Section 1: Location Restrictions

1.1 Introduction

Regulatory reference

OAR 340-94-030 and 40 CFR Part 258 include location restrictions for new landfills or lateral expansions of existing landfills.

Location restrictions

The location restrictions address the following:

- airport safety
- flood plains
- wetlands
- fault areas
- seismic impact zones
- unstable areas
- critical habitat
- sensitive hydrogeologic environments

In this section

This section provides guidance on

- how to determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is located in a restricted area, and
- how to make the associated location restriction demonstrations

How to respond

Complete the appropriate location restriction demonstrations and place the associated documentation in the facility operating record. Notify the Department when the demonstration has been placed in the operating record. Cite all sources used in making each of the analyses and demonstrations.

Inadequate demonstrations

If an existing landfill unit cannot successfully meet the location restrictions, then the unit must be closed in accordance with OAR 340-94-120 and post-closure activities must be conducted in accordance with OAR 340-94-130.

Related information

Site Characterization Reports, Site Geotechnical Investigations, and the facility conceptual design should provide relevant information for making location restriction demonstrations.

1.2 Airport Safety

Notification to FAA

Determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is located within a five-mile (eight kilometer) radius of any airport runway end used by turbojet or piston-type aircraft. If so, notify the affected airport and the Federal Aviation Administration (FAA).

Need for demonstration

Determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is within

- 10,000 feet (3,048 meters) of any airport runway end used by turbojet aircraft, or
- 5,000 feet (1,524 meters) of any airport runway end used by only piston-type aircraft

If so, demonstrate that the landfill is designed and operated so that the landfill does not pose a bird hazard to aircraft. Include a copy of the notifications, and any responses received from the FAA or affected airport.

The hazard of birds

Birds may be attracted to landfill units to satisfy a need for water, food, nesting, or roosting. Scavenger birds such as starlings, crows, blackbirds, and gulls are most commonly associated with active landfill units. Where bird/aircraft collisions occur, these types of birds are often involved due to their flocking, feeding, roosting, and flight behaviors.

Bird hazard demonstration

A demonstration that a landfill unit does not pose a bird hazard to aircraft within specified distances of an airport runway end should address at least the following elements:

- regulated distance
- public use
- collision risk
- landfill operation and design

Demonstration of regulated distance

The distance measurement can be made using existing maps showing the relationship of existing runways at the airport to the existing or proposed new unit or lateral expansion. The measurement can be made by drawing a circle of appropriate radius from the centerline of each runway end. The measurement only should be made between the end of the runway and the nearest landfill unit perimeter, not between any other boundaries.

Maps: Topographic maps (USGS 15-minute series) or State, regional, or local government agency maps providing similar or better accuracy would allow direct scaling, or measurement, of the closest distance from the end of a runway to the nearest landfill unit

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Demonstration of public use

The demonstration of whether the runway is part of a public use airport and whether all applicable public airports have been identified can be made by contacting the airport administration or the regional FAA office.

Note: The demonstration is not required for private airfields

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Demonstration of collision risk

The demonstration should address the likelihood that the landfill unit may increase bird/aircraft collisions. One approach is to determine whether birds are attracted to the landfill unit and whether this increased population may result in more in bird/aircraft collisions. The evaluation of bird attraction can be based on field observations at existing facilities that have similar geographic location, design features, and operational procedures.

Demonstration of landfill operation and design

The landfill unit design features and operational practices significantly effect the potential for bird/aircraft collisions. The demonstration should include a discussion of techniques to reduce collision risk. The following landfill design and operation techniques may be employed to reduce the bird hazard to aircraft:

- waste management
- bird control
- landfill design

Waste management techniques

Waste management techniques to reduce the supply of food to these birds include:

- frequent covering of wastes
- shredding, milling, or baling wastes, and
- diverting wastes that represent a food source for birds by source separation, composting, waste minimization, or other methods

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Frequent covering

Frequent covering of wastes effectively reduces the availability of the food supply. Depending on site operations, cover may need to be applied several times a day to minimize the working face.

Shredding, milling, or baling

Milling or shredding municipal solid waste breaks up food waste into smaller particle sizes and distributes the particles throughout non-food wastes, which dilutes food wastes and reduces the materials' attractiveness to birds.

Bird control techniques

The use of varying bird control techniques may prevent the birds from adjusting to a single method. The table below provides examples of various techniques. Many of these methods have limited long-term effects on controlling bird populations at landfills, as the birds adapt to the environment in which they find food.

Bird control technique	Example
visual deterrents	realistic models (still or animated) of the bird's natural predators (e.g., humans, owls, hawks, falcons)
sounds	cannons, distress calls of the scavenger birds, and sounds of its natural predators
physical barriers	fine wires strung across or near the working face
other more labor intensive methods	falconry and firearms

Landfill design

Proper design and operation can also reduce bird habitat. For example, good stormwater management can prevent surface water ponding, which limits a source of water for the birds.

Birds may also be attracted to a landfill unit as a nesting area. Closed landfill cells may provide a roosting habitat due to elevated ground temperatures and freedom from disturbance. Nesting can be minimized by examining the nesting patterns and requirements of undesirable birds and designing appropriate controls. For example, nesting by certain species can be controlled through the mowing and maintenance schedule at the landfill.

1.3 Floodplains

Need for demonstration

Determine if the proposed new or lateral expansion of an existing solid waste landfill is located in a 100-year floodplain. If so, demonstrate that the landfill will not:
- restrict the flow of the 100-year flood
- reduce the temporary water storage capacity of the floodplain, or
- result in washout of solid waste that poses a hazard to human health, the environment, wildlife, or land or water resources

Identification of floodplains

Identify floodplains using:
- flood insurance rate maps (FIRM) and flood boundary and floodway maps published by the Federal Emergency Management Agency (FEMA), or
- floodplain maps available through other agencies such as the U.S. Army Corps of Engineers; the U.S. Geologic Survey, the U.S. Soil Conservation Service, the Bureau of Land Management and state and local agencies

Maps not available: If floodplain maps are not available, and the facility is located within a floodplain, then a field study to delineate the 100-year floodplain may be required

Demonstration of temporary storage

To demonstrate that the facility does not significantly reduce the temporary storage capacity of the floodplain during the base flood, estimate the
- floodplain storage capacity that would likely exist in absence of the facility
- floodplain storage capacity available in the vicinity of the facility, and
- change in storage capacity and base flood elevation due to facility construction

Demonstration of washout

The location of facilities relative to the velocity distribution of floodwaters will greatly influence the susceptibility to washout. To demonstrate that the facility will not result in washout of solid wastes, provide a conservative estimate of the shear stress of the landfill components caused by the depth, velocity, and duration of impinging river waters during a 100-year storm event.

1.4 Wetlands

Need for demonstration

Determine and describe whether the proposed new or lateral expansion of an existing municipal solid waste landfill is located in wetlands. If so, demonstrate that the unit will not cause or contribute to significant degradation of the wetland.

Other required permits

If the municipal solid waste landfill unit is to be situated or significantly expanded in wetlands, then consult with and obtain a permit from the Corps of Engineers (COE). Include a copy of the permit or permit application in the demonstration, if applicable.

Reference: Section 404(b)(1) of the Clean Water Act

Involvement of other agencies

During the permitting process, the Department and the State Division of Lands will need to be contacted to schedule a site visit. In general, the COE will require notification and/or consultation on any proposed impact on any wetland regardless of the actual degree of the impact. Other agencies such as the Fish and Wildlife Service and the SCS may also need to be contacted.

Mitigation

Mitigation plans must be approved by the appropriate regulatory agencies and must achieve an agreed-upon measure of success. Examples of mitigation include restoration of degraded wetlands or creation of wetland acreage from existing uplands.

Wetlands identification

Wetlands are identified based on the presence of hydric soils, hydrophytic vegetation, and the wetland hydrology. These characteristics affect the functional value of a wetland in terms of its role in:

- supporting fish and wildlife habitats
- providing aesthetic, scenic, and recreational value
- accommodating flood storage
- sustaining aquatic diversity, and
- its relationships to surrounding natural areas through nutrient retention and productivity exportation (e.g., releasing nutrients to downstream areas, providing transportable food sources)

Examples of wetlands

The term "wetlands" includes swamps, marshes, bogs, and any areas that are inundated or saturated by ground water or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions.

Wetlands assessment

A wetland assessment will need to be conducted by a qualified and experienced multi-disciplinary team. The assessment should identify:

- the limits of the wetland boundary based on hydrology, soil types and plant types
- the type and relative abundance of vegetation, including trees, and
- rare, endangered, or otherwise protected species and their habitats (if any)

Delineation methods

The current methods used to delineate wetlands are presented in "COE Wetlands Delineation Manual," 1987, per a January 1993, EPA and COE agreement. The Federal manual for "Identifying and Delineating Jurisdictional Wetlands" (COE, 1989) contains an extensive reference list of available wetland literature. For example, lists of references for the identification of plant species characteristic of wetlands throughout the United States, hydric soils classifications, and related wetland topics are presented. USGS topographic maps, National Wetland Inventory (NWI) maps, Soil Conservation Service (SCS) soil maps, wetland inventory maps, and aerial photographs prepared locally also may provide useful information.

Evaluation of wetland value

Evaluation of ecological resource protection may include assessment of the value of the affected wetland.

Methods for evaluating wetland value

Available methods include:

- analysis of functional value
- the Wetland Evaluation Technique (WET), and
- the Habitat Evaluation Procedure (HEP)

The most appropriate technique for a specific site should be selected in conjunction with the Department and other applicable regulatory agencies.

Analysis of functional value

The functional value of a given wetland is dependent on its soil, plant, and hydrologic characteristics, particularly the diversity, prevalence, and extent of wetland plant species. The relationship between the wetland and surrounding areas (nutrient sinks and sources) and the ability of the wetland to support animal habitats, or rare or endangered species, contributes to the evaluation of functional value.

WET

Wetland Evaluation Technique (WET) allows comparison of the values and functions of wetlands before and after construction of a facility, thereby projecting the impact a facility may have on a wetland. WET was developed by the Federal Highway Administration and revised by the COE (Adamus *et al*., 1987).

HEP

Habitat Evaluation Procedure (HEP) was developed by the Fish and Wildlife Service to determine the quality and quantity of available habitat for selected species. HEP and WET may be used in conjunction with each other to provide an integrated assessment.

Locating in a wetlands

Erosion potential and stability of wetland soils and any dredged or fill material used to support the landfill unit should be identified as part of the wetlands evaluation. Any adverse stability or erosion problems that could affect the landfill or contaminant effects that could be caused by the landfill unit should be resolved.

Minimizing impacts

All practicable steps are to be taken to minimize potential impacts of the landfill unit to wetlands. A number of measures that can aid in minimization of impacts are available. Appropriate measure are site-specific and should be incorporated into the design and operation of the landfill unit. For example, placement of ground water barriers may be required if soil and shallow ground water conditions would cause dewatering of the wetland due to the existence of underdrain pipe systems at the facility.

It is possible that the landfill unit/facility will not directly displace wetlands, but that adverse effects may be caused by leachate or run-off. Engineered containment systems for both leachate and run-off should mitigate the potential for discharge to wetlands.

Unavoidable impacts

All unavoidable impacts must be "offset" or compensated for to ensure that the facility has not caused, to the extent practicable, any net loss of wetland acreage. Wetland offset studies require review and development on a site-specific basis. This compensatory mitigation may take the form of

- upgrading existing marginal or lower-quality wetlands, or
- replacement of wetlands

Upgrading existing wetlands

To identify existing wetlands that may be proposed for upgrade, a cursory assessment of surrounding wetlands and uplands should be conducted. The assessment may include a study to define the functional characteristics and inter-relationships of these potential wetland mitigation areas. An upgrade of an existing wetland may consist of transplanting appropriate vegetation and importing low-permeability soil materials that would be conducive to forming saturated soil conditions. Excavation to form open water bodies or gradual restoration of salt water marshes by culvert expansions to promote sea water influx are other examples of compensatory mitigation.

Replacement of wetlands

The Division of State Lands (DSL) has established offset ratios to determine how much acreage of a given functional value is required to replace the wetlands that were lost or impacted. Preservation of lands, such as through perpetual conservation easements, may be considered as a viable offset option. DSL offset ratios require for wetlands of an equivalent functional value, that a larger acreage be created than was displaced.

Monitoring the mitigation

Due to the experimental nature of creating or enhancing wetlands, a monitoring program to evaluate the progress of the effort should be considered and may be required as a wetland permit condition. The purpose of the monitoring program is to verify that the created/upgraded wetland is successfully established and that the intended function of the wetland becomes self-sustaining over time.

1.5 Critical Habitat

Need for demonstration	Determine if the municipal solid waste landfill unit is located where landfill activities could cause or contribute to the reduction of the likelihood of survival and recovery of a threatened or endangered species. If so, demonstrate the measures that will be taken to protect the species. Reference: OAR 340-94-030(3)
Other permits required	If the municipal solid waste landfill unit is to be situated or significantly expanded in a critical habitat, obtain a permit from the Secretary of Interior.
Information on threatened and endangered species	The Oregon Department of Fish and Wildlife maintains an up to date database of information on threatened and endangered species. The database coordinator can be reached at (503) 229-5454.

1.6 Fault Areas

Need for demonstration

Determine if faults, having displacement in Holocene time, are likely or have been identified in the vicinity of the proposed new or lateral expansion of an existing municipal solid waste landfill unit. If so, demonstrate that the landfill:

- is more than 200 feet (60 meters) of a fault that has had displacement in Holocene time, or
- that an alternative setback distance of less than 200 feet (60 meters) will prevent damage to the structural integrity of the landfill unit and protect human health and the environment

Fault danger

Proximity to a fault can cause damage through:

- movement along the fault which can cause displacement of facility structures
- seismic activity associated with faulting which can cause damage to facility structures through vibratory action, and
- earth shaking which can cause ground failures such as slope failures

Locating fault areas

U.S. Geological Survey (USGS) mapping can be used to determine if a proposed landfill unit is located in a Holocene fault area. A series of maps known as the "Preliminary Young Fault Maps, Miscellaneous Field Investigation (MF) 916" was published by the USGS in 1978. For information, call the USGS at 1-800-USA-MAPS (USGS National Center in Reston, Virginia) or by calling (303) 236-7477 (USGS Map Sales Center in Denver, Colorado). The Oregon Division of Geology and Mineral Industries (DGAMI) is a good local source of data on Holocene faults. They can be reached at (503) 731-4444 (Nature of Oregon Information Center).

Locating a fault zone that has moved since the USGS maps and other sources were published may require a geologic reconnaissance of the site and surrounding areas to identify and map these features.

1.7 Seismic Impact Zones

Need for demonstration

Determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is located in a seismic impact zone. If so, demonstrate that all containment structures are designed to resist the maximum horizontal acceleration in lithified earth material for the site. To make the demonstration:

- determine the expected peak ground acceleration from a maximum strength earthquake that could occur in the area
- determine the site-specific seismic hazards such as soil settlement, and
- design the facility to withstand the expected peak ground acceleration

Note: containment structures include liners, leachate collection and storage systems, and surface water control systems

Definition: seismic impact zone

A Seismic Impact Zone is an area with a ten percent or greater probability that the maximum horizontal acceleration in lithified earth material expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10g in 250 years.

Determining horizontal acceleration

The determination of the maximum horizontal acceleration of the lithified earth material for the site (see Figure 1-1) can be made by reviewing the seismic 250-year interval maps in U.S. Geological Survey Miscellaneous Field Study Map MF-2120, entitled "Probabilistic Earthquake Acceleration and Velocity Maps for the United States and Puerto Rico" (Altermissin *et al*., 1991). To view the original of the map that is shown in Figure 1-1 (reduced in size), contact the USGS office in your area. The original map (Horizontal Acceleration - Base modified from U.S.G.S. National Atlas, 1970, Miscellaneous Field Studies, Map MF 2120) shows county lines within each state. For areas not covered by the aforementioned map, USGS State seismic maps may be used to estimate the maximum horizontal acceleration. The National Earthquake Information Center, located at the Colorado School of Mines in Golden, Colorado, can provide seismic maps of all 50 states.

Other sources of information

The National Earthquake Information Center maintains a database of known earthquakes and fault zones. Information on the location of earthquake epicenters and intensities may be available through DGAMI or the Earthquake Information Center. For information concerning potential earthquakes in specific areas, the Geologic Risk Assessment Branch of USGS may be of assistance. Other organizations that study the effects of earthquakes on engineered structures include the National Information Service for Earthquake Engineering, the Building Seismic Safety Council, the National Institute of Science and Technology, and the American Institute of Architects.

Impact of seismic activity on landfills

Studies indicate that earthquakes produce superficial (shallow) slides and differential displacement, rather than massive slope failures (U.S. Navy 1983). Stresses created by superficial failures can affect the liner system, final cover systems, and leachate and gas collection and removal systems. Tensional stresses within the liner system can result in fracturing of the soil liner and/or tearing of the flexible membrane liner.

Design considerations

The design of the facility slopes, leachate collection system, and other structural components should have built-in conservative design factors. Additionally, redundant precautionary measures should be designed and built into the various landfill systems. Establish precautions using the table below.

If the maximum horizontal acceleration in the area is	and the facility is	then
greater than 0.1g	-----	complete an engineering evaluation of seismic effects when preparing the landfill design
less than 0.1g	situated in an area with low strength foundation soils or soils with potential for liquefaction	complete an engineering evaluation of seismic effects when preparing the landfill design
less than 0.1g	not situated in an area with low strength foundation soils or soils with potential for liquefaction	assess the facility for the effects of seismic activity, and design the landfill accordingly

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Engineering evaluation of seismic effects

The engineering evaluation should examine soil behavior with respect to earthquake intensity, including an evaluation of seismic effects on foundation soil stability and waste stability under seismic loading. When evaluating soil characteristics, it is necessary to know the soil strength as well as the magnitude or intensity of the earthquake in terms of peak acceleration. Other soil characteristics, including degree of compaction, sorting (organization of the soil particles), and degree of saturation, may need to be considered because of their potential influence on site conditions.

Example: deposits of loose granular soils may be compacted by the ground vibrations induced by an earthquake resulting in large uniform or differential settlements of the ground surface

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Design implications

Design modifications to accommodate an earthquake may include shallower waste sideslopes, more conservative design of dikes and run-off controls, and additional contingencies for leachate collection in case primary systems are disrupted. Strengths of the landfill component should be able to withstand these additional forces with an acceptable factor of safety. The design should be based on the evaluation of seismic effects.

Materials to use

Well-compacted cohesionless embankments or reasonably flat slopes in insensitive clay are less likely to fail under moderate seismic shocks (up to 0.15g and 0.20g acceleration). Embankments made of insensitive, cohesive soils founded on cohesive soils or rock may withstand even greater seismic shocks. For earthen embankments in seismic regions, designs with internal drainage and core material most resistant to fracturing should be considered.

Vulnerable landforms and materials

Slope materials vulnerable to earthquake shocks include:

- very steep slopes of weak, fractured and brittle rocks or unsaturated loess are vulnerable to transient shocks caused by tensional faulting
- loess and saturated sand may be liquefied by seismic shocks causing the sudden collapse of structures and flow slides
- similar effects are possible in sensitive cohesive soils when natural moisture exceeds the soil's liquid limit, and
- dry cohesionless material on a slope at an angle of repose will respond to seismic shock by shallow sloughing and slight flattening of the slope

In general, loess, deltaic soils, floodplain soils, and loose fills are highly susceptible to liquefaction under saturated conditions (USEPA, 1992).

Computer modeling

Geotechnical stability investigations frequently incorporate the use of computer models to reduce the computational time of well-established analytical methods. Several computer software packages are available that approximate the anticipated dynamic forces of the design earthquake by resolving the forces into a static analysis of loading on design cross sections. A conservative approach would incorporate both vertical and horizontal forces caused by bedrock acceleration if it can be shown that the types of material of interest are susceptible to the vertical force component. Typically, the horizontal force caused by bedrock acceleration is the major force to be considered in the seismic stability analysis.

Examples of computer models: PC-Slope by Geoslope Programming (1986), FLUSH by the University of California

Staffing

The use of professionals experienced in seismic analysis is strongly recommended for design of facilities located in areas of high seismic risk.

1.8 Unstable Areas

Need for demonstration

Determine if the site is located in an unstable area. If so, demonstrate that engineering measures have been incorporated into the appropriate landfill design to protect the structural integrity of the landfill.

Note: The results of the site stability investigation (see section 4) should be assessed in making this determination

Geotechnical factors

Consider the following factors when determining whether an area is unstable:
- on-site or local soil conditions that may result in significant differential settling
- on-site or local geologic or geomorphologic features, and
- on-site or local man-made features or events (both surface and subsurface)

Natural unstable areas

Natural unstable areas include those areas that have poor soils for foundations or are susceptible to mass movement. Examples are described below:
- Areas with compressible or expansive soils.
- Expansive soils usually are clay-rich soils that, because of their molecular structure, tend to swell and shrink by taking up and releasing water and thus are sensitive to a variable hydrologic regime. Bentonite is a commonly used example.
- Soils that are subject to rapid settlement (subsidence) include saturated silts, unconsolidated clays, and wetland soils in general.
- Sloped areas subject to mass movement such as avalanches, landslides, debris slides and flows, and rock slides. Such areas can be situated on steep or gradual slopes.

Human-induced unstable areas

Examples of human-induced unstable areas are described below:
- The presence of cut and/or fill slopes during landfill construction causing slippage of existing soil or rock.
- Excessive drawdown of ground water increases the effective overburden on the foundation soils underneath the unit causing excessive settlement or bearing capacity failure of the foundation soils.
- A closed landfill as the foundation for a new landfill ("piggy-backing") becoming unstable if the foundation wastes have not undergone complete settlement.

Unstable area demonstration contents	Assess the ability of the soils and/or rock to serve as a foundation and the ability of site embankments and slopes to maintain a stable condition. Develop a design that will address these types of concerns and prevent possible associated damage to structural components.
Stability assessment	In designing a new unit or lateral expansion or re-evaluating an existing unit, conduct a stability assessment to identify stability problems and preventive measures.
Source of information on natural features	• Nature of Oregon Information Center, Oregon Department of Geology and Mineral Industries at 731-4444 • Regional or local U.S. Soil Conservation Service soil maps • Aerial photographs, and • Site-specific investigations
Finding human-induced instability	To evaluate possible sources of human-induced ground instability, the site and surrounding area should be examined for activities related to extensive withdrawal of oil, gas, or water from subsurface geologic units. Evaluate construction or other operations that may result in ground motion (e.g., blasting).
Types of soil and rock failures	Principal modes of failure in soil or rock include: • rotation (change of orientation) of an earthen mass on a curved slip surface approximated by a circular arc • translation (change of position) of an earthen mass on a planar surface whose length is large compared to depth below ground • displacement of a wedge-shaped mass along one or more plans of weakness; • earth and mud flows in loose clayey and silty soils, and • debris flows in coarse-grained soils
Common landfill failures	Two common types of failures can occur at a landfill unit: • settlement • loss of bearing strength

Settlement

Settlement beneath a landfill unit, both total and differential, should be assessed and compared to the elongation strength and flexure properties of the liner and leachate collection pipe system. Small amounts of settlement can damage leachate collection piping and sumps.

Allowable settlement is typically expressed as a function of total settlement because differential settlement is more difficult to predict. However, differential settlement is a more serious threat to the integrity of the structure than total settlement. Differential settlement generally occurs beneath a landfill in response to consolidation and dewatering of the foundation soils during and following waste loading.

Loss of bearing strength

Loss of bearing strength is a failure mode that can occur in areas that have expansive, compressible, or liquefaction-prone soils. Loss of bearing strength has occurred at sites where excavations for new landfill units near existing filled areas reduced the mass of the soil at the toe of the slope and the overall strength (resisting force) of the foundation soil.

1.9 Sensitive Hydrogeologic Environments

Need for demonstration

Determine if the landfill unit is located in a sensitive hydrogeologic environment.

Definition: sensitive hydrogeologic environments

Sensitive hydrogeologic environments are defined as:
- gravel pits excavated into or above a water table aquifer
- areas underlain by a sole source aquifer or other sensitive aquifer, and
- designated wellhead protection areas

Reference: OAR 340-90-030(4)

Definition: sensitive aquifer

A sensitive aquifer is defined as ". . . any unconfined or semi-confined aquifer which is hydraulically connected to a water table aquifer, and where flow could occur between the aquifers due to either natural gradients or induced gradients resulting from pumpage . . . ."

Location prohibition

OAR 340-94-030(4) does not allow landfill units to be located in sensitive hydrogeologic environments where the Department has determined that:
- groundwater must be protected from pollution because it has existing or potential beneficial uses, or
- existing natural protection is insufficient or inadequate to minimize the risk of polluting groundwater

1.10 Additional Resources

References

U.S. EPA's Solid Waste Disposal Facility Criteria, Technical Manual (EPA 530-R-93-017)

40 CFR Part 230 (Guidelines for Specification of Disposal Sites for Dredged or Fill Materials)