Date:	February 09, 2009
To:	Core 4, Reserves Steering Committee, County Coordination Committees
From:	Core 4 Technical Team
Re:	Preliminary Analysis of Providing Urban Level Sanitary Sewer Service Within Reserves Study Area

Background & Overall Analysis Approach

The purpose of the Urban and Rural Reserves project is, in part, to designate appropriate land for each reserve type by addressing the factors listed in Oregon Administrative Rule 660 Section 27. The urban reserve factors that must be considered range in scale from assessing whether land can be served with public facilities and services in an efficient and cost-effective manner to determining whether areas can be designed to be walkable with a well-connected transportation system. For this reason, the Core 4 Technical Team (Tech Team), made up of staff from the three counties and Metro, chose to conduct a suitability of land analysis using a phased approach.

This memo describes the first step in this phased approach. It consists of an initial screening of the entire approximately 400,000-acre study area to address the following two urban reserve factors in the state rule:

UR-1: *Can be developed at urban densities in a way that makes efficient use of existing and future public and private infrastructure investments.*

UR-3*: Can be efficiently and cost-effectively served with public schools and other urban level public facilities and services by appropriate and financially capable service providers.*

The state rule defines 'public facilities and services' as sanitary sewer, water, transportation, storm water management facilities and public parks. Due to the sheer size of the study area, the Tech Team looked at it through a broad landscape-scale lens to assess suitability of the land for meeting these two reserve factors. This approach led to the Tech Team limiting this first screen analysis to sewer, water and transportation. Service providers of storm water management, public schools and public parks confirmed this screening decision.

The particular methodology and results for the sanitary sewer element is discussed below. The result of this element is expressed graphically on the attached map showing areas that are rated , 'high', 'medium' or 'low' for serviceability. This map, combined with those from the water and transportation elements, will be used to create a composite map that will begin to address the two reserve factors above.

Sanitary Sewer Element Strategy & Methodology

Under Oregon law, sanitary sewer service is generally not allowed to be provided outside an Urban Growth Boundary (UGB). Because of this the Reserves study area currently has no sewer service[1]. Also, because providing sewer capacity is very expensive and because there has been no way for local service providers to predict which areas will be brought into the UGB in the future, there is very little capacity currently available in existing treatment and conveyance facilities beyond that needed to serve the existing UGB. Likewise, very little planning work has been undertaken to understand how sewer services could be provided to areas outside the existing UGB. An "expert group" of engineers and key staff from the potentially impacted service providers worked together to develop an assessment of serviceability of the study area, based on their professional expertise and knowledge of nearby areas and facilities.

The sanitary sewers expert group[2] was convened in November 2008 to complete an initial assessment for the potential to provide sanitary sewer service to the study area, should it become urbanized. Prior to the meeting, each participant was provided with a study area map, divided into subareas delineated by watersheds, as well as proposed criteria for evaluating the study area. The purpose of the meeting was to answer the following questions for the entire Reserves Study Area:

How efficiently can the area use infrastructure *if the area is urbanized*

- Does it exist or can it be efficiently provided in the future?
- How efficiently and cost-effectively can an area be served?

Who would provide facilities and services? Are they "appropriate and financially capable" providers?

- What are the characteristics of an "appropriate and financially capable service provider?"
- Who is the logical service provider?
- Which of these categories do the listed service providers fall into?

During the meeting, it became apparent that the key set of criteria for this first landscape scale analysis includes topography, proximity to a current waste water treatment plant, existing capacity of that treatment plant, and the ability of the treatment plant to expand.

The sewers expert group worked on base maps that showed watersheds, topography, major rivers and streams, wetlands, floodplains, and major streets. During the discussion, staff and participants marked-up and made comments on the maps. They were also provided a ratings sheet, which was filled out for each sub-area. These ratings are reflected in Table A-1 in the Appendix to this memo. Serviceability rating factors included:

- Existing service availability
- Local system improvements that would be needed
- Area-wide improvements that would be needed (i.e. new major trunk lines or full system expansion)
- Service extension requirements
- Treatment capacity at likely facility
- Discharge issues

As part of the expert group review, information was provided about current treatment and transmission facilities. Current status of existing waste water treatment plants (WWTPs) in the Portland metropolitan area is briefly described in Table 1, below. This information is important to the serviceability ratings of

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1 Except for the Boring rural center; this has a small plant intended to resolve a health hazard that is not adequate to serve additional development.

2 The Sanitary Sewers Expert Group included: Ted Kyle from Clackamas County Water Environment Services (WES); Carrie Pak and Nora Curtis from Washington County Clear Water Services (CWS); Jim Montgomery from the City of Gresham, Mike Stone from the City of Wilsonville, Lana Danaher from the Portland Bureau of Environmental Services (BES), Stephan Lashbrook from the City of Lake Oswego. These represented the likely existing service providers for the study area. These experts were also able to speak for the neighboring cities that provide their own sewer services, such as Canby.

the study area because, as noted, simply the fact that there is a plant located near an area being studied does not necessarily mean that it could serve new areas. Many existing plants will be at or near capacity in the foreseeable future.

Table 1. Existing Waste Water Treatment Plants

Plant/Provider	Current Status/ Capacity	Expansion Possibility/Comments
Durham/Clean Water Services (CWS)	Currently have a master-plan to serve surrounding areas that completely utilizes the capacity of the plant site.	Limited site size. If additional geographic areas are added to the service area beyond what is included in the master plan – will need to add to the site, which would be very difficult (there may not be enough room), or accommodate the new geography with another plant.
Hillsboro/CWS	Winter discharge only. Little to no additional capacity	No room to expand.
Forest Grove/CWS	Winter discharge only.	Summer discharge may be possible Has room to expand.
Rock Creek/CWS	Little to no additional capacity	Has room to expand.
Lake Oswego/BES	Little to no additional capacity	Area of service is essentially fully developed – no way to get additional flow to site because of topography.
Columbia Blvd/BES	Little to no additional capacity	Has potential to expand
Wilsonville/City	Currently has 4 M gal/day capacity and plans to expand to 7 M gal/day. This larger facility will max out the current site and the current trunk lines with the expected growth of the city by 2020.	No room to expand beyond 7M gal/day on-site
Gresham/City	Currently has a 20 M gal/day capacity plant and is using 12 M gal/day.	Has room to expand. They have limited conveyance; however, the incremental cost for Gresham to serve areas is less than incremental cost for Troutdale.
Tri City/WES	Currently expanding to 8M gal/day – larger facility will accommodate 5-8 years of expected growth (plus excess from Kellogg)	Has land and approved land use decision to further expand up to a 40 M gal/day facility
Oak Lodge/WES	Plant technologically obsolete	Area of service is essentially fully developed
Kellogg/WES	Currently over-capacity	Will be off-loading some excess to expanded Tri City plant
Boring/WES	Serves 100 hook-ups, no additional capacity	Very small, expensive-to-operate facility built to resolve a health hazard. If area is urbanized, this facility probably will be replaced.
Canby/City		Has a permitted outfall on the Willamette River.
Troutdale/City	3 M gal/day facility built in 2001-has not yet reached capacity	Has land to expand
Sandy, Estacada, Molalla	Limited capacity	Limited because winter discharge only (into streams); need to have enough farmland for summertime discharge onto agricultural land

The efficiency ratings were sketched on the maps by the expert group, then digitized in GIS. This digital map was sent to all the participating service providers for comment. This map shows the sewer serviceability of the study area considering availability of all treatment plants in the area, including the neighboring cities. To see *Map A-1 -- Sewer Serviceability for the Reserves Study Area including areas that might be served by neighboring cities*, please go to the Appendix of this report. Table A-1 summarizes the rationale for the categories shown on the map.

When technical staff for the Reserves project reviewed the map produced by the expert group, they determined that information about the ease of servicing areas that would be logically served by neighboring cities does not provide useful information about the best possible locations for future expansion of the Portland Metro UGB, and also requested that the four categories of information created by the expert group be rolled-up to three categories to be more compatible with the water and transportation maps. Therefore, staff produced Map 1 as shown in this memo, which focuses on serviceability for Portland Metro service providers.

Sanitary Sewer Element Results

The assessment of suitability for sewer services is not based on engineering or cost estimates, which cannot be produced without more information about employment, dwelling units, location of future facilities, and future regulations. General (not site-specific) issues that pertain to sanitary sewer service include the following.

1. Conveyance costs are generally the same on the east and west sides; however, on the west side (Tualatin basin) treatment requirements are more stringent (and therefore more expensive) than on the east side. The longer-term trend may be for higher level of treatment for all plants.

2. DEQ has stringent requirements for new outfalls into the Clackamas River basin, as specified in the Three Basin Rule for the Santiam, Clackamas and Mackenzie basins. Because of this, sanitary sewage generated in the Clackamas River basin has to be piped to the Willamette.

3. There are many existing state and federal environmental regulations as well as regulations under consideration that constrain how and where sanitary sewer treatment can be provided, including issues about nutrient discharge, fish standards, total load allocations and water temperature standards.

4. There are many unknowns to the future of sanitary sewer provision in this area. These include possible future changes in regulations the service providers must meet, and in the technology the providers have available to use.

5. There are potential relationships between sanitary sewage provision and designated rural reserves:
   - In the long run there may be an opportunity to link rural reserves with reclaimed sewage treatment water – we wouldn't necessarily need new outfalls if water could be discharged onto agricultural land, particularly nurseries. However, what would be done with the water in the winter? This works now (part of the year) for the neighboring cities with relatively small discharges.
   - CWS is using swales and floodplains in the rural area as part of its temperature management plan – would an Urban Reserve have an effect on this? Could they keep reserves/buffers around affected streams in Washington County with the designation of new urban reserves?

6. The expert group agreed that from their perspective all the likely service providers for the study area were "appropriate and financially capable."

The attached map *(Map 1 -- Sewer serviceability for potential Portland Metro UGB urban reserve sewer providers)* indicates areas that were identified as high, medium or low suitability for providing sanitary sewer services. For the most part, the boundaries of the sub-areas are defined by drainage basins. The analysis was an initial evaluation of a very large area of land, so there may be small areas for which a more detailed review would show a different rating than for the overall sub-area.

The map shows four categories of information:

High suitability for sewer service – generally these areas are the easiest and least costly to serve. This includes those few areas where there is capacity in a nearby treatment plant or conveyance facility, or those areas where capacity could be relatively easily provided. It also includes areas that require substantial improvements, but relatively easy ones for which there is land available or no major issues identified. These also include areas for which topography enables primarily gravity flow to an existing plant. For the most part, these areas will primarily require investment in facilities located inside the area to be developed, but be able to hook up to existing facilities inside the current UGB.

Medium suitability for sewer service – generally those areas would require new facilities located both inside and outside the area to be served. For example, treatment facilities would be needed that aren't planned or sited; existing conveyance facilities located between the area and the plant may be too small and need to be re-built. These areas may also have more topography, longer distances to potential outfalls, more pump stations, or other issues that make them less suitable, but no major issues that were identified by the expert group.

Low suitability for sewer service – generally these were areas for which difficult concerns were identified. They would require relatively larger investments both inside the area to be served and to treatment and conveyance facilities outside the area. Connections to these areas are sometimes difficult. For these areas it would be more difficult to figure out how to provide services and more costly to provide services. Low suitability areas included areas with steep topography, areas separated from transmission facilities by natural features, areas that were located long distances from potential outfalls or areas that were in drainage basins not served by a permitted outfall.

Areas logically served by neighboring cities – these are areas for which the logical service provider is the city of Sandy, Estacada, Molalla, or Canby. The neighboring cities in Washington County (Gaston, Banks, and North Plains) are served by Clean Water Services, which is a Portland Metro area service provider.

Next Steps

The sanitary sewer service analysis map is one element to be used in creating a composite map, which will be the foundation of the first screen analysis. Information derived from this composite map should provide a basis for eliminating some of the study area from further consideration as urban reserves. The next screen analysis will involve more detailed analyses of the remaining potential urban reserve areas. These areas will be referred to as priority candidate urban reserve areas.

For reference, the additional urban reserve factors outlined in the Administrative Rule that will be applied to the candidate urban reserve areas, in addition to refining factors 1 and 3 are:

UR-2: Includes sufficient development capacity to support a healthy economy;

UR-4: Can be designed to be walkable and served with a well-connected system of streets, bikeways, recreation trails and public transit by appropriate service providers;

UR-5: Can be designed to preserve and enhance natural ecological systems;

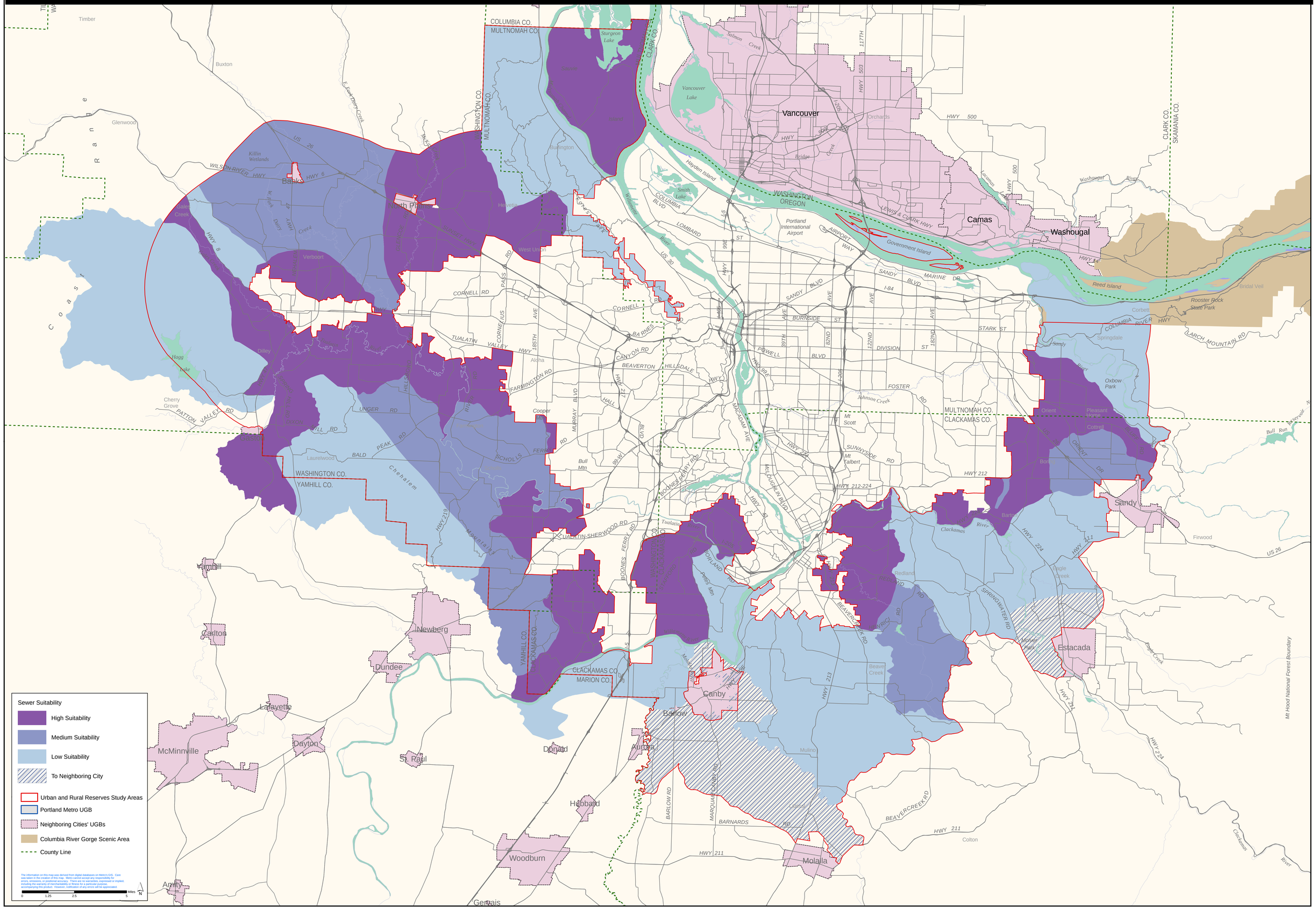
UR-6: Includes sufficient land suitable for a range of needed housing types;

UR-7: Can be developed in a way that preserves important natural landscape features included in urban reserves; and

UR-8: Can be designed to avoid or minimize adverse effects on farm and forest practices, and adverse effects on important natural landscape features, on nearby land including land designated as rural reserves.

Urban and Rural Reserve Study Areas

Preliminary Sewer Service Suitability



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APPENDIX 1

Map A-1 Sewer serviceability for the Reserves Study Area, including areas that might be served by neighboring cities, is the map produced by the sewers expert group. It is included in this appendix along with Table A-1, which explains the rationale behind each designation. Map 1, the map included in the main body of the memo, is derived directly from map A-1 as follows:

- Areas characterized in Map A-1 as "Efficient" and "Moderately Efficient" were rolled into one category, the "High suitability" category.
- Areas characterized in Map A-1 as "Moderately Difficult" were shown on Map 1 as "Medium suitability"
- Areas characterized in Map A-1 as "Difficult" were shown on Map 1 as "Low suitability"
- When Table 1 shows the most likely service provider to be the WWTP of one of the neighboring cities that is not a part of the Portland Metro UGB, these areas were shown on Map 1 as "neighboring city" regardless of the Map A-1 sewer efficiency rating.

The expert group rated drainage basins for the relative efficiency and cost of providing sanitary sewer services. Four categories were mapped and illustrated in Map A-1:

Efficient. These areas are the easiest and least costly to serve. They would require relatively simple extensions of the existing system within the area to be urbanized, and could connect directly to existing facilities in the existing urban area. These areas are the few areas for which the treatment and conveyance systems inside the current UGB appear to have capacity to serve areas outside the current UGB.

Moderately efficient. These are areas that will require substantial improvements, but relatively easy ones. Within the area, facilities would be relatively easy to provide. Out of area improvements would be required, but, again, they would be relatively easy .An example would be an area that would require a treatment plant expansion, but where there is sufficient land available to expand the plant.

Moderately difficult. These areas would require substantial improvements inside the area itself, and also substantial improvements outside the area. These are areas where providing sewer services would require construction of treatment facilities that are not currently sited, expensive expansions of existing trunk lines, or that have moderately difficult topography or natural features impacting services.

Difficult to serve. These are areas for which difficult concerns have been identified. Substantial and difficult –to-provide improvements would be needed both inside and outside the areas. For example, these are areas with steep slope, difficult river crossings, long conveyances, or gravity flow to areas that can't be served by an existing permitted outfall.

Table A-1 below shows specific information for areas shown in Map A-1, including a brief description of the rationale behind the expert group's designation. Areas are numbered S-1, S-2, etc, as shown on the map; these areas correspond very roughly to drainage basins.

Sub-Area	Suitability	Comments	Potential Waste Water Treatment Provider (WWTP)
S1	Difficult	Require new trunk lines and river crossing, maybe tunnel; most land is floodplain	Gresham
S2	Difficult	Major pipelines and system expansion needed; Sandy River area very difficult because of topography and river	Troutdale or Gresham
S3	Moderately efficient	N of Hwy 26 - Major pipelines and system expansion needed; capacity available at existing plant(s)	Troutdale or Gresham
		SW of Hwy 26 - Major pipelines and system expansion needed; could go west to Tri City plant. Timing matters – could size Damascus conveyance to include this area.	Tri City
S4	Moderately difficult	Require new plant or long conveyance to Willamette River	Tri City or pump to Gresham
S5	Moderately difficult	Plateau between two creeks, steep topography on both sides	Tri City
S6	Difficult	No nearby facility; difficult topography; pump to Willamette River	Tri City
S7	Moderately difficult possibly served by neighboring city	Possibly pipe to Estacada WWTP	Estacada
S8	Difficult	No nearby facility; would require long conveyance, possibly to Tri City	Tri City
S9	Moderately efficient	Require new conveyance to planned new major line just north (inside existing UGB) or new trunk directly to Tri City WWTP; both require Clackamas River crossing; expansion of plant possible	Tri City
S10	Efficient	Require new conveyance to Tri City WWTP; may have capacity at plant – transmission line exists/has capacity	Tri City
S11	Moderately difficult	Require longer conveyance to Tri-Cities WWTP; would require expansion of capacity at plant	Tri City

Sub-Area	Suitability	Comments	Potential Waste Water Treatment Provider (WWTP)
S12	Difficult/ possibly served by neighboring city	Major system expansion needed; require new or expanded plant in Oregon City or Canby; steep topography that slopes away from existing sewers in Oregon City	Tri City or possibly Canby
S13	Efficient/Moderately efficient / possibly served by neighboring city	Require relative short new conveyance to Canby WWTP; limited existing capacity at plant	Canby
S14	Moderately difficult/possibly served by neighboring city	No close discharge; flat area – difficulty to serve with gravity system; potential for part of area to be served by Molalla	Canby/ Molalla
S15	Difficult	Floods	Canby
S16	Difficult/ portion possibly served by neighboring city	Difficult topography; would require a new regional pump station upstream of Willamette Falls that would have to pump across Tualatin or Willamette River	Tri City and/or Canby
S17	Efficient	W Stafford basin - relatively easy to serve	Durham
		NE Stafford basin - gravity flow to an existing pump station, then pump to Tri City WWTP	Tri City
S18	Moderately efficient	New trunk line to serve small portion of Boeckman Creek Basin in already in plan; additional trunk line is needed	Wilsonville
S19	Difficult	Require new pump station; trunk line and plant expansion; difficulty crossing river (current crossing maxed out with Charbonneau)	Wilsonville
S20	Moderately efficient	Mostly gravity flow to pump station	Wilsonville
S21	Moderately difficult	Steep topography; relatively small net developable area	Durham
S22	Moderately efficient	Large wetland areas near Tualatin River; potential for development area maybe south of Sherwood Rd; upgrade of Onion Flat PS currently planned to be completed within five years; may need to be upgraded to accommodate additional flows	Durham

Sub-Area	Suitability	Comments	Potential Waste Water Treatment Provider
S23	Moderately difficult	Potential of two or more new PS; wetland areas near Tualatin River	Rock Creek
S24	Moderately difficult	Potential of four or more PS; wetland areas near Tualatin River	Rock Creek
S25	Difficult	Steep terrain w/ deep ravines; questionable development potentials	Rock Creek
S26	Efficient	Contiguous to existing UGB; new PS and FM needed near Rosedale Rd and River Rd	Rock Creek
S27	Moderately efficient	New PS and FM needed near Meyer's Pond	Rock Creek
S28	Efficient	Contiguous to existing UGB; relatively small developable land	Forest Grove– winter Rock Creek - summer
S29	Efficient	Contiguous to existing UGB; relatively small developable land	Forest Grove – winter Rock Creek - summer
S30	Moderately efficient	PS and FM upgrade needed; wetlands and floodplain near Tualatin River but should not significantly impact sanitary; net developable land may be limited due to natural resources	Forest Grove – winter Rock Creek - summer
S31	Difficult	Steep terrain; Hagg Lake located here; very little net developable area	N/A
S32	Difficult	Steep terrain; very little net developable land due to terrain	Hillsboro– winter Rock Creek - summer
S33	Moderately difficult	Vast areas of wetlands; Dairy Creek has high value natural resources; some potential for developable land but will require careful planning to avoid natural resources	Hillsboro – winter Rock Creek - summer
S34	Moderately efficient	Contiguous to existing UGB	Hillsboro – winter Rock Creek - summer
S35	Moderately efficient	New PS needed near of Hwy 26 and McKay Creek; relatively large areas of wetland and floodplain near McKay Creek north of Hwy 26	Hillsboro – winter Rock Creek - summer
S36	Efficient	No real issues identified; will require upsizing of existing trunk line or adding new trunk lines	Rock Creek

Sub-Area	Suitability	Comments	Potential Waste Water Treatment Provider
S37	Difficult	Very difficult topography, many areas would require conveyance through Forest Park	Columbia Blvd
S38	Moderately efficient	Relatively short conveyance, mostly through urban land; would require river crossing. There is potential to expand plant.	Columbia Blvd

MAP A-1

Sewer Serviceability for the Reserves Study Area

Including areas that might be served by neighboring cities

Sewer Efficiency Ratings

- Efficient
- Moderately Efficient
- Moderately Difficult
- Difficult

- Rural Reserves Study Area Boundary
- Areas within the Urban Growth Boundary
- Sewer Treatment Plants
- Outfall

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