RESOLUTION NO. 1542

A RESOLUTION ADOPTING A PROGRAM TO CORRECT THE PROBLEM CREATING THE MORATORIUM ON PLANNING APPROVALS FOR LAND DEVELOPMENTS THROUGHOUT THE CITY OF WILSONVILLE DUE TO A LACK OF WATER SYSTEM CAPACITY AND REPEALING RESOLUTION NO. 1495.

WHEREAS, on January 5, 1998, the Wilsonville City Council adopted Ordinance No. 493 entitled, "An Ordinance Adopting a Moratorium on Planning Approvals for Land Developments Throughout the City of Wilsonville Due to a Lack of Water System Capacity; and Declaring an Emergency"; and

WHEREAS, on June 15, 1998, the Wilsonville City Council adopted emergency Ordinance No. 497 entitled, "An Ordinance Extending a Moratorium on Development Throughout the City of Wilsonville Due to a Lack of Water System Capacity, Allowing for Tentative Land Use Approvals in Advance of the End of the Moratorium; and Declaring an Emergency," with effective date of July 5, 1998; and

WHEREAS, on December 21, 1998, the Wilsonville City Council adopted emergency Ordinance No. 504 entitled, "An Ordinance Extending a Moratorium on Development Throughout the City of Wilsonville Due to a Lack of Water System Capacity, and Continuing the Moratorium to July 5, 1999; and Declaring an Emergency," with an effective date of January 5, 1999; and

WHEREAS, Oregon Revised Statutes 197.530 requires that a City that adopts a moratorium on construction or land development in conformity with ORS 197.520 shall within 60 days after the effective date of the moratorium adopt a program to correct the problem creating the moratorium. The program must be presented at a public hearing. The City is

required to give at least 14 days advance notice to the Department of Land Conservation and Development (DLCD) of the time and date of the public hearing; and

WHEREAS, on March 2, 1998, the City Council adopted Resolution No. 1441 which was a program to correct the problem creating the moratorium on planning approvals for land developments throughout the City of Wilsonville due to a lack of water system capacity; and

WHEREAS, the program which was described in Resolution No. 1441 was substantially modified due to (1) a lack of information concerning the City's ability to obtain water from the Bull Run system, and the cost of participating in a sub-regional Willamette River water treatment plant; and (2) action taken by City Council on June 29, 1998, adopting Resolution No. 1487 entitled, "A Resolution Directing the City Staff to Expedite the Planning and Development of the Troutdale Aquifer as the Future Water Supply Source for the City of Wilsonville"; and

WHEREAS, after approximately six months and more than $200,000 spent on the effort to expedite the development of the Troutdale Aquifer as a water source, the City Council on December 21, 1998, adopted Resolution No. 1530, directing the City staff to discontinue that effort; and

WHEREAS, on December 15, 1998, the City of Portland Bureau of Water Works published the "Portland Water System Plan for Expanded Southwest Service" to include the cities of Tualatin, Tigard, Sherwood and Wilsonville; and

WHEREAS, on December 15, 1998, the City received the preliminary engineering report by Murray Smith & Associates, Montgomery Watson and FCSG for the Willamette Water Supplies System which was to include the cities of Tualatin, Tigard, Sherwood, Wilsonville and the Tualatin Valley Water District as participants; and

WHEREAS, representatives from the City of Portland Bureau of Water Works and from the consulting firms of Murray Smith & Associates and Montgomery Watson presented details of their plans to the City Council and answered questions from Council and citizens at a public meeting held on January 12, 1999; and

WHEREAS, citizens have expressed concerns about the impact of each alternative on their water bill; and

WHEREAS, citizens have expressed concerns about the sampling and testing of the Willamette River waters; and

WHEREAS, the moratorium cannot be extended beyond January 5, 2000; and

WHEREAS, selection of the Portland alternative will necessitate a year delay from the time a decision is made because even as Wilsonville votes approval Portland will not commit to supply Wilsonville with water until they have negotiated contracts with all other Portland customers who are critical to funding the necessary improvements to the Portland system; and

WHEREAS, the contract with Portland would not be available until after the moratorium must be ended; and

WHEREAS, the only interim water supply available to provide water until a long-term source is available is from Tualatin Valley Water District (TVWD) as part of an agreement between TVWD and the Department of Corrections for TVWD to construct lines and provide two million gallons per day to the Women's Prison/Intake Center; and

WHEREAS, this interim water would only be available if a Women's Prison/Intake Center is built at a Wilsonville site; and

WHEREAS, Council desires to provide all voting citizens with the opportunity to approve the recommended long-term water source and financing; and

WHEREAS, 14 days advance notice has been given to DLCD, regarding adoption of Resolution No. 1542; and

WHEREAS, the public hearing has been scheduled for March 1, 1999, at 7:00 p.m.; and

WHEREAS, staff has developed a modified program to correct the problem creating the moratorium (Attachments A, B, C and D); and

WHEREAS, the modified program has been available to the public for seven (7) days prior to the public hearing; and

WHEREAS, based on the staff report and public testimony (written and oral) the City Council finds that to arrive at the most reliable and expeditious solution to the current water moratorium additional information is required; and

NOW, THEREFORE, THE CITY OF WILSONVILLE RESOLVES AS FOLLOWS:

1. Based on the above recitals and findings incorporated herein, the City Council of the City of Wilsonville adopts and incorporates by reference herein the program to correct the problem creating the moratorium, as shown in:

Attachment A, "Program to Correct the Long Term Water Shortage Creating the Moratorium on Planning Approvals for Land Developments Throughout the City of Wilsonville"; Attachment B, "Schedule to Solve Water Moratorium"; and Attachment C, "Memorandum dated February 23, 1998, to Eldon Johansen, Community Development Director, from Jeff Bauman, Public Works Director, regarding Review of Wilsonville's Water Supply Planning"; and Attachment D, "Memorandum dated November 7, 1997, to Mike Kohlhoff, City Attorney, from Jeff Bauman, regarding Water Supply Planning".

2. In addition, the City staff is hereby directed as follows:

a.) To ensure that an election providing voters the opportunity to approve the recommended long-term water source and funding is scheduled for no later than the November 1999 election.

b.) To select an independent party to review the protocol and the specific sampling reports on the Willamette River, provide comments on the validity of the data to use it as a basis or determining if the Willamette River water is treatable and if using this data is sufficient to use as a basis for design of a water treatment plant.

c.) To determine and provide cost impacts of the selection of either the Willamette River alternative or the Portland alternative on customer water bills.

d.) To research and be prepared to develop the necessary documentation to obtain authorization for a public facilities water strategy which would be in effect until short-term water would be available and long-term water would be assured.

Based on the adoption of this resolution, Resolution No. 1495 is hereby repealed.

ADOPTED by the Wilsonville City Council at a regular meeting thereof on the 1st day of March, 1999, and filed with the Wilsonville City Recorder this date.

CHARLOTTE LEHAN, Mayor

Attest:

SANDRA C. KING, CMC, City Recorder

SUMMARY OF VOTES:

Mayor Lehan	Yes
Councilor Helser	Yes
Councilor Barton	Yes
Councilor Holt	Yes
Councilor Kirk	Yes

Earliest End to Moratorium with November Election					
Schedule to Solve Water Moratorium					
Prison Option for Temporary Water					
Long Term and Interim Water Sources to Be Determined					
2/25/99					
Activity	**Action**	**Proposed Timeline**	**Revised Timeline**	**Actual Completion Date**	**Comments**
Council decision on extending or canceling moratorium effective January 5,1999	*Council*	*12/21/98*		*12/21/98*	
Council directs abandonment of efforts to acquire water from Troutdale Aquifer (Res. 1530)	*Council*	*12/21/98*		*12/21/98*	
For simplicity activities prior to abandonment of Troutdale Aquifer efforts have been hidden		*2/4/99*		*2/4/99*	
Approve program to solve moratorium	Council	3/1/99			
Obtain state or federal (peer review is a less desired option) review of Willamette River raw water testing reports and procedures for reliability of data to use as a basis for decision making	Eldon & Jeff	4/30/99			
Council decision on extending or canceling moratorium effective July 5,1999	*Council*	6/21/99			
Council considers options, selects long term water option and refers to voters for source and funding approval	Council	8/16/99			
At this point schedule diverges with the Portland option at Incl. I & 2 and the Willamette option at Incl 3 & 4.	Eldon	8/16/99			

Continuation with Portland long term option & Interim Water from Tualatin Valley Water District via Agreement with Department of Corrections

Review and if necessary change program to solve moratorium	Council	8/16/99			
Staff initiates action to change from moratorium to public facilities water strategy	Stephan	8/23/99			
Conduct/attend public meetings to explain water situation and long term water alternatives if needed	Council & staff	10/26/99			
WV citizens approve long term water supply source and revenue bonds for financing	Voters	11/2/99			
Council provides guidance and authorization to negotiate long term water contract with Portland and lease agreement for use of Washington County Supply Line	Council	11/22/99			
Wilsonville and possibly Tigard begin negotiations with Portland on water contract	Jeff, Mike K., Arlene & Eldon	11/23/99			
Wilsonville and possibly Tigard begin negotiation of lease for use of Washington County Supply until parallel line is completed	Jeff, Mike K., Arlene & Eldon	11/23/99			
City oversizes and completes lines to Wilsonville reservoir adjacent to Tualatin reservoir for future interconnect to receive 2 MGD of Bull Run water for prison & Wilsonville	*Mike*	*12/1/99*			
Public facilities water strategy adopted to replace moratorium effective Jan 6, 2000	Council	12/20/99			
Negotiations with owners of available capacity in Washington County Supply Line successfully completed and approved by all boards	Council	11/22/00			
Negotiations with Portland completed and Council approves water supply contract	Council	11/22/00			
Portland begins design & construction of line from WV to tie to Washington County Supply Line	Portland	12/1/00			
Council approves end to public facilities water strategy assuming Tualatin connection was completed to provide temporary water service to prison and improvements to Tualatin system by Tualatin Valley Water District are in progress	**Council**	**12/4/00**			
TVWD completes oversizing Tualatin lines to deliver 2MGD of water to Wilsonville for prison and City use	*TVWD*	*4/1/01*			
Bull run water starts flowing to Wilsonville through temporary Tualatin connection in April 2001	*Mike S*	*4/1/01*			
Completion of construction of line from Wilsonville to Washington County Supply Line	Portland	8/31/03			
Blended Portland water starts to flow to WV through long term connection and Tualatin connection reverts to emergency use only	Portland	9/1/03			

Continuation with Portland long term option & No interim Water					
Review and if necessary change program to solve moratorium	Council	8/16/99			
Staff initiates action to change from moratorium to public facilities water strategy	Stephan	8/23/99			
Conduct/attend public meetings to explain water situation and long term water alternatives if needed	Council & staff	10/26/99			
WV citizens approve long term water supply source and revenue bonds for financing	Voters	11/2/99			
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Wilsonville and possibly Tigard begin negotiation of lease for use of Washington County Supply until parallel line is completed	Jeff, Mike K., Arlene & Eldon	11/23/99			
City oversizes and completes lines to Wilsonville reservoir adjacent to Tualatin reservoir for emergencies	*Mike*	*12/1/99*			
Public facilities water strategy adopted to replace moratorium effective Jan 5, 2000	Council	12/20/99			
Negotiations with owners of available capacity in Washington County Supply Line successfully completed and approved by all boards	Council	11/22/00			
Negotiations with Portland completed and Council approves water supply contract	Council	11/22/00			
Portland begins design & construction of line from WV to tie to Washington County Supply Line	Portland	12/1/00			
Council approves end to public facilities water strategy	**Council**	**3/1/03**			
Completion of construction of line from Wilsonville to Washington County Supply Line	Portland	8/31/03			
Blended Portland water starts to flow to WV through long term connection	Portland	9/1/03			

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Continuation with Willamette Water Treatment Plant Option & Interim Water from Tualatin Valley Water District via Agreement with Department of Corrections					
Review and if necessary change program to solve moratorium	Council	8/16/99			
Conduct/attend public meetings to explain water situation and long term water alternatives if needed	Council & staff	10/26/99			
WV citizens approve long term water supply source and revenue bonds for financing	Voters	11/2/99			
City oversizes and completes lines to Wilsonville reservoir adjacent to Tualatin reservoir for future interconnect to receive 2 MGD of Bull Run water for prison & Wilsonville	*Mike*	*12/1/99*			
Council cancels moratorium effective Jan 5, 2000 if TVWD is installing lines in Tualatin for connection to provide 2 MGD for prison & WV	***Council***	**12/20/99**			
Notice to MSA & Montgomery Watson by subregional participants to begin plant design and Construction	*WWSA & WV*	*2/1/00*			
TVWD completes oversizing Tualatin lines to deliver 2MGD of water to Wilsonville for prison and City use	*TVWD*	*4/1/01*			
Completion of plant & pipeline construction	*WWSA & Mike S*	*11/30/03*			
Plant begins to serve water to WV and temporary Tualatin connection reverts to standby	Mike S.	12/1/03			

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Continuation with Willamette Water Treatment Plant Option & No Interim Water					
Review and if necessary change program to solve moratorium	Council	8/16/99			
Conduct/attend public meetings to explain water situation and long term water alternatives if needed	Council & staff	10/26/99			
WV citizens approve long term water supply source and revenue bond funding	Voters	11/2/99			
City oversizes and completes lines to Wilsonville reservoir adjacent to Tualatin reservoir for emergencies	*Mike*	*12/1/99*			
Public facilities water strategy adopted & moratorium canceled effective Jan 5,2000	Council	12/20/99			
Notice to MSA & Montgomery Watson by subregional participants to begin plant design and Construction	*WWSA & WV*	*2/1/00*			
Council cancels moratorium	***Council***	**3/1/03**			
Completion of plant & pipeline construction	*WWSA & Mike S*	*11/30/03*			
Plant begins to serve water to WV	Mike S.	12/1/03			

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ATTACHMENT C

City of
WILSONVILLE
in OREGON

30000 SW Town Center Loop E
Wilsonville, Oregon 97070
(503) 682-1011
(503) 682-1015 Fax
(503) 682-0843 TDD

MEMORANDUM

DATE: FEBRUARY 23, 1998

TO: ELDON JOHANSEN,
COMMUNITY DEVELOPMENT DIRECTOR

FROM: JEFF BAUMAN,
PUBLIC WORKS DIRECTOR

RE: REVIEW OF WILSONVILLE'S WATER SUPPLY PLANNING

Historically, Wilsonville has relied upon wells in the local aquifer as its sole source for municipal water supply. However, in the early 1970s it became evident that local aquifers would not be adequate to meet the needs of this growing community. To assure a long-term supply, Wilsonville applied for and was eventually granted a municipal water right to the Willamette River. This right in the amount of 30 cubic feet per second (which translates to 19.4 million gallons per day) has a priority date of 1974, making it among the most senior of municipal water rights for this portion of the Willamette River.

Meanwhile as Wilsonville continued to grow, additional wells and pumping capacity have been installed. This has accelerated the depletion of the local aquifer. When the State of Oregon Water Resources Department granted Wilsonville a permit to drill its eighth (and final) well, one of the permit conditions stated in part: "The City of Wilsonville understands that reliance on ground water for a long-term water supply is unacceptable."

Beginning in 1992, Wilsonville has experienced varying degrees of water shortages each summer during periods of peak demand. These shortages have been addressed by a combination of: voluntary and mandatory water curtailment practices; deepening existing wells to increase their productivity; drilling an additional well; and installing additional reservoir storage capacity. The unprecedented growth of recent years has increased peak water demand to the limit of the City's ability to meet such demand - - even with all the operational and capital improvements being undertaken. All the while, the water table in the city's aquifer has been dropping, and this rate of depletion is accelerating as the City withdraws larger and larger quantities of water out of the ground.

Since 1989 Wilsonville has been actively involved in numerous efforts to secure a sustainable long-term water supply. A summary of these activities is included in my November 7, 1997, memo to Mike Kohlhoff (copy attached). Altogether, the planning efforts alone represent approximately $4 million of work, of which Wilsonville's share has been more than $368,000. In addition, the City is hiring an independent engineering consultant to further analyze the Troutdale aquifer south of Wilsonville as a potential source for future municipal water supply.

The remainder of this memo is a review of the water supply options which have been considered. I've structured the discussion in three categories: potentially viable long term sources; activities which significantly reduce peak season requirements, but which

cannot themselves meet the long term need: and options which do not effectively address the long term need.

I. POTENTIALLY VIABLE SOURCES

Bull Run

An interconnected regional water system to the north of Wilsonville is supplied by water from Portland's Bull Run watershed, and to a lesser extent from the Trask/Tualatin watershed. At the current time the water from these sources is available in excess of the demand from their respective service areas. Over time, however, these providers will need this water to serve growth in their own customer bases. According to the Regional Water Supply Plan (RWSP), all existing and committed sources of water will be fully utilized by approximately the year 2035, at which time a major new increment of water supply will be needed.

Potentially, the new increment of water supply could be the expanded utilization of the Bull Run watershed. This would require construction of an additional (i.e., third) dam in the Bull Run system. Given the status of environmental regulations, it is questionable whether construction of another dam is possible. Related concerns include impacts on salmon and steelhead runs being considered for listing as threatened/endangered species. It would literally take an act of the U.S. Congress to authorize a third dam in the Bull Run, and if this were to occur it would likely be 30 to 40 years before such an impoundment is constructed and operational.

Alternatively, the height of one of the existing dams could be increased and a water filtration plant could be added to the Bull Run system. A higher dam would impound more water in the reservoir. And a filtration plant would allow greater draw down of the water level during peak summer months. Currently such draw down is limited because of turbidity problems when the reservoir level is low. Portland estimates the cost of a higher dam plus filtration plant would be in the range of $120 - 150 million. In addition, larger water transmission lines would need to be installed to deliver the needed quantities of water to Wilsonville. The cost of such transmission lines would be tens of millions of dollars, depending on the size and alignment of these facilities. If this option were selected, a series of interagency commitments would need to be made regarding the timing and cost sharing for the necessary capital improvements.

At best it would be a decade or two before major expansion of the Bull Run supply could be brought on line. In the meantime, it seems possible to provide Wilsonville with approximately 3 million gallons a day of "excess" Bull Run water. This would entail optimizing the capacity of existing transmission lines in the Portland, Tigard, and Tualatin water distribution systems. It would also necessitate unprecedented coordination between numerous water supply agencies to wheel the water from its source to Wilsonville.* Such considerations include:

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* Similar short term arrangements could be made with water providers in the Clackamas basin to supplement Bull Run for delivery of approximately 3 million gallons per day to Wilsonville.

The new Joint Water Commission facility improvements would be operated in a way that assures the Tualatin Valley Water District (TVWD) obtains 12 million gallons per day, thereby enabling TVWD to reduce its purchase of Bull Run water. This "freed up" Bull Run water then becomes available for sale to other wholesale customers, such as Wilsonville.

The Columbia South Shore Well Field is available to the Portland Water Bureau not only for emergency backup supply, but also to meet maximum daily demand during the peak season.

The Portland Water Bureau would have to re-route water service in its Washington Park and Burlingame supply systems, and conduct further system hydraulics analyses to determine whether opportunities are available to increase transmission capacities throught these systems.

Connections would need to be constructed at key locations in the existing transmission system.

The cities of Portland, Tigard, Tualatin, Sherwood, Wilsonville and the Tualatin Valley Water District would have to coordinate the daily (and at times hourly) storage and release of water as it flows through each jurisdiction from source to end user.

Mutually agreeable funding, ownership, operational, and maintenance arrangements would need to be formalized.

The cost of water supplied would have to be agreed upon by all parties involved.

Troutdale Aquifer

An extensive, relatively shallow, relatively porous underground zone known as the Troutdale formation is located south and east of Wilsonville's city limits. This aquifer contains vast quantities of ground water, and it has been suggested that Wilsonville consider it as a source for future water supply. Until recently the City did not view the Troutdale aquifer as a viable alternative because: years of study by 27 water providers in the Portland metropolitan region (plus Metro) concluded that ground water should not be a primary source to meet future demand; the permit issued to Wilsonville by the state for purposes of constructing municipal wells indicates that "reliance on ground water for a long-term water supply is unacceptable;" and it has been the City's understanding that state and county land use agencies have concerns about the extension of urban infrastructure into designated agricultural areas. Nonetheless, if the Troutdale aquifer is a viable source for Wilsonville's future water supply, it should be an alternative that is given full consideration. The Oregon Water Resources Department has clarified that the language cited in the permit for our final well is a restriction on the use of the basaltic aquifer, and does not necessarily restrict Wilsonville from using water from the Troutdale aquifer. Accordingly, an independent engineering consultant is being hired to conduct a technical, regulatory, and financial analysis of the Troutdale aquifer as a potential water supply for Wilsonville. The results of this study will be available by June, 1998.

Willamette River

As noted earlier in this memo, planners decades ago foresaw the need for Wilsonville to secure a new source of water to meet the future needs of this growing community. The City currently holds a water right for municipal use of the Willamette River in the amount of 19.4 million gallons per day. This volume of water, if coupled with a conservation program and local wells during peak summer periods, would be sufficient to meet the needs of the City at full development (including adjacent lands designated as urban reserve) based on the comprehensive plan. The Regional Water Supply Plan acknowledges Wilsonville's need for a new source of water as follows:

> "The Regional Water Supply Plan process has focused primarily on regionally significant demands and resource options. The process did not address in detail the fact that certain localities in the region are facing more imminent needs than others. Examples of those entities which are likely to need new resource capacity prior to 2000 include the cities of Wilsonville, Tigard, Sherwood, Canby, and possibly the Damascus Water District.
>
> This plan recognizes that steps must be taken in the near-term to meet these demands. . . On the supply side, seemingly plausible source options (due to availability of existing systems, proximity to alternative sources, and water rights availability) include connection and contracted purchase of water from existing systems (e.g., Bull Run, Clackamas), ASR, or construction of first phase supply facilities on the Willamette River."

Currently the City of Corvallis uses the Willamette River as its water supply. A conventional water treatment plant is in operation which provides finished water that meets federal and state drinking water standards. Because the Willamette River downstream of Corvallis is subject to additional contamination, the question has been raised whether the river water in Wilsonville is too polluted to be safely used as a water supply. To evaluate and address this concern, several steps are being taken to assure that if the Willamette River is utilized for water supply, the water delivered to our customers will be safe to drink.

> A pilot project was conducted to measure contaminant levels in the river, and to demonstrate the effectiveness of water purification processes in removing whatever pollutants are present. Water samples were analyzed for all the chemicals regulated under the drinking water standards plus other unregulated chemicals suspected to be of greatest concern in the Willamette watershed. In sampling over a two-year period, the vast majority of chemicals were not detected (even at trace levels) in the "raw water" taken from the river. Those chemicals that were measurable in the samples existed at low levels, and all were readily removed when processed through the pilot purification plant. The extensive findings and conclusions of this multi-year study are contained in a series of reports.
>
> If the Willamette is used for municipal water supply, the City would construct a "multi-barrier" water purification plant which would more than merely meet state and federal drinking water standards. Steps beyond conventional water treatment

would be included to break down chemicals and remove organic pollutants, regardless of whether state or federal standards exist for them.

In addition to the water purification plant itself, further safeguards would assure the reliability of water supplied to customers. The City's contingency systems would include expanded water storage capacity; maintenance of City wells for backup supply; and constructing an interconnection to City of Tualatin's water transmission system for emergency service. Should the purification plant be taken off line for any reason, these contingency supplies would be available.

The City would support efforts to reduce water pollution in the Willamette basin. The Governor's Task Force on the Willamette River points out that municipal water supply is a designated use of this resource, and the Task Force has recommended over 100 steps be taken to protect and improve water quality in the Willamette. As these recommendations are implemented, the river will become cleaner and easier to treat.

The Willamette River is one of the very few options which is capable of meeting Wilsonville's long term water supply needs. It is also the option which is least dependent on decisions/actions of other agencies in terms of commitments or approvals needed. Nonetheless if a purification plant is built and operated, it would be financially advantageous for Wilsonville to partner with the City of Tigard and others who have a similar interest in the Willamette as a source of water.

II. ACTIVITIES WHICH SIGNIFICANTLY REDUCE PEAK SEASON REQUIREMENTS

Water Conservation

The City has been involved in water conservation activities (both voluntary and mandatory) every summer since 1992. Attached to this memo is a summary of the water conservation actions taken during the summer of 1997. While it is not possible to determine what the level of water consumption would have been without these measures, we've estimated that on peak days conservation measures have reduced overall demand by 13%. It is our goal to achieve at least 17% reduction in peak demand by implementing an even more vigorous conservation program. We believe these efficiencies can be gained by modifying the pricing structure of water service to provide further financial incentives for conservation; by increasing our public information and technical assistance efforts; and by updating the City Code to revise landscaping requirements in a way that promotes native and drought-tolerant vegetation (rather than turf and other irrigation-dependent plantings). Achieving the 17% goal translates into a savings of approximately 1 million gallons on days of peak demand in the near term, and could reduce peak demand by approximately 4 million gallons per day in the long term (i.e., at "build out" of the entire City). This goal is consistent with the conservation target recommended in the Regional Water Supply Plan.

Some people have suggested that the goal of 17% is too modest, citing the more ambitious accomplishments of communities in the Southwest and in California. While it is technically possible to conserve more water, those communities essentially had little choice in the matter. Water simply was not available. Experience suggests that a 17% to 20% reduction in peak demand is perhaps an upper limit on sustainable conservation when other water supply options are available.

Aquifer Storage and Recovery (ASR)

Water usage goes through seasonal cycles with peak demand in the summer months - - at the very time water supply is scarcest. The ASR procedure is a method to capitalize on available water in the winter months (when supply is high and demand is low) and store this water in underground aquifers for subsequent withdrawal during the peak demand period in the summer. In a way this can be thought of as a huge underground reservoir with no walls. This procedure is gaining regulatory agency acceptance as successful pilot projects demonstrate the ability to inject/withdraw water without plugging the well field, without contaminating the naturally occurring water table, and without interfering with adjacent groundwater resources. It should also be noted that ASR is one of the options recommended in the Regional Water Supply Plan.

In evaluating Wilsonville's water supply situation, ASR looks promising for several reasons.

Throughout the fall, winter and spring seasons, large quantities of relatively inexpensive water is available for Wilsonville to purchase from any or perhaps all of the sources described in the preceding pages. Not only do water supply agencies throughout the region have excess water during non-peak months of the year, but such water is likely to be available for many decades into the future (as opposed to "excess" water in the summer, which is available for only a few years).

Wilsonville's aquifer lends itself exceptionally well to ASR. The deep basaltic rock formation provides a suitable zone for injection/withdrawal of water. Intense pumping of this aquifer as Wilsonville's only source of water has resulted in the lowering of the water table at a rate of two to four feet per year. This has not only reduced the productivity of the well field, but is also increasing the concentration of iron and manganese in the well water as we pump from deeper levels containing higher mineral content. The "good news" is that by this substantial lowering of the water table, there is now room in the aquifer for very large quantities of water. For each million gallons per day injected into the aquifer during 9 months of the year, three million gallons per day could be extracted during maximum peak days in the summer.

Some of the needed infrastructure is already in place. Wilsonville has a series of well sites which could be adapted for both injection and withdrawal of ASR supplies. Furthermore, during non-peak times of the year, jurisdictions near Wilsonville are not using the full capacity of the water transmission lines currently in place. Millions of gallons per day could be transferred through the existing transmission system to Wilsonville for purposes of ASR. While some coordination would be necessary among impacted agencies, the type and extent of operational

responsibilities in the "off season" would be greatly simplified compared to the level of activity associated with peak season transfer of water into the Wilsonville service area.

If the City were to build a water purification plant using the Willamette River as a supply, ASR could be used in conjunction with such a plant to keep capital and operating costs at a minimum. Rather than design a purification plant to meet peak summer demand, a smaller plant could be built and operated at more or less a steady rate of production all year long. In the winter, "excess" water from the purification plant could be stored in the underground aquifer. In the summer, this stored water could be withdrawn from the aquifer on peak days. Not only would the smaller purification plant reduce construction costs, but operating such a facility on a "steady state" basis is a more efficient and reliable way to treat the water.

By raising the level of the water table in the aquifer, several benefits could be achieved. The City would no longer be drawing from the deeper levels and would thereby reduce the problems associated with iron and manganese content of the groundwater. The efficiency and productivity of the existing wells would be improved. And interference (if any) with nearby private wells would be eliminated. In fact, if there is any connection with neighboring wells, they could benefit from ASR.

In the past, the State's ASR permitting process has taken approximately 5 years for required site-specific pilot testing and subsequent authorization for full-scale operation. Recently this approval process has been streamlined somewhat. With a year of feasibility study plus a year of pilot testing, it is conceivable under a "best case" scenario that the City could have at least some ASR on line within three years of the decision to pursue this method. It would nonetheless be 5 years or so before approval could be obtained for permanent, full-scale use of ASR. There is not yet enough experience to accurately determine the capital, operating and maintenance costs for application of ASR to Wilsonville's aquifer. And while this technique seems encouraging, it is only a partial solution to Wilsonville's long term water supply needs.

III. OPTIONS WHICH DO NOT EFFECTIVELY ADDRESS THE LONG TERM NEED

Local Aquifer

As noted above, existing development (not to mention future growth) is depleting this resource. At best, the wells could be used as a supplemental source to meet demand on peak summer days. The wells could also be available as a year-round backup supply in the event of an emergency and/or temporary interruption of the new (primary) source of water. Another potential use of the local aquifer could be for ASR as described above.

Wilsonville's wells tap a thick layer of water contained in a massive basalt formation 300 to 700 feet beneath the City. Groundwater is also present at shallower levels above the basaltic rock. Indeed, private wells in and adjacent to Wilsonville already draw water

from this shallower formation. It has been suggested that the City use its wells in the deep aquifer only for domestic (i.e., indoor) uses and that the shallower aquifer be used for outdoor uses - - particularly landscape irrigation during peak demand in the summer. This would necessitate extensive changes to the water distribution system throughout the City and/or widespread installation of new private wells. Furthermore, owners of active (shallower) wells in the area report that the water table is dropping due to current usage. It does not appear the shallower local aquifer could sustain repeated, large-volume withdrawals of water. Thus it does not seem practical to tap the shallow local aquifer on a large enough scale to make a significant contribution toward solving the City's water supply problem.

Clackamas River

Just as water could be delivered to Wilsonville from suppliers to the north, so could Wilsonville be supplied by water from purveyors in the Clackamas basin. In the near term, the Clackamas basin as a whole is capable of supplying more water than is used by customers within that service area. The City of Lake Oswego and the Clackamas River Water District have expressed interest in selling water to Wilsonville. However, both these agencies have indicated that they are unable to guarantee water to Wilsonville beyond a 7 - 10 year time frame. Eventually all water providers within the Clackamas basin will need their entire capacity to meet growth within their respective service areas. The Regional Water Supply Plan indicates that by the year 2035 the Clackamas service area will no longer be self-sufficient in terms of water supply, and will need to obtain water from outside the basin.

There are three ways "excess" water in the short term could be wheeled from the Clackamas basin to Wilsonville. There is an existing transmission connection from Lake Oswego to Tigard. From there, the same water distribution system could be used as described above when considering the purchase of water from the Bull Run system. A second, less direct, method to transport water to Wilsonville would utilize a connection between the Clackamas basin and the Bull Run system. In essence, "excess" water from the Clackamas basin would be delivered to customers in the Bull Run service area thereby freeing up Bull Run water for delivery to the west through Tigard and Tualatin, ultimately reaching Wilsonville. Either of these delivery mechanisms would require the same (or perhaps greater) level of cooperation and coordination among numerous agencies as explained previously. And the maximum amount of water that could be delivered to Wilsonville through the existing transmission system is approximately 3 million gallons per day.

The third and most direct method of delivering water from the Clackamas basin would be to construct a new transmission main from the source to Wilsonville. It would not be cost effective to size and build such a pipeline merely to meet short term needs. Yet a transmission line with a capacity of at least 20 million gallons per day would cost tens of millions of dollars, depending on the size and alignment of the pipeline. It only makes economic sense to build such a transmission line if there is some assurance of a long term supply of water - - a commitment that Clackamas providers are unable to make.

Willamette River (for non-potable use)

This option would require little or no purification, and would use water from the Willamette for landscape irrigation purposes. In practice, however, this option has several limitations. It would require installation of a separate water transmission system, which would be feasible only for large irrigation users (who, by the way, have been very cooperative by curtailing their water use during peak demand periods). As such, this component of peak demand has already been discounted in future forecasts as part of the 17% reduction due to conservation practices. If the Willamette is to significantly address overall demand for peak season irrigation use, a city-wide network of (non-potable) water lines would have to be installed. This would not only entail large cost and disruption, but it would create health risks if unsuspecting people mistakenly took a drink of this non-potable water from a garden hose or used this water in their children's wading pools. For all these reasons, use of the Willamette on a massive scale for non-potable purposes does not appear to be a feasible solution to Wilsonville's water supply problem.

Re-use of "Gray Water"

The term "gray water" applies to wastewater other than that discharged from toilets. Thus "gray water" includes such things as water from sinks, dishwashers, washing machines, bathtubs, showers, etc. Some people have suggested that "gray water" be used for non-potable purposes such as outdoor watering during the summer. While this could reduce the peak demand on the City's municipal water supply, there are significant practical limitations to this option. It requires extensive re-plumbing of virtually all buildings in the City, and it raises potential difficulties. State regulations are very restrictive about re-use of "gray water" because such water contains bacteria and other contaminants of potential health concern - - particularly if the untreated "gray water" is stored for any length of time allowing bacteria to incubate. For all these reasons, the re-use of "gray water" on a massive scale is not a feasible solution to Wilsonville's water supply problem.

Use of Cisterns

A cistern is essentially a container or tank whereby rainwater can be collected and stored for use at a later time. People have suggested that cisterns could be helpful in providing water for non-potable uses and thereby reduce peak demand on the City's municipal water system. To be of any significant help during peak season demand, cisterns would have to be installed on a massive scale on individual properties. Alternatively, larger cisterns (in the range of 30,000 to 50,000 gallons) would have to be installed to serve each 10 square block area. There would need to be an apparatus to collect rainwater plus a tank (either above ground or underground) to store the water. A series of plumbing connections and/or pumping facilities would have to be installed to deliver the water for the intended uses, presumably outdoor irrigation. Due to the potential for uncontrolled bacterial growth or other possible contamination in the cisterns and distribution system, backflow prevention devices would be needed to assure this water doesn't flow into the domestic water lines. Even if these considerations were satisfied, it is questionable whether

adequate rainwater is available to replenish storage levels in the cisterns during extended periods of peak demand in the summer months. An alternate use of cisterns would be for fire protection only. However, there are only limited areas in the City where cisterns could possibly be used for this purpose. Thus cisterns are of limited utility in addressing Wilsonville's water shortage and are not a feasible solution to meet the City's long term water needs.

Re-use of Treated Wastewater

Some people have suggested that effluent from the City's wastewater treatment plant could be used for non-potable purposes and thereby ease demand on the municipal water system. In fact, this is occurring to a limited extend. At the City's new wastewater facilities, treated effluent is being used for processes within the plant that were previously supplied by the municipal water system. Similarly the treated effluent could be used for irrigation of nearby landscaping (such as Boones Ferry Park) during the summer months. Thus where it is feasible to do so, effluent can and will be used for non-potable purposes. However, on a broader scale it is not practical to rely upon treated wastewater to address the City's overall water shortage for the reasons discussed in the sections above regarding the use of the Willamette for non-potable supply. It should also be noted that the total output of the wastewater treatment plant during summer months is less than 3 million gallons per day. Even if all the effluent were re-used, it would not be enough to address the City's water shortage.

Corral Creek

To the west of Wilsonville is a stream referred to as Corral Creek. Historically, impoundments (for agricultural purposes) have been built in this watershed. It has been suggested that the City use water from these impoundments - - or perhaps build a new dam - - to meet future demand for municipal water supply in Wilsonville. Given the needs for this water to support in-stream and agricultural uses, it is unlikely the State would authorize Wilsonville to withdraw large quantities of water from Corral Creek. But even if such water rights were granted, the cost of building/improving the necessary impoundments plus the cost of associated water treatment and transmission would be greater than other, more viable water supply options. Thus Corral Creek does not appear to be a promising source for the City's future water supply.

CONCLUDING REMARK

Several factors will need to be considered in selecting Wilsonville's future water supply. These factors include: health and safety, reliability, environmental stewardship, efficiency, certainty of future supply, degree of local control, compatibility with regional plans and programs, cost effectiveness, and time frame for implementation. It will also be important to distinguish between alternatives that truly address our water supply problem versus measures that merely "buy time" while the underlying problem gets even worse.

ATTACHMENT D

City of WILSONVILLE in OREGON

30000 SW Town Center Loop E
Wilsonville, Oregon 97070
(503) 682-1011
(503) 682-1015 Fax
(503) 682-0843 TDD

MEMORANDUM

DATE: NOVEMBER 7, 1997

TO: MIKE KOHLHOFF

FROM: JEFF BAUMAN JB

RE: WATER SUPPLY PLANNING

Over the past years, the city of Wilsonville has undertaken numerous steps to address future water supply needs. The following list identifies key activities that have occurred, with emphasis on planning and engineering studies that have occurred.

1989: Regional Providers Advisory Group
Technical staff representing 35 agencies (including Wilsonville) convened monthly to discuss/coordinate water supply issues of regional interest.

1991-92: "Water Source Options Study"
This engineering study represented Phase I of a regional planning effort. It evaluated 29 potential sources of water for the Portland/Vancouver metropolitan area. It concluded that 6 of these options merited further analysis. The study was conducted for the 35 agencies of the Regional Providers Advisory Group, which included the city of Wilsonville. The study was conducted by an engineering consulting team headed by CH2MHill.

1992 to present: Water conservation efforts and/or curtailment programs have been implemented every summer in Wilsonville (ranging from public education and requests for voluntary reduction in water usage, to mandatory restrictions during peak demand periods).

1992-94: Willamette River pilot plant
A pilot-scale water treatment facility was set up in Wilsonville to demonstrate how "raw water" from the Willamette River could be treated with readily available technologies to provide water which meets all federal and state drinking water standards. The project was conducted by the Tualatin Valley Water District, with support from the city of Wilsonville.

1993: Second Elligsen reservoir placed in service.

1993: Canyon Creek well placed in service.

1993-96: "Regional Water Supply Plan"
This engineering study represented Phase II of the regional planning effort. It evaluated the 6 most promising supply options in greater detail and concluded that a combination of sources (including the Willamette River) should be protected

and be available to meet future potable water needs of the region. The study was conducted by an engineering consulting team headed by Barakat & Chamberlin. Wilsonville was one of 28 agencies participating in this study.

1996: "Water Conservation and Management Plan"
This state-mandated report was prepared for Wilsonville by Montgomery Watson (consulting engineers). The report described the city's water resources, how to manage them efficiently, and forecasted future water supply needs of the city.

1996: "Willamette River Water Supply Study"
This engineering study evaluated potential service areas and water demands which might be served from a Willamette River water treatment plant. The lead agency for this study was the Canby Utility Board. The other participating agencies were: Wilsonville, Sherwood, Tigard, Tualatin Valley Water District, and Clackamas River Water District. The consulting engineer was Montgomery Watson.

1996: "Willamette River Water Treatment Plant Project Sizing and Regional Network Analysis"
This engineering study evaluated potential water treatment plant sites and water transmission line routes for supplying potable water from the Willamette River. The lead agency for this study was the city of Wilsonville. The other participating agencies were: Tigard, Sherwood, Tualatin, Tualatin Valley Water District, Canby Utility Board, and Clackamas River Water District. The consulting engineer was Montgomery Watson.

1996-97: "Clackamas Basin Water Treatment and Supply Options Study"
This engineering study evaluated alternative methods, sites, and transmission routes to develop additional water supply from the Clackamas River to meet future demand within the Clackamas sub-region - - and to potentially "export" water to other service areas (such as Wilsonville). The lead agency for this study was Clackamas River Water District. The other participating agencies were: South Fork Water Board, Oak Lodge Water District, Mt. Scott Water District, Damascus Water District, Gladstone, Lake Oswego, Milwaukie, Portland, and Wilsonville. The lead consulting firm was Black and Veatch.

1997: "Water Supply Study"
This engineering study evaluated alternative methods to meet the near-term and long-term water supply needs of the city of Wilsonville. It concluded that for Wilsonville, the least costly and most reliable future source of water would be the Willamette River. This study was conducted by Montgomery Watson (consulting engineers).

1997: "Washington County Supply Line Capacity Analysis"
This engineering study evaluated methods to divert water from the Trask/Tualatin and Bull Run water supplies to meet peak summer demand in portions of Washington County and in Wilsonville. The study pointed out that any such diversions would be interim in nature and would not address the long-term needs

of the participating agencies. The lead agency for this study was the city of Tigard. Other participating agencies included: Wilsonville, Tualatin, Sherwood, Portland, Tualatin Valley Water District, and Clackamas River Water District. The consulting engineer was Murray, Smith & Associates.

1997 (ongoing): Regional Water Providers Consortium
This group of 28 agencies is an outgrowth of the Regional Providers Advisory Group. All 28 agencies have endorsed the Regional Water Supply Plan, and have designated elected officials from their respective governing bodies to serve on the Regional Water Providers Consortium Board. Wilsonville Mayor Charlotte Lehan was elected Vice-Chair of this Board.

1997 (ongoing): Columbia-Willamette Water Conservation Coalition
Wilsonville has joined this group of 18 agencies which work cooperatively to establish conservation goals, provide public information/technical assistance, and evaluate the effectiveness of conservation efforts. Wilsonville Public Works Director Jeff Bauman serves on the "core team" (i.e., steering committee) of the Coalition.

in process: "Willamette River Water Treatment Plant Project Concept Design"
This engineering study is a detailed site analysis as well as technical/financial feasibility analysis of a Willamette water treatment plant designed to meet Wilsonville's long-term water supply needs. The study is scheduled to be completed in 1998. The consulting engineer is Montgomery Watson.

in process: Construction has begun on the Boeckman well, which should be in service by the summer of 1998.

in process: Bids are being solicited for construction of an additional reservoir (2 million gallon capacity) to be in service by the summer of 1998.

Summer '97

City of Wilsonville
Water Conservation Actions Taken

* Conservation insert in utility billings (late spring)
* Free plumbing fixture "check-up" kits
* Site visits to customers whose '97 consumption was significantly higher than '96 (check for leaks; encourage conservation)
* "Compassionate Leak Repair" policy (i.e., financial incentive to fix leaks quickly)
* Articles in "Boones Ferry Messenger"
* Articles in "Seedling"
* Articles every week in local newspaper throughout the peak season
* Personal phone contact throughout the summer with 30 largest outdoor water users
* Participation in regional "water audits"
* Mandatory restrictions on outdoor watering
* City ceased watering parks and landscaping
* Direct mailing from City Manager and Fire Chief
* Door hangers when wasteful practices observed
* Final warnings and daily water meter readings for suspected violators

NOTE: New development in the past year should have increased peak season water consumption by 150,000 to 200,000 gallons per day. Instead, peak season consumption decreased by 150,000 gallons per day - - before mandatory restrictions were placed on outdoor watering. It appears more customers are incorporating conservation into their regular practices.

Additional Activities for the coming year:

- review/modify pricing structure to provide further financial incentives for conservation
- xerophytic demonstration project
- investigate irrigating park(s) with Willamette River water
- update City Code - - including revisions to landscaping requirements
- active participation in Water Conservation Coalition