City Council Workshop Agenda

Monday, March 2, 2016, 4:00 PM

City Hall Council Chambers, 898 Elk Drive, Brookings, OR 97415

1. Call To Order
2. Roll Call
3. Topics
   a. Agreement With Friends Of The Brookings-Harbor Aquatic Center.

      Documents: FBHAC AGREEMENT CWR.PDF, FBHAC AGREEMENT.ATT.A.DRAFT AGREEMENT.PDF

   b. Ferry Creek Reservoir.

      Documents: FERRY CREEK RESERVOIR CWR.PDF, FERRY CREEK.ATT.A.INSPECTION SUMMARY.PDF, FERRY CREEK.ATT.B.COST ESTIMATES.PDF

   c. Humboldt State University Water Study.

      Documents: WATER STUDY CWR.PDF, WATER STUDY.ATT.A.1 RESILIENCY SUMMARY.PDF, WATER STUDY.ATT.A.2 STORAGE AND DISTRIBUTION.PDF, WATER STUDY.ATT.A.3 DESALINATION SUMMARY.PDF, WATER STUDY.ATT.A.4 REUSE.PDF

   d. Water Supply Development.

      Documents: WATER SUPPLY CWR.PDF, WATER SUPPLY.ATT.A.REPORT.PDF

   e. Possible Sales Tax.

      Documents: SALES TAX CWR.PDF, SALES TAX.ATT.A.LRO REPORT.PDF, SALES TAX.ATT.B.FORT BRAGG BUDGET.PDF

   f. Economic Development Strategy And Action Plan.

      Documents: ECON DEVELOPMENT STRATEGY CWR.PDF, ECON DEVELOPMENT.ATT.A.2013 PLAN.PDF, ECON DEVELOPMENT.ATT.B.2016 DRAFT PLAN.PDF
4. Council Member Request For Workshop Items
5. Adjournment

All public meetings are held in accessible locations. Auxiliary aids will be provided upon request with 10 days advance notification. Please contact 469-1102 if you have any questions regarding this notice.

CITY OF BROOKINGS

COUNCIL WORKSHOP REPORT

Meeting Date: 3/7/16

Originating Dept: Parks

Signature (submitted by)

City Manager Approval

Subject: Agreement with Friends of the Brookings-Harbor Aquatic Center (FBHAC)

Financial Impact: The Community Recreation Center Task Force conducted an informal Request for Qualifications (RFQ) process and received qualification proposals from three architecture firms and out of those selected Robertson Sherwood Architects (RSA). RSA in a Eugene based firm with a portfolio full of community recreation/aquatic facility examples. The Task Force is recommending the hire of RSA to evaluate the Bud Cross site as well as develop schematic design plans and renderings for presentation to the community. For this, an agreement to share the cost of the plan development phase for this project between FBHAC and the City is desired.

The City of Brookings will be the primary contract holder with RSA. The total budget for schematic design architectural services is estimated to cost $26,000. The City of Brookings was recently awarded a $10,000 grant from AllCare specifically for the planning of a Community Recreation Center. The agreement will propose a shared cost for schematic design services as follows: $8,000 from City of Brookings, $8,000 from FBHAC and $10,000 from AllCare.

We will pay the City's share from savings from pool resurfacing project completed this last Fall and from any additional funds needed from Parks and Pool contract services. FBHAC currently has a grant application pending with West Family Foundation for $6000 which if awarded will be used for future community outreach, workshops and presentation materials.

Background/Discussion: In 2013, staff meet with FBHAC to discuss progress towards an aquatic center in Brookings. It was agreed that it would be mutually beneficial for the City and FBHAC to approach the community with this project in partnership. A "Task Force" of community stakeholders was formed with the duty of evaluating the future development and operation of a Community Recreation Center (with an aquatics component) in the Brookings-Harbor community.

The location of the Community Recreation Center was discussed in depth at the onset. One site that has emerged among few is the existing municipal pool at Bud Cross Park. The use of the existing facility has a potential benefit to the future project in that it takes property acquisition off the table as well as cost to construct a new swimming pool. In addition, the City would not be burdened with a vacant facility if the project were to be constructed elsewhere. The existing pool is in good working condition (resurfaced this year) and with a phased expansion approach, coupled with the restructuring of its operations, could make the project more feasible in the near rather than far future. In October of 2014, the Parks and Recreation Commission was presented with the proposal and voted to forward a recommendation to Council to use of the existing municipal pool at Bud Cross Park as the site for the new Community Recreation Center. The next step in this process is to hire an architect to evaluate the Bud Cross site as well as develop schematic design plans and renderings to present to the community.

Attachments:

a. Draft Agreement

AGREEMENT
(City of Brookings/Friends of the Brookings Harbor Aquatic Center)

THIS AGREEMENT, effective as of March __, 2016, by and between the CITY OF BROOKINGS, a municipal corporation of the State of Oregon, hereinafter called "CITY"; and the FRIENDS OF THE BROOKINGS-HARBOR AQUATIC CENTER, an Oregon Not For Profit Corporation, hereinafter called "FRIENDS".

RECITALS

WHEREAS, CITY desires to develop plans for a Community Recreation Center in Brookings and

WHEREAS, CITYis committed to a partnership with FRIENDS to share the financial responsibility for the plan development phase of a Community Recreation Center in Brookings and

WHEREAS, the City of Brookings has identified the Municipal Pool at Bud Cross Park as the location for the new Community Recreation Center and

WHEREAS, FRIENDS and CITY, through a "Task Force", will actively pursue grant funding and provide matching funds required for any grants awarded for the plan development phase of the project.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Brookings, Oregon, does hereby authorize a partnership with Friends of the Brookings Harbor Aquatic Center to develop plans for a Community Recreation Center in Brookings, as described herein.

AGREEMENT

NOW, THEREFORE, for and in consideration of the sums to be paid by the CITY and the obligations to be performed by FRIENDS as hereinafter set forth, the parties hereto mutually covenant, stipulate and agree as follows:

1. Plan Development Fees.
   - CITY and FRIENDS agree to each pay one third of the cost for the plan development phase of this project estimated to cost $_____.
   - CITY and FRIENDS agree to equally share the remaining one third of the cost to be paid from grant receipts.

2. Indemnity. FRIENDS shall be solely responsible and shall hold CITY harmless from all matters relating to FRIENDS performance under this Agreement, including payment of its employees in compliance with social security, withholding and other regulations governing such matters. FRIENDS shall, at all times, indemnify and hold CITY harmless from and against any and all actions or causes of action, claims, demands, liabilities, losses, damages, or expenses of whatsoever kind and nature, including attorney fees, which CITY may sustain or incur as a result of errors or omissions in FRIENDS performance under this Agreement. The CITY shall, at all times, indemnify and hold FRIENDS harmless from and against any and all actions or causes of action, claims, demands, liabilities, losses, damages, or expenses of whatsoever kind and nature, including attorney fees, which FRIENDS may sustain or incur as a result of errors or omissions in CITY'S performance under this Agreement.

3. Term. This Agreement shall take effect on the 1st day of April 2016, and shall remain in effect until terminated at the completion of the plan development phase.

4. Termination. This Agreement may be terminated by either party for any reason provided that written notice of termination is given at least Sixty (60) days prior to the anniversary date of this Agreement. In addition, this Agreement may be terminated automatically, if it is later determined that any of its terms conflicts with or are preempted by state law, now existing or hereafter enacted.

5. Compliance With Law. FRIENDS shall observe and comply with all local, state and federal laws, ordinances and regulations applicable to the services described in this Agreement.

6. Notices. The addresses of the parties to this Agreement for purpose of any notices permitted or required under this Agreement are as follows:

CITY:	City of Brookings 898 Elk Drive Brookings, OR 97415
FRIENDS:	Friends of the Brookings-Harbor Aquatic Center P.O. Box 6489 Brookings, OR 97415

7. Integration. This Agreement constitutes the entire and fully integrated agreement between the parties. All prior negotiations or agreements between the parties, oral or written, are superseded by, and included in, this Agreement.

8. Modification. This Agreement may not be released, discharged, abandoned, changed, or modified in any manner, except by an instrument in writing signed on behalf of each of the parties by their duly authorized representatives.

9. Titles and Headings. Titles and headings to sections and paragraphs herein are inserted for convenience of reference only and are not intended to be a part of or to affect the meaning or interpretation of this Agreement.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals the day and year first herein above written.

CITY OF BROOKINGS,
A Municipal corporation

By_____
Ron Hedenskog, Mayor

FRIENDS OF THE BROOKINGS-
HARBOR AQUATIC CENTER
A not for profit corporation

By_____
Juliane Leighton, President

ATTEST by City Recorder this ____ day of _____, 2016.

_____
Joyce Heffington
City Recorder

CITY OF BROOKINGS

COUNCIL WORKSHOP REPORT

Meeting Date: March 7, 2016

Originating Dept: City Manager

Signature (Submitted by)

City Manager Approval

Subject: Ferry Creek Reservoir

Recommended Action: Discussion.

Financial Impact: See below.

Background/Discussion:
We have received an inspection report on Ferry Creek Reservoir from the Oregon Water Resources Department (OWRD). The report finds that the dam is in unsatisfactory condition and states that "It is essential that a plan to make this dam safe be developed, and progress begin on improving the safety of this dam."

Prior inspection reports found that the condition of the concrete spillway was a concern, but that otherwise the dam was considered low risk. The OWRD report dated February 1, 2016, is the first time the City has received notice that the dam is considered anything other than low risk. The last inspection was in 2009 and conditions at the reservoir have not changed. The OWRD report is based upon a visual inspection of the dam. The City has contracted with Geotechnical Resources Incorporated for a geotechnical investigation of the dam.

OWRD has offered to prepare an Emergency Action Plan for the dam, and we have requested that they do so. The Dyer Partnership has developed preliminary cost estimates for three alternative approaches to dealing with the dam:

1. Remove the dam, $2,180,480.
2. Repair the dam and related drain lines, $418,371.
3. Construct a new dam after the existing dam is removed, $3,290,100.

Following completion of the geotechnical report, we will secure a full engineering proposal from Dyer.

Rehabilitation of Ferry Creek Reservoir and putting it back into service as a redundant water supply was included in the City's application for funding under the National Disaster Resiliency Competition. The estimated cost for that project is $1,896,964. That proposal was not funded.

City Staff has initiated discussion with the grants manager at Oregon Emergency Management concerning a possible hazard mitigation grant, similar to that which was received for slope stabilization at the Wastewater Treatment Plant in 2014. Staff has also initiated discussion with

Congressional staff concerning possible funding for a reservoir rehabilitation project through the reauthorization of the Water Resources Development Act, currently in development.

Attachment(s):

a. Ferry Creek Dam Inspection Summary.
b. Cost estimates from The Dyer Partnership.

Oregon
Kate Brown, Governor

Water Resources Department
725 Summer St NE, Suite A
Salem, OR 97301
(503) 986-0900
Fax (503) 986-0904

February 1, 2016

Gary Milliman, City Manager
City of Brookings
898 Elk Drive
Brookings, OR 97415

Re: Ferry Creek Dam (F-25) – Inspection Summary

This dam was inspected on October 6, 2015. I performed the inspection with Greg Wacker, Watermaster District 19. Ray Page from the City was also there for the inspection, and we met briefly with you and Laura Lee Snook, after our inspection. The Water Resources Department conducts routine inspections of the dam's exterior surfaces to identify conditions that might affect the safety of the dam. Dams are assigned a hazard rating based on downstream hazard to people and property. OWRD conducts review of hazard ratings as resources are available. The hazard rating of this dam has changed to high based on the dam breach inundation analysis and homes off of the North Bank Chetco Road. The dam will now be inspected on an annual basis.

Summary: The dam has not been recently operated for water supply purposes, and is in unsatisfactory condition. It had been rated as low-hazard by this agency, so had not been a frequently inspected dam, and this was the first time I have performed the inspection. Multiple issues of concern were identified at the dam, as described in this inspection letter.

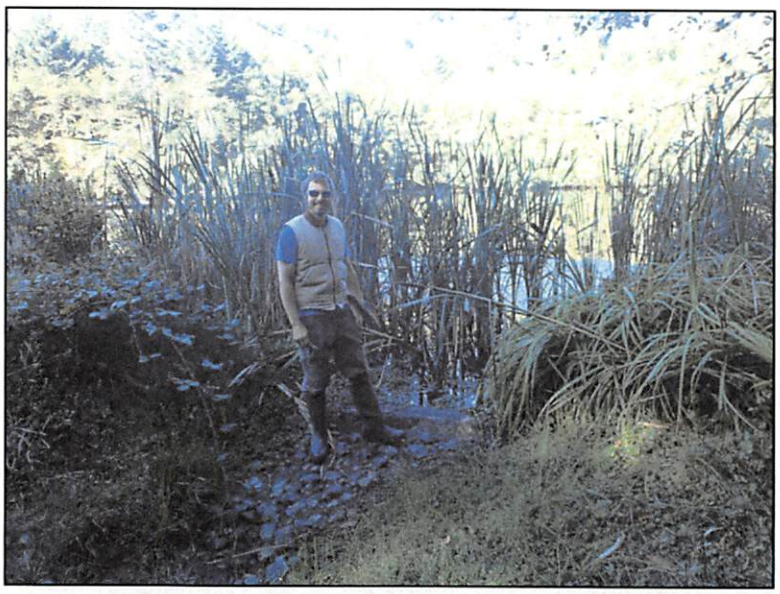
Results of Inspection:

Ferry Creek Reservoir

The reservoir level was 3-feet below the dam crest when inspected. Minimum freeboard was 2-feet, which is unsafe. The reservoir was fairly clean, with no large floating logs. The photo above shows, what is believed to be, the inlet structure for the conduits. It is unknown if this is operational.

Crest of dam

The crest of the dam also serves as road access across the dam. The surface is moderately rutted. I observed no sign of recent slope movement on the crest or either face of the dam. Inspection for animal damage was limited by heavy cattail cover on the upstream face.



Spillway approach channel

There was moderate growth of vegetation at the spillway approach. This restricts flood flow into the spillway.

Spillway control section

The spillway control section appears very narrow for passage of a probable maximum flood, which is the design standard for a high-hazard rated dam. There are significant defects in the concrete control part of the spillway, as shown in the next photo.

Slope movement into spillway control section

The hillslope adjacent to the spillway has, at some point, moved towards the spillway control section. Struts have been placed and may be reducing or temporarily controlling slope movement. Additional movement is a very real possibility, and such movement would greatly compromise ability of the spillway to pass flood flow.

First and Second valves

There are multiple conduits that penetrate through this dam. This is very atypical. Each conduit provides a potential location for leakage into the dam. It also appears that these pipes, with valves on the downstream side, may very well be pressurized. There was no opportunity to inspect the conduit, since the upstream end was submerged and the downstream end was buried and connected to the pressurized irrigation system. A conduit is pressurized when the control valve is at or below the outlet of the dam, instead of in the reservoir on the upstream face. Most dams are designed for gravity flow, not for pressurized conduits. Conduits are pipe, and depending on the type of pipe and the age of the pipe, risk of high-pressure leakage exists in a pressurized system. In an earthen dam, this high pressure water can cause severe internal erosion, and this can result in rapid dam failure.

Intermediate and bottom valves

To date, I had not inspected an embankment dam with many penetrating conduits. It may not be possible to make the dam safe with penetrating conduits.

Downstream face of dam

It appears the dam may have been built into and/or around an outcrop or boulder on the left side of the photo above. Accurate characterization of the geologic conditions at this dam will be essential in deciding how to move forward.

The combination of the spillway, multiple non-functional conduits and high-seismic shaking zone, put this dam into UNSAFTISFACTORY condition. It is essential that a plan to make this dam safe be developed, and progress begin on improving the safety of this dam.

Making This Dam Safe: This dam is in need of major rehabilitation. This should be under the direction of an experienced dam engineer, with geotechnical, hydrologic and seismic expertise. In addition, an Emergency Action Plan should be developed for this high-hazard dam. We would be happy to prepare a draft EAP for your review, upon notification from you.

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. I plan on another routine inspection next year. Please let me know if you have any questions about this inspection. I understand this is the first correspondence from this agency on these serious issues. It is essential to develop and a timeframe for making this dam safe.

Sincerely,

Keith Mills

Keith Mills, P.E., State Engineer
(503) 986-0840
Cell (541) 706-0849

C: Greg Wacker, Watermaster District 19
Dam Safety File F-25

Dam Safety
Inspection Form

State of Oregon
Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900

Name of Dam: Ferry Ck File #: F-25
Height: 65 ft. Storage: 167 ac. ft. Permit: R-4720 NID #: OR- 00437
Hazard: ☐ Low ☐ Significant ☐ High * ☑ **Request Inundation Analysis for change**
Inspector(s): Mills, Wacker Watermaster District: 19
Others on site: Ray Page
Date: 10-2-2015 Weather: sunny
Prior Inspection Date: 1-15-2009 Issues from prior inspection:

Expedited Re-inspection Needed: ☐ Next Inspection Date: 2016

***Rating Criteria**: 5-Very good; 4-Adequate 3-Maintenance or minor repair needed*
2-Serious repair needed; 1- ***Urgent dam safety issue – action now - Contact dam owner and dam safety engineer directly***

I. Dam	☑ Earth ☐ Rock ☐ Concrete ☐ Other	Rating
Up. Slope	Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent	4-
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching	4
Down. Slope	Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide	3
R. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy)	3
L. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy)	3
Toe	Vegetation, Erosion, Seepage, Leak (muddy), Boil	3
Seepage/leak flow	Right ____ gpm Center ____ gpm Left ____ gpm Other ____ gpm (use comment)	4
Auxiliary dike (s)	☐ No ☐ Yes ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ over 5	
Comments:		

II. Reservoir	Pool elevation: 730 Point of Reference: crest	Rating
Minimum freeboard	Vertical distance debris from debris line to crest 2½ ft.	2
Floating Debris/Trash	☑ Clean ☐ Around reservoir ☐ Near spillway	4
Log Boom	☐ Not needed ☐ Present ☑ Needed ☐ Deterioration ☐ Ineffective	3
Unusual Conditions	☐ None ☑ Active Landslide ☐ Wildfire in Watershed ☐ Other (comments)	—
Comments:	Signs slope movement, activity unknown	

III. Toe Drains #									
Flow (gpm)									
Damage									
Sediment									
Rating									

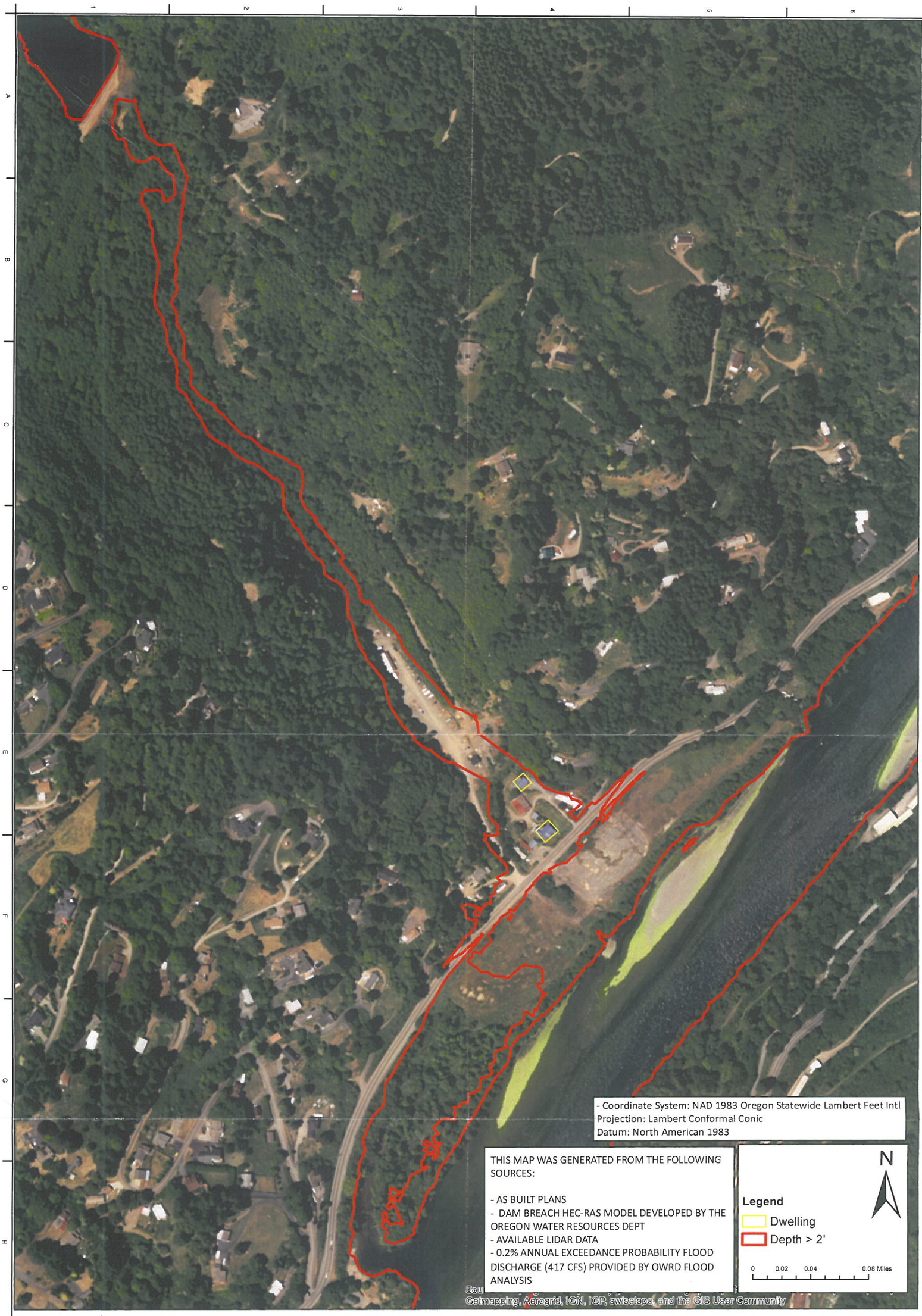
IV. Conduit	Control: ☐ Manual ☐ Power ☐ Other ☐ Conduit Control missing	Rating
Inlet	☑ **Submerged** ☐ **Debris on Trash Rack** ☐ **Deterioration**	—
Trickle tube	☑ **None** ☐ **Screened** ☐ **Blockage** ☐ **Deterioration**	—
Control/Stem	☐ **Operable** ☐ **Damaged** ☑ **Missing**	2
Valve(s) cycling	☐ **Frozen** ☑ **unknown** ☐ **past year** ☐ **frequent**	2
Size: 18"	**Material** concrete **Condition** 1 ancient, 1 old	3
Outlet Structure	☑ Overgrown ☐ Clean ☑ Pressurized ☐ Leaking _____ gpm	✓
Secondary outlet	☑ Yes ☐ No Type _____ Diameter _____ in.	3
Comments:	multiple pipes, 3 or 4 levels	

V. Spillway	☐ **Earth** ☐ **Rock** ☐ **Concrete** ☐ **Other**	Rating
Modifications	☐ None ☐ Reduction in capacity ☐ Feature not on design	—
Approach Channel	☐ Clear ☐ Trees/brush ☐ debris ☐ erosion brush	2
Control Section	Width ____ Depth ____ ☑ Concrete ☑ Rock ☐ Soil ☐ Culvert ☐ Unstable	2
Flashboards/Gate	☑ None ☐ In place ☐ operational ☐ deteriorated	—
Discharge Channel	☐ Clear ☐ Trees/brush ☐ leakage leaking ☐ headcutting (____ feet approaching control section, depth ____ feet.)	3
Stilling basin	☑ N/A ☐ Functional ☐ Minor Erosion ☐ Severe Erosion/Undercutting	—
Aux. Spillway	☐ Yes ☑ No (use comments below)	
Comments:	Spillway retaining wall shown, mm	

VI. Access and Security		Rating
Vehicle access	☐ Public road ☐ all weather road ☑ dirt road ☐ cross country	3
Fencing, signage	☑ Remote ☐ Gate ☐ Secure Fence ☐ Camera ☐ Uncontrolled	—
New Structure below dam	Dwelling ___ feet Paved public road ____ feet Other sig building ____ feet	—
Emergency Action Plan	☐ Not required ☐ Completed _____ at dam (dated_____) ☑ None	3
Comments:		

Instrumentation data reviewed: ☐ N/A ☐ Yes ☐ No

Other:



DRAWING STATUS DRAFT	FERRY CREEK DAM CURRY COUNTY OREGON	OREGON WATER RESOURCES DEPARTMENT DAM SAFETY	Drawn by: TIM BEDFORD	Designed by: TIM BEDFORD			
DRAWING NO: 1	DAM BREACH INUNDATION MAP	725 SUMMER ST SUITE A SALEM, OR 97301	Date: 1/7/2016	Checked by:	Revision	Date	Description

City of Brookings
Ferry Creek Reservoir Repair *(minimum)*

Feb. 23, 2016

No.	Description	Quantity	Unit	Unit Cost	Item Cost
	Phase 2 - Drain Line Repairs				
1	Construction Facilities And Temporary Controls	All	LS	$9,500.00	$9,500
2	Repair existing drain valves	All	LS	$7,150.00	$7,150
3	New 16" Gate Valve	1	Each	$4,800.00	$4,800
4	16" Piping and Appurtenances	All	LS	$14,300.00	$14,300
5	Pipe Anchor / Support	All	LS	$7,150.00	$7,150
6	Recondition stems and support	All	LS	$35,700.00	$35,700
	Total Construction Cost				$78,600
	Permitting				$7,150
	Engineering				$19,650
	Contingency				$15,810
	Legal & Administration				$2,358
	Total Project Cost				**$123,568**

City of Brookings
Ferry Creek New Reservoir Cost (*assumes old dam previously removed)*

Feb. 23, 2016

so add 2,180,480

No.	Description	Quantity	Unit	Unit Cost	Item Cost
1	Mobilization, Overhead, Bonds	LS	1	$275,000	$275,000
2	Traffic Control	LS	1	$25,000	$25,000
3	New top of Embankment Gravel Road	LF	280	$35	$9,800
4	Erosion Control	LS	1	$50,000	$50,000
5	Excavation for key and abutments	CY	4,000	$22	$88,000
6	Excavation Haul - 10 cy loads	Trip-Mile	3,000	$6	$18,000
7	Embankment Placement & Compaction	CY	12,000	$30	$360,000
8	Fill Haul - 10 cy loads	Trip-Mile	15,000	$6	$90,000
9	Riprap	TN	2,000	$45	$90,000
10	New Primary Spillway	LS	1	$95,000	$95,000
11	New Water Supply Withdrawals Tower	LS	1	$200,000	$200,000
12	New Piping	LF	3,000	$110	$330,000
13	New Emergency Spillway	CY	315	$900	$283,500
14	New Valves	LS	1	$60,000	$60,000
15	Landscaping	LS	1	$15,000	$15,000
16	New Fencing	LF	2,200	$28	$61,600
17	Misc. Site Work	LS	1	$35,000	$35,000
18	Final Clean Up & Demob.	LS	1	$20,000	$20,000
	Total Construction				$2,105,900
	Contingency 20%				$421,000
	Engineering Design, Bid, Project Management				$505,000
	Geotechnical*				$75,000
	Hearings, Permitting and Application Process*				$120,000
	Admin. & Legal*				$63,200
	Total Project Cost				$3,290,100

* Assumes numerous issues addressed during removal application and process

City of Brookings
Ferry Creek Reservoir Removal Cost Estimate

Feb. 23, 2016

No.	Description	Quantity	Unit	Unit Cost	Item Cost
1	Mobilization, Overhead, Bonds	LS	1	$182,000	$182,000
2	Access Road Improvements/Repair	LF	9,900	$18	$178,200
3	Traffic Control	LS	1	$25,000	$25,000
4	Erosion Control	LS	1	$50,000	$50,000
5	Sediment Removal & Dewatering	CY	10,000	$25	$250,000
6	Embankment Excavation	CY	12,000	$15	$180,000
7	Excavation Haul - 10 cy loads	Trip-Mile	5,380	$6	$32,280
8	Excavation Spoils Disposal/Compaction	CY	22,000	$5	$110,000
9	Rock Excavation & Disposal	CY	400	$75	$30,000
10	Riprap Installation	TN	1,200	$45	$54,000
11	Riparian Channel Restoration	LS	1	$60,000	$60,000
12	Slope Stabilization	LS	1	$40,000	$40,000
13	Misc. Site Work	LS	1	$30,000	$30,000
14	Final Clean Up & Demob.	LS	1	$12,000	$12,000
	Total Construction				$1,233,480
	Contingency 20%				$247,000
	Engineering Design, Bid, Project Management				$300,000
	Special Surveys				$45,000
	Biologist				$30,000
	Geotechnical				$90,000
	Hearings, Permiting and Application Process				$200,000
	Admin. & Legal				$35,000
	Total Project Cost				$2,180,480

City of Brookings
Ferry Creek Reservoir Repair (minimum)

Feb. 23, 2016

No.	Description	Quantity	Unit	Unit Cost	Item Cost
	Phase 1 - Chute Replacement				
1	Construction Facilities And Temporary Controls	All	LS	$17,900.00	$17,900
2	Reservoir Drawdown	All	LS	$29,800.00	$29,800
3	Demolition and Site Preparation	All	LS	$14,300.00	$14,300
4	Excavation - Retaining wall	All	LS	$14,300.00	$14,300
5	Wall Drain	200	LF	$48.00	$9,600
6	Concrete Reinforced Retaining Wall	60	CY	$1,800.00	$108,000
7	Landscaping	All	LS	$3,600.00	$3,600
	Total Construction Cost				$197,500
	Engineering - Permitting				$6,300
	Engineering - Design, Bid, Constr. Admin.				$47,400
	Contingency				$37,680
	Legal & Administration				$5,925
	Total Project Cost				**$294,805**

CITY OF BROOKINGS

COUNCIL WORKSHOP REPORT

Meeting Date: March 7, 2016

Originating Dept: City Manager

Signature (submitted by)

City Manager Approval

Subject: Humboldt State University Water Study

Recommended Action:
Discussion.

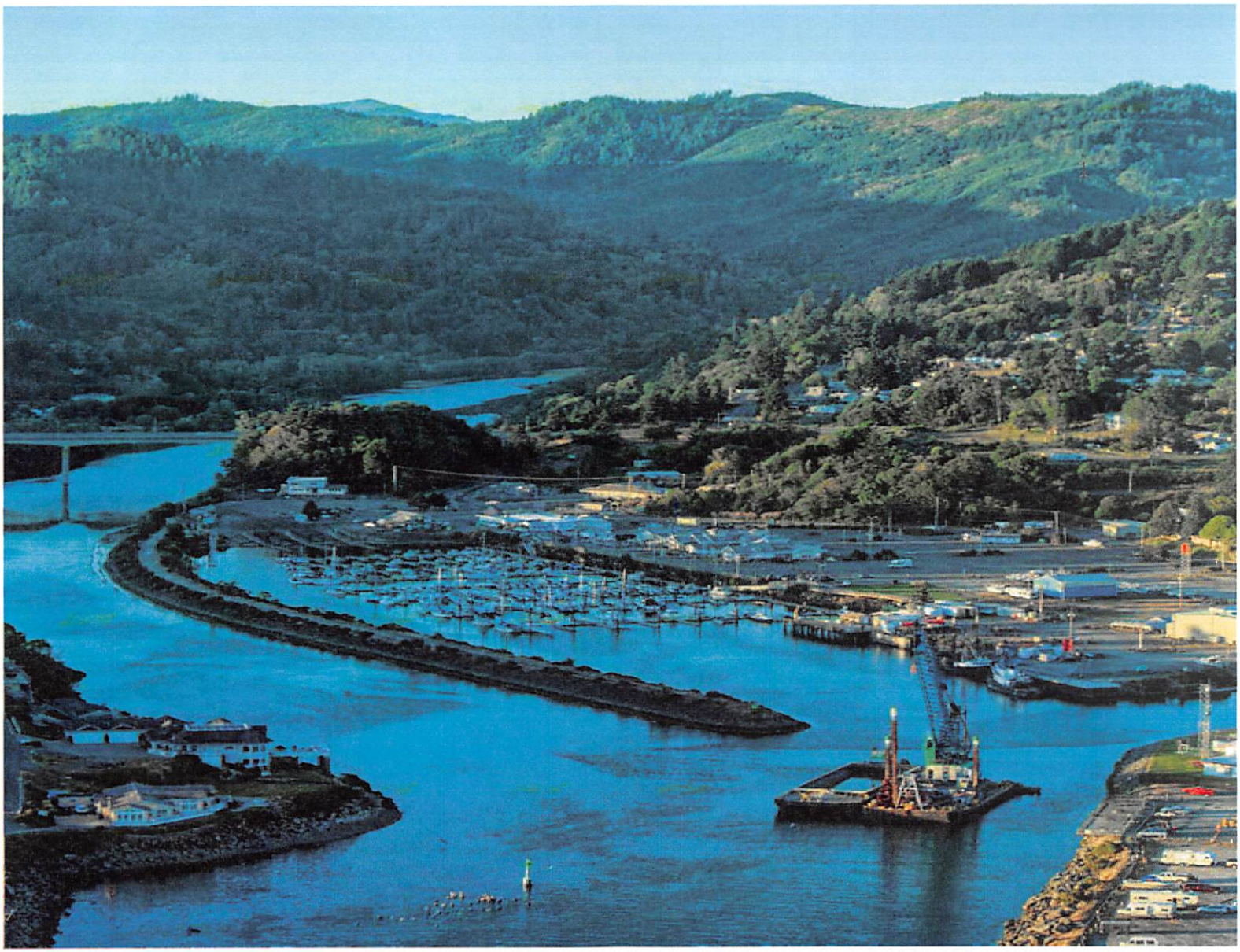
Background/Discussion:
The Environmental Engineering Capstone Class at Humboldt State University conducted a water infrastructure and resiliency study for the City of Brookings as their Fall 2015 project. The study actually produced four reports:

1. **Brookings-Harbor Water Infrastructure and Resiliency** which provides a comprehensive overview of water source alternatives.
2. **Brookings-Harbor Storage and Distribution Improvement Project** which looks at the proposal to reactivate Ferry Creek Reservoir and the Tide Rock Intake (similar to the project submitted under the National Disaster Resiliency Competition).
3. **Brookings and Harbor Desalination Facility Design Project** which evaluates alternatives for the development of a desalination plant.
4. **Water Reuse** which evaluates the introduction of treated recycled water (i.e. treated wastewater) into the City's domestic water supply.

Attached are the Executive Summaries for each of these reports (the full reports are over 300 pages in length). The full reports...which are impressive...are available. These reports advance some exciting new concepts for consideration in providing a long term and sustainable water supply for Brookings and Harbor. Staff will be conducting further review of these reports, which advance a number of concepts that were not addressed by the professional consulting engineer retained to develop the most recent Water Master Plan. We would like to invite representatives of the Class to Brookings to make presentations to the City Council on the desalination and reuse reports.

Attachment(s):

a. Executive Summaries



Brookings-Harbor Water Infrastructure and Resiliency

ENGR 492 Senior Capstone Design Fall 2015

Prepared By:
James Griggs, Kusondra King, Tatiana Lewis, Michael Ross

Executive Summary

This report provides the design and analysis of a resilient source of water for the coastal city of Brookings, Oregon and the neighboring community of Harbor. Brookings and Harbor are located in the southwest corner of Curry County, Oregon with the Chetco River estuary set between the two communities (Figure E.1). The community of Harbor is experiencing a recurring issue involving saltwater intrusion at the intake of their water supply systems located along the Chetco River. Low flows in the Chetco River due to the recent ongoing drought impacting the west coast of the United States have recently intensified the saltwater intrusion problem. The Harbor Water Public Utility District (PUD) in particular has experienced saltwater intrusion events lasting up to 30 days during the summer months of 2014 and 2015. In addition to occasional high salinity levels, the supply intakes lie within the coastal tsunami inundation zone. With the current status of the water supply system, a tsunami event could leave Harbor and Brookings without the ability to supply potable water to their respective populations. The objective of this project is to design a system that supplies a new source of water to Brookings and Harbor that is resilient to saltwater intrusion and tsunami inundation. The proposed system is designed to meet the current daily water demand given the project constraints and is evaluated based on client-driven criteria.

Figure E.1: Location of Brookings and Harbor, OR (Google maps 2015)

Project solutions must meet the following constraints to satisfy the project objective:

- The project will not develop a water supply intake upstream from the current Brookings intake.
- The integrity of the drinking water source will be maintained and meet the Oregon Drinking Water Quality Act standards.
- The project will provide an emergency water supply resilient to a tsunami resulting from a 9.1 magnitude earthquake at the Cascadia Subduction Zone, 50 miles off the coast of Oregon
- The project will comply with applicable water rights and environmental discharge standards.

In order to guarantee a sustainable project, environmental, social, and economic criteria were weighted and normalized to ensure that each category received equal importance. Criteria were chosen based off of the needs and concerns of the client. Each criteria included sub-categories and descriptions (Table E.1).

Table E.1: List of criteria for the Brookings Water Resiliency Project

Categories	Criteria
Environmental	
Habitat Preservation	Minimize the adverse effects to habitat, forestry, and biodiversity for the lifetime of the project.
Footprint of Facilities	Minimize the total project area associated with above ground structures and areas closed to the public.
	Minimize the extent of intake and distribution systems required by operations.
Greenhouse Gas Emissions	Minimize the greenhouse gas emissions from resulting construction, transportation, and lifetime operations for the project.
Waste Products	Minimize the concentration of brine produced by the project.
Tsunami and Earthquake Resiliency	Maximize the time the project can provide potable water to the community following a tsunami event.
Social	
Public Acceptance	Minimize the degradation of cultural resources as a result of project implementation.
Community Development	Maximize the aesthetic value of the natural and man-made environment.
Recreation	Maximize recreational value of the community by maintaining river conditions suitable for fishing, swimming, hiking, and rafting.
Economic	
Ease of Implementation	Minimize capital costs required for implementation.
	Maximize the ease of the permitting process associated with the project design.
Operations and Maintenance	Minimize the operation and maintenance costs required for continued operation of the project.
Robustness	Maximize the ability of the project to meet future population growth.
	Maximize the project lifetime.

Criteria weights were determined through communication with Gary Milliman, the city manager of Brookings, OR. The weighted criteria were utilized by the New Source design team to determine a preferred design alternative. An optimal solution was determined through the use of a decision matrix which was based on stated criteria and evaluated using the Delphi Method.

Alternative One involves the installation of a seasonal saltwater barrier near the Harbor Water PUD intake location. During low flow events in the Chetco River, the infiltration rate of the river into the groundwater aquifer surrounding the Harbor collector well is significantly reduced. The implementation of this alternative allows for the inflation of a rubber barrier during low flow events, causing an increased depth and enlargement of submerged river channel area behind the barrier. Increasing the depth of the Chetco River near the Harbor collector well accelerates the rate of infiltration of the river into the surrounding groundwater aquifer. The proposed alternative also provides a barrier that prevents the travel of high salinity water up the reach of the Chetco River from the estuary to the location of the Harbor Water PUD intake. When flow conditions are high enough to sufficiently saturate the surrounding groundwater aquifer through natural mechanisms, the seasonal saltwater barrier is deflated. When the barrier is inflated it causes an impassable block for swimmers, kayakers, and others enjoying recreational activities on the river.

Alternative Two involves the installation of the same seasonal saltwater barrier described in Alternative One. In addition to the barrier, Alternative Two also proposes an intertie between the water distribution systems of Harbor and Brookings. This intertie connects the Harbor collector well to the Brookings water intake with a pipeline that is embedded in the foundation of the seasonal saltwater barrier. The intertie requires approximately 1,100 feet of pipeline and provides a backup supply of water for the community of Harbor.

Alternative Three involves a small brackish water desalination system to treat the water from the Harbor Ranney collector for salt water intrusion. The treatment facility utilizes reverse osmosis membrane technology and is designed to operate during summer months, when low flows and high tide cause saltwater intrusion at the Harbor Ranney collector. The desalination facility is constructed adjacent to the Brookings Water Treatment Plant. The project requires 800 linear feet (lf) of underground transmission pipeline, and 13,600 lf of along-road transmission pipelines for brackish and clean water transport. Additionally the project requires brine holding tanks and a brine disposal pipeline to discharge the brine into the Chetco River during high tide events. The project produces 3 MGD of clean water for use by Brookings and Harbor during low flow events.

Alternative Four involves implementing a small desalination system at the current Brookings drinking water treatment plant to treat the brackish water from the Tide Rock intake. This alternative is similar to alternative three, but the water intake is a surface water intake rather than a groundwater intake and only produces 2 MGD. Since Tide Rock is a surface water source, the water requires pretreatment. Pretreatment will consist of chlorination and the addition of anti-scalants to prevent fouling before an ultrafiltration membrane. Desalinated water is re-mineralized before it is mixed with the treated water from the current Brookings Ranney collector after which it is disinfected and distributed to the users in Harbor. Similar to

Alternative Three, Alternative Four requires a brine holding tank and a brine discharge pipeline. The project requires 400 linear feet (lf) of underground transmission pipeline, 11,700 lf of along-road transmission pipelines for brackish and clean water transport.

Evaluation of the alternatives identified advantages and disadvantages for each alternative. In an attempt to determine a preferred alternative, the Delphi Method was used. The Delphi method resulted in the all alternatives scoring within a point of each other, with the lowest alternative scoring just 3% lower than the highest alternative. Due to the similarity in values, the client was contacted with information on the alternatives and gave feedback on each. With the client's feedback, the two highest scoring alternatives were merged together, forming a larger two-phase preferred alternative. This amended project solves the immediate problem of saltwater intrusion in the Harbor intake and the long term need to protect the water supply of Brookings from saltwater intrusion as well as protect both communities against tsunami inundation.

Phase One of the preferred alternative design provides a short term solution to the saltwater intrusion events experienced at the Harbor Water PUD Ranney collector well by the installation of a seasonal saltwater barrier near the Harbor Water PUD intake location. Phase Two of the preferred alternative design provides a long term water supply solution for both Brookings and Harbor through the construction of a seasonally operated reverse osmosis desalination facility. Figure E. 2 shows a schematic of the locations of both Phase One and Phase Two with respect to Brookings.

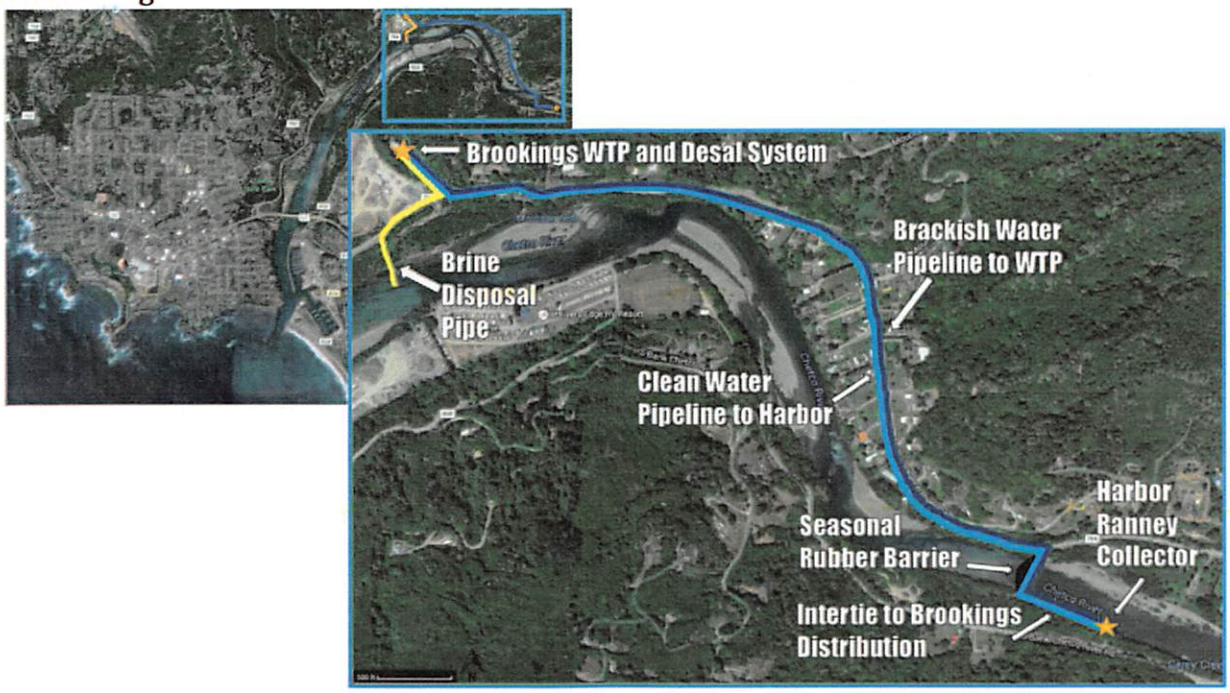


Figure E. 2: Schematic showing the location of the proposed seasonal rubber barrier, desalination system, brackish water pipeline, brine disposal pipeline, Brookings and harbor intertie, and currently existing Harbor Ranney collector and Brookings WTP. (Google Maps 2015)

Phase One of the preferred alternative design proposes the installation of a seasonally air inflated rubber barrier that is inflated during low river flow conditions. Inflation of the barrier increases the depth and cross sectional area of submerged river channel behind the barrier, which increases the infiltration rate of the river into the surrounding groundwater aquifer. The barrier also prevents the travel of high salinity surface water up the reach of the Chetco River from the estuary to the location of the Harbor Water PUD intake. The installation of the rubber barrier requires the construction of a concrete foundation to which the rubber barrier is anchored. A vertical slot fish ladder is incorporated into the concrete foundation of the rubber barrier to accommodate the passage of anadromous fish species while the barrier is inflated. When flow conditions are high enough to sufficiently saturate the surrounding groundwater aquifer through natural mechanisms, the seasonal saltwater barrier will be deflated. Deflating the barrier causes it to lie flat against its concrete foundation along the bottom of the river channel, allowing the full passage of water, debris, sediment, and aquatic life.

Two water lines are installed into the foundation of the barrier during Phase One. One of the installed water lines connects the Harbor water distribution system to the mainline that connects the Brookings Ranney collector well to the Brookings WTP. The installation of this water line supplies Harbor with an emergency source of water in the event that the Harbor collector well begins to draw saline water before the rubber barrier has been inflated. The second water line installed into the foundation of the barrier is necessary for the implementation of Phase Two of the preferred alternative design.

The water supply intertie between Brooking and Harbor requires updating the place of use for six of their water rights through the Oregon Water Resources Department. The water rights that need to be changed are S37091, and S41805 for Brookings, and S58045, S41825, G9502, G3361 for Harbor. The place of use for Harbor extends to the California border while the place of use for Brookings just surrounds the city. Because of the intertie, Harbor's water rights need to be modified to include Brookings as a place of use, and Brookings' water rights need to include Harbor's area as a place of use.

The cost of implementation for Phase One is approximately $7 million (Table E.2). This includes the cost for construction, materials, and contingency costs.

Table E.2: Summary of total cost for implementing Phase One.

Description		Cost
Rubber Barrier		
Excavation		410,000
Foundation		2,340,000
Fish Ladder		350,000
Rubber Barrier		1,200,000
Installation of Barrier		500,000
Electrical Instrumentation		200,000
Transmission piping under Rubber Barrier		
12" HDPE, Trenching and Backfill, Along Road		100,000
Valves/Appurtenances (15% of total piping)		15,000
Intertie from Brookings distribution system to Harbor Intake		
12" HDPE, Trenching and Backfill, Along Road		190,000
Valves/Appurtenances (15% of total piping)		30,000
Cost Subtotal		**5,335,000**
Contingency	30%	1,600,500
Total Phase One Estimate		**6,935,500**

Phase Two of the preferred alternative design involves the construction of a seasonally operated reverse osmosis (RO) desalination treatment system at the existing Brookings water treatment plant. Two transmission pipelines from the Harbor Ranney collector to the Brookings Water Treatment Plant (WTP) are implemented to transport brackish water from the Harbor intake to the Brookings WTP, and clean water from the Brookings WTP to the Harbor distribution system. Pipelines installed in Phase One are utilized in Phase Two to connect transmission pipelines to the Harbor Ranney collector. The treatment facility is an expansion of the existing Brookings treatment facility and is designed to operate during summer months, when low flows and high tide cause saltwater intrusion at the Harbor Ranney collector. The system is designed to treat the average daily demand of the Harbor community of 750,000 gallons per day, which is a decrease from alternatives three and four. The system capacity is smaller to reduce initial project costs, and is a modular design to promote expansion as the water needs in Brookings and Harbor increase. To treat the brackish water and to meet demand levels, 20 pressure vessels are required, with each vessel using seven brackish water membranes. The total number of membranes required for the system is 140.

The brine resulting from desalination has a concentration of 10,000 mg/L TDS and will be held in two 20,000 gallon storage tanks until it is released into the seawater zone of the Chetco during high tides. There are two release cycles each day corresponding to the change from high to low tide. The concentrate volume for each release is 0.078% of the mean annual summer flow in the Chetco River. The discharge rate of the concentrate flow is small in relation to the flow in the Chetco and the concentration is much less than the concentration of the seawater zone (35,000-25,000 ppm) which will be flushed with the outgoing tide. Therefore the concentrate will not have a significant impact on the environment. The project's saline water

discharge into the Chetco River requires a National Pollution Discharge Elimination System (NPDES) Permit from the Oregon Department of Environmental Quality.

The cost of implementation for Phase Two is approximately $7.06 million (Table E.3). This includes the cost of the desalination plant, transmission pipelines, the brine discharge pipeline, brine storage tanks, and various additional contingency costs.

Table E.3: Cost analysis of desalination plant with transmission and brine disposal piping

Description		Cost
Desalination		
Capital Cost		2,200,000
Transmission piping from Harbor Intake to WTP		
12" HDPE, Trenching and Backfill, Along Road		1,320,000
Valves/Appurtenances (15% of total piping)		200,000
Transmission piping from WTP to Harbor Distribution		
12" HDPE, Trenching and Backfill, Along Road		1,200,000
Valves/Appurtenances (15% of total piping)		180,000
Transmission piping for brine disposal		
12" HDPE, Trenching and Backfill, Along Road		270,000
Valves/Appurtenances (15% of total piping)		40,000
Brine Storage		
Storage Tanks		44,000
Cost Subtotal		**5,430,000**
Contingency	30%	1,630,000
Total Phase Two Estimate		**7,060,000**

Implementation of the preferred alternative in a two-phase project would provide the city of Brookings and the community of Harbor with a reliable source of water that is resilient to saltwater intrusion and tsunami inundation. Phase One is expected to have an immediate positive effect on the quality of water that is infiltrating the groundwater supply near the Harbor intake and is a good short term solution to salt water intrusion into the drinking water supply. Phase Two provides a long term solution to ensure that the drinking water supply for Brookings and Harbor remains resilient to tsunami inundation.

2015

Brookings-Harbor Storage and Distribution Improvement Project

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12/15/2015

EXECUTIVE SUMMARY

Introduction

The communities of Brookings and Harbor are located on the southern coast of Oregon. While these communities are separated only by the Chetco River, each community operates an independent municipal water system with water drawn from beneath the river (Figure 1). The Harbor community has recently and historically been impacted by intrusion of saltwater into the municipal water supply. Recent drought conditions have caused the aquifer beneath the river to recede, allowing seawater intrusion. Intrusion impacts have caused concern within the Brookings-Harbor area about the availability and resiliency of municipal water in the event of continued drought. Another concern is the water supply after a major tsunami or earthquake event. The City of Brookings would like to take proactive measures to protect the combined area water supply.

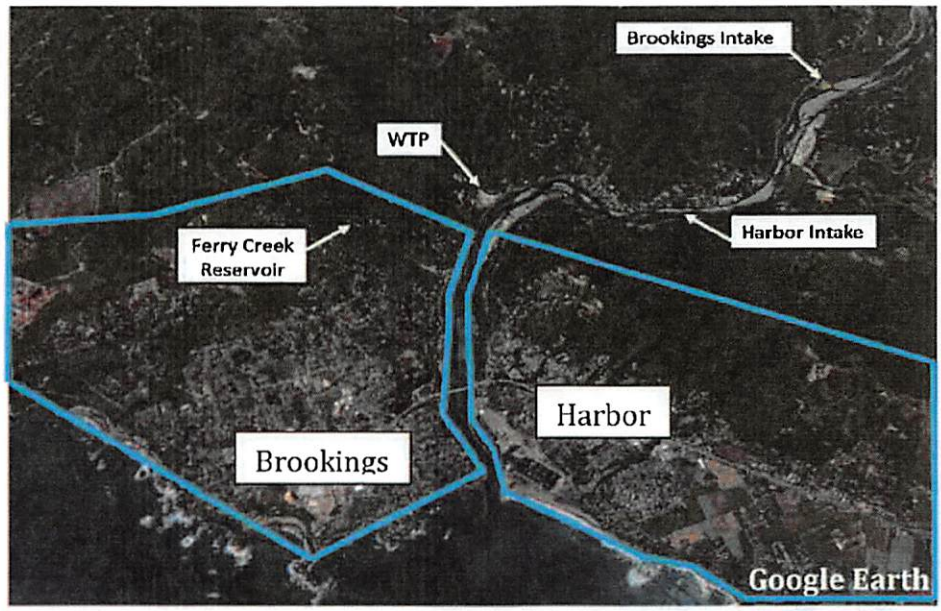

Figure 1: Map showing current system overview for Brookings and Harbor

Objective

The objective of this project was to design new storage or retrofit existing municipal storage infrastructure and distribution for the communities of Brookings and Harbor, Oregon. Four alternatives were developed and analysis was performed to evaluate these different designs to determine the most sustainable solution to meet the combined area water demand during water supply emergencies. These alternatives were composed of a range of storage types based on community supply time of five days to meet client goals and constraints.

Constraints

The project was designed to adhere to identified constraints. These include:

- Supply sufficient drinking water to the Harbor and Brookings communities for a time period of source-water inaccessibility.
- Be consistent with all regulations and legal provisions.
- Five-day community supply time as a conservative estimate based on FEMA suggested 72-hour community supply time.

Criteria

The design criteria for the proposed alternatives were evaluated using client weighted values. These values were used to help facilitate the decision making process for the preferred alternative. Design criteria were valued as a part of three equally-weighted categories, *Environmental*, *Social*, and *Economic*. These design criteria are shown in Table 1.

Table 1: Design criteria for the project. Each category (Environmental, Social, and Economic) shared an equal weight for the overall project.

Category	Criteria
Environmental	
Habitat Preservation	Minimize the adverse impacts to habitat, forest, and biodiversity for the life time of the project.
Community Supply Time	Maximize the time the project can provide potable water to the community.
Social	
Public Acceptance	Minimize adverse impacts to cultural resources
	Maximize the palatability of drinking water through water treatment processes.
Aesthetics	Minimize the negative aesthetic impact the design has on the natural and man-made environment.
Recreation	Maximize recreational value of the community by maintaining or expanding conditions suitable for fishing, swimming, hiking, and rafting.
Economic	
Capital Cost	Minimize the capital costs required for implementation.
Ease of Implementation	Maximize the ease of the permitting process associated with the project design.
Operations and Maintenance	Minimize the costs associated with operations and maintenance of the design.
Robustness	Maximize the ability of the design to accommodate community growth.
	Maximize the operating lifetime of the design to meet robustness of the project.

Design Alternatives

Four design alternatives were developed which provide storage and distribution for the Brookings-Harbor communities. Each of these alternatives link the individual community's municipal water distribution systems using an intertie between Brookings and Harbor. The alternatives are:

- Municipal Storage
- Ferry Creek Reservoir Expansion
- Harbor Distribution Repair
- Residential Storage

Brookings-Harbor Intertie

An intertie connecting the Brookings and Harbor systems is utilized for each design alternative. Without much information for Harbor's water system, several options were evaluated for the physical placement of the intertie. The options are listed in Table 2 and range from $550,000 to $1.3 million. Costs for option three were estimated assuming installation of pipe across the bridge would be in the road bed, this cost could be reduced substantially if the pipe were attached to the bottom of the bridge. Intertie locations are shown in Figure 2.

Table 2: Brookings Harbor intertie options and associated costs

Option	Description	Cost ($M)
1	Directional Boring Under Chetco River connecting Brookings WTP to Harbor at River's Edge RV park	$0.55
2	East Along Road connecting to Harbor's Ranney Collector using Directional Boring under Chetco River	$1.3
3	Tie-In to Brookings Distribution near the 1.5 MG Storage Tank and Cross the Brookings-Harbor Bridge	$1.1

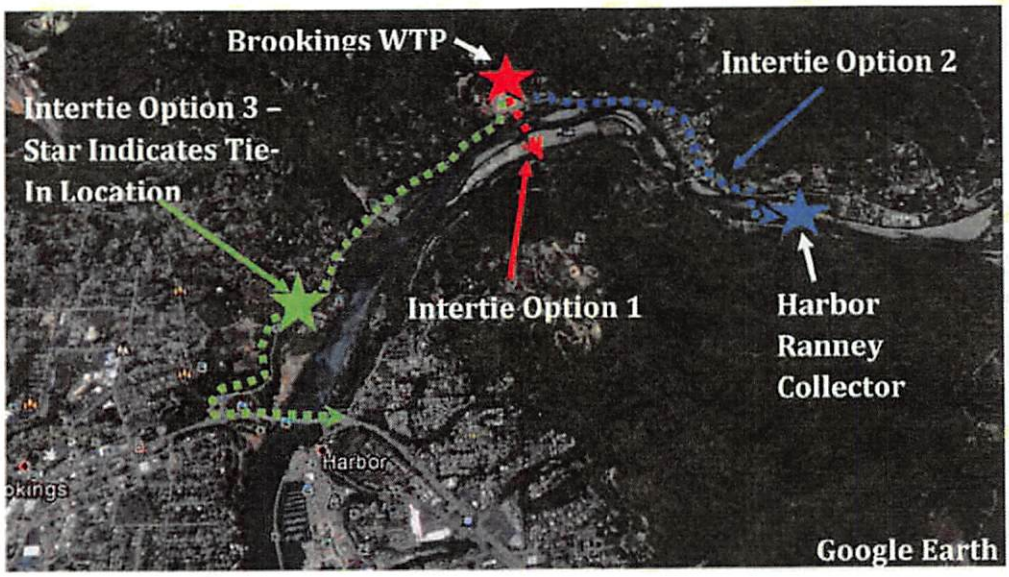

Figure 2: Map of proposed options for the Brookings-Harbor Intertie

Alternative 1: Municipal Storage

This alternative incorporates a 2.5 million gallon bolted steel storage tank placed within the Brookings community next to an existing 1.5 MG water storage tank for easy connectivity. Utilizing the Brookings-Harbor intertie, the stored water would be transferred to Harbor when needed. A total of 8.14 MG of stored water would yield five days of community supply time. The cost of this alternative is approximately $5 million.

Alternative 2: Ferry Creek Reservoir Expansion

This alternative would include the restoration and expansion of Ferry Creek Reservoir. An expansion including a nine-foot increase in dam height had previously been identified by Civil West Engineering as a possible solution for the Brookings-Harbor area. The new capacity for the reservoir would be 39 MG yielding a community supply time of 24 days. The cost of this alternative is approximately $5.5 million.

Alternative 3: Harbor Distribution Repair

This alternative includes reducing water loss to 10% by installing new distribution pipes in over 30% of the system. Through comparison to other municipalities, including Brookings which had a water loss of 20%, it was estimated that Harbor may be experiencing unaccounted water loss of 30%. Approximately one-third of Harbor's system was installed prior to 1970. This reduction in water loss saves approximately 150,000 GPD, yielding a community supply time of 0.7 days. The cost of this alternative is $16.6 million.

Alternative 4: Residential Storage

This alternative includes installing residential-scale storage tanks, pressure tanks, and pumps across the Brookings and Harbor communities. The design would be scaled by household size to yield a community supply time of five days. This design encourages residents to use less water by giving personal ownership to stored water possibly yielding a greater community supply time. The cost of this alternative is $8.8 million.

Decision Process

The project alternatives were compared by Delphi matrix using the using the previously-introduced sustainability criteria. The Ferry Creek Reservoir design alternative was found preferable to the other alternatives with respect to environmental, social, and economic criteria (Figure 3). A second analysis using capital costs as a function of storage capacity for each alternative further indicates that the reservoir is the least expensive option (Figure 4).

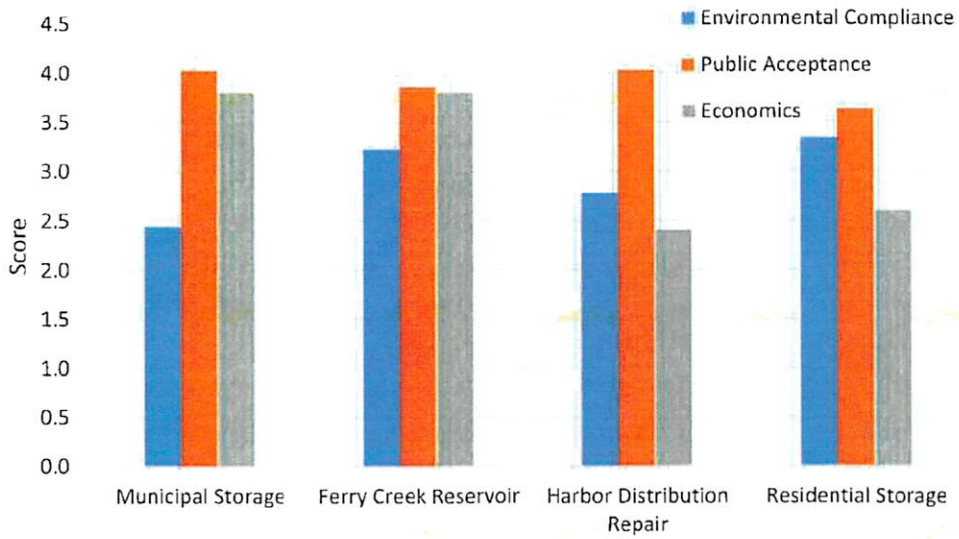

Figure 3: Alternative comparison evaluated using a Del-phi matrix and client-weighted criteria

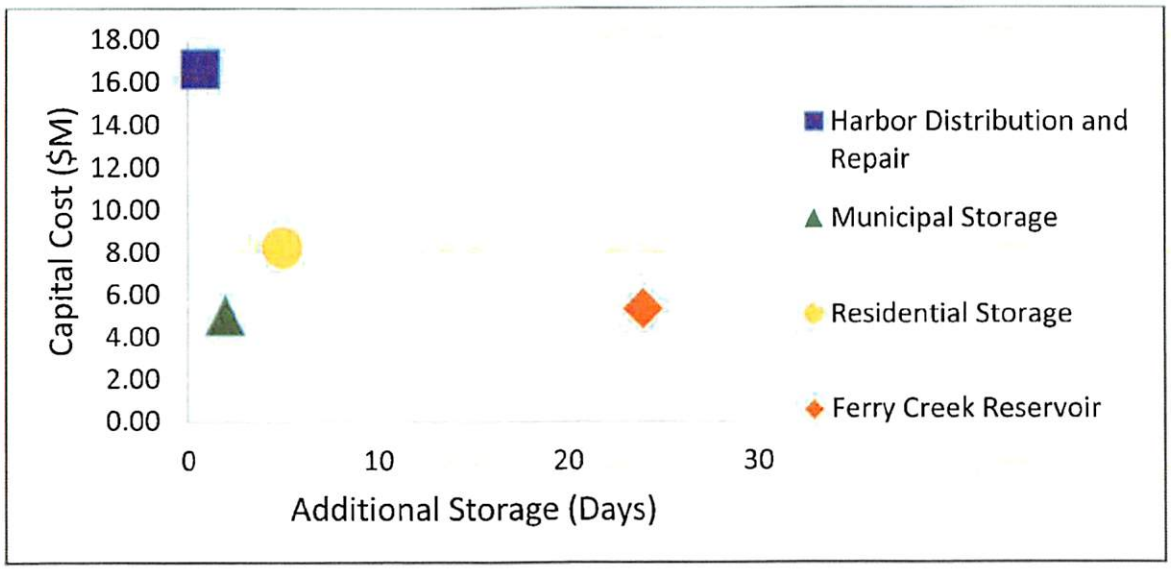

Figure 4: Alternative comparison evaluated using capital cost as a function of stored water

Preferred Alternative

The Ferry Creek Reservoir expansion alternative including the Brookings-Harbor intertie was determined to be the preferred alternative for this project. Ferry Creek Reservoir has been previously identified as a solution for the water supply of the Brookings-Harbor area. Civil West Engineering Services determined that major repairs were needed at Ferry Creek Reservoir and provided cost estimates. Identified system components include piping rehabilitation, erosion control, replacement of the spillway, and a new transmission pipeline connecting the reservoir to the Brookings WTP. Three options exist for the reservoir as analyzed; repairing the existing reservoir, increasing the dam height by six feet, or increasing the dam height by nine feet. Analysis to determine the best option for the client were inconclusive due to sensitivity of the design criteria. Based on providing the greatest community supply time, a nine-foot expansion was chosen for the alternative.

Ferry Creek Reservoir Expansion Analysis

The project identified by Civil West was leveraged and additional analysis was performed for this alternative design. This additional analysis included identifying water from Ferry Creek reservoir as surface water which requires treatment at the Brookings WTP. Currently, the WTP is used only when needed based on water quality from the Brookings Ranney collector. The WTP has a capacity of 2.6 MGD which exceeds the 1.6 MGD nominal usage by the combined communities. An upgraded SCADA system and flow meter would be required at the WTP for real-time monitoring and control of the system. Analysis of pipe flow from the reservoir

resulted in including a single 16-inch diameter transmission pipe to the WTP. A habitat-flooding analysis was performed. Results from this analysis indicates that 61,000 square feet of habitat will be lost upon completion of the nine-foot dam

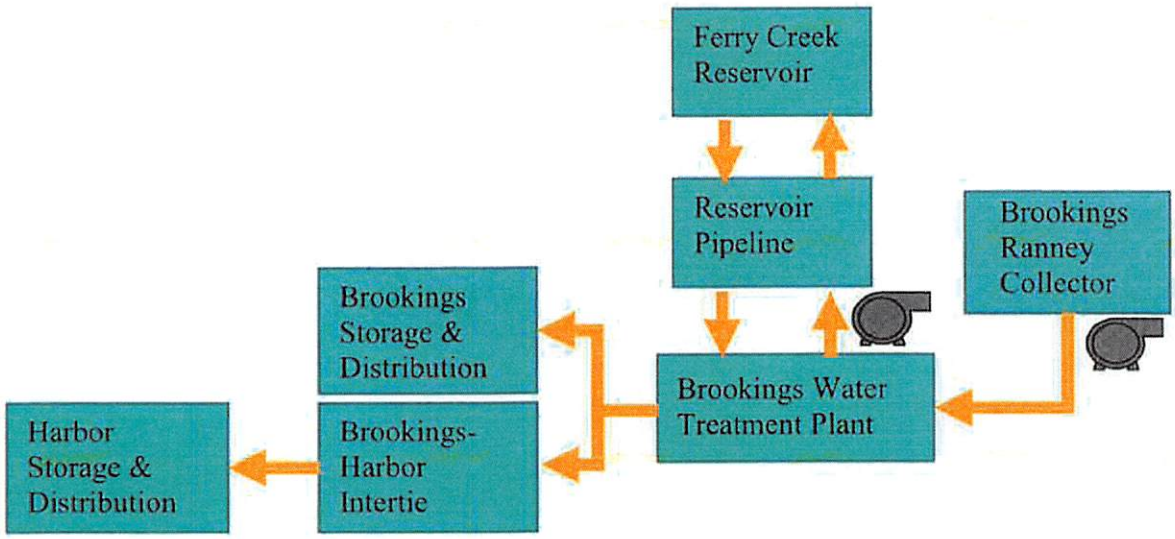

Figure 5: Schematic of Brookings and Harbor water distribution system including the Ferry Creek Reservoir expansion and the Brookings-Harbor intertie.

increase. The following schematic shows the flow between system components (Figure 5).

EPANET was used to model the system according to the flow diagram in Figure 5. EPANET is a hydraulic water distribution modeling software developed by the U.S. EPA. The model simulates two scenarios, pumping to fill the reservoir and emptying the reservoir for community use. Characteristics of the model include a maximum system pressure of 175 psi, the use of 16-inch, 333 psi diameter pipe, a diurnal demand pattern applied to the nominal usage of 1.6 MGD, and energy costs associated with pumping.

The fill scenario simulates a priority pumping scheme where community demand is prioritized over adding stored water at the reservoir. This allows the use of one of two pumps located at the WTP, providing for system redundancy. With this scenario, approximately 73 days is required to fill the reservoir to capacity from a completely empty state with a total pumping cost of approximately $6,000. The emptying scenario indicates the reservoir will be completely drained after approximately 24 days using the diurnal use pattern and nominal usage.

Ferry Creek Reservoir Expansion Economics

The total system cost was estimated to be $5.5M. This estimate used the modified Civil West Engineering reservoir expansion analysis, the pipeline connecting the

reservoir to the water system, the estimated cost of improving the water treatment plant, and the Brookings-Harbor intertie cost (Table 3).

A cost of water delivered was determined by calculating pumping and treatment costs of an assumed annual usage of 96 million gallons which is equivalent to 60 days of use per year. This cost is approximately $45,000 annually or $0.45 per kilo-gallon of water.

Table 3: Ferry Creek Expansion alternative cost detail

Description	Unit Cost	Quantity	Total Cost
Access Road Improvement	$72,000	1	$72,000
Erosion Control	$20,000	1	$20,000
Fill Material	$45	13,500 cy	$607,500
Piping Rehabilitation	$412,000	1	$412,000
Spillway Replacement	$472,000	1	$472,000
Riprap Installation	$45	136 tons	$6,120
Slope Stabilization	$35,000	1	$35,000
General Site Work	$50,000	1	$50,000
Permitting	$50,000	1	$50,000
Seismic Modifications *	$250,000	1	$250,000
Mobilization, Overhead, Bonds		15%	$296,158
Construction Cost			**$2,270,778**
Engineering		20%	$454,109
Administrative Costs		5%	$113,527
Contingency		20%	$454,109
SCADA System		1	$61,000
Community Intertie		1	$550,000
BWTP to Reservoir Piping		1	$1,560,000
Total Project Cost			**$5,500,000**

Recommendations

Analysis of this project yielded the following recommendations for the City of Brookings:

- A nine-foot increase in the dam height at Ferry Creek Reservoir creates the most storage of alternatives analyzed at a favorable cost.
- Further research should be conducted on permitting and insurance requirements associated with increasing the dam height.
- Additional water quality testing should be performed at Ferry Creek reservoir.
- Enhanced recreation may be possible via public access to the reservoir.

- Enhanced wild-fire protection may be possible via expanded access to the reservoir.

Brookings and Harbor Desalination Facility Design Project

Prepared by Humboldt State University
Engineering 492: Capstone Design
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Fall 2015

Objective

The communities of Brookings and Harbor receive their drinking water from the Chetco River. Recently, drought has resulted in saltwater intrusion in the aquifer, contaminating Harbor's drinking water supply; furthermore, Brookings and Harbor are concerned about the possible effect tsunami hazards can have on their water supply. The objective of this project is to design a desalination facility to provide an alternative source of potable water to Brookings and Harbor, one that will not be subject to saltwater intrusion and will be resilient to tsunami hazards.

Constraints

The desalination facility design operates under the following constraints:

- The desalination facility will meet the 30-year projected water demands for Brookings and Harbor.
- The design will collect sea-water or water affected by salt water intrusion to produce drinking water that meets the Oregon drinking water standards.
- The design will use only commercially available technology.
- The site will be located outside of the tsunami inundation zone.
- The footprint of the facility will not exceed the property owned or purchasable by Brookings.
- The design will not exceed the current or projected energy availability.
- The brine discharge will meet EPA standards.

Criteria

A set of criteria has been developed for use in analyzing the suitability of alternative designs for the desalination plant (Table 1). Criteria were divided into environmental, social, and economic categories, with each category given equal weight in analysis. Designs that best met all three categories were preferred.

Table 1: Environmental, social, and economic criteria for the project.

Categories	Criteria	Comparison Method
	Environmental	
Habitat Preservation	Minimize the adverse effects to habitat and biodiversity for the lifetime of the project.	An assessment of the habitat area impacted by the project.
Footprint of Facility	Minimize the extent of intake and distribution systems required by operations.	An assessment of the length of distribution pipeline, intake wells, and outfall pipeline.
	Minimize the land area occupied by aboveground structures or otherwise closed to the public.	An assessment of the land area required by the facility structures, pump houses, and other structures.
Greenhouse Gas Emissions	Minimize the greenhouse gas emissions from the project's construction and lifetime operations.	An assessment of the amount of greenhouse gas emissions created by the project during construction and over the lifetime of the project.
Waste Products	Minimize the concentration of brine produced by the project.	An assessment of the concentration of brine discharged by day-to-day operations.

Categories	Criteria	Comparison Method
	Social	
Public Acceptance	Minimize the project's adverse impacts to cultural resources.	An assessment of the extent to which the alternative preserves properties on the National Register of Historic Places.
	Maximize the palatability of drinking water through water treatment processes.	An assessment of the project's ability to maintain a pH of 6.8, and minimize salinity.
Safety and Public Health	Minimize the risk of contaminant introduction and distribution.	An assessment of the project's log removal of pathogens in the effluent.
Aesthetics	Minimize the degree of adverse aesthetic impacts.	An assessment of visual, noise, odor impacts to the surrounding community.
Recreation	Minimize the coastal area that will be closed or otherwise restricted for recreational activities.	An assessment of the coastal area affected by the facility.
	Economic	
Capital Cost	Minimize the capital cost of the project.	An assessment of the capital cost of the project.
Ease of Implementation	Maximize the ease of implementation of the project.	An assessment of the number of required permits
Robustness	Minimize the operation and maintenance costs.	An assessment of the operational and maintenance costs.
	Maximize the project lifetime.	An assessment of the project's lifetime, accounting for component replacement.

Alternatives

The four alternative designs considered were developed based on two differences: whether the desalination plant had a capacity of 3.8 or 1.5 MGD, and whether it drew in water using a surface or subsurface intake. The two alternatives with a 3.8 MGD capacity required more resources for construction and operation, in exchange for their greater ability to provide water to Brookings and Harbor. The two alternatives with a surface intake risked drawing up aquatic organisms with the intake water, producing a greater environmental impact and requiring more extensive pretreatment than the alternatives with as subsurface intake, but had lower capital costs. To analyze the alternatives, the criteria were given weights based on their relative importance, and each alternative was given a score based on how well it met each criteria. The alternative with the highest total weighted score was preferred.

Preferred Alternative

Analysis determined that the design alternative with a 1.5 MGD capacity and a subsurface intake best met the environmental, social, and economic criteria. The facility is located at the Brookings wastewater treatment facility. The preferred alternative incorporates a subsurface intake well, a pretreatment process, a reverse osmosis (RO) process, a post-treatment process, a distribution system, and a brine disposal system (Figure 1). The subsurface intake allows pretreatment to be limited to fine mesh screens, chemical dosing, and cartridge filters, lacking the UV disinfection and microfiltration that would be required with a surface intake. After the RO process, the product water is remineralized and disinfected to ensure that it is healthy to drink. The brine produced by the RO process is disposed of using the existing Brookings wastewater outfall into the ocean, sparing the time and expense of constructing new infrastructure for brine disposal.

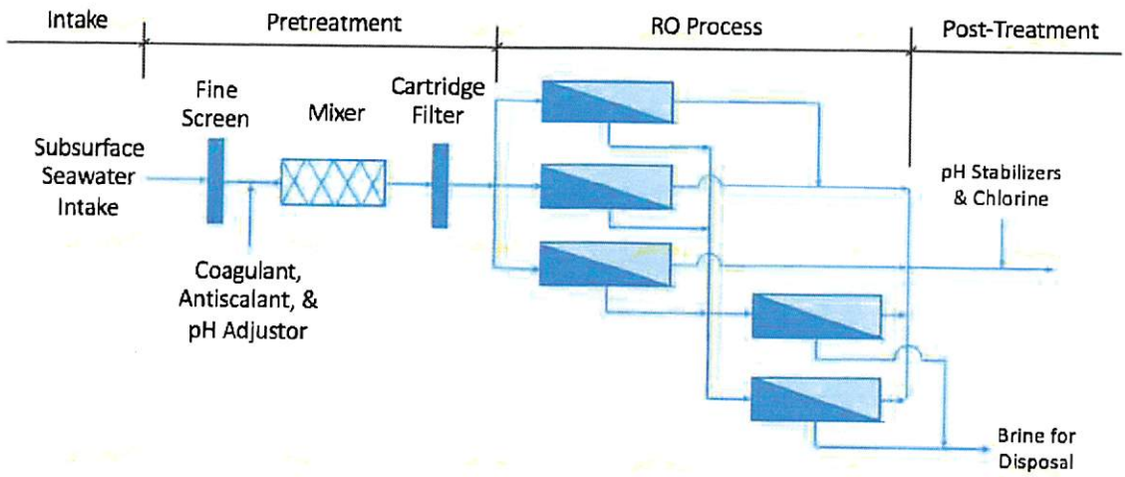


Figure 1: Preferred alternative process flow diagram.

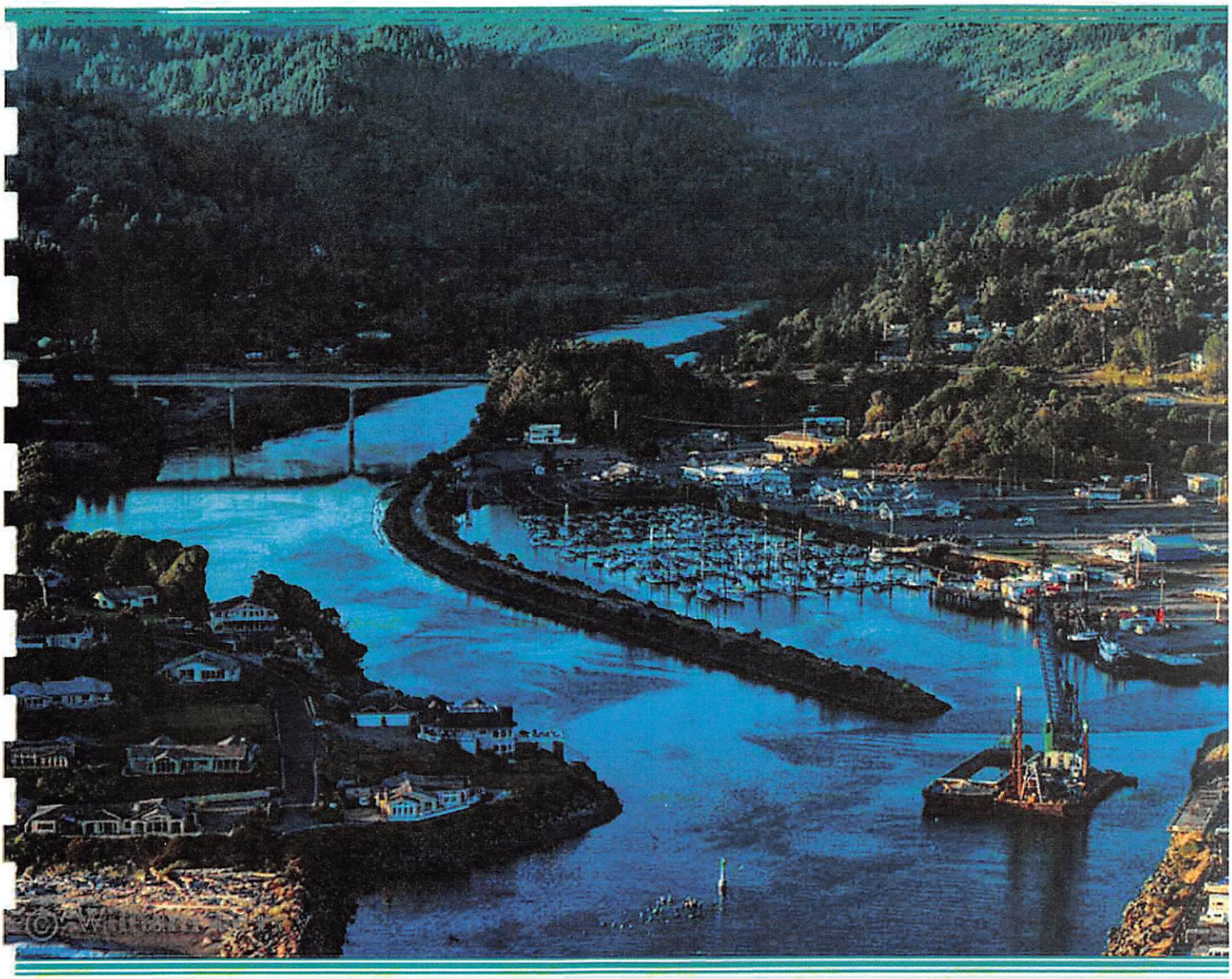
To reduce the initial cost of the project, construction was split into two 0.75 MGD phases. The first phase is sufficient to meet Harbor's average daily water demand, significantly decreasing the amount of water it demands from the Chetco River and thus reducing the risk of saltwater intrusion due to low flows in the Chetco River. This first phase can also provide an 85 gallon per day water ration to the citizens of Brookings and Harbor during emergencies. It has a capital cost of roughly 10.4 million dollars and an annual operations and maintenance cost of roughly 338 thousand dollars. The second phase can be implemented in ten years or when Brookings or Harbor's water supply is again contaminated by saltwater intrusion, whichever comes first. This phase has a capital cost of roughly 3.1 million dollars and raises the annual operations and maintenance cost to roughly 676 thousand dollars. The total capacity of the two phases comes close to meeting Harbor's peak daily water demand, further reducing the amount of water drawn from the Chetco River and doubling the water ration available during emergencies.

Conclusions and Recommendations

A 1.5 MGD desalination facility provides a viable source of water for Brooking and Harbor at a 30-year lifetime cost of 20 million dollars, but further analysis is recommended.

- The desalination facility should be constructed in two 0.75 MGD phases to reduce the initial cost.
- Investigation of the Brookings and Harbor water distribution system may determine that a more direct intertie between the two communities is possible.

- Further analysis is necessary to model the dispersion and diffusion of the discharged brine.
- Despite the low risk from the comparatively small quantity of brine produced, a monitoring program should be implemented to determine if the brine discharge violates EPA salinity regulations.



WATER REUSE

Brookings-Harbor Water Infrastructure and Resiliency

ENGR 492 Senior Capstone Design Fall 2015

2NKB Engineering

Matthew Brown
Jenny Kunna
Faith Neff
Sara Newell

BROOKINGS

HUMBOLDT STATE UNIVERSITY

EXECUTIVE SUMMARY

1.1 OBJECTIVE

The objective of this project is to develop and analyze the design of a water reuse system that will add resiliency and redundancy to the existing drinking water supply for the Brookings and Harbor communities. The interest in further developing the water supply stems from concerns related to water source contamination through saltwater intrusion and tsunami inundation, and the need for a dependable source of water during emergency situations. The design team worked with the client, Gary Milliman the City Manager of Brookings, to produce a water reuse system that fits the needs of the Brookings and Harbor communities.

1.2 CONSTRAINTS

Project constraints were developed after an initial consultation with the client (Table 1). These constraints guided the design process to stay within the scope of the water reuse project. The constraints appear in no particular order of importance, as each one is paramount to the design.

Table 1: Description of design constraints for Brookings and Harbor water resiliency proposal.

Constraints	Description
Water Quality	Design solutions must adhere to the State of Oregon's Recycled Water Quality Standards and Requirements as outlined in the background section.
Safety	New development will not add to current water infrastructure vulnerabilities and will increase the overall infrastructure resilience.
Land use	New development will be restricted to suitable land as defined by land use zoning districts within the Title 17 Brookings Land Development Code.

1.3 CRITERIA

The team developed criteria with input from the client to achieve a sustainable water reuse design solution. The descriptions of the criteria (Table 2) are organized in three categories of environmental, social, and economic. To achieve a sustainable design each of these categories are equally important.

Table 2: Presentation of environmental, social, and economic criteria used to evaluate design alternatives.

Environmental Category	
Sub-Categories	***Criteria***
Habitat Preservation	Minimize significant impacts to habitat, forest, and biodiversity for the life time of the project.
Footprint of Facility	Minimize the extent of intake and distribution systems required by operations.
	Minimize the number of pumps required to distribute the recycled water.
	Minimize the total project area associated with above ground structures and areas closed to the public.
Waste Products	Minimize the waste produced by life time operations of the project.
Tsunami Resiliency	Maximize the time the project can provide potable water to the community in a post natural disaster environment.
Social Category	
Sub-Categories	***Criteria***
Public Acceptance	Maximize the amount of best management practices (BMPs) or innovative approaches implemented by the design
	Minimize the impact to cultural resources.
Community Development	Minimize the aesthetic impact the design has on the natural and man-made environment.
	Minimize the depreciation of property value within the vicinity of the design infrastructure.
Economic Category	
Sub-Categories	***Criteria***
Ease of Implementation	Minimize the capital costs required to implement the design.
	Maximize the ease of the permitting process associated with the project design.
Robustness	Minimize the costs associated with operations and maintenance of the design.
	Maximize the ability of the design to accommodate community growth.
	Maximize the operating lifetime of the design to meet robustness of the project.

1.5 Alternative Solutions

Preliminary solutions were developed to meet the objective of this project. In general, the alternatives were developed with regard to the level of treatment of recycled water required by various regulations and their respective reuse applications. The list of alternatives for this design analysis are summarized below:

- **Non-Potable Reuse Alternative:** Tertiary treated recycled water is supplied to predominate water consumers for non-potable uses. Non-potable recycled water for industrial, irrigation, and toilet flushing purposes will offset the current demand on the Chetco River, which acts as the drinking water source for the Brookings-Harbor Community.
- **Direct Potable Reuse (DPR) Alternative:** Potable recycled water will be achieved through advanced water treatment of the Brookings treated wastewater effluent. After advanced treatment, DPR water will be further polished at the Brookings drinking water treatment facility before it is distributed to the Harbor Ranney well intake to offset the drinking water demand of Harbor by 20%.
- **Indirect Potable Reuse (IPR) Alternative:** Treated wastewater effluent from the Brookings wastewater treatment plant, purified through advanced treatment, will be injected into the Chetco aquifer to create a seawater barrier. The injection of highly purified water will recharge the drinking water aquifer and create a barrier against encroaching saltwater intrusion.
- **DPR and IPR Alternative:** DPR water will be distributed to the Harbor Ranney well intake for a mix of 20% of the current instantaneous drinking water demand of Harbor. This will allow for blending and chlorination of recycled water and raw source water at the Harbor intake. Additional advanced treatment water will be injected into the Chetco aquifer to create a seawater barrier that halts the encroaching saltwater intrusion.
- **IPR and Non-Potable Reuse Alternative:** Advanced treated water will be supplied to meet the injection demand required to combat saltwater intrusion. The remaining treated recycled water will be supplied to predominate non-potable water users in Brookings.
- **DPR, Non-Potable, and IPR Alternative:** Treated recycled water will be supplied to each of the standalone alternatives. DPR water will first be supplied to the Harbor Ranney well intake. Secondly, IPR water is supplied to seawater barrier injection wells that defend against saltwater intrusion. Finally, additional water will be supplied to the viable non-potable users.

1.6 Decision Process

Alternatives were quantitatively evaluated using the project criteria previously stated. The Delphi Method was used to determine a score for each alternative. Similar performance amongst the criteria categories resulted in a common overall score for many of the developed alternatives. Therefore a preferred alternative that represented the strengths and innovative technology of water reuse was developed. This preferred alternative utilized the combination of DPR and IPR. The selection of the DPR and IPR alternative was justified in its use of the majority of available wastewater to provide a new water source and facilitate defense against saltwater intrusion. This alternative was not placed first in the economic and environmental criteria options; therefore, beneficial alterations were made to the design to further improve the alternative to a higher overall standard.

1.7 Preferred Alternative

The preferred alternative design is to implement a combined DPR and IPR system. The demands for both DPR and IPR are based on the 1.8 million gallons per day (MGD) maximum daily demand of the Harbor community. The DPR water is mixed 20% with the regular drinking water of Harbor, resulting in a 0.36 MGD demand of DPR water. Due to the lack of hydrogeological data for the Chetco aquifer, the demand for IPR is developed from an analysis of other seawater barrier injection well projects in Southern California and their respective pumping ratios. Applying the pumping ratios to the Harbor demand results in an IPR demand of 0.1 MGD. The DPR demand is fixed to produce a mixture of 20% of the instantaneous Harbor demand; however, this design allows for flexibility in the form of adjustment to the amount of DPR water that is needed. The rest of the recycled water is used to maintain the seawater barrier.

The amount of treated wastewater taken from the WWTP is more than the combined demand of 0.46 for DPR and IPR. This is due to the nature of the advanced treatment processes needing to reject some of the treated wastewater. The recycled water treatment process begins with diverting 0.61 MGD of treated wastewater effluent into a membrane bioreactor (MBR) for tertiary treatment. The tertiary treated wastewater from the membrane bioreactor is sent through a series of advanced treatment processes including

reverse osmosis (RO), advanced oxidation processes (AOP), and water polishing (Figure 1) and ultimately produces 0.46 MGD of recycled water for DPR and IPR use. The DPR recycled water is mixed at 20% with the regular raw drinking water at the Harbor intake, where the blended water is then chlorinated and distributed to the Harbor residents. The remaining treated recycled water (at least 0.1 MGD) is used for IPR and is injected into the drinking water aquifer beneath the Chetco River to create a seawater barrier that prevents further saltwater intrusion. The design offers seasonal operating scenarios for DPR depending on the operation status of the Brookings water treatment plant.

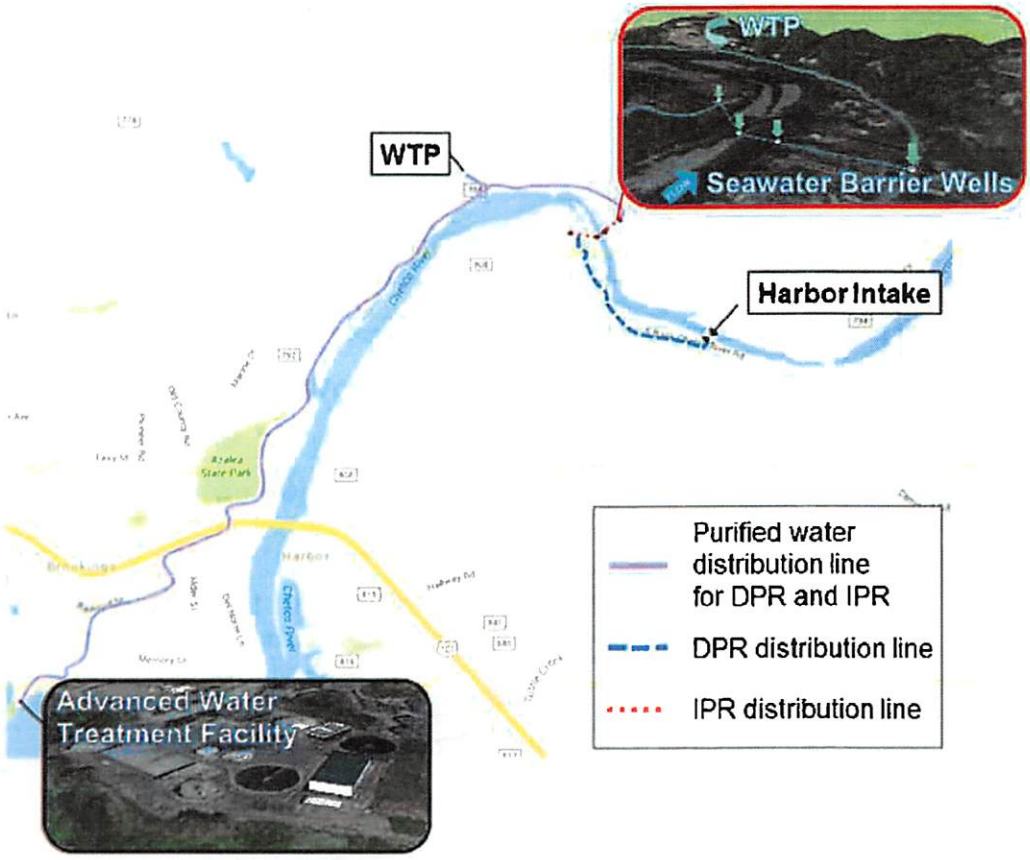


Figure 1: Path of reuse distribution from the advanced water treatment facility to the IPR injection wells used to create a saltwater barrier as well as the DPR distribution location at the Harbor Intake facility (Newell 2015).

1.8 Cost Analysis Summary

A cost analysis of the recommended design includes the capital and O&M costs. These costs include the water treatment equipment, transmission pipeline, and injection wells. The capital cost is approximately $13 million and the annual O&M costs is $136,000. Based on

the energy required for the water treatment processes (Table 3) and the capital cost spread out over 20 years, the cost of purified recycled water is $1.62 per thousand gallons.

Table 3: Energy consumption and cost per kilo-gallon of treated recycled water for each step and the combined total of the advanced water treatment process. $0.06/kWh is the average cost of energy for the region.

Treatment Process	MBR	RO	AOP	Pumping	Combined Total
Energy Consumption (kWh/kgal)	2.44	2.21	0.56	2.61	7.82
Energy Consumption ($/kgal) @ $0.06/kWh	0.15	0.13	0.04	0.16	0.48

1.9 Conclusions and Recommendations

The combined design of utilizing DPR to produce more water for Harbor and creating a seawater barrier with IPR to halt saltwater intrusion effectively mitigates the immediate and future drinking water system concerns for Brookings and Harbor. The IPR portion of the design improves the resiliency of the drinking water supply by providing protection from the increasing contamination of saltwater intrusion and the additional water supplied to the aquifer conserves the historically reliable source of drinking water. The DPR portion of the design actively adds redundancy to the drinking water system of Harbor and acts as an emergency supply of drinking water for both Brookings and Harbor. The following recommendations are advised for the possible implementation of the combined DPR and IPR design:

- A public outreach program regarding the history, benefits, and acceptability of water reuse should be implemented in the Brookings-Harbor community.
- The permitting process for the IPR and DPR design will most likely be carried out on a case-to-case basis that will be performed by local, state, and federal regulatory agencies because this type of design is especially unique for Oregon and rare for the United States.
- A hydrogeological study of the Chetco River aquifer is required to determine the optimal number of injection wells, placement of the wells, and pumping requirements to successfully establish a seawater barrier.

CITY OF BROOKINGS

Council WORKSHOP Report

Workshop Date: March 7, 2016

Originating Dept: PWDS

Chrissy Bevens
Management Analyst

City Manager Approval

Subject: Report on existing information for water supply development.

Recommendation: Discussion and direction to staff.

Background/Discussion: As part of the City's ongoing efforts to ensure adequate and resilient water supplies for its users, staff has reviewed and made a report on water plans and studies dating back to the 1960s. The report is meant to accompany City planning documents, such as the Redundant Water Supply Plan, and to inform current and future water supply development decision making.

Attachment(s): Water Supply Development Staff Report

City of Brookings

898 Elk Drive, Brookings, OR 97415

MEMORANDUM

DATE: February 16, 2016

TO: File

FROM: Chrissy Bevens, Management Analyst

SUBJECT: Report on existing information for water supply development

Introduction & Purpose

The City of Brookings (City) is currently assessing options to develop a redundant water supply as part of its continuing efforts to secure a reliable and resilient water supply for its users. The recommendations of the current Redundant Water Supply Plan (Civil West, 2015) involve the expansion of the Ferry Creek Reservoir and securing additional water from the Chetco River to fill the enlarged reservoir. In reviewing this plan, and other recent plans and studies, it was not clear whether water from the Chetco was necessary if the reservoir was not expanded. Finding information to help answer this question required review of older documents, dating back to the 1960s.

This report is meant to pull together pertinent information from these older studies, together with new information, to help inform the future direction of water supply development for the City. This report should accompany the City's 2015 Redundant Water Supply Plan (RWSP) as it contains additional and updated information and it proposes further considerations and options for the development alternatives identified in the RWSP.

Basic Timeline

1960	City hired a consultant to conduct a study of the existing, privately owned, water system and to appraise the facilities.
1964	City hired a consultant to make recommendations toward designing a new municipal water system, as City had not been able to purchase the existing private system.
1972	City water right on Chetco (referred to as the Tide Rock location) is perfected.
1973	City purchased the existing water supply system, previously under private

	ownership by Elmer Bankus. City develops Chetco River as sole water source and abandons Ferry Creek water.
1988	Tide Rock intake was subject to saltwater intrusion.
1989	City constructs an intake at the current water source location on the Chetco River (Ranney Collector).

Water Rights

A summary of the City of Brookings water rights can be found on page 3-2 of the 2014 Water System Master Plan (WSMP) Update. Copies of the City's water rights and permits are included as Appendix 5.1 of the 2007 WSMP Update. The City has rights that are not currently being utilized, however these are not subject to cancelation because they are municipal water rights (see page 35 of the Oregon Water Resources Department 2013 publication *Water Rights in Oregon*, http://www.oregon.gov/owrd/pubs/docs/aquabook2013.pdf). The main sources under consideration, that are not currently being utilized, are Ferry Creek and the Chetco River Tide Rock location.

The RWSP includes a draft water rights analysis, conducted by GSI Water Solutions Inc. (GSI). After a request from City of Brookings staff, GSI finalized that analysis memo and it is included in this report as Appendix A.

When considering how and whether to utilize existing water sources that are currently out of service, it is important to note that any action that triggers a new water right requirement will bring along with it new restrictions. The solution proposed in the RWSP, to store waters from the Tide Rock intake on the Chetco in Ferry Creek Reservoir, is an example of such an action. A new storage water right would be required because the City's water rights allow only Ferry Creek waters to be stored in Ferry Creek Reservoir. If we can find solutions within our existing rights, that is the best outcome. In that case, we would not be subject to new, more stringent water right conditions.

Ferry Creek & Ferry Creek Reservoir

The RWSP notes that the current storage capacity of Ferry Creek Reservoir is 29 million gallons, while the City water rights would allow storage of 55 million gallons (p 10). It further notes that if the reservoir was enlarged, additional water from a different water source would be needed to augment Ferry Creek waters (p 17). However, there isn't any discussion of how much water is available from Ferry Creek for water use and storage. Also, the plan's alternatives do not include the option of utilizing Ferry Creek and Ferry Creek Reservoir for water use and storage while maintaining the reservoir at its current size. A review of older studies and plans yields some information on that and other important considerations for utilizing Ferry Creek waters.

Water Quantity. The most substantive discussion of Ferry Creek quantity exists as part of the 1961 R.H. Erichsen study of the then existing private water supply system. In general, Ferry Creek is described as "flashy", running high during storms but becoming "nearly dry" during the summer (p 3).

That study used rainfall and runoff records from the Smith River to estimate runoff for the Ferry Creek watershed (pp 17-18):

At that time, based on "a minimum rainfall", runoff was estimated at 632 million gallons per year. The study breaks this down into monthly creek flow, and compares that with anticipated future monthly demands totaling 385 million gallons per year. (This compares relatively well with actual usage in 2014 of 356 million gallons.)

According to this analysis, if Ferry Creek was the only water supply for Brookings, in an average rain year, during most of the year, creek flow would be adequate. Shortfalls would occur in June, July, August, and September, requiring the use of stored water. Taking evaporation and ground seepage into account, they estimated a need of 130 million gallons of stored water in an average year.

Extrapolating from these estimates, the 29 million gallon Ferry Creek Reservoir could function well as a redundant supply during most of the year. However, if the reservoir were to be drawn completely down in June and then left to recharge, per the estimated creek flow, it would not completely refill until sometime in September.

As this study is more than fifty years old, a refreshed assessment of Ferry Creek and Reservoir would be needed to move forward. Even if the analysis holds up, certainly the regulatory environment has changed. For example, the 2007 WSMP Update advises that 2001 laws enacted fish passage requirements, that will likely trigger due to necessary infrastructure replacements, may limit the City's ability to divert during times of low flow (6-6).

Water Quality. As part of the Feasibility Study for Restoration of Ferry Creek Reservoir (Dames & Moore, 1997), water samples were collected and analyzed in October of 1996. Ferry Creek reservoir water was found to be acceptable for water supply, but the untreated water exceeded levels for iron, manganese, and odor (p 14). The study does caution that seasonal variation in water quality can be expected and recommended that further testing occur in order to develop a clearer picture of water quality changes throughout the year (p 14). No further testing has been discovered in City records.

The 2000 WSMP adds the following:

"Water from Ferry Creek will be much more difficult to treat than most surface water sources in western Oregon due to high concentrations of iron, manganese, color, odor and low pH.... Dames and Moore did not consider that Brookings would lose the groundwater classification, which will significantly increase disinfection requirements, and require construction of a new clearwell of substantially increased size." (p 6-5)

Abandonment. According to the 2000 WSMP, Water from Ferry Creek was used into the early 1970s (p 2-2), combined with water from the Chetco during peak demand times (p 6-4). Further, when the City purchased the existing system water from the Chetco was developed as the sole water source moving forward (p 6-4).

The City's long efforts to purchase the existing private system adds some context. After working toward purchasing the system for at least three years, in 1964 the City hired a consultant to make recommendations for the development of a separate, new City system, as they had been unsuccessful in purchasing the private one (CH2M, 1964, p 1). Between that time and the final purchase of the private system in 1973, the City had received water rights on the Chetco River.

It seems reasonable to assume that by the time the private system was purchased, the City would choose to pursue the Chetco River source they had developed, and forego the Ferry Creek water. The Chetco source was adequate to supply the total water demand and requires less treatment than Ferry Creek waters.

Additional Options. The 2000 WSMP identifies two options for Ferry Creek that are not developed further in subsequent plans and studies. However, the 2007 WMP Update does briefly critique the idea presented under "B" below (p 6-7). These two options are captured here as they may warrant further consideration as the City negotiates water needs and regulations into the future.

A. **Provide new, separate treatment plant for Ferry Creek Reservoir.** Ferry Creek waters would require more treatment for two reasons: the water is surface water (versus the current Chetco source, which is classified as groundwater) and Ferry Creek waters have been tested and/or observed to require treatment for high iron and manganese, color, odor, low pH, and algae. The current treatment plant is not designed to handle these various issues. It is noted that if new facilities for Ferry Creek waters were located near the reservoir, it is possible that the old transmission lines and/or easements might be utilized. (p 2-3)

B. **Augment Chetco flows with Ferry Creek Reservoir**. Flow from Ferry Creek reservoir could be released to augment Chetco flows, to benefit aquatic life. According to this plan, the priority ecological issue is adequate fresh water flows for desired salinity in the

upper estuary, so that flows would need to be piped upstream about 3 miles in order to introduce the water sufficiently upstream in order to achieve the desired salinity downstream in the upper estuary. A further challenge that would need to be discussed with regulatory agencies is the question of Ferry Creek's water quality and the possibility of degrading Chetco River water quality. (p 6-5)

Tide Rock Intake

The RWSP considers rebuilding this intake only as a dedicated source for filling an expanded Ferry Creek Reservoir (p 21). Further it notes that close monitoring would be needed so that withdrawals only occurred at times when "saltwater intrusion is impossible" (p 22). Additional information on saltwater intrusion at this location as well as another possible use for the Tide Rock intake are discussed below.

Saltwater Intrusion. First documented in the fall of 1987, seawater intruded the Tide Rock intake, resulting in a sodium level more than 50 times above normal (CH2M Hill, 1987, p 12). Harbor customers did not complain of salty taste at this time nor did Harbor water district perform sodium sampling (CH2M Hill, 1987 p 14). At that time the CH2M Hill consultant report recommended first that the City consider purchasing water from Harbor, and second, if the first option was not workable, to install a Ranney Collector at a new location on the Chetco River (1987, p 21).

The City did develop a new location, and the current Ranney Collector on the Chetco is at about River Mile (RM) 5.3, compared with the abandoned Tide Rock location at RM 3.1 and the Harbor intake at RM 3.4. At that time the Tide Rock intake was taken out of service.

Backup for Ranney. The 2014 WMP Update indicates a different purpose for the redevelopment of the Tide Rock Intake, besides the possibility of providing water for Ferry Creek Reservoir. It notes that there have been concerns that the Ranney Collector at the City's current Chetco intake site could be inaccessible during high floods (p 6-10). In this case, the redevelopment of the Tide Rock intake could provide an emergency back-up to the Ranney Collector site, enhancing system reliability overall (p 6-10). The WMP Update also recommends a hydro-geological evaluation to explore whether an alternative intake, such as a Ranney Collector, could be installed at Tide Rock in a way that might mitigate the risk of saltwater intrusion (p 6-1).

Classification & Treatment. The RWSP describes the existing infiltration gallery at the Tide Rock station and indicates that it would act as a groundwater source (p 21). However, the 2014 WMP Update warns that water from Tide Rock would be classified as surface water (p 6-10). The currently utilized Chetco source is classified as groundwater, and needs less treatment than would be required for surface water. Treatment Supervisor Ray Page confirmed that Tide Rock

waters from the existing infiltration gallery would be classified as surface water. He clarified that in order to qualify as a groundwater source relative to treatment requirements, a series of water quality tests would occur and Tide Rock waters would not pass these tests.

Items for Further Research

Ransom and Joe Hall Creeks. The City holds water rights on other streams, though their utility appears to be limited. For short discussions of Ransom Creek and Joe Hall Creek see the 2014 WMP Update (p 6-2) and the 2007 WMP Update (p 6-7).

Another Chetco Site. After the saltwater intrusion at the Tide Rock intake site, the 1988 CH2M Hill study considered an alternate intake site that is not the City's current Ranney Collector site. It considered a location on City owned property about half a mile upstream from the Tide Rock location, at about RM 3.9. The current Ranney site is at about RM 5.3. After an evaluation of several factors, the report concluded that the proposed new location, at RM 3.9, would be "acceptable...for preventing sea water intrusion" (p 15). It may not be at all feasible to move the City's intake from Tide Rock to a different location, but this consideration of a third location would be easy to miss in the reports, so it is included here.

Recommendations

This review of previous plans and studies suggests several ways to move forward. Below are some recommended areas for next steps in developing additional water supply and sources:

Sampling & Testing. All of the discussion about Ferry Creek and Ferry Creek Reservoir water quality are based on one set of tests that occurred in October of 1996. A regular schedule of testing throughout an annual cycle would yield better information for further consideration of Ferry Creek and Reservoir as a potential drinking water source. Similarly, it should be considered whether there is any testing we could do currently at or near the Tide Rock intake location that would inform future decision making.

Ferry Creek Reservoir Feasibility. The most substantive consideration of Ferry Creek and Reservoir, at least in terms of water quantity available, occurred more than 50 years ago. More study is needed to determine whether Ferry Creek and Reservoir could function as a self-sustaining water supply source and must include a consideration of the current regulatory requirements that would be associated with any needed repairs or adjustments to existing infrastructure.

Tide Rock Redevelopment. Further consideration of the redevelopment of the Tide Rock intake is warranted, independent of a tie to the Ferry Creek Reservoir. For at least part of the year, this water source could serve as a backup supply in cases of emergency or the need for

maintenance of the Ranney Collector at the City's primary intake site. It may also be worth exploring whether an alternate intake design could mitigate vulnerability to saltwater intrusion.

Treatment Considerations. Any development of alternatives that involve Ferry Creek Reservoir or Tide Rock waters must fully consider water treatment requirements. This consideration could involve any of the following, or combinations of the following:

A. capabilities of the existing water treatment plant and necessary upgrades to the plant
B. stand-alone plant for the treatment of Ferry Creek Reservoir waters
C. reverse osmosis or other desalination treatment for brackish waters from Tide Rock intake

Plans, Reports, and Studies

Older documents (annotated):

Publication Date	Title	Author	Notes
1961, November	Engineering Report: Water Supply Study	R.H. Erichsen & Associates	Assesses existing water sources and system to determine merits of City purchasing the existing private system versus creating a new system. Recommended purchase, rehabilitation, and augmentation of existing system.
1964, August	An Engineering Report to the Brookings City Council on a New Municipal Water System	Cornell, Howland, Hayes & Merryfield (CH2M)	Develops recommendations and preliminary plan for a new municipal water system, as efforts to purchase the existing system had not been successful to that point.
1982, June	City of Brookings Water Study	City of Brookings	Reports on City's present and projected water needs in relationship to the City's water treatment plant capabilities.
1988, February	Water Intake, Treatment Plant, and Distribution Study	CH2M Hill	In response to the saltwater intrusion at the Tide Rock intake, recommends action to procure a new water source. Preferred alternatives were purchasing water from Harbor and developing an intake further upstream.
1997, May	Final Report on Feasibility Study for Restoration of	Dames & Moore	Assessed feasibility of restoring Ferry Creek Reservoir and utilizing for municipal water supply. Determined that Ferry

Publication Date	Title	Author	Notes
	Ferry Creek Reservoir Brookings, Oregon		Creek waters were acceptable for drinking water, but with some treatment challenges. Concluded that waters from Ferry Creek were not needed at the time of the study, as the Chetco source provided a more than adequate supply. But further indicated that if there were changes in the future, including more stringent water rights restrictions, that Ferry Creek waters could be further considered as a municipal water source.

Newer documents:

Publication Date	Title	Author
2000, April	Water System Master Plan and Water Conservation Management Plan	HGE, Inc.
2002, May	Evaluation of Increasing Groundwater Pumping from Ranney Collector During Low Flows of the Chetco River	Luzier Hydrosciences
2007, October	Water System Master Plan Update	HGE, Inc.
2014, April	Water Master Plan Update	Pace
2014, July	Public Facilities Plan	City of Brookings
2015, August	Redundant Water Supply Plan	Civil West Engineering Services

Some additional studies are identified on page 1-4 of the 2000 Water System Master Plan.

GSI Water Solutions, Inc.

December 3, 2015

TO: Quinn Dance, Civil West Engineering Services, Inc.

FROM: Kimberly Grigsby, GSI Water Solutions, Inc.
Adam Sussman, GSI Water Solutions, Inc.

SUBJECT: Water supply redundancy options for the City of Brookings

You have requested GSI Water Solutions, Inc. (GSI) to conduct a brief water rights analysis of water supply redundancy options for the City of Brookings (City). In particular, you have asked us to evaluate opportunities, from a water rights perspective, for the City to expand the capacity and store additional water in Ferry Creek Reservoir, and to obtain groundwater from new water supply wells. The following memorandum briefly summarizes the water rights considerations for both of these opportunities to obtain additional water supply.

A. Storing Additional Water in an Expanded Ferry Creek Reservoir

The City currently holds a water right certificate (Certificate 46860) that authorizes the storage of up to 167.4 acre-feet of water from Ferry Creek in Ferry Creek Reservoir. The City also holds a water right (Certificate 46861) to use the 167.4 acre-feet of stored water for municipal purposes. We understand that the City is considering the opportunity to expand the current capacity of Ferry Creek Reservoir, and to divert water from the Chetco River to be stored in the expanded reservoir.

To implement this approach, the City could apply for a new water right authorizing the storage of the additional amount of water, or potentially use an existing water right to obtain water that would be put into the expanded reservoir.

1. Use an Existing Water Right ("Bulge in the System")

Although the Oregon Water Resources Department (OWRD) typically requires a storage water right to store water in a reservoir, the agency does allow water that is appropriated under an existing water right to be stored, without a storage water right, for a limited period of time. (This time period is not identified in rule but is understood to be in the range of not more than 72 hours). This short-term storage is referred to as a "bulge in the system."

If the City could use the water placed into the reservoir within a few days, it could divert water from the Chetco River under its existing water rights, and pipe that water to the reservoir.

A second (theoretical) alternative exists for using the City's existing water rights to fill an expanded reservoir. The City could potentially "transfer" (change) one of its existing water rights to allow the storage of that water. For example, the City could transfer Certificate 64614 (for the use of up to 6.0 cfs from River Well #1 for municipal purposes) to authorize the storage of water in the reservoir at the same rate. However, to our knowledge OWRD has never approved a transfer that changed a groundwater right into a storage water right.

2. Obtain a New Storage Permit

If the City intended to store water for periods of time longer than a few days, it would need to apply for and obtain a new storage permit that would authorize the diversion of water from the Chetco River for storage in the expanded reservoir. OWRD reviews permit application to determine if: 1) the proposed use is prohibited by law because the water source has been withdrawn from appropriation; 2) water is available; 3) the proposed use would cause injury to existing water rights; 4) the use is allowed in the applicable basin program rules; and 5) the proposed use is consistent with other rules of the Oregon Water Resources Commission. If OWRD determines that each criteria is favorably met, the agency can approve the application.

We have evaluated the City's opportunity to obtain a permit for the storage of water from the Chetco River consistent with OWRD's review process as follows: 1) the water from the Chetco River has not been withdrawn from appropriation; 2) water is available for a new storage water right from the Chetco River from November through June; 3) the City's storage of water would not injure existing water rights; 4) Nothing in the South-Coast basin program rules would preclude issuance of a water right for an expanded storage project; and 5) a new storage permit would likely be conditioned to protect species listed under the state and federal endangered species acts based on recommendations from the Oregon Department of Fish and Wildlife (ODFW) and the Department of Environmental Quality (DEQ). In sum, the elements of OWRD's permit application review criteria appear to be favorable, but it is not currently known what conditions might be placed on a new storage permit from the Chetco River. Additional research would be needed to determine what conditions might be required by ODFW and DEQ.

Once the City had obtained a new storage permit, it would need to obtain a new "secondary" water right that authorized the use of water for municipal purposes. The process to obtain a "secondary" water right is typically relatively simple. OWRD would review an application for such a right using the criteria described above for a storage right. Based on the information available, we do not see a reason why OWRD would not issue a new "secondary" permit for the use of additional water stored in the Ferry Creek Reservoir for municipal purposes.

3. Obtain a New Storage Water Right and Use an Existing Water Right

A final option related to an expanded reservoir would be for the City to combine the two options described above. The City could obtain a new storage permit that authorized the storage of water from November through June. After June 30, the City could appropriate water from River Well #1 and store the water for short periods of time by using the expanded reservoir as a bulge in the system. This could allow the City to maintain reservoir levels during the summer months.

B. Obtain Access to Groundwater Supply

As an alternative to storing additional water in Ferry Creek Reservoir, the City could obtain access to groundwater to provide a redundant water supply. OWRD would require the City to have a groundwater right authorizing the use of groundwater for municipal purposes. The City could either use groundwater under its existing groundwater right, or could apply for a new groundwater right.

1. Transfer the City's Existing Groundwater Right

The City currently holds a groundwater right certificate (Certificate 64614) that authorizes the use of water from River Well #1 at a rate of up to 6.0 cfs for municipal purposes. Certificate 64614 has a priority date of August 14, 1972. According to the map for this water right, Well #1 is located immediately adjacent to the Chetco River, at the top bank vegetation line.

We understand there are concerns about salt water intrusion at the current well location. The City would, therefore, likely want to appropriate groundwater from a different location. It is unlikely that the City would want to appropriate groundwater at a downstream location due to increased likelihood of problems with salt water. The City could appropriate groundwater at an upstream location, but the strong hydraulic connection between Well #1 and the Chetco River could make this problematic. As a final alternative, the City could appropriate groundwater further away from the river, but this is expected to significantly reduce the quantity of water available under the water right. The latter two options are described in more detail below. In either case, Certificate 64614 would need to be "transferred" (changed) to authorize the new well location.

OWRD reviews transfer applications to determine whether the proposed change would cause "enlargement" (expansion) of the right or "injury" to existing water rights (prevent other water rights from receiving the water to which they are entitled). OWRD provides public notice of proposed transfers and allows third parties to file protests, but only on the grounds that the requested change will cause injury.

a. <u>Transfer to an upstream location.</u> If the City wanted to move Certificate 64614 to a location upstream, it would need to file a transfer application. If the City wanted to move the water right to its Ranney Collector Well, the first step would be to receive confirmation that OWRD considers it to be a well, even though the City's water rights at that location are surface water (rather than groundwater) rights. As part of its review of a transfer application, OWRD determines whether the requested change would cause "injury" to other water rights, including instream water rights. Instream water right certificate 73087 protects water instream in the Chetco River at rates between 101 and 595 cfs from river mile 5.4 to the mouth, and has a priority date of November 8, 1990. A review of gage data shows that this instream water right is routinely not met from June through October.

Moving Certificate 64614 upstream would likely reduce the stream flows for a greater portion of the instream water right's reach due to the following factors: 1) the City's water right is "senior" to (has an earlier priority date than) the instream water right; 2) the Ranney Collector Well has close hydraulic connection to the river; and 3) the instream water right is routinely not met. As a

result, OWRD would likely determine that moving the authorized point of appropriation (well) for Certificate 64614 upstream to a location with hydraulic connection with the Chetco River would cause injury to the instream water right. OWRD would likely deny the transfer application if the City could not mitigate for the impact to the instream water right. A possible method for providing mitigation would be to reduce the water right's maximum authorized rate. Additional evaluation, however, would be required to determine available opportunities to provide mitigation for the anticipated injury determination.

b. Transfer to a location further away from the Chetco River. The City could also move the point of appropriation for Certificate 64614 further away from the river. This could eliminate concerns about injury to the instream water right. Such a move could also reduce the amount of water available for appropriation. As with other transfers, OWRD would review the application to determine whether it would cause injury. So long as the new well was not located near existing wells, it is unlikely that the agency would find injury.

2. Obtain a new Groundwater Right

As a final alternative, the City could obtain a new groundwater right authorizing the use of groundwater from a new well. The new well would need to be strategically located from surface to avoid permitting problems associated with hydraulic connection to surface water. OWRD would review a groundwater permit application using criteria similar to those described above for a new storage water right. Our evaluation of the City's opportunity to obtain a groundwater permit is summarized as follows: 1) the groundwater has not been withdrawn from appropriation; 2) groundwater is likely available for a new permit, depending on the rate of appropriation proposed; 3) the City's use of groundwater would not injure existing water rights (assuming the well was located strategically); 4) Nothing in the South-Coast basin program rules would preclude issuance of a new groundwater right; and 5) the use would be expected to be consistent with the rules of the Water Resources Commission (assuming the well is more than a mile from a surface water source). In sum, the City could likely obtain a new groundwater permit. The amount of groundwater in the area is generally limited and additional investigation would be required to determine whether sufficient supply could likely be obtained to meet the City's needs.

C. Conclusion

Several opportunities exist (from a water rights perspective) for the City to obtain a redundant source of water supply.

The City could likely obtain new water rights that would authorize the storage of water from the Chetco River in an enlarged reservoir during the winter months and the use of the stored water for municipal purposes. The City could also use its existing groundwater right (Certificate 64614) to appropriate water and store it in the reservoir for short periods of time as a "bulge in the system."

The City would likely be able to move its existing groundwater right Certificate 64614 away from the river or to obtain a new water right from a well that is strategically located to avoid hydraulic connection with a surface water source. The City could also move Certificate 64614

upstream to the Ranney Collector Well, but additional investigations would be required to confirm that OWRD would consider the Ranney Collector to be a well, and to determine how to mitigate for an anticipated finding of injury caused by the change.

CITY OF BROOKINGS

COUNCIL WORKSHOP REPORT

Meeting Date: March 7, 2016

Originating Dept: Mayor

Signature (submitted by)

City Manager Approval

Subject: Possible Sales Tax

Recommended Action:
Discussion.

Financial Impact:
Unknown at this time.

Background/Discussion:
This item has been placed on the agenda at the request of Mayor Hedenskog.

Mayor Hedenskog is proposing that the City Council consider placing a Sales Tax measure on the City ballot. Mayor Hedenskog has advanced several ideas for the use of Sales Tax proceeds including:

- Providing working capital to facilitate the opening of the Emergency Room at Curry Medical Center.
- Construction and operation of an Aquatics Center.
- Wastewater Treatment Plant improvements.
- Park improvements and maintenance.
- Using proceeds for Wastewater Treatment Plant debt service and reducing sewer rates.

All of the above expenditures would benefit an area larger than the Brookings corporate limits. A Sales Tax collected within the City Limits would be paid by City residents and non residents alike.

Staff has not identified resources for developing reliable estimates on the amount of revenue that would be generated by a local Sales Tax, and has not obtained information on the cost of implementing and collecting such a tax. Because there is no Sales Tax in Oregon, information concerning retail sales that would be subject to a Sales Tax would need to be extrapolated from sources not yet identified.

Curry County considered the Sales Tax matter in 2012 and utilized data provided through the State Legislative Revenue Office...not the State Department of Revenue. Attached is the LRO report, which relies heavily upon 2007 Census data. That report estimated that a 3.0 per cent Sales Tax collected countywide would generate %5.8 million by fiscal 2015-16.

Another piece of early data would be using a comparable city in California. In the personal experience of the City Manager, Fort Bragg, California, could serve as a comparable city. That community is of comparable demographics and has a comparable retail base, although there is no Fred Meyer-like retail business located there. The 1.0 per cent local share of the Sales Tax in Fort Bragg was estimated to generate $1.79 million in fiscal 2015-16. The voters in Fort Bragg also approved a special 0.5 per cent Sales Tax in 2013, the proceeds of which are used to fund the operation of their regional aquatics/recreation center.

Staff will need authorization from the City Council at a City Council meeting to develop a plan for gathering additional information relating to this topic

Attachment(s):

a. Legislative Revenue Office report.
b. City of Fort Bragg budget information.

STATE OF OREGON

Research Brief

LEGISLATIVE REVENUE OFFICE
143 State Capitol Building
Salem, Oregon 97301

(503) 986-1266

Research Brief #2-12 **April 2012**

Estimating Potential Sales Tax Revenue in Curry County

Introduction

Curry County's historic dependence on revenue from federal timber lands and the distinct prospect that the federal Secure Rural Schools Act will be extended in a sharply reduced form or not at all this fiscal year leaves county government in an extremely precarious fiscal situation. In response to the potential loss of a major revenue source, county government must balance its budget using a combination of the following options:

- Reduce expenditures on public services and the personnel that provide those services.
- Increase revenue from existing tax bases (mainly property taxes).
- Explore new tax bases for potential revenue.

This brief focuses on the third option. Specifically, the potential revenue that could be raised from a county retail sales tax applied to goods and restaurant meals purchased in the county. Initial revenue estimates from an untapped tax base present a number of difficulties. Out-of-date secondary data must be used as a starting point. At the local level, these data are highly aggregated, making detailed estimates difficult. Finally, there is the prospect of behavioral changes in response to the imposition of a new tax making even accurate detailed existing data suspect for purposes of preparing estimates. These complications have the effect of increasing the uncertainty around the initial revenue estimates from a new tax base, thereby increasing the margin of error for these estimates. It is important to note that these sources of error are in addition to the typical sources associated with projecting revenue from an existing tax. These sources of error largely stem from the uncertainty of forecasting the economy.

Because of the uncertainty around the initial estimates of revenue from a new tax base, it is recommended that county budget officials leave a portion of the estimated revenue in reserve to protect against downside risks in the first 2 years of implementation.

This brief is divided into three sections. The first section outlines the steps used to estimate the potential Curry County sales tax base. The second section attempts to put those estimates in context by comparing the results with sales tax revenue currently raised in Pacific County, Washington. The final section assesses the risks associated with these estimates.

Estimating the Curry County Tax Base

The starting point for estimating the potential Curry County sales tax base is the U.S. Census Bureau. In addition to its widely known decennial census of the population, the U.S. Census Bureau produces an economic census at 5-year intervals. These data are provided for individual sectors of the economy down to the county level. However, the detail for less populated counties, including Curry County, is limited by federal disclosure laws. The most recent census data available is 2007. The 2012 data are being collected now but will not be available for several years.

The two sectors that comprise the bulk of the sales tax base are the retail trade sector and the service sector. The service sector is limited to food services establishments. The North American Industrial Code (NAICs) for these sectors are # 44 and #45 (retail trade) and #722 (eating and drinking establishments). 2007 data for these sectors are available for Curry County.

The next step is to remove exempt items from the 2007 retail sales data. The components of retail trade that are exempt are motor vehicles, gas stations, health and personal care products and food and beverage stores. These elements are removed from the Curry County data when they are available (not excluded because of disclosure laws). When these data are not available at this level of detail, state proportions are used as an estimate of the size of the exempt sector.

The final step in the initial estimate is to take the 2007 base estimate and bring it forward to the starting point of the new tax—assumed to be January 1, 2013. As part of its forecasting process, the state (through the Oregon Office of Economic Analysis) receives projections on the international, national and state economies from IHS Global Insight Inc. Global Insight provides estimates and projections for retail sales in each state, including Oregon. The growth from 2007 to 2013 is then applied to the 2007 Curry County sales data. As a final step, the growth rate applied to Curry County is reduced to reflect the fact that the county grew at a slower rate than the overall state over the 2007 to 2013 period.

Table 1 lays out the steps taken to derive an initial estimate of the 2013-2015 sales tax base for Curry County.

Table 1: Calculation of Curry County's Potential Sales Tax Base

Tax Base Calculation (in millions)	2007	2009	2013	2014	2015
Curry County Retail Sales (in millions)	$227.0	$210.0	$250.5	$259.5	$269.3
Curry County Food Service Sales (in millions)	$27.0	$25.0	$29.8	$30.8	$32.0
Total Potential Curry County Base (in millions)	$254	$235.0	$280.3	$290.2	$301.3
Sales Tax Exemptions (in millions)	$90.2	$83.4	$99.5	$103.0	$107.0
Estimated Sales Tax Base (in millions)	**$163.8**	**$151.6**	**$180.8**	**$187.2**	**$194.3**
Estimated Revenue @ 3% (in millions)*			**$5.42**	**$5.61**	**$5.83**
Retail Sales Growth (From Previous Column)					
Oregon		-7.4%	26.1%	4.6%	4.9%
Curry County		-7.5%	19.3%	3.5%	3.8%
Sales Tax Base as % of Personal Income					
Curry County Estimate	23.3%	20.7%			
Average Sales Tax Base for States that Impose Sales Tax	46.8%	43.1%			

*Applies to fiscal year.

The economic census estimates that Curry County's retail sales totaled $227 million in 2007(NAICs codes 44 and 45). Sales of food services establishments are estimated at $27 million for 2007(NAICs code 722). This leaves a potential, no exemptions, tax base of $254 million for 2007. Exempt items are estimated at $90.2 million for 2007. The estimated county sales tax base for 2007, derived from subtracting exemptions from the potential base, is equal to $163.8 million.

The breadth of the sales tax base can be measured by comparing it with total resident personal income. The estimated tax base for Curry County is 23.3% of personal income for 2007. The breadth is influenced by two major factors. The first is the items covered by the tax and the exemptions allowed. The narrower the tax is defined and the more the allowed exemptions, the lower the base will be as a percentage of personal income. A second factor is the amount of taxable purchases made by non-residents. A large amount of purchases by non-residents will increase the percentage of the base relative to personal income. Hawaii, for example, with its tourism dominated economy, has a sales tax base which is greater than 100% of resident personal income. For comparison purposes, Table 1 also includes the average sales tax base as a percent of personal income (46.8%) for all the states that impose a retail sales tax.

The Curry County estimated sales tax base is extended to 2009, based on state data. The 2009 data shows the impact of the Great Recession, which lasted from December 2007 through June of 2009. The county sales tax base declined an estimated 7.5% during this period to $151.6 million.

The third column in Table 1 extends the estimated county sales tax base into the 2013 calendar year. This estimate is based on statewide retail sales estimates, which are then adjusted downward to reflect lower economic growth in Curry County between 2009 and 2013. The result is an estimated county tax base of $180.8 million for 2013. This reflects estimated growth of 19.3% between 2009 and 2013, an annual growth rate of 4.5%. This compares with growth of 26.1%, 6.0% annually for the state as a whole.

Tax base growth is then projected into 2014 and 2015. Again, the statewide projection is the basis, with roughly a 1% lower annual growth rate assumed for Curry County. The result is a sales tax base estimate of $187.2 million in 2015 and $194.3 million in 2016. This translates into annual growth of 3.5% in 2015 and 3.8% in 2016.

A final adjustment for sales tax revenue estimates is to assume a 6-month collection lag between tax base estimates and actual revenue coming into the county. This means that the tax base estimate for 2013 should be applied to the 2013-14 fiscal year which begins July 1, 2013. The revenue estimate for a 3% sales tax estimate is $5.4 million for 2013-14 fiscal year, $5.6 million for 2014-15 fiscal year and $5.8 million for 2015-16 fiscal year.

Comparison of Curry and Pacific Counties

In order to provide some context for the Curry County tax base estimates, a comparison with Pacific County, Washington is provided. Pacific County occupies the same relative geographic position as Curry County along the southwest coast. In addition, the population of the two counties is nearly identical. However, there are some important differences that will affect the sales tax base for the 2 counties. First, Curry County's personal income was 13% higher than Pacific County in 2009. This means that Curry County would collect more sales tax revenue on a base that is the same percentage of personal income. Moreover, Curry County, bordering a sales tax state, can be expected to attract more non-resident taxable purchases than can Pacific County which borders a non-sales tax state. These two factors indicate that the Curry County base should be larger than the Pacific County base. However, when comparing actual sales tax base numbers for Pacific County, the existing Washington State tax base is used. Because this base is considerably broader than the proposed Curry County base, it is likely that the breadth of the Pacific County base would more than offset the higher resident personal income in Curry County.

Table 2 shows the details of the comparison between the two counties for 2009. The first four rows of the table come from the Bureau of Economic Analysis. The Pacific County sales tax base numbers come from the Washington Department of Revenue.

Table 2: Comparison of 2009 Data for Curry and Pacific Counties

2009*	Curry County	Pacific County
Total Personal Income (in millions)	$733.5	$646.7
Population	21,148	21,272
Total Full-Time & Part-Time Jobs	10,819	9,344
Per Capita Income	$34,683	$30,403
Washington Sales Tax Base (in millions)	--------	$201.6**
Estimated Curry County Sales Tax Base (in millions)	$151.6	--------
Sales Tax Base as % of Personal Income	20.7%	31.2%

*Data from Bureau of Economic Analysis, U.S. Department of Commerce
**Washington Department of Revenue

The actual sales tax base for Pacific County in 2009 was $201.6 million. This compares with the estimated Curry County base of $151.6 million for 2009. In terms of resident personal income, the Pacific County tax base is 31.2% of income while the estimated Curry County base is 20.7% for 2009.

Assessing the Risks to the Estimates

As stated in the introduction to this brief, estimating a new tax base necessarily involves considerable uncertainty because of the lack of detailed secondary data and the non-existence of actual tax data. However, going through the detailed estimation process points to plausible areas which may cause the estimates to be too high or too low.

A potential cause of estimates that are too high is the under-estimation of exempt purchases or purchases that are not part of the legal tax base. The lack of detailed retail trade data makes this a distinct possibility. The estimates are based on excluded sectors within the retail trade data such as grocery stores and automobile dealers. However, categories that are included in the estimates are likely to have some portion of sales that are exempt. Another potential source of over-estimation error is the extrapolation from the 2007 Census data up to the 2013 calendar year. The county estimates are based on state level retail sales estimates and projections. While, an attempt was made to adjust the Curry County growth factor down, it is possible that the growth rates were not adjusted down enough leading to an over estimate of the 2013 tax base.

There are also factors which potentially lead to an under-estimate of the county tax base. Most prominent of these is the exclusion from the estimate of other economic sectors which are likely to have some taxable purchases. These sectors were not included because the proportion of their taxable sales is likely to be low and the detailed data to break into fine components of sales is not available. The sectors most likely to generate some taxable sales are wholesale trade and construction. For example, 50% of wholesale trade sales were part of the Washington sales tax base in 2010. Another potential source of downward bias is an under estimate of the actual tax base growth between 2007 and 2013. This would lead to a revenue estimate that was too low in 2013, 2014 and 2015.

This brief does not address the issues of compliance and enforcement of a sales tax at the county level. Compliance and therefore collections are influenced by the credibility of enforcement. In addition, the county's administrative costs of enforcement and collection must be netted against the revenue estimates for budgetary purposes.

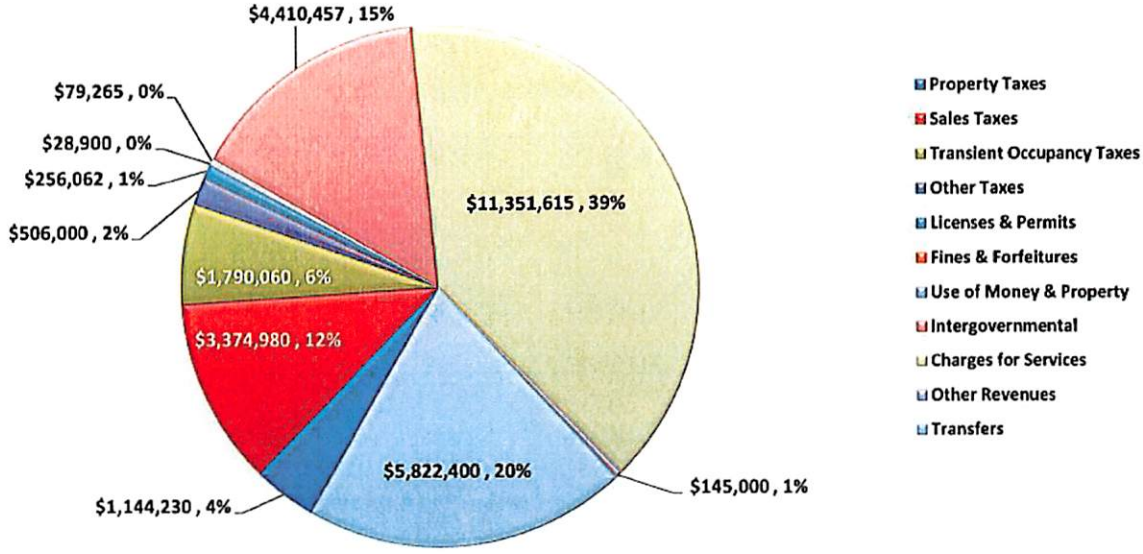
Finally, it is important to keep in mind that these risks all pertain to the initial estimate of the county tax base. Going forward, revenue forecasts will always be susceptible to errors caused by economic forecasts that are too high or too low.

In developing these estimates of potential sales tax revenue in Curry County, it is the intent of the Legislative Revenue Office to provide unbiased estimates. This means that it is our opinion that the upside and downside risks roughly offset leading to an estimate that in the middle of a range of plausible outcomes. It is important to recognize that the range of plausible outcomes is greater in the case of estimating revenue from a new tax base. For this reason, we recommend that county policy-makers use considerable caution when developing budgets based on these revenue estimates until this base is established and more predictable.

ALL FUNDS
SUMMARY OF REVENUES BY CATEGORY
FY 2012/13 THROUGH FY 2015/16

ALL FUNDS	FY 2012/13 FYE AUDITED	FY 2013/14 FYE AUDITED	FY 2014/15 AMENDED BUDGET	FY 2014/15 FYE PROJECTED	FY 2015/16 ADOPTED BUDGET	% INCR/ -DECR
Property Taxes	$ 1,161,741	$ 1,157,847	$ 1,124,097	$ 1,136,903	$ 1,144,230	0.6%
Sales Taxes	3,181,825	3,255,939	3,308,197	3,298,562	3,374,980	2.3%
Transient Occupancy Taxes	1,561,122	1,667,580	1,641,000	1,755,000	1,790,060	2.0%
Other Taxes	503,328	518,118	494,000	506,165	506,000	0.0%
Total Taxes	**6,408,016**	**6,599,484**	**6,567,294**	**6,696,630**	**6,815,270**	**1.8%**
Licenses & Permits	262,592	237,692	255,207	253,452	256,062	1.0%
Fines & Forfeitures	23,415	37,537	32,000	25,900	28,900	11.6%
Use of Money & Property	70,193	76,890	84,950	80,255	79,265	-1.2%
Intergovernmental	1,520,353	3,182,808	10,674,466	8,017,556	4,410,457	-45.0%
Charges for Services	9,878,541	10,782,846	11,136,833	11,328,597	11,351,615	0.2%
Other Revenues	172,690	169,844	89,000	128,034	145,000	13.3%
Transfers	2,269,010	2,313,265	8,878,562	9,294,553	5,822,400	-37.4%
Total	**20,604,810**	**23,400,366**	**37,718,312**	**35,824,977**	**28,908,969**	**-19.3%**
Less Transfers	(2,269,010)	(2,313,265)	(8,878,562)	(9,294,553)	(5,822,400)	37.4%
Total Without Transfers	**18,335,800**	**21,087,101**	**28,839,750**	**26,530,424**	**23,086,569**	
Less Internal Service Funds	(687,520)	(1,245,534)	(1,077,602)	(1,077,552)	(1,188,550)	-10.3%
Less Internal Service Charges	(2,486,615)	(2,974,407)	(2,954,354)	(2,958,751)	(2,981,643)	-0.8%
Interfund Cost Reimbursement	(398,932)	(474,603)	(443,000)	(469,500)	(450,000)	4.2%
Net Revenues	**$ 14,762,733**	**$ 16,392,557**	**$ 24,364,794**	**$ 22,024,621**	**$ 18,466,376**	**-16.2%**

REVENUES BY CATEGORY
FY 2015/16 ALL FUNDS



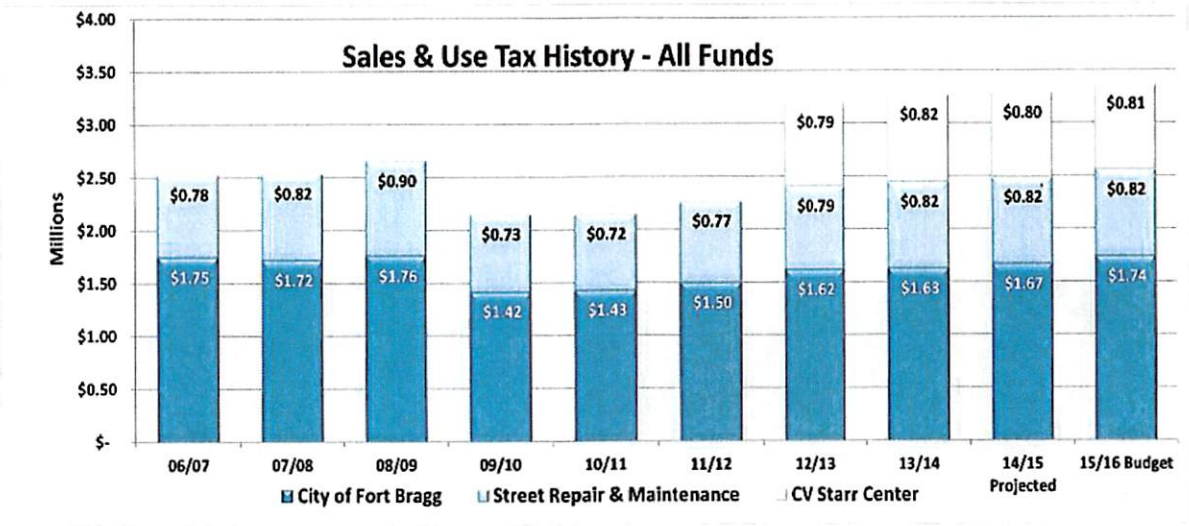
DISCUSSION OF REVENUE TRENDS

Overall, City operating revenues show modest, upward trends. Operating revenue totals for FY 2014/15 and FY 2015/16 show increases of 5.6% and 1.0% respectively. Operating funds include the General Fund, Water Enterprise and Wastewater Enterprise. The 13% decrease (excluding transfers) in total revenue for FY 2015/16 shown on the table above is primarily due to a decrease in grant revenue funding for the north portion of the Coastal Restoration & Trail Project. Grant revenue represents 13.6% of the City's projected revenue for FY 2015/16.

Sales Tax

Sales tax revenues include the City's general sales tax as well as a special half-cent sales tax for the C.V. Starr Center and a special half-cent sales tax for Street Repairs. Based on an analysis of trends in year-to-date tax receipts, macroeconomic conditions and an examination of local business data, it is anticipated that the City will receive sales tax revenue of $1.67 million in FY 2014/15 and $1.74 million in FY 2015/16 (not including the two special half-cent sales taxes). The State has terminated its "triple flip" program so the City will receive more timely payments of its sales tax receipts. This primarily affects cash flow, but will result in slightly better interest earnings for the General Fund.

While overall sales tax revenue growth continues in a slow positive trend from recessionary lows, there are some potential risks that could affect the current trend. The most evident of these is internet sales. Recent news indicates that internet retail sales are anticipated to increase by over 15% (over prior year) during the critical holiday sales season. This trend will continue to exert downward pressure on sales tax growth, a key source that constitutes approximately 20% of General Fund revenue.



Transient Occupancy Tax

Transient occupancy tax (TOT) is a 10% local tax that is applied to the cost of hotel or other lodging stays of less than 30 days. This tax is a revenue source for the General Fund. TOT is collected by lodging establishments and remitted to the City on a monthly basis. Factors influencing TOT revenues include vacancy rates, changes in business and leisure travel, new hotels, hotel expansion, and room rate increases. TOT is the largest General Fund revenue source and is expected to account for 20% of all projected General Fund resources next year.

Based on year-to-date receipts, FY 2014/15 year-end TOT revenues are projected to be approximately $87k higher than FY 2013/14 totals. The FY 2015/16 Budget projects continued growth in TOT revenue.

CITY OF BROOKINGS

COUNCIL WORKSHOP REPORT

Meeting Date: March 7, 2016

Originating Dept: City Manager

(Signature Submitted by)

City Manager Approval

Subject: Economic Development Strategy and Action Plan

Recommended Action:
Discussion.

Background/Discussion:
The City Manager prepared an Economic Strategy and Action Plan that was adopted by the City Council in 2009 and revised in 2013. The City Manager has developed a 2016 revision to this Strategy/Plan for discussion with the City Council.

Attached are copies of the 2013 Strategy/Plan with elements highlighted where there has been significant progress, and a draft 2016 Strategy/Plan.

The City Manager will discuss the proposed Strategy Plan at the workshop and seeks Council comments.

Attachment(s):

a. Economic Development Strategy and Action Plan, January 2013.
b. Draft Economic Development Strategy and Action Plan, March 2016.

Brookings: Oregon's South Pacific

CITY OF BROOKINGS
ECONOMIC DEVELOPMENT STRATEGY and ACTION PLAN
January 2013

The City of Brookings has undertaken a number of activities formulating the basis for an Economic Development Strategy in recent years including:

- The Proud Study (2000)
- The Downtown Master Plan (2002)
- Urban Renewal Plan (2002)
- Systematically updating the Land Development Code (2007-2009)
- Updating infrastructure master plans (2007-2008)
- The Lone Ranch Master Plan of Development (2004 and 2009)
- ECONorthwest Economic Opportunities/Development Strategy (2009)

The City Manager prepared several "white paper" reports on economic development in 2008 and an Economic Development Strategy document in June 2009. During the 2009 goals setting meeting, it became evident that the City Council is desirous of a more aggressive approach to facilitating economic development.

The City Manager has also reviewed various other documents, including the Curry County Economic Development Plan, and the Del Norte County Tri Agency Economic Development Plan.

City staff has participated in various community meetings economic development discussions, including the local Board of Realtors, Chamber of Commerce, Curry Promotional Alliance and others. The City Manager has met with other groups and individuals with future economic development related interests in Brookings, including representatives of Lone Ranch LLC, the Smith River Rancheria, Southwestern Oregon Community College, Border Coast Airport Authority, Curry Health District and others. The City Manager convened a meeting of local marketing professionals to discuss the development of a marketing plan in November 2011. During the 2011-12 budget process, the City Manager recommended retention of an economic development specialist to assist the City in a proactive approach to matching up local landowners and business leaders with developers and development funding; this project was deleted by the Budget Committee. In May 2011, the City Manager facilitated a meeting between Curry County, City of Brookings, City of Crescent City and Del Norte County representatives to explore the possible expansion of the Tri-Agency Economic Development Commission to include Curry County; this concept apparently lacked support.

Staff recommends that the City Council adopt the following policy statements and Action Plan for economic development.

DEFINING THE CITY'S FUTURE ECONOMIC BASE

While these are difficult economic times in which to develop an economic vision for the community, the City Council finds that the City's economic future will rely heavily upon:

1. Retaining existing resource-based business and industry, including lumber production and fishing, to the greatest extent possible. These activities typically provide better "living wage" jobs than are found in tourism or service industries.
2. More retirees as full time residents. Retirees bring with them entitlement incomes. The development of an employment base and the same level of infrastructure needed to support

business/industry are not needed with a retirement-based community as retirees import income from elsewhere and contribute to the local economy from their home. Retirees bring a job and a "salary" with them…their job is being retired.

3. Employees who work in Del Norte County and live in Brookings.
4. Sustaining and expanding tourism.
5. Attracting "boutique industry"…smaller entrepreneurs who do not need to be located in an urban area are increasingly interested in moving their family business to an area where they and their employees can enjoy a better quality of life. "Quality of life" has a number of elements, including public safety, education, parks, health care, clean air and being able to have a sense of pride in the community where you live.
    - The same "quality of life" ribbon runs through business attraction, tourism, and recruiting new residents.
6. Service and retail industry to support people "employed" in 1-5 above.
7. State and National Parks.

ASSETS AND CONSTRAINTS

Assets and constraints to economic development in Brookings have been well documented in earlier studies and reports. The City Council finds that the top three major constraints to attracting more retiree homeowners to Brookings are:

1. Access to medical care.
2. Transportation…air and ground ("to visit the grandkids, medical and shopping).
3. Lack of shopping and entertainment opportunities.

Other economic development constraints identified through discussion with community stakeholders include:

- Lack of available sites for light industry.
- Lack of continuing education/job training opportunities.
- High utility connection costs (SDCs) for some business classifications.
- Need for more/better local recreational amenities.
- National economic trends and regulation of resources (lumber, fishing).

Assets related to building the future economic base include:

- Comparatively (with California) low property costs.
- Comparatively low taxes.
- Mild coastal climate.
- Attractive physical environment.
- Sustainable resource usage practices.
- Proximity to California and a major California State employer.
- Community-based organizations offering a variety of social opportunities.

GETTING THERE

Based upon a comprehensive review of the forgoing, the City's economic development strategy consists of the following action items:

1. ***Assist Curry Health Network in securing approval of an Emergency Room designation at the Brookings Clinic.*** The 2009 Strategy was "Improve access to medical care: *Work with the Curry*

Health District to facilitate the development of a 24-hour urgent care facility and hospital on the 7.5-acre parcel adjacent to the Civic Center. This would involve annexing the Brookings area to the District. Work with public and private transit agencies to establish a ground shuttle transportation system to medical service providers in Medford." A new clinic with an Urgent Care unit has been constructed adjacent to City Hall. The Health District has been seeking approval of an Emergency Room designation for this facility, which would be an enhanced level of critical care.

2. ***Improve transportation systems.***

   a. Continue working with the Border Coast Airport Authority to redevelop Del Norte Airport and attract additional commercial air carriers, specifically to add northbound service.

   b. Develop an intergovernmental agreement with curry County to develop a master plan for the Brookings Airport area and pursue funding for infrastructure construction.

3. ***Make more property available for light industry.***

   a. Work with the County to develop a plan for providing infrastructure to the Brookings Airport and adjacent properties that could support light industry.

4. ***Make park and recreation facilities part of the economic development plan.*** Parks are an existing resource that can be built upon. The quality of parks and public areas are a significant part of the decision making process by retirees, small business entrepreneurs and others considering relocating to the community. Parks are also part of the tourism economic base. Brookings could market itself as "the City of parks." Elevate park maintenance and development to the same level as other economic development endeavors. Pursue the following projects:

   a. A new aquatics facility. Possibly an ocean view/front indoor water park type of facility.
   b. Develop a "Brookings: City of Parks" marketing campaign promoting City parks and the City's proximity to State and National Parks.
   c. Budget for improvements to sports field improvements at Azalea Park and Cross Park; promote those facilities for regional tournaments.
   d. Work with the golf course lessee to establish a reliable water supply source and to complete facility improvements contemplated in the golf course improvement plan.
   e. Budget for improvements to the Mill Beach access.

   Community amenities include local events, such as the Kite Derby, Festival of the Arts, Azalea Festival, summer music series and holiday lights festival. The City should continue to support these activities.

5. ***Create more incentives for downtown urban renewal.*** The City has waived the off-street parking requirements for property located in the downtown business district, has invested thousands of dollars in façade improvement projects, and street/pedestrian/drainage improvements. Waiver of the off-street parking requirements has transferred the responsibility for this infrastructure to the City.

   a. Restart the facade improvement grant program through the Urban Renewal Agency.

   b. Begin purchasing land for off-street parking.

   c. Develop a business incentive package that would include items including subsidizing System Development Fees and building permit fees for targeted businesses in the downtown area, and waiving first-year business license fees.

6. ***Utilize the college.*** The 2009 Strategy included: ***"Build the college*** *and work with the college leadership to develop programs that will assist in developing a local workforce appropriate to the local economy, and to provide continuing education opportunities to the retirement community.*" The college has been built; the City should continue to be engaged in assisting in matching employee development needs with college programs.

7. ***Develop and implement a marketing plan.***

    a. Retain the services of a marketing consultant to develop a marketing plan and marketing funding strategy to target-market retirees and California State employees.

According to California labor market statistics, the number of California State employees working in Del Norte County rose by 6.0 per cent from December 2007-December 2008. In a meeting with realtors, it was noted that sales to California State employees (Pelican Bay, Agricultural Station, etc.) make up a sizeable portion of real estate acquisitions. About 30 per cent of current prison employees reside in the Brookings area.

8. ***Continue support of tourism expansion.*** The City currently appropriates a portion of the Transient Occupancy Tax (motel tax) it collects to support Chamber of Commerce tourism promotion efforts. The Chamber of Commerce currently operates a visitor information center at the Port, and the State has relocated its visitor center to the Oregon/California border. While several private business operators in Brookings have installed visitor information kiosks or tables within their business, there is no clearly identifiable visitor information center along Highway 101 within the City. The City's contract with the Chamber for tourism promotion expires July 1, 2012.

    a. Develop a plan for a visitor information center in downtown Brookings.

    b. Issue an RFP for tourism promotion services.

9. ***Improve Infrastructure.*** Improvements are needed to the City's water, sewer, storm drain and street systems. Specific projects that should be pursued as a part of the economic development effort include:

    a. Reconstruction/widening/channelization of Railroad Street.

    b. Extending water and sewer service to the Airport.

    c. Water, wastewater and storm drain capacity improvements.

10. ***Revisit the old Visitor Center.*** The former visitor center at Harris Beach State Park is now being used internally by the Parks and Recreation Department for small meetings. This area of the Park property has been designated as a future group campground area. However, State Parks may be considering alternatives.

    a. Initiate discussion with State Parks on the highest and best use for the former visitor center area.

11. ***Act proactively and take advantage of emerging opportunities.***

    a. Retain the services of a real estate and economic development consultant to help initiate economic development projects with targeted Brookings landowners. Assess development potential of undeveloped or underdeveloped properties to assess development potential, identify potential development/financing partners, and lay the groundwork development deals. Not included in this strategy report is discussion of a possible destination resort.

b. There may be other economic development opportunities that do not seem feasible or are not conceivable at this time. The City should be prepared to consider such opportunities as they arise.

BEYOND BROOKINGS

In pursuing its economic development efforts the City needs to be cognizant of regional economic development efforts and develop relationships and partnerships with other agencies on mutually beneficial projects/programs.

- ***The Port.*** Staff receives many comments from the public as to how the Port of Brookings Harbor is a "diamond in the rough" and could become a larger regional tourism attraction. The City has little or no contact with the Port, although the Port has a significant economic impact on the City of Brookings. The City Manager recommends that an effort be made to develop a joint economic development strategy with the Port.
- ***The College.*** Southwestern Oregon offers a number of economic development related services, including the operation of a Small Business Development Center (a representative is in Brookings one day/week) and job training.
- ***Smith River Rancheria.*** Smith River Rancheria is fast becoming one of the largest employers in the area, with a large percentage of employees and tribal members residing in Brookings. Rancheria development plans include a major casino expansion, hotel, conference and recreation facilities, and affordable housing. These activities could have residual benefit to Brookings in attracting tourists, new business and new residents. Regular contact with the Rancheria management should be maintained to pursue projects of mutual interest.
- ***Curry County.*** The County has disbanded its Economic Development Department and this function is now a part of the Commissioner's Office.

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1. Retaining existing resource-based business and industry, including lumber production and fishing, to the greatest extent possible. These activities typically provide better "living wage" jobs than are found in tourism or service industries.
2. Expansion of health care services.
3. More retirees as full time residents. Retirees bring with them entitlement incomes. The development of an employment base and the same level of infrastructure needed to support business/industry are not needed with a retirement-based community as retirees import income from elsewhere and contribute to the local economy from their home. Retirees bring a job and a "salary" with them…their job is being retired.
4. Employees who work in Del Norte County and live in Brookings.
5. Sustaining and expanding tourism.
6. Attracting "boutique industry"…smaller entrepreneurs who do not need to be located in an urban area are increasingly interested in moving their family business to an area where they and their employees can enjoy a better quality of life. "Quality of life" has a number of elements, including public safety, education, parks, health care, clean air and being able to have a sense of pride in the community where you live.
    - The same "quality of life" ribbon runs through business attraction, tourism, and recruiting new residents.
7. Service and retail industry to support people "employed" in 1-5 above.
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Other economic development constraints identified through discussion with community stakeholders include:

- Lack of available sites for light industry.
- Lack of continuing education/job training opportunities.
- High utility connection costs (SDCs) for some business classifications.
- Need for more/better local recreational amenities.
- National economic trends and regulation of resources (lumber, fishing).

Assets related to building the future economic base include:

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- Mild coastal climate.
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- Sustainable resource usage practices.
- Proximity to California and a major California State employer.
- Community-based organizations offering a variety of social opportunities.

GETTING THERE

Based upon a comprehensive review of the forgoing, the City's economic development strategy consists of the following action items:

1. ***Assist Curry Health Network in securing approval of an Emergency Room designation at the Brookings Clinic.*** While state approval has been secured and construction is complete, the Curry Health Network (CHN) has been unable to open the Emergency Room to due to CHN financial constraints. The City should continue to explore alternatives for assisting CHN with full implementation.

2. ***Improve transportation systems.***

    a. Continue working with the Border Coast Regional Airport Authority to redevelop Del Norte Airport and attract additional commercial air carriers, specifically to add northbound service.

    b. Develop an intergovernmental agreement with curry County to develop a master plan for the Brookings Airport area and pursue funding for infrastructure construction.

3. ***Make more property available for light industry.***

    a. Work with the County to develop a plan for providing infrastructure to the Brookings Airport and adjacent properties that could support light industry. This includes overcoming access issues related to the County-owned industrial property adjacent to the airport.

4. ***Make park and recreation facilities part of the economic development plan.*** Parks are an existing resource that can be built upon. The quality of parks and public areas are a significant part of the decision making process by retirees, small business entrepreneurs and others considering relocating to the community. Parks are also part of the tourism economic base. Brookings could market itself as "the City of parks." Elevate park maintenance and development to the same level as other economic development endeavors. Pursue the following projects:

    a. Budget for improvements to sports field improvements at Azalea Park and Cross Park; promote those facilities for regional tournaments.

    b. Develop a "Brookings: City of Parks" marketing campaign promoting City parks and the City's proximity to State and National Parks.

    c. A new aquatics facility. Possibly an ocean view/front indoor water park type of facility.

    d. Work with the golf course lessee to establish a reliable water supply source and to complete facility improvements contemplated in the golf course improvement plan.

Community amenities include local events, such as the Kite Derby, Festival of the Arts, Azalea Festival, summer music series and holiday lights festival. The City should continue to support these activities.

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    a. Restart the facade improvement grant program through the Urban Renewal Agency.

    b. Begin purchasing land for off-street parking.

    c. Develop a business incentive package that would include items including subsidizing System Development Fees and building permit fees for targeted businesses in the downtown area, and waiving first-year business license fees.

6. ***Utilize the college.*** The 2009 Strategy included: *"**Build the college** and work with the college leadership to develop programs that will assist in developing a local workforce appropriate to the local economy, and to provide continuing education opportunities to the retirement community."* The college has been built; the City should continue to be engaged in assisting in matching employee development needs with college programs.

7. ***Develop and implement a marketing plan.***

    a. Retain the services of a marketing consultant to develop a marketing plan and marketing funding strategy to target-market retirees and California State employees.

    b. Target telecommuters

According to California labor market statistics, the number of California State employees working in Del Norte County rose by 6.0 per cent from December 2007-December 2008. In a meeting with realtors, it was noted that sales to California State employees (Pelican Bay, Agricultural Station, etc.) make up a sizeable portion of real estate acquisitions. About 30 per cent of current prison employees reside in the Brookings area. Technology is enabling more people to telecommute.

According to the California Employment Development Department, the number of people seeking opportunities to relocate from urban areas and telecommute is rising sharply; Millennials are being forced out of urban areas by factors like housing affordability and the cost of raising families. One EDD report indicates:

> "A key point with Millenials is that they don't want to abandon the amenities that drew them to urban areas…like active arts and culture and foodie scenes. So, when they look to relocate they're going to seeking small and mid-size areas that offer a good quality of life, but that still have the amenities they're accustomed to enjoying and want to expose their kids to."

8. ***Continue support of tourism expansion.*** The City currently appropriates a portion of the Transient Occupancy Tax (motel tax) it collects to support Chamber of Commerce tourism promotion efforts. The Chamber of Commerce currently operates a visitor information center at the Port, and the State has relocated its visitor center to the Oregon/California border. While several private business operators in Brookings have installed visitor information kiosks or tables

within their business, there is no clearly identifiable visitor information center along Highway 101 within the City. The City has developed a rudimentary visitor center at City Hall.

a. Improve/expand the visitor information center at City Hall.

9. ***Improve Infrastructure.*** Improvements are needed to the City's water, sewer, storm drain and street systems. Specific projects that should be pursued as a part of the economic development effort include:

   a. Reconstruction/widening/channelization of Railroad Street.

   b. Extending water and sewer service to the Airport.

   c. Water, wastewater and storm drain capacity improvements.

   d. Park improvements to attract more events and tournaments.

10. ***Revisit the old Visitor Center.*** The former visitor center at Harris Beach State Park is now being used internally by the Parks and Recreation Department for small meetings. This area of the Park property has been designated as a future group campground area. However, State Parks may be considering alternatives.

   a. Initiate discussion with State Parks on the highest and best use for the former visitor center area.

11. ***Act proactively and take advantage of emerging opportunities.***

   a. Retain the services of a real estate and economic development consultant to help initiate economic development projects with targeted Brookings landowners. Assess development potential of undeveloped or underdeveloped properties to assess development potential, identify potential development/financing partners, and lay the groundwork development deals. Not included in this strategy report is discussion of a possible destination resort.

   b. There may be other economic development opportunities that do not seem feasible or are not conceivable at this time. The City should be prepared to consider such opportunities as they arise.