Buffers and Storage Requirements by State

ALABAMA

ALASKA

ARIZONA

- No lining is required for an impoundment storing Class A+ reclaimed water, but a liner is required for Class A water. The liner should use a low hydraulic conductivity artificial or site-specific liner material that achieves a discharge rate of less than 550 gal/acre-day.

ARKANSAS

CALIFORNIA

- Irrigation must be >50 ft. from a domestic water supply, unless the well owner waives this requirement. (Other actions may also be stipulated to waive this requirement.)
- Impoundments of reclaimed water must be >100 ft. from a domestic well supply.

- Short-term facilities for storage or disposal should be able to accommodate water for at least 24 hrs. Such facilities should include necessary diversion devices, provisions for odor control, conduits, and pumping and pump-back equipment. All except the pump-back equipment should be independent of the normal power supply or provided with standby power.
- Long-term storage or disposal provisions (ponds, reservoirs, percolation areas, sewers) should be similarly equipped and of sufficient capacity for at least 20 days.
- Redundant or standby primary and secondary sedimentation units are required, or long-term storage or disposal provisions must be provided. Multiple units must be capable of producing acceptable effluent with one unit not in operation.

COLORADO

- No impoundment may be within 100 ft of any domestic water supply well unless the impoundment is lined with a synthetic material with a permeability of 10EE-6 cm/sec or less.
- No irrigation may be within 100 ft of any domestic water supply well.
- For irrigation at single-family residential dwellings, no irrigation water may be within 500 ft of any domestic supply well or within 100 ft of any irrigation well.

DELAWARE

- Buffer zones are determined on a case-by-case basis, but they are not normally required.
- A buffer zone may be required to accommodate aerosol containment, noise, and nuisance control.

- Storage must be provided either as a separate facility or incorporated into the treatment system if it can be done without compromising treatment efficiency.
- A minimum of 15 days' storage is required unless other measures of controlling flow can be demonstrated. Minimum storage for reject effluent is the volume of 2 days' flow at the average daily design flow rate of the treatment process.
  - Storage and irrigation pumping must not affect design hydraulic retention time.
  - Storage ponds must have impermeable liners.
- Automatic diversion of partially treated wastewater to a reject wastewater storage system must be provided.
- An up-gradient and down-gradient well is required for pond treatment and storage.

FLORIDA

- Low trajectory nozzles are required within 100 ft of outdoor public eating, drinking, and bathing facilities to minimize aerosols.
- Indoor aesthetic features such as decorative pools or fountains that are using reclaimed water must be at least 100 ft from adjacent to indoor public eating and drinking facilities in the same room or building space.
- At least 75 ft is required between a transmission facility or wetted area and a potable water supply well, and municipalities may adopt ordinances that prohibit private drinking water wells in residential areas.
- At least 3 ft of separation must be maintained between reclaimed water lines and potable lines or sewer lines. Concrete encasement of a reclaimed line, or a vertical gap between a reclaimed water line and other lines, can lower this spacing requirement. Separation distances stipulated for reliability in rights-of-ways are recommended but not required on properties where reclaimed water is being used.
- No setback distance is required from nonpotable wells.
- No setback is required from surface waters or developed areas.
- At least 200 ft is required between an unlined storage pond and a potable water supply well.
- Setback distances are specified for injection and recovery wells and for extended zones of discharge.

- Storage is not required if another permitted reuse system or effluent disposal system is included in the design that ensures continuous facility operation.
- If storage ponds are required to accommodate low customer demand for water, sizing criteria are provided, with a minimum volume equal to three times that portion of the average daily flow of the total reuse capacity for which no alternative reuse or disposal system is permitted.
- Existing ponds or lake can be used for storage of excess treated water as long as the storage does not impair the ability of an impoundment to serve as a storm water management unit.
- Storage can also be provided by use of an aquifer storage and recovery system (ASR), where reclaimed water is injected into a subsurface formation for storage and then recovered at a later date.
- If storage is required for reject flow, minimum volume required is one day flow at the average daily design flow of the treatment facility or the average daily permitted flow of the reuse system, whichever is less. Reject ponds must be lined or sealed to prevent seepage.

GEORGIA

- Buffer requirements are stipulated on a case-by-case basis.

- Accommodations for wet weather periods can be made by providing storage on site or with the user OR with the provision of additional land OR by obtaining an NPDES permit for the flow to be diverted to surface water.
- A storm water detention pond can be used to store reclaimed water, but it must be sized appropriately with a control structure and two outlets.

HAWAII

- No irrigation is allowed within 50 ft of a drinking water supply well, and the edge of an impoundment must be >100 ft from a drinking water supply well.

- The design and operation of system storage capacity shall be sufficient to assure the retention of the recycled water under adverse weather conditions, harvesting conditions, maintenance of irrigation equipment, or other conditions that preclude reuse.
- If storage is provided in the form of a restricted recreational impoundment or landscape impoundment, runoff should be prevented from entering the storage impoundment unless the impoundment is sized to accept the runoff without discharge, or an NPDES permit has been issued for the discharge; no discharge is permitted to any impoundment with less than two feet of freeboard.
- To retain its contents, an impoundment shall have liners impervious to water. Liner stipulations are provided.
- Stipulations are provided for exceptions to the storage requirement and to the 20 day retention time required.
- Storage for reject water is required if another backup disposal system is not provided. Minimum capacity for reject storage is the volume equal to one day's flow at the average daily design flow of the reclamation facility or the average daily design flow of the approved alternate reuse area, whichever is less.

IDAHO

ILLINOIS

- Setback distances must conform to the terms of state groundwater protection legislation.
- The wetted area cannot encroach on wetlands, streams, waterways, surface waters, public road rights of way or residential lot lines.
- No distance restriction from residential lot lines is imposed if application occurs only during hours between dusk and dawn.
- The treatment area must include signage.

- Storage is required, with the storage volume determined by one of two methods. One method bases the volume on a rational design that requires sufficient capacity for diversion (due to climate constraints, land cultivation, equipment maintenance or the like) during the wettest year with a 20-yr return frequency. The second method requires capacity for 150 days' production at the average design flow.
- Lagoon storage is acceptable.
- Storage capacity must be provided for high groundwater periods.

INDIANA

- Irrigation water must be applied:
  - a minimum of 200 ft from potable water supply wells or drinking water springs,
  - a minimum of 300 ft from any waters of the state,
  - a minimum of 300 ft from any residence.
- A management plan has to be approved that stipulates certain conditions about setbacks and application rates.
- Off-site storage must not be within 1000 ft of a residence or public building, within 300 ft of any state waters, within 200 ft of any well, or in a flood plain.

- A minimum of 90 days storage capacity is required unless an equivalent means of meeting the requirement is approved.
- If reduction, loss or failure of power to disinfection equipment occurs, land application and discharge to storage (for later irrigation) must cease for 72 hours.
- Storage must have a minimum of 1 ft freeboard.
- Off-site storage in underground storage tanks must comply with existing regulations.
- Stipulations are provided for storage structure and construction. Earthen lagoons are permitted, but the setback requirements differ, and a statement from the water producer or the user is required accepting responsibility for closure and abandonment.

IOWA

- Wetted area must be > 1000 ft from a shallow public water supply well.
- Wetted area must be > 500 ft from a public lake or impoundment.
- Wetted area must be at least 0.5 mile from any public lake or impoundment used as a source of raw water by a potable water supply.
- Wetted area must be >300 ft from existing dwellings or public use areas.
- There must be >50 ft between a property line and wetted area; case-by-case exceptions may be allowed.
- The wetted area must be > 400 ft from a potable water supply not on the property.
- The wetted area must be >300 ft from a structure, stream, or other land feature that may provide a direct connection between the ground water table and the surface.

- Storage requirements stipulated by state region.

KANSAS

- No runoff to adjacent landowners is permitted.
- Irrigation must occur while the public is restricted from access.
- No irrigation spray is allowed to drift to areas used for picnicking, public drinking fountains, potable water hose bibs, private residences, or any other areas where food or drink is routinely prepared or served.

KENTUCKY

LOUISIANA

MAINE

MARYLAND

- The distance from the wetted perimeter of spray irrigation areas to property lines, waterways and roads must be ≥ 200 ft.
- When spray areas are located adjacent to housing developments, parks, or other areas where people congregate, a wetted area buffer of 500 ft is recommended. Exceptions may be permitted.
- If a windbreak is provided or a non-spray irrigation system is employed, the buffer zone may be as low as 50 ft.

- Storage must be provided for flows generated during periods when treated wastewater cannot be applied to land. Storage capacity requirements will be a function of the climate where the system is located.
- No less than 60 days' storage will be permitted.

MASSACHUSETTS

- Spray is not permitted within 100 ft of a building or residential property;if no private wells are involved, a green barrier in the form of hedges or trees may be placed at the dwelling side of the buffer, and the setback distance can be reduced to 50 ft.
- Spray is not permitted within 100 ft of a private well.
- Spray is not permitted within 100 ft of Class A surface water bodies and surface water intakes.

- Irrigation ponds must be designed to minimize the degradation of water quality between the time that treated water is stored and then withdrawn for irrigation. Some of the recommended design considerations that will reduce adverse impacts on the water during storage are:
  - pond liners
  - storage capacity that does not change the morphology of the pond
  - aeration
  - minimization of physical hazards associated with the pond
  - inlet/outlet devices to promote circulation
  - sizing to allow frequent turnover of the pond volume
  - diversion of runoff containing fertilizer so that the runoff does not enter the pond
  - stormwater management that minimizes the carriage of nutrients into the pond
  - perimeter landscaping to reduce access of children to the pond water
  - signage

MICHIGAN

- An effluent discharge point must be ≥ 100 ft inside property boundary, although permission for narrower buffers may be approved.
- An effluent discharge point must be ≥ 2000 ft from a Type I or Type IIa water supply well, 800 ft from a type IIb or III water supply well, and 300 ft from a domestic well, although permission for narrower distances may be approved.

- If treatment or storage lagoons are used, they must have a composite liner. The base must contain a natural soil barrier, a compacted soil barrier or a geo-composite clay liner. Details about lagoon construction are stipulated. The lagoon may hold only wastewater that meets the permitted water quality limits.

MINNESOTA

MISSISSIPPI

MISSOURI

- Standard land application regulations require that the wetted application area must be at least 150 ft from existing dwellings or public use areas, (except roads or highways) and at least 50 ft inside the property line. However, these distances may be reduced depending on the extent of pretreatment and operational techniques. Half the required distances may be used if the wastewater is disinfected to produce a total chlorine residual of 0.5 mg/L after 15 min of contact time at the peak flow rate.
- The wetted application area must be
  - 300 ft from an existing potable water supply well not on the property, and
  - 300 ft from any sinkhole, stream or other structure or physiographic feature that may provide direct connection between the ground water table and the surface.

- Minimum storage requirements for no discharge systems range from 60 days in southern Missouri to 120 days in northern Missouri unless flows are generated only during the application period. In the latter case, a storage capacity of 45 da or the flow generated during the period of operation, whichever is less, is required.

MONTANA

- Irrigation must be 100 ft from any water supply well.
- Buffer distances from surface water are set on a case-by-case basis.

NEBRASKA

NEVADA

- No buffer is required in areas of unrestricted public access.

- Storage must contain, without release, the precipitation that falls within the boundaries for the 25-yr, 24-h storm event at the site. The reservoir must also withstand, without release of reclaimed water, the runoff generated from the 100-yr, 24-h storm at the site.
- Reservoir design requirements must comply with design of wastewater detention basins and additional stipulations from the regulatory agency with respect to liner criteria.
- It is recommended that a minimum of 4 days' storage volume be available in reservoirs for periods when the reuse system is not operating.

NEW HAMPSHIRE

NEW JERSEY

- A setback of 75 ft from edge of wetted area to a potable water supply well is required.
- A setback of 75 ft from a reclaimed water transmission facility to all potable water supply wells is required.
- A setback of 100 ft from indoor aesthetic features such as decorative pools and fountains is required.
- The edge of the wetted area shall not cross into adjoining sites.

- Storage is required if another permitted reuse system or effluent disposal system is not incorporated into the system design. Use of ponds for reuse storage shall not impair the ability of the ponds to function as storm-water management systems.
- Reject storage ponds must be lined, but system storage ponds need not be lined.

NEW MEXICO

- Even if disinfected, irrigation water must not be aerosolized via a sprinkler system within 100 m (328 ft) of human living quarters.

(• A setback of 50 ft is required from potable water supply wells.)

(• If the producer does not possess an NPDES permit for discharge into surface waters, the facility must provide for emergency storage of a volume equal to 5 days of average design flow, to be used for inadequately treated water, and to allow for periods when permitted use is impractical or impossible.)

NEW YORK

- A 50-ft buffer is required between a five-day detention pond and the property lines.
- A 50-ft buffer is required between an irrigation pond for treated water withdrawal and the property line.
- A 100-ft buffer is required from the edge of spray influence and any surface waters classified SA (shellfish areas). For waters not classified SA, a 25 ft buffer is required.
- A 100-ft buffer is required from the edge of spray influence to any water supply well.
- A 10-ft buffer is required from the edge of spray influence and any nonpotable well.

- Treated water failing the fecal coliform or turbidity limits must be discharged to a five-day side-stream detention pond, unless other permitted disposal options have been arranged.
  - There must be a 50-ft buffer from the side-stream detention pond to property lines
  - The detention pond must have a liner of natural material that is at least one foot thick with a hydraulic conductivity of no greater than 1EE-6 cm/sec, or a synthetic liner of sufficient thickness to exhibit structural integrity, and a comparable hydraulic conductivity.
- Storage for unused reclaimed water must be provided unless arrangements for other disposal options have been made, e.g. an NPDES permit for discharge to surface waters.
- The size of any irrigation pond that follows the five day detention pond must be designed using a mass water balance based on a recent 25-yr period using monthly average precipitatio data, potential evapotranspiration and soil drainage data that are available from or representative of the area involved.
  - Irrigation ponds are not required to have liners or be located some minimum distance from the groundwater table if it can be demonstrated by calculation or modeling that concstruction and use of the pond will not result in contravention of assigned groundwater standards at the compliance boundary.
- Public access to a five-day detention pond is not permitted.

NORTH DAKOTA

OHIO

- Irrigation flow setback distance requirements are
  - 100 ft from a private water well
  - 300 ft from a community water well
  - 100 ft from a sinkhole
  - 50 ft from a drainage way
  - 50 ft from surface water
  - 100 ft from a road right-of way unless a windbreak is used, which reduces the requirement to 10 ft
  - 50 ft from the property line

- A seasonal storage system should provide for at least 130 days of design average flow. Storage requirements should be developed considering the wettest year with a 5-year return frequency. Storage should be used when the ground is frozen, when the temperature is less than 35 F, when the wind velocity exceeds 20 mph in urban areas, when snow or water is standing on the ground surface, or when groundwater is within 1 ft of the surface. In some cases, permits may be obtained for surface water discharge during winter months.
- Operational storage should be four-fold times greater than the daily design flow. It is needed to give the operator flexibility to adjust, maintain, and service the irrigation system.
- A freeboard of 2-3 ft is recommended for storage ponds.

OKLAHOMA

OREGON

Buffers for non-restricted access sites are not required.

PENNSYLVANIA

- A minimum 50 ft buffer zone is required along property boundaries, roadways, parking lots and rock outcrops.
- Wind drift consideration must be used in the design to determine longer downwind lateral distances to site features such as streams and lakes, wells, occupied dwellings, and sinkholes.

- Storage is required to hold good quality water that is not in use.
- Storage requirements must be calculated according to stipulated methods.
- Storage periods may vary depending on seasonal or year-round operation; periods may vary from a low of 60 days in southeast PA to a high of 120 days in the northwest.
- Pond construction for storage must comply with stipulated state design criteria for Domestic Wastewater Facilitates.

RHODE ISLAND

SOUTH CAROLINA

- No buffers are required.

- Basins or storage ponds for reclaimed water will not require a liner unless it is specifically stipulated.
- Groundwater monitoring for storage impacts is not required.
- Covered storage may be required in order to maintain effluent quality prior to distribution.

SOUTH DAKOTA

- A windbreak or buffer zone is recommended to protect downwind sites from mist and/or aerosol contamination.
- No buffers are required if the wastewater has undergone extensive treatment and could be considered suitable for human consumption.
- Buffers for sites with public access would be set on a case-by-case basis.

- An effluent storage pond system must be provided with a minimum capacity of 210 days neglecting evaporation.
- The pond design must meet stipulated criteria for wastewater stabilization ponds.

TENNESSEE

- Treated wastewater must not be applied within 100 ft of the site boundaries.
- Treated wastewater must not be applied within 50 ft of on-site streams, ponds and roads.

TEXAS

- Storage is required to hold good quality water that is not in use.
- Water managed in ponds for storage may not be discharged into waters of the state, except for discharges with issued permits or that result from rainfall events. Unauthorized overflow of a holding pond must be reported to the regulatory agency.
- Storage facilities may not be located within a floodway unless they are authorized in an on-channel pond.
- Holding ponds must be designed and constructed to prevent groundwater contamination; they must meet stipulated requirements for liners and construction.
- Reclaimed water may be stored in leak-proof fabricated tanks.

UTAH

- Any irrigation must be at least 50 ft from any potable water well.
- Impoundments of reclaimed water, if not sealed, must be at least 500 ft from any potable water well.
- For residential landscape irrigation at individual homes, additional quality control restrictions may be required. The local health authority may be consulted to determine if there are any conditions they require.

VERMONT

VIRGINIA

WASHINGTON

- There must be at least 50 ft between a reclaimed water line and potable water supply well.
- For spray irrigation, there must be at least 50 ft between the spray area and a potable water supply well.
- When reclaimed water is used for an impoundment or storage pond that is not lined or sealed against seepage, there must be at least 500 ft between the perimeter of the impoundment and a potable water supply well; however, if the unit is lined or sealed to prevent seepage, the setback distance need only be 100 ft.

- Storage is required to divert water that doesn't meet water quality limits:
  - emergency storage, and
  - alternate permitted discharge locations during upsets.
- Storage must be provided for retention of reclaimed water when it is not required by a user unless an alternative disposal system is permitted. Storage should be sufficient to hold water for the duration of a 10-year storm, with the storm duration based on a minimum of 20 years of climate data. At a minimum, storage should be equal to three times that portion of the average daily flow of reuse capacity for which no alternative reuse or disposal system is permitted.
- When short-term storage is provided as a reliability feature to retain diverted flow, it should be capable of storing the wastewater for at least a 24-h period. The facilities must include all necessary provisions for odor control, conduits and pumping and pump back equipment. The equipment should be independent of the normal power supply or provided with a standby power source.
- Long-term storage for diverted water may consist of ponds, reservoirs, percolation areas, downstream sewers leading to other treatment or disposal facilities or any other facilities reserved for the purpose of emergency storage or disposal. The facilities must be of sufficient capacity to provide disposal or storage for at least 20 days.

WEST VIRGINIA

WISCONSIN

WYOMING

- At least 30-ft separation distance is required between a spray irrigation reuse site and all surface waters.
- At least 100-ft separation distance is required between a spray irrigation reuse sites and potable water supply wells.
- At least 100-ft separation distance is required between a spray irrigation reuse sites and adjacent property lines.
- If flood irrigation is used, at least 30-ft separation distance is required between the reuse site and adjacent property lines. Public right-of-way land may be used to meet this buffer requirement.
- Drip irrigation systems may be used in the buffer zones required for spray or flood irrigation.