SUMMARY
Stakeholder Workshop on Treatment and Discharge
(Stakeholder Workshop #2)

May 25, 2006, 1 PM – 3 PM
1820 Jefferson Street
Port Townsend, WA 98368-0920

In response to the 1990 Growth Management Act (GMA), Jefferson County pursued the designation of an Urban Growth Area (UGA) in the Irondale/Port Hadlock area. As part of the requirements for establishing a UGA, Jefferson County is conducting a study of alternatives for developing a sewer system. There are currently no sewer facilities in the area, and existing residences and businesses are served by on-site treatment and disposal (septic) systems.

The sewer study will enable the County to identify 1) the final preferred alternative or method of collection, treatment, and disposal of wastewater, 2) the service area, 3) the phasing of implementation of sewers throughout the service area, 4) the cost for individual connections to sewer, and 5) revenue sources. The goal of the study is to produce a comprehensive sewer plan that will help the County plan for growth in the area over the next 20 years; that will satisfy RCW 36.94 concerning County's sewerage, water, and drainage system responsibilities; and that will be approved by the Department of Ecology.

Workshop Summary

A stakeholder workshop was held at the Jefferson County Courthouse on Thursday, May 25 from 1:00 pm to 3:00 pm. The workshop was open to the public.

The purpose of the workshop was to:
- Present discharge and treatment alternatives
- Review advantages and drawbacks of each alternative
- Take questions and comments
- Identify preferences for a discharge system and a treatment system

Jefferson County Commissioners, County staff, local agency staff, and several community leaders were invited to the workshop. The County had identified local agencies whose facilities might be sewered and/or whose activities might be affected by the installation or operation of a sewer. The County also identified representatives of business and community organizations and citizens who had been active previously in the process to establish a UGA. These parties were contacted by mail. A notice of the workshop was available on the project website (www.porthadlocksewer.org), the County's website, and in the Port Townsend Leader.

County Commissioner David Sullivan (District 2) attended the workshop. The consultants to the County were represented by Kevin Dour, P.E. and Jim Santroch, P.E. of TetraTech/KCM and

Bob Wheeler and Ellen Blair of Triangle Associates. A complete list of workshop participants is attached to this summary.

Introductions & Workshop Overview

Mr. Wheeler, workshop facilitator, opened the meeting at 1:00 pm. He led introductions and explained the purpose of the workshop. He reviewed the workshop agenda and the steps that would lead to the selection of a complete sewer system, including public involvement opportunities, technical work, and the development of cost estimates and funding options.

Mr. Wheeler emphasized the complexity of planning a new sewer system, noting the number of components involved, such as the collection system, interceptor lines, treatment system, disposal system, and treatment and disposal of biosolids. He noted that cost was also a major factor to consider. He explained that each component affected the others, such that sewer planning was a stepwise process of matching up components that worked together.

Mr. Wheeler explained that this workshop presentation would address discharge alternatives before treatment alternatives because the method of discharge determines the level of treatment that is required. He said that, during the workshop, the project team hoped to narrow the discharge and treatment alternatives under consideration with the stakeholders help.

Mr. Wheeler reported that a project website had been created where information and announcements could be found and comments could be submitted: www.porthadlocksewer.org.

Review of Stakeholder Workshop on Collection System Alternatives

Mr. Dour, consultant team project manager, provided a brief review of the first Stakeholder Workshop on Collection System Alternatives, which took place March 16, 2006. His PowerPoint presentation is attached to this summary. Mr. Dour said that the first workshop had focused on three collection system alternatives: a gravity collection system, a pressurized STEP or grinder collection system, and a combination of the gravity and pressurized systems. He noted that the workshop participants had discussed their preferences for a collection system, but system selection was pending.

Mr. Dour provided an update on action items from the collection system workshop. Attendees had requested a calculation of the life cycle costs of the collection system alternatives over a 50-year period. Mr. Dour explained that the 50-year life cycle cost analysis had shown the following:

- Gravity has higher start-up costs
- Pressure is about 15% ($8.3 million) more expensive than gravity over 50 years
- Pressure and a combined pressure and gravity system cost about the same
- Operations and maintenance are more expensive for STEP than for gravity

Attendees had asked about the feasibility of separating gray water out before it entered the sewer system. Mr. Dour reported that key points on gray water separation included:

- Less water in the sewer system impacts system design parameters. For example, most gravity collection systems are designed for a certain amount of water to wash solids down the pipes. Removing gray water might generate a need to build steeper gravity collection pipes in order to keep solids moving, which would need to be constructed deeper and thus cost more.
- Plumbing retrofits would be required in existing homes in order to separate gray water from black water systems (water from toilets).
- Sending gray water to a wastewater treatment plant for treatment could help prevent gray water from possibly degrading groundwater supplies.
- A septic tank and drainfield would need to be maintained for gray water separation.
- Gray water separation as a means to recharge groundwater may be redundant if land-based disposal is selected for the treated plant effluent.

Discharge Alternatives

Mr. Dour presented the discharge alternatives for the Port Hadlock UGA sewer system, reviewed the advantages and drawbacks of each alternative, and identified the short-list of alternatives that were still under consideration. Key points of the presentation are summarized below.

Mr. Dour explained that there were two basic types of discharge: marine outfall and land-based application. He reiterated that the discharge method would determine the level of wastewater treatment required. He said that for a marine outfall, secondary wastewater treatment was sometimes acceptable, although regulators could require advanced (tertiary) treatment depending on the circumstances. He said advanced treatment was almost always required for land-based disposal.

Mr. Dour described the discharge alternatives that had been considered and noted the advantages and drawbacks of each one. He said the alternatives had been reviewed and narrowed to an initial short-list for further evaluation. He noted that a key consideration for land-based disposal options was the rate at which effluent could be applied, and therefore the amount of land required. He also explained that each option may require a certain amount of wastewater storage capacity as a precaution for wet weather storage, depending upon the acceptance rate of the soil. The short-list of alternatives included:

1. Marine outfall
2. Irrigation at agronomic rates
    a. Irrigation at agronomic rates entails applying a level of effluent such that the plant cover can use all of the water and metabolize all of the nutrients.
3. Groundwater recharge: slow-rate infiltration
    a. Not an agronomic rate – the ground is used as a means of disposal
    b. Effluent is applied at a rate that allows it to percolate through the soil lens before entering groundwater

   c. Effluent can be applied at the surface or subsurface. Subsurface application may be considered due to site considerations such as ponding potential, thereby minimizing potential for human contact. If effluent is applied subsurface, for example six inches underground, a higher level of treatment is required.
4. Groundwater recharge: rapid-rate infiltration
   a. Effluent disposal in leaky bottom ponds similar to stormwater ponds.
   b. Effluent is applied at a rate that allows it to percolate through the soil lens before entering groundwater
5. Constructed wetlands
   a. Plants use nitrogen as effluent moves through wetland
   b. Water used for habitat
   c. Outflow can go into rapid infiltration ponds or straight into a stream or other water body
   d. This method often used for polishing rather than treatment

Advantages and Drawbacks of Short-Listed Discharge Alternatives

Advantages	Drawbacks
Marine Outfall	
• Less storage required • Reliability during wet season • Less land required	• Creates shellfish closure zone/might impact use of public beaches • Habitat impacts to marine environment • Additional studies would be required • Regulatory requirements may become stricter over time/getting permit is uncertain • Public acceptance
Irrigation at Agronomic Rates	
• Fewest regulatory issues • Range of uses (forests, grasses, crops) • Can be implemented in or near sewer planning area	• Largest land area required • Effluent must be stored during wet months • Largest storage area required • Potential for human contact with effluent
Slow-Rate Infiltration	
• Minimizes potential for human contact with effluent • Provides groundwater recharge	• Relatively large land area required • Regulatory considerations (sub-surface spreading vs. surface spreading, aquifer protection)
Rapid Infiltration	
• Least land area required for land-based	• Regulatory considerations (aquifer

Advantages	Drawbacks
disposal • Least expensive approach • Provides groundwater recharge	protection)
Constructed Wetlands	
• Wildlife habitat/public benefit • Works in association with recharge • Provides additional treatment of treatment plant effluent	• Moderate amount of land required • Creates mosquito habitat • Regulatory considerations (wetlands, aquifer protection)

Mr. Dour reviewed a table of estimated hydraulic application rates in gallons per day per square foot (gpd/sf), land required in acres, and storage required in millions of gallons (mgal) for each land application alternative. He explained that irrigation at agronomic rates was probably not feasible in the project area because it required an estimated 230 acres for discharge and 210 mgal of storage. Mr. Dour showed the potential land-based disposal sites on a map. He observed that irrigating HJ Carroll Park would use only a fraction (about one quarter) of the expected volume of effluent, which illustrated that the irrigation alternative would have to be used in conjunction with another method of disposal.

Mr. Dour then reviewed a chart of estimated, planning level costs for each disposal alternative. The estimated costs were broken down to show cumulative cost at each phase.

Mr. Dour summed up the following technical perspectives about the discharge options:

- Marine outfall: The estimated cost of a marine outfall is relatively low, but technical and shellfish issues could make it difficult to get approved
- Irrigation: The high cost of the irrigation alternative is driven by the need for a lot of land
- Slow-rate infiltration: Cost-effective and approvable with appropriate level of treatment
- Rapid-rate infiltration: Lowest cost and most likely approvable
- Constructed wetlands: High initial costs and expensive ongoing maintenance over time

Mr. Dour explained that, from a technical perspective, the engineering team viewed slow-rate infiltration and rapid-rate infiltration as the two best discharge options to continue to explore. He noted that rapid-rate infiltration was currently the most popular discharge method in Western Washington.

Treatment Alternatives

Referring to a diagram in the PowerPoint presentation, Mr. Santroch provided a brief overview of the wastewater treatment process, including secondary and advanced treatment and classes of disinfection (Classes A, B, and C). His PowerPoint presentation is attached to this summary. He

noted that advanced treatment did not produce effluent of drinking water quality. He said that where water shortages existed, such as in California and Arizona, treatment plant effluent from advanced processes was stored for a year and then applied to groundwater before it was pulled out for consumption. He said that advanced effluent with Class A disinfection was, however, designated as public contact water and could be used on golf courses and in swimming lakes.

Mr. Santroch reiterated the point that the discharge method selected would determine the level of treatment required. He reviewed a table that correlated the discharge options that had been presented with the level of treatment that each required, either secondary or advanced. Advanced treatment was required for both of the discharge alternatives that the engineering team thought were viable, slow-rate infiltration and rapid-rate infiltration. Mr. Santroch noted that advanced treatment would likely be required by the permitting agencies for a marine outfall as well, because of shellfish issues.

Mr. Santroch described the treatment alternatives that had been considered and noted the advantages and drawbacks of each one. He said a key consideration was the ability to build the treatment system in phases, since the system would be expanded as demand grew over time. He said the alternatives had been reviewed and narrowed to an initial short-list for further evaluation. The short-list consisted of advanced treatment options and included:

1. Oxidation ditch & filter
2. Sequencing batch reactor & filter (SBR)
3. Membrane treatment (the newest technology)

Advantages and Drawbacks of Short-Listed Discharge Alternatives

Advantages	**Drawbacks**
Oxidation Ditch & Filter	
• Tried and true • Moderate cost	• More difficult to phase • High initial costs • Good, but not best, effluent quality
Sequencing Batch Reactor & Filter	
• Moderate cost • Relatively easy to phase	• Good, but not best, effluent quality
Membrane Treatment	

• Best effluent quality
  o Removes trace organic material
  o Thought to be best at removing pharmaceuticals
• Easiest to phase
	• Higher cost

Advantages	**Drawbacks**
• More regulatory certainty – regulators likely to favor this technology into the future	

He described the planning parameters that had been used to project population and wastewater flows and how they translated into treatment system size and cost. He explained that Jefferson County had provided population numbers for 2005 and population projections through 2025, which were then used to develop projections of wastewater flow. The flow projections were extended to 2030, the planning horizon for this project.

He said that the treatment plant would open in 2010 at the earliest, so "start-up" flows had been based on population projections for 2010. The start-up flow estimates assumed that all commercial properties and no residential properties would be sewered in the core planning area. For the year 2030, a low end estimate of flows assumed that all commercial properties and post-2010 residences would discharge to sewer. A high end estimate of flows for the year 2030 assumed that all commercial properties and all residences would discharge to sewer. The flow estimates also assumed certain levels of groundwater seepage, or infiltration, into the sewer pipes and that gravity sewers would be more susceptible to infiltration than pressure sewers.

Treatment Plant Phasing

Mr. Santroch pointed out that the projected start-up flows in 2010 were roughly 10% of the projected flows in 2030, meaning a smaller treatment system would be needed in 2010 than in 2030. He said the launching costs would be extremely expensive if a treatment system were built initially with capacity for 2030 flows. He explained that it would be necessary to build a smaller system first and expand it as needed. He then described the relative ease of phasing each of the treatment options:

Oxidation ditch & filter

- There is a regulatory requirement to initially build parallel systems
    - It is necessary to build a redundant ditch and filter at the start
    - Must build 2/3 of 2030 capacity at start
- Consists of specialized structures that cannot be used for other purposes
- Many small towns who start with this technology abandon it after 15 years
- Does not lend itself to phasing

Sequencing batch reactor & filter

- Can start smaller than oxidation ditch & filter, build 1/4 or even 1/8 of 2030 capacity
- System is composed of basic boxes that are always useful at a treatment plant
- Question is how small to build the initial modules so that it makes sense to add on later

Membrane treatment

- Comparable to SBR – can build 1/4 or 1/8 of 2030 capacity at start
- System is composed of basic boxes that are always useful at a treatment plant
- Question is how small to build the initial modules so that it makes sense to add on later

Cost Estimates

Mr. Santroch reviewed a chart of estimated costs for the three treatment technologies. The costs were broken down to show cumulative cost at each phase. He pointed out that the oxidation ditch and filter technology could be cost effective if much of the long-term capacity needed were built upfront. However, he said it could be difficult to launch when starting with no sewer system in place because of the high upfront costs.

The estimated costs for the membrane system were the highest. Mr. Santroch noted that since the technology was new, the industry had not settled out yet, so the actual costs could be a bit higher than shown. He explained that the membranes have to be replaced every 7-10 years and that the technology uses 50% more energy than the other options because of the energy to clean the membranes.

Technical Perspectives

Mr. Santroch reviewed a table of criteria including qualitative and cost differences used to compare the three wastewater treatment technologies. He highlighted the inherent uncertainty about whether regulators would require effluent quality studies for any of the technologies and about which technologies could win regulatory approval. He said that one challenge of sewer planning was to balance effluent quality, regulatory requirements, and costs. He said that the project team would meet with a representative of the Department of Ecology in June to learn more about the treatment technologies considered appropriate for the Port Hadlock area.

Mr. Santroch summed up the following technical perspectives about the treatment options:

- Oxidation ditch & filter: Good effluent quality but difficult to phase and high initial costs
- Sequencing batch reactor & filter: Good effluent quality and easy to phase
- Membrane treatment: Best effluent quality, easy to phase, but potentially high cost

Mr. Santroch explained that, from a technical perspective, the engineering team viewed membrane treatment as the most viable alternative based on its excellent effluent quality and ease of phasing. He said that the less costly sequencing batch reaction & filter alternative was considered potentially viable, but that the team would need to investigate whether its effluent quality was acceptable to regulators and the community. He said that the oxidation ditch & filter alternative would be very difficult to launch unless a source of funding could be found for the upfront cost.

Disinfection

Mr. Santroch briefly described the alternative methods for disinfecting wastewater effluent, a required element of the advanced treatment process. The two short-listed alternatives under consideration were:

- Liquid sodium hypochlorite (chlorine)
- Ultraviolet (UV) disinfection

Mr. Santroch said that UV disinfection was required for marine outfall disposal but not for land application. He said that the engineering team favored the less costly liquid sodium hypochlorite alternative. Additionally, a chlorine residual would be required should treatment plant effluent be used for beneficial reuse such as irrigation.

Solids Disposal

Mr. Santroch provided a brief overview of the options for solids disposal and said the topic would be addressed in more detail at the next workshop. He said that the Port Townsend Biosolids/Composting Facility seemed to be a good candidate site for disposing of solids. Other options included hauling solids to sites in Mason County, Kitsap County, or King County, or applying the solids to forestland.

Treatment Plant Siting Considerations

Mr. Santroch described the considerations that went into siting a treatment plant. These included odors, aesthetics, costs, and space for buffer zones. He said that siting was sometimes a contentious process and that the project team was carefully considering ways to minimize the impact of a treatment system to the community. He explained that odors and noise could be controlled and the facility's appearance could be integrated with the surrounding area, but that odor and aesthetic mitigation could add 20% to 100% to the cost of the treatment plant. He noted that sites closer to developed areas required more mitigation. He explained that the ultimate decision about odor and aesthetic mitigation would be determined by community preference and cost.

Questions & Comments

Workshop participants commented and asked questions during the presentation and during the discussion period at the end of the workshop. Their comments and questions, as well as the project team's responses, are grouped by topic below.

Disposal Alternatives

Question: Did you consider using the Indian Island marine outfall for disposal?

Response (Dour): We did not look closely at that option because of the extremely high cost to pump effluent to Indian Island. Also, the Indian Island outfall is permitted for a certain volume of effluent, and it might need to be re-permitted to accommodate additional flow from Port Hadlock. Alternatively, the permit might limit the amount of effluent that the Port Hadlock UGA sewer facility would be able to produce.

Question: Did you consider the impact of the Indian Island outfall on the ability to site a new marine outfall?
Response (Dour): It would be necessary to conduct many studies to determine the potential impact of the Indian Island outfall. In particular, the existing fecal coliform count in Port Townsend bay attributable to the Indian Island outfall might impact the size of the shellfish closure zone required for a new Port Hadlock outfall.

Question: Are these fecal coliform exposure levels a problem for the shellfish or for the people who consume the shellfish?
Response (Dour): My understanding is that the risk is to humans who consume shellfish. If the contaminant is removed from the environment, the shellfish will eventually metabolize the contaminants that remain in their bodies.

Question: How recently has an outfall been permitted in Puget Sound?
Response (Santroch): I'm not certain, but the regulatory community has been raising the bar for approval of small systems like this one. It was very difficult for Vashon Island to get permission to extend an existing outfall, and Island County chose not to explore a marine outfall for its new treatment plant because it considered approval extremely unlikely. However, the regulatory community has been less strict about siting new marine outfalls in south Puget Sound.

Question: If tertiary treatment were used, would a marine outfall still cause shellfish issues?
Response (Dour): Yes, although as shown on the map, the shellfish closure zone would presumably be smaller with tertiary rather than secondary treatment. Permitting could still be a challenge even with tertiary treatment.

Question: Will tertiary treatment be necessary regardless of the disposal option selected?
Response (Dour): We believe that is the case.

Comment: I would like to see further consideration of the marine outfall disposal option. It seems like a potentially viable, lower cost alternative.
Response (Dour): If there is interest, we will look into it further.
Response (Santroch): I would caution that, although a marine outfall is the traditional discharge method, the engineering team thinks it is an unlikely option for this project because of the need for a shellfish closure zone. A Department of Health official indicated to us that a marine outfall could potentially be permitted, but that with the most advanced membrane treatment plant a shellfish closure zone with a minimum radius of 900 feet would be required and that extensive studies would be required to determine the impacts.

Question: Have you looked at combinations of disposal options, such as slow-rate infiltration combined with constructed wetlands? Wetlands are of strategic importance to the EPA, so including wetlands may open up some federal funding.
Response (Dour): We have not considered that, although it might be possible. We will have our financial specialist look into that kind of funding.

Disposal – Recharge/Reuse Issues

Question: Have you looked at the direction of groundwater flow?
Response (Santroch): We will look at that more closely as we move forward.

Comment: If disposal were at the site near the elementary school and airstrip, the effluent would flow away from Chimacum Creek rather than providing recharge.
Response (Wheeler): As we understand it, discharge from that site would flow in the direction of the creek. If that site were selected, we would investigate the issue further.

Comment: Recharge is very important. We need to put as much clean water back in the ground as possible. A study by the U.S. Geological Survey showed groundwater flow from the east side of Chimacum Creek towards the bay, so I am very concerned that discharge east of the creek would not recharge the creek.
Response (Dour): We will investigate that further.

Comment: The potential disposal site near Cotton Redi-Mix is only a few feet higher than the creek and the wetlands adjacent to the creek. The selection of a disposal site will depend on the results of specific hydrogeological studies.

Question: How do areas with gravel lenses that accept water very quickly influence the level of treatment that is required? Do some areas accept water so quickly that they cannot be used for discharge?
Response (Dour): Either those areas cannot be used or the effluent must be treated to a very advanced degree.
Response (Santroch): The question of how quickly to allow effluent into the ground is important. It will be addressed at our meeting with the Department of Ecology in June. Water reuse is still relatively new in Washington. It was approved in 1997 and there have been roughly 6-10 projects in the state. The regulations are still evolving, so there is a lot of room for negotiation with regulators. We recently did a disposal study for Island County where the soil is tight, glacial till that accepts water slowly. In that instance, rapid-rate infiltration was not feasible, but slow-rate infiltration was a good option. Here in the Irondale/Port Hadlock area, rapid-rate infiltration is being considered because of the high acceptance rate of the soil, but the regulatory community will ultimately determine what is acceptable.

Question: Can you discharge membrane-treated effluent to a lake?
Response (Santroch): Discharging to a lake is possible with very advanced treatment requirements, but such an approach is unlikely due to environmental, regulatory, and cost concerns.

Question: Could the County buy a lake, like Peterson Lake at the headwaters of Chimacum Creek, and discharge to the lake to recharge the creek?
Response (Santroch): Peterson Lake is uphill and far from the sewer planning area, so the cost of the sewer system would increase. Discharging effluent would promote eutrophication of the lake, because some amount of nitrogen and phosphorous will be present. It is possible to remove all of those nutrients, but it is expensive.

Comment: For disposal siting, it may be important to take existing and potential future wells into account.

Comment: If there are levels of toxics that are not detectable, but can still be harmful, maybe its best to move discharge away from drinking water sources. Perhaps a marine outfall is a better option.
Response (Dour): Right now, the septic tanks in the area discharging out of drainfields to groundwater. The treatment technologies proposed here would remove more toxics than are removed now.
Comment: Even if more toxics are removed, the speed at which infiltration would occur is an important factor to consider.

Comment: John Cambalik at the Puget Sound Action Team has some data about the effect of septage on water quality in Port Hadlock.
Response (Dour): That kind of information could improve our ability to get funding. We will try to get it from him.

Treatment Alternatives

Question: Does membrane treatment technology produce drinking water?
Response (Santroch): The kind of membrane technology used for sewage treatment does not produce drinking water-quality effluent. Membrane technology is used in drinking water treatment, but nobody goes straight from wastewater treatment to drinking water, as far as I know.

Question: What kind of treatment removes pharmaceuticals from wastewater?
Response (Santroch): That is a cutting edge question. There are no definitive answers yet, but membrane technology is thought to do a better job of removing pharmaceuticals than other technologies. Membrane technology is very much in favor with regulatory agencies because it removes trace organic material and pathogenic bacteria.

Question: You said that the oxidation ditch & filter alternative worked well for small treatment systems. Can you quantify small?
Response (Santroch): That technology can handle an upper limit of about 5 million gallons per day (MGD).

Question: Where has phased construction of a treatment plant been done successfully? Where has a treatment plant started small and expanded to a target size?

Response (Santroch): The engineer has to design the system to be easy to expand. Existing treatment plants that can be expanded are between 10 and 15 years old, so they haven't had to expand yet. Kingston has a system that is similar to the kind proposed here. Also, in a UGA similar to the one here, Thurston County put in a single oxidation ditch and two clarifiers. The County fronted the cost for the excess capacity, which is being paid off by latecomers. In another location, two ditches and two clarifiers were installed, but the regulatory community paid for the redundant set because they were nervous about the risks of having only one treatment path. I don't know of any SBR systems that have had to expand yet.

Question: If we started with SBR, and the membrane technology became preferred over time, could we mix and match the technologies?
Response (Santroch): Yes. The deep square tanks that are used with SBR and membrane technologies are always useful in a treatment plant setting.

Question: Would it be feasible to start with a small membrane system with a cost of $5-6 million?
Response (Santroch): Yes, absolutely. It's just a matter of how large the tanks are and how many you will need in the end. The largest standard membrane tank size handles 100,000 gallons per day. Some tanks are steel, and the bigger ones are concrete. If you wanted, you could build a treatment facility over time with many small steel tanks that would need to be replaced in 20 years.

Question: Is ozone an option for disinfection?
Response (Santroch): Ozone was used around 1980, but it did not work well. The energy costs are high, and ozone is an unstable, reactive, and dangerous substance.
Response (Wheeler): Ozone disinfection is used in potable water systems and fish hatcheries. The costs and practicalities simply have not worked well with sewage treatment.

Question: Does membrane treatment control odor better?
Response (Santroch): The risk of odor is equivalent for all three technologies.

Population & Flow Rate Projections

Question: What percentage rate did the County use for its population projections?
Response (Santroch): I'm not sure exactly, but it's a couple of percent. It's the County's GMA projection figure.

Question: Why do you expect groundwater to leak into the sewer pipes?
Response (Santroch): Infiltration is a common phenomenon. Pipe joints, manhole lids, and other components leak. Pipes underneath people's houses leak.
Response (Wheeler): We have assumed some level of infiltration and inflow. Inflow can be from illegal hook-ups from roof drains, for example, or from a maintenance hole that is too low. As good as the engineering standards are these days, infiltration and inflow still happens.

Question: What happens in an area that doesn't have a stormwater system?

Response (Wheeler): Inspectors don't know what happens on private property sometimes. Some people will have stormwater problems, and they may dump in the sewer.
Response (Santroch): The good news is that current water use in the core planning area is approximately 50,000 gallons per day and we wouldn't expect to see 95,000 gallons per day because of infiltration and inflow during the first rainy season. Sewers deteriorate over time. If your system is tight, you might need a smaller treatment facility. In addition, our numbers are based on the assumption that the sewer lines are in the groundwater area. But our hydrogeologist said that the water table here is relatively low, so our flow estimates may be too conservative. There is a fair chance that the flow would not reach the high end of our estimates, but if we make that assumption, there is a risk of building the treatment plant too small. It is also uncertain how quickly this community will grow.

Question: Who is your hydrogeologist?
Response (Santroch): Arnie Sugar with HWA is on our team.

Question: Many municipalities have problems with combined sewer overflows. How will that be dealt with here?
Response (Santroch): This is not a combined system; it does not include stormwater.
Question: What about the influence of infiltration and inflow?
Response (Santroch): We have increased our estimates of treatment plant capacity by a factor of about two to account for infiltration and inflow. In a combined system, that could be a factor of four or five. This will be a sanitary system in Port Hadlock.
Response (Wheeler): Although a few people will probably put stormwater into the sewer illegally, it will not happen throughout the whole system. Usually this kind of a system does not experience combined system overflows. Over time, however, infiltration and inflow problems might develop.

Comment: The Port Hadlock UGA stormwater plan is based on a minimal need to manage stormwater because the soils absorb so well. That is not to say that problem areas don't exist or that they won't increase as impervious surface area increases.

Comment: I'm concerned about creating a surface water problem because water is being lost to the sewer pipes.
Response (Santroch): The amount of water that infiltrates is a tiny fraction; it's to about the fourth decimal place.

Question: Is there a risk of wastewater leaking out of pressurized pipes into the ground?
Response (Santroch): Yes, that is a risk. It should be noted that public pipes tend to leak much less than pipes on private property.

Next Steps and Wrap Up

Mr. Wheeler stated that the attendees seemed to prefer the two infiltration options for disposal, with some interest in a marine outfall. He said that the attendees also seemed to agree that the membrane technology was of interest for treatment, but that the sequencing batch reactor & filter

alternative should be further explored. The attendees agreed that these were their preferences. One participant said that the oxidation ditch & filter treatment alternative would be of interest if someone would front the cost.

Mr. Wheeler noted that the next stakeholder workshop that would focus on combined alternatives of wastewater collection, treatment, and disposal would be held on June 22.

The meeting was adjourned at 3:10 pm.

Workshop Attendance

The stakeholder workshop was attended by County Commissioner David Sullivan (District 2). Additional attendees are listed below.

Name	**Affiliation**
Nancy Dorgan	Citizen
Craig Durgan	Citizen
John Fischbach	Jefferson County, County Administrator
Frank Gifford	Jefferson County, Public Works
Alan Goodwin	Citizens for the UGA/Community United Methodist Church
Elaine Goodwin	Citizens for the UGA/Community United Methodist Church
Paula Mackrow	North Olympic Salmon Coalition
Jim Parker	Jefferson PUD #1
Jim Pivarnik	Port of Port Townsend
Mike Regan	Irondale Community Action Neighbors
Ray Serebrin	Jefferson County Library
Jim Strong	Hadlock Building Supply
Troy Summerill	Inn at Port Hadlock

Consultant Team Staff in Attendance

TetraTech/KCM
Kevin Dour, Project Manager; Jim Santroch, Senior Project Engineer – Treatment

Triangle Associates, Inc.
Bob Wheeler, Facilitator; Ellen Blair, Public Involvement Support