City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

CITY COUNCIL MEETING PACKET

FOR

Tuesday, May 5, 2015

Sherwood City Hall
22560 SW Pine Street
Sherwood, Oregon

6:15 pm Work Session

7:00 pm City Council Regular Meeting

City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

AGENDA

SHERWOOD CITY COUNCIL
May 5, 2015

6:15 pm Work Session

7:00 pm City Council Meeting

Sherwood City Hall
22560 SW Pine Street
Sherwood, OR 97140

6:15 PM WORK SESSION

A. Tonquin Employment Area Implementation Plan (Julia Hajduk)

REGULAR CITY COUNCIL MEETING

1. CALL TO ORDER

2. PLEDGE OF ALLEGIANCE

3. ROLL CALL

4. APPROVAL OF AGENDA

5. CONSENT AGENDA

A. Approval of April 21, 2015 City Council Meeting Minutes

6. PRESENTATIONS

A. Proclamation Proclaiming May 18-23, 2015 as Emergency Medical Services Week
B. Proclamation Proclaiming May 10-16, 2015 as National Police Week in Sherwood
C. Eagle Scout Recognition
D. Arbor Day Report (Kirsten Allen, Planning Program Coordinator)

7. CITIZEN COMMENTS

8. NEW BUSINESS

A. Resolution 2015-046 Authorizing the City Manager to execute a construction contract with Brix Paving Northwest for the Sunset Boulevard and April Court Pavement Rehabilitation Project (Craig Sheldon, Public Works Director)

B. Resolution 2015-047 Approving the Intergovernmental Agreement with Metro for Solid Waste Community Enhancement Program (Joe Gall, City Manager)

9. PUBLIC HEARINGS

A. Ordinance 2015-004 Amending Chapter 7 of Volume II of the Sherwood Comprehensive Plan and adopting the Sherwood Water System Master Plan
(Brad Kilby, Planning Manager), (2nd Reading)

B. Ordinance 2015-005 Amending multiple sections of the Zoning and Community Development Code including Divisions I, II, and III as it relates to the regulation of medical marijuana dispensaries and declaring an emergency (Michelle Miller, Senior Planner) (2nd Reading)

10. CITY MANAGER REPORT

11. COUNCIL ANNOUNCEMENTS

12. ADJOURN

How to Find Out What's on the Council Schedule:
City Council meeting materials and agenda are posted to the City web page at www.sherwoodoregon.gov, by the Friday prior to a Council meeting. Council agendas are also posted at the Sherwood Library/City Hall, the YMCA, the Senior Center, and the Sherwood Post Office. Council meeting materials are available at the Sherwood Public Library.

To Schedule a Presentation before Council:
If you would like to schedule a presentation before the City Council, please submit your name, phone number, the subject of your presentation and the date you wish to appear to the City Recorder Sylvia Murphy, 503-625-4246 or murphys@sherwoodoregon.gov

SHERWOOD CITY COUNCIL MEETING MINUTES
22560 SW Pine St., Sherwood, Or
April 21, 2015

WORK SESSION

1. **CALL TO ORDER:** Mayor Krisanna Clark called the meeting to order at 5:30 pm.

2. **COUNCIL PRESENT:** Mayor Krisanna Clark, Council President Sally Robinson, Councilors Linda Henderson, Dan King. Councilors Jennifer Harris and Jennifer Kuiper arrived at 5:35 pm. Councilor Beth Cooke was absent.

3. **STAFF PRESENT:** City Manager Joseph Gall, Assistant City Manager Tom Pessemier, Police Chief Jeff Groth, Public Works Director Craig Sheldon, Finance Director Julie Blums, Planning Manager Brad Kilby, Administrative Assistant Colleen Resch and City Recorder Sylvia Murphy.

4. **TOPICS:**

A. Water Master Plan, Rates and SDC

Public Works Director Craig Sheldon introduced the engineering consultants from Murray, Smith and Associates (MSA) who worked on the Water System Master Plan Update. He said overall the water system is in good condition and the projects identified are growth driven.

Heidi Springer and Brian Ginter with Murray, Smith and Associates (MSA) presented a Water System Master Plan Update (see record, Exhibit A). Ms. Springer said this is an update to the 2005 Water System Master Plan and said she will discuss the purpose of water system master plans, provide an overview of the existing water system, review service area growth and future water needs, analyze and recommend improvements and incorporate those into the Capital Improvement Program (CIP). She said the purpose of a water system master plan is to comply with state drinking water program requirements and the goal is to have a long term guidance document to identify current system deficiencies, plan for facility upgrades and plan for service area growth and expansion. She referred to the existing water system and said the majority of the water is received from the Willamette River Water Treatment Plant (WRWTP) in Wilsonville and the City has two existing wells that are used for a backup for emergency supply and there is also a 24" emergency supply connection from Portland through Tualatin. She discussed the projected growth and said they look at both a 20 year and a saturation development horizon which is the point at which all of the developable land has been developed. She said for the 20 year planning horizon they looked at existing City limits, Tonquin Employment Area (TEA), Brookman Annexation Area and West Urban Reserve. She said that within the City limits they correlated water demand growth with population. In the TEA there is an existing concept plan that outlined water facilities, in the Brookman Road area there is an

existing concept plan that outlines 20 year growth percentages and in the West Urban Reserve a concept plan is being developed so they assumed 10 net units per acre for residential development which is consistent with Brookman Road. She stated they used the projected growth to determine future water demands and based it on recent water trends for residential, non-residential and industry/office. She commented on the 20 year water demand estimate and said the current average daily demand is 1.9 million gallons per day (mgd) and they are predicting in 20 years is will be 2.9 mgd. She said they calculate the maximum day demand which is the peak usage in any single day and the current demand is 3.9 mgd, in 20 years will be 6 mgd and up to 9 mgd at saturation.

She referred to the supply portion of the water system and said the WRWTP meets the existing peak demand and the existing city wells provide emergency supply and there is no need to continue purchasing water from Portland. She said future supply is anticipated to come from WRWTP and the City will need an addition 4 mgd at saturation development and the timeline for developing additional capacity will be influenced by other partners.

She referred to the distribution system and said they looked at storage and pumping facilities and Sherwood has adequate capacity to meet projected demands through the 20 year planning horizon. She commented on pressure zones and said they look at a service pressure goal between 40 to 80 pounds per square inch (psi) and said there are some areas in the Brookman area and the West Urban Reserve that are too high in elevation to be served from existing pressure zones. She said to analyze the distribution piping they used a computerized hydraulic model to identify piping deficiencies based on fire flow capacity and service pressure.

She referred to the recommended projects for the water supply and said there are expected upgrades to WRWTP for capacity expansion growth and there are expected upgrades to serve existing and future customers and reach the 5 mgd that Sherwood currently owns in the plant. She said for pump stations they are recommending a few small stations to serve growth areas in Brookman and the West Urban Reserve when and if growth occurs. She discussed planning and operation project recommendations and said the SCADA system which records the reservoir level, the pump station operation and allows the water system staff to optimize management of the system to make it efficient. She said regionally they have noticed with SCADA systems that within 10 to 15 years of being installed the technology begins to evolve to the point that it is more expensive to maintain an older system than to replace it. She said the City system is 10 years old so they recommend an upgrade in the next few years. She said they have also recommended a resiliency plan for response to earthquakes.

She referred to recommended water mains and said the City has a robust distribution system within the City limits and it is fairly new and sized appropriately. She said the only recommended improvements to the water mains are minor and the majority of the improvements are for growth within the TEA, Brookman Road and West Urban Reserve areas.

City Manager Gall commented on the TEA area and asked what would happen if a large water user moved into the area and asked if we would be prepared.

Ms. Springer said there is excess capacity from WRWTP and in terms of supply it may push the timeline for expanding at the plant ahead but in the short term there would be supply available. She said the distribution system in that area is 10” and mostly 12” and that should be robust enough.

She referred to the CIP and said these are recommended projects that a cost has been applied to and prioritized through discussions with the City and considered when development may occur. She said the CIP provides a roadmap for the water system improvements needed to serve growth and existing customers. She said the prioritization of the projects is reviewed annually and through the budgeting process. She stated over the next 10 years within this CIP short-term improvements for system expansion are estimated at $18.3 million and $1.6 million to serve existing customers. She noted a number of the projects are for growth if and when it occurs. She said the overall CIP through saturation development is $36.2 million and the majority of the costs are for projects dedicated to growth and system expansion. She commented on the detailed breakdown of the CIP projects and costs and noted that PRV stands for pressure reducing valve.

Councilor Kuiper referred to the two pump stations and asked if they are recommending them in a 5 or 10 year period. Ms. Springer said the pump station recommendation in the West Urban Reserve area is a beyond 20 years and that is a long term plan.

Council President Robinson said this update has assumptions built into it that are very liberal. She said the likelihood of us growing into Sherwood West in 10 years is very slim but yet that is the assumption that has been incorporated into the master plan. She commented on other assumptions based on old data. She said she is concerned with adopting this master plan update as a basis to justify an increase in fees if the assumptions used are not an accurate forecast of reality in the next few years. Ms. Springer said in the West Urban Reserve she looked at a small area of that growing within the 10 year window but it amounts to 50,000 gallons out of the 2.3 million gallons that would be used on a daily basis. She said they were sensitive to the fact that there is a lot of unknowns in that area and it is her understanding the City has a limited amount of developable land within the City and the Brookman Annex has been rejected by the voters a few times so if the City is going to continue growing, growth will have to occur somewhere.

Council President Robinson referred to a statement in the packet that said based on proposed subdivision PUDs approved by the City in 2012 and 2013 it is assumes potential growth within the City limits for the next 3 to 5 years, and she is not sure what 3 to 5 years they are referring to. She said if the numbers are based on 2012 and 2013 has that changed since then.

Public Works Director Craig Sheldon said the information MSA used was based on the information they received from the Planning Department.

Ms. Springer referred to the statement read by Councilor Robinson and said that is referring to within the existing City limits and when they met with the Planning Department a year ago they were trying to determine what was a reasonable percentage of growth and the growth percentages put forth by Metro didn't meet the mark so they narrowed it based on the developments they had approved that were moving forward. She said it did not have a large impact overall.

Councilor Kuiper asked what is the alternative to doing a more liberal approach to water planning and she commented that a more conservative approach would not anticipate what could be. She said just because you have a storm water master plan that anticipates something in the future you at least have the plan and you don't have to work all of the plan you just work as you go. Ms. Springer said that is the intent especially with the CIP which has a lot of projects based on expansion.

Council President Robinson said the TEA is based on the growth estimated in 2010 which is five years old. She said Brookman is based on a 2009 concept plan. Planning Manager Brad Kilby said it is important to note that those are the most recent adopted and approved plans. He said the Planning Department knows that Sherwood grew fastest in the state with 3.4% growth. He said Sherwood will likely slow down with only 96 buildable acres within the existing City limits. He noted with the web and flow of development and the pressure from development it has to be planned for based on what has been adopted and approved. He said if land was annexed into the City they could not develop outside of the parameters of the adopted plan without coming before the Council for an amendment. He said it is the same with the TEA.

Council President Robinson referred to language stating that in shutting down well number 4 there is an associated cost of $25,000 to abandon the well for the transfer of water and she asked if that was all cost or fee related. Mr. Ginter responded that a lot of the cost is the physical abandonment of the well and there are some cost related to license transfer.

Council President Robinson commented on reserves for future improvement of replacement of the lines and said it states that City staff is recommending Sherwood allocate $50,000 annually for routine pipe replacement and she asked if that is a high or low number and do we have any reserves from past years to contribute. Ms. Springer said that is a low and palatable number and referred to the benefit of Sherwood having a great deal of new pipes that won't need replacement for some time. She said the goal of the pipe replacement project is to not spend money fixing leaks and the damage from potential leaks. She said it is intended to be a long term savings account.

Mr. Sheldon referred to the upcoming April Court project and noted that project alone will be over $50,000 with engineering and construction costs.

Council President Robinson asked if the $50,000 was part of the budget. Mr. Sheldon said that is for reserves.

Mr. Gall said both the TEA and Brookman Road Area have concept plans and Sherwood West Urban Reserve is working on a concept plan and asked if the water master plan will need to be updated when the concept plan is completed. Ms. Springer said that generally the plans get updated between 7 to 10 years. Mr. Gall said then this is a pre-concept plan.

Mr. Kilby noted that this is a pre-concept plan and noted that they have assumed 10 units per acre which is higher than Sherwood has historically developed out, which is 7.9 units per acre.

Deb Galardi with MSA presented a Water System Master Plan Update Financial Analysis (see record, Exhibit B) focusing on study elements, system development charges, financial plan and summary of recommendations. She stated system development charges (SDC) are a one-time charge at the time of connection or permit to recover capital investments to serve growth. She said state statutes provide guidelines for development and administration and eligible systems include water, wastewater, drainage, transportation, parks and recreation. She stated Oregon law allows for three SDC components which are reimbursement fees, improvement fees and compliance charge. She referred to the reimbursement fee and the improvement fee and said there is a combination of both fees needed to fully recover the cost of growth. She said they look at the major components of the systems to identify the growth costs and she provided examples. She stated most of the CIP is growth related. She noted based on all of their analysis

the SDCs decrease slightly based on the assumptions in the current master plan. She said the current SDC for a typical residential customer with a 5/8" meter is $6,726 and the revised is $5,592. She provided a regional SDC comparison and said it is system and methodology dependent and provided examples. She said for larger developments the fees are scaled on meter size and would also be below our current rates. She commented on comparisons with other municipalities and said Sherwood is unique with 94% of the allocated costs of the master plan are growth related.

Ms. Galardi said the financial plan is different than SDC and looks at operating costs, capital costs and annual cash flow of all of the costs of the system. She said the process looks at current sources of funds, existing reserves, current rates, SDCs, interest and miscellaneous fees. She said they forecast the costs and look at the CIP and different funding scenarios. She said the result is an annual projection of the costs, the available revenue and the gap is the revenue increase that is needed. She said this plan includes the 10 year capital improvement projects program and the inflation adjusted amount need is approximately $24 million and half of which is related to the supply and the other half is related to distribution and ongoing planning projects. She commented on the phasing of the CPI and said the question is the timing of the expansion for the treatment plant and based on what they know today they are projecting that project to occur in the beginning of the second five year window. She noted this is back loaded with most of the cost occurring in the second five year window. She said this gives an opportunity to phase in a plan for the next increment.

Mr. Gall referred to the WRWTP partners involved and asked who makes the decisions. Mr. Sheldon commented on the expansion of WRWTP and said as soon as both Wilsonville and Sherwood hit 12 mgd the State will require expansion. He said Wilsonville is in control of the plant and is a partner. He said it is based on demand and if partners come sooner the expansion will be sooner. He said consumption numbers are decreasing and that will prolong the expansion out to maybe 2023.

Ms. Galardi commented on the pattern of investment needs and the funding plan. She said Sherwood has $5 million of reserves. She stated the SDCs are projected to be a $2 million and said when there is a peak in the capital costs such as an expansion and there are not enough reserves to cover the cost debt is issued. She said they assumed the debt proceeds to be $10,200,000 and still need about $7 million in operating reserves or rate transfers. She said they are figuring that the entire reserve fund of $4.8 million be applied to these future projects.

Ms. Galardi discussed the revenue requirements which include the O&M (Operations and Maintenance) costs, existing debt and capital transfers. She referred to the current rate revenue and said it is not sufficient to fund any new capital and it just covers the O&M and the existing debt. She said in addition to capital reserves there are also operating reserves at $3 million. She said because the CIP is back loaded the existing reserves could be applied to near term improvements while building capacity in the rates to continue to fund the increase in O&M and to build capital. She said this plan takes the existing available reserves and utilizes them to smooth the revenue increases to allow incremental adjustment to the rates. She noted they try to make the best assumptions and there are a number of factors such as water sales stabilizing, deferral of WRWTP expansion, future partnering, slowdown in growth and an increased cost of borrowing.

Ms. Galardi discussed customer bill impacts and provided an example of a typical customer and said the portion related to water is only 40% of the total bill. She commented on projected increase on customer bills and said it is about a $2.20 month average increase in the first five years. She said if the revenue

slope remains what we are predicting, it would increase to $3.20 per month in the 2nd five year period. She said some revenue increases are needed to both fund O&M as well as to begin building the capacity to fund the CIP.

Council President Robinson asked if MSA typically goes through all of this analysis during the budget cycle when discussing SDCs or is this just because we are updating the master plan. Ms. Galardi said this is for the master plan.

Ms. Galardi provided a residential bill comparison with neighboring communities and discussion followed. Council President Robinson asked why Wilsonville's rates are $10 less than Sherwood. Ms. Galardi said it is based on when the investment was made and how it was structured.

Ms. Galardi concluded by stating there will be a slight reduction to the SDCs and the methodology needs to be available for review 60 days prior to a public hearing which has been done and the public hearing is scheduled for June 16, 2015. She referred to the financial plan with the recommendation to begin phasing in rate increases of 4% per year to build financial capacity for the next increment of supply and the ongoing distribution projects. She recommended monitoring the financial plan and updating projections in the next 2 to 3 years following completion of WRWTP facilities plan.

Councilor King referred to the SDC proposed rate reduction and asked how that affects the proposed 4% increase. Ms. Galardi said not much because of the issue of developable land. She said the unfortunate thing about SDCs is you have to build the capacity before the growth is here.

Ms. Springer said there is a public perception that there is discretion in determining how much growth should fund and how much rates should fund and she said there is a limit based on State law.

Councilor Henderson asked about the wheeling rate. Mr. Sheldon said Sherwood no longer pays a wheeling rate since segment 3 was built. He referred to potential partners becoming involved with WRWTP and discussed the benefits.

5. ADJOURN

With no further questions Mayor Clark adjourned the work session at 6:53 pm and convened to a regular Council meeting.

REGULAR SESSION

1. **CALL TO ORDER:** Mayor Clark called the meeting to order at 7:03 pm.

2. **COUNCIL PRESENT:** Mayor Krisanna Clark, Council President Sally Robinson, Councilors Linda Henderson, Dan King, Jennifer Harris, and Jennifer Kuiper. Councilor Beth Cooke was absent.

3. **STAFF AND LEGAL COUNSEL PRESENT:** City Manager Joseph Gall, Assistant City Manager Tom Pessemier, Police Chief Jeff Groth, Police Captain Mark Daniel, Police Captain Ty Hanlon, Administrative Assistant Angela Hass, Community Development Director Julia Hajduk, Library Manager Adrienne Doman Calkins, Public Works Director Craig Sheldon, Administrative Assistant Colleen Resch, and City Recorder Sylvia Murphy. City Attorney Chris Crean.

4. APPROVAL OF AGENDA:

MOTION: FROM COUNCILOR KUIPER TO APPROVE THE AGENDA, SECONDED BY COUNCILOR KING. MOTION PASSED 6:0, ALL PRESENT MEMBERS VOTED IN FAVOR. (COUNCILOR COOKE WAS ABSENT).

Mayor Clark addressed the next item on the agenda.

5. CONSENT AGENDA:

A. Approval of April 7, 2015 City Council Meeting Minutes
B. Resolution 2015-041 Appointing Meerta Meyer to the Budget Committee
C. Resolution 2015-042 Authorizing the City Manager to take actions necessary for accepting the State of Oregon Department of Transportation's request for transfer of State road right-of-way (portions of SW Langer Drive) into City jurisdiction and maintenance control
D. Resolution 2015-044 Authorizing appointment of Eric Kneifel to Parks and Recreation Board
E. Resolution 2015-045 Authorizing appointment of Brian Amer to Parks and Recreation Board

MOTION: FROM COUNCILOR HARRIS TO APPROVE THE CONSENT AGENDA, SECONDED BY COUNCILOR KUIPER. MOTION PASSED 6:0, ALL PRESENT MEMBERS VOTED IN FAVOR. (COUNCILOR COOKE WAS ABSENT).

Mayor Clark addressed the next item on the agenda.

6. PRESENTATIONS:

A. Proclamation, Recognition of Sherwood Resident

City Manager Gall asked Gregg Jacot to introduce Harriette Mandel to the Council. Mr. Jacot came forward with Mr. Mandel and said Ms. Mandel has been an active member of the community for over 70 years, is a role model for hard work, and inspires others with her positive attitude and on May 2 she will be 100 years old. Mayor Clark read a proclamation, presented it to Harriette Mandel recognizing and honoring her on her 100th birthday, and stated that on behalf of the City of Sherwood she proclaimed May 2, 2015 to be Harriette Mandel Day.

B. Oregon Accreditation Alliance

Oregon Accreditation Alliance Executive Director Ed Boyd presented Police Chief Groth with a certificate of re-accreditation. He stated the Oregon Accreditation Alliance exists to improve the quality of law enforcement agencies in the State of Oregon and ultimately the quality of services provided to the citizens of this state. He stated accreditation is about standards and accreditation means the department meets the best practice standards. He said in order to be accredited an agency must meet 102 professional standards comprised of over 400 separate requirements contained within those standards. He said in Oregon 36% of all law enforcement agencies are involved in the accreditation program which is up from 32% a year ago and only 23% of agencies currently hold state accreditation. He said in Oregon there are 61 agencies involved in accreditation and 39 agencies are accredited. He noted it takes courage for an agency to take on the rigorous accreditation process and that shows commitment, transparency and

dedication to excellence. He stated the Sherwood Police Department received the award in 2012 and is reevaluated and assessed every 3 years. He commended Accreditation Manager Angela Hass for her outstanding work in preparing the agency for re-accreditation.

C. Sherwood Main Street Presentation

Sherwood Main Street President Lee Weislogel and Treasurer Gregg Jacot provided the Council with a handout (see record, Exhibit C) and presented their annual report (see record, Exhibit D). Mr. Jacot said in 2011 the organization became a 501c3 and is part of the Oregon Main Street program. He said Oregon Main Street has four levels of Main Street programs and Sherwood Main Street is in the "transforming downtown" level. He said the Board of Directors is made up of Sherwood business owners. He stated the purpose of the program is to build a high quality, livable and sustainable Old Town community that will grow Sherwood's economy while maintaining a sense of place. He said their focus is to make Old Town a destination in the Portland area and they are interested in recruiting and maintaining businesses. He said they want to strengthen communication between the businesses, civic organizations, building owners, City government and the citizens and help put historic preservation back into the community. He said the mission is to preserve and revitalize. He provided information on the fixed costs of the organization and said any additional funding goes towards maps, signs and banners. He said most of the money received is Board funded and they received a donation for map printing. He explained what the organization would do if there was additional funding and explained the need for interns and volunteers.

Councilor Harris asked if the program is funded mostly by the Board of Directors. Mr. Jacot said that is correct.

Mayor Clark stated she was the liaison to Sherwood Main Street and commented on the hard work they do and she commended them for their dedication to Old Town Sherwood.

Councilor Kuiper commented on their ideas and asked how they were classified into the "transforming downtown" category. Mr. Weislogel said there is a list of criteria and it requires various training with the Oregon Main Street coordinator. He said when the state sees that progress has been made they classify the program. Mr. Jacot said the state requires the organization to make a quarterly report and they review it to see that the downtown is continuing to transform.

Mayor Clark thanked Mr. Weislogel and Mr. Jacot and addressed the next item on the agenda.

7. CITIZEN COMMENTS:

None.

Mayor Clark addressed the next item on the agenda.

8. NEW BUSINESS:

A. Resolution 2015-043 Authorizing the City Manager to sign an Intergovernmental Agreement (IGA) with the Washington County Emergency Management Co-operative for the purpose of becoming a partner agency

Police Chief Groth stated the Council was provided information, including possible financial costs and benefits of joining the Washington County Emergency Management Co-operative (EMC) during the March 17, 2015 Council work session. He recapped the staff report and commented on the benefits of being part of a team and the benefit of additional expertise. He noted the City Manager is proposing $10,000 for FY 2105 to be a full voting member of the Co-Op. He said Washington County pays 51% of the cost of the Co-Op and the remaining partner agencies pay 49%.

Mayor Clark commented on the importance of partnering with our neighbors and asked what other cities have joined the Co-Op. Washington County EMC Director Scott Porter said the partners include TVFR, Beaverton, Tigard, Forest Grove, Cornelius, Washington County and Clean Water Services.

Councilor Henderson referred to page 33 of the packet and asked why the effective date of the IGA is 2013. Mr. Porter explained that the original EMC agreement went into effect on July 1, 2013 and will remain in effect until June 30, 2018 unless it is renewed. He said Sherwood will become a partner effective the date the IGA is signed.

With no other questions, the following motion was received.

MOTION: FROM COUNCILOR HENDERSON TO APPROVE RESOLUTION 2015-043, SECONDED BY COUNCILOR KING. MOTION PASSED 6:0, ALL PRESENT MEMBERS VOTED IN FAVOR. (COUNCILOR COOKE WAS ABSENT)

Mayor Clark addressed the next item on the agenda.

9. PUBLIC HEARING

A. Ordinance 2015-004 Amending Chapter 7 of Volume II of the Sherwood Comprehensive Plan and adopting the Sherwood Water System Master Plan

The City Recorder read the public hearing statement.

Planning Manager Brad Kilby recapped the staff report and said staff recommends the Council conduct their first hearing and reading and schedule the second hearing and reading for May 5, 2015 and approve Ordinance 2015-004.

Heidi Springer with MSA provided a presentation (see record, Exhibit E) regarding the proposed Sherwood Water System Master Plan including plan overview, water supply, distribution systems, recommended projects and the Capital Improvement Program (CIP). She said the purpose of a water system master plan is to comply with state drinking water program requirements and the goal is to create a long term guidance document that evaluates the existing water system and plans for future facility upgrades to serve potential growth and expansion of the water system. She stated the plan documents existing water system facilities and creates an estimate of potential growth within the water service area and potential expansion through a 20 year planning horizon. She said they established criteria for evaluating the water system and identified deficiencies within the existing system. She said the deficiencies are addressed with recommended improvement projects which are presented in a capital improvement program. She noted the CIP sets costs to recommended projects and a prioritization as to when the projects may occur. She said the primary facilities they examined where the water supply and

the distribution system. She said the City's current supply comes from the Willamette River Water Treatment Plan (WRWTP) in Wilsonville and the existing 5 million gallon per day capacity that Sherwood owns meets existing peak demands and the existing wells within the City are used to provide emergency backup supply. She commented on the current supply, and said there is no need to continue purchasing water from Portland. She said future water supply would be anticipated when and if growth occurs and it would come from the WRWTP. She stated there is some capacity remaining there for growth that Sherwood already owns and has constructed.

She commented on the distribution systems and said they evaluated the storage and pump stations and all of the facilities have the capacity to meet projected demands through the 20 year planning horizon. She said there are a few new pump stations that are recommended to service growth beyond 20 years. She noted for the distribution piping they used a computerized hydraulic model to evaluate the pipes and mainly focusing on fire flow capacity and adequate pressure. She said based on the evaluation they recommended WRWTP upgrades to serve existing and future customers and in the long term planning for a WRWTP capacity expansion as growth occurs. She said pump stations are recommended to serve future growth in the long term. She discussed planning and operation improvements and said the City is due for a SCADA system upgrade and due a resiliency plan which looks at response and recovery goals in the event of an earthquake.

She discussed the CIP and said the goal is to provide a roadmap for the City to plan long term improvements for the water system and for projects to serve existing customers and those that provide for growth if it occurs. She said the prioritization of projects within the CIP is reviewed annually through the City's budgeting process. She commented on the projects identified within the CIP and $34 million would be expected to serve growth within the system and only $2.2 million for existing facilities for existing customers.

Brad Kilby said in this process the Sherwood Comprehensive Plan will need to be updated. He said the Sherwood Comprehensive Plan is a plan for all things within the City and Chapter 7 is dedicated to public facilities. He said within this chapter the existing conditions, future growth assumptions, needs and improvement to the water system are discussed. He said the plan serves as a long term document. He said the proposed plan amendments would update the table of contents, update objective B.7 to remove old plan dates and make relevant to the current time period, and change the Unified Sewer Agency to Clean Water Services. He said the entire section of the chapter discussing the water system plan will be removed to coincide with what is being proposed under this Water System Master Plan for 2015. He said if approved the adopted the Water System Master Plan would be included as an appendix to the Sherwood Comprehensive Plan. He noted the Comprehensive Plan was not updated with the Water System Master Plan in 2005 and they will also amend the Comprehensive Plan for the Sewer Master Plan and the Storm Water Master Plan as they are updated. He said the proposed amendments will not adjust fees or rates. He said the Planning Commission held a public hearing and recommends the Council approve the proposed amendments to Chapter 7 of the Comprehensive Plan, adopt the Water System Master Plan and adopt it as an appendix to the Comprehensive Plan.

Mayor Clark opened the public hearing. With no public testimony received, Mayor Clark closed the public hearing.

Mayor Clark said prior to this meeting the Council had a work session regarding this issue and most of their questions were answered.

With no other questions, the following motion was received.

MOTION: FROM MAYOR CLARK TO APPROVE ORDINANCE 2015-004 AND PLACE IT ON THE NEXT AVAILABLE COUNCIL MEETING AGENDA FOR ADDITIONAL PUBLIC COMMENT AND CONSIDERATION AMENDING CHAPTER 7 OF VOLUME II OF THE SHERWOOD COMPREHENSIVE PLAN AND ADOPTING THE SHERWOOD WATER SYSTEMS MASTER PLAN. SECONDED BY COUNCILOR HENDERSON, MOTION PASSED 6:0, ALL PRESENT MEMBERS VOTED IN FAVOR. (COUNCILOR COOKE WAS ABSENT)

Mayor Clark clarified that the next regular Council meeting is May 5, 2015 and the meeting scheduled for April 28 is a special City Council meeting.

Mayor Clark addressed the next item on the agenda.

10. CITY MANAGER REPORT:

None.

Mayor Clark addressed the next item on the agenda.

11. COUNCIL ANNOUNCEMENTS:

Mayor Clark commented on the previous weekend activities including Council Adopt-a-Road Clean-up, Trashpalooza and WCCLS Art of Story. She commented on the lack of garbage on the road and shared a story of two residents the Council met that said they clean that stretch of road regularly. She thanked those residents for their dedication and pride and offered to recognize them in public if they wish to come forward. She stated the 3rd annual Trashpalooza was the second largest SOLV event in the state with 125 participants and 15 teams and said they filled a 3 yard dumpster donated by Pride Disposal. She said PGE sponsored the event and the CEO Jim Piro was on the PGE team. She thanked Nadia Belov, the student who started the program, and noted that every year there is less trash. She thanked everyone that participated. She said WCCLS Art of the Story was held on Saturday night at the Sherwood Center for the Arts with Rose's catered the event and 503 Uncorked served wine. She commented on the large audience and said that over half were from outside Sherwood. She said she attended the Green Heron event for Tualatin River Keepers along with Councilor Kuiper. She said this is the fundraising event for the Tualatin River Keepers who are the people that support the Tualatin River Natural Wildlife Refuge. She said Councilor Kuiper serves as the liaison to the Friends of the Refuge and thanked her for coming. She thanked City Manager Gall for initiating the community leadership event last week to start the discussion about suicide prevention. She said there was a large group from Washington County and she thanked Washington County Suicide Prevention Coordinator Amy Baker for speaking to the group. She said the presentation was very informative and announced there will be another event in May with a targeted date for May 21. She said attendees included the School Board, many leaders from the youth sports community and many faith community leaders as well as Councilors Harris, Robinson and Kuiper. She said they want to give everyone an opportunity to attend and to come up with a plan in Sherwood. She said talking about problems is how you solve problems. She said Sheriff Pat Garrett and Chief Groth will be hosting our State Senator and State Representative at our Town Hall for Measure 91 at the Sherwood Police Department at 6:30 pm on April 29. She announced that she will not be attending and will be with Metro JPAC lobbying in Washington DC.

Councilor Kuiper said she attended the Volunteer Appreciation dinner on April 14 and said there were several volunteers from the library and the Police Department. She said the Sherwood High School will be presenting the musical "Thoroughly Modern Millie" April 23-24 and April 30 and May 1-2 at 7:30 pm. She commented on the talent in Sherwood and encouraged everyone to attend.

Councilor Henderson stated the Sherwood High School Mixolydians won the 4th Annual Rose City Sing Off and will be preforming at the Portland Rose Parade and the Queen's Coronation. She attended the Community Development Block Grant meeting and they adopted the draft of the 2015-2020 Consolidated Action Plan which will go to the county for approval. She said Meals on Wheels has a new CEO and a new Chief Operating Office and they are planning on visiting every center. She thanked the Public Works staff for helping improve the patio and IT Director Brad Crawford for coming to the Senior Center and helping a senior with the computer. She announced that on May 1 the Laurel Ridge Choir will perform at the Senior Center and today the seniors took a bus trip to Tacoma with 24 attending seniors. She thanked the Sherwood Friends Church for donating the bus. She said she did not attend the last Police Advisory Board meeting and asked staff for a status report.

Chief Groth said the Board meeting focused on expanding introductions and getting to know each member.

Councilor Henderson announced the Senior Center has a Steering Committee meeting tomorrow and she will have a report on facility issues at the next meeting.

Council President Robinson thanked Mr. Gall for organizing the meeting with the community leaders regarding suicide prevention and thanked Councilor Harris for asking Mr. Gall to start the conversation. She commented on the information presented and said she did not know suicide was such an epidemic in our society. She said it is an issue that needs to be discussed as well as all mental health issues. She said discussion will be valuable to community leaders and Sherwood was the first community to request a suicide prevention presentation from the county and noted that we are ahead of the curve. She commented on possible outreach on the website. She encouraged everyone to attend future suicide prevention meetings and said it is not just youth but seniors are also at risk. She announced the Westside Economic Alliance is having a meet and greet West Side Mayors event and Mayor Clark will speak at the event. She said there will be a Special City Council meeting next Tuesday for the first reading of a proposed medical marijuana ordinance that was recommended by the Planning Commission. She will be attending a medical marijuana forum next Wednesday with State Representative Davis and State Senator Thatcher and said Representative Davis has welcomed feedback and said it is important to tap into new resources and make sure our voices are heard. She said she is impressed with Mayor Clark's efforts to explore matters on the state level that can benefit Sherwood. She said Sherwood West Concept Plan Citizen Advisory Committee will be having an open house on May 21 and she commented on the work of the consultant.

Councilor Harris commented on the suicide prevention meeting and said Oregon has the 9th highest rate of suicide and the highest category is men 65 and older. She said one of the myths is that if someone is going to commit suicide there is nothing you can do and she learned that is not true. She said talking about suicide is something we can do. She stated the reason the Council is talking about it is because talking is the first step. She said suicide effects a lot of people and Sherwood is the first City to have Ms. Baker provide training and she thanked Mr. Gall for bringing all of the entities together. She said the forum included coaches, City Council, schools and clergy. She said the purpose was to help mental

health in our community. She said the suicide crisis line is 503-291-9111. She is excited to learn more and take the information out into the community and make Sherwood a zero suicide community. She said the library has several events listed on the website and recognized Library Manager Adrienne Calkins. She said at the Library Committee meeting Ms. Calkins shared stories of her interactions with patrons and said she has a positive outlook about the library. She commented on the library programs that Ms. Calkins has instituted to get people interested in the library. She said the Cultural Arts Committee did not meet. She announced the Edy Ridge Carnival is Friday from 5:30 pm to 8:30 pm and encouraged everyone to attend. She said they are asking for donations of 2 liter sodas for the ring toss.

Councilor King commented on being the new liaison to Sherwood Main Street and said their website address is www.sherwoodmainstreet.org. He said their theme for this year is *Sherwood One Community for Everyone* and the meetings are open and are on the 3rd Thursday of the month at 8:00 am at the Rebekah Lodge.

Mayor Clark addressed the next item on the agenda.

12. ADJOURN:

MOTION TO ADJOURN: COUNCILOR KUIPER MOTIONED TO ADJOURN, SECONDED BY COUNCILOR HARRIS. MOTION PASSED 6:0, ALL PRESENT MEMBERS VOTED IN FAVOR. (COUNCILOR COOKE WAS ABSENT)

Mayor Clark adjourned the meeting at 8:15 pm.

Submitted by:

Sylvia Murphy, MMC, City Recorder

Krisanna Clark, Mayor

City Council Meeting Date: May 5, 2015

Agenda Item: New Business

TO: Sherwood City Council

FROM: Craig Sheldon, Public Works Director
Through: Joseph Gall, ICMA-CM, City Manager

SUBJECT: **Resolution 2015-046 authorizing the City Manager to execute a construction contract with Brix Paving Northwest for the Sunset Boulevard and April Court Pavement Rehabilitation Project**

Issue:
Should the City Council authorize the City Manager to execute a construction contract with Brix Paving Northwest for pavement replacement on SW Sunset Boulevard and SW April Court?

Background:
The City of Sherwood has a Pavement Management program that identifies paving projects for each year. The FY2014-15 budget identified the need to resurface SW Sunset Boulevard from Highway 99 to SW Heatherwood Lane. During the inspection many severe structural issues were observed (Pavement Condition Index of 53/100), which will have the potential to jeopardize the city's ability to maintain the drivability along this street.

Also, during routine facilities inspections, staff identified the need to resurface SW April Court from west of SW Upper Roy Street. During the inspection many severe structural issues were observed (Pavement Condition Index of 42/100), which also have the potential to jeopardize the city's ability to maintain the drivability along this street. The proposed repaving work would occur after an upcoming water line construction within SW April Court, which will further damage the asphalt surface.

Based on the severity of the rating and number of defects found, Public Works has proposed these sections of public streets to be replaced this spring/summer.

The SW Sunset Boulevard portion of the project will include grinding the surface of SW Sunset Boulevard and resurfacing with asphalt in areas showing lighter deterioration. A full depth repair will occur at the intersection of SW Sunset Boulevard and SW Timbrel Lane where the pavement is showing more severe deterioration. This will provide increased longevity of the intersection. The SW April Court portion of the project includes removal of the existing asphalt and treating the existing base with cement and installing a new asphalt surface.

The project was advertised for bid on April 8 and 10, 2015 with a mandatory pre-bid meeting occurring on April 14, 2015. Bid proposals were opened on April 23, 2015 at 2:00 pm. The Notice of Intent to Award was issued on April 24, 2015 and the 7 day protest period has expired as of May 1, 2015 with no protest.

Traffic will be impacted during the construction of the SW Sunset Boulevard street improvements. One direction of traffic within SW Sunset Boulevard is proposed to be maintained at all times with the other direction of traffic being routed through a signed detour. Advance notice has been sent out to Sherwood school bus services, Middleton Elementary School and the YMCA. Additional notifications will be sent out after passage of this resolution.

A Notice of Award will be issued on approval and adoption of the Resolution. If City Council approves, a contract will be issued to Brix Paving Northwest for the approved construction cost of $339,569.88.

City staff expects the work to begin on or around Monday, May 11, 2015 and to be completed by June 30, 2015.

Financial Impacts:
The lowest responsive bid for the construction of the street improvements is $339,569.88. An additional $50,935.48 (15%) for construction contingencies is recommended to cover unforeseen construction issues or differing site conditions. The total contract shall not exceed $390,505.36 Funding for the project will come from City of Sherwood Street Operation Fund.

Recommendation:
Staff respectfully requests City Council adoption of Resolution 2015-046 authorizing the City Manager to execute a construction contract with Brix Paving Northwest for the Sunset Boulevard and April Court Pavement Rehabilitation Project.

City of Sherwood Oregon
Home of the Tualatin River National Wildlife Refuge

RESOLUTION 2015-046

AUTHORIZING THE CITY MANAGER TO EXECUTE A CONSTRUCTION CONTRACT WITH BRIX PAVING NORTHWEST FOR THE SUNSET BOULEVARD AND APRIL COURT PAVEMENT REHABILITATION PROJECT

WHEREAS, the City of Sherwood needs to replace the deficient pavement surface within SW Sunset Boulevard and SW April Court; and

WHEREAS, the City has budgeted and will pay for the construction cost through the City of Sherwood Street Operation Fund; and

WHEREAS, the City completed the design and produced bid documents to solicit contractors using a competitive bidding process meeting the requirements of local and state contracting statutes and rules (ORS 279C, OAR 137-049); and

WHEREAS, the City opened bids on April 23, 2015, reviewed all bid proposals and identified Brix Paving Northwest as the lowest responsive bidder.

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

Section 1: The City Manager is hereby authorized to execute a contract with Brix Paving Northwest in an amount not to exceed $390,505.36 for the completion of the Sunset Boulevard and April Court Pavement Rehabilitation Project.

Section 2: Subject to the limitations of local and state contracting rules, the City Manager is hereby authorized to execute contract change orders for a total amount not-to-exceed 15% of the original award ($339,569.88).

Section 3: This Resolution shall be in effect upon its approval and adoption.

Duly passed by the City Council this 5th day of May 2015.

_____
Krisanna Clark, Mayor

Attest:

_____
Sylvia Murphy, MMC, City Recorder

City Council Meeting Date: May 5, 2015

Agenda Item: New Business

TO: Sherwood City Council

FROM: Joseph Gall, ICMA-CM, City Manager
Through: N/A

SUBJECT: **Resolution 2015-047 Approving the Intergovernmental Agreement (IGA) with Metro for Solid Waste Community Enhancement Program**

Issue:
Shall the City Council approve a proposed IGA with Metro for the Solid Waste Community Enhancement Program?

Background:
Metro recently adopted a new ordinance for the existing solid waste community enhancement program in Metro Code Chapter 5.06, which has not been comprehensively revised since its inception in 1988. Under the existing program, a fee ($0.50 per ton) is collected on solid waste at the Metro Central Transfer Station (Portland), Metro South Transfer Station (Oregon City) and the Forest Grove Transfer Station. The collected funds are used for community enhancement projects in the vicinity of these solid waste facilities. Effective July 1, 2015, the new code revisions will increase the fee to the state maximum of $1 per ton, and extend the program to all solid waste facilities in the region that qualify under Metro's updated program.

Sherwood is host to one of the solid waste facilities (Pride Recycling Company) that has not been part of the previous program. Starting on July 1, 2015, Pride Recycling Company's facility here in Sherwood will be subject to the Community Enhancement Fee per their franchise agreement with Metro. This proposed IGA between Metro and the City of Sherwood will enable those new fees to be distributed back to the City of Sherwood for use on projects and programs that meet the eligibility criteria within the Solid Waste Community Enhancement Program as defined in Chapter 5.06 of the Metro Code. In the City Manager's proposed budget for FY2015-16, these funds will be used for development of an enhanced recycling program in city parks and facilities and development of the city's first community garden.

The City Council was previously briefed about the revised Metro ordinance and its applicability to Sherwood in a work session held on March 3, 2015. It is important to note that if the City Council made the decision to not agree to participate in the Metro Solid Waste Community Enhancement Program, the fees would still be collected at the Pride Recycling Company's Sherwood facility, but Metro would retain the collected funds. City staff would prefer to see those funds come back to the City of Sherwood.

Financial Impacts:
Based upon previous tonnage reports to Metro from the Pride Recycling Company facility here in Sherwood, we are projecting to receive $70,000 in funds in FY2015-16.

Recommendation:
Staff respectfully recommends approval by City Council of Resolution 2015-047 approving the IGA with Metro for the Solid Waste Community Enhancement Program

DRAFT

City of Sherwood Oregon

Home of the Tualatin River National Wildlife Refuge

RESOLUTION 2015-047

APPROVING THE INTERGOVERNMENTAL AGREEMENT WITH METRO FOR SOLID WASTE COMMUNITY ENHANCEMENT PROGRAM

WHEREAS, the Metro Solid Waste Code is set forth in Title V of the Metro Code; and

WHEREAS, Metro Solid Waste Code Chapter 5.06 contains the requirements for Community Enhancement Programs; and

WHEREAS, under the previous version of Chapter 5.06, a solid waste enhancement fee of $.50 per ton is collected on waste at three transfer stations in the region – Metro Central, Metro South, and Forest Grove; and

WHEREAS, the regional solid waste system has grown and changed significantly since 1990; and

WHEREAS, Metro recently updated Chapter 5.06 concerning the community enhancement program to include additional eligible facilities, provide a clear process for collecting and distributing the fee, increase the fee to account for inflation, and establish an enhancement program framework for the future; and

WHEREAS, Pride Recycling Company's transfer station facility located within the City of Sherwood is a facility that is now subject to the new code provisions within Chapter 5.06; and

WHEREAS, the City of Sherwood as a host of this facility has the opportunity to participate in the Metro Community Enhancement Program; and

WHEREAS, the proposed Intergovernmental Agreement (IGA) with Metro outlines the requirements of both Metro and the City of Sherwood to implement the provisions of the Community Enhancement Program.

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

Section 1. The City Manager is authorized to sign the IGA, attached as Exhibit A, with Metro for the Solid Waste Community Enhancement Program.

Section 2. This Resolution shall be effective upon its approval and adoption.

Duly passed by the City Council this 5th day of May 2015.

_____
Krisanna Clark, Mayor

Attest:

_____
Sylvia Murphy, MMC, City Recorder

METRO

Intergovernmental Agreement

600 NE Grand Ave.
Portland, OR 97232-2736
(503) 797-1700

METRO CONTRACT NO. 933297

INTERGOVERNMENTAL AGREEMENT

THIS AGREEMENT, entered into under the provisions of ORS Chapter 190, is between Metro, a Metropolitan service district organized under the laws of the State of Oregon and the Metro Charter, located at 600 NE Grand Avenue, Portland, Oregon 97232-2736, and the City of Sherwood (the "City") an Oregon municipal corporation, whose address is 22560 SW Pine Street, Sherwood, Oregon 97140.

Section 1: Purpose

The purpose of this Agreement is to implement the provisions of Metro Code Chapter 5.06 related to the establishment of a Solid Waste Community Enhancement Program ("program") for the Pride Recycling Company transfer station located at 13980 SW Tualatin-Sherwood Road, in Sherwood, Oregon.

Section 2: Term

This Agreement begins on July 1, 2015 and terminates on June 30, 2020. The parties may agree to terminate this Agreement earlier. Metro may terminate this Agreement under Section 8. The parties may extend the term of the Agreement by written amendment.

Section 3: Collection and Distribution of Community Enhancement Fee Funds

A. Under the terms of Metro Franchise No. F-002-08, Metro requires Pride Recycling Company (the "facility") to collect and remit to Metro a solid waste community enhancement fee of $1.00 per ton for all putrescible solid waste, including yard debris mixed with food waste, and food waste received at the facility.

B. Metro will send to the City the solid waste community enhancement fee funds ("funds") collected in A. above by January 31, April 30, July 31, and October 31 of each year this Agreement is in effect beginning October 31, 2015.

C. At the request of the City, Metro will provide quarterly reports of activity at the facility, including data on (l) the gross weight of solid waste received in vehicles that are weighed as they enter the facility; (2) the number of other vehicles assessed fees on an estimated volume basis; and (3) the tonnage of solid waste transferred from the facility.

D. At the request of the City, Metro will assist with the establishment and implementation of the program.

METRO

Intergovernmental Agreement

600 NE Grand Ave.
Portland, OR 97232-2736
(503) 797-1700

E. The Metro Councilor for the district where the facility is located shall have the option to serve on the community enhancement committee (as provided in Section 4B) including without limitation as: 1) a member of the committee with voting rights, 2) co-chair of the committee with voting rights, or 3) non-membership on the committee (with notification of committee meetings and actions only). The Metro Councilor may change their participation role by notifying the committee at the beginning of the calendar year. Whenever a new Metro Councilor is elected or appointed, they will indicate their preferred role to the committee within 90 days of taking office.

Section 4: City Obligations

A. The City shall establish and implement a program that complies with Metro Code Chapter 5.06 (Exhibit A), and Metro Administrative Procedures (Exhibit B). Exhibits A and B are incorporated into this Agreement and are binding on the City.

B. The City shall establish a solid waste community enhancement program advisory committee ("committee") that complies with Exhibit A and Exhibit B. The City shall ensure that the committee fulfills its duties, including without limitation establishment of a solid waste community enhancement area boundary and compliance with Exhibits A and B. The committee membership shall include the mayor or chief executive officer of the City, three citizens of the City appointed by the Mayor, and the Metro Councilor (as provided in Section 3E) whose district includes the City. The City may include additional members at its discretion. Alternatively the City and the Metro Councilor (as provided in Section 3E) whose district includes the City shall perform the functions of the committee.

C. The City shall create a separate program account for deposit of the funds collected under Section 3. The City shall ensure that only projects chosen by the committee receive these funds. The City shall carry forward any funds not expended during a budget year to the following year. The City shall not use the funds for general government purposes.

D. The City shall promote the program within the solid waste community enhancement program boundary area. The City shall publish information about the program, including without limitation funding criteria, goals, application process, and timeline, on its website and in the local newspaper.

E. The City shall require the committee to provide an open public process for project review and selection.

F. The City shall require the committee to review an annual budget. The budget shall identify the expected distribution of funds for projects during a fiscal year. The committee may propose that there be no distribution of funds during a fiscal year, for a maximum of three consecutive years.

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600 NE Grand Ave.
Portland, OR 97232-2736
(503) 797-1700

G. The City shall ensure funding decisions are made by a majority vote of the committee. Funding for projects or programs sponsored by the city, city advisory committees, departments or special districts shall be approved at the discretion of the committee, and shall not be limited by Metro Administrative Procedures section 6.1.2.4.

H. The City shall provide all necessary support to administer the program. The City may charge the fund no more than 20% of the annual program budget, not to exceed $50,000, for the direct costs of administering the program. Direct costs include staff time and materials.

I. No later than October 1 of each year beginning in 2016, the City shall provide a written report to Metro on the program that includes revenues and expenditures of the program funds and the fund balance carried forward, if any. The report also shall include a general accounting of any funds expended for program administration.

J. The City shall maintain complete and accurate records related to the administration of the program and all funds expended and carried forward, and shall make these records available to Metro for inspection, auditing and copying.

Section 5: Notices

Legal notice provided under this Agreement shall be delivered personally or by certified mail to the following individuals:

For the City:
Office of City Counsel
City of Sherwood
22560 SW Pine Street
Sherwood, OR 97140

For Metro:
Office of Metro Attorney
Metro
600 NE Grand Avenue
Portland, OR 97232-2736

Management of this Agreement will be conducted by the following designated Project Managers:

For the City:
Joseph Gall, City Manager
City of Sherwood
22560 SW Pine Street
Sherwood, OR 97140
(503) 625-4200

For Metro:
Heather Nelson Kent
Metro
600 NE Grand Ave.
Portland, OR 97232
(503) 797-1739

The City may change the above-designated Project Manager by written notice to Metro. Metro may change the above-designated Project Manager by written notice to the City.

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(503) 797-1700

Section 6: Indemnification

Subject to the limits of the Oregon Constitution and Oregon Tort Claims Act, the City shall hold harmless Metro, its officers and employees from any claims or damages or property or injury to persons or for any penalties or fines, for the City's actions under this Agreement.

Section 7: Dispute Resolution

The parties shall attempt to negotiate resolutions to all disputes arising out of this Agreement.

Section 8: Termination or Modification

During the term of this Agreement, each party retains the right to terminate the Agreement as of any anniversary date by written notice delivered to the other party no later than 60 days prior to the anniversary date. The parties may terminate this Agreement at any time for nonperformance of any material term thereof. Metro may modify or terminate this Agreement related to changes based on a substantive amendment, renewal or termination of the Metro franchise issued to the facility described in Section 3A.

Section 9: Insurance

The City agrees to maintain insurance levels, or self-insurance in accordance with ORS 30.282, for the duration of this Agreement to levels necessary to protect against public body liability as specified in ORS 30.270. The City also agrees to maintain for the duration of this Agreement, Workers' Compensation Insurance coverage for all its employees as a self-insured employer, as provided by ORS chapter 656, or disability coverage under its Disability, Retirement and Death Benefits Plan.

Section 10: Integration and Amendment

This writing contains the entire Agreement between the parties, and may only be amended by written instrument, signed by both parties.

Section 11: Severability

If any portion of this Agreement is found to be illegal or unenforceable, this Agreement nevertheless shall remain in full force and effect and the offending provision shall be stricken.

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(503) 797-1700

Section 12: Notice of Default

If a party determines that a default exists, that party shall give thirty days' written notice to the other party, which notice shall specify the nature of the default and shall give the other party an opportunity to cure the default before taking any further action.

City	Metro
By:_____	By:_____
_____	Martha J. Bennett
Print name and title	Print name and title
_____	_____
Date	Date

BM:bjl
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CHAPTER 5.06

SOLID WASTE COMMUNITY ENHANCEMENT PROGRAM

(Formerly Metro Code Chapter 5.06 "Community Enhancement Programs" repealed and replaced by Ordinance No. 14-1344, Sec. 1.)

5.06.010 Policy and Purpose

It is the policy of Metro to establish and implement a solid waste community enhancement program at all eligible solid waste facilities in the Metro region. The purpose of the program is to rehabilitate and enhance the area around the facility from which the fees are collected.

5.06.020 Authority and Jurisdiction

Metro's solid waste authority, including the authority to collect an enhancement fee and establish and implement a solid waste community enhancement program, is established under the Oregon Constitution, ORS Chapters 268 and 459, and the Metro Charter.

5.06.030 Amount of Enhancement Fee

Solid waste facilities subject to this chapter shall collect an amount not exceeding $1.00 on each ton of putrescible solid waste delivered to the facility and remit the funds to Metro for use as a solid waste community enhancement fee. Eligible solid waste facilities may also collect an amount not exceeding $1.00

on each ton of non-putrescible waste delivered to the facility when the Metro Chief Operating Officer and facility owner determines it is in the public interest. Metro will set the rate of the enhancement fee under Metro Code Section 5.02.020.

5.06.040 Enhancement Fee Requirements and Exemptions for Solid Waste Facilities

(a) Solid waste facilities that operate all or in part as disposal sites, transfer stations, reload facilities, compost facilities, and energy recovery facilities, as defined by Chapter 5.00, shall collect and remit an enhancement fee under this Chapter.

(b) Where only a portion of a solid waste facility's operations qualify for collection of a fee under subsection (a), the facility shall collect and remit an enhancement fee only on the solid waste it accepts as an eligible facility.

(c) Notwithstanding section (a) above, yard debris reload and yard debris composting facilities are not subject to the requirements of this Chapter.

5.06.050 Establishment of a Solid Waste Community Enhancement Program

(a) Upon approval of a license or franchise application, the Metro Chief Operating Officer will inform a solid waste facility of the requirement to collect a solid waste community enhancement fee. The Metro Chief Operating Officer will require collection of the fee in the facility license or franchise.

(b) The Metro Chief Operating Officer will inform the local government where the facility is located that a solid waste community enhancement fee will be collected by the facility and remitted to Metro.

(c) The solid waste community enhancement program will be administered by (1) Metro directly or through a contract; or (2) the local government where the facility is located, so long as Metro and the local government agree on the terms of an intergovernmental agreement.

(d) The Metro Councilor for the district where the facility is located shall be eligible to participate in the solid waste community enhancement program, including without limitation participation as a co-chair and voting member of the community enhancement committee, regardless of whether Metro or

the local government, through an intergovernmental agreement, administers the program.

(e) The Metro Chief Operating Officer will establish a timeline for implementation of a solid waste community enhancement program.

(f) The funds collected and remitted to Metro shall be used for solid waste community enhancement projects chosen by a community enhancement committee and may include administrative costs in an amount set by the Metro Chief Operating Officer.

5.06.060 Solid Waste Community Enhancement Program Advisory Committee

A solid waste community enhancement program established under this section shall have a solid waste community enhancement committee. The committee is responsible for implementation of the program, including without limitation:

(a) Establishment of the enhancement area boundary.

(b) Creation of committee bylaws.

(c) Development of a process for soliciting and selecting solid waste community enhancement projects.

(d) Compliance with the eligibility criteria set forth in Section 5.06.070 and the goals set forth in Section 5.06.080 and creation of additional criteria and goals where needed.

(e) Annually review enhancement program revenue estimates provided by Metro staff and propose how these funds will be allocated for the upcoming fiscal year or funding cycle.

(f) Presentation of an annual report to the Metro Council on all projects approved for funding.

(g) Maintenance of complete and accurate records related to the administration of the program, submitted to Metro annually.

5.06.070 Eligibility Criteria for Solid Waste Community Enhancement Projects

A solid waste community enhancement project must meet the following criteria to be eligible for funding. A solid waste community enhancement committee may apply more restrictive eligibility criteria:

(a) The project must be located in the solid waste community enhancement area boundary as specified by the solid waste community enhancement committee or the project must benefit individuals or programs located inside the solid waste community enhancement area boundary.

(b) The project applicant must be:

(1) A non-profit organization, including without limitation a neighborhood association or charitable organization with 501(c)(3) status under the Internal Revenue Service; or

(2) A school or institution of higher learning; or

(3) A local government, local government advisory committee, department or special district provided that they include documented support from the local government executive officer.

(c) The project must not be used to replace any other readily available source of federal, state, local or regional funds.

(d) The project must not promote or inhibit religion.

(e) The project must not discriminate based on race, ethnicity, age, gender, or sexual orientation.

(f) If the project is located on private land, the project application must establish a clear public benefit and must document landowner permission.

5.06.080 Goals for Solid Waste Community Enhancement Projects

Projects shall meet one or more of the following goals and solid waste community enhancement committees shall give priority to projects that best meet with goals. A solid waste community enhancement committee may adopt additional funding goals. The project will:

(a) Improve the appearance or environmental quality of the community.

(b) Reduce the amount or toxicity of waste.

(c) Increase reuse and recycling opportunities.

(d) Result in rehabilitation or upgrade of real or personal property owned or operated by a nonprofit organization having 501(c)(3) status under the Internal Revenue Code.

(e) Result in the preservation or enhancement of wildlife, riparian zones, wetlands, forest lands and marine areas, and/or improve the public awareness and the opportunities to enjoy them.

(f) Result in improvement to, or an increase in, recreational areas and programs.

(g) Result in improvement in safety.

(h) Benefit youth, seniors, low income persons or underserved populations.

5.06.090 Compliance and Dispute Resolution

The Metro Chief Operating Office is responsible for ensuring compliance with this Chapter.

5.06.100 Administrative Procedures

(a) The Metro Chief Operating Office may issue administrative procedures to implement this chapter.

(b) The Metro Chief Operating Officer shall issue or substantially amend the administrative procedures for this chapter only after providing public notice and the opportunity to comment on the proposed language.

(c) The Metro Chief Operating Officer may hold a public hearing on any proposed new administrative procedures or on any proposed amendment to any administrative procedure if the Metro Chief Operating Officer determines that there is sufficient public interest.

(Ordinance No. 14-1344, Sec. 1.)

Exhibit B to Metro Contract No. 933297

METRO

SOLID WASTE ADMINISTRATIVE PROCEDURES

Published: January 28, 2015

Administration of Metro Code Chapter 5.06 Solid Waste Community Enhancement Program

Contents

METRO

SOLID WASTE
ADMINISTRATIVE PROCEDURES

AP NO. 5.06
Section 1

Policy and Legal Authority

1.1 Policy and Legal Authority.

1.1.1 Metro's solid waste planning and implementing authority is established under the Metro Charter, the Constitution of the State of Oregon, and ORS Chapters 268 and 459.

1.1.2 Metro's solid waste community enhancement program is established based on state law (ORS 459.280 and 459.284).

1.1.3 All solid waste administrative procedure shall be subject to the authority of all other applicable laws, regulations or requirements in addition to those contained in this administrative procedure and performance standard.

1.1.4 Administrative procedures are adopted, as necessary, to implement the provisions of Metro Code Chapter 5.06 Solid Waste Community Enhancement Program.

1.1.5 The purpose of these administrative procedures is to protect and preserve the health, safety and welfare of the Metro residents; to protect and preserve the local environment, to implement cooperatively a solid waste community enhancement fee program; and to reduce the volume and toxicity of waste disposed through source reduction, reuse, recycling, and composting.

1.1.6 These administrative procedures and performance standards are issued by the Metro Chief Operating Officer ("Metro COO") pursuant to Metro Code Section 5.06.100.

METRO

SOLID WASTE
ADMINISTRATIVE PROCEDURES

AP NO. 5.06
Section 2

Application and Purpose of Chapter 5.06

2.1 Application of Chapter 5.06

2.1.1 Chapter 5.06 shall apply to all eligible solid waste facilities within Metro's jurisdictional boundary that are licensed or franchised by Metro pursuant to Metro Code Chapter 5.01.

2.1.2 Metro Code Chapter 5.06 shall apply to all eligible solid waste facilities within Metro's jurisdictional boundaries that are owned by Metro.

2.2 Purpose

2.2.1 Metro has long recognized that certain solid waste facilities may present economic, environmental, health or other impacts on local host communities.

2.2.2 Metro's solid waste community enhancement program provides funds that are used for community enhancement grant projects located in the vicinity of each eligible solid waste facility. Funds are to be used for the rehabilitation and enhancement of the area in and around the facility from which the fees are collected, as determined by each solid waste community enhancement committee established in accordance with Metro Code Chapter 5.06.

METRO

SOLID WASTE
ADMINISTRATIVE PROCEDURES

AP NO. 5.06
Section 3

Program Exempt and Program Eligible Facilities

3.1 Exempt Facility Types and Ineligible Solid Waste Activities

3.1.1 The following types of facilities are not subject to Metro Code Chapter 5.06.

3.1.1.1 Reuse or recycling facilities that (A) exclusively receive non-putrescible source-separated recyclable materials and (B) reuse or recycle such materials, or transfer, transport or deliver such materials to a person or facility that will reuse or recycle them.

3.1.1.2 Material recovery facilities that (A) exclusively receive non-putrescible solid waste and conduct material recovery on such waste, and may also (B) receive non-putrescible source-separated recyclable materials and reuse or recycle such materials or transfer, transport or deliver such materials to a person or facility that will reuse or recycle them.

3.1.2 The following types of solid waste activities are not subject to Metro Code Chapter 5.06.

3.1.2.1 Yard debris reloading.

3.1.2.2 Yard debris composting.

3.1.2.1 Material recovery on non-putrescible waste, except as provided in Section 3.3.

3.1.2.2 Recycling or reuse of non-putrescible materials.

3.2 Program Eligibility by Facility Type and Solid Waste Activity

3.2.1 Eligible facility types include, but are not limited to, the following:

3.2.1.1 Disposal sites.

3.2.1.2 Transfer stations.

3.2.1.3 Reload facilities.

3.2.1.4 Energy recovery facilities.

3.2.1.5 Compost facilities.

3.2.2 Eligible solid waste activities include, but are not limited to, the following:

3.2.2.1 Processing, reloading or transfer of putrescible waste (includes food waste and yard debris mixed with food waste).

3.2.2.2 Composting or any other processing of putrescible waste (includes food waste and yard debris mixed with food waste).

3.2.2.1 Energy recovery (including anaerobic digestion of putrescible waste to include food waste and yard debris mixed with food waste).

3.2.2.2 Disposal (includes landfilling and incineration).

3.3 Special conditions related to non-putrescible waste activities at an eligible facility

3.3.1 Non-putrescible waste that is subject to material recovery and delivered to a transfer station or other eligible solid waste facility shall be subject to Metro Code Chapter 5.06 when a facility owner/operator and the Metro COO determines it to be in the public interest.

3.3.2 For the purpose of this section the public interest shall include, but is not limited to: A) the historical program relationship established between a facility and host local government or community (e.g. Metro Central Transfer Station and Metro South Transfer Station), or B) such conditions necessary to operate a new facility, or at an existing facility conducting a new solid waste activity that is subject to Metro Code Chapter 5.06 and Metro Code Chapter 5.01.

Establishing a Solid Waste Community Enhancement Program

The purpose of this section is to establish a general process for Metro and a host local government to implement and administer a solid waste community enhancement program at an eligible solid waste facility.

4.1 New Facilities Without a Solid Waste Community Enhancement Program

4.1.1. Notification to a host local government.

Upon receipt of a complete Metro license or franchise application for a new eligible solid waste facility that is subject to this chapter, or a new eligible solid waste activity at an existing facility, the Metro COO shall notify the host local government that it qualifies for the solid waste community enhancement program.

4.1.2 Coordination with Metro and the host local government.

4.1.2.1 As part of Metro's license and franchise review or renewal process, the Metro COO will notify the local government hosting an eligible solid waste facility that a solid waste community enhancement program shall be established.

4.1.2.2 The Metro COO shall provide the host local government with an opportunity to enter into an intergovernmental agreement to administer the program. As provided in Section 5.1, Metro and the local government may consider other approaches to administer the program if an intergovernmental agreement cannot be established.

4.1.2.3 A host local government shall not be excluded or limited from participating in Metro's solid waste community enhancement program for an eligible solid waste facility, nor shall Metro be limited in implementing a solid waste community enhancement program when a host local government adopts: (1) a tax or charge that imposes a fee on haulers of commercial solid waste or other users of the facility; (2) any tax duly adopted by the local government which is generally applicable for all persons doing business in boundaries of the local government; or (3) any franchise fee collected by the local government from haulers collecting solid waste within the boundaries of the local government,

4.1.2.4 Metro shall not establish a solid waste community enhancement program at a solid waste facility if the respective host local government has implemented and is actively administering a solid waste community enhancement program

for that solid waste facility under separate authority of ORS 459.284 and 459.290.

4.1.2.5 Prior to establishing a solid waste community enhancement program at an eligible solid waste facility, the Metro COO shall inform the Metro Council President and the Metro Councilor whose district hosts the solid waste facility of the decision to establish a solid waste community enhancement program and provide the Metro Councilor with the opportunity to chair, co-chair, or otherwise participate in the solid waste community enhancement committee at the option of the Metro Councilor.

4.2 Programs Established Prior to January 1, 2014

Solid waste community enhancement programs that were established prior to January 1, 2014 and are administered through an intergovernmental agreement with a host local government shall be updated and reissued with an effective date of July 1, 2015 to provide consistency with all applicable provisions in Metro Code Chapter 5.06 and these administrative procedures.

4.3 Existing Eligible Facility Without a Solid Waste Community Enhancement Program

The Metro COO shall notify a host local government of an existing eligible solid waste facility within its jurisdictional boundaries regarding a timeframe and process for the implementation and administration of a solid waste community enhancement program in accordance with this chapter.

4.4 Funding

4.4.1 Except as provided in Section 3.3, solid waste facilities subject to Metro Code Chapter 5.06 shall collect an amount not exceeding $1.00 on each ton of putrescible solid waste delivered to the facility and remit the funds to Metro for use as a solid waste community enhancement fee.

4.4.2 Metro may periodically adjust the solid waste community enhancement fee based on the Consumer Price Index (CPI) up to the maximum amount set forth in ORS 459.284.

4.4.3 On a quarterly basis, Metro will remit the solid waste community enhancement funds to each host local government with a solid waste community enhancement program established by intergovernmental agreement with Metro in accordance with Metro Code Chapter 5.06.

4.4.4 Projects funded from a solid waste community enhancement fund will be made with the positive vote of a majority of the solid waste community enhancement committee created to administer such a program. Frequency of funding projects is also to be determined by the committee.

Establishing a Solid Waste Community Enhancement Committee

5.1 Establishing a Solid Waste Community Enhancement Committee

5.1.1 For the purpose of establishing a solid waste community enhancement committee, the Metro COO shall coordinate with the host local government and the Metro Councilor whose district hosts the eligible solid waste facility.

5.1.2 Metro may designate a solid waste community enhancement committee in accordance with Metro Code Chapter 2.19.

5.1.3 The Metro COO may enter into an intergovernmental agreement to designate the host local government as the solid waste community enhancement committee. Such a committee shall consist of at least five members and may include the Metro Councilor whose district hosts the solid waste facility (with the option to serve as co-chair to the committee), and three citizen representatives appointed by the mayor, city manager, or county administrator. In lieu of appointment of such a committee, the local government may designate itself and the Metro Council member representing the district that hosts the solid waste facility (with the option to serve as co-chair to the committee) to perform the function of such committee. The term for such intergovernmental agreements should be established to coincide with the term set forth in the subject facility's Metro license or franchise.

5.1.4 The Metro COO may enter into an agreement with a recognized non-profit community organization including, but not limited to, a neighborhood district coalition, neighborhood association, committee for citizen involvement or other similar community-based group having a legally constituted active board of directors. The designated solid waste community enhancement committee shall consist of at least five members, and may include the board of directors, the Metro Councilor whose district hosts the solid waste facility, and any number of citizen representatives appointed by the Metro Councilor whose district hosts the solid waste facility.

5.1.5 The Metro COO shall establish the terms and conditions of the agreements for the establishment and administration of a solid waste community enhancement committee as provided in Metro Code Chapter 5.06.

5.2 Administration

5.2.1 The administration and distribution of funds from a solid waste community enhancement program shall be subject to the approval of a solid waste community enhancement committee.

5.2.2 Each solid waste community enhancement committee or host local government shall promote, advertise, solicit and accept requests for proposals or projects to be funded from the solid waste community enhancement fund within its solid waste community enhancement program area boundary.

5.2.3 Either Metro or the host local government shall prepare and publish an annual budget for the solid waste community enhancement account. Each budget shall be subject to review and comment by the solid waste community enhancement committee and shall, at a minimum, identify the proposed allocation of grant funding and administrative costs for the upcoming fiscal year, except that a solid waste community enhancement committee may propose that there be no expenditure of funds during a fiscal year for up to a maximum of three consecutive fiscal years, or longer if approved by the Metro COO or the community enhancement committee.

5.2.4 Either Metro or the host local government shall segregate solid waste community enhancement funds by establishing a separate set of accounts for the revenues and expenditures of the solid waste community enhancement program to ensure that only committee-authorized plans, projects, and programs receive funding. Funds not expended during a budget year shall be carried forward to each subsequent year.

5.2.5 Each solid waste community enhancement committee or host local government shall publish and follow the project funding criteria in Section 6.1 and goals in Section 6.2 for selecting projects or programs to fund during the fiscal year. A solid waste community enhancement committee may request that Metro modify or change the criteria. A community enhancement committee may publish and follow more restrictive program funding criteria, and may adopt and publish additional goals and/or guidelines.

5.2.6 Each solid waste community enhancement committee or host local government shall, provide an annual written report to the Metro COO regarding all expenditures from the enhancement fund and shall itemize all enhancement fund expenditures including the amount of funds expended on each project under its jurisdiction including the funding balance by October 1 of each year.

5.2.7 Each solid waste community enhancement committee, upon request by the Metro COO, shall provide an oral presentation to the Metro Council at a time such presentation can be scheduled at a Metro Council meeting.

5.2.8 If administrative costs incurred by Metro or the host local government to administer the solid waste community enhancement program are reimbursed from the solid waste community enhancement funds as provided in Section 5.3. The annual report required in Section 5.2.6 shall include an accounting of the funds expended for program administration.

5.2.9 Each solid waste community enhancement committee will provide an open public process for project/program review and approval.

5.3 Administrative Cost Reimbursement

5.3.1 A solid waste community enhancement fund may be used to help defray the direct costs incurred to administer a solid waste community enhancement program by Metro or a host local government (e.g., staff time and materials necessary to set up and administer a solid waste community enhancement program).

5.3.2 No more than twenty percent (20%), and not more than $50,000 of a solid waste community enhancement fund that is collected during a program funding cycle may be used to pay for costs directly associated with administering a solid waste community enhancement program. Administrative costs in excess of these amounts shall not be borne by the solid waste community enhancement fund.

5.4 Recordkeeping and Audits

5.4.1 Each solid waste community enhancement committee or host local government shall maintain complete and accurate records related to the administration of the program and funds expended under its jurisdiction. The committee shall make these records available to Metro for inspection, auditing, and copying.

5.4.2 Metro may require, at Metro's expense, that a solid waste community enhancement committee submit to an independent audit conducted by an auditor chosen by Metro. The audit shall address only those matters reasonably related to the solid waste community enhancement program fund and its administration.

METRO

SOLID WASTE
ADMINISTRATIVE PROCEDURE

AP NO. 5.06
Section 6

Eligibility Criteria and Goals

6.1 Eligibility Criteria for Funding Solid Waste Community Enhancement Projects

6.1.2 To qualify for funding, a proposed solid waste community enhancement project shall meet the following funding criteria. A designated solid waste community enhancement committee may adopt and publish more restrictive eligibility criteria.

6.1.2.1 Be within the solid waste community enhancement area boundaries specified by the designated solid waste community enhancement committee or benefit individuals or programs located inside the community enhancement area boundary.

6.1.2.2 Be from non-profit organizations including, but not limited to, neighborhood associations or charitable organizations with 501(c)(3) status under the Internal Revenue Service, or

6.1.2.3 Be from a school, or institution of higher learning, or

6.1.2.4 Be from a local government, local government advisory committee, department or special district provided that they include documented support from the local government executive officer, and, as a guideline, the requested funding not exceed 15% of an annual solid waste community enhancement program budget or funding cycle, or more as otherwise provided in an intergovernmental agreement between Metro and a host local government.

6.1.2.5 Not replace another readily available source of federal, state, regional or local funds.

6.1.2.6 All applicants must go through the official application, review and approval process established by the solid waste community enhancement committee.

6.1.2.7 Not promote or inhibit religion.

6.1.2.8 Not fund organizations, projects or programs that discriminate based upon race, ethnicity, age, gender or sexual orientation.

6.1.2.9 Be able show a clear public benefit if projects are on private land.

6.1.2.10 Have written landowner permission at the time of application.

6.2 Goals for Funding Solid Waste Community Enhancement Projects

6.2.1 Projects shall meet one or more of the following goals. Priority will be given to projects that best meet the goals and which offer benefits to the areas and populations most directly impacted by the solid waste facility. A designated solid waste community enhancement committee may adopt and publish additional funding goals. The order of the following listing does not imply ranking or weighting. Projects should:

6.2.1.1 Result in an improvement to the appearance or environmental quality of the area/neighborhood within the enhancement area boundaries.

6.2.1.2 Result in the reduction in the amount or toxicity of waste, or increase reuse and recycling opportunities within the enhancement area boundaries.

6.2.1.3 Result in rehabilitation, upgrading or direct increase in the real or personal property owned or operated by a nonprofit organization having 501(c)(3) status under the Internal Revenue Code within the enhancement area boundaries.

6.2.1.4 Result in the preservation or enhancement of wildlife, riparian zones, wetlands, forest lands and marine areas within the enhancement area boundaries, and/or improve the public awareness and the opportunities to enjoy them.

6.2.1.5 Result in improvement to, or an increase in, recreational areas and programs within the enhancement area boundaries.

6.2.1.6 Result in improvement in the safety of the area within the enhancement area boundaries.

6.2.1.7 Result in projects that benefit youth, seniors, low income persons or underserved populations within the enhancement area boundaries.

METRO

SOLID WASTE
ADMINISTRATIVE PROCEDURE

AP NO. 5.06
Section 7

Dispute Resolution

7.1 The Metro COO shall, in good faith, attempt to negotiate resolutions to all disputes arising out of the implementation and administration of Metro Code Chapter 5.06 and these administrative procedures. Disputes arising out of or relating to the implementation or administration of Metro Code Chapter 5.06 or these administrative procedures shall be resolved as follows:

7.1.1 The Metro COO will review the matter or dispute to determine if there is sufficient reason or cause to take action.

7.1.2 When warranted, the Metro COO will notify the host local government and the solid waste community enhancement committee, the Council President and the corresponding councilor whose district hosts the solid waste facility in writing of the dispute or alleged breach. The notice shall describe the nature of the dispute or alleged breach. The notice shall prescribe a resolution process and include a date by which the host local government or solid waste community enhancement committee must respond to the Metro COO's notice.

7.1.3 Within the period specified by the Metro COO, the host local government or solid waste community enhancement committee shall respond to the notice provided by the Metro COO regarding the dispute. Such response may include information that proves that the dispute or alleged breach has been resolved, or that diligent efforts to correct the dispute or alleged violation is being made and is likely to succeed in a reasonable period of time.

7.1.4 If the Metro COO determines that the dispute or alleged violation has not or cannot be resolved within the manner prescribed and in a reasonable period of time, the Metro COO may take further action, including the modification or termination of an intergovernmental agreement to ensure that the dispute or breach is resolved within a reasonable period of time.

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City Council Meeting Date: May 5, 2015

Agenda Item: Public Hearing, 2nd Reading

TO: Sherwood City Council

FROM: Brad Kilby, AICP, Planning Manager
Through: Joseph Gall, ICMA-CM, City Manager and Julia Hajduk, Community Development Director

SUBJECT: Ordinance 2015-004, amending Chapter 7 of Volume II of the Sherwood Comprehensive Plan and adopting the Sherwood Water System Master Plan

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Issue:
Shall the City Council adopt an ordinance amending Chapter 7 of Volume II of the Sherwood Comprehensive Plan and adopting the Sherwood Water System Master Plan?

Summary:
This is the second reading of the ordinance. The first reading was held on April 21, 2015. No changes have been made to the proposed ordinance.

The City is proposing to amend the Table of Contents and Chapter 7 Community Facilities and Services, of the Sherwood Comprehensive Plan, Part 2, and to adopt the 2015 City of Sherwood Water Master Plan as a technical appendix to the Comprehensive Plan. The proposed amendments coincide with an update of the City's Water System Master Plan. Although the Water System Plan was updated in 2005, the language within the Comprehensive Plan was never updated to reflect the changes to the system in 2005. The proposed amendments to the text would delete and replace the existing language within the Comprehensive Plan to be aligned with the 2015 Water Master Plan Update. Adoption of the plan as a technical appendix is consistent with the single goal and eight policies that relate to community facilities and services.

Murray Smith and Associates was hired to perform an analysis of the City of Sherwood's water system, document water system upgrades, estimate future water requirements, identify deficiencies, update the City's capital improvement program (CIP), and evaluate the City's existing water rates and system development charges (SDCs). Adoption of the Water System Master Plan update will inform the community on needed changes to the CIP, water rates, and SDC's.

The Planning Commission held a public hearing on March 24, 2015 and forwarded a recommendation of approval to the City Council.

Previous Council Action:
The City Council held the first reading on April 21, 2015 and no changes were proposed. The City Council authorized the City Manager to enter into an agreement with Murray Smith and Associates, under Resolution 2013-052, to update the City's Water Master Plan.

Background:
The Planning Commission held a Work Session on February 24, 2015. The Public Works Department held a public meeting the following night on February 25, 2015. The requirement to prepare a Water System Master Plan can be found in Oregon Administrative Rules (OAR) Chapter 333, Division 61.

Financial Impacts:
The financial impacts associated with making the proposed amendments are paid for by staff time through the general fund, and included in the cost of the contract with Murray Smith and Associates. Updates to water rates, SDC's and water utility funding are independent of the Water System Master Plan Update. Updates to water rates, SDC's and water utility funding will be presented to the City Council for review and adoption consistent with Sherwood policies. Of the $36.2 million total estimated cost for recommended capital improvement projects, only $2.2 million is anticipated to be paid by existing customers through saturation development, the remaining projects in the CIP are for water system expansion to serve growth, as development occurs. These improvements will be funded through the collection of System Development Charges (SDCs).

Recommendation:
Staff respectfully recommends that City Council approve Ordinance 2015-004, amending Chapter 7 of Volume II of the Sherwood Comprehensive Plan and adopting the Sherwood Water System Master Plan.

ORDINANCE 2015-004

AMENDING CHAPTER 7 OF VOLUME II OF THE SHERWOOD COMPREHENSIVE PLAN AND ADOPTING THE SHERWOOD WATER SYSTEM MASTER PLAN

WHEREAS, the City Comprehensive Plan and Water System Master Plans are long range planning documents intended to be updated as conditions within the City change; and

WHEREAS, the Sherwood Water System Master Plan was updated in 2005; and

WHEREAS, at the time of the last Sherwood Water System Master Plan, the associated information in Volume II of the Sherwood Comprehensive Plan was not updated; and

WHEREAS, the City has determined that amendments to the Sherwood Comprehensive Plan and Water System Master Plan are necessary and must be coordinated and;

WHEREAS, the City contracted with Murray Smith and Associates to update the Sherwood Water System Master Plan; and

WHEREAS, in the course of review of the Sherwood Water System Master Plan, staff identified the need to update Chapter 7 of Volume II of the Sherwood Comprehensive Plan as it relates to water; and

WHEREAS, after an Open House and input from the Planning Commission, staff proceeded with noticing and processing an amendment to: 1) Update certain portions of Chapter 7 of Volume II of the Comprehensive Plan as they relate to the Water System Master Plan, so that the information is current; 2) Identifying the Sherwood Water System Master Plan as an appendix to the Comprehensive Plan; and 3) Adopting the Sherwood Water System Master Plan; and

WHEREAS, the proposed amendments were reviewed for compliance and consistency with the Comprehensive Plan, regional and state regulations and found to be fully compliant; and

WHEREAS, the proposed amendments were subject to full and proper notice and review and a public hearing was held before the Planning Commission on March 24, 2015; and

WHEREAS, the Planning Commission voted to forward a recommendation of approval to the City Council for the proposed Comprehensive Plan amendments and the Sherwood Water System Master Plan; and

WHEREAS, the analysis and findings to support the Planning Commission recommendation are identified in Attachment 1; and

WHEREAS, the City Council held a public hearing on April 21, 2015 and determined that the proposed amendments to the Comprehensive Plan met the applicable Comprehensive Plan criteria and continued to be consistent with regional and state standards; and

WHEREAS, the City Council determined that the Sherwood Water System Master Plan addressed existing conditions, identified capital improvements and associated costs needed to meet the future needs for the Sherwood Water System over the planning horizon.

NOW, THEREFORE, THE CITY OF SHERWOOD ORDAINS AS FOLLOWS:

Section 1. Findings. After full and due consideration of the proposed amendments to the Chapter 7 of Volume II of the Sherwood Comprehensive Plan and the updates to the Sherwood Water System Master Plan, the Planning Commission recommendation, the record, findings, and evidence presented at the public hearing, the Council adopts the findings of fact contained in the Planning Commission Recommendation, finding that Water System Master Plan and Comprehensive Plan shall be amended as documented in the attached Exhibits 1 and 2.

Section 2. Approval. The proposed amendments for Water System Master Plan and Comprehensive Plan (PA 15-01) identified in Exhibits 1 and 2 are hereby **APPROVED**.

Section 3 - Manager Authorized. The Planning Department is hereby directed to take such action as may be necessary to document this amendment, including notice of adoption to DLCD.

Section 4 - Effective Date. This ordinance shall become effective the 30th day after its enactment by the City Council and approval by the Mayor.

Duly passed by the City Council this 5th day of May 2015.

_____
Krisanna Clark, Mayor

Attest:

_____
Sylvia Murphy, MMC, City Recorder

	AYE	NAY
Cooke	____	____
Harris	____	____
Kuiper	____	____
King	____	____
Henderson	____	____
Robinson	____	____
Clark	____	____

TABLE OF CONTENTS - Part 2 Sherwood Development Plan

COMMUNITY FACILITIES AND SERVICES

A. GENERAL INTRODUCTION

Community facilities and services in the Sherwood Planning Area are provided by Washington County, the City of Sherwood, special service districts, semi-public agencies and the State and Federal government, (see Table VII-1). Public facilities and services include sewer, water, fire and police protection, libraries, drainage, schools, parks and recreation, solid waste and general governmental administrative services. Semi-public facilities and services are those which are privately owned and operated but which have general public benefit. They include health facilities, energy and communication utilities, and day care.

Although a small community, Sherwood has learned well the importance of adequate community facilities and services to orderly urban growth. Lack of sewer treatment capacity curtailed growth in the City in the 1970's. Planning for public facilities and services in response to growth rather than in advance of growth results in gaps in facilities and services. As population growth and density increase in the Sherwood Planning Area, greater facility and service support will be required. In recognition of this basic fact, the Plan stresses the need for provision of necessary facilities and services in advance of, or in conjunction with, urban development.

The Community Facilities and Services element identifies general policy goals and objectives; service areas and providers, problems, and service plans, and potential funding for key public and semi-public facilities and services. Park and recreation facilities are treated in Chapter 5, Environmental Resources. Transportation facilities are treated in Chapter 6, Transportation. This element was updated in 1989 to comply with OAR 197.712(2)(e).

B. POLICY GOAL AND OBJECTIVES

To insure the provision of quality community services and facilities of a type, level and location which is adequate to support existing development and which encourages efficient and orderly growth at the least public cost.

OBJECTIVES

1. Develop and implement policies and plans to provide the following public facilities and services; public safety fire protection, sanitary facilities, water supply, governmental services, health services, energy and communication services, and recreation facilities.

2. Establish service areas and service area policies so as to provide the appropriate kinds and levels of services and facilities to existing and future urban areas.

3. Coordinate public facility and service plans with established growth management policy as a means to achieve orderly growth.

4. Coordinate public facility and service provision with future land use policy as a means to provide an appropriate mix of residential, industrial and commercial uses.

5. Develop and implement a five-year capital improvements and service plan for City services which prioritizes and schedules major new improvements and services and identifies funding sources.

6. The City will comply with the MSD Regional Solid Waste Plan, and has entered into an intergovernmental agreement with Washington County to comply with the County's Solid Waste and Yard Debris Reduction Plan, 1990.

7. Based on Sewer, Water, Stormwater, and Transportation Plan updates, the City shall prepare a prioritized list of capital improvement projects to those systems and determine funding sources to realize the improvements envisioned in those plans.

8. It shall be the policy of the City to seek the provision of a wide range of public facilities and services concurrent with urban growth. The City will make an effort to seek funding mechanisms to achieve concurrency.

C. PUBLIC AND SEMI-PUBLIC UTILITIES

Public utilities including water, sanitary sewer, drainage, and solid waste, as well as semi-public utilities including power, gas and telephone services are of most immediate importance in the support of new urban development. Water, sewer collection, and drainage facilities are the major services for which the City of Sherwood has responsibility. Service plans for these key services are contained in this section. The other utilities referred to above are the principal responsibilities of those agencies listed in Table VII-1. These agencies have been contacted for the purpose of coordinating their service planning and provision with the level and timing of service provision required to properly accommodate growth anticipated by the Plan.

TABLE VII-1
FACILITY AND SERVICE PROVIDERS
IN THE SHERWOOD PLANNING AREA

1. Public Utilities

   a. Public Water Supply
      City of Sherwood

   b. Sanitary Sewer System
      (1) Clean Water Services
      (2) City of Sherwood

   c. Storm Drainage System
      (1) City of Sherwood
      (2) Washington County
      (3) State of Oregon

2. Private/Semi-Public Utilities

   a. Natural Gas
      Northwest Natural Gas Co.

   b. Electric Power
      Portland General Electric

   c. Solid Waste: Pride Disposal Co.

3. Transportation

   a. Paved Streets, Traffic Control, Sidewalks, Curbs, Gutters, Street Lights
      (1) City of Sherwood
      (2) Washington County
      (3) State of Oregon

   b. Bikeways
      (1) City of Sherwood
      (2) Washington County
      (3) State of Oregon

c. Public Transit
Tri-Met

4. Public Health and Safety

a. Police Protection
(1) City of Sherwood
(2) Washington County
(3) State of Oregon

b. Fire Protection
Tualatin Valley Fire and Rescue

c. Animal Control
Washington County

5. Recreation

a. Parks and Recreation
City of Sherwood

b. Library
City of Sherwood

6. Schools
Sherwood School District 88J

D. SEWER SERVICE PLAN

INTRODUCTION

The Sewer Service Plan of the Comprehensive Plan was updated in 1990 and is included as an appendix to the Plan, and is incorporated into this chapter. The following describes the existing sewer system, recommended improvements to the existing system, recommended expansion of the sewer system and estimated costs.

EXISTING SEWER SYSTEM

The City of Sherwood's existing sewer system is as shown on Figure VII-1. The system is located in USA's Durham South Basin which consists of two sub-basins are centered around Cedar Creek and Rock Creek, respectively, and will be referred to as the Cedar Creek basin and the Rock Creek basin throughout the remainder of this section.

The Rock Creek Basin system currently serves a residential area bounded by Lincoln Street to the west, West Sunset Boulevard to the south, Oregon Street to the north and the UGB to the east. Rock Creek Basin also contains approximately 7l.2 acres of land, north of Oregon Street, which is currently zoned and developed for industrial use. The remaining northern portion of the Basin is essentially undeveloped and zoned primarily for industrial use. Flow is by gravity from south to north, eventually connecting to USA's Rock Creek trunk. This trunk then follows Rock Creek until it connects with the Upper Tualatin Interceptor which transports sewage to the Durham treatment plant.

The Cedar Creek Basin system serves the majority of Sherwood. Drainage is again from south to north and the main trunk of the system follows Cedar Creek from Sunset Boulevard under Pacific Highway continuing north until it connects with the Upper Tualatin Interceptor. From this point sewage is transported to the Durham Treatment plant.

insert map

ANALYSIS OF EXISTING SEWER SYSTEM

The population for the City of Sherwood in the year 2008 is estimated to be 7,000 people. The 1979 Sewer Service Plan estimated a population of 10,600 people in the year 2008, and a full-development population within the Sherwood Urban Growth Boundary (UGB) of 18,900 people.

In order to accentuate any deficiencies in the existing sanitary sewer system, peak flowrates were generated based on full development or saturation of the Sherwood UGB. This analysis was used for the following reasons. Maximum design flows for sanitary sewers are far less than peak storm sewer flows. Very often sanitary sewer pipes are sized at a minimum 8-inch diameter for maintenance purposes; consequently the majority of these pipes are flowing at a minimum of their capacity. A full-development demand analysis was the most conservative and efficient way of analyzing the system for all deficiencies.

Wastewater flow criteria for the analysis was taken from USA's 1985 Master Sewer Plan Update and is based on land use designation as listed below:

TABLE VII-2
WASTEWATER FLOW DESIGN CRITERIA
DESIGN UNIT FLOW RATE

LAND USE DESIGNATION	EXISTING	FUTURE
RESIDENTIAL	75 gpcd	75 gpcd
COMMERCIAL	1000 gpad	1000 gpad
INDUSTRIAL	3000 gpad	3000 gpad
INSTITUTIONAL	500 gpad	500 gpad
PEAK ANNUAL	4000 gpad	4000 gpad

The City of Sherwood Zoning Map was used to determine the amount of acreage of each land use designation. This acreage was then applied to tributary basins contributing to their respective sewers and multiplied by the appropriate land use design unit flowrate in order to generate the total design flowrate. An average of residential densities per tributary basin was used to account for the five different residential zoning densities shown on the current City Zoning Map.

The domestic sewage flow allowance for the 1979 Sewer Plan followed the 1969 USA Master Plan value of 90 gallons per capita per day (gpcd). The updated, June 1985 USA Master Plan, has reduced this value to 75 gpcd.

In order to account for periods of maximum use, flowrates are multiplied by factors which result in peak flowrates. The 1979 Sewer Service Plan used peak factors of 3.0 for lateral sewers and 2.7 for trunk sewer lines. The 1985 USA Master Plan Update requires peak factors ranging from 1.5 to 2.0. These lower values are based on actual dry-weather flow monitoring, performed in June and July of 1984, at points throughout the Durham Basin.

The July 1979 Sewer Service Plan used values ranging from 500 gallons per acre per day (gpad) to 700 gpad for inflow and infiltration (I&I), depending on land use designation. These values were concurrent with past EPA design standards and were based on the assumption that rehabilitation measures would remove 60 to 90 percent of excessive I&I. According to USA's 1985 Master Plan these abatement techniques proved to be ineffective. USA's review of the Durham treatment facility led to the design rate of 4000 gpad for the existing peak annual occurrence for infiltration and inflow. This value is not anticipated to decrease for the Durham basin and is therefore also used for the future design flowrates.

Two areas of special concern exist inside the current City of Sherwood UGB. Both areas are recent additions to the UGB and have not yet been assigned a land use. Rather than assume zoning designations for the areas they were both excluded from the model. Both areas can be served by gravity and neither will cause deficiencies in the system. Their service routes are discussed below.

The first area is located in the southwest corner of the UGB in the Cedar Creek Basin, between Pacific Highway and Old Highway 99W. This area can be served by line number 1 in area A (Figure VII-2). The northern half of this area may also be served by connecting to the southern most extension of line number 2 in area B. The second area is located east of Pacific Highway and north of Edy Road, in the Rock Creek Basin. The southern portion should be incorporated in line number 3 extending from Rock Creek west along Edy Road (Figure VII-2). The northern half must be served using a direct lateral to the area from the Rock Creek trunk.

RECOMMENDED IMPROVEMENTS TO EXISTING SEWER SYSTEM

The analysis of the existing system shows no size deficiencies in any of the City maintained pipes. City officials have confirmed that there are areas of surcharge in the system due to pipe under sizing. Surcharge due to blockage of the system has occurred but has since been remedied.

Improvements are recommended to the existing sewer systems main trunk lines. These improvements are required due to very slight slips which occur in the northern sections of the Rock Creek and Cedar Creek main trunk lines.

The Rock Creek trunk requires improvements from manhole number 11663, which is located at the confluence of the Rock Creek and Cedar Creek trunk lines, south to a manhole located near the Southern Pacific crossing of Rock Creek. The existing 18-inch diameter pipe has a length of 6,035 feet and an existing slope of 0.0031 feet/feet. The USA master plan recommends that a 15-inch diameter pipe be placed parallel to the existing 18-inch in order to convey future flows based on 20-year ultimate development peak flowrates. Our analysis is based on total ultimate development of the Sherwood UGB and therefore suggests that an 18-inch diameter pipe parallel the existing 18-inch at the existing slope of 0.0031 feet/feet.

The Cedar Creek Trunk presents similar slope problems along the northern trunk. USA's Master Plan breaks these into three sections but this report will combine them for simplicity. The section of sewer begins at manhole 11663, which is located at the confluence of the Rock Creek and Cedar

Creek trunks, and continues south to manhole number 11752 which is 200 feet south of Edy Road and slightly west of the UGB. (see Fig.1) The entire 12,640 feet of this line is outside of the UGB, and has a slope averaging between 0.0016 feet/feet and 0.0025 feet/feet. Depending on existing slopes a parallel system will be required ranging from 18 to 30-inches in diameter.

insert Figure VII-2

RECOMMENDED SEWER SYSTEM EXPANSION

The City of Sherwood's Urban Growth Boundary includes significant areas that are currently not served by the existing sanitary sewer system. All of these areas are part of either the Rock Creek Basin system or the Cedar Creek Basin system and can be easily served by extending laterals off the respective trunk lines of each basin. These new laterals have no special priority except to serve those who require sewer service. The locations of the recommended sewers are shown on Figure VII-3.

All new sewer lines should have a minimum diameter of 8-inches for ease of serviceability. These new laterals were designed by setting the slope of the sewer pipe invert, equal to the slope of the existing ground along the sewer line path. Individual pipe slopes may be required to be less than natural ground slopes in order to serve isolated areas of low ground elevation.

The sewer expansions are listed below under the basin in which they occur. The costs are listed by pipe diameter and are in 1990 dollars. These costs are typically paid for by the land developments that create the need for the extensions. The costs include design and construction. Land acquisition may be required but those costs are not included in the estimates below.

1.	Sewer Trunk Lines		
	Cedar Creek Parallel (15"-30")	12,640LF	$991,000
	Rock Creek Parallel (18")	6,750 LF	$378,000
2.	Rock Creek Basin Lines (All 8")		
	Tonquin	1400 LF	$ 47,000
	Highland/12th	3000 LF	$100,800
	Tualatin-Sherwood	2300 LF	$ 77,300
	Onion Flats W.	5000 LF	$168,000
	Onion Flats E.	2900 LF	$ 97,500
3.	Cedar Creek Basin Lines (8" except as noted)		
	Steeplechase S. (10")	4100 LF	$160,700
	Steeplechase N. (12")	650 LF	$ 29,100
	Steeplechase N. (10")	4100 LF	$161,000
	E. Sunset	1300 LF	$ 43,700
	W. Sunset	3500 LF	$117,600
	Scholls-Sherwood W.	1200 LF	$ 40,300
	Scholls-Sherwood E.	3100 LF	$104,200
	BPA#	3500 LF	$117,600

insert Figure VII-3

WATER SERVICE PLAN

INTRODUCTION

The City draws the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville, approximately 6 miles southeast of Sherwood. The City owns 5 million gallons per day (MGD) of production capacity in the existing WRWTP facilities. Sherwood also maintains four groundwater wells within the city limits for back-up supply. Prior to 2011, the City also purchased water from the Portland Water Bureau (PWB) through the City of Tualatin's water system and maintains an emergency connection and transmission piping associated with this supply source. The Water System Master Plan that provides the supporting documentation to this section is attached as Appendix A to Volume II of the Sherwood Comprehensive Plan.

The City's future water service area is comprised of five different planning areas:
1. Sherwood city limits
2. Tonquin Employment Area (TEA)
3. Brookman Annexation Area
4. West Urban Reserve
5. Tonquin Urban Reserve

Each of these areas has their own land use characteristics, approximate development timelines and existing planning information. Estimates of future growth and related water demand are developed using the best available information for each area including Sherwood buildable lands geographic information system (GIS) data, population growth projections, development area concept plans and current water demand data.

Water demand growth is projected at 10 years, 20 years and at saturation development. Estimated water demands at saturation development are used to size recommended transmission and distribution improvements. .

EXISTING WATER SYSTEM CONDITIONS

Pressure Zones

The City's existing distribution system is divided into three major pressure zones. Pressure zone boundaries are defined by ground topography in order to maintain service pressures within an acceptable range for all customers in the zone. The hydraulic grade line (HGL) of a zone is designated by overflow elevations of water storage facilities or outlet settings of pressure reducing valves (PRVs) serving the zone.

The majority of Sherwood customers are served from the 380 Pressure Zone which is supplied by gravity from the City's Sunset Reservoirs. The 535 Pressure Zone, serving the area around the Sunset Reservoirs, is supplied constant pressure by the Sunset Pump Station, and the 455 Pressure

Zone serves higher elevation customers on the western edge of the City by gravity from the Kruger Reservoir.

Storage Reservoirs

Sherwood's water system has three reservoirs with a total combined storage capacity of approximately 9.0 million gallons (MG). Two reservoirs, Sunset Nos. 1 and 2, provide 6.0 million gallons (MG) of gravity supply to the 380 Pressure Zone. The other reservoir, Kruger Road, provides 3.0 mg of gravity supply to the 455 Pressure Zone.

Pump Stations

Sherwood's water system includes two booster pump stations, the Sunset Pump Station and the Wyndham Ridge Pump Station.

The Sunset Pump Station is located in Snyder Park adjacent to the Sunset Reservoir complex and has an approximate total capacity of 3,770 gallons per minute (gpm). This station provides constant pressure service and fire flow to the 535 Pressure Zone.

The Wyndham Ridge Pump Station is located on SW Handley Street west of Highway 99W. Two 40-hp pumps supply a total capacity of approximately 1,200 gpm from 380 Zone distribution piping to the Kruger Road Reservoir.

Distribution System

The City's distribution system is composed of various pipe materials in sizes up to 24 inches in diameter. The total length of piping in the service area is approximately 77.4 miles. Pipe materials include cast iron, ductile iron, PVC and copper. The majority of the piping in the system is ductile iron.

ANALYSIS OF EXISTING WATER SYSTEM

Water Supply

Sherwood's supply from the WRWTP is sufficient to meet MDD through the 10-year planning horizon with an additional 1 mgd of capacity required at 20 years and an additional 4 mgd needed at build-out. Existing City groundwater wells provide an effective emergency supply to complement emergency storage in the City's reservoirs.

Pumping and Storage

The City's distribution system has adequate storage and pumping capacity to meet existing service area demands through 2034. Due to significant uncertainty related to long-term growth and system expansion, minor storage and pumping deficiencies at build-out should be re-evaluated with the

next Water Master Plan Update or as development warrants. Additional pump stations are recommended to serve proposed high-elevation closed pressure zones in the water service expansion areas: Brookman Annexation and West Urban Reserve.

Distribution Piping

Sherwood's distribution piping is sufficiently looped to provide adequate fire flow capacity to commercial, industrial and residential customers. Few piping improvement projects are needed to meet fire flow criteria. Extensive large diameter mains will be needed to expand the City's water service area to supply the Brookman Annexation, TEA and West Urban Reserve as development occurs.

RECOMMENDED IMPROVEMENTS TO EXISTING WATER SYSTEM

Recommended improvements for the City's water system include proposed supply, pump station and water line projects.

Cost Estimating Data

An estimated project cost has been developed for each improvement project recommended. Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The cost estimates presented have an expected accuracy range of -30 percent to +50 percent. As the project is better defined, the accuracy level of the estimates can be narrowed. Estimated project costs include approximate construction costs and an aggregate 45 percent allowance for administrative, engineering and other project related costs.

Capital Improvement Program

A summary of all recommended improvement projects and estimated project costs is presented in Table ES-3 of the 2015 City of Sherwood Water System Master Plan Update. The table provides for project sequencing by showing fiscal year-by-year project priorities for the first five fiscal years, then prioritized projects in 5-year blocks for the 10-year, 20-year and Beyond 20 year timeframes. The total estimated cost of these projects is approximately $24.6 million through FY 2034. Approximately $19.9 million of the total estimated cost is for projects needed within the 10-year timeframe and $5.4 million of these improvements are required in the next 5 years.

F. DRAINAGE PLAN

INTRODUCTION

The Sherwood Planning Area is located within the Willamette River-Tualatin River Basin as identified in the Portland-Vancouver Metropolitan Area Water Resources Study (PMAWRS). The Cedar Creek and Rock Creek sub-basins channel surface runoff to the Tualatin River just north of the Planning Area. Within these sub-basins there exists considerable variation in slope. A highland area known as Washington Hill has some erosion and sedimentation potential. High groundwater and poorly drained soils in portions of the northern half of the Planning Area will require measures to regulate excavation and site drainage.

In March 1989, DEQ issued draft rules for storm water quality control to all jurisdictions in the Tualatin River sub-basin. The City of Sherwood is required to comply with the rules and participate in the development of a Surface Water Drainage Management Plan for the region. When the Plan is completed and adopted this section will be amended accordingly.

Objectives

1. Comply with DEQ Storm water quality control rules until completion of a Drainage Management Plan.

2. Cooperate with United Sewerage Agency, Washington County, and DEQ in the preparation of a Drainage Management Plan.

Findings

1. A storm drainage plan for the City's urban growth area has been developed and is illustrated on Figure VII-7. Major storm sewers are recommended for construction in accordance with the Plan; minor storm sewers are not shown on the proposed storm drainage plan. This Plan will be updated upon completion of the regional Drainage Plan.

2. Cedar Creek, Rock Creek, and Chicken Creek shall continue to be the City's primary conveyance systems for storm runoff.

3. Existing flood areas have been identified and are analyzed and described in Section VII Background Data and Analysis. It is anticipated, all but one of the problem areas will be eliminated by implementation of the Plan. An area of flooding at N.W. 12th Street and Highway 99W remains to be resolved by construction of a minor storm sewer, which is not shown on the Plan.

4. The rational method formula was used to estimate runoff to proposed storm sewers. This method has a tendency to overestimate design flows when applied to large basins. Runoff

coefficients used in the rational method are predicted on the City's Comprehensive Plan. During final design of storm sewers, actual development within the basin should be reviewed to verify previous assumptions in selection of a runoff coefficient.

5. Cost estimates for proposed storm sewer improvements have been prepared, based on 1980 construction costs and increased in 1990 by 1.25%, and on Engineering News Record (ENR) index of 3264. These estimates are presented in Table 2 of the Appendix.

6. Design of relief culverts in Cedar Creek and Rock Creek may significantly alter hydraulic control sections used by the U.S. Army Corps of Engineers to establish water surface elevations and limits of the flood plain as set forth in Flood Insurance Study, City of Sherwood, Oregon, and provided to the City in preliminary draft, dated December 17, 1980. Design of relief culverts should be coordinated with the U.S. Army Corps of Engineers to insure integrity of their flood insurance study.

Implementation

1. The City will endeavor to establish a source of revenue to finance the cost of storm sewer construction, acquisition of lands along creeks, maintenance of storm sewers and waterways, and administration of the storm plan in accordance with the regional Surface Water Drainage Management Plan.

2. Until user fees are in effect, the City should obtain waivers of remonstrance to future storm drainage improvements projects from all property owners wishing to develop their land, and the City should also require all developers to provide adequate storm sewers to serve their property as well as those properties that would naturally drain to the proposed storm sewer.

SOLID WASTE

Solid waste disposal is a regional concern requiring regional solutions. The City of Sherwood recognizes MSD's responsibility and authority to prepare and implement a solid waste management plan and supports the MSD Solid Waste Facilities Model Siting Ordinance and will participate in these procedures as appropriate. There are no landfills in Sherwood.

The Model Siting Ordinance will be incorporated into this Plan when approved by METRO. In addition, the City conducted extensive hearings on solid waste incineration in 1990 and determined incineration is generally not a form of solid waste disposal environmentally compatible in the community except in limited circumstances. Therefore, solid waste incineration is generally prohibited by this Plan.

Electrical Power

The Sherwood Planning Area is well served by major power facilities. Portland General Electric Co. (PGE) runs and operates a major regional sub-station in the northern portion of the Planning

Area and has a network of major transmission lines which cross the Planning Area. Minor sub-station siting and construction, if needed in response to development, will be coordinated with PGE.

Natural Gas

The Sherwood Planning Area is served by Northwest Natural Gas Co. (NNG) lines. The existing system consists of a 6" high pressure line extended to the Planning Area via Tualatin-Sherwood Road, So. Sherwood Blvd. and Wilsonville Road. The distribution system is adequate to serve immediate development. NNG reports that the 6" main will be adequate to serve growth projected by the Plan with new lateral line extensions and attention to proper "looping" of existing lines.

Telephone

General Telephone services the Sherwood Planning Area. Planned improvements should have the capability of handling projected growth demands in the Area.

H. SCHOOLS

INTRODUCTION

The Sherwood Planning Area is wholly contained within Sherwood School District 88J. Although the City of Sherwood is the only currently urbanized area within the district, district boundaries include approximately 44 square miles and parts of Washington, Clackamas, and Yamhill Counties. The District is currently predominately rural but, by the year 2000, the Sherwood Planning Area will contribute most of the total student enrollment.

FUTURE ENROLLMENT/FACILITY NEEDS

The School District completed a School Enrollment Study (Metro Service District Analysis) in the Fall of 1990. Revisions were made in the Spring of 1991. The study data suggests that school enrollments will be increasing sharply in the coming years. The growth assumption is supported by record-setting residential building permit issuance during 1990. Major arterial road improvements between I-5 and 99W will also cause further growth and development.

ELEMENTARY AGE STUDENTS (K-5)

J. Clyde Hopkins Elementary School has a capacity to house 600 students. Currently, 670 students are enrolled in grades K-5. Three double portable classrooms and one single portable classroom are utilized to address the growing elementary age population.

INTERMEDIATE AGE STUDENTS (6-8)

Approximately 300 students are enrolled in grades 6-8. The Intermediate School building capacity is 400 students. This capacity can be accessed by relocating District office services, which occupy a four classroom wing of the building.

HIGH SCHOOL AGE STUDENTS (9-12)

Sherwood High School has a capacity of 500 students. Approximately 420 students are currently enrolled. No major housing issues exist in this 1971 constructed facility.

SCHOOL FACILITY PLANNING

The School District is preparing to undertake a detailed facility development plan. The most immediate need for the District is to expand housing of elementary age school children (K-5). During the Fall of the 1990-91 school year, the District completed the purchase of a new elementary school site located within the City limits of Sherwood. The District also owns a school site (purchased in 1971) in the proximity of the Tualatin portion of the school district.

The intent of the District is to seek voter approval of a bond measure to address short and long-term housing needs. The measure is planned to be submitted in the Fall of 1991 or the Spring of 1992 in order to construct an additional elementary school.

I. PUBLIC SAFETY

POLICE PROTECTION

The City of Sherwood, Washington County and the State Police co-ordinate police protection within the Planning Area. In 1989 the Sherwood Police Force consisted of five officers. In order to meet future demand it is anticipated that the department will need additional patrolmen proportional to the projected increase in population. The State formula for City police protection is one officer per 500 people. The police force should expand accordingly.

FIRE PROTECTION

The Planning Area is wholly contained within the Tualatin Valley Consolidated Fire and Rescue District. One engine house is located within the City. The District feels that present physical facilities will be adequate to serve the projected year 2000 growth in the area with some increase in manpower and equipment. The District currently employs a 5-year capital improvement planning process which is updated annually. The City will co-ordinate its planning with the district to assure the adequacy of fire protection capability in the Planning Area.

J. GENERAL GOVERNMENTAL SERVICES

As a general purpose governmental unit, the City of Sherwood intends to fulfill its responsibilities in the principal areas of general administration, planning, public works, and library services. With expected growth in Sherwood, additional manpower and facilities will be required.

1. Manpower Needs

In 1989 there are currently seventeen (17) City staff in general governmental services. A review of cities which have reached Sherwood's projected five and twenty year growth levels indicate that new staffing will be needed proportional to population increases in most departments. Using this assumption a full-time staff of 15-20 persons will be required by 1985 and a staff of 20-40 will be needed by the year 2000. Most critical immediate needs are in the area of clerical staff to support existing departmental work loads.

2. Space Needs

The City offices, water department, police department, planning department and public works, are currently housed in a remodeled turn-of-the-century house. Although the structure is significant historically and should be saved, it may not meet the long term functional or space needs of a City Hall.

In 1982 the Senior and Community Center was built and provides meeting space for the City Council and Planning Commissions.

K. HEALTH FACILITIES

The local health system is linked to a number of organizations and institutions that can and do affect how it will develop. The latest planning legislation P.L. 93-641 and its recent amendments has placed Health care delivery systems planning are under the auspices of the State Certificate of Need laws and the Federal Health System Agency (HSA) planning regulations. Sherwood is located in the six county Northwest Oregon Health Systems Agency (NOHS) which is charged with reviewing new service proposals, expenditures involving public funds and the development of a health system plan for the area. The first HSA plan was adopted in 1978. State agencies administer HSA regulations. NOHS established subdistricts within the six county service area. Sherwood is located in the south-rural sub-district (see Figure VII-8). The only hospital located in the sub-district is Meridian Park Hospital in Tualatin.

Sherwood is served by various Metropolitan area hospitals depending on local physician affiliations. The City currently has only one doctor with offices in the Planning Area. St. Vincent's Hospital in Beaverton has expressed interest in establishing a satellite clinic in Sherwood.

The City will encourage the decentralization of Metropolitan health care delivery to assure that a broad range of inpatient, outpatient and emergency medical services are available to Sherwood residents. To that end the City will support the location of a St. Vincent's Satellite Center in Sherwood and encourage the appropriate expansion of Meridian Park facilities to meet the growing needs of the Planning Area.

L. SOCIAL FACILITIES AND SERVICES

A broad range of social services will be needed in the Planning Area to serve a growing urban population. Sherwood will continue to depend on metropolitan area services for which the demand does not justify a decentralized center. Multi-purpose social and health services and referral are offered by the Washington County Satellite Center in Tigard. The City will encourage the continued availability of such services.

Sherwood is located in Region 8 of the State Department of Human Resources Service Area and benefits from that agency's services. State services are administered through the County's Washington County office located in Hillsboro. In addition to public social service programs, many private organizations serve the Sherwood area.

The City is particularly interested in locating a multi-purpose social and health service referral agency in Sherwood so that residents of Sherwood would be able to get timely information on the available services. The City also supports the development of a Comprehensive Social and health services delivery plan for the Planning Area to identify gaps in needed services and develop an ongoing strategy for their provision. Of particular concern are day care and senior citizens services.

Day Care

A growing need exists for day care. State standards for the establishment of day care centers are supplemented by City standards. Currently day care has been carried on by churches and small home operations. The City recognizes and supports the proper siting and housing of day care services.

Senior Citizens Services

With an increasing proportion of the Planning Areas population reaching the age of 60, Sherwood will require additional specialized services and facilities for senior citizens. The City was awarded a grant from HUD for a Senior Citizen Community Center was completed in 1982. Community Center functions will be carried out under the authority of the City. It is the intent of the City that the Center be the focus for the Community activities requiring meeting and multi-purpose areas with particular emphasis on Senior Citizens programs and activities.

MSA
Murray, Smith & Associates, Inc.
Engineers | Planners

City of Sherwood Oregon

CITY OF SHERWOOD

Water System Master Plan Update

DRAFT

Exhibit 2 FEBRUARY 2015

WATER SYSTEM MASTER PLAN UPDATE

FOR

CITY OF SHERWOOD

FEBRUARY 2015

DRAFT

MURRAY, SMITH & ASSOCIATES, INC.
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Portland, OR 97204
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TABLE OF CONTENTS

Page

5. RECOMMENDATIONS AND CAPITAL IMPROVEMENT PROGRAM (CIP)

FIGURES

TABLES

APPENDICES

EXECUTIVE SUMMARY

Introduction

The purpose of this Water System Master Plan Update is to perform an analysis of the City of Sherwood's (City's) water system and:

- Document water system upgrades, including significant changes in water supply completed since the 2005 Master Plan
- Estimate future water requirements including potential water system expansion areas
- Identify deficiencies and recommend water facility improvements that correct deficiencies and provide for growth
- Update the City's capital improvement program (CIP)
- Evaluate the City's existing water rates and system development charges (SDCs)

This plan complies with water system master planning requirements established under Oregon Administrative Rules (OAR) for Public Water Systems, Chapter 333, Division 61.

Study Area

The study area of this planning effort includes the current city limits, the Tonquin Employment Area (TEA), Brookman Annexation area, the West Urban Reserve and a portion of the Tonquin Urban Reserve, which generally includes all area within the City's existing Urban Growth Boundary (UGB).

Planning Period

The planning period for this Water Master Plan Update is 20 years, through the year 2034. Some planning and facility sizing efforts within this plan will use estimates of water demands at saturation development. Saturation development occurs when all the vacant, developable land within the planning area has been developed to the maximum zoning density with some practical allowance for in-fill of existing developed properties.

Water System Background

The City owns and operates a public water system that supplies potable water to all residents, businesses and public institutions within the city limits.

Supply Facilities

The City draws the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville, approximately 6 miles southeast of Sherwood. The City owns 5 mgd of production capacity in the existing WRWTP facilities. Sherwood also maintains four groundwater wells within the city limits for back-up supply. Prior to

2011, the City also purchased water from the Portland Water Bureau (PWB) through the City of Tualatin's water system and maintains an emergency connection and transmission piping associated with this supply source.

Pressure Zones

The City's existing distribution system is divided into three major pressure zones. Pressure zone boundaries are defined by ground topography in order to maintain service pressures within an acceptable range for all customers in the zone. The hydraulic grade line (HGL) of a zone is designated by overflow elevations of water storage facilities or outlet settings of pressure reducing valves (PRVs) serving the zone.

The majority of Sherwood customers are served from the 380 Pressure Zone which is supplied by gravity from the City's Sunset Reservoirs. The 535 Pressure Zone, serving the area around the Sunset Reservoirs, is supplied constant pressure by the Sunset Pump Station, and the 455 Pressure Zone serves higher elevation customers on the western edge of the City by gravity from the Kruger Reservoir.

Storage Reservoirs

Sherwood's water system has three reservoirs with a total combined storage capacity of approximately 9.0 million gallons (MG). Two reservoirs, Sunset Nos. 1 and 2, provide 6.0 million gallons (mg) of gravity supply to the 380 Pressure Zone. The other reservoir, Kruger Road, provides 3.0 mg of gravity supply to the 455 Pressure Zone.

Pump Stations

Sherwood's water system includes two booster pump stations, the Sunset Pump Station and the Wyndham Ridge Pump Station.

The Sunset Pump Station is located in Snyder Park adjacent to the Sunset Reservoir complex and has an approximate total capacity of 3,770 gallons per minute (gpm). This station provides constant pressure service and fire flow to the 535 Pressure Zone.

The Wyndham Ridge Pump Station is located on SW Handley Street west of Highway 99W. Two 40-hp pumps supply a total capacity of approximately 1,200 gpm from 380 Zone distribution piping to the Kruger Road Reservoir.

Distribution System

The City's distribution system is composed of various pipe materials in sizes up to 24 inches in diameter. The total length of piping in the service area is approximately 77.4 miles. Pipe materials include cast iron, ductile iron, PVC and copper. The majority of the piping in the system is ductile iron.

Water Demand Projections

Water demand refers to all water required by the system including residential, commercial, industrial and institutional uses. Demands are described using two water use metrics, average daily demand (ADD) and maximum day demand (MDD), in gallons per unit of time such as gallons per day (gpd) or million gallons per day (mgd).

Current Water Demand

For the purposes of this Plan, water production data is used to calculate total water demand in order to account for unmetered water uses. Table ES-1 summarizes the City's current system-wide water demand based on water production data.

Table ES-1
Current Water Demand Summary

Year	ADD (mgd)	MDD (mgd)	Ratio MDD:ADD
2012	1.85	3.85	2.1
2013	1.87	3.83	2.0
Average	1.86	3.84	2.1

Future Water Demand Projections

The City's future water service area is comprised of five different planning areas:

1. Sherwood city limits
2. Tonquin Employment Area (TEA)
3. Brookman Annexation Area
4. West Urban Reserve
5. Tonquin Urban Reserve

Each of these areas has their own land use characteristics, approximate development timelines and existing planning information. Estimates of future growth and related water demand are developed using the best available information for each area including Sherwood buildable lands geographic information system (GIS) data, population growth projections, development area concept plans and current water demand data.

Water demand growth is projected at 10 years, 20 years and at saturation development. Estimated water demands at saturation development are used to size recommended transmission and distribution improvements. Future MDD is projected from estimated future ADD based on the current average ratio of MDD:ADD, also referred to as a peaking factor.

Future demand projections by planning area and pressure zone are summarized in Tables ES-2.

Table ES-2
Future Water Demand Summary

	Current			10-Year (2024)			20-Year (2034)			Saturation Development		
Pressure Zone	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**
City Limits	***8,779***	***1.87***	***3.93***	***9,536***	***2.03***	***4.26***	***9,536***	***2.03***	***4.26***	***9,536***	***2.03***	***4.26***
380	6,857	1.47	3.09	7,447	1.59	3.34	7,447	1.59	3.34	7,447	1.59	3.34
400	149	0.03	0.06	162	0.03	0.06	162	0.03	0.06	162	0.03	0.06
455	816	0.17	0.36	887	0.19	0.40	887	0.19	0.40	887	0.19	0.40
535	957	0.20	0.42	1,039	0.22	0.46	1,039	0.22	0.46	1,039	0.22	0.46
Tonquin Employment Area (TEA)				***238***	***0.05***	***0.11***	***484***	***0.11***	***0.23***	***744***	***0.16***	***0.34***
380	-	-	-	238	0.05	0.11	484	0.11	0.23	744	0.16	0.34
Brookman Annexation				***752***	***0.16***	***0.34***	***1,330***	***0.28***	***0.59***	***1,330***	***0.28***	***0.59***
380	-	-	-	752	0.16	0.34	1,275	0.27	0.57	1,275	0.27	0.57
400 Brookman	-	-	-	-	-	-	55	0.01	0.02	55	0.01	0.02
West Urban Reserve				***235***	***0.05***	***0.11***	***2,066***	***0.43***	***0.90***	***7,974***	***1.70***	***3.57***
380	-	-	-	235	0.05	0.11	1,138	0.24	0.50	4,391	0.94	1.97
455	-	-	-	-	-	-	432	0.09	0.19	1,670	0.36	0.76
475 West	-	-	-	-	-	-	52	0.01	0.02	202	0.04	0.08
630 West	-	-	-	-	-	-	444	0.09	0.19	1,711	0.36	0.76
Tonquin Urban Reserve										***591***	***0.13***	***0.27***
380	-	-	-	-	-	-	-	-	-	591	0.13	0.27
GRAND TOTAL	**8,779**	**1.9**	**3.9**	**10,761**	**2.3**	**4.8**	**13,416**	**2.9**	**6.0**	**20,175**	**4.3**	**9.0**

Planning and Analysis Criteria

Criteria are established for evaluating water supply, distribution system piping, service pressures, storage and pumping capacity and fire flow availability. These criteria are used in conjunction with the water demand forecasts to complete the water system analysis.

The water distribution system should be capable of operating within certain performance limits under varying customer demand and operational conditions. The recommendations of this plan are based on performance criteria developed through a review of State requirements, American Water Works Association (AWWA) acceptable practice guidelines, *Ten States Standards* and the *Washington Water System Design Manual*.

Water System Analysis

Water Supply

Sherwood's supply from the WRWTP is sufficient to meet MDD through the 10-year planning horizon with an additional 1 mgd of capacity required at 20 years and an additional 4 mgd needed at build-out. Existing City groundwater wells provide an effective emergency supply to complement emergency storage in the City's reservoirs.

Pumping and Storage

The City's distribution system has adequate storage and pumping capacity to meet existing service area demands through 2034. Due to significant uncertainty related to long-term growth and system expansion, minor storage and pumping deficiencies at build-out should be re-evaluated with the next Water Master Plan Update or as development warrants. Additional pump stations are recommended to serve proposed high-elevation closed pressure zones in the water service expansion areas: Brookman Annexation and West Urban Reserve.

Distribution Piping

Sherwood's distribution piping is sufficiently looped to provide adequate fire flow capacity to commercial, industrial and residential customers. Few piping improvement projects are needed to meet fire flow criteria. Extensive large diameter mains will be needed to expand the City's water service area to supply the Brookman Annexation, TEA and West Urban Reserve as development occurs.

Recommendations and Capital Improvement Program

Recommended improvements for the City's water system are based on the analysis and findings presented above. These improvements include proposed supply, pump station and water line projects.

Cost Estimating Data

An estimated project cost has been developed for each improvement project recommended. Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The cost estimates presented here have an expected accuracy range of -30 percent to +50 percent. As the project is better defined, the accuracy level of the estimates can be narrowed. Estimated project costs include approximate construction costs and an aggregate 45 percent allowance for administrative, engineering and other project related costs.

Capital Improvement Program

A summary of all recommended improvement projects and estimated project costs is presented in Table ES-3. This CIP table provides for project sequencing by showing fiscal year-by-year project priorities for the first five fiscal years, then prioritized projects in 5-year blocks for the 10-year, 20-year and Beyond 20 year timeframes. The total estimated cost of these projects is approximately $24.6 million through FY 2034. Approximately $19.9 million of the total estimated cost is for projects needed within the 10-year timeframe and $5.4 million of these improvements are required in the next 5 years.

Table ES-3
CIP Summary

DRAFT

Project Category	Project ID	Project Description	CIP Schedule and Project Cost Summary								% Allocated to Growth
			FY1 (2016)	FY2 (2017)	FY3 (2018)	FY4 (2019)	FY5 (2020)	10-Year (2024)	20-Year (2034)	Beyond 20 years	
Supply	S-1	Existing WRWTP upgrades to achieve max 15 mgd capacity				$ 250,000	$ 250,000	$ 500,000			20%
	S-2	WRWTP purchase 5 mgd intake capacity			$ 100,000	$ 150,000	$ 150,000	$ 1,600,000			100%
	S-3	WRWTP treatment expansion - Sherwood 5 mgd share			$ 440,000	$ 550,000	$ 550,000	$ 6,160,000			100%
	S-4	Install hydrants at Wells 3 and 5	$ 25,000								0%
	S-5	Abandon Well 4 and transfer water rights	$ 25,000								0%
		Subtotal	***$ 50,000***	***$ -***	***$ 540,000***	***$ 950,000***	***$ 950,000***	***$ 8,260,000***	***$ -***	***$ -***	
Pump Station	P-1	Proposed 1,600 gpm Ladd Hill Pump Station to serve future 400 Brookman Zone customers							$ 477,000		100%
	P-2	Proposed 2,400 gpm Kruger Pump Station to serve future 630 Zone customers								$ 2,547,000	100%
	P-3	Proposed 1,600 gpm Edy Road Pump Station to serve future 475 Zone customers								$ 1,505,000	100%
		Subtotal	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 477,000***	***$ 4,052,000***	
Water Main	M-1	Fire flow capacity -Sherwood Senior Center		$ 36,000							0%
	M-2	Fire flow capacity - Norton Ave			$ 92,000						0%
	M-60	Fire flow capacity - June Court				$ 43,000					0%
	M-7	Expansion to Brookman - Loop from prop SW Sherwood PRV to Hwy 99		$ 68,000							100%
	M-8				$ 204,000						100%
	M-9				$ 239,000						100%
	M-29	Expansion to TEA - Loop with existing Oregon Street mains			$ 154,000						100%
	M-30					$ 264,000					100%
	M-31					$ 438,000					100%
	M-32						$ 267,000				100%
	M-33						$ 162,000				100%
	M-34						$ 178,000				100%
	M-3, 4 & 5	10-Year (2024) - upgrade existing mains						$ 300,000			56%
	M-6, 10 to 19B, 35 to 37, 40 to 42	10-Year (2024)						$ 5,275,000			100%
	M-20 to 28, 43 to 45	20-Year (2034)							$ 3,295,000		100%
	M-38, 39, 46 to 59	Beyond 20 years								$ 7,183,000	100%
		Routine Pipe Replacement Program	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 250,000	$ 500,000	$50K annually	57%
		Subtotal	***$ 50,000***	***$ 154,000***	***$ 739,000***	***$ 795,000***	***$ 657,000***	***$ 5,825,000***	***$ 3,795,000***	***$ 7,183,000***	
PRV	V-1	SW Sherwood PRV			$ 150,000						100%
	V-2	Handley PRV						$ 150,000			100%
	V-3	Haide PRV								$ 150,000	100%
	V-4	195th PRV								$ 150,000	100%
		Subtotal	***$ -***	***$ -***	***$ 150,000***	***$ -***	***$ -***	***$ 150,000***	***$ -***	***$ 300,000***	
Other		Upgrade SCADA System		$ 75,000							35%
		Subtotal	***$ -***	***$ 75,000***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	
Planning		Update Water Master Plan						$ 150,000	$ 150,000		35%
		Update Water Management and Conservation Plan			$ 150,000				$ 150,000		35%
		Update Vulnerability Assessment						$ 60,000	$ 60,000		35%
		Resiliency Plan	$ 150,000						$ 150,000		35%
		Subtotal	***$ 150,000***	***$ -***	***$ 150,000***	***$ -***	***$ -***	***$ 210,000***	***$ 510,000***	***$ -***	
Capital Improvement Program (CIP) Total			**$ 250,000**	**$ 229,000**	**$ 1,579,000**	**$ 1,745,000**	**$ 1,607,000**	**$ 14,445,000**	**$ 4,782,000**	**$ 11,535,000**	**$ 36,172,000**

Annual Average CIP Cost		
$1,082,000 over 5 years	**$1,985,500 over 10 years**	**$1,231,850 over 20 years**

SECTION 1
INTRODUCTION AND EXISTING WATER SYSTEM

Introduction

The purpose of this Water System Master Plan Update is to perform an analysis of the City of Sherwood's (City's) water system and:

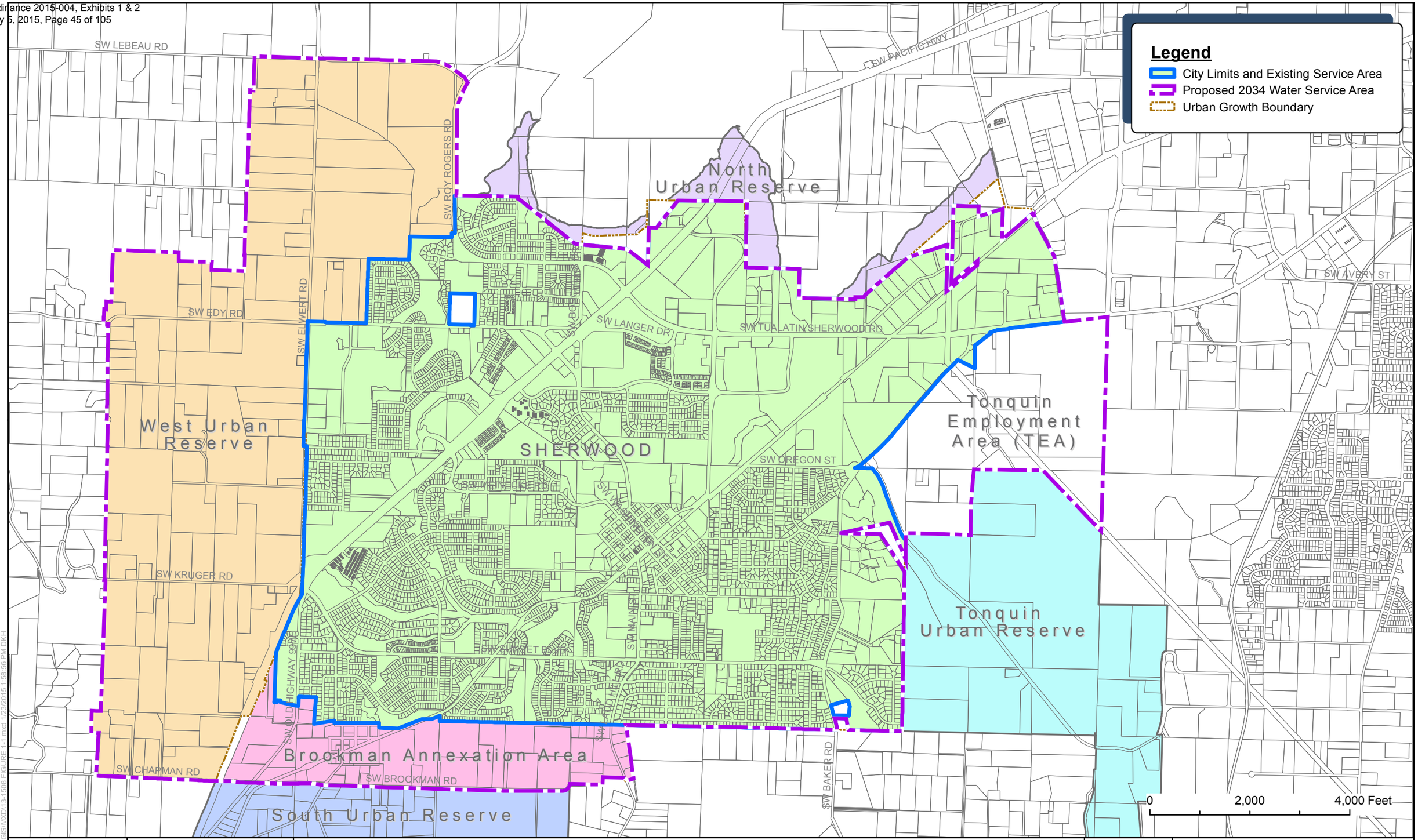
- Document water system upgrades, including significant changes in water supply completed since the 2005 Master Plan
- Estimate future water requirements including potential water system expansion areas
- Identify deficiencies and recommend water facility improvements that correct deficiencies and provide for growth
- Update the City's capital improvement program (CIP)
- Evaluate the City's existing water rates and system development charges (SDCs)

In order to identify system deficiencies, existing water infrastructure inventoried in this section will be assessed based on estimated existing and future water needs developed in Section 2 and water system performance criteria described in Section 3. The results of this analysis are presented in Section 4. Section 5 identifies improvement projects to mitigate existing and projected future deficiencies and provide for system expansion including a prioritized CIP. Section 6 presents the water system financial analysis including an assessment of the City's current water rates and SDCs. The planning and analysis efforts presented in this Master Plan Update are intended to provide the City with the information needed to inform long-term water infrastructure decisions.

This plan complies with water system master planning requirements established under Oregon Administrative Rules (OAR) for Public Water Systems, Chapter 333, Division 61.

Study Area

The City's current water service area includes all areas within the current city limits. The study area of this planning effort includes the current city limits, the Tonquin Employment Area (TEA), Brookman Annexation area, the West Urban Reserve and a portion of the Tonquin Urban Reserve. The TEA and Brookman Annexation are within the City's existing Urban Growth Boundary (UGB). Some development in the West and Tonquin Urban Reserves is considered in the future water system analysis in order to provide for anticipated long-term growth. Future jurisdiction of the Tonquin Urban Reserve area is divided between the City of Sherwood and the City of Tualatin with Sherwood serving customers west of SW 124th Avenue. The study area is illustrated in Figure 1-1.



MSA Murray, Smith & Associates, Inc.

City of Sherwood Oregon

Sherwood Water System Master Plan Update

Figure 1-1
Study Area

G:\PDX_Projects\13\1508\GIS\MXD\13-1508 FIGURE 1-1.mxd 1/23/2015 1:58:56 PM DKH

February 2015 13-1508

Water System Background

The City owns and operates a public water system that supplies potable water to all residents, businesses and public institutions within the city limits. This section describes the water service area and inventories the City's water system facilities including existing supply sources, pressure zones, finished-water storage reservoirs, pump stations and distribution system piping.

Plate 1 in Appendix A illustrates the City's water system service area limits, water system facilities and distribution system piping. The water system schematic in Figure 1-2 at the end of this section shows the existing configuration of water system facilities and pressure zones.

Supply Facilities

The City draws the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville, approximately 6 miles southeast of Sherwood. Sherwood maintains four wells within the city limits for back-up supply. Prior to 2011, the City also purchased water from the Portland Water Bureau (PWB) through the City of Tualatin's water system.

Willamette River Water Treatment Plant

The Willamette River Water Treatment Plant (WRWTP) in the City of Wilsonville began operating in 2002 using conventional filtration to treat up to 15 million gallons per day (mgd) of Willamette River water for municipal consumption. The facility was developed and funded by Wilsonville and the Tualatin Valley Water District (TVWD). In December 2006, Sherwood purchased 5 mgd of the WRWTP's capacity from TVWD. The plant is currently operated and maintained under contract by Veolia Water, a private contractor.

WRWTP Transmission to Sherwood

Water is supplied from the WRWTP to Sherwood's Sunset Reservoirs through approximately 6.3 miles of 63-inch and 48-inch diameter welded steel pipe. Some segments of the transmission main currently serve both Sherwood and Wilsonville customers with pipe oversizing to accommodate future WTP expansion. Intergovernmental agreements (IGAs) between Sherwood, Wilsonville and TVWD define the capacity in each shared pipe segment that is available to each water provider. Transmission main segment descriptions, lengths, sizes and capacities are summarized in Table 1-1.

Table 1-1
WRWTP-Sherwood Transmission Main

Pipe Segment	From	To	Length (LF)	Dia (in)	Capacity	
					IGA Total (mgd)	Sherwood Share
1	Willamette River WTP	Kinsman Road at Wilsonville Road	4,300	63	70	5 mgd
2	Kinsman Road at Wilsonville Road	Kinsman Road at Barber Road	2,537	48	40	1/2
3A	Kinsman Road at Barber Road	180 feet north of Segment 2	180	48	40	1/2
3B	Segment 3A	Boeckman Road at Kinsman Road	2,400	48	40	1/2
4	Boeckman Road at Kinsman Road	Tooze Road at 110th Avenue	4,185	48	30	2/3
5A	Tooze Road at 110th Avenue	400 feet west of Tooze Road & Grahams Ferry Road	1,461	48	30	2/3
5B	Segment 5A	Revenue Meter Vault (Tooze Road)	198	48	40	1/2
6 thru 9	Revenue Meter Vault (Tooze Road)	Sherwood Sunset Reservoirs	18,000	48		All

Groundwater Wells

Sherwood operates four groundwater wells for back-up supply within the City's water service area. Well Nos. 3, 4, 5 and 6 have a combined production capacity of approximately 3.3 mgd. Liquid sodium hypochlorite is added at each well for disinfection.

Although the wells are currently used for back-up supply only, they are exercised regularly and supplied approximately 6 percent of the City's annual demand in 2013 while Segment 3B of the WRWTP transmission main was completed. City wells are summarized in Table 1-2.

Table 1-2
Groundwater Well Summary

Well No.	Location	Pump Type	Hp	Year Constructed	Production Capacity (gpm)	Approx. Depth (feet)	Casing Dia. (inches)
3	Intersection of Pine and Willamette Street	Vertical Line Shaft Turbine	75	1946	890	319	12
4	17191 Smith Road	Vertical Line Shaft Turbine	60	1969	250	458	14
5	16491 Sunset Boulevard	Vertical Line Shaft Turbine	150	1984	600	800	16
6	1830 Roy Street	Vertical Line Shaft Turbine	75	1997	550 [1]	889	16
				Total Production Capacity (gpm):	**2,290**		
				(mgd):	**3.3**		

[1] *Production capacity is limited to 550 gpm by available water rights.*

Tualatin Emergency Intertie

Sherwood maintains an emergency connection with the City of Tualatin through an approximately 4-mile long, 24-inch diameter Sherwood-owned transmission main. This transmission main begins at the Tualatin Community Park where the Tualatin-Portland supply main connects to the City of Tualatin's distribution system. A pressure reducing valve (PRV) at this connection reduces the hydraulic grade to approximately 385 feet of head for the City of Sherwood.

Prior to 2011 when Sherwood began drawing water from the WRWTP, Sherwood purchased water from the Portland Water Bureau, under an agreement with the City of Tualatin and TVWD, through this 24-inch main. Currently, the City receives a small amount of supply from Tualatin through this main under normal operating conditions to maintain water quality in the main for use in a water emergency.

Pressure Zones

The City's existing distribution system is divided into three major pressure zones. Pressure zone boundaries are defined by ground topography in order to maintain service pressures within an acceptable range for all customers in the zone. The hydraulic grade line (HGL) of a zone is designated by overflow elevations of water storage facilities, discharge pressure of pump stations, or outlet settings of pressure reducing valves (PRVs) serving the zone. Existing pressure zone HGLs, approximate service elevation ranges and related facilities are summarized in Table 1-3. Water system facilities serving each pressure zone are illustrated on Figure 1-2 at the end of this section.

The majority of Sherwood customers are served from the 380 Pressure Zone which is supplied by gravity from the City's Sunset Reservoirs. The 380 Zone can also be served by gravity from the WRWTP, the City's groundwater wells and the Tualatin emergency supply connection. The 535 Pressure Zone, serving the area around the Sunset Reservoirs, is supplied constant pressure by the Sunset Pump Station. The Murdock sub-zone, with an HGL of 400 feet, is served through a PRV from the 535 Zone. The 455 Pressure Zone serves higher elevation customers on the western edge of the City. This zone is served by gravity from the Kruger Reservoir which is filled by pumping out of the 380 Zone at the Wyndham Ridge Pump Station.

Storage Reservoirs

Sherwood's water system has three reservoirs with a total combined storage capacity of approximately 9.0 million gallons (MG). Table 1-3 presents a summary of the City's existing storage reservoirs.

Table 1-3
Reservoir Summary

Reservoir	Location	Capacity (MG)	Overflow Elevation (ft)	Pressure Zone Served
Sunset No. 1	Snyder Park	2.0	380	380
Sunset No. 2	Snyder Park	4.0	383.5	380
Kruger Road	SW Kruger Road west of Highway 99W	3.0	455	455

Sunset Reservoirs

Sherwood's Sunset Reservoirs provide gravity service to the City's largest pressure zone, 380. Both Reservoirs are located at the north end of Snyder Park near the intersection of SW Division and Pine Streets. The 2.0 MG Sunset Reservoir No. 1 is a 105-foot diameter circular, partially buried, cast in place, prestressed concrete reservoir constructed in 1972. Reservoir No. 1 was seismically upgraded in 2005 with more extensive seismic structural improvements, drainage improvements and re-coating completed in 2012. The 4.0 MG Sunset Reservoir No. 2 was constructed in 2009 adjacent to Sunset Reservoir No. 1. Sunset No. 2 is a 155-foot diameter circular, partially buried, cast in place, prestressed concrete reservoir.

Both reservoirs are supplied from the WRWTP through the Sherwood transmission main which terminates at the reservoir site. The reservoirs provide suction supply to the Sunset Pump Station which provides constant pressure service to the 535 Zone. Site piping at

Snyder Park is configured such that either or both reservoirs may be taken out of service for maintenance.

Kruger Road Reservoir

The 3.0 MG Kruger Road Reservoir was constructed in 2002 and is located approximately one-half mile west of Highway 99W, outside of the UGB on the west side of Sherwood. Kruger Road Reservoir is a 130-foot diameter circular, partially buried, cast in place, prestressed concrete reservoir. The reservoir is supplied water from the Wyndham Ridge Pump Station and serves the 455 Pressure Zone by gravity.

Pump Stations

Sherwood's water system includes two booster pump stations, the Sunset Pump Station and the Wyndham Ridge Pump Station. Table 1-4 summarizes the City's existing pump stations.

Table 1-4
Pump Station Summary

Pump Station	Pump No.	Horsepower (Hp)	Capacity (gpm)	Serves
Sunset	1	7.5	120	Constant Pressure to 535 Zone and Murdock Sub-Zone
	2	20	325	
	3	20	325	
	4	100	1500	
	5	100	1500	
Wyndham Ridge	1	40	600	Kruger Road Reservoir and 455 Zone
	2	40	600	
	3	10	N/A[1]	
	4	10	N/A[1]	

[1] *Pumps are not used to supply the Kruger Road Reservoir under normal operating conditions.*

Sunset Pump Station

The Sunset Pump Station is located in Snyder Park adjacent to the Sunset Reservoir complex and houses five vertical turbine pumps with an approximate total capacity of 3,770 gallons per minute (gpm). This station provides constant pressure service and fire flow to the 535 Pressure Zone and the PRV controlled Murdock sub-zone. Site piping at Snyder Park is configured such that suction supply to the station can be provided from either the Sunset Reservoirs or the 380 Zone distribution piping. Sunset Pump Station is equipped with variable frequency drives (VFDs) to meet instantaneous demands and improve operating

efficiency. Back-up power and redundant high capacity pumps capable of supplying adequate fire flow provide resilient operation for this continuously operating station.

Wyndham Ridge Pump Station

The Wyndham Ridge Pump Station is located on SW Handley Street west of Highway 99W and houses four close-coupled, end suction centrifugal pumps. Two 40-hp pumps supply water from 380 Zone distribution piping to the Kruger Road Reservoir. Each of these pumps has a capacity of approximately 600 gpm. Prior to the completion of the Kruger Road Reservoir in 2002, the Wyndham Ridge Pump Station provided constant pressure service to the 455 Zone at a lower HGL using a 5-hp and two 10-hp pumps. The required pumping head to deliver water to the Kruger Road Reservoir and the 455 Pressure Zone exceeds the operating range of these original pumps which are not currently used. The 5-hp pump was removed and the piping and valving reconfigured to allow supply from the 455 Zone to the 380 Zone.

In the event that the Kruger Road Reservoir is taken out of service, the pump station is capable of providing constant pressure service to the 455 Zone. The two 40-hp pumps are equipped with VFDs which will operate to maintain pressure and meet demands in the zone. The pump station is equipped with a 125 kilowatt generator for emergency back-up power.

Distribution System

The City's distribution system is composed of various pipe materials in sizes up to 24 inches in diameter. The total length of piping in the service area is approximately 77.4 miles. Pipe materials include cast iron, ductile iron, PVC and copper. The majority of the piping in the system is ductile iron. Table 1-5 presents a summary of pipe lengths by diameter.

Table 1-5
Distribution System Pipe Summary

Pipe Diameter	Approximate Length (miles)
4-inch or Less	0.7
6-inch	5.0
8-inch	37.2
10-inch	6.9
12-inch	14.0
14-inch	0.9
16-inch	1.8
18-inch	0.8
24-inch	4.3
Total Length	**77.4**

SCADA System

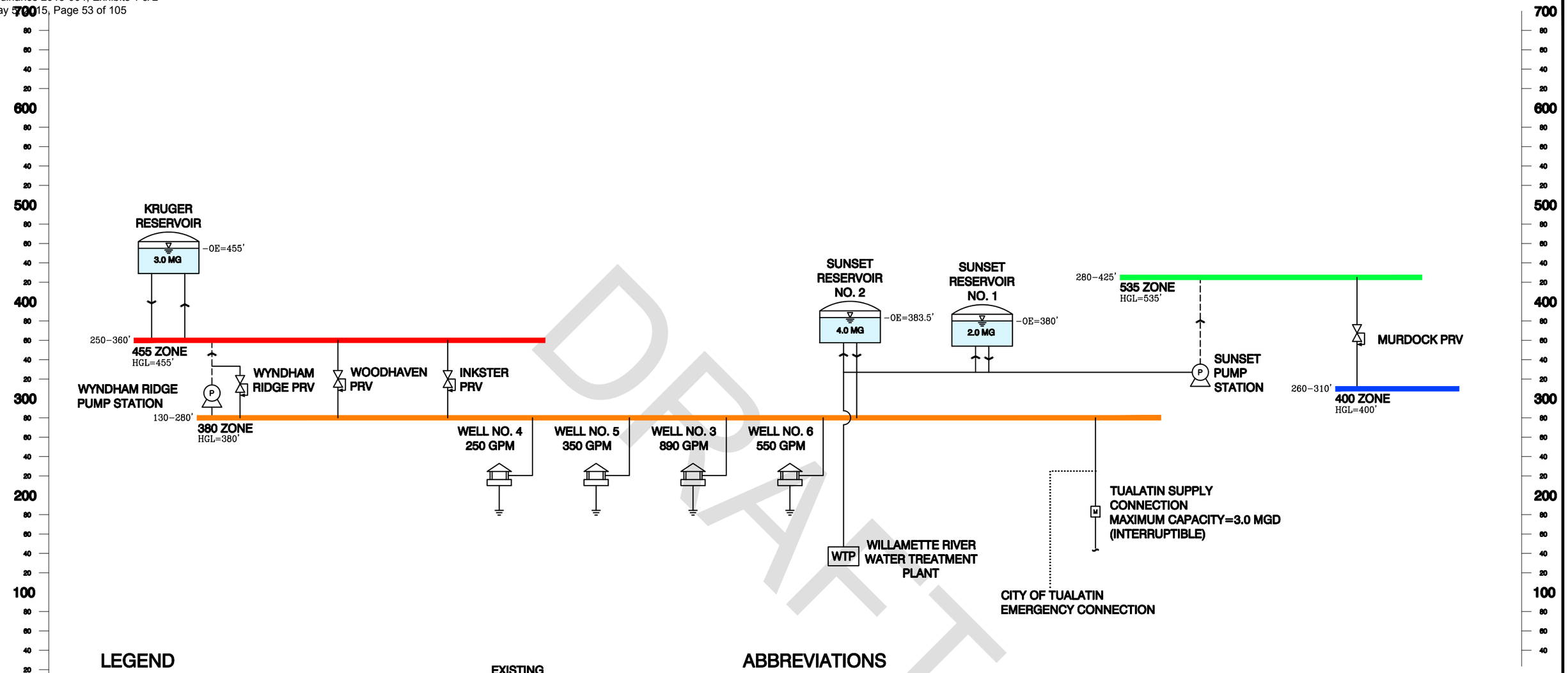
Sherwood's supervisory control and data acquisition (SCADA) system monitors all storage reservoirs, pump stations and wells within the City's water distribution system and provides for manual or automatic control of certain facilities and operations. The SCADA system also collects and stores system status and performance data.

All facilities are equipped with remote telemetry units (RTUs) that monitor reservoir water surface elevations, pump station on/off status and pump station flow rates. In addition, some sites are equipped with intrusion, overflow warning and fire alarms which alert staff to unauthorized access, flooding or fire.

All signals from the RTUs are collected and transmitted to the local operations center and to a Human-Machine Interface (HMI) located at the Public Works complex which enables City staff to view the status of the water system. The system is also capable of automatically dialing City officials 24 hours a day in the event that one of the alarms is triggered at any of the sites. Many of the City's telemetry system facilities have recently been upgraded.

Summary

This section presents a summary of the City of Sherwood's existing water system, including the transmission and supply system, emergency interties, pressure zones, storage and pumping facilities and distribution system piping.



LEGEND

	EXISTING
PUMP DISCHARGE WATER MAIN	-------
WATER MAIN	———
RESERVOIR (CAPACITY IN MG, OVERFLOW ELEVATION IN FEET)	1.0 MG, OE=410'
GROUNDWATER WELL (PRODUCTION CAPACITY IN GPM)	
PRESSURE REDUCING VALVE	
PUMP STATION	P
MASTER METER	M
WATER TREATMENT PLANT	WTP
DISTRIBUTION SYSTEM EMERGENCY INTERTIES	.....

ABBREVIATIONS

GPM	GALLONS PER MINUTE
HGL	HYDRAULIC GRADE LINE
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
OE	OVERFLOW ELEVATION
PRV	PRESSURE REDUCING VALVE

FIGURE 1-2

City of Sherwood Oregon

Water System Master Plan Update

WATER SYSTEM SCHEMATIC

FEBRUARY 2015

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SECTION 2
LAND USE AND WATER REQUIREMENTS

This section presents existing and projected future water demands for the City of Sherwood's (City's) water service area. Demand forecasts are developed from current land use, buildable lands data and historical water consumption and production records.

Service Area

The existing water service area is the entire area within the existing city limits. The City's future water system planning area includes the current city limits, the Tonquin Employment Area (TEA), Brookman Annexation Area, West Urban Reserve and a portion of the Tonquin Urban Reserve. The TEA and Brookman Annexation Area are within the City's existing Urban Growth Boundary (UGB). Some development in the West and Tonquin Urban Reserves is considered in the future water system analysis in order to provide for anticipated long term growth. Future jurisdiction of the Tonquin Urban Reserve area is divided between the City of Sherwood and the City of Tualatin with Sherwood serving customers west of SW 124th Avenue.

Future water service expansion areas are divided between existing and proposed future pressure zones based on ground elevations and a service pressure range of 40 to 80 pounds per square inch (psi). Sherwood's existing and future service areas and pressure zones are illustrated on Figure 2-1 at the end of this section.

Planning Period

The planning period for this Water Master Plan Update is 20 years, through the year 2034. Some planning and facility sizing efforts within this plan will use estimates of water demands at saturation development. Saturation development occurs when all the vacant, developable land within the planning area has been developed to the maximum zoning density with some practical allowance for in-fill of existing developed properties. Typically, if substantial water system improvements are required beyond the 20-year planning period in order to accommodate water demands at saturation development, staging is recommended for facilities where incremental expansion is feasible and practical. Unless otherwise noted, recommended improvements identified in this plan are sized for saturation development.

Current Water Demand

Water demand refers to all water required by the system including residential, commercial, industrial and institutional uses. Demands are described using two water use metrics, average daily demand (ADD) and maximum day demand (MDD), in gallons per unit of time such as gallons per day (gpd) or million gallons per day (mgd). ADD is the total annual water volume used in the system divided by 365 days per year. MDD is the largest 24-hour

water volume for a given year. In western Oregon, MDD usually occurs each year between July 1st and September 30th. This timeframe is referred to as the peak season.

Water demand can be calculated using either water consumption or water production data. Water consumption data is taken from the City's customer billing records which do not include unmetered water use such as system flushing and water loss. Water production is the total of all water entering the Sherwood water system including water purchased from the Willamette River Water Treatment Plant (WRWTP), water wheeled through Tualatin from the Portland Water Bureau and water produced at the City's wells.

For the purposes of this Plan, water production data is used to calculate total water demand in order to account for unmetered water uses. Customer consumption and billing records are used to distribute demands throughout the Sherwood water system hydraulic model discussed in Section 4 and to estimate water demand distribution among the City's pressure zones. The historical ratio of MDD:ADD is used to estimate future maximum day demands. Table 2-1 summarizes the City's current system-wide water demand based on water production data.

Table 2-1
Current Water Demand Summary

Year	ADD (mgd)	MDD (mgd)	Ratio MDD:ADD
2012	1.85	3.85	2.1
2013	1.87	3.83	2.0
Average	1.86	3.84	2.1

Water Demand by Pressure Zone

As described in Section 1, water systems are divided into pressure zones in order to provide adequate service pressure to customers at different elevations. Each pressure zone is served by specific facilities, such as, reservoirs or pump stations and related piping which supply pressure to customers. In order to assess the sufficiency of these facilities, it is necessary to estimate demand in each pressure zone. Current water demand based on water production data, as shown in Table 2-1 is distributed between the City's pressure zones based on metered water consumption from utility billing records. Current water demand by pressure zone is summarized in Table 2-2.

Table 2-2
Current Water Demand by Pressure Zone

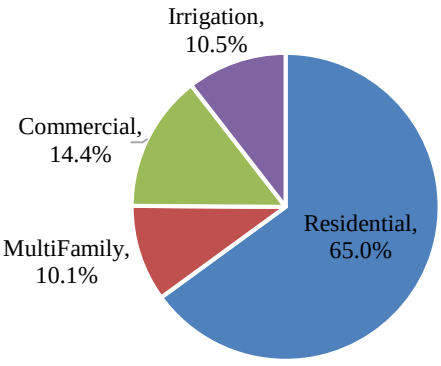
Pressure Zone	ADD (mgd)	MDD (mgd)
380	1.45	2.97
400	0.04	0.07
455	0.18	0.38
535	0.19	0.42
Total	1.86	3.84

Water Consumption by Customer Class

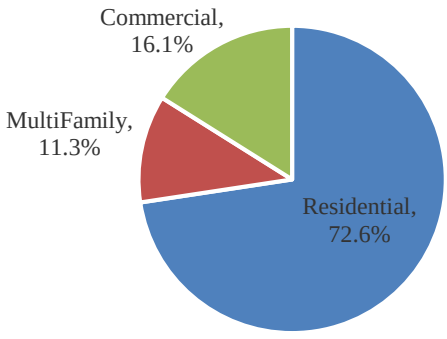
Current water consumption by service type or customer class from the City's billing records is used to correlate water demand to land use type for future demand projections. The City's water utility billing records maintain five service types, Residential, MultiFamily, Commercial, Irrigation and Fireline. Fireline meters are used only in an emergency and are not included in this consumption analysis.

Sherwood's irrigation consumption serves both residential and non-residential properties. It is important to include irrigation use in estimates of future water consumption for properties that are not yet developed. In order to estimate the water need for each customer class including irrigation use, the current annual irrigation demand is distributed to the other three customer classes, Residential, MultiFamily and Commercial, proportional to their share of total annual metered consumption. Current water consumption by customer class is based on a 2-year average of City water billing data from 2012 and 2013. Current water consumption by customer class, including irrigation use, is illustrated in Figure 2-2.

Figure 2-2
Current Annual Water Consumption by Customer Class



with Irrigation independent



with Irrigation included

Commercial Water Demand per Acre

Commercial demand per acre is used to estimate long term future water demands in areas without detailed planning information, such as, the Tonquin and West Urban Reserves and for infill development within the city limits. Current average daily commercial water demand per acre is estimated by associating commercial water consumption to developed commercial and light industrial acreage within the city limits and TEA. Developed commercial acreage is estimated using the City's buildable lands geographic information systems (GIS) data general zoning categories. Estimated commercial average daily water demand is 437 gpd per acre.

Water Demand per Residential Unit

Growth projections developed for the City through previous planning efforts identify the number of future residential units (RUs) anticipated within an area to be developed. In order to forecast future water demands using these estimated future RUs, an average daily water demand (ADD) per RU is established from current water billing data.

ADD per residential unit is calculated as the total annual consumption by single-family residential customers divided by the total number of single-family residential service connections. As previously discussed, the City has a significant number of irrigation meters. Consumption from irrigation meters is distributed to all other customer classes proportional to their annual water use as illustrated in Figure 2-2. Current ADD per RU including irrigation use is approximately 213 gallons per day (gpd/RU) as summarized in Table 2-3. For the purposes of this analysis, ADD per residential unit is anticipated to remain constant in the future.

Table 2-3
ADD per Residential Unit

Annual Water Consumption (gallons)	Residential	370,287,850
	Residential Portion (72.6%) of Irrigation Consumption	43,465,166
	Residential Total	413,753,016
Residential Consumption ADD		1,133,570
No. of Residential Services		5,322
ADD per RU (gpd/RU)		**213**

Future Water Demand Projections

Approach

The City's future water service area, illustrated on Figure 2-1, is comprised of five different planning areas:

1. Sherwood city limits
2. Tonquin Employment Area (TEA)
3. Brookman Annexation Area
4. West Urban Reserve
5. Tonquin Urban Reserve

Each of these areas has their own land use characteristics, approximate development timelines and existing planning information. Estimates of future growth and related water demand are developed using the best available information for each area including Sherwood buildable lands geographic information system (GIS) data, population growth projections, development area concept plans and current water demand data. The buildable lands GIS includes a calculated number of new units for each residentially zoned property and a net acreage for each non-residential property. Each of these values take into account the property's current zoning and development restrictions such as floodplain overlays.

Water demand growth is projected at 10 years, 20 years and at saturation development. Estimated water demands at saturation development are used to size recommended transmission and distribution improvements. Future MDD is projected from estimated future ADD based on the current average ratio of MDD:ADD, also referred to as a peaking factor. From current water demand data shown in Table 2-1, the MDD:ADD peaking factor for the Sherwood system is approximately 2.1.

Forecasted demands are allocated to existing and proposed future pressure zones based on the ground elevations in water service expansion areas and a service pressure range of 40 to 80 pounds per square inch (psi). Existing and proposed pressure zone boundaries for the study area are illustrated on Figure 2-1 and Plate 1 in Appendix A. Future demand projections by pressure zone are summarized in Tables 2-7 and 2-8 at the end of this section.

Sherwood City Limits

Residential services account for the majority of water demand in the City of Sherwood, thus, an estimated annual average population growth rate is used as an indicator of growth in water demand within the current city limits. The regional government Metro projects saturation development will occur within the existing Sherwood city limits in the next 10 years. According to annual population estimates developed for all Oregon cities by the Portland State University Population Research Center (PRC), recent population growth within the Sherwood city limits has occurred at an average rate of less than 0.3 percent annually.

Based on proposed subdivisions and planned unit developments (PUDs) approved by the City in 2012 and 2013, it is assumed that residential growth within the city limits will be slightly accelerated for the next 3 to 5 years as these housing developments are completed. For this analysis, future population growth within the city limits is estimated based on an annual average growth rate of approximately 1.25 percent through 2019 and 0.15 percent after 2019 to saturation development in approximately 2024.

Tonquin Employment Area (TEA)

Growth in the TEA is estimated based on the September 2010 *Tonquin Employment Area Preferred Concept Plan Report* Table IV-1: TEA 20-Year Employment Forecast. This table develops estimates of job density per acre for four sub-areas within the TEA. For the Water Master Plan analysis, it is assumed the TEA will begin developing in sub-areas A and B1 within 5 years and in sub-areas B2 and B3 within 10 years. Development in the TEA is assumed to follow a linear growth pattern based on 20-year development percentages established in Table IV-1 of the *TEA Concept Plan.* For example, the 96.8 acres of light industrial buildable land in sub-area A is anticipated to be 70 percent developed in 20 years. Using a linear growth pattern, light industrial land in sub-area A will be 35 percent developed in 10 years and approximately 17 percent developed within 5 years. Total jobs within the TEA at saturation development (buildout) are also established in Table IV-1.

Future water demand projections in the TEA are based on water use per employee of 45 gallons per day (gpd) for mixed use commercial, office and light industrial development as presented in the *TEA Concept Plan*. This water demand estimate assumes there will be no process water uses in future TEA developments. Growth projections and future water demand estimates for the TEA are summarized in Table 2-4.

Table 2-4
TEA Projected Growth and Future Water Demand

Growth Projection	TEA Sub Area	Total Developed Acres	Total Jobs	ADD (mgd)
5-Year (2019)	A, B1	31.0	490	0.03
10-Year (2024)	All	74.9	1,160	0.05
20-Year (2034)	All	147.0	2,290	0.11
Saturation Development	All	235.2	3,520	0.16

Brookman Annexation Area

Growth projections in the Brookman Annexation Area are developed based on the *2009 Brookman Addition Concept Plan Final Report* and the City's buildable lands GIS data. The concept plan identifies areas for residential, commercial, office and light industrial development within the Brookman Annexation Area. Table 1 Land Use Metrics from the *Brookman Concept Plan* presents an estimated density and total number of jobs within the Brookman Annexation Area at saturation development. The City's buildable lands GIS data for the Brookman area includes an estimated number of residential units at saturation development. Due to the small amount of developable residential land within the existing city limits and the exclusively non-residential, primarily industrial development anticipated within the TEA, it is assumed that the Brookman Annexation Area will reach saturation development within the 20-year planning horizon.

It is assumed that the Brookman Annexation Area will begin developing in five years with an initial 80 households and 300 jobs. The initial number of households is based on existing housing unit counts in the area from the 2010 Census and two new residential developments of 30 to 40 homes. Approximately eight acres of non-residential development would yield 300 jobs based on the density of 35.83 jobs/acre presented in the *Brookman Concept Plan* Table 1. Growth projections at 10 years are based on a linear growth pattern from initial development at five years to saturation at 20 years.

Average daily water demands for future residential development are estimated based an ADD/RU of 213 gpd/RU. Commercial, office and light industrial average daily water demands within the Brookman Annexation Area are based on an average water use per employee of 45 gpd consistent with the *TEA Concept Plan* for these same land uses. All Brookman Annexation Area growth through 2024 is assumed to occur only in the 380 Pressure Zone. Growth projections and future water demand estimates for the Brookman Annexation Area are summarized in Table 2-5.

Table 2-5
Brookman Projected Growth and Future Water Demand

Growth Projection	Non-Residential Developed Acres	Total Jobs	Residential Units	ADD (mgd)
5-Year (2019)	8.4	300	80	0.04
10-Year (2024)	18.6	665	596	0.16
20-Year (2034)	28.7	1,029	1,112	0.28
Saturation Development	28.7	1,029	1,112	0.28

West Urban Reserve

For the purposes of this analysis, future land use within the West Urban Reserve is assumed to mirror the proportion of land use types among developed properties within the current city limits. The proposed 630 West Zone within the West Urban Reserve, as shown on Figure 2-1, is not anticipated to have any industrial development. Percentages of future land use by type have been adjusted to exclude industrial development in this area. 20 percent of land within the West Urban Reserve is assumed to be dedicated to right-of-way, parks and open space with no future water demand.

Due to the small amount of developable residential land within the existing city limits, the exclusively non-residential development anticipated within the TEA, and the assumed build-out of the Brookman Annexation Area, it is assumed that the West Urban Reserve will be approximately one-quarter developed within the 20-year planning horizon. It is assumed that the West Urban Reserve will begin developing in 10 years with an initial 20 acres of non-residential development and 100 residential units. Long term residential development in the West Urban Reserve is anticipated to occur at approximately 10 units per acre based on discussion with City planning staff.

Future water demand in the West Urban Reserve is based on 213 gpd/RU and 437 gpd/acre for non-residential land as developed previously in this section. The West Urban Reserve will be served from the existing 380 and 455 Pressure Zones and proposed 475 West and 630 West Pressure Zones. Initial growth in the West Urban Reserve is assumed to occur only in the 380 Pressure Zone north of SW Handley Street. Growth projections and future water demand estimates for the West Urban Reserve are summarized in Table 2-6.

Table 2-6
West Urban Reserve Projected Growth and Future Water Demand

Growth Projection	Total Residential Units	Developed Non-Residential Acres	ADD (mgd)
10-Year (2024)	150	20	0.05
20-Year (2034)	1,849	93.8	0.44
Saturation Development	7,395	281.5	1.70

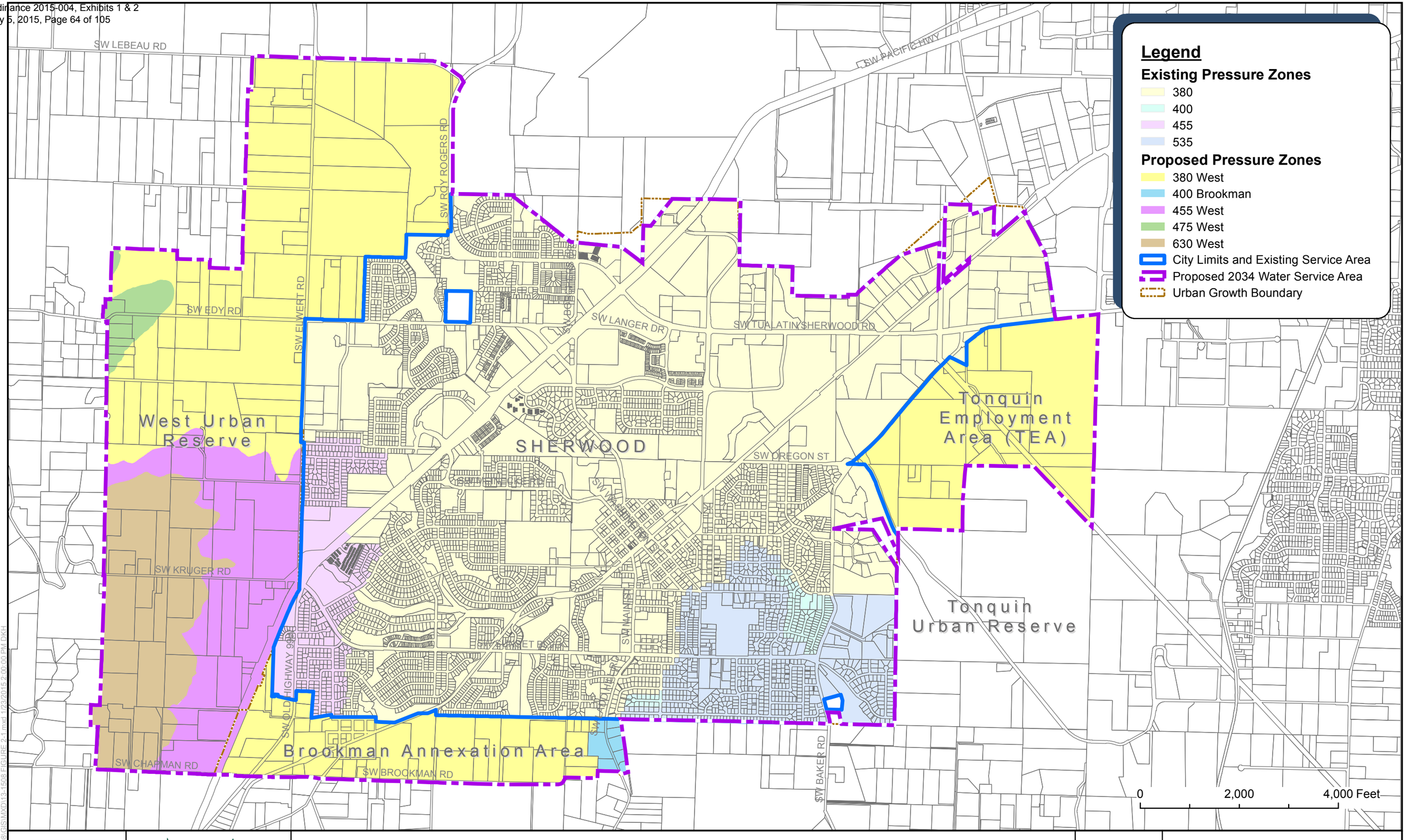
Tonquin Urban Reserve

The Tonquin Urban Reserve is not anticipated to begin development until the end of the 20-year planning horizon. Future land use within the Tonquin Urban Reserve is anticipated to be entirely industrial and commercial, based on conversations with City planning staff. Future water demands are forecast based on 437 gpd/acre as previously presented. The Tonquin Urban Reserve will be served from the existing 380 Pressure Zone.

Equivalent Residential Units (ERUs)

Sherwood's water system serves single-family residential customers as well as commercial customers and multifamily housing developments. Single-family residential water services generally have a consistent daily and seasonal pattern of water use or demand. Water demands for multifamily residences, commercial and industrial users may vary from service to service depending on the number of multifamily units per service or the type of commercial enterprise. In order to establish a common measure of water demand growth for all service types, the water needs of non-residential and multi-family residential customers are represented by comparing their water use volume to the average single-family residential unit. The number of single-family residential units that could be served by the water demand of these other types of customers is referred to as a number of "equivalent residential units" (ERUs).

ERUs differ from actual metered service connections in that they relate all water services to an equivalent number of representative single-family residential services based on typical annual consumption. ERUs calculated here are specific to estimating future water demand and are not the same as dwelling units used in housing studies or comprehensive planning to forecast future population. Demand per ERU in the Sherwood system is 213 gpd/ERU. ERUs are used in the water system financial analysis to distribute anticipated project costs between existing customers and water system growth.



MSA Murray, Smith & Associates, Inc.

City of Sherwood Oregon

Sherwood Water System Master Plan Update

Figure 2-1
Existing and Future Pressure Zones

February 2015 13-1508

G:\PDX_Projects\13\1508\GIS\MXD\13-1508 FIGURE 2-1.mxd 1/23/2015 2:00:00 PM DKH

Table 2-7
Future Water Demand Summary

	Current			10-Year (2024)			20-Year (2034)			Saturation Development		
Pressure Zone	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**
City Limits	***8,779***	***1.87***	***3.93***	***9,536***	***2.03***	***4.26***	***9,536***	***2.03***	***4.26***	***9,536***	***2.03***	***4.26***
380	6,857	1.47	3.09	7,447	1.59	3.34	7,447	1.59	3.34	7,447	1.59	3.34
400	149	0.03	0.06	162	0.03	0.06	162	0.03	0.06	162	0.03	0.06
455	816	0.17	0.36	887	0.19	0.40	887	0.19	0.40	887	0.19	0.40
535	957	0.20	0.42	1,039	0.22	0.46	1,039	0.22	0.46	1,039	0.22	0.46
Tonquin Employment Area (TEA)				***238***	***0.05***	***0.11***	***484***	***0.11***	***0.23***	***744***	***0.16***	***0.34***
380	-	-	-	238	0.05	0.11	484	0.11	0.23	744	0.16	0.34
Brookman Annexation				***752***	***0.16***	***0.34***	***1,330***	***0.28***	***0.59***	***1,330***	***0.28***	***0.59***
380	-	-	-	752	0.16	0.34	1,275	0.27	0.57	1,275	0.27	0.57
400 Brookman	-	-	-	-	-	-	55	0.01	0.02	55	0.01	0.02
West Urban Reserve				***235***	***0.05***	***0.11***	***2,066***	***0.43***	***0.90***	***7,974***	***1.70***	***3.57***
380	-	-	-	235	0.05	0.11	1,138	0.24	0.50	4,391	0.94	1.97
455	-	-	-	-	-	-	432	0.09	0.19	1,670	0.36	0.76
475 West	-	-	-	-	-	-	52	0.01	0.02	202	0.04	0.08
630 West	-	-	-	-	-	-	444	0.09	0.19	1,711	0.36	0.76
Tonquin Urban Reserve										***591***	***0.13***	***0.27***
380	-	-	-	-	-	-	-	-	-	591	0.13	0.27
GRAND TOTAL	**8,779**	**1.9**	**3.9**	**10,761**	**2.3**	**4.8**	**13,416**	**2.9**	**6.0**	**20,175**	**4.3**	**9.0**

Table 2-8
Future Water Demand Summary by Pressure Zone

	10-Year (2024)			20-Year (2034)			Saturation Development		
Pressure Zone	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**	**ERUs**	**ADD (mgd)**	**MDD (mgd)**
380	8,672	1.85	3.90	10,344	2.21	4.64	14,448	3.09	6.49
400	162	0.03	0.06	162	0.03	0.06	162	0.03	0.06
455	887	0.19	0.40	1,319	0.28	0.59	2,557	0.55	1.16
475 West	-	-	-	52	0.01	0.02	202	0.04	0.08
535	1,039	0.22	0.46	1,039	0.22	0.46	1,039	0.22	0.46
400 Brookman	-	-	-	55	0.01	0.02	55	0.01	0.02
630 West	-	-	-	444	0.09	0.19	1,711	0.36	0.76

SECTION 3
PLANNING AND ANALYSIS CRITERIA

This section documents the performance criteria used for water system analysis presented in Section 4 of this Water System Master Plan. Criteria are established for evaluating water supply, distribution system piping, service pressures, storage and pumping capacity and fire flow availability. These criteria are used in conjunction with the water demand forecasts presented in Section 2 to complete the water system analysis.

Performance Criteria

The water distribution system should be capable of operating within certain performance limits under varying customer demand and operational conditions. The recommendations of this plan are based on the performance criteria summarized in Table 3-3. These criteria have been developed through a review of State requirements, American Water Works Association (AWWA) acceptable practice guidelines, *Ten States Standards* and the *Washington Water System Design Manual*.

Water Supply

As described in Section 1, the City of Sherwood (City) draws the majority of its water supply from the Willamette River Water Treatment Plant (WRWTP) in Wilsonville. Supplemental water supply can be provided from Sherwood Well Nos. 3, 4, 5 and 6. The City also has an emergency connection to the Portland Water Bureau's Washington County Supply Line through the City of Tualatin.

Based on current water system operations, the City should plan for adequate supply capacity to provide maximum day demand (MDD) from the WRWTP alone. As discussed later in this section, storage capacity in the City reservoirs and supplemental supply from City wells should provide adequate water in the event of a WRWTP supply or transmission emergency lasting less than 48 hours under average demand conditions.

Service Pressure

Water distribution systems are separated by ground elevation into pressure zones in order to provide service pressures within an acceptable range to all customers. Typically, water from a reservoir will serve customers by gravity within a specified range of ground elevations so as to maintain acceptable minimum and maximum water pressures at each individual service connection. When it is not feasible or practical to have a separate reservoir for each pressure zone, pump stations or pressure reducing valves (PRVs) are used to serve customers in different pressure zones from a single reservoir.

The maximum service pressure limit is 80 pounds per square inch (psi) as required by the *Oregon Plumbing Specialty Code*. The desired service pressure range under normal operating conditions is 40 to 70 psi. Conformance to this pressure range may not always be

possible or practical due to topographical relief, existing system configurations and economic considerations. Where mainline pressures exceed 100 psi, services must be equipped with individual PRVs to maintain their static pressures at no more than 80 psi. During a fire flow event or emergency, the minimum service pressure is 20 psi as required by Oregon Health Authority, Drinking Water Program (OHA) regulations. Recommended service pressure criteria are summarized in Table 3-1.

Distribution System Evaluation

The distribution system should also be capable of providing the required fire flow to a given location while, at the same time, supplying MDD and maintaining a minimum residual service pressure at any meter in the system of 20 psi as required by OHA regulations. The system should meet this criterion with all equalization storage depleted, booster pump stations operating at firm capacity and flow velocity in the distribution system of less than 10 feet per second (fps).

The distribution system should be capable of supplying peak hourly demands (PHD) while maintaining service pressures within approximately 85 percent of service pressures under average day demand (ADD) conditions but not less than the minimum 40 psi service pressure as shown in Table 3-1. The system should meet this criterion with booster pump stations operating at firm capacity and flow velocity in the distribution system of less than 10 fps.

Table 3-1
Recommended Service Pressure Criteria

Service Pressure Criterion	Pressure (psi)
Normal Range under ADD conditions	40-70
Maximum	80
Minimum under MDD conditions + Fire Flow	20
Minimum under PHD conditions	85% of normal, not less than 40 psi

Main Size

Typically, new water distribution mains should be at least 8 inches in diameter in order to supply minimum fire flows. According to the 2010 *Sherwood Engineering Design Manual*, a minimum 6-inch diameter main is required except 4-inch diameter mains are acceptable on runs less than 300 feet, if no fire hydrant connection is required, there are no more than 8 services on the main and future extension of the main is not anticipated. A 4-inch or 6-inch diameter main may be sufficient under these specific conditions; however, it is recommended that proposed or new water mains be at least 8 inches in diameter to supply adequate fire flows.

Storage Capacity

Sherwood water storage reservoirs should provide capacity for four purposes: operational storage, equalization storage, fire storage, and standby or emergency storage. A brief discussion of each storage element, as defined in the *Washington Water System Design Manual,* is provided below.

Adequate storage capacity must be provided for each pressure zone. Storage volume for pressure zones served through PRVs or by constant pressure pump stations is provided in the upstream pressure zone supplying the PRV or pump station. For instance, Sherwood's Sunset Reservoirs serve customers in the 380 Zone and provide suction supply to the constant pressure 535-Zone Sunset Pump Station which in turn supplies the 400 Zone through the Murdock PRV. Thus, the Sunset Reservoirs must have adequate storage volume to meet the storage criteria for the 380, 535 and 400 Zones.

Operational Storage

Operational storage is the volume of water dedicated to supplying customers while the pumps used to fill the reservoir are "off". Operational storage in the 455 Zone is defined by Kruger Reservoir level set points which signal the Wyndham Ridge pumps to turn on and off. The set points are discussed further in Section 4.

The 380 Zone reservoirs are continuously supplied from the WRWTP making operational storage irrelevant under normal operating conditions. For this analysis, required operational storage for the 380 Zone is assumed to be zero.

Equalization Storage

Equalization storage is required to meet water system demands in excess of delivery capacity from the water supply source to reservoirs serving each pressure zone. Equalization storage volume should be sufficient to supply demand fluctuations throughout the day resulting from typical customer water use patterns and is generally considered as the difference between PHD and MDD on a 24-hour basis.

For pressure zones with a continuously available supply like the 380 Zone's supply from the WRWTP, equalization storage of approximately 25 percent of MDD is sufficient for analysis and planning purposes.

In the 455 Zone, supply to the Kruger Reservoir is provided from only one source, the Wyndham Ridge Pump Station. For pressure zones with a single source of supply to the reservoir, equalization storage is calculated as PHD minus the source capacity operating for 150 minutes.

Fire Storage

Water stored for fire suppression is typically provided to meet the single most severe fire flow demand within each pressure zone. Required fire flow rates and durations based on the 2014 *Oregon Fire Code* (OFC) are discussed later in this section and summarized in Table 3-2. The recommended fire storage volume is determined by multiplying the fire flow rate by the duration of that flow.

Emergency (Standby) Storage

Emergency storage is provided to supply water from storage during emergencies such as pipeline failures, equipment failures, power outages or natural disasters. The amount of emergency storage provided can be highly variable depending upon an assessment of risk and the desired degree of system reliability.

According to standby storage guidelines from the *Washington Water System Design Manual*, water systems with multiple sources, like Sherwood's 380 Zone, should have sufficient storage to supply ADD for 48 hours with the largest source, the WRWTP, out of service. Standby storage for the 380 pressure zone is calculated as two times ADD minus the maximum operational capacity of the City wells operating for 24 hours but not less than 200 gallons per ERU. Standby storage for zones with a single source, like Sherwood's 455 Zone, is calculated as 2 times ADD but not less than 200 gallons per ERU.

Pump Stations

Capacity and Number of Pumps

Pumping capacity requirements vary depending on the water demand, volume of available storage and the number of pumping facilities serving a particular pressure zone. When pumping to storage reservoirs, also referred to as an "open zone", a firm pumping capacity equal to the pressure zone's MDD is recommended. Firm pumping capacity is defined as a station's pumping capacity with the largest pump out of service. A minimum of three pumps at each pump station are recommended for redundancy.

Constant Pressure Pump Stations

Although it is desirable to serve water system customers by gravity from storage, constructing and maintaining a reservoir for a small group of customers may be prohibitively expensive and lead to water quality issues associated with slow reservoir turnover. Constant pressure pump stations supply a pressure zone without the benefit of storage, also referred to as a closed zone. These stations are only recommended for residential developments with a small number of services, preferably in an area that will not be looped back into adjacent pressure zones in the future. Constant pressure stations are commonly used to serve customers at the highest elevations in a water service area where only an elevated reservoir would be capable of providing the necessary head to achieve adequate service pressures by gravity.

Pump stations supplying constant pressure service to closed zones should have firm pumping capacity to meet PHD while simultaneously supplying the largest fire flow demand in the zone.

Backup Power

It is recommended that pump stations supplying gravity storage reservoirs include manual transfer switches and connections for a portable back-up generator. The emergency storage volume in each reservoir will provide short term water service reliability in case of a power outage at the pump station. Back-up power generators with automatic transfer switches are recommended for all constant pressure pump stations serving closed zones without the benefit of gravity storage.

Required Fire Flow

While the water distribution system provides water for domestic uses, it is also expected to provide water for fire suppression. The amount of water required for fire suppression purposes is associated with the local building size and type or land use of a specific location within the distribution system. Fire flow requirements are typically much greater in magnitude than the MDD in any local area. Adequate hydraulic capacity must be provided for these potentially large fire flow demands. Emergency response in the City of Sherwood is provided by Tualatin Valley Fire and Rescue (TVFR). TVFR establishes fire flow requirements for each building within the City. General TVFR fire flow guidelines are described in the TVFR *Fire Code Applications Guideline* consistent with the 2014 OFC. Fire flow requirements by land use type based on these guidelines are summarized in Table 3-2.

Single-Family and Duplex Residential

The OFC and TVFR guidelines specify a minimum fire flow of 1,000 gpm for single-family and two-family dwellings with a square footage less than 3,600 square feet. For residential structures larger than 3,600 square feet, the minimum fire flow requirement is 1,500 gpm. Among currently developed single-family residential properties in the City, approximately 2 percent of homes are 3,600 square feet and larger, based on information available from the regional government Metro. For the purposes of this Plan, residential fire flow capacity will be tested in the water system hydraulic model with a minimum requirement of 1,500 gpm to accommodate the range of potential future residential development in the City.

Medium Density Residential, Office and Neighborhood Commercial

Existing medium density residential development, such as, the Cherry Woods Condominiums have an average building size of approximately 6,900 square feet with four dwellings per building. For the purposes of this Plan, it is assumed that future medium density residential development would involve buildings of similar size. Based on the 2014 OFC requirements adopted by TVFR, a required fire flow of 2,500 gpm is recommended for

medium density residential properties. Properties zoned for neighborhood commercial or office development are anticipated to require similar flows for fire suppression.

High Density Residential, Commercial, Industrial and Institutional

A 3,000 gpm fire flow is recommended for high density residential, commercial and industrial development in Sherwood consistent with TVFR maximum fire flow guidelines. This maximum fire flow requirement is also appropriate for institutional and public facilities, such as, schools or community centers. Fire flow requirements by land use type are summarized in Table 3-2.

Table 3-2
Required Fire Flow Summary

Land Use Type	Applicable Zoning	Required Fire Flow (gpm)	Required Duration (hours)
Single-Family and Duplex Residential	VLDR, LDR	1,500	2
Medium Density Residential, Office and Neighborhood Commercial	MDRL, MDRH, NC, OC	2,500	2
High Density Residential, Commercial, Industrial and Institutional	HDR, RC, GC, EI, LI, GI, IP	3,000	3

Summary

Table 3-3 provides a summary listing of the criteria presented in this Section.

Table 3-3
Water System Performance Criteria

Water System Facility	Evaluation Criterion	Value	Design Standard/Guideline
Water Supply	Supply Capacity	MDD[2]	Ten States Standards and Washington Water System Design Manual
Service Pressure	Normal Range (ADD[1] Conditions)	40-70 psi	AWWA M32
	Maximum	80 psi	AWWA M32, Oregon Plumbing Specialty Code, Section 608.2
	Minimum, during MDD[2] with Fire Flow	20 psi	AWWA M32, OAR 333-061
	Minimum, during PHD[3]	85% of normal, not less than 40 psi	MSA recommended, AWWA M32
Distribution Piping	Velocity during PHD[3] or Fire Flow	Not to exceed 10 fps	AWWA M32
	Minimum Pipe Diameter	8-inch recommended for fire flow, current City standard is 6-inch, except 4-inch for short mains without fire service	MSA recommended, Sherwood Engineering Design Manual
Storage	Total Storage Capacity	Sum of operational, equalization, fire suppression and emergency (standby) storage volumes	Washington Water System Design Manual
	Operational Storage	Kruger Res level set point for 455 Zone, none in 380 or closed[5] zones	
	Equalization Storage	25% of MDD[2]	
	Fire Storage	Required fire flow x flow duration	
	Emergency (Standby) Storage	2 x [ADD[1] – (all but largest supply to the zone x 24 hours)], not less than 200 gallons per ERU	
Pump Stations	Minimum No. of Pumps at Firm Capacity	2	Ten States Standards
	Open Zone Capacity[4]	MDD[2]	Washington Water System Design Manual
	Closed Zone Capacity[5]	PHD[3] + Fire Flow	Washington Water System Design Manual
	Backup Power	At least two independent sources	Ten States Standards
Required Fire Flow and Duration	Single Family and Duplex Residential	1,500 gpm for 2 hours	2014 Oregon Fire Code, Tualatin Valley Fire & Rescue Fire Code Applications Guide
	Medium Density Residential, Office and Neighborhood Commercial	2,500 gpm for 2 hours	
	High Density Residential, Commercial, Industrial and Institutional	3,000 gpm for 3 hours	

[1] *ADD: Average daily demand, defined as the average volume of water delivered to the system during a 24-hour period = total annual demand/365 days per year.*
[2] *MDD: Maximum day demand, defined as the maximum volume of water delivered to the system during any single day.*
[3] *PHD: Peak hour demand, defined as the maximum volume of water delivered to the system during any single hour of the maximum demand day.*
[4] *Open zone is defined as a pressure zone supplied by gravity from a storage reservoir.*
[5] *Closed zone is defined as a pressure zone supplied constant pressure from a booster pump station without the benefit of storage.*

SECTION 4
WATER SYSTEM ANALYSIS

This section presents an analysis of the City of Sherwood's (City's) water distribution system based on criteria outlined in Section 3. The water demand forecasts summarized in Section 2 are used in conjunction with analysis criteria to assess water system characteristics including supply capacity, service pressures, storage and pumping capacity and emergency fire flow availability. This section provides the basis for recommended distribution system improvements presented in Section 5.

Water Supply Analysis

In 2011 Sherwood transitioned their primary water source from the City's groundwater wells to the Willamette River Water Treatment Plant (WRWTP). The City is also able to draw Portland Water Bureau (PWB) supply through a 4-mile long, 24-inch diameter City-owned transmission main from the City of Tualatin's system. An agreement with Tualatin Valley Water District (TVWD) and the City of Tualatin allows Sherwood to purchase up to 3 million gallons per day (mgd) of TVWD's excess capacity in PWB's Washington County Supply Line (WCSL) system and wheel it through the City of Tualatin's transmission to the Tualatin Supply Connection. These agreements expire in 2015.

The City continues to maintain Wells 3, 4, 5 and 6 and the Tualatin Supply Connection. Currently, the City takes a small amount of PWB supply through the Tualatin Supply Connection to maintain drinking water quality in the pipeline for use in a water emergency.

WRWTP Capacity

It is recommended that Sherwood develop adequate source capacity to supply maximum day demand (MDD) from the WRWTP alone. Sherwood's 5 million gallons per day (mgd) share of the WRWTP's existing 15 mgd capacity is adequate to meet forecasted MDD, including projected service area expansion, through the 10-year (2024) planning horizon. It is recommended that the City purchase additional intake capacity and pursue WRWTP expansion within the 20-year planning horizon through existing cooperative agreements with TVWD and the City of Wilsonville. Based on projected MDD and service area expansion presented in Section 2, Sherwood will require a total capacity of approximately 9 mgd from the WRWTP at build out. Future expansion of the WRWTP capacity will likely be through construction of a parallel 15 mgd treatment train. Based on the strong potential for continued growth in Sherwood and anticipated long-term water system expansion into urban reserve areas it is recommended that the City pursue an additional 5 mgd of capacity from the WRWTP. The WRWTP capacity analysis is summarized in Table 4-1.

Table 4-1
WRWTP Supply Capacity Analysis

Timeframe	Capacity (mgd)		
	Recommended Supply Capacity (MDD)	Sherwood's Existing WRWTP Share	Surplus / (Deficit)
Current	3.9	5.0	1.1
10-Year (2024)	4.8	5.0	0.2
20-Year (2034)	6.0	5.0	(1.0)
Build-Out	9.0	5.0	(4.0)

Emergency Supply

In the event of a WRWTP supply or transmission emergency, it is recommended that the City's groundwater wells and storage reservoirs be used to provide adequate emergency water supply to meet average day demands (ADD) for 48 hours.

City Wells

Wells 3, 5 and 6 have an existing combined operational capacity of approximately 1,790 gallons per minute (gpm) (2.6 mgd). Well 5 production capacity is limited to approximately 350 gpm due to foaming in the well caused by air entrainment at higher pumping rates. All of Sherwood's wells are currently inactive. The City does not have a regular schedule for exercising the wells and monthly water quality samples are not currently required. In order to ensure that wells are available as an on-demand emergency source, water operations staff will begin exercising the wells and performing regular water quality testing. To accomplish this, the City must have a means of isolating the well discharge from the distribution system. There is an existing fire hydrant and isolation valve at Well 6 which allows the City to pump Well 6 to atmosphere. It is recommended that a new hydrant and isolation valve be installed at Wells 3 and 5 for this purpose.

The City has expressed interest in abandoning the low-producing Well 4 which would reduce well maintenance costs and potentially allow water rights to be transferred to other City wells which may have additional production capacity. Sherwood could attain additional value by allowing development of the Well 4 property after the well is abandoned. The well site is located in an established residential area along Smith Avenue and, as presented in Section 2, the City has limited developable land available within the existing city limits. For the purposes of this analysis, Well 4 capacity is not considered as an emergency source. Existing well capacities are summarized in Table 4-2.

Table 4-2
Well Capacity Summary

Well	Water Rights Capacity (gpm)	Production Capacity (gpm)
3	900	890
5	673	350
6	550	550
Total	**2,123**	**1,790**

It is not recommended that the City develop additional groundwater wells to meet the emergency supply goal of ADD for 48 hours. This emergency capacity should be provided from emergency storage in the City's reservoirs and from the existing wells. Emergency supply goals and well capacity are summarized in Table 4-3.

Table 4-3
Emergency Supply from City Wells

Timeframe	Emergency Supply Goal: 2 * ADD (mgd)	City Well Production Capacity (mgd)	Deficit to be Supplied from Emergency Storage (mgd)[1]
Current	3.8	2.6	(1.2)
10-Year (2024)	4.6	2.6	(2.0)
20-Year (2034)	5.8	2.6	(3.2)
Build-Out	8.6	2.6	(6.0)

[1] *See Table 4-4 Storage Analysis*

Tualatin Supply Connection

Under the City's supply agreement with TVWD and Tualatin, excess capacity from the PWB wheeled through the WCSL system is interruptible, meaning capacity is only available to Sherwood under certain contractual conditions where surplus supply is available from PWB. Because of this contingent capacity the Tualatin Supply Connection is a less reliable on-demand emergency source than the City's wells. It is not recommended that the City maintain the Tualatin Supply Connection solely as an on-demand emergency source. However, the 24-inch diameter main is a vital link to long-term regional supply and Sherwood may benefit from maintaining a portion of the 24-inch diameter supply line capacity for emergency supply. The remaining capacity could be sold to Tualatin as part of a future WRWTP supply agreement or to provide large diameter looping within Tualatin's distribution system.

Potential Future Supply to Tualatin

The City of Tualatin, which currently receives all of its source water from the WCSL system, is in the process of evaluating their long-term source options and needs. If Tualatin opts to pursue source water from the WRWTP, they may negotiate purchase of plant capacity or wholesale water from Sherwood. The Sherwood-owned 24-inch diameter transmission main would be a key facility to allow supply of WRWTP water through Sherwood to Tualatin's distribution system. It is recommended that Sherwood does not abandon the Tualatin Supply Connection to allow for future supply of WRWTP water to Tualatin. However, the City of Tualatin's current supply agreement with PWB does not expire until 2026 so Tualatin may not make a final decision regarding their long-term water source for several years. It is recommended that Sherwood discontinue taking water through the Tualatin Supply Connection and close valves to isolate the transmission main. The transmission main would need to be disinfected before bringing it back on-line to serve the City of Tualatin if a long-term WRWTP supply agreement is established between the two cities in the future.

The 24-inch diameter Tualatin supply main may also be useful to the City of Tualatin as part of their distribution system regardless of Tualatin's long-term source decisions. Sherwood staff have engaged with Tualatin to determine the potential for mutual benefit of selling or transferring portions of the main.

Pressure Zone Analysis

Sherwood's four existing pressure zones provide adequate service pressures between 40 and 80 pounds per square inch (psi) to all water system customers. The existing 380 and 455 Pressure Zones are open zones, served by gravity from storage facilities. The 535 Zone serves the southeast corner of the City by constant pressure from the Sunset Pump Station. Zones served by constant pressure are also referred to as closed zones. Customers in the 400 Zone are supplied from the 535 Zone through the Murdock pressure reducing valve (PRV). The City's existing and proposed future pressure zones are illustrated on Figure 2-1.

Future 535 Zone Reservoir

The 535 and 400 Zones have approximately 810 existing services. For pressure zones of this size, it is preferable to supply customers by gravity from a storage reservoir rather than through a constant pressure pump station. Supplying customers from storage reduces the risk of a water outage due to mechanical or electrical failure at the pump station and reduces maintenance and power costs associated with pumping.

The City's 2005 Master Plan recommended construction of a storage reservoir to serve the 535 Zone by gravity. However, the nearest site which would meet the elevation requirements for a ground level reservoir is almost a mile south of existing 535 Zone distribution mains along Ladd Hill Road. With the approximately mile-long waterline required to fill the proposed reservoir and the relatively low customer demands in this residential zone, it is likely that water quality issues would develop in the waterline and

reservoir due to minimal water circulation and slow reservoir turnover. Due to potential water quality issues associated with a 535 Zone reservoir and the high cost of constructing a transmission main to serve the proposed reservoir, it is recommended that the 535 Zone continue to be served as a closed zone from the Sunset Pump Station.

Future Service Area Expansion

Brookman Annexation and TEA

As the City's water service area expands to include the Brookman Annexation and Tonquin Employment Area (TEA), it is anticipated that the majority of customers in these areas will be served from the 380 Zone by extending existing distribution mains. A small area along Ladd Hill Road in the southeast corner of the Brookman Annexation is too high in elevation to receive adequate service pressure from the 380 Zone. For master planning purposes, this area is referred to as the 400 Brookman Zone.

400 Brookman Zone

As development occurs, it is recommended that the City evaluate the benefits and risks of serving the 400 Brookman Zone through one of the following methods:

1. A PRV which reduces pressure from existing 535-Zone mains on Highpoint Drive east of Ladd Hill Road

2. A booster pump station which provides constant pressure to the zone and draws suction supply from existing 12-inch diameter 380-Zone distribution mains on Ladd Hill Road at Brookman Road

Although option 1, the PRV from the 535 Zone, seems to be the simplest solution there are additional factors which should be considered. Existing 535-Zone distribution mains on Highpoint Drive dead-end approximately 375 feet west of Ladd Hill Road. In order to provide service to the proposed 400 Brookman Zone, the existing 535-Zone mains would need to be extended or existing 380-Zone mains which already extend west to Ladd Hill Road along Highpoint Drive would need to be re-configured to be part of the 535-Zone.

Extending 535-Zone mains west to Ladd Hill Road may add substantial cost to the PRV solution. In addition, the existing Highpoint Drive right-of-way (R-O-W) does not connect with the Ladd Hill Road R-O-W. Thus, any new 535-Zone mains would need to be constructed within an existing 15-foot wide City of Sherwood easement parallel to existing 8-inch diameter 380-Zone mains. Existing 380-Zone mains provide service to 32 existing homes between 225 and 300-feet elevation along Bowmen Lane and Highpoint Drive. Re-configuring these mains to be part of the 535-Zone would cause significant pressure increases for these existing 32 customers and would likely require individual PRVs at each service. Both of these considerations may increase the project cost of option 1 significantly.

A constant pressure pump station, as described in option 2, requires more maintenance and has a higher operating cost than a PRV. However, capital costs for constructing the pump station may be comparable to option 1 because distribution mains upstream of the proposed pump station would not need to be constructed new or re-configured as described above for the PRV.

For the purposes of this Master Plan, an estimated cost for the booster pump station described in option 2 is included in the CIP presented in Section 5.

West Urban Reserve

Initial anticipated growth in the West Urban Reserve will be served by extending existing 380- and 455-Zone distribution mains. Future customers along the ridge north and south of the existing Kruger Reservoir will be served by constant pressure from the proposed Kruger Pump Station at the existing reservoir site. This proposed closed zone is referred to as the 630 West Zone. Some future customers in the West Urban Reserve at the interface between the 630 West and 455 Zones may need to be served through a PRV-controlled sub-zone or through individual PRVs on each service in order to maintain required service pressures. This area is referred to as the 630 West PRV Zone.

A small area on the western edge of the West Urban Reserve along Edy Road near Eastview Road is too high in elevation to receive adequate service pressure from the adjacent 380 Zone. This area will be served as part of the closed 475 West Zone by constant pressure from the proposed Edy Road Pump Station.

Storage Capacity Analysis

Existing storage reservoirs serve customers in the 380 and 455 Pressure Zones by gravity. All of the City's other existing and proposed pressure zones are supplied either through constant pressure pump stations or PRVs. There must be adequate reservoir volume to meet customer demands in the zone served directly from the reservoir, as well as any smaller zones served through constant pressure pumping or PRVs from the zones with storage. For instance, Sherwood's Sunset Reservoirs serve customers in the 380 Zone and provide suction supply to the constant pressure 535-Zone Sunset Pump Station which in turn supplies the 400 Zone through the Murdock PRV. Thus, the Sunset Reservoirs must have adequate storage volume to meet the storage criteria for the 380, 535 and 400 Zones.

Ideally, the 535 Zone, which supplies a relatively large geographic area, would have dedicated gravity storage. As previously described, due to the City's topography, sites with adequate elevation for a future 535-Zone reservoir are too far away from existing 535 Zone customers to be practical or cost effective.

Storage facilities are provided for four purposes: operational storage, equalization storage, fire storage and emergency or standby storage. As presented in Section 3, the total storage required is the sum of these four elements. Storage volumes are calculated according to the following criteria:

- *Operational Storage*
  - 455 Zone - volume of average Kruger Reservoir level drop between "off" and "on" operation of Wyndham Ridge Pump Station
  - 380 Zone and closed zones - none

- *Equalization Storage* - 25 percent of maximum day demand (MDD)

- *Fire Storage* - largest fire flow demand for each pressure zone multiplied by the duration of that flow

- *Emergency Storage* - 2 times average day demand (ADD) minus the approximate volume of water supplied in 24 hours by all but the largest capacity supply to the zone

Operational Storage

Operational storage is the volume of water dedicated to supplying customers while the pumps used to fill the reservoir are "off". In the 455 Zone, operational storage is managed by City water staff using Kruger Reservoir level set points. These set points signal the Wyndham Ridge pumps to turn on and refill the reservoir when the water level drops to the specified point. Reservoir level set points are adjusted seasonally to mitigate potential water quality issues associated with slow reservoir turnover during periods of low water demand in the fall and winter. For the purpose of this analysis, operational storage in the 455 Zone will be estimated based on a year-round average drop in the Kruger Reservoir level of six feet, approximately 0.6 million gallons (MG).

The 380 Zone's Sunset Reservoirs are continuously supplied from the WRWTP making operational storage irrelevant under normal operating conditions. For this analysis, required operational storage for all zones served by the Sunset Reservoirs is assumed to be zero.

Emergency Storage

The 380 Zone is supplied by both the WRWTP and the City's wells. The WRWTP is the largest supply to the 380 Zone. Thus, emergency storage for the 380 Zone is calculated as 2 times ADD minus the volume of water supplied by City Wells 3, 5 and 6 pumping for 24 hours. The only supply to the 455 Zone is the Wyndham Ridge Pump Station. Although the pump station contains multiple pumps there are emergency situations, such as a break in the suction supply line to the pump station, which would take the entire station out of service.

Thus, for the purpose of calculating required emergency storage volume in the 455 Zone, it is assumed that the entire pump station is out of service.

Storage Analysis Findings

Both the Kruger and Sunset Reservoirs have adequate capacity to meet storage criteria through the 20-year planning horizon. An approximately 0.3 MG storage deficit in 455 Zone at build-out may be mitigated by modifying the Kruger Reservoir average water level drop from 6 feet to 3 feet to reduce the operational storage need. No significant operational challenges are anticipated with this change as increased future demands will reduce the need for this operational strategy to maintain water quality. Under existing conditions the Kruger Reservoir water level is set lower to allow the City to store water at Kruger that has been delivered from the WRWTP but is not immediately needed in the 380 Zone and to mitigate potential water quality issues associated with slow reservoir turnover at Kruger. Increasing water demands due to future growth in both the 380 and 455 Zone will lessen the need to drop the Kruger Reservoir to this lower existing set point.

Despite a 0.61 MG storage deficit at build-out, additional storage is not recommended for the 380 Zone due to the uncertainty of long-term future development over a large area to be served from this zone. Storage capacity in the 380 Zone should be re-evaluated with the next Master Plan update to determine if additional capacity will be needed and to identify the optimal sites for additional storage, if needed. The storage analysis is summarized in Table 4-4.

Table 4-4
Storage Analysis

Storage Component (MG)	Sunset Reservoirs			Kruger Reservoir		
	380, 535, 400, Future 400 Brookman & Future 475 West Pressure Zones			455 & Future 630 West Pressure Zones		
	Existing	2034	Build-Out	Existing	2034	Build-Out
Operational	-	-	-	0.60	0.60	0.60
Equalization	0.87	1.30	1.78	-	0.05	0.25
Fire Suppression	0.63	0.63	0.63	0.63	0.63	0.63
Emergency	1.58	2.38	4.20	0.36	0.74	1.82
TOTAL Required	3.07	4.31	6.61	1.59	2.01	3.30
Existing Storage	6.00	6.00	6.00	3.00	3.00	3.00
Surplus/(Deficit)	**2.93**	**1.69**	**(0.61)**	**1.41**	**0.99**	**(0.30)**

Pump Station Analysis

Closed Zones

The existing Sunset Pump Station and proposed Ladd Hill, Kruger and Edy Road Pump Stations supply constant pressure to customers in existing and future pressure zones without water storage facilities, also referred to as closed zones. Pump stations serving these closed zones are the only means of supplying domestic water demands and fire flow to the zone. Pump stations serving closed zones should have sufficient firm capacity to supply PHD and the highest required fire flow in the primary zone and any PRV-controlled sub-zones. Firm capacity is defined as the nominal pump station capacity with the largest pump out of service.

Open Zones (Supplied by Gravity Storage)

The Wyndham Ridge Pump Station supplies the Kruger Reservoir which serves customers in the 455 Zone by gravity. Pressure zones with the benefit of gravity storage are also referred to as open zones. Operational and fire storage provided by open zone reservoirs such as the Kruger Reservoir make it unnecessary to plan for fire flow or peak hour capacity from pump stations assuming adequate storage is available. Open zone pump stations such as the Wyndham Ridge Pump Station must have sufficient firm capacity to meet the MDD for all customers in the zone and any higher level zones supplied from the primary zone.

Back-Up Power

At least two independent power sources are recommended for the City's pump stations. Back-up power is particularly critical for facilities that serve closed zones through constant pressure pumping. It is recommended that pump stations supplying gravity storage reservoirs include, at a minimum, manual transfer switches and connections for a portable back-up generator. The emergency storage volume in each reservoir will provide short term water service reliability in case of a power outage at the pump station. On-site standby power generators with automatic transfer switches are recommended for all constant pressure pump stations serving closed zones without the benefit of gravity storage. Both of Sherwood's existing pump stations have on-site, diesel powered, backup generators with automatic transfer switches.

Pump Station Analysis Findings

Table 4-5 summarizes the City's existing and future pumping requirements. Existing pump stations have adequate firm capacity to supply customer demands through the 20-year planning period. There is a small firm capacity deficit in the 455 Zone at build-out which may be addressed by replacing one of the existing Wyndham Ridge pumps as development warrants.

Due to the uncertainty of long-term future development, it is recommended that 455 Zone pumping capacity needs beyond 2034 be re-evaluated with the next Master Plan Update. Additional constant pressure pump stations are recommended to supply future proposed pressure zones as development warrants.

Table 4-5
Pump Station Analysis

Pressure Zone	Pumping Criteria	Existing Pump Stations		Firm Pumping Capcity (gpm)					
				Existing		2034		Build-out	
		Name	Firm Capacity (gpm)	Required	Surplus / (Deficit)	Required	Surplus / (Deficit)	Required	Surplus / (Deficit)
535 & 400	PHD + FF	Sunset	2,270	2,078	-	2,114	-	2,114	-
455	MDD	Wyndham Ridge	600	264	-	410	-	806	**206**
Future 400 Brookman	PHD + FF					1,524	**1,524**	1,524	**1,524**
Future 630 West	PHD + FF					1,724	**1,724**	2,397	**2,397**
Future 475 West	PHD + FF					1,524	**1,524**	1,594	**1,594**

Distribution System Analysis

A steady-state hydraulic network analysis model was used to evaluate the performance of the City's existing distribution system and identify proposed piping improvements based on performance criteria described in Section 3. The purpose of the model is to determine pressure and flow relationships throughout the distribution system for average and peak water demands under existing and projected future conditions. Modeled pipes are shown as "links" between "nodes" which represent pipeline junctions or pipe size changes. Diameter, length and head loss coefficients are specified for each pipe and an approximate ground elevation is specified for each node.

The hydraulic model was developed prior to the Water System Master Plan using the InfoWater modeling software platform and geographic information system (GIS) base mapping. Building on the facilities identified in the prior model and updated facility and operations data provided by the City, analysis scenarios were created to evaluate existing and projected 20-year demand conditions.

Modeled Demands

Existing and projected future demands are summarized in Table 2-7. Within the existing city limits, demands are assigned to the model based on customer billing records and meter locations provided by the City. Future demands in water service expansion areas such as the Brookman Annexation, TEA and West Urban Reserve are assigned uniformly over each proposed pressure zone area shown in Figure 2-1.

Fire Flow Analysis

Fire flow scenarios test the distribution system's ability to provide required fire flows at a given location while simultaneously supplying MDD and maintaining a minimum residual service pressure of 20 psi at all services. Required fire flows are assigned based on the zoning surrounding each node as summarized in Table 3-2.

Since the 2005 Master Plan, the City has invested in large diameter loops through developing commercial areas and small projects to provide additional looping for fire flow in residential areas. As a result, very few fire flow deficiencies were identified under existing and projected future MDD conditions.

Peak Hour Demand Analysis

Distribution system pressures were evaluated under peak hour demand conditions to confirm identified piping improvements. Peak hour demands (PHD) were estimated as 1.7 times the maximum day demand. No additional deficiencies were identified under these conditions.

Summary

Section 4 presents an analysis of Sherwood's water supply capacity and distribution system performance. Criteria outlined in Section 3 and water demand forecasts summarized in Section 2 are used to assess water system characteristics including service pressures, storage and pumping capacity and emergency fire flow availability. Proposed facilities to mitigate deficiencies are discussed in Section 5 and illustrated on Plate 1 Water System Map in Appendix A.

Sherwood's supply from the WRWTP is sufficient to meet MDD through the 10-year planning horizon with an additional 1 mgd of capacity required at 20 years and an additional 4 mgd needed at build-out. Existing City groundwater wells provide an effective emergency supply to complement emergency storage in the City's reservoirs.

The City's distribution system has adequate storage and pumping capacity to meet existing service area demands through 2034. Due to significant uncertainty related to long-term growth and system expansion, minor storage and pumping deficiencies at build-out should be re-evaluated with the next Water Master Plan Update or as development warrants. Additional pump stations are recommended to serve proposed high-elevation closed pressure zones in the water service expansion areas Brookman Annexation and West Urban Reserve.

Sherwood's distribution piping is sufficiently looped to provide adequate fire flow capacity to commercial, industrial and residential customers. Few piping improvement projects are needed to meet fire flow criteria. Extensive large diameter mains will be needed to expand the City's water service area to supply the Brookman Annexation, TEA and West Urban Reserve as development occurs.

SECTION 5
RECOMMENDATIONS AND CAPITAL IMPROVEMENT PROGRAM (CIP)

This section presents recommended improvements for the City of Sherwood's (City's) water system based on the analysis and findings presented in Section 4. These improvements include proposed supply, pump station and water line projects. The capital improvement program (CIP) presented in Table 5-3 later in this section summarizes recommended improvements and provides an approximate schedule for project completion. Proposed distribution system improvements are illustrated on Plate 1 Water System Map in Appendix A and on Figure 5-1, Proposed Water System Schematic at the end of this section.

Cost Estimating Data

An estimated project cost has been developed for each improvement project recommended in this section. Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The Association for the Advancement of Cost Engineering International (AACE) classifies cost estimates depending on project definition, end usage and other factors. The cost estimates presented here are considered Class 4 with an end use being a study or feasibility evaluation and an expected accuracy range of -30 percent to +50 percent. As the project is better defined, the accuracy level of the estimates can be narrowed.

Estimated project costs are based upon recent experience with construction costs for similar work in Oregon and southwest Washington and assume improvements will be accomplished by private contractors. Estimated project costs include approximate construction costs and an aggregate 45 percent allowance for administrative, engineering and other project related costs. Estimates do not include the cost of property acquisition. Since construction costs change periodically, an indexing method to adjust present estimates in the future is useful. The Engineering News-Record (ENR) Construction Cost Index (CCI) is a commonly used index for this purpose. For purposes of future cost estimate updating; the current ENR CCI for Seattle, Washington is 10162 (August 2014).

Water System Capital Improvement Program

A summary of all recommended improvement projects and estimated project costs is presented in Table 5-3. This CIP table provides for project sequencing by showing fiscal year-by-year project priorities for the first five fiscal years, then prioritized projects in 5-year blocks for the 10-year, 20-year and Beyond 20 year timeframes.

The City's fiscal year begins July 1st and ends June 30th. Fiscal years are designated by the year in which they end. For example, fiscal year (FY) 2016 includes the period from July 1, 2015 through June 30, 2016. The 10-year project timeframe includes projects recommended for completion between 6 and 10 years (FY 2021 through FY 2024). The 20-year timeframe

includes projects recommended for completion between 11 and 20 years (FY 2025 through FY 2034).

CIP Cost Allocation to Growth

Water system improvement projects are recommended to mitigate existing system deficiencies and to provide capacity to accommodate growth and service area expansion. Projects that benefit future water system customers by providing capacity for growth may be funded through system development charges (SDCs). SDCs are sources of funding generated through development and water system growth and are typically used by utilities to support capital funding needs. SDCs are determined as part of a financial evaluation and are based in part on a utility's current CIP. To facilitate the Financial Analysis presented in Section 6, a percentage of the cost of each project which benefits future water system growth is allocated in the CIP table. Percentages allocated to growth are described later in this section for each type of recommended facility and summarized in the CIP Table 5-3.

Water Supply Projects

WRWTP

S-1 Existing Plant Upgrades

The City currently owns 5 million gallons per day (mgd) of the WRWTP's current 15 mgd capacity. As part of previous WRWTP studies, Sherwood and Wilsonville have determined that two improvement projects related to surge mitigation and disinfectant contact time (CT) are needed at the plant in order to deliver the current 15 mgd capacity. Sherwood's share of these improvements is approximately $500,000 for each project. The surge mitigation project needs to be completed in order to achieve 12 mgd plant capacity. Estimated costs for this project are included in the CIP distributed over fiscal years 2019 and 2020. CT improvements are needed to achieve 15 mgd plant capacity. The CT project is included in the CIP in the 10-year timeframe. Costs for both projects are allocated 80 percent to existing customers based on Sherwood's existing maximum day demand (MDD) of 4 mgd of the total 5 mgd Sherwood capacity from the WRWTP. The remaining 20 percent of project cost is allocated to system growth.

S-2 and S-3 Plant Expansion

To meet long-term supply needs, it is recommended that the City pursue purchase of 5 mgd of additional capacity in the WRWTP's oversized intake facilities (S-2). The estimated $2 million purchase cost for an additional 5 mgd of intake capacity is based on individual treatment plant component costs from the City's 2006 contract with TVWD for the purchase of an initial 5 mgd of capacity at the WRWTP.

It is further recommended that Sherwood pursue expansion of the WRWTP treatment facilities (S-3) to secure a total capacity of 10 mgd from the plant. The cost of plant

expansion is estimated based on the 2005 WRWTP Master Plan which identified improvements required to expand plant capacity by 50 mgd at an estimated 2005 cost of approximately $900,000 per mgd without contingency. Project cost for Sherwood's proposed 5 mgd share of plant expansion is estimated at $7.7 million including a 45 percent allowance for administration, engineering and contingency adjusted to 2014 dollars using the ENR CCI for Seattle described previously. An update of the 2005 WRWTP Master Plan is currently being completed and will include an update and refinement of these cost estimates. It is recommended that the City update plant expansion costs in the Sherwood CIP when that study is complete.

It is recommended that the City pursue both projects within the 20-year planning horizon in order to mitigate an estimated 1 mgd supply deficit in 2034. Based on the City's discussions with their WRWTP partner City of Wilsonville, expansion of treatment facilities will need to be completed within the 10-year timeframe in order to meet Wilsonville's forecasted demands. It is anticipated that design and engineering of the WRWTP expansion will begin within fiscal year 2018 with the majority of construction occurring within the 10-year timeframe. 20 percent of estimated costs for treatment plant expansion and future intake capacity purchase are distributed over the 2018, 2019 and 2020 fiscal years with the remaining 80 percent assigned to the 10-year timeframe. Project costs for this supply expansion are allocated 100 percent to growth.

City Wells

S-4 Hydrants at Wells 3 and 5

In order to maintain the City's groundwater wells as an on-demand emergency source, the City must have a means of isolating well water from the distribution system for exercising the well pumps and taking water quality samples. There is an existing fire hydrant and isolation valve at Well 6 which allows the City to pump Well 6 to atmosphere. It is recommended that a new hydrant and isolation valve be installed at Wells 3 and 5 for this purpose within fiscal year 2016. Emergency capacity from all of the City's wells is only sufficient to benefit existing customers, thus the estimated cost of this project is allocated entirely to existing customers.

S-5 Well 4 Abandonment and Water Rights Transfer

It is recommended that the City abandon the low-producing Well 4. Well 4 water rights may be eligible for transfer to one of Sherwood's other existing wells. Approximately $25,000 is allocated in the CIP to abandon Well 4 and apply for a water rights transfer to other City wells. For the purposes of this analysis it is assumed that the City's total well capacity for emergency supply will be from Wells 3, 5 and 6 not including any capacity from Well 4 or water rights transferred from Well 4. The Well 4 project is recommended for completion in fiscal year 2016. Emergency capacity from all of the City's wells is only sufficient to benefit existing customers, thus the estimated cost of this project is allocated entirely to existing customers.

Pump Station Projects

Sherwood's existing pumping facilities are adequate to meet customer demands in the 455 and 535 Pressure Zones through the 20-year planning horizon. Due to significant uncertainty regarding the nature of future development in the West Urban Reserve, a deficiency in the 455 Zone at build-out is recommended to be re-evaluated with the next Master Plan update or as development warrants. No pump station projects are currently recommended to mitigate this 455 Zone deficiency. Additional pumping facilities are recommended to serve proposed future constant pressure (closed) zones outside of the City's existing service area.

Estimated project costs for proposed pump stations are allocated 100 percent to growth as all of the proposed stations are intended to serve future development outside of the existing Sherwood water service area.

P-1 Ladd Hill Pump Station

The 1,600 gpm Ladd Hill Pump Station is proposed to serve future customers along Ladd Hill Road in the proposed 400 Brookman Zone. The proposed pump station, illustrated on Plate 1 in Appendix A, will boost water from existing 380 Zone distribution mains on Ladd Hill Road at Brookman Road to provide customers with constant pressure service at an hydraulic grade line (HGL) of approximately 400 feet. The pump station is proposed for construction within the 20-year timeframe.

P-2 Kruger Pump Station

The 2,400 gpm Kruger Pump Station is proposed to serve future high-elevation customers west of Kruger Reservoir in the proposed 630 West Zone. The proposed pump station, located on the same site as the existing Kruger Reservoir, will boost water from the reservoir to provide customers with constant pressure service at an HGL of approximately 630 feet. The pump station is proposed for construction beyond 20 years as development warrants.

P-3 Edy Road Pump Station

The 1,600 gpm Edy Road Pump Station is proposed to serve future high-elevation customers along Edy Road near the western boundary of the West Urban Reserve in the proposed 475 West Zone. The proposed pump station, illustrated on Plate 1 in Appendix A, will boost water from proposed 380 Zone distribution mains (M-54 and -55) on Edy Road west of Chicken Creek to provide customers with constant pressure domestic and fire flow service at an HGL of approximately 475 feet. The pump station is proposed for construction beyond 20 years as development warrants.

During the pump station pre-design process, it is recommended that the City evaluate providing fire flow to future 475 West Zone customers from the nearby 380 Zone proposed distribution mains. Providing fire flow from the 380 Zone would allow a significant

reduction in the proposed Edy Road Pump Station capacity thereby reducing construction and long-term maintenance costs for this station.

Distribution Main Improvement Projects

Table 5-2 presents prioritized water distribution main project recommendations for fire flow capacity and system expansion including estimated project costs and cost allocations to future growth. All recommended water main projects are illustrated on Plate 1 in Appendix A. Water main project costs are estimated based on unit costs by diameter shown in Table 5-1.

Table 5-1
Unit Cost for Water Main Projects

Pipe Diameter	Cost per Linear Foot
6-inch	$160
8-inch	$180
10-inch	$210
12-inch	$250

Assumptions:

1. Ductile iron pipe with an allowance for fittings, valves and services
2. Surface restoration is assumed to be asphalt paving
3. No rock excavation
4. No dewatering
5. No property or easement acquisitions
6. No specialty construction included

Projects for Fire Flow

As presented in Section 4, analysis using the City's water system hydraulic model revealed that minimal piping improvements are needed to provide sufficient fire flow capacity within the existing water service area under existing and projected future demand conditions. Some water main projects identified in the 2005 Sherwood Water System Master Plan were eliminated from the CIP based on the 2014 analysis. This was primarily due to the availability of more refined data in 2014 and completion of major piping improvement projects since 2005. Water main projects recommended for fire flow capacity serve only existing developed areas, thus estimated project costs are allocated 100 percent to existing customers.

Projects for Future System Expansion

Large diameter distribution main loops are needed to serve the currently undeveloped Brookman Annexation, TEA and West Urban Reserve. Proposed water main projects to serve future development in Brookman and TEA are adapted from their respective concept

plans and prioritized according to the projected development timelines provided in the concept plans. Proposed water main projects to serve potential growth in the West Urban Reserve are aligned with existing roadways where possible and highest priority is given to areas with adjacent existing development which will be served from the existing 380 and 455 Pressure Zones.

Cost Allocation to Growth for System Expansion Projects

Estimated costs for projects which are recommended to replace existing pipes in order to serve system expansion areas are allocated to growth based on the ratio of existing and proposed future replacement pipe diameter. The flow area of the existing pipe size is considered to be serving existing system demands and benefiting existing customers. Any capacity beyond the existing pipe size is allocated to growth based on flow area. This cost allocation applies to recommended water main replacement projects M-3, M-4 and M-5.

Costs for all other water main projects recommended to facilitate water system expansion to the Brookman Annexation, TEA and West Urban Reserve are 100 percent allocated to growth.

Routine Pipe Replacement Program

In addition to distribution main projects to address capacity deficiencies, the City should plan for replacement of pipes based on a 100-year life cycle. It is recommended that routine pipe replacement be prioritized as follows:

1. Known pipe capacity and condition issues
2. Pipe material – based on City record of pipe material and era of manufacture
    - Highest priorities are galvanized pipe and post-1950 cast iron
3. Pipe age – coordinate replacement of pipes 50 years or older with other City utilities and transportation (City, County or State) projects

Sherwood has experienced substantial growth and city boundary expansion over the last few decades, as a result much of the City's water system is less than 30 years old. Based on a 100-year replacement cycle, none of this infrastructure would need to be replaced for 70 years, well beyond the planning horizon of this Master Plan Update. However, it is recommended that the City allocate funds for a long term pipe replacement program.

Based on the lengths and diameters of the City's oldest existing pipe, those mains within the 1960 city limit boundary, and input from City staff it is recommended that Sherwood allocate approximately $50,000 annually for routine pipe replacement. Estimated costs for the pipe replacement program are allocated to future growth based on the ratio of existing to projected build-out demands.

PRV Projects

Two new pressure reducing valves are recommended, as development warrants, to provide an emergency connection between the existing 455 Zone distribution mains and future 380 Zone mains on Elwert Road at Handley Street and on Old Highway 99W at the Brookman Annexation boundary. Two additional PRVs are recommended, as development warrants, to provide an emergency connection between the future 630 West Pressure Zone and 455 Zone future expansion in the West Urban Reserve. Project costs for all four PRVs are allocated 100 percent to growth.

SCADA System Upgrade

A Supervisory Control and Data Acquisition (SCADA) system is a computer and communication system which provides critical real-time information and data recording to inform both immediate and long-term water system operations decisions. The SCADA system monitors water facility performance with measures, such as, system pressure, reservoir water level and pump on/off status as well as entry alarms for security at drinking water reservoirs and pump stations. Based on experience with similar water providers in the region, equipment becomes more difficult to maintain and repair 10 to 15 years after installation as SCADA technology advances leading to increasing maintenance effort and cost. The City's current SCADA system is over 10 years old. It is recommended that the City upgrade their existing SCADA system in fiscal year 2017. Estimated costs for the proposed upgrade are allocated to future growth based on the ratio of existing to 20-year projected demands. It is assumed that the SCADA system would likely need to be upgraded again at the end of the 20-year planning horizon.

Planning Projects

It is recommended that the City update this Water System Master Plan within the next 6 to 10 years and again at 20 years. An update may be needed sooner if there are significant changes to the City's water service area, supply or distribution system which are not currently anticipated.

To comply with Oregon Water Resources Department (OWRD) requirements for groundwater permit holders Sherwood is required to complete an update of their Water Management and Conservation Plan (WMCP) every 10 years. The next update of the City's WMCP is expected to begin in fiscal year 2018.

The City intends to update the existing Water System Vulnerability Assessment within the next 10 years to identify any additional security measures or operations procedures which may be needed to protect water facilities. It is assumed that this assessment update will be repeated at 20 years.

Sherwood staff have identified the need for a local water system resilience plan to achieve the seismic response and recovery goals for Willamette Valley water utilities presented in the

Oregon Resilience Plan. It is recommended that the City begin developing this plan in the next year.

Estimated costs for future water system planning projects are allocated to future growth based on the ratio of existing to 20-year projected demands.

Summary

This section presented recommendations for improvement and expansion projects in the City's supply system, pump stations and distribution mains. As presented in Table 5-3, the total estimated cost of these projects is approximately $24.6 million through FY 2034. Approximately $19.9 million of the total estimated cost is for projects needed within the 10-year timeframe and $5.4 million of these improvements are required in the next 5 years.

Table 5-2
Water Main Projects

DRAFT

CIP ID	Project Description	Project Purpose	Diameter (in)	Total Project Length (ft)	Timeframe	Estimated Project Cost	% Allocated to Growth
M-1	Upgrade 6-inch fire line to Sherwood Senior Center (21907 Sherwood Boulevard) from Sherwood Boulevard	Commercial Fire Flow	8	196	FY2 (2017)	$ 36,000	0%
M-2	Upgrade 6-inch main along Norton Street from Willamette Street south to fire hydrant at Forest Avenue	Residential Fire Flow	8	507	FY3 (2018)	$ 92,000	0%
M-3	Upgrade 8-inch main along Sanders Terrace from Inkster Drive to Maidenfern Lane	Fire flow to Brookman Expansion	12	487	10-Year (2024)	$ 122,000	56%
M-4	Upgrade 8-inch main along Maidenfern Lane from Sanders Terrace to Middleton Road, open NCV at 18191 Maidenfern to transfer services from 455 to 380 Zone		12	381	10-Year (2024)	$ 96,000	56%
M-5	Upgrade 8-inch main along Middleton Road from Maidenfern Lane to city limits, close valve at Middleton & Maidenfern to transfer services from 455 to 380 Zone		12	325	10-Year (2024)	$ 82,000	56%
M-6	Install new main along Middleton Road from city limits south to 24312 Middleton Road	Brookman Expansion - 380 Zone	12	884	10-Year (2024)	$ 221,000	100%
M-7	Install new main along Old Hwy 99W from existing dead end south of Crooked River Lane to proposed Southwest Sherwood PRV (V-1)		12	268	FY3 (2018)	$ 68,000	100%
M-8	Install new main along Old Hwy 99W from proposed Southwest Sherwood PRV (V-1) across Goose Creek		12	813	FY4 (2019)	$ 204,000	100%
M-9	Install new main along proposed Goose Creek arterial from Old Hwy 99W northwest to Hwy 99W		8	1,325	FY4 (2019)	$ 239,000	100%
M-10	Install new main along proposed Goose Creek arterial from Old Hwy 99W southeast to Brookman Road		12	1,246	10-Year (2024)	$ 312,000	100%
M-11	Install new main along Middleton Road from Brookman Road north to 24312 Middleton Road		12	517	10-Year (2024)	$ 130,000	100%
M-12	Install new main along Brookman Road from Middleton Road east to 16655 Brookman Road		12	1,223	10-Year (2024)	$ 306,000	100%
M-13			12	1,233	10-Year (2024)	$ 309,000	100%
M-14			12	2,414	10-Year (2024)	$ 604,000	100%
M-15	Install new main from 16655 Brookman Road northeast to 24100 Ladd Hill Road		12	1,382	10-Year (2024)	$ 346,000	100%
M-16	Install new main along Ladd Hill Road from 24100 Ladd Hill Road north to Brookman Road		12	255	10-Year (2024)	$ 64,000	100%

Table 5-2
Water Main Projects

DRAFT

CIP ID	Project Description	Project Purpose	Diameter (in)	Total Project Length (ft)	Timeframe	Estimated Project Cost	% Allocated to Growth
M-17	Install new main along proposed roadway running north-south at 17433 Brookman Road	Brookman Expansion - 380 Zone	12	1,726	10-Year (2024)	$ 432,000	100%
M-18	Install new main from proposed roadway through 17433 Brookman Road, across Cedar Creek to Redfern Drive		12	1,537	10-Year (2024)	$ 385,000	100%
M-19A	Install new main from Redfern Drive east to Brookman Road	Brookman Expansion - 380 Zone	8	565	10-Year (2024)	$ 102,000	100%
M-19B	Install new main along Brookman Road to Ladd Hill Road		8	995	10-Year (2024)	$ 180,000	100%
M-20	Install new main along Old Hwy 99W from proposed Goose Creek arterial southwest to Brookman Road		8	878	20-Year (2034)	$ 159,000	100%
M-21	Install new main along Brookman Road from Old Hwy 99W west to Hwy 99W		8	627	20-Year (2034)	$ 113,000	100%
M-22	Install new main along Hwy 99W from Brookman Road north to proposed Goose Creek arterial		8	1,678	20-Year (2034)	$ 303,000	100%
M-23	Install new mains along proposed roadways for system looping in the Brookman Annexation area		8	860	20-Year (2034)	$ 155,000	100%
M-24			8	2,254	20-Year (2034)	$ 406,000	100%
M-25			8	412	20-Year (2034)	$ 75,000	100%
M-26	Install new mains along Ladd Hill Road from proposed Ladd Hill Pump Station (P-1) south of Brookman Road	Brookman Expansion - 400 Zone	12	288	20-Year (2034)	$ 73,000	100%
M-27			12	498	20-Year (2034)	$ 125,000	100%
M-28	Extend proposed Ladd Hill main (M-27) south to southern boundary of Brookman Annexation		12	453	20-Year (2034)	$ 114,000	100%
M-29	Extend Cipole Road main south from Tualatin Sherwood Road to proposed TEA water main backbone	TEA Expansion - 380 Zone	10	731	FY3 (2018)	$ 154,000	100%
M-30	Install new mains to form TEA water main backbone running northeast to southwest across TEA parallel to Oregon Street		10	1,256	FY4 (2019)	$ 264,000	100%
M-31			12	1,750	FY4 (2019)	$ 438,000	100%
M-32	Install new main across 21600 Oregon Street property to TEA water main backbone		10	1,267	FY5 (2020)	$ 267,000	100%
M-33	Extend proposed Cipole Road main (M-29) southeast to proposed 124th Avenue roadway extension south of Tualatin Sherwood Road		10	768	FY5 (2020)	$ 162,000	100%

Table 5-2
Water Main Projects

DRAFT

CIP ID	Project Description	Project Purpose	Diameter (in)	Total Project Length (ft)	Timeframe	Estimated Project Cost	% Allocated to Growth
M-34	Install new main along proposed 124th Avenue roadway extension south of Tualatin Sherwood Road contiuing south to proposed collector road running west to east across TEA	TEA Expansion - 380 Zone	10	843	FY5 (2020)	$ 178,000	100%
M-35	Install new main from intersection of Dahlke Lane & Oregon Street southeast to TEA water main backbone		10	1,530	10-Year (2024)	$ 322,000	100%
M-36	Install new main from TEA water main backbone east to 124th Avenue roadway extension at proposed collector road		12	1,695	10-Year (2024)	$ 424,000	100%
M-37	Extend proposed TEA water main backbone (M-31) south to serve TEA concept plan area B(2)		12	1,161	10-Year (2024)	$ 291,000	100%
M-38	Install new main parallel to the south side of the Bonneville Power Easement from Oregon Street to the TEA water main backbone at Dahlke Lane	TEA Expansion - 380 Zone	12	1,347	Beyond 20 years	$ 337,000	100%
M-39	Install new main from Tualatin Sherwood Road west of Cipole Road south to TEA water main backbone		10	942	Beyond 20 years	$ 198,000	100%
M-40	Extend Edy Road 12-inch 380 Zone main west to Elwert Road		12	870	10-Year (2024)	$ 218,000	100%
M-41	Install new main along Elwert Road from Edy Road south to 21615 Elwert Road	West Expansion - 380 Zone	12	1,323	10-Year (2024)	$ 331,000	100%
M-42	Install new main along Elwert Road from 21615 Elwert Road to connect with existing 455 Zone piping through proposed Handley PRV (V-2)		12	1,191	10-Year (2024)	$ 298,000	100%
M-43	Extend existing 12-inch 455 Zone main along Hwy 99W from the intersection of Hwy 99W & Kruger Road southwest across Goose Creek to 23975 Hwy 99W	West Expansion - 455 Zone	12	2,908	20-Year (2034)	$ 727,000	100%
M-44	Install new main from 23975 Hwy 99W west to proposed 195th PRV (V-4)		12	1,533	20-Year (2034)	$ 384,000	100%
M-45	Install new main from existing 18-inch 455 Zone Kruger Road main south to connect with 455 distribution extension (M-44) near proposed 195th PRV (V-4)		12	2,642	20-Year (2034)	$ 661,000	100%
M-46	Extend existing 10-inch 380 Zone main along Roy Rogers Road north across Chicken Creek bridge to Scholls Sherwood Road	West Expansion - 380 Zone	12	3,168	Beyond 20 years	$ 792,000	100%
M-47	Install new main along Scholls Sherwood Road from Roy Rogers Road west to Elwert Road		12	3,088	Beyond 20 years	$ 773,000	100%

Table 5-2
Water Main Projects

DRAFT

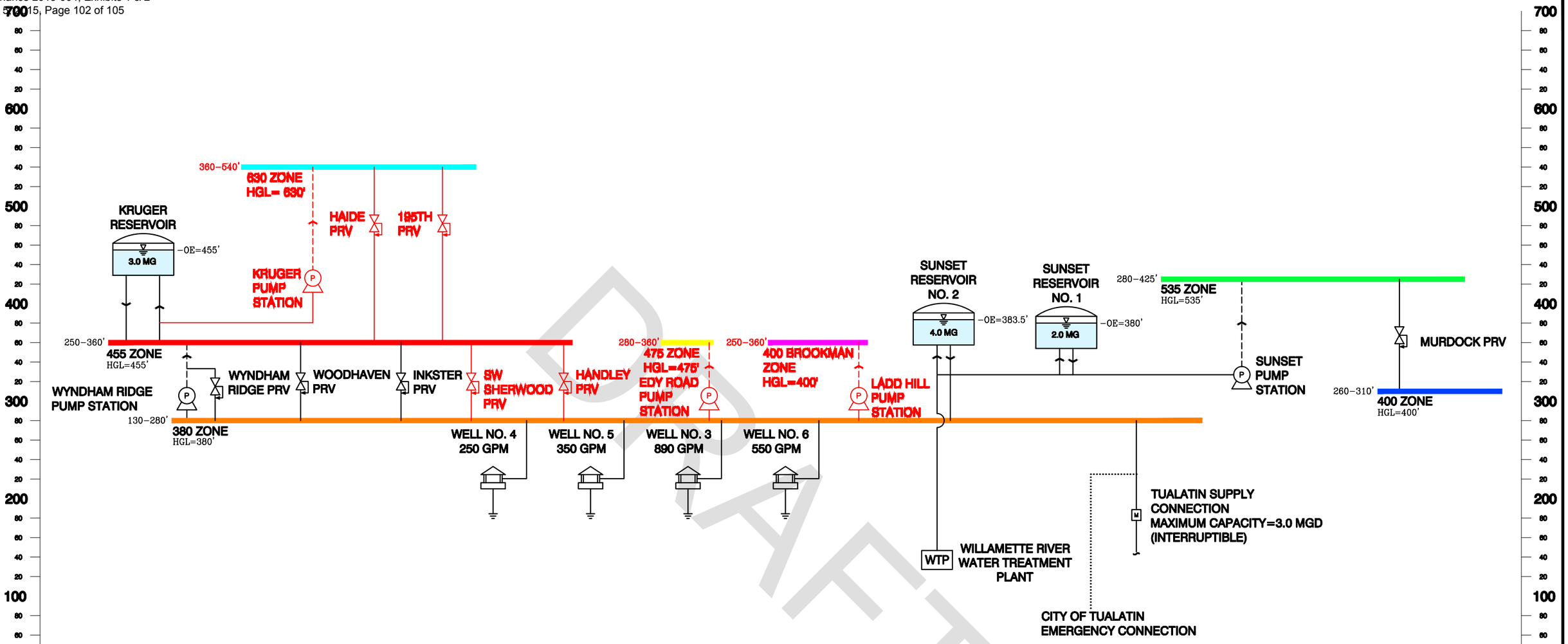
CIP ID	Project Description	Project Purpose	Diameter (in)	Total Project Length (ft)	Timeframe	Estimated Project Cost	% Allocated to Growth
M-48A	Install new main along Elwert Road from Scholls Sherwood Road south to Conzelmann Road	West Expansion - 380 Zone	12	2,640	Beyond 20 years	$ 660,000	100%
M-48B	Install new main along Elwert Road from Conzelmann Road south across Chicken Creek to Edy Road		12	2,640	Beyond 20 years	$ 661,000	100%
M-49	Install new main along Haide Road from Elwert Road west to proposed Haide PRV (V-3)	West Expansion - 455 Zone	12	2,658	Beyond 20 years	$ 665,000	100%
M-50	Install new main from existing 18-inch 455 Zone Kruger Road main north to connect with Haide Road 455 distribution extension (M-49)		12	1,998	Beyond 20 years	$ 500,000	100%
M-51	Install new main along Kruger Road from proposed Kruger Pump Station (P-2) west to serve future West Urban Reserve customers in proposed 630 Zone	West Expansion - 630 Zone	12	750	Beyond 20 years	$ 188,000	100%
M-52	Install new mains from proposed Kruger Road 630 Zone main (M-51) north to loop with proposed 455 Zone mains on Haide Road through proposed Haide PRV (V-3)		12	1,615	Beyond 20 years	$ 404,000	100%
M-53			12	1,230	Beyond 20 years	$ 308,000	100%
M-54	Extend proposed 380 Zone main along Edy Road from Elwert Road west across Chicken Creek to proposed Edy Road Pump Station (P-3)	West Expansion - 380 Zone	12	1,978	Beyond 20 years	$ 495,000	100%
M-55			12	970	Beyond 20 years	$ 243,000	100%
M-56	Install new mains from proposed Kruger Road 630 Zone main (M-51) south to loop with proposed 455 Zone mains through proposed 195th PRV (V-4)	West Expansion - 630 Zone	12	1,387	Beyond 20 years	$ 347,000	100%
M-57			12	1,434	Beyond 20 years	$ 359,000	100%
M-58			12	559	Beyond 20 years	$ 140,000	100%
M-59	Install new main along Edy Road west of proposed Edy Road Pump Station (P-3) to serve future West Urban Reserve customers in proposed 455Booster Zone	West Expansion - 475 Zone	12	452	Beyond 20 years	$ 113,000	100%
M-60	Upgrade existing 2-inch main on June Court from Cochran Avenue to existing dead end, add fire hydrant at end of cul-de-sac	Residential Fire Flow	6	263	FY4 (2019)	$ 43,000	100%
					Total Cost	**$ 18,198,000**	

Table 5-3
CIP Summary

DRAFT

Project Category	Project ID	Project Description	CIP Schedule and Project Cost Summary								% Allocated to Growth
			FY1 (2016)	FY2 (2017)	FY3 (2018)	FY4 (2019)	FY5 (2020)	10-Year (2024)	20-Year (2034)	Beyond 20 years	
Supply	S-1	Existing WRWTP upgrades to achieve max 15 mgd capacity				$ 250,000	$ 250,000	$ 500,000			20%
	S-2	WRWTP purchase 5 mgd intake capacity			$ 100,000	$ 150,000	$ 150,000	$ 1,600,000			100%
	S-3	WRWTP treatment expansion - Sherwood 5 mgd share			$ 440,000	$ 550,000	$ 550,000	$ 6,160,000			100%
	S-4	Install hydrants at Wells 3 and 5	$ 25,000								0%
	S-5	Abandon Well 4 and transfer water rights	$ 25,000								0%
		Subtotal	***$ 50,000***	***$ -***	***$ 540,000***	***$ 950,000***	***$ 950,000***	***$ 8,260,000***	***$ -***	***$ -***	
Pump Station	P-1	Proposed 1,600 gpm Ladd Hill Pump Station to serve future 400 Brookman Zone customers							$ 477,000		100%
	P-2	Proposed 2,400 gpm Kruger Pump Station to serve future 630 Zone customers								$ 2,547,000	100%
	P-3	Proposed 1,600 gpm Edy Road Pump Station to serve future 475 Zone customers								$ 1,505,000	100%
		Subtotal	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ 477,000***	***$ 4,052,000***	
Water Main	M-1	Fire flow capacity -Sherwood Senior Center		$ 36,000							0%
	M-2	Fire flow capacity - Norton Ave			$ 92,000						0%
	M-60	Fire flow capacity - June Court				$ 43,000					0%
	M-7	Expansion to Brookman - Loop from prop SW Sherwood PRV to Hwy 99		$ 68,000							100%
	M-8				$ 204,000						100%
	M-9				$ 239,000						100%
	M-29	Expansion to TEA - Loop with existing Oregon Street mains			$ 154,000						100%
	M-30					$ 264,000					100%
	M-31					$ 438,000					100%
	M-32						$ 267,000				100%
	M-33						$ 162,000				100%
	M-34						$ 178,000				100%
	M-3, 4 & 5	10-Year (2024) - upgrade existing mains						$ 300,000			56%
	M-6, 10 to 19B, 35 to 37, 40 to 42	10-Year (2024)						$ 5,275,000			100%
	M-20 to 28, 43 to 45	20-Year (2034)							$ 3,295,000		100%
	M-38, 39, 46 to 59	Beyond 20 years								$ 7,183,000	100%
		Routine Pipe Replacement Program	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 250,000	$ 500,000	$50K annually	57%
		Subtotal	***$ 50,000***	***$ 154,000***	***$ 739,000***	***$ 795,000***	***$ 657,000***	***$ 5,825,000***	***$ 3,795,000***	***$ 7,183,000***	
PRV	V-1	SW Sherwood PRV			$ 150,000						100%
	V-2	Handley PRV						$ 150,000			100%
	V-3	Haide PRV								$ 150,000	100%
	V-4	195th PRV								$ 150,000	100%
		Subtotal	***$ -***	***$ -***	***$ 150,000***	***$ -***	***$ -***	***$ 150,000***	***$ -***	***$ 300,000***	
Other		Upgrade SCADA System		$ 75,000							35%
		Subtotal	***$ -***	***$ 75,000***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	***$ -***	
Planning		Update Water Master Plan						$ 150,000	$ 150,000		35%
		Update Water Management and Conservation Plan			$ 150,000				$ 150,000		35%
		Update Vulnerability Assessment						$ 60,000	$ 60,000		35%
		Resiliency Plan	$ 150,000						$ 150,000		35%
		Subtotal	***$ 150,000***	***$ -***	***$ 150,000***	***$ -***	***$ -***	***$ 210,000***	***$ 510,000***	***$ -***	
Capital Improvement Program (CIP) Total			**$ 250,000**	**$ 229,000**	**$ 1,579,000**	**$ 1,745,000**	**$ 1,607,000**	**$ 14,445,000**	**$ 4,782,000**	**$ 11,535,000**	**$ 36,172,000**

Annual Average CIP Cost		
$1,082,000 over 5 years	**$1,985,500 over 10 years**	**$1,231,850 over 20 years**



LEGEND

	EXISTING
PUMP DISCHARGE WATER MAIN	———
WATER MAIN	———
RESERVOIR (CAPACITY IN MG, OVERFLOW ELEVATION IN FEET)	1.0 MG, OE=410'
GROUNDWATER WELL (PRODUCTION CAPACITY IN GPM)	
PRESSURE REDUCING VALVE	
PUMP STATION	P
MASTER METER	M
WATER TREATMENT PLANT	WTP
DISTRIBUTION SYSTEM EMERGENCY INTERTIES	.....

ABBREVIATIONS

GPM	GALLONS PER MINUTE
HGL	HYDRAULIC GRADE LINE
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
OE	OVERFLOW ELEVATION
PRV	PRESSURE REDUCING VALVE

NOTES:

1. FACILITIES SHOWN IN RED ARE PROPOSED.

FIGURE 5-1

City of Sherwood Oregon

Water System Master Plan Update

PROPOSED WATER SYSTEM SCHEMATIC

FEBRUARY 2015

MSA

13-1508

G:\PDX_Projects\13\1508\CAD\13-1508-405-OR-FIG 5-1.dwg FIG 5-1 1/23/15 13:07

PLATE 1

City of Sherwood Oregon

Water System Master Plan Update

Water System Map

MSA Murray, Smith & Associates, Inc. Engineers/Planners

DRAFT

24-inch Tualatin Supply Connection

Future 475 WEST Zone

Future 380 WEST Zone

Future 380 TEA Zone

380 Zone

Proposed Handley PRV

Wyndham Ridge Pump Station

Proposed Haide PRV

455 Zone

Woodhaven PRV

Kruger Reservoir

Future 455 WEST Zone

Inkster PRV

Sunset Reservoirs & Pump Station

400 Zone

Murdock PRV

535 Zone

Proposed SW Sherwood PRV

Proposed 195th PRV

Future 630 WEST Zone

Proposed NCV Hatched Area Customers Transfer to 380 Zone

Future 380 BROOKMAN Zone

Future 400 BROOKMAN Zone

Willamette River Water Treatment Plant 48-inch Transmission Main (to Wilsonville)

West Fork Chicken Creek

Chicken Creek

Rock Creek

Coffee Lake Creek

Gaarde Creek

Cedar Creek

Legend

- Existing Reservoir
- Existing Well

Pump Station
- Existing
- Proposed

Pressure Reducing Valve
- Existing
- Proposed

Water Main
- Existing
- Proposed
- Existing Transmission
- Railroad
- Stream
- City Limits
- Urban Growth Boundary (UGB)

This map is intended for informational purposes only. The City of Sherwood makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, or surveying purposes. Notification of any errors is appreciated.

Source Data:
Basemapping - Metro/RLIS Nov. 2014
Water System - MSA and City of Sherwood Dec. 2014

800 0 800 Feet

N W E S

City of Sherwood Oregon

MSA

MURRAY, SMITH & ASSOCIATES, INC.
ENGINEERS | PLANNERS

City Council Meeting Date: May 5, 2015

Agenda Item: Public Hearing, 2nd Reading

TO: Sherwood City Council

FROM: Michelle Miller, AICP, Senior Planner
Through: Brad Kilby, AICP, Planning Manager and Joseph Gall, ICMA-CM, City Manager

SUBJECT: **Ordinance 2015-005, amending multiple sections of the Zoning and Community Development Code including divisions I, II, and III as it relates to the regulation of Medical Marijuana Dispensaries and declaring an emergency**

Issue:
Shall the City Council adopt an ordinance amending the Zoning and Community Development Code (SZCDC) in order to develop reasonable time, place and manner restrictions of medical marijuana dispensaries?

Summary:
The proposal would amend 16.10 (Definitions), 16.31 (Industrial Land Use Districts), 16.38 (Special Uses), 16.72 (Procedures for Processing Development Permits) of the Sherwood Zoning and Community Development Code (SZCDC) in order to regulate medical marijuana dispensaries in Sherwood.

The Planning Commission held a public hearing on April 14, 2015 and forwarded a recommendation of approval to the City Council. The Planning Commission recommendation is attached in Attachment 1 of this report.

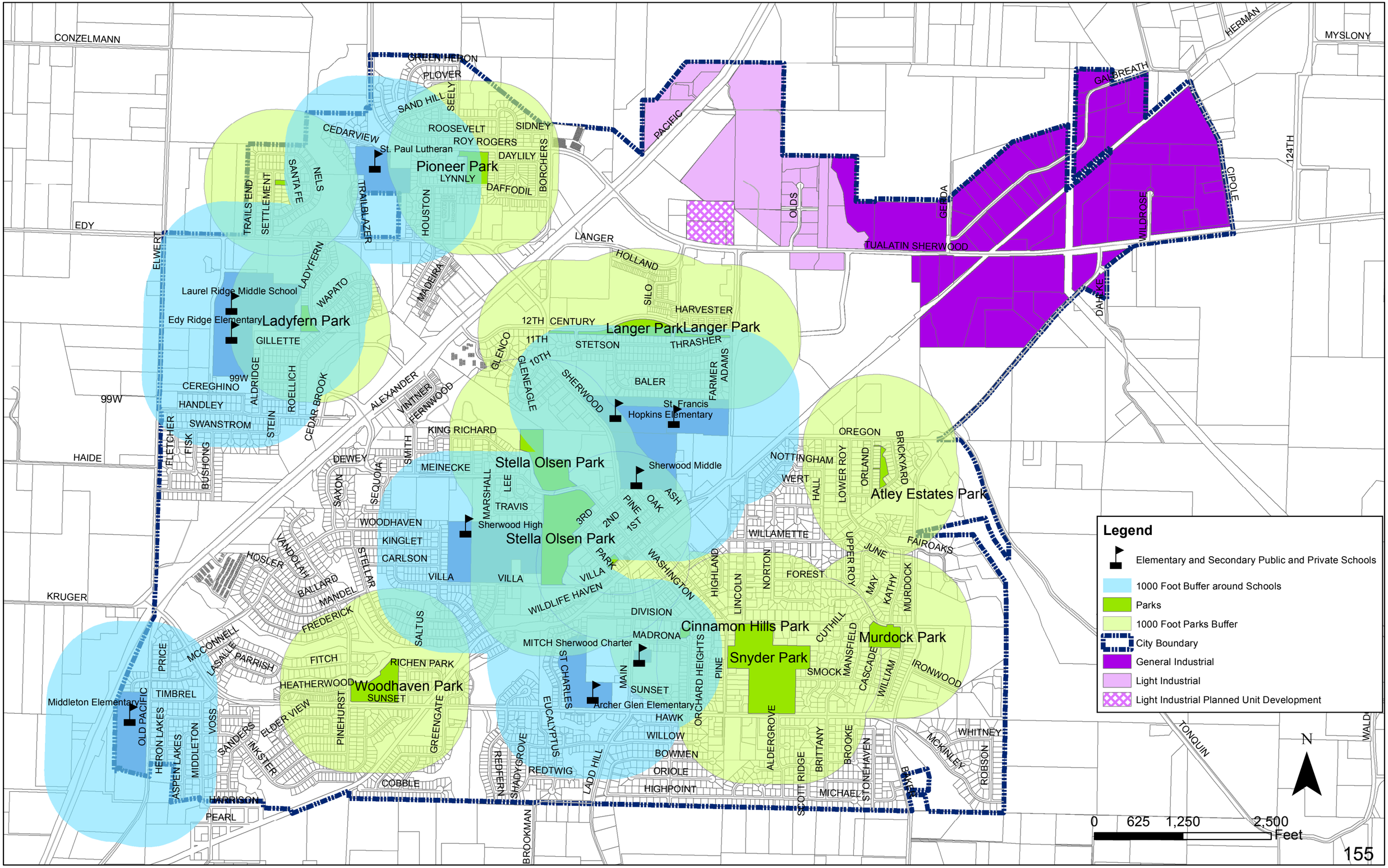
The City Council scheduled a special meeting on April 28, 2015 and held a public hearing on the proposed legislation. Since the submittal of the packet to Council for the April 28, 2015 hearing, staff has amended Attachment 2, Industrial Zone, Parks and Schools Buffer Map to clarify and better reflect the intention of the map. This is the second reading of Ordinance 2015-05 by City Council.

Previous Council Action:
Public Hearing: Moratorium on Medical Marijuana Dispensaries
Work Session: February 3, 2015
Public Hearing: 1st Reading, April 28, 2015

Recommendation:
Staff respectfully recommends City Council approval of Ordinance 2015-005 amending multiple sections of the Zoning and Community development code including divisions I, II, and III as it relates to the regulation of medical marijuana dispensaries and declaring an emergency.

Attachments:
Ordinance 2015-005
Exhibit A: Proposed Code Amendments
Amended Attachment 2: Industrial Zone, Parks and Schools Buffer Map

1000 Foot School and Parks Buffers with Industrial Zones



ORDINANCE 2015-005

AMENDING MULTIPLE SECTIONS OF THE ZONING AND COMMUNITY DEVELOPMENT CODE INCLUDING DIVISIONS I, II, and III AS IT RELATES TO THE REGULATION OF MEDICAL MARIJUANA DISPENSARIES AND DECLARING AN EMERGENCY

WHEREAS, the Oregon Legislature approved House Bill 3460 (2013), which creates a registration system for medical marijuana dispensaries and allows medical marijuana dispensaries to be located in areas zoned for commercial, industrial, or mixed use: and

WHEREAS, House Bill 3460 (2013) authorized certain restrictions on the location of medical marijuana dispensaries related to proximity to schools attended by minors and to other medical marijuana dispensaries; and

WHEREAS, Senate Bill 1531 (2014) authorized local jurisdictions to regulate medical marijuana dispensaries by imposing time, place and manner restrictions on their operations and included provisions allowing local jurisdictions to adopt a moratorium on dispensaries effective through May 1, 2015; and

WHEREAS, the City Council adopted a moratorium on the siting of medical marijuana facilities within the City of Sherwood that expires on May 1, 2015; and

WHEREAS, the City Council believes it is in the best interest of the health, safety and welfare of the citizens of Sherwood to establish time, place and manner regulations concerning medical marijuana dispensaries; and

WHEREAS, the Planning Commission conducted a public hearing on April 14, 2015, and voted to forward a recommendation of approval to the City Council for the proposed Zoning and Community Development Code amendments that regulates medical marijuana dispensaries; and

WHEREAS, the analysis and findings to support the Planning Commission recommendation are identified in Attachment 1 of the City Council Staff Report; and

WHEREAS, the attached Exhibit A to this ordinance reflects the code amendments; and

WHEREAS, the City Council held public hearings on April 28, 2015 and May 5, 2015 and determined that the proposed changes to the Development Code met the applicable Comprehensive Plan criteria and continued to be consistent with regional and state standards.

NOW, THEREFORE, THE CITY OF SHERWOOD ORDAINS AS FOLLOWS:

Section 1. Findings. After full and due consideration of the application, the Planning Commission recommendation, the record, findings, and evidence presented at the public hearing, the Council adopts

the findings of fact contained in the Planning Commission recommendation finding that the text of the Sherwood Zoning and Community Development Code shall be amended as documented in Exhibit A.

Section 2. Approval. The proposed amendments for Plan Amendment (PA) 15-02 identified in Exhibit A are hereby **APPROVED**.

Section 3 - Manager Authorized. The Planning Department is hereby directed to take such action as may be necessary to document this amendment, including notice of adoption to DLCD and necessary updates to Chapter 16 of the Municipal Code in accordance with City ordinances and regulations.

Section 4 - Applicability. The amendments to the City of Sherwood Zoning and Community Development Code approved by this Ordinance apply to all land use applications submitted after the effective date of this Ordinance.

Section 5 - Effective Date. In order to maintain the health, peace and welfare of the City of Sherwood, an **emergency is declared** and this ordinance takes effect immediately upon passage and approval by the Mayor.

Section 6 - Ordinance 2014-008, establishing a moratorium on medical marijuana dispensaries is repealed.

Duly passed by the City Council this 5th day of May 2015.

_____
Krisanna Clark, Mayor

Attest:

_____
Sylvia Murphy, MMC, City Recorder

	AYE	NAY
Cooke	____	____
Harris	____	____
Kuiper	____	____
King	____	____
Henderson	____	____
Robinson	____	____
Clark	____	____

Exhibit A. Planning Commission Recommended Draft Code Language

Medical Marijuana Dispensary Plan Amendment –

April 15, 2015

DRAFT CODE LANGUAGE

Additions are in BLUE

Add to Section 16.10 - DEFINITIONS

MEDICAL MARIJUANA DISPENSARY: A retail facility registered by the Oregon Health Authority that is allowed to receive marijuana, immature marijuana plants or usable marijuana products (such as edible products, ointments, concentrates or tinctures) and to transfer that marijuana, immature plants, or usable project to a person with a valid Oregon Medical Marijuana Program card (a patient or the patient's caregiver). A dispensary includes all premises, buildings, curtilage or other structures used to accomplish the storage, distribution and dissemination of marijuana.

MOBILE VENDOR: A service establishment operated from a licensed and moveable vehicle that vends or sells food and/or drink or other retail items.

PUBLIC PLAZA: a square in a city or town; an open area usually located near urban buildings and often featuring walkways, trees and shrubs, places to sit, and sometimes shops which is under the control, operation or management of the City or other government agency.

EXISTING Definitions (for reference purposes)

Public Park: A park, playground, swimming pool, reservoir, athletic field, or other recreational facility which is under the control, operation or management of the City or other government agency.

Educational Institution: Any bona-fide place of education or instruction, including customary accessory buildings, uses, and activities, that is administered by a legally-organized school district; church or religious organization; the State of Oregon; or any agency, college, and university operated as an educational institution under charter or license from the State of Oregon. An educational institution is not a commercial trade school as defined by Section 16.10.020.

Add to Land uses tables of Chapter 16.31 tables with footnotes to see Special Uses

CHAPTER 16.31 INDUSTRIAL LAND USES

16.31.020 - Uses

A. The table below identifies the land uses that are permitted outright (P), permitted conditionally (C) and not permitted (N) in the industrial zoning districts. The specific land use categories are described and defined in Chapter 16.88.

B. Uses listed in other sections of this code, but not within this specific table are prohibited.

C. Any use not otherwise listed that can be shown to be consistent or associated with the uses permitted outright or conditionally in the commercial zones or contribute to the achievement of the objectives of the commercial zones may be permitted outright or conditionally, utilizing the provisions of Chapter 16.88

D. Additional limitations for specific uses are identified in the footnotes of this table.

INDUSTRIAL USES	LI	GI	EI
COMMERCIAL			
General Retail - sales oriented			
• Incidental retail sales or display/showroom directly associated with a permitted use and limited to a maximum of 10 % of the total floor area of the business.[7]	C	C	P
• Medical Marijuana Dispensary, not exceeding 3,000 square feet of gross square footage	P[8]	P[8]	N
• Tool and Equipment Rental and Sales, Including Truck Rental.[7]	P	P	P
• Retail plant nurseries and garden supply stores (excluding wholesale plant nurseries)	P	P	N
• Wholesale building material sales and service	C	P	N
• Retail building material sales and lumberyards[7]	C	P	N

8. See Special Criteria for Medical Marijuana Dispensary under Chapter 16.38.020.

Add Medical Marijuana Dispensary to Category Type II Land Use Procedures for Processing Development Permits.

CHAPTER 16.72 Procedures for Processing Developing Permits

16.72.010 - Generally

A. Classifications

Except for Final Development Plans for Planned Unit Developments, which are reviewed per Section 16.40.030, all quasi-judicial development permit applications and legislative land use actions shall be classified as one of the following:

2. Type II

The following quasi-judicial actions shall be subject to a Type II review process:

a. Land Partitions

b. Expedited Land Divisions - The Planning Director shall make a decision based on the information presented, and shall issue a development permit if the applicant has complied with all of the relevant requirements of the Zoning and Community Development Code. Conditions may be imposed by the Planning Director if necessary to fulfill the requirements of the adopted Comprehensive Plan, Transportation System Plan or the Zoning and Community Development Code.

c. "Fast-track" Site Plan review, defined as those site plan applications which propose less than 15,000 square feet of floor area, parking or seating capacity of public, institutional, commercial or industrial use permitted by the underlying zone, or up to a total of 20% increase in floor area, parking or seating capacity for a land use or structure subject to conditional use permit, except as follows: auditoriums, theaters, stadiums, and those applications subject to Section 16.72.010.4, below.

d. "Design Upgraded" Site Plan review, defined as those site plan applications which propose between 15,001 and 40,000 square feet of floor area, parking or seating capacity and which propose a minimum of eighty percent (80%) of the total possible points of design criteria in the "Commercial Design Review Matrix" found in Section 16.90.020.4.G.4.

e. Industrial "Design Upgraded" projects, defined as those site plan applications which propose between 15,001 and 60,000 square feet of floor area, parking or seating capacity and which meet all of the criteria in 16.90.020.4.H.1.

f. Homeowner's association street tree removal and replacement program extension.

g. Class B Variance

h. Street Design Modification

i. Subdivisions between 4—10 lots

j. Medical Marijuana Dispensary permit

16.38 SPECIAL USES

16.38.010 GENERAL PROVISIONS

Special uses included in this Section are uses which, due to their effect on surrounding properties, must be developed in accordance with special conditions and standards. These conditions and standards may differ from the development standards established for other uses in the same zoning district. When a dimensional standard for a special use differs from that of the underlying zoning district, the standard for the special use shall apply.

16.38.020 MEDICAL MARIJUANA DISPENSARY

A. CHARACTERISTICS:

1. A medical marijuana dispensary is defined in Section § 16.10.

2. Registration and Compliance with Oregon Health Authority Rules. A medical marijuana dispensary must have a current valid registration with the Oregon Health Authority under ORS 475.314. Failure to comply with Oregon Health Authority regulations is a violation of this Code.

B. APPROVAL PROCESS. Where permitted, a medical marijuana dispensary is subject to approval under § 16.72.010A.2a, the Type II land use process.

C. STANDARDS

1. Hours of Operation. A medical marijuana dispensary may not be open to the public before 10:00 AM and not later than 8:00 PM all days of the week.

2. Security Measures Required.

a. Landscaping must be continuously maintained to provide clear lines of sight from a public right of way to all building entrances.

b. Exterior lighting must be provided and continuously maintained.

c. Any security bars installed on doors or windows visible from a public right of way must be installed interior to the door or window, in a manner that they are not visible form the public right of way.

3. Co-location prohibited.

a. A medical marijuana dispensary may not be located at the same address as a marijuana manufacturing facility, including a grow operation.

b. A medical marijuana dispensary may not be located at the same address with any facility or business at which medical marijuana is inhaled or consumed by cardholders.

4. Mobile and Delivery Businesses Prohibited.

a. A dispensary may not operate as a mobile business as defined in Chapter 16.10.

b. A dispensary may not operate to deliver medical marijuana.

5. Drive-Through and Walk-Up. A medical marijuana dispensary may not engage in product sales outside of the facility or building through means of a walk-up window or drive-through access.

6. Proximity Restrictions.

A medical marijuana dispensary may not be located within 1,000 feet of any of the uses listed below. For purposes of this paragraph, the distance specified is measured from the closest points between the property lines of the affected properties:

a. An Educational Institution: public or private elementary, secondary, or career school that is attended primarily by children under 18 years of age.

b. Another medical marijuana dispensary.

c. A Public Park or Plaza.