris, etc.) can not be stockpiled or stored longer than 6 months if it contains litter and trash.</td>
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<tr>
<td>Street sweepings</td>
<td>Classified as industrial process waste. Must be managed at permitted waste facilities or recycled appropriately. Hydrocarbons (oil, diesel, gasoline) and heavy metals are common chemical pollutants in sweepings. These pollutants are regulated and can pose health risks to humans and the environment. Division of State Lands (DSL) Removal Fill laws may apply when placing sweepings near waters of the State.</td>
<td>If pollutant contamination levels are high, special management or disposal may be required. Sweepings can have low pollutant levels (especially from roads under 30,000 ADT) but the presence of pollutants is always a concern. Stockpiling or landfilling sweepings at non-permitted waste disposal sites is not allowed unless reuse or recycling is planned. Proper placement (no impact to wetlands or streams) and erosion control is a concern with storage of all sweepings (clean or contaminated).</td>
<td>• Dispose all sweepings at local landfill or incinerator. &lt;br&gt;• Test and characterize pollutant levels. Sort sweepings for disposal or reuse. &lt;br&gt;• Work with ODOT staff to develop appropriate ways to remediate or reuse contaminated sweepings (screen trash, stockpile for natural break down of hydrocarbons, use for concrete manufacture, use in fill, compost, or as soil amendment in appropriate high traffic areas). Reuse of any contaminated sweepings requires DEQ approval. &lt;br&gt;• Reuse clean sweepings for construction fill, shoulder repair, quarry reclamation, etc. Sweepings that are high in organic levels (leaves, twigs, etc.) can make poor fill. As organics break down material shrinks and bacteria and nitrates can become pollutant problems. &lt;br&gt;• Stockpiling is allowed if reuse is planned. BMPs may be needed to ensure contaminants do not migrate into the environment or the ground (store on pavement, cover storage piles, etc.).</td>
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<tr>
<td><strong>Vactor waste</strong></td>
<td>Classified as an industrial process waste. Must be managed at permitted waste facilities or recycled appropriately. Hydrocarbons and heavy metal contaminants are common and are regulated as toxic pollutants. Liquids and Solids must be separated prior to disposal. Solids typically go to a landfill or incinerator and liquids to a sewerage treatment facility.</td>
<td>If pollutant contamination levels are high, special management or disposal may be required. Vactor waste collected in highly urbanized areas may have high pollutant levels that pose health risks to humans and exceed DEQ pollutant clean-up standards. The more often catchbasins are cleaned the lower the pollutant levels. Clay and fine soil is more likely to bind with chemical pollutants than coarse soil or sand and gravel.</td>
<td>• Partner with local jurisdictions and develop vactor waste management options (construct decant facilities, share disposal contracts, etc.). Contaminated vactor waste is primarily an urban issue. Local transportation agencies often share ODOT’s need for vactor waste management. • Characterize and test vactor waste loads. Sort for management and disposal. If contaminant levels are low, land decanting liquids and stockpiling solids for reuse may be allowed. • Work with ODOT staff and regulators to identify appropriate areas and methods to dispose, stockpile, or use clean vactor waste (high and dry storage, fill sites, drying strategies, etc.) • Work with ODOT staff, regulators, and waste management experts to develop low cost methods and technologies for managing contaminated vactor waste (evaporation ponds, pollutant filters, microbes, flocculant, etc.).</td>
</tr>
<tr>
<td><strong>Brush and Landscape debris</strong></td>
<td>Classified as waste and must be managed at a permitted disposal site or recycled appropriately. Noxious weeds (including seeds) can be present. Regulated by ODA.</td>
<td>Landscape debris is waste and can not be temporarily stored over 6 months. Decomposing vegetation in large quantities is associated with a number of pollutants including bacteria, nutrients, and low oxygen levels (in association with water).</td>
<td>• Separate brush and reuse or dispose at a landfill (or other permitted waste facility). • Grind or chip and use for compost or mulch (composting more than 20 tons/year requires a DEQ permit). • Place large woody debris in waterways. Coordinate with ODOT REC and ODFW. This may require a permit from the Army Corps of Engineers. • Burning is allowed only in limited areas: outside riparian corridors, where air quality allows, etc. Various permits may be required.</td>
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<td><strong>Ditchings</strong></td>
<td>Classified as waste and must be managed at a permitted disposal site or recycled appropriately. DSL Removal Fill may apply when placing ditches near waters of the State. Storage or fill sites must be suitable (proximity to wetlands or streams). Erosion control may be required.</td>
<td>Regulated pollutants can be present, especially in urban ditches or ditches in high traffic areas. ODOT has found contaminant levels vary widely in ditches, whether the source is an urban or rural ditch.</td>
<td>• Pollutant testing may be needed to determine if ditches meet clean fill requirements (especially in urban, high traffic areas, or areas where chemical pollutants are suspected). • ODOT REC should assess storage and fill sites for environmental concerns (needed removal fill permits, wetland impacts, etc.). • Stockpiling is allowed if use as fill is planned. • Erosion control may be required for stockpiles or fill areas. • Screening may be needed to remove litter or excessive amounts of organic debris.</td>
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<tr>
<td><strong>Used Winter Sand and Gravel</strong></td>
<td>Considered waste if regulated pollutants are present. However, these materials can often meet clean fill requirements. DSL Removal Fill laws may apply when placing material near waters of the State. Storage or fill sites must be suitable (proximity to wetlands or streams). Erosion control may be required.</td>
<td>Regulated pollutants can be present (litter, brush, chemical pollutants, etc.). Used Winter Sand and Gravel typically has low pollutant levels if it is picked up quickly – after 2 or 3 days. However, dust, erosion, and chemical pollutants can be problems if traffic counts are high. Proper placement and erosion control are concerns even if material is clean.</td>
<td>• ODOT REC should assess storage and fill sites for environmental concerns (needed removal fill permits, wetland impacts, etc.). • Stockpiling is allowed if use as fill is planned. • Erosion control may be required for stockpiles and fill areas. • Screening may be needed to remove litter or excessive amounts of organic debris. • Testing will be needed if pollutants are suspected (winter sand and gravel is dirty, slide debris originated near a septic drainfield, waste was collected near a high traffic area, spill or illicit dumping is suspected, etc.).</td>
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<tr>
<td><strong>Grindings (old asphalt)</strong></td>
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Direct questions regarding roadwaste management to Jeff Moore (ODOT Office of Maintenance) (503) 731-8289
Oregon Department of Transportation (ODOT)
Deer and Animal Carcass Composting Plan

Purpose
This plan provides composting guidance and instructions to ODOT Maintenance crews on how to compost deer carcasses that can accumulate on ODOT highway right of way. Deer carcasses can pose safety, human health, and environmental risks in some situations. Dead deer and other large animal carcasses are defined as waste by Oregon Department of Environmental Quality (DEQ). DEQ is the primary state agency in Oregon that regulates and enforces waste management practices. Managing deer carcass waste using the composting methods outlined below addresses the risks associated with this special waste and complies with DEQ waste rules and requirements.

ODOT intends to work with DEQ and local regulating authorities to develop several small animal composting facilities around the State. The facilities will be located where high numbers of deer carcasses are associated with vehicle collisions on ODOT roads. Composting operations outlined below provide a basic ODOT composting plan as required by DEQ and other local regulators in Oregon for composting permits. ODOT Composting Plans will consist of this composting guidance document as well as additional information, plans, and documents that outline specific composting operations for individual ODOT composting facilities.

Washington Dept. of Transportation deer composting operations near Maryhill, WA
COMPOSTING GUIDANCE AND INSTRUCTIONS
For ODOT Maintenance Crews

Permits
Before any composting can begin, you must first have all operating permits in place as required by Oregon Department of Environmental Quality (DEQ) and local land use authorities. Call ODOT Maintenance and Operations Branch in Salem (503-731-8289) prior to setting up your composting operations. Staff at the Maintenance Office can assist you in determining if permits will be required for your composting operations.

DEQ does not require a composting permit if you compost less than 20 tons of feedstock annually. For deer carcasses this will work out to approximately 1 deer per day if the carcasses you are collecting average 100-120 lbs. You need to estimate number and weight of carcasses you will be composting to determine if a permit is necessary.

Composting permits typically require a detailed compost site and operation plan. A Composting Plan will consist of this guidance document as well as additional documents that describe compost operations and concerns specific to your composting location. Additional documents will include maps, property descriptions, site plans, and written descriptions of composting details or activities not provided in this plan. Staff at ODOT Maintenance and Operations Branch can assist you in preparing documents and obtaining permits.

Site Location
Find a well drained site with minimal slope, at least 300 feet from waterways and wetlands. Composting sites are not allowed inside a flood plain. Sites with hydro-geological or environmental concerns (unstable slopes, wetlands, shallow groundwater, endangered species habitat, etc.) should be avoided. The site should be isolated or screened from near by residences and situated such that composting will occur at least 100 feet from adjacent property lines. Prevailing wind direction and aesthetic impact on neighbors and passersby should be considered when choosing a site. Odor, scavengers, and other issues typically associated with animal carcasses should not be problematic if you follow the composting guidance outlined below, but realize there is potential for these issues to be associated with your site.

The site will need a paved surface made of asphalt, concrete, or compacted asphalt grindings that can be used as a base for setting up composting bins. Composting bins will be constructed on top of the paved surface with walls made from Jersey barrier (or a similar type of mobile concrete barrier structure). Bins will be a minimum of 20 feet wide by 20 feet deep. The number of bins and size of paved surface will depend on number of deer to be composted but its likely four bins on a 50 ft square pad (approx.) will be typical for small ODOT composting operations (see “Sizing the Bins” below).
What You Need

- Bulking material (finished compost, woodchips, sawdust, straw, or combination of materials)
- Starter compost material
- 3-4 foot long compost thermometer
- Supply of water. Where there is no water access, a water tank with a hose set up so you can spray the pile and/or bulking material is an option.
- Loader
- Jersey barrier (or equivalent) for constructing bins.
- Asphalt, concrete, or asphalt grindings to make a hard base surface for the bins.
- Latex or vinyl gloves for handling material.
- Composting log book or log sheets to record composting data and activities.

To Start Your Compost Pile

- Prepare a hard, flat surface. This will be the base surface for your composting bins and should be made of asphalt, concrete or compacted asphalt grindings. This pad will protect underlying groundwater from compost process water and stormwater that comes in contact with the compost piles. Compost water can be contaminated with bodily fluids from the deer carcasses or contain pollutants associated with composting, such as nitrogen, bacteria, or high pH (acid) levels. The pad will also provide a good working surface for composting operations during all weather conditions. (The “Sizing Bins” section below will help you to determine what size of pad you need.)

- The working base pad should be slightly sloped (1-3%) so that water will not pool or collect on the pad.

- The pad should be designed so that water runoff from the pad is directed to a single edge or spot. This way, if there is runoff, it can be collected or treated as necessary. (See “Runoff and Water Management” below.)

- Soil next to the pad should be sloped to prevent stormwater run-on.

- Sufficient quantities of bulking material (wood chips, shrub and tree grindings, finished compost) must be at the site before any carcasses arrive to ensure composting piles can be formed in a timely manner.

- Size and construct bins (see “Sizing Bins” below). To construct bins start with the back wall of your first bin made of at least two jersey barriers lined up end to end. Add to the ends of this back wall two perpendicular side walls also made of at least two jersey barriers. The jersey barriers should form an open ended square at least 20 ft. x 20 ft. The size and number of square bins you make will depend on the volume of deer you compost and the size of the equipment (front loader) you will be using.

- Lay a foundation of dry bulking agent (wood chips, tree grindings, or compost) in the bottom of the bin 18 to 24 inches deep. Make sure this foundation bed is large enough to allow for at least a 2 foot margin around any added deer carcasses. This dry foundation material is intended to absorb bodily fluids from
the deer carcasses and excess water from the composting process. Deer carcasses you place in the pile are comprised of approximately 50% water. You want to contain and manage all fluids associated with the carcasses.

- Top this foundation with at least 6 inches of damp, high-carbon material such as wood chips or recycled deer compost (see “Moisture” section below).

- Lay animals in the center of the bed, back to back, in a single layer. It may be challenging to lay the deer back to back when using a loader, but this configuration will aid in achieving higher compost temperatures. The primary objective is to make sure the deer are in close proximity to each other in order to get the piles to heat up. It may be adequate to simply lay the carcasses on the pile and whack them a few times with a loader bucket.

- Completely cover and surround carcass with at least 6 inches of damp, high-carbon material such as wood chips or recycled deer compost. It is helpful to either use fresh compost or blend some fresh compost material into the damp high carbon bulking material that immediately surrounds the carcasses. Using active or fresh compost will ensure your pile is inoculated with microbes needed to get the composting process started. For your initial piles you can use commercial compost.

- If there are not sufficient carcasses for a full layer, cover the edges of the placed carcasses with at least 12 inches of wood chips or compost and then add more carcasses later when the deer become available. Always leave the compost pile with all parts of every carcass buried under at least 12 inches of cover material, even if extra wood chips or compost must be added.

- When building your pile and adding more carcasses there should always be at least 6 inches of damp high carbon bulking material between newly placed carcasses and those underneath. New carcasses should be placed as before with a minimum of 6 inches of damp, high-carbon material (with some compost added) surrounding all sides of the carcasses.

- Depending upon the size of the bin and your method of loading, you may not want to start your pile with a whole layer covering the bottom of the bin. This is because your loader may not be able to reach the back area of the bin when you want to add more carcasses (never drive equipment on top of your pile). You can avoid this by building the pile from the back, adding material up and forward simultaneously.

- Continue this layering procedure until the bin is full. Do not stack bins over 6 feet high. An increase in the temperature of the pile to 125 degrees Fahrenheit or higher indicates that the compost process is working.

- Leave 6-12 inches between edge of pile and walls of bin.

- The last layer used to cap the bin should be 12-24 inches of bulking material or finished compost (wood chips, sawdust, shrub and tree grindings/chippings, coarse compost, or straw). This layer should curtail odors and dissuade scavengers. Again, do not stack bins over 6 feet high.
• You need to keep detailed records of work done every time you work on the compost piles (i.e. carcasses added, compost or bulk material added, water added, temperature readings for the pile, etc.). See section on “Logbook Notes” below.

**Turn pile**
When the temperature of the pile drops after its initial heating, the pile must be turned (see “Temperature” section below).

• Check for moisture and add water if necessary (see “Moisture” section below). Add water before turning.

• Estimated time for the first turning of the pile is 30 to 60 days.

• Piles should be turned from the top of the bottom layer of bulking material and up. Turning from the top of the bottom layer gives the operator sufficient distance to avoid disturbing the bin floor and introducing unwanted material into the compost (asphalt from the underlying pad).

• Prior to turning the pile, layer the bottom of a second empty bin with 12 inches of bulking agent. Then use a front-end loader to move the material from the primary bin to the secondary bin. This aerates the pile. If an additional bin is not available, piles may be turned in place.

• You may notice bits of fur or bone as you are turning the pile. This material should break down further as the pile goes through a second 30-60 day composting/heating process.

• Finish turning the pile and cover the turned pile with 12 inches of bulking agent.

• After the pile has been turned and covered manage it again as you did through its initial 30–60 composting/heating process (checking moisture and temperature).

• Once the primary bin is empty you can use it to start composting a new pile of carcasses. If you have finished compost on site, you can use it as bulking agent for the new pile.

**Finished pile**
If you can no longer see flesh, and you have documented three days at 130+ °F, the compost is probably finished.

• Completed compost will be a dark brown or black; it will have a soil-like texture and very little odor. Bones should be so brittle they are easily crushed.

• Finished compost can be used to start new compost piles. If there is more compost then can be used for starting new piles, you can use finished compost within the right-of–way as a soil amendment product.

• Finished compost should be tested at a laboratory prior to use in order to ensure bacteria levels are acceptable and that the finished compost meets compost standards (see “Testing and Analysis” section below).
Sizing the Bins
The size of bin you need, will depend on the size and numbers of animals you are composting and the size of equipment used to turn the compost.

- Bin width should be at least twice the width of the blade or bucket on the equipment you'll be using.

- Using estimates provided by the Minnesota Dept. of Agriculture a bin anywhere from 1300 to 2000 ft³ is needed to compost 400 carcasses per year at 120 lbs each. A bin sized at 20 ft. x 20 ft x 6 ft high gives you a volume of 2,400 ft³. This should be large enough to compost a little over 400 deer annually.

- Washington DOT trial compost operations found this estimate of 400 deer per bin (annually) may be high for composting operations in the Pacific Northwest. Wash. DOT operators found they could fit roughly 20 deer per pile and initial turnings took 4–6 weeks. However, they felt it is likely this rate could increase as they improved pile management techniques. Wash. DOT recommends closely monitoring moisture levels and using fresh compost as a bulking material around deer carcasses to improve composting rates.

- Composting volume rates will vary depending on the operating factors of your individual facility. However, using the volume estimates above it is likely you will be able to compost roughly 500 deer annually with the use of two 20 ft. x 20 ft. bins.

- Estimate the number of deer you will need to compost in a year. Consider the fact that you will be picking up more deer and need more space at different times of the year. Then using the above rate estimates you should be able to estimate the size and number of bins you will need.

- Even if a single bin is large enough to manage the volume of deer you will be generating, consider that using two bins will make turning a pile easier since it enables you to move material from one bin to another.

- In most situations, if you pick up a deer a day (averaged over a year's time), four bins (20 ft. x 20 ft.) will provide you with ample composting volume. The extra bin space will allow for easy pile turning and surplus space during those times of the year when you have high deer counts.

- The minimum base or pad size for four 20 foot jersey barrier bins placed back to back will be just over 40 square ft. Consider a larger pad if you want margin space around your bins or room for storage of finished compost or feedstock (woodchips, grindings, etc.).
Bulking agents

The ratio of carbon to nitrogen in the materials you are composting is an important consideration in optimizing the composting process.

- A Carbon:Nitrogen (C:N) ratio of 25-30:1 will give you the best composting results (20-40:1 is acceptable). This means in order to compost deer carcasses that are high in nitrogen requires a bulking agent that is high in carbon.

- You want to use a bulking agent with a high Carbon:Nitrogen (C:N) ratio. Woodchips have a C:N ratio (weight to weight) of approx. 400:1, sawdust has a C:N ratio of 100-750:1 whereas straw, has a C:N ratio of 48-150:1.

- Recycled deer compost can also be used as a bulking agent. The compost you make will likely have a high carbon ratio because of high wood chip content. Commercial compost typically has a carbon ratio of approximately 10:1.

- In addition to choosing a bulking agent with a high C:N ratio, you want to choose one with a large enough particle size to allow for air flow, but not so large that it cools the pile. Air circulation and oxygen are needed by the microbes that you want to have growing in your compost pile.

- If you are using sawdust or another fine material as your bulking agent and wind erosion is occurring, consider a top layer of coarser chips. The coarser material will allow water and air to pass into the pile while keeping the underlying sawdust in place and protecting it from wind erosion.

- You can mix bulking agents if it is helpful. If you can get sawdust cheaper than woodchips, but the sawdust is blowing from the pile, you can mix the sawdust with woodchips, compost, or another coarse grained high carbon bulking agent.

Temperature

- Temperature of your compost pile should increase to between 125° to 150°F within a week of starting your compost pile. Once pile reaches 125°-130°F., it should remain there for at least a week.

- Use a temperature probe (bimetal thermometer) with a four-foot extension to take temperature readings of your pile. The probe should be placed so readings are taken 12”–36” from the top of the pile and directly in the areas of the pile where carcasses are located. During the initial trial, temperatures should be taken at several depths and locations in each cell.

- For pathogen reduction, it must be shown that the carcasses achieved a temperature of 131°F or greater for 3 consecutive days (high temperatures will kill most pathogens of concern). Do not start counting the days until the area that you last added to pile reaches this temperature. It is very important, to record these high temperatures on your log sheets. Thermometer readings should be taken daily during the height of the heating process to document high temperatures.
• Leave the pile undisturbed until the temperature has subsided to about 115 degrees near the carcasses. After this first heat cycle you can turn the pile which will introduce more air and increase aerobic activity. After the temperature subsides the 2nd time, the compost should be finished and ready for curing.

• After the second heat cycle, the compost goes to a curing pile for at least 30 days. This curing can take place off the pad.

**Moisture**
Composting works best when the pile is sufficiently, but not overly moist. The amount of water you add depends on the moisture content of the bulking agent and the carcasses.

• A moisture content of about 60% is recommended. This is the point where a handful of material will just begin to stay together when squeezed (wear rubber gloves when squeezing compost).

• 60% is the amount of moisture you want surrounding the carcass or in the active part of your pile. The bottom layer of your pile should initially be dry so that it can absorb excess water that moves down through the pile. You do not want water running out the bottom of your pile.

• The simplest way to check for moisture is to dig into the pile and grab a hand sample. If material falls apart when squeezed, it is too dry. If free water drips from the squeezed material or if a film of water is left on the hand, then the material is too wet.

• If the pile is too dry you can spray water directly on to the pile to add moisture. Add water slowly so you are sure you do not over saturate the pile with water. Monitor the amount of water you add to the pile. This will enable you to better judge how much water you need to add next time the pile is dry.

• Too much water reduces air in the pile and encourages anaerobic microbes or microbes that thrive in a low oxygen environment. Most anaerobic microbes will cause odors in your pile. If your pile starts to have bad odors it may mean water content is too high.

• You might find it easiest to add water by adding it first to your wood chips or compost and then adding them to the compost pile.

• If the pile is too wet, spread the material a bit and allow it to air dry, or mix the wet material with drier material to lower the moisture content before adding it to the compost pile.

• If pile dries out (25 – 45% moisture), and if piles are too large, spontaneous combustion can occur. Fire is a real risk when composting. Plan on monitoring your pile daily when the pile is at the height of its heating process. You will need to monitor for both moisture and temperature.

• A variety of moisture probes are available that might be helpful in monitoring the moisture level of your pile. But this monitoring equipment is optional and testing moisture content by hand can provide adequate information.
Logbook notes

- Record the number and type of carcasses added to the pile along with the date. There needs to be records for each bin you are operating on site. Number your bins so that it is clear which bin you are tracking what has been added to each bin.
- Record when bulking agent is added and what type of material is used (i.e., chips, saw dust, recycled compost).
- Record temperatures within the piles once/day.
- Odors should be recorded. Indicate whether there are odors disseminating in the downwind direction, and if so, estimate how many feet downwind it is noticeable.
- Check moisture daily and record when and how much water is added. You can check draw down levels to measure amount of water added if you are using a water tank.
- Make note of when last the last carcass is added to a pile (the bin is at capacity).
- It’s a good idea to have a weather proof box or storage unit on site where you can store your daily log notes and small equipment (thermometer, rubber gloves, etc.). Some crews have welded a locking pickup box on a metal stand for use at their composting sites.
- When compost pile is finished, file the records at your office.
- Make note of problems such as critter-interest, odors or other complaints.
- Keep records of any modifications to your management methods. This information can be used to update your site plans or this guidance manual.

Managing Water Runoff

Compost water can be contaminated with pollutants such as nitrogen, bacteria, or high pH (acid) levels. Past experience by other agencies using this method of composting has shown that preventing process water from leaving compost piles is not a problem as long as the pile is managed properly and water management methods are in place. These include:

- Placing a sufficient absorbent layer of dry bulking material at the bottom of your pile to help capture excess water.
- Paving the base of your compost bins to prevent compost water from seeping into the ground.
- Designing your paved composting area so that it does not receive storm water run-on from adjacent property.
Other water management methods to consider include:

- Keep dry bulking materials on hand that can be used to soak up excess water leaving the piles. Once absorbent material is saturated it can be picked up, dried out on the pad or mixed with dry material to 60% moisture, and added to the pile.
- If you have designed your paved surface to drain to one edge or one spot this will make capturing excess water with absorbent material easier.
- Stormwater that comes in contact with your piles must be managed. Keep a tarp on site that can be tied or weighted down over the pile during heavy rains. This will prevent stormwater from being exposed to the pile and can also help prevent your pile from getting too wet.

Managing water may take more effort if you are in a wet weather climate where rainfall is plentiful.

- The shape of your pile influences how much rain water can penetrate the pile. A steep pointy pile will shed water, where as a flat topped pile has a larger surface area that will allow water to penetrate and soak in.
- Plan for excess stormwater flowing off the paved area. Pavement should be slightly sloped so that excess water will discharge to one edge or one spot. Water can then be collected and held for use on the pile during dry weather or directed for passive treatment. Pollutants in compost water can generally be easily captured and treated in a lined vegetated swale. Maintenance and Operations Branch can work with you and your local ODOT hydraulic designers to help develop a stormwater treatment facility for excess runoff if necessary.
- Manage wet weather piles by increasing the amount of dry absorbent material placed in the pile and working with tarps.
- You may want to consider locating your compost piles under cover. A suitable roof structure might already exist such as underneath an overpass or bridge if the structure is isolated and not associated with a river, stream, or water body.
- Roof structures can be constructed for composting in wet climates. Keep in mind roof structures can be very expensive because of the height clearance needed for operating equipment. You might consider a cheap temporary roof structure just for the wet season.

**Testing and Analysis**
If you are generating more compost than can be recycled back into your compost piles you can use the excess for landscaping purposes along your right of way.

- If you plan to use the compost, it should be tested at a laboratory first to make sure bacteria levels are acceptable and it meets compost manufacture standards. Contact Maintenance and Operations Branch and they can assist you in collecting samples and sending them to an appropriate laboratory for analysis.
• If you are required to obtain a permit for your composting operations, periodic testing for bacteria levels will be required. Pathogens and bacteria are a concern when managing animal carcasses. Again, Maintenance and Operations Branch can assist in setting up and collecting any needed lab samples.

Winter
You can compost in the winter. Active piles will continue to heat in the winter.

• New piles should not be started during the winter unless active, hot compost is available as a bulking agent. Smaller piles may not reach ideal temperatures in winter.

• New carcasses should not be allowed to freeze and should not be added to a pile that has dropped below 60°F.

• The compost pile must be large enough to be self-insulating. A thick layer of bulking agent between the carcasses and the floor and walls of the bin will insulate microbial activity from cold air.

• Warm material from a pile ready for the first turning should be used in place of the sawdust bulking agent and the six inch compost layers. The thickness of the six inch compost layers should be increased to one foot and the first turning material should be used for the top and bottom layers of bulking agent also. The top layer can be covered with additional chips if needed for insulation or erosion control.

• Do not turn the pile on extremely cold days.

• You can also compost in or next to a heated area in winter.

Odors/pests/miscellaneous
• Control odors by having an adequate quantity of bulking agent around the carcass.

• The presence of flies can be caused by inadequate cover over carcasses, poor sanitation conditions, failure to achieve proper temperatures, or the pile being too wet. Carcasses should be covered with a minimum of one foot of bulking agent.

• A hot, active compost pile, adequately covered will reduce the potential to attract varmints.

Emergency Operations
Preventative and emergency procedures should be planned in case of fire or other possible emergency situations.

• Know the phone numbers of local fire and county health services in the area and have them posted where they are easily accessible on site.

• Make sure trucks are equipped with adequate communication equipment and/or communication equipment is available on site in case of emergency.
• Staff should know communication plans and who they need to contact in case of emergency.

• Spill kits should be easily accessible in case of fuel spills or spills of other hazardous materials on site.

**Operational Concerns**

Site upgrades and changes may be needed to prepare a site for use as a composting facility. Some site improvements can require approval or review from local authorities (adding fill, paving access roads, setting up water lines, etc.). Maintenance and Operations Branch can assist with having plans reviewed by local authorities. Develop a site plan that considers operational needs and impacts.

• Consider hours of use and if operation activities will have negative impacts to the surroundings. Impacts can be caused by traffic, noise, lighting, etc.

• Screen operations as much as possible. It may be possible to use vegetation plantings or landscape berms to help reduce impacts to neighbors or the general public.

• Consider if access roads should be paved, if locked gates or fencing is needed, if extra security measures or signing is needed, etc. If your site is remote and naturally screened, you may be able to avoid these types of site improvements.

• For animal composting, compost feed stock is restricted to animal carcasses only. If you also do vegetation composting, both types of composting can be located at the same site but plant and animal composting piles and operations should be kept completely separate.

• Your compost site should be located where travel time and access will not be issues. When piles are at the height of the heating process they need to be monitored daily. Transporting and unloading deer carcasses should be done discreetly and out of public view.

**Facility Closure**

Bacteria and pathogens are associated with mortality composting. When closing a deer composting facility health precautions should be taken.

• Finish composting all piles on site as set forth in this operations plan prior to closing a facility.

• Decontaminate the pad and jersey barriers using a 5 - 10 percent solution of household bleach in water.

• Notify your local Health Department (and DEQ) 60 days prior to facility closure.
**Additional Information**
There are various documents posted on the internet regarding mortality composting that may be useful.

Cornell University has an excellent composting web site that includes a number of guidance documents specifically aimed at DOT composting operations for deer carcasses. Visit their website at: [http://cwmi.css.cornell.edu/](http://cwmi.css.cornell.edu/)

The Texas A&M University system also offers several excellent mortality composting guidance documents aimed at composting farm animals. Visit their website at: [http://tammi.tamu.edu/index.html](http://tammi.tamu.edu/index.html)

Call ODOT Maintenance and Operations Branch (503-731-8289) if you have questions regarding this composting plan or your composting operations.
Introduction
Disposal of ODOT roadkill carcasses in burial pits is no longer allowed due to stricter environmental regulations. Many rendering plants that used to accept roadkill waste have closed down. New methods are needed to manage ODOT roadkill waste.

The ODOT Compost Project
A variety of disposal options for roadkill waste were investigated including incineration, composting, landfills, and mobile rendering. Of these, composting seems adaptable and affordable. In 2009 the District 12 Heppner Maintenance crew initiated a composting trial to investigate affordability and benefits and concerns of composting roadkill waste.

The Trial
The Heppner crew constructed a composting facility at an old quarry site with placement such that quarry operations were still possible. The compost trial lasted one year and was coordinated with Department of Environmental Quality (DEQ) and Morrow County to ensure compliance with composting and permitting rules. Following the trials, both DEQ and the County endorsed the composting facility. The Heppner crew was pleased with the trial and plan to continue their composting operations.

Affordability
Total $18,100 ($11,600 = site development and permits / $6,500 = annual operations)
- Set up of the site - approximately $5,000
  Construction of an asphalt pad was required to contain compost moisture and runoff. Bins to contain the piles were made by placing moveable Jersey barriers on top of the pad. There was a requirement to screen the site from public view by constructing an earth berm adjacent to the highway. A gate was required to better secure the facility.
- Permits and Land Use Approval - $1,600
  Morrow County charged $600 for land use approval. DEQ required two six month waste management permits which cost $500 apiece. (No more DEQ permitting is required.)
- Annual Operations - approximately $6,500
  Composting requires routine maintenance of piles, monitoring, and record keeping.
- Site Improvements – approximately $5,000
  Installation of a water tank and pump will improve fire safety and compost operations.

Benefits and Concerns
- Composting seems affordable and can meet state waste management requirements.
- Composting variables and limitations are site specific, but operations are flexible.
- Finished compost can be used for landscaping but pathogen testing is required.
- Water runoff from piles is a high concern. Roofs and pads can alleviate this problem.
- Compost permits are quantity driven and may be required if roadkill counts are high.
- Constant tracking and monitoring of compost piles is required (temperature/moisture).
- Land use approval for compost facilities can be difficult to obtain.

Composting has a high potential as a preferred waste management method for roadkill but it may not be suitable for all ODOT maintenance crews or locations.
PERMISSION TO PLACE FILL MATERIAL
ON PRIVATE PROPERTY

ADDRESS OF FILL LOCATION:

OWNER’S NAME:                             TELEPHONE NUMBER:
OWER’S MAILING ADDRESS:

I HEREBY CERTIFY THE FOLLOWING:

1. I am legal owner of record (not a renter or lessee) of the property identified below.

2. I request that the Oregon Department of Transportation (ODOT) place fill material on said
   property. At that time I will assume possession and responsibility for the fill material.

3. I understand that the fill material I am receiving may have been removed from highway shoulders
   and ditches and that the State offers no warranty regarding the cleanliness of the material. I also
   understand ODOT has no reason to believe this material contains hazardous contaminants.

4. I understand that it shall be my sole responsibility to specify the location where I want fill material
   placed by the State, and to specify the route the State is to utilize to cross my property to get to
   the specified location.

5. I understand that Federal and State laws apply to placement of fill material and it can be illegal to
   place fill material in wetlands, waterways, or on a known archeological site. I certify that I shall not
   designate any area for fill that violates Federal or State fill placement laws.

6. I agree that I will indemnify and hold harmless the State for any damages or costs or liabilities
   incurred by myself, my property, or any other entity by the State’s performance pursuant to this
   request.

OWNER’S SIGNATURE:       DATE:

RECEIVED AND APPROVED BY SECTION SUPERVISOR :   DATE:

Fill to be Placed at: HIGHWAY:    MILEPOST:

OTHER DESCRIPTION NECESSARY TO FIND PROPERTY:

TO BE FILLED IN WHEN OPERATIONS ARE COMPLETED:

The fill placement has been completed to my satisfaction:

OWNER’S SIGNATURE:       DATE:

RECEIVED BY SECTION SUPERVISOR:   DATE:

ESTIMATED NUMBER OF FILL YARDS:   SOURCE AND TYPE OF FILL MATERIAL: