



## **Region 2050 Alternative Growth Scenarios Evaluation Wastewater Facilities and Services DRAFT April 25, 2005**

This summary evaluates the extent to which each scenario meets the Regional Goal and Objectives related to public facilities and services. Specifically, this evaluation assesses the relative impacts of the three scenarios on the capacity and cost to provide wastewater facilities and services. A companion document, *Relative Potential Effects of On-Site Wastewater Treatment Systems on Groundwater Quality under the Rural Growth Scenario*, reports on the evaluation of individual on-site systems in the rural area in the Rural Growth Scenario.

### **Summary of Findings**

Table 1 displays estimates of capital costs for wastewater systems in the three alternative scenarios and provides detailed discussions of the issues related to wastewater systems.

- In terms of capital costs for wastewater facilities, the Satellite Communities Scenario would be the most costly, due to the relatively high cost of constructing new wastewater systems in Pleasant Hill, Goshen, and Alvadore.
- The Rural Growth Scenario would have the lowest capital cost of the three scenarios, because there would be no centralized waste treatment facilities or collection systems.
- The Compact Growth Scenario would have medium capital costs; the expense of extending lines to serve Pleasant Hill, Goshen, and Alvadore add significantly to the cost of this scenario, with Alvadore contributing the greatest marginal cost.
- Eugene-Springfield, Cottage Grove, Oakridge, and Westfir are well positioned from a wastewater perspective to serve growth, although capital upgrades will be needed.
- Oakridge and Westfir share in the costs of the regional facility which was built to accommodate growth.
- For many of the small cities, it was difficult to estimate costs to serve the scenarios because local wastewater management plans were not current and/or environmental requirements were unknown.

- Other than Lowell, Oakridge and Westfir, the cost for the small cities to serve the Satellite Communities Scenario range from \$18 million in Cottage Grove to \$34 million in Junction City. Westfir and Lowell are around \$2 million and Oakridge is less than \$700,000.
- For the City of Coburg, and the three new cities in the Satellite Scenario, the capital cost of wastewater would be quite high, particularly in the three new cities: Pleasant Hill, Goshen, and Alvadore.
- Cost estimates for the rural area assume individual systems for each new dwelling unit. No attempt was made to calculate the expense of community systems, although that is the more likely alternative in the rural communities, as they are assumed to develop at one acre lots. The feasibility of this assumption is discussed in the companion piece, *Relative Potential Effects of On-Site Wastewater Treatment Systems on Groundwater Quality under the Rural Growth Scenario*.

## **Methodology**

This assessment reflects the results of a quantitative and qualitative evaluation conducted by the Wastewater Evaluation Team, comprised of staff from the cities of Eugene and Springfield, Metropolitan Wastewater Management Commission, Lane County, and the Oregon Department of Environmental Quality. A survey was administered on November 4, 2004, attached. All survey responses were received by April 2005 and results were tabulated in Table 1.

### **Factors for Evaluation:**

- General feasibility, is it possible to implement?
- Capital value of system per dwelling unit verses per person
- Operation and Maintenance costs per dwelling unit
- Ownership and Administration of facilities

### **Variables:**

- Environmental protection: Vulnerability due to soil and water conditions.
- Legislative: institutional arrangements, planning/operating/enforcement
- Economic: Cost per dwelling, equity, burden/safety net, and ability to pay
- Engineering: Design, treatment, performance, adaptability, topography, distance, population density, capacity of existing municipal system.
- Administrative: Records, decision authority, staffing, flexibility, regulatory
- Social: group responsibility/bigger government, public support, user education
- Management: maintenance, repair, operation, ownership

## General description and findings for types of disposal systems:

Options – Three growth scenarios have been considered. Sewage disposal could be achieved by:

- Individual onsite sewage disposal systems (decentralized onsite)
- Cluster – decentralized cluster systems
- Centralized municipal sewage treatment plant

**Centralized system** –The centralized municipal system consists of a treatment facility and a collection system to transport the wastewater from each residence to the facility. The collection system starts with a buried private lateral from the dwelling to a collector pipe, publicly owned collector pipes, and interceptor (transmission) sewers. Manholes and lift stations are additional components of the municipal system. Collection systems will involve river crossings and other environmentally regulated areas. Distance between lots, available gradient (downstream slope), and distance to treatment plant are factors which dictate the location of treatment facilities. Development to urban densities must proceed in an orderly progression rather than pockets in isolated locals.

Where distance between lots, and to treatment plant is great, or steep and hilly topography requires pump stations it may be more cost effective to use other types of disposal systems.

**Cluster systems.** These serve more than one dwelling. The dwellings are grouped by proximity, topography, suitability/severity of soil for onsite disposal, and vulnerability and depth to groundwater. Onsite septic tanks are used to separate the fats, oils and greases, as well as, the settleable solids, thus allowing for smaller diameter collection pipe. The water is discharged from the septic tank to collector mains that discharge to a cluster sewage disposal system. The system is designed in accordance to site conditions.

**Individual on-site sewage treatment systems.** Onsite systems treat and dispose of the effluent from each dwelling on its own parcel, thereby eliminating the need for centralized collection systems. Each site is first evaluated for its suitability for a septic system. A conventional system consists of a septic tank and drainfield. The septic tank decants the solids and allows anaerobic decomposition to occur. The effluent is then dispersed throughout the drainfield where it infiltrates into the soil; additional aerobic treatment occurs in the soil. More severe site conditions may require additional treatment (sand filter) before the drainfield, or pressurized distribution of the effluent within the drainfield. Cost of private septic systems was calculated by multiplying the total average cost of on-site systems (standard and sand filter) by the number of new dwelling units ( $\$4,000 + \$14,000/2 = \$9,000 \times 30,988$ ). Value of the land that the system requires was excluded from the total.

## **Management of on-site sewage treatment systems**

Installation of septic systems currently requires a detailed site evaluation, choice of a system that reflects the individual site conditions, and inspection of the system installation. Although time-of-sale inspections and tank pumping is a common requirement of lending institutions, there is no comprehensive management program to aid in the long term effectiveness of an on-site wastewater treatment strategy.

The US EPA has outlined five management models which progressively increase management controls as sensitivity of the environment (or system complexity) increases.

- 1) Homeowner Awareness – Homeowner owned and operated in areas of low environmental sensitivity. Maintenance reminders are sent to owners.
- 2) Maintenance Contracts – Because of more sensitive environments or complexity of systems contracts with qualified technicians are employed to ensure proper and timely maintenance.
- 3) Operating Permits – Sustained performance of system is critical. Renewable operating permits requires owner to demonstrate compliance with maintenance and performance conditions of permits. This type of permit currently exists in Oregon under the DEQ's Water Pollution Control Facility permit. It is required when design flows exceed 2500 gallons per day, or nonresidential waste strength.
- 4) "Responsible Management Entity Operation and Maintenance". Due to system complexity and/or sensitive environments a RME performs regular and reliable O&M, under an Operating Permit issued to the RME.
- 5) RME Ownership. The RME owns, operates and maintains the system. Property owner is removed from equation. Similar to municipal system. Provides greatest assurance of performance, in the most sensitive environments.

## **Assumptions**

For all wastewater evaluations the following assumptions apply:

- The purpose of any option is to restore and maintain the quality of public waters and to protect the public health.
- Groundwater shall be protected from contamination based on the impact of the disposal systems related to DEQ vulnerability index of soils, slopes and depth to groundwater.
- Development restricted in WRD Critical Groundwater Areas.

- Evaluations are done under the current regulatory standards.
- Current technologies for disposal are implemented.
- Capital costs used in the evaluation will be in today's dollars.

## **Criteria**

The evaluation is based on the following Regional Goals and Objectives.

### **Goal**

Develop a regional approach to facilitate the efficient provision of infrastructure and community services in the Southern Willamette Valley in conformance with the desires of each utility and district.

### **Objectives**

1. Work collaboratively to ensure the availability of a full range of infrastructure and services to meet the needs of all residents in the region.
2. Identify innovative strategies and partnerships to finance existing and future facility expansions and improvements.
3. Develop a regional strategy to place less demand on infrastructure through enhanced conservation policies and practices.

## **Wastewater Facilities and Services Assessment**

In terms of capital costs for wastewater facilities, the Satellite Communities Scenario would be the most costly, due to the relatively high cost of constructing new wastewater systems in Pleasant Hill, Goshen, and Alvadore. The Rural Growth Scenario would have the lowest capital cost of the three scenarios, because there would be no centralized waste treatment facilities. The Compact Growth Scenario would have medium capital costs; the expense of extending lines to serve Pleasant Hill, Goshen, and Alvadore add significantly to the cost of this scenario, with Alvadore contributing the greatest marginal cost.

Eugene-Springfield, Cottage Grove, Oakridge, and Westfir are well positioned from a wastewater perspective to serve growth, although capital upgrades will be needed. For the Metropolitan Wastewater Management Commission (MWWC), in the Satellite Scenario, there would be minimal extension of urban services to the expanded UGB and additional increments of treatment capacity needed. The Rural Scenario would generate increased septic pumping, hauling, and disposal volumes to MWWC plant. In the Compact Growth Scenario, the LCC Basin and Goshen are close and could be served with gravity systems feeding into existing public systems, crossing I-5. Pleasant Hill is further away and would require longer trunk service lines and river crossing,

although gravity trunk is possible to serve Pleasant Hill. Alvadore is down gradient from the treatment plant and would need a pumping facility to convey sewage to the plant and a trunk line. A treatment facility to serve Alvadore would be more costly alternative and would require permitting for both the facility and an outfall for the treated water. User fees and assessment mechanisms will be needed to serve these areas.

Oakridge and Westfir share in the costs of the regional facility which was built to accommodate growth; and, in Oakridge, the Satellite Scenario would provide a faster solution to the inflow and infiltration problem that is currently underway.

For many of the small cities, it was difficult to estimate costs to serve the scenarios because local wastewater management plans were not current and/or environmental requirements were unknown. For the City of Coburg, and the three new cities in the Satellite Scenario, the capital cost of wastewater would be quite high, particularly in the three new cities. In Pleasant Hill, Goshen, and Alvadore, the Satellite Scenario costs ranged from \$45,000,000 in Pleasant Hill to \$84,000,000 in Alvadore. These estimates assume construction of a conventional gravity system with a treatment plant that discharges to the Coast Fork of the Willamette River for Goshen and Pleasant Hill and to the Long Tom for Alvadore. The systems would include an effluent reuse program. Biosolids would either be composted or dried to meet the Class-A requirements as a soil amendment or fertilizer.

Coburg's population and employment does not vary significantly in the three scenarios; thus, the cost estimates will be about the same, \$26,000,000. Coburg currently has no centralized wastewater system. The wastewater facilities plan is based on a 20-year planning period with an ending year of 2028. Effluent irrigation during the summer may be required to comply with more stringent temperature regulations. This could add a million dollars to the cost of treatment.

Junction City's estimated capital costs are relatively high, \$34,000,000 in the Satellite Scenario. Junction City's facilities plan is based on a twenty year planning horizon and a service population of 9,800. Treatment alternatives proposed are based on a residential strength waste stream; therefore industrial pre-treatment programs could be a significant issue for the City.

Creswell's new facility being built is designed for 8 million gallons per day. However, the City is currently in an MAO agreement with DEQ, and until the TMDLs are determined in the Willamette River, City doesn't know what the limitations are going to be in terms of requirements, so service area can not yet be determined. Cost estimates assume the limitations are going to be more stringent than City is capable of meeting, requiring it to install a mechanical plant, at \$15 million. Anticipated issues providing service to all the scenarios are cost associated with permanent pump stations, acquisition of easements, upgrading existing collections system etc. These costs are incurred by developers for the collection systems, and require annexation into the city limits.

City staff reports that in Lowell, past development has not been at urban densities; if significant infill does not occur to bring the City up to urban densities, significant

additional costs for sewer collection facilities and lift stations might be experienced; and in the Rural Scenario, where the necessary urban growth expansion occurs will have some bearing on costs.

Veneta is in the process of developing a capital program for wastewater. The City's existing facility capacity of 5,471 would need to increase significantly to serve any of the three scenarios, particularly the Satellite Communities Scenario. The estimates provided are based on the projected growth needs.

In the rural area, 1,000 new dwelling units were assumed in the Compact and Satellite Scenarios, although more of the existing units are absorbed in UGBs in the Satellite. Lane Code guides construction and development of rural land as it relates to septic systems. No construction or development work on proposed lots or parcels shall be started until septic system information is submitted and approved. Sufficient evidence is necessary to show that each parcel or lot to be developed will have available an adequate system which will meet minimum County standards. Cost estimates for the rural area assume individual systems for each new dwelling unit. No attempt was made to calculate the expense of community systems, although that is the more likely alternative in the rural communities, as they assumed to develop at one acre lots. The feasibility of this assumption is discussed in the companion piece, *Relative Potential Effects of On-Site Wastewater Treatment Systems on Groundwater Quality under the Rural Growth Scenario*.



Table 1. Wastewater System Capital Costs and Capacity Issues to Serve 2050 Alternative Growth Scenarios, April 12, 2005 (For Scenario Comparisons)

Service Area	Service Area Population		Compact Urban Scenario		Satellite Scenario		Rural Growth Scenario		Issues
	Current	Current System Capacity	Population	Cost to Serve	Population	Cost to Serve	Population	Cost to Serve	
Eugene-Springfield	297,000	297,000	364,792	\$550,000,000	296,048	\$350,000,000	277,495	\$180,000,000	<b>Compact:</b> The LCC Basin and Goshen are close and could be served with gravity systems feeding into existing public systems, crossing I-5; Pleasant Hill is further away and longer trunk service lines needed and requires river crossing; gravity trunk possible. Alvadore is down gradient from the treatment plant and will need a pumping facility to convey sewage to the plant and a trunk line. A treatment facility to serve Alvadore would be more costly alternative and would require permitting for both the facility and an outfall for the treated water. User fees and assessment mechanisms will be needed to serve these areas. <b>Satellite:</b> Minimal extension of urban services to the expanded UGB and additional increments of treatment capacity needed. <b>Rural:</b> Will generate increased septic pumping, hauling, and disposal volumes to MWMC plant.
Coburg	969	4,600	5,827	\$26,000,000	5,984	\$26,000,000	5,878	\$26,000,000	Coburg currently has no centralized wastewater system. The wastewater facilities plan is based on a 20-year planning period with an ending year of 2028. All scenarios are about the same for Coburg. Effluent irrigation during the summer may be required to comply with more stringent temperature regulations. This could add a million dollars to the cost of treatment.
Cottage Grove	9,010	16,000	16,148	\$11,000,000	26,501	\$18,000,000	14,723	\$11,000,000	The figures are based on the Wastewater Master Plan which is currently being updated. Current capacity is projected on dry weather flow.
Creswell	3,909	3,909	14,920	\$17,000,000	22,858	\$20,100,000	5,795	\$2,000,000	Creswell's new facility being built is designed for 8 million gallons a day, however, we are currently in an MAO agreement with DEQ, and until the TMDLs are determined in the Willamette River, City doesn't know what the limitations are going to be in terms of requirements, so service area can not yet be determined. Costs shown assume the limitations are going to be more stringent than City is capable of meeting, requiring it to install a mechanical plant, at \$15 million. Anticipated issues providing service to all the scenarios are cost associated with permanent pump stations, acquisition of easements, upgrading existing collections system etc. These cost are incurred by developers for the collection systems, and require annexation into the city limits.
Junction City	4,910	7,318	9,128	\$26,893,135	12,524	\$34,368,326	8,465	\$20,620,912	Junction City's facilities plan is based on a twenty year planning horizon and a service population of 9,800. Treatment alternatives proposed are based on a residential strength waste stream; therefore industrial pre-treatment programs could be a significant issue for the City.
Lowell	900	2,400	2,368	\$1,240,000	2,845	\$2,540,000	2,359	\$1,240,000	City staff reports that in Lowell, past development has not been at urban densities; if significant infill does not occur to bring the City up to urban densities, significant additional costs for sewer collection facilities and lift stations might be experienced; and in the Rural Scenario, where the necessary urban growth expansion occurs will have some bearing on costs.
Oakridge	3,300	5,000	7,895	\$382,118	13,939	\$674,648	7,136	\$345,382	In Oakridge, the current plant, aside from normal upgrades and maintenance that will be done regardless of any of the scenarios, will accommodate growth. It was built as a regional facility with growth factors incorporated. The Satellite Scenario would provide a faster solution to the inflow and infiltration problem that is currently underway.
Veneta	3,480	5,471	14,110	\$15,000,000	24,016	\$22,000,000	10,002	\$18,000,000	Veneta is in the process of developing a capital program for wastewater. These are estimates based on the projected growth needs.
Westfir	166	460	546	\$2,000,000	564	\$2,000,000	544	\$2,000,000	No problems anticipated in providing wastewater services under each of the scenarios in Westfir.
Pleasant Hill Growth Center	230				11,777	\$45,000,000			In Pleasant Hill, Satellite Scenario costs are to construct a conventional gravity system with a treatment plant that discharges to the Coast Fork of the Willamette River and an effluent reuse program. Biosolids would either be composted or dried to meet the Class-A requirements as a soil amendment or fertilizer.

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Table 1. Wastewater System Capital Costs and Capacity Issues to Serve 2050 Alternative Growth Scenarios, April 12, 2005 (For Scenario Comparisons) - Continued

Service Area	Service Area Population		Compact Urban Scenario		Satellite Scenario		Rural Growth Scenario		Issues
	Current	Current System Capacity	Population	Cost to Serve	Population	Cost to Serve	Population	Cost to Serve	
Goshen Growth Center	543				10,180	\$65,000,000			In Goshen, Satellite Scenario costs are to construct a wastewater system relying on summer reuse and winter discharge into the Coast Fork. Biosolids management would be based on producing a fertilizer or soil amendment.
Alvadore Growth Center	309				16,027	\$84,000,000			In Alvadore, Satellite Scenario costs are to construct a wastewater system relying on summer reuse and winter discharge into the Long Tom. Biosolids management would likely rely on reuse through composting or heat drying to produce a soil amendment product.
Outside UGBs**	56,733	56,733	27,766	\$9,000,000	20,237	\$9,000,000	131,103	\$278,892,000	In rural area, 1,000 new dwelling units assumed in Compact and Satellite, although more of the existing units are absorbed in UGBs in the Satellite. Cost of private septic systems was calculated by multiplying the total average cost of on-site systems (standard and sand filter) times the number of new dwelling units (\$4,000+\$14,000/2=\$9,000 X 30,988). Value of the land that the system requires is excluded from the total. Lane Code guides construction and development of rural land as it relates to septic systems. No construction or development work on proposed lots or parcels shall be started until septic system information is submitted and approved. Sufficient evidence is necessary to show that each parcel or lot to be developed will have available an adequate system which will meet minimum County standards.
<b>Totals</b>	381,459	398,891	463,500	\$658,515,253	463,500	\$678,682,974	463,500	\$540,098,294	



## Wastewater Facilities Questionnaire

1. What is the current service area population of your wastewater system?
  
2. What is the projected service area population (current capacity in terms of population)?
  
3. In round numbers, please estimate the cost (in today's dollars) of providing wastewater services to the additional population (including all customer classes) for each of the growth scenarios (see attached tables).
  - Assume the mix of customer base and current average consumption levels remain the same as in the year 2000 over the next 50 years.
  - Please include and break out costs for capital and management of sludge/bio-solids.
  - Please include and break out costs for trunk lines. Assume that the cost will be \$1 million per mile for trunk lines and estimate the miles by scaling the distance to new development on the scenario maps.
  - Please include overall systems costs as well as an average cost per customer. (Average cost per customer is not a rate. It is a fraction that will be used as a common measure to compare the scenarios.)
  - Please list all assumptions made in deriving these estimates.

**ASSUMPTIONS:**

- Costs will be funded from user fees and Systems Development Charge funds so the cost per customer is based on total anticipated population. (User rates and SDC's anticipated to increase with time)

	Total Estimated Costs	Break Out Bio-solids Cost	Break Out Trunk Lines Cost	Unit Cost
Compact Urban Growth				
Satellite Communities				
Rural Growth				

4. Assuming that the average per customer usage in all customer classes remains the same as in 2000 and that costs are spread evenly among all customers (new and existing), at what customer level (service area population) will you be required to make a major capital investment such as new treatment, pumping, or transmission facilities? Please include these costs into the estimates in question #3.

5. In which, if any, of the three scenarios require improving or upgrading wastewater treatment to meet more stringent effluent limits? Check all that apply:

- Compact Urban Growth Scenario
- Satellite Communities Scenario
- Rural Growth Scenario
- None

6. What issues do you anticipate in providing wastewater services under each of the growth scenarios?

Compact Urban Growth Scenario

Satellite Communities Scenario

Rural Growth Scenario