STATE OF MONTANA DEPARTMENT OF COMMERCE

MONTANA COAL BOARD MEETING

DATE: March 13, 2025—Department of Commerce, 301 South Park Avenue, Helena, Montana
LOCATION: Department of Commerce, Rooms 226-228; 301 South Park Avenue, Helena, MT
(Applications to be considered for this meeting were due January 27, 2025)

Register in advance for this webinar:
Please click this URL to join: https://mt-gov.zoom.us/s/82237723829?pwd=KpvE809ILuZS9geob42acQWpaJbbAG.1
Passcode: 777111
Or join by phone:
Dial (for higher quality, dial a number based on your current location):
US: +1 213 338 8477 or +1 206 337 9723 or +1 646 558 8656
Webinar ID: 822 3772 3829
Passcode: 777111

WHEN: 8:30 a.m.

March 13, 2025

Board Members

Scott Rosenthal, Butte – Engineering
Jon Wells, Hardin – Impact Area
Catherine Laughner, Big Sky – Attorney
Sandra Jones, Roundup – Public Administration
Tim Schaff, Roundup – Education
Hal Fuglevand, Billings -- Impact Area
Sandy Tutvedt, Kalispell -- Education

Notice of Public Meeting

March 12, 2025:

6:00 p.m.-The Board may gather informally for dinner at 6:00 p.m. in the Governors Room at Silver Star Steak Company, 833 Great Northern Blvd, Helena, MT. Members of the public are also invited to attend dinner at their own expense.

March 13, 2025: **The Board will hold a quarterly meeting at 8:30 am, Thursday, March 13, 2025, in Rooms 226-228, Department of Commerce, 301 South Park Avenue, Helena, MT.** For more information or to request reasonable accommodations for a disability, please contact Community MT staff at (406) 841-2770 or at DOCCDD@mt.gov before the meeting. Conference call information for this meeting is available on the Coal Board website (https://comdev.mt.gov/Boards/Coal/Meetings).

Agenda:

Informational Items:

1. Call to order
2. Roll call
3. Commerce Updates
4. Opportunity for public comment on items not on the agenda, but within the Board's jurisdiction
5. Budget Update
    - *Community MT Staff update*
    - *Opportunity for public comment*
    - *Board discussion*
6. Project Updates
    - Open and Closed project status
        - *Community MT Staff update*
        - *Opportunity for public comment*
        - *Board discussion*
    - 0992-City of Roundup-Thank You Letter and Picture

- o *Community MT Staff update*
- o *Opportunity for public comment*
- o *Board discussion*

o 0976-Richland County-Status Update

- o *Community MT Staff update*
- o *Opportunity for public comment*
- o *Board discussion*

o 1003-Musselshell County-Thank you Letter

- o *Community MT Staff update*
- o *Opportunity for public comment*
- o *Board discussion*

o 1011-Big Horn County-Withdrawal Letter

- o *Community MT Staff update*
- o *Opportunity for public comment*
- o *Board discussion*

7. New Applications - Presentations (See Table below)

Applicant #	Applicant	Project Description	Funds Requested	Total Project Costs
1010	Town of Winnett	Purchase of a Dump Truck	$100,000.00	$115,000.00
1012	Big Horn County	Boiler and Fire Systems Replacements at Big Horn County Library	$155,620.87	$202,620.87
1013	City of Forsyth	Construction of a New Water Tank and Installation of a Booster Pump	$200,000.00	$3,482,871.00
		Total Requested:	**$ 455,620.87**	**$3,800,401.87**

Board Action Items:

8. Approval of Minutes
   - o December Meeting minutes (December 12, 2024)
     - o *Community MT Staff update*
     - o *Opportunity for public comment*
     - o *Board discussion*
     - o *Board action*
9. Board action on grant applications
   - o *1010-Town of Winnett*
   - o *1012-Big Horn County*
   - o *1013-City of Forsyth*
10. Opportunity for public comment
11. Board Matters
    - o Confirmation of next meeting dates and location
      - o June 5, 2025-Billings-Hilton Garden Inn (Tentative)
      - o September 11, 2025-Billings-Hilton Garden Inn (Tentative)
12. Adjourn

Updated as of 2/28/2025

Cash Balance as of July 1	$	9,652,911.21
Obligated Grant funds from Current Year	$	2,811,320.00
Obligated Grant funds from Previous Years	$	5,035,229.85
Current Year Expenses	$	1,787,853.10
Current Year Revenue	$	3,303,979.78
Net Cash Available	**$**	**3,322,488.04**

Fiscal Year 2024 Available Grant Authority	$	3,482,000.00
Current Year Obligated Grants	$	2,811,320.00
Current Year Funding Available for Grants	**$**	**670,680.00**

Coal Tax Revenue Comparison

	Fiscal Year						
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
July	776,652.84	229,874.49					
August	380,203.53	779,907.23					
September	6,181.02	6,181.02					
October	1,150,663.76	1,237,774.60					
November	6,181.02	6,181.02					
December	6,181.02	6,181.02					
January	679,293.47	836,814.16					
February	479,636.88	201,066.24					
March	6,181.02	-					
April	686,355.14	-					
May	343,007.67	-					
June	6,181.02	-					
TOTAL	**4,526,718.39**	**3,303,979.78**	**-**	**-**	**-**	**-**	**-**

	Fiscal Year						
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
July	247,193.27			222,429.42	431,312.73	617,761.79	592,505.22
August	693,771.22	740,446.95	918,302.50	539,831.96	6,181.03	6,181.02	557,127.95
September			(504.39)	5,979.51	6,181.03	6,181.02	6,181.02
October	755,932.38	332,719.15	519,416.85	316,099.35	489,138.85	6,181.02	1,326,249.17
November	101,974.55	629,341.43	439,644.24	457,270.54	6,181.03	884,379.21	6,181.02
December		580.99			6,181.03	6,178.12	6,181.02
January	648,624.21	308,187.51	702,308.56	327,851.56	302,836.00	763,081.14	682,360.04
February	80,414.86	551,400.30	235,857.70	316,829.05	238,944.10	182,395.75	329,880.83
March	(1,551.84)			2,063.81	21,376.15	6,181.02	6,181.02
April	531,173.29	721,648.76	625,338.13	557,704.92	863,630.16	972,088.37	801,341.83
May	146,179.43	98,316.33	95,829.81	90,338.94	7,826.03	6,181.02	470,259.15
June	7,422.78	505.97	(505.97)	108,927.02	(84,162.96)	19,694.51	(6,181.02)
TOTAL	**3,211,134.15**	**3,383,147.39**	**3,535,687.43**	**2,945,326.08**	**2,295,625.18**	**3,476,483.99**	**4,778,267.25**

Open Coal Board Grants

Grant #	Grantee Name	Project Name	Award Date	Grant Amount	Remaining Funds as of **February 28**, 2025	Expiration Date
2017 Biennium						
787	Crow Tribe	Phase 3C WW Collection	6/16/2016	$200,000.00	$65,000.00	3/31/2026
2021 Biennium						
889	City of Hardin	Upgrade Wastewater Collection and Treatment Plants	3/12/2020	$250,000.00	$82,500.00	3/31/2026
2023 Biennium						
932	City of Colstrip	Business Innovation Center Construction Project	3/10/2022	$375,000.00	$154,409.70	9/30/2026
937	City of Forsyth	Water Intake Project	6/9/2022	$100,000.00	$100,000.00	12/31/2025
946	City of Colstrip	North End Water Loop Construction Project	12/8/2022	$224,484.00	$224,484.00	12/31/2025
947	Rosebud County	Purchase of Ambulance/Extrication Equipment	12/8/2022	$614,200.00	$293,868.00	12/31/2024
948	City of Colstrip	Purchase of Pumper/Tanker for Colstrip Volunteer FD	12/8/2022	$375,000.00	$67,697.00	12/31/2025
957	Big Horn County	Equipment Purchase for Big Horn County Rural FD	3/9/2023	$385,000.00	$385,000.00	9/30/2025
2025 Biennium						
966	Treasure County	Gibson Road Bridge Replacement	9/14/2023	$189,550.00	$175,832.00	3/31/2026
968	Musselshell County	Purchase of a Replacement Ambulance	9/14/2023	$215,000.00	$215,000.00	12/31/2026
972	Rosebud County	Castle Rock Road Improvements	9/14/2023	$500,000.00	$459,828.05	12/31/2025
975	Big Horn County	Purchase of Patrol Vehicles for Sheriff's Office	12/14/2023	$120,000.00	$120,000.00	12/31/2026
976	Richland County	Development of County EDS and CEDS	12/14/2023	$45,000.00	$19,381.16	9/30/2025
977	Colstrip Public Schools	Gymnasium Vestibules	12/14/2023	$376,151.00	$376,151.00	12/31/2025
982	Pryor Public Schools	PAR for School Building	12/14/2023	$83,062.00	$83,062.00	12/31/2025
985	Petroleum County	Courthouse Renovation and Reuse Project	3/14/2024	$250,000.00	$203,474.94	12/31/2026
987	City of Hardin	Purchase of a Garbage Truck	3/14/2024	$210,000.00	$210,000.00	12/31/2026
988	Rosebud County	Re-Roof Project at Colstrip Medical Center	6/13/2024	$138,000.00	$138,000.00	12/31/2026

989	Hysham Public Schools	Preparation of a PAR	6/13/2024	$40,122.00	$40,122.00	12/31/2025
990	Rosebud County	Sheriff's Department Dispatch Upgrades	6/13/2024	$169,600.00	$169,600.00	12/31/2026
993	Savage Public Schools	School Building Repairs	9/12/2024	$281,000.00	$281,000.00	12/31/2026
994	Forsyth Public Schools	Heating System Controls Replacement	9/12/2024	$139,150.00	$139,150.00	12/31/2025
996	City of Colstrip	Phase 1 of the Crack Sealing Project	9/12/2024	$200,000.00	$200,000.00	12/31/2025
997	Town of Hysham	Phase 1B of the Water Treatment Improvements Project	9/12/2024	$350,000.00	$350,000.00	12/31/2027
999	City of Colstrip	Replacement of Water Main at WWTP/Cedar Street	9/12/2024	$481,670.00	$481,670.00	12/31/2026
1002	Rosebud County	Test and Training Site Feasibility Study	12/12/2024	$35,000.00	$35,000.00	
1003	Musselshell County	Wier Building Revitalization Project	12/12/2024	$182,000.00	$182,000.00	3/31/2027
1004	Hardin Public Schools	Boiler Replacement Project	12/12/2024	$750,000.00	$750,000.00	12/31/2026
1008	Big Horn County	Growth Policy Update	12/12/2024	$37,500.00	$37,500.00	3/31/2026
1009	Treasure County	Firehall Remodel and Roof Replacement Project	12/12/2024	$100,000.00	$100,000.00	

Total balance remaining	$6,139,729.85

Sandra Jones, Mayor

GARY TOOMBS, President of Council
TANYA LANTER, Clerk/Treasurer
CASSANDRA MANN, Assistant Clerk
LON SIBLEY, Director of public Works
BRADLEY MARKING, City Judge

City of Roundup

P.O. BOX 660
Roundup, MT 59072
Phone(406) 323-2804 Fax (406)323-2757
Roundupmontana.net

GARY TOOMBS Ward I
JAMES VIVIRITO Ward I
FLOYD FISHER Ward II
JEREMY ERICKSON Ward II
RICK CARLSON Ward III
DOLLY LONG Ward III
CAMERON MCCLEARYWard IV
GEORGE ADAMS Ward IV

January 23, 2025

To: The Montana Coal Board

Subject: City of Roundup project purchase of a backhoe

On Behalf of the City of Roundup we want to thank the Montana Coal Board for all of the help that they provide for projects in Coal communities in the State. We thank you for funding our purchase of a new backhoe.

I am attaching a picture of the backhoe that the Public Works Department immediately put to work with snow removal. efforts.

Once again thank you so very much for your continued support to the City of Roundup.

Respectfully Yours

Sandra Jones

Roundup Mayor

Sandra Jones


DEERE
DEERE

richland
redc.
economic development corp

February 26, 2025
Update to MT-CB-PL-25-0976

It has been a while since I touched bases with you, and so I thought I'd bring you up to date to where we're at in our Economic Diversification (EDS) and Comprehensive Economic Development Strategies (CEDS).

When I presented an update to you in September 2024, I had successfully attained the grants from the Coal Board and EDA to put out the RFQ to qualified consulting firms with experience in creating economic diversification strategies, as well as the CEDS.

The RFQ's were placed in the Billings Gazette, The Roundup, The Sidney Herald, and on Face Book during the month of Sept 2024. Our office received 3 quality proposals from: Kadrmas, Lee & Jackson (KLJ), TPMA, and Interstate Engineering. We created a committee of 6 individuals who each scored the proposals. Based upon the results, KLJ Engineering was selected as the top proposal.

In October, a professional contract was signed by REDC and KLJ.

In November, we researched and drafted the survey that would best suit the needs for both the diversification and the CEDS.

In December, KLJ and our REDC held multiple public meetings, pop up meetings, and socials all over the county conducting the survey: Three in Sidney, one in Fairview, one in Savage, one in Lambert. We were told by KLJ that for a county population of roughly 11,000 people, if we got between 250-300 respondents, this would be a successful representation of the residents. We received 280 responses.

At this time, KLJ is analyzing all of the responses and extra comments and putting them into a legible and presentable format. Soon, (March 5) KLJ will present a draft to my board of directors for them to approve. We expect to have the final strategies no later than April 30, 2025, well ahead of our grant deadline of June 30, 2025.

609 south central avenue
sidney, montana 59270
406.482.4679

richland **redc.** economic development corp

I'd like to thank you again for your match in the project, and I am excited to use this final strategy (when it's complete) to help guide our economy forward.

Respectfully,

Leslie Messer

Leslie Messer, Executive Director
Richland Economic Development Corp

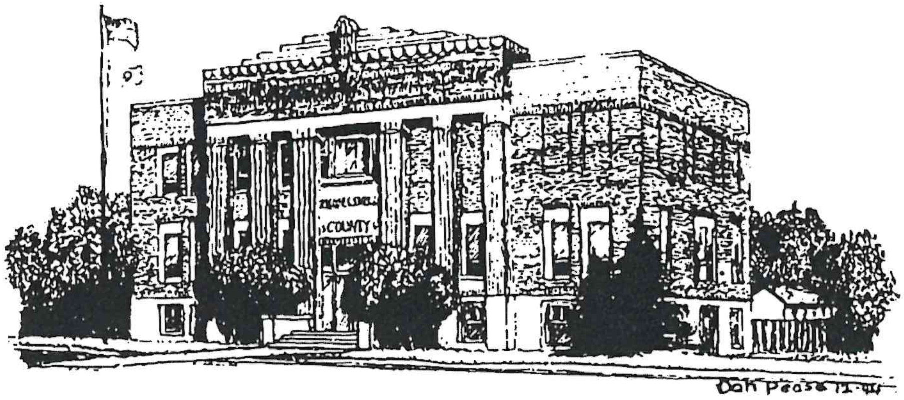
609 south central avenue
sidney, montana 59270
406.482.4679

MUSSELSHELL COUNTY

:IKE GOFFENA
:ICHAEL TURLEY
OBERT S. PANCRATZ
)UNTY COMMISSIONERS
6 Main Street
6-323-1104

HERYL TOMASSI
.ERK & RECORDER
6 Main Street
6-323-1104
x: 406-323-3303

ARCIE L. HETRICK
REASURER
JPT. OF SCHOOLS
SSESSOR
6 Main Street
6-323-2504
x: 406-323-3127



SHAWN L. LESNIK
SHERIFF
CORONER
820 Main Street
406-323-1402
Fax: 406-323-2566

BEN KRAKOWKA
COUNTY ATTORNEY
506 Main Street
406-323-2230
Fax: 406-323-3458

BARB HALVERSON
CLERK OF DISTRICT COURT
506 Main Street
406-323-1413
Fax: 406-323-1710

BRAD MARKING
JUSTICE OF THE PEACE
P.O. Box 565
406-323-1078

ROUNDUP, MONTANA 59072

January 17, 2025

Rachel Young
Montana Coal Board
Montana Department of Commerce
301 S Park Ave
Helena, MT 59620

RE: Montana Coal Board Grant Award

Dear Rachel and Team,

Musselshell County is incredibly thankful for the Montana Coal Board's grant support for our Wier Building Revitalization project. This partnership will enable an important step forward in the revitalization of our community and recovery of our economy. This project will create an anchor development for Main Street and help address our workforce housing and Main Street retail service space needs.

We have shared the Department of Commerce's press release regarding the Coal Board awards with our regional newspapers and our local radio station. It was also posted on Roundup Community Partners' Facebook page.

Thank you again for enabling this anchor development for the intentional revitalization of our Main Street. This improvement would not be possible without this partnership.

Sincerely,

Robert Pancratz
County Commissioner Chair
rpancratz@co.musselshell.mt.us
406-323-1104

Theresa Doumitt
Project/Grant Manager
tdoumitt@hotmail.com
406-323-3793

RECEIVED
JAN 22 2025
DEPARTMENT OF COMMERCE
COMMUNITY DEVELOPMENT DIVISION

SCANNED

Big Horn Hospital Association

CHOOSE HEALTH

Big Horn Hospital Association
17 N Miles Avenue
Hardin, MT 59034
kgatrell@bighornhospital.org
406-665-2310

February 24, 2025

Montana Coal Board
301 S Park Avenue
Hardin, MT 59034

Dear Members of the Montana Coal Board,

I am writing to formally request the withdrawal of our application for funding that was submitted for consideration at the March meeting. Unfortunately, we have encountered delays with other funding entities, which do not have a definitive timeline for their decisions. As a result, we are unable to proceed with our project as initially planned.

We greatly appreciate the time and effort the Board has invested in reviewing our application. We hope to reapply in the future once we have more clarity on the timelines from our other funding sources.

Thank you for your understanding and consideration.

Sincerely,

Kristi Gatrell
CEO
Big Horn Hospital Association

Applicant 1010-Town of Winnett

The applicant is requesting $100,000 of a total project cost of $115,000 in Coal Board funds to purchase a New Dump Truck. The request to the Board is 86% of the total project cost. The applicant is a designated unit.

Coal Board Grant Applicant #1010 Town of Winnett
Staff Report / March 2025 Meeting

Applicant: Town of Winnett
Project: Purchase of a Dump Truck for the Town
Coal Board Funds Requested: $100,000.00
Total Project Cost: $115,000.00

I. General Project Information

A. Eligibility:
- The applicant is a local government, which is eligible according to 90-6-205(4), MCA.
- The project would assist the applicant in providing several services to the community.
- The application lists waste services, road services and ambulance services projects. The following citation authorizes the applicant to make expenditures to provide for the proposed governmental services or facilities:
    - Solid waste services: 7-13-4108, MCA
    - Road project: 7-6-2527(7)

B. Application Items:
- The Coal Board Application form was complete.
- A PER/PAR or technical memo is not required for equipment purchases.

C. The applicant is a designated unit according to 90-6-207, MCA.

D. Location of applicant:
- The applicant lists Bull Mountain Mine as the nearest coal development area or coal-using energy complex, which is 63 miles away.
- Winnett is the county seat for Petroleum County in central Montana.

E. Grant funding history:
- The applicant has been awarded $100,000.00 in Coal Board funds since 2009, based on historical information available in the Commerce projects database.

II. Coal Board Statutory Criteria (90-6-206, MCA) *For the following, provide bulleted analysis of the project against the criteria based on facts in the application.*

A. Need: Explain how the assistance that is required to eliminate or reduce a direct and obvious threat to public health, safety, or welfare has been caused as a direct result of coal development or decline (Coal Board Application and Guidelines, p. 15).
- The applicant demonstrated there is a need for this equipment.
- The dump truck will assist the applicant to improve essential public infrastructure, including road maintenance.
- The applicant states that a serious deficiency exists in the community's ability to maintain drivable roads which are essential for emergency services.
- The current equipment is unreliable and deteriorating due to age, making the replacement of this equipment a priority, in terms of public health and safety.

- The entire community and any who travel though the region are affected by the deficiency of passable and safe roadways.
- There is no current documentation of a direct violation of state or federal health or safety standards but the potential for these is significant.

B. Severity of Impact: Explain why the proposed project or governmental services or facilities “are needed as a direct consequence of an increase or decrease in coal development or in the consumption of coal by a coal-using energy complex” (Coal Board Application and Guidelines, p. 16).
   - Bull Mountain Mine (formerly Signal Peak Mine) has seen large variations in coal production, exceeding 1 million tons, which continues to impact local tax revenues, population dynamics and public service demands.

C. Availability of funds: What amount of funds is available in light of the total request submitted (Coal Board Application and Guidelines, p. 17).
   - Revenues and appropriation from the legislature related to the Coal Natural Resource account are currently $670,680.00. Total requested grants for this meeting are $1,171,178.39.

D. Degree of local effort: As applicable, what bonding, millage effort, or user charge has been made in the past, those currently being made, and what effort has been made to secure funds from other sources to answer needs (Coal Board Application and Guidelines, p. 17).
   - The applicant is asking for 86% of this project to be funded by a Coal Board grant and will be absorbing the administrative costs for the project.
   - The current millage rate from the application is only listed as taxable valuation. That number is .99% lower than the number listed for 2024. The application states that the town has levied the maximum millage rates during the past three years. This information was collected from the application.
   - Based on the most recent audit submitted (2024), Commerce staff identified no concerns related to financial management.

E. Planning and Management: 90-6-207(5), MCA requires the Coal Board to give attention “to the need for community planning before the full impact of coal development or decline is realized. Applicants should be able to show how the request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems.” Therefore, pursuant to Sub-Chapter 3 of the Administrative Rules of Montana, planning is an additional criterion the Coal Board will apply when judging applications. (Coal Board Application and Guidelines, p. 20).
   - Applicant states that production at Bull Mountain Mine has experienced dramatic fluctuations over the past decade, impacting the local economy and public service demands.
   - Applicant included a copy of their Growth Policy in their application and mentioned a 2025 Capital Improvements Plan.
   - The Town of Winnett claims to have purchased a new (used) loader that was on the equipment list of their CIP. The purchase of a dump truck is also on their needed CIP equipment list (Page 32 in Application).

III. Staff Summary

Commerce staff recommend funding because the application materials are complete and meet the required statutory criteria.

Appendix A: Coal Board Application

THE COAL IMPACT GRANT APPLICATION FORM SUBMITTED BY SAVANNAH MOORE

CERTIFICATION

The chief elected official or executive officer of the applicant must sign the application certifying that to the best of the official's knowledge and belief, the information provided in the application and the attached documents is true and correct.

The chief elected official or executive officer of the applicant must also certify that, in accordance with Section 90-6-205, MCA, the applicant is eligible for a Coal Impact Grant and has the authority to administer and make expenditures to provide for the proposed service or facility.

CERTIFICATION

To the best of my knowledge and belief, the information provided in this application and in the attached documents is true and correct.

In accordance with Section 90-6-205, MCA, the applicant is eligible for Coal Board grants and has the statutory authority to make expenditures to provide for the particular service or facility.

Name:
David
Harris

Title:
Mayor

Signature: David K. Harris

Date: 02/09/25

Appendix A: Coal Board Application

THE COAL IMPACT GRANT APPLICATION FORM SUBMITTED BY (NAME OF APPLICANT)

CERTIFICATION

The chief elected official or executive officer of the applicant must sign the application certifying that to the best of the official's knowledge and belief, the information provided in the application and the attached documents is true and correct.

The chief elected official or executive officer of the applicant must also certify that, in accordance with Section 90-6-205, MCA, the applicant is eligible for a Coal Impact Grant and has the authority to administer and make expenditures to provide for the proposed service or facility.

CERTIFICATION

To the best of my knowledge and belief, the information provided in this application and in the attached documents is true and correct.

In accordance with Section 90-6-205, MCA, the applicant is eligible for Coal Board grants and has the statutory authority to make expenditures to provide for the particular service or facility.

Name: Savannah Moore

Title: Town Clerk & Treasurer

Signature:

Date: 01/21/2025

SUMMARY INFORMATION

1. NAME OF APPLICANT(S):
Town of Winnett

2. TYPE OF ENTITY:
Town Government

3. SENATE AND HOUSE DISTRICTS:
State Senate District #15
House of Representatives District #029

4. AMOUNT OF COAL IMPACT GRANT REQUESTED
$100,000.00

5. NAME OF PROJECT:
Town of Winnett Dump Truck

6. TYPE OF PROJECT:
Equipment; purchase of one new (used) dump truck

7. POPULATION SERVED BY PROJECT:
198 residents with an estimated 500-600+ people benefiting from this project.

8. NUMBER OF HOUSEHOLDS SERVED BY PROJECT:
Approximately 500-600 (anyone driving through Winnett

9. CHIEF ELECTED OFFICIAL OR AUTHORIZEDREPRESENTATIVE:
David Harris, PO Box 225, Winnett, MT 59087
Phone: (406)429-5451 **Email:** dkharris73@hotmail.com

10. PRIMARY ENTITY CONTACT PERSON:

Savannah Moore, PO Box 225, Winnett, MT 59087
Ph: (406)429-5451 Email: twinnett@midrivers.com

11. OTHER CONTACT PERSONS:

Joshua Schreiner, PO Box 225, Winnett, MT 59087
Ph: (406)208-9120 Email: twinnettdpw@gmail.com

12. MILLAGE RATES:

Fiscal Year	Entity Wide Taxable Valuation	% From Previous Year	Mills Carried Forward
FYE 2023	156,557	5.63%	0
FYE 2024	180,507	1.15%	0
FYE 2025	179,273	.99%	0

13. AMOUNT OF COAL GROSS PROCEEDS TAX:

- **The Town of Winnett did not receive any Coal Proceeds taxes**.

14. IMPACTS FROM COAL INDUSTRY:

The Town of Winnett is a community among Montana's coal country and is within a reasonable driving distance (approximately 45 miles from Roundup) or 63 miles from the Bull Mountain Mine (formerly Signal Peak Mine). Over the mines history, it is likely that employees have resided in Winnett. Among job opportunity as an impact from the coal industry, the coal production has impacted tax revenue for the Town of Winnett. Due to the everchanging industry and coal opposition, tax revenues from the mine have been inconsistent which negatively impact tax revenue that can be used towards equipment maintenance.

15. MAPS:

See attached map.

16. BRIEF PROJECT SUMMARY:

The project summary should briefly provide some background information including:
Winnett, the seat of Petroleum County and its most populated town, serves as a hub for local residents, seasonal visitors, and recreational users. Currently, the Town's only functional dump truck/plow is a 1974 model plagued with numerous issues: a failing engine, non-functional heater, and a plow prone to detachment. The vehicle's condition jeopardizes public safety, particularly during winter months when accessible roads are critical for emergency services.
This project seeks to purchase a used dump truck in good condition, equipped with a reliable plow, to ensure that roads remain clear and safe. While primarily intended for snow removal, the truck will also be used for essential maintenance and improvement projects. The acquisition of this vehicle will enhance the Town's ability to meet public safety and infrastructure needs effectively.

17. PROJECT BUDGET AND IMPLEMENTATIONSCHEDULE:

A. Project Budget Form:

The proposed project budget ***must*** include a breakdown of all major project costs, and a description of the proposed source and use of all funds. Designate the total budget of any proposed project as either "Administrative/Financial Costs" or "Activity Costs: (such as engineering or construction). Administrative Costs may not exceed 10% of the total project cost. Refer to the description of expenditure categories shown below that outline the expenditures that may be part of the budget. The Administrative/Financial Costs cover the expenses of administering a local project, including the cost of local government personnel involved with managing the project; the cost of the local project audit; and other contractual costs for professional services (such as hiring a project manager) that may be associated with administration of the program.
Administrative/Financial Costs must be reasonable and appropriate to ensure cost-effective and proper management of the project.

Any proposed Administrative/Financial Costs must be eligible, fully supported, and adequately explained. Applicants which propose to contract for project management assistance with a consultant or other entity must specifically itemize this amount in the Administrative Budget and explain it.

PROJECT BUDGET

Completed by: Savannah Moore **For:** Winnett , MT **Date:** January 7th, 2025

ADMINISTRATIVE/ FINANCIAL COSTS	SOURCE: Local Funding	SOURCE: Carrell Grant	SOURCE: MT Coal Impact Grant	SOURCE:	TOTAL:
Grant Administration	* $	$	$	$	$
Office Costs	$	$	$	$	$
Professional Services	$	$	$	$	$
Legal Costs	$	$	$	$	$
Travel & Training	$	$	$	$	$
TOTAL ADMINISTRATIVE/ FINANCIAL COSTS	$	$	$	$	$
ACTIVITY COSTS:					
Equipment Cost	$5,000	$10,000	$100,000	$	$
Construction Cost	$	$	$	$	$
Architectural/Engineering Design	$	$	$	$	$
Product Completion (PER's, studies, etc.)	$	$	$	$	$
Contingency	$	$	$	$	$
TOTAL ACTIVITY COSTS	$	$	$	$	$
TOTAL PROJECT COSTS	$5,000	$10,000	$100,000	$	$115,000

B. Project Budget Narrative:

The total project cost is estimated at $115,000 for a used dump truck with a plow in good working condition. Local funding of $5,000 has been secured, and $10,000 is anticipated through the Carrell Grant. The remaining $100,000 is requested from the MT Coal Impact Grant to ensure project feasibility. Ongoing maintenance and insurance costs will be absorbed by the Town's existing budget. All administration for this project will be covered by the town.

C. Implementation Schedule:

Each applicant must submit an implementation schedule that describes the overall schedule for project completion.

TASK	QUARTERS 2025 1st	2nd	3rd	4th	QUARTERS 2026 1st	2nd	3rd	4th	QUARTERS 2027 1st	2nd	3rd	4th
IMPLEMENTATION SCHEDULE FOR Town of Winnett Dump Truck												
PROJECT START-UP												
A. Sign contract with Coal Board		X										
B. Secure approval of other funding	X											
C. Submit progress reports and drawdown request. (Progress reports quarterly if no draws submitted)		X										
PROJECT CONSTRUCTION												
A. Architectural Design												
B. Conduct pre-construction conference												
C. Construction and purchase and installation of equipment		X										
D. Monitor Progress												
E. Final Inspection												
PROJECT CLOSE-OUT												
A. Coal Board administrative staff conduct on-site monitoring of the project												
B. Submit project completion report.			X									
C. Include project in audits.												

18. DESCRIPTION OF RELATIONSHIP TO COAL BOARD STATUTORY GRANT CRITERIA

The Coal Board does base its awards on the following four statutory criteria (90-6-206, MCA). In addition, State law (90-6-207(5), MCA) that requires attention be given to the need for community planning before the full impact of coal development or decline is realized.

A. Need

Explain how the assistance that is required to eliminate or reduce a direct and obvious threat to the public health, safety, or welfare that has been caused as a direct result of coal development or decline?" (90-6-206, MCA)

The need for assistance is directly tied to the decline in coal development within the community. As coal production and related industries have declined, funding and resources for essential public infrastructure, including road maintenance and emergency services, have also diminished. Historically, coal development played a significant role in funding local government services and infrastructure improvements. However, with the reduction in coal-related revenue, the community now faces increased challenges in maintaining its roads and emergency response capabilities. The lack of reliable equipment for maintaining safe roads exacerbates public safety risks, especially for emergency vehicles that need to navigate treacherous terrain, often exacerbated by severe weather conditions. Without the necessary resources to invest in new equipment or infrastructure, the community is left vulnerable to delays in emergency response, property damage, and health risks. This project is essential to mitigate these risks and restore the community's ability to safely manage and respond to emergencies, addressing the direct consequences of the coal industry's decline on public safety and infrastructure.

1. Does a serious deficiency exist in a basic or necessary community public facility or service? Examples include emergency services such as police, fire or ambulance services. Describe the nature and frequency of occurrence and provide supporting documentation.

   Yes, a serious deficiency exists in the community's ability to maintain drivable roads, which are essential for emergency services such as ambulance, fire trucks, and search and rescue operations. The lack of a functioning dump truck and adequate plowing equipment severely hinders timely emergency response, especially during adverse weather conditions. In this remote area, accessible roads are critical for ensuring that local responders can effectively perform their duties and provide life-saving services. Supporting documentation, including call logs and response delays due to road conditions, can be provided to illustrate the urgency of this need.

2. Have serious public health or safety problems that are clearly attributable to a deficiency occurred, or are they likely to occur, such as illness, disease outbreak, substantial property loss, environmental pollution, safety problems, hazards, or health risks? Describe the nature and frequency of occurrence and provide supporting documentation.

   Yes, serious public health and safety risks are likely to occur due to the unreliability of the community's current equipment. The aging and deteriorating equipment used for road maintenance is at constant risk of failure and could become entirely inoperable at any time. If this occurs, the community would face significant challenges in ensuring safe travel throughout Winnett, particularly during emergencies. Inaccessible roads could delay or prevent ambulances, fire trucks, and other emergency services from responding, putting lives and property at risk. Additionally, equipment breakdowns could exacerbate environmental hazards, such as unaddressed flooding or snow accumulation, leading to substantial property damage and safety hazards. Supporting documentation, including maintenance records and reports of equipment failures, can be provided to highlight the severity of these issues.

3. Is the entire community, or a substantial percentage of the residents of the community, seriously affected by the deficiency or at risk, as opposed to a small percentage of the residents? Describe the number or percentage of community residents affected by the problem.

Yes, the entire community and those traveling in the region are seriously affected by the deficiency and is at risk due to poor road conditions. With unreliable equipment for road maintenance, every resident, including those requiring emergency services, is at risk of delayed or inaccessible assistance. This impacts 100% of the community, as safe and drivable roads are critical for daily activities, emergency response, and access to essential services. Poor road conditions create widespread safety hazards, leaving no resident unaffected.

4. Is there clear documentation that the current condition of the public facility or service (or lack of a facility or service) violates, or may potentially violate, a state or federal health or safety standard. If yes, describe the standard being violated. If the proposed project is necessary to comply with a court order or a state or federal agency directive, describe the directive and attach a copy of it.

While there is no current documentation of a direct violation of state or federal health or safety standards, the potential for noncompliance is significant due to the unreliable condition of the community's road maintenance equipment. The inability to maintain safe and accessible roads could result in situations that violate safety standards outlined by state or federal emergency response guidelines, such as timely access for ambulances, fire trucks, and law enforcement. If the equipment fails and road conditions deteriorate to the point of impassability, it could lead to delayed emergency response times, putting lives at risk and potentially violating safety expectations for emergency preparedness and response. This project is critical to ensuring continued compliance with these standards and avoiding future violations.

5. Does the standard that is being violated, or potentially may be violated; represent a significant threat or potential threat to public health or safety?

Yes, the potential violation of health and safety standards represents a significant threat to public health and safety. If the current road maintenance equipment fails, the community would be unable to ensure safe and passable roads, particularly during emergencies or adverse weather conditions. This poses a direct threat to the ability of emergency services—such as ambulances, fire trucks, and law enforcement—to respond promptly, which could result in loss of life, property damage, and increased health risks for residents. Ensuring compliance with safety standards is essential to mitigating these threats and protecting the well-being of the entire community.

6. Additional information supporting the NEED for this project.

This project is critical for ensuring the safety and well-being of the entire community. The current road maintenance equipment is outdated and unreliable, posing a constant risk of failure. Without functioning equipment, the community cannot maintain safe and accessible roads, especially during harsh weather conditions common to the region. This directly impacts the ability of emergency services, including fire, ambulance, and law enforcement, to respond in a timely and effective manner. Additionally, poor road conditions could lead to increased wear and tear on personal and public vehicles, higher costs for repairs, and potential property damage from issues such as flooding or erosion. Investing in new equipment will ensure that the community can maintain essential infrastructure, protect public safety, and reduce the risks associated with inadequate road maintenance.

7. <u>Degree of Severity of Impact from an Increase or Decrease in Coal Development or In the Consumption of Coal by A Coal-Using Energy Complex</u>

Explain why the proposed project or governmental services or facilities "are needed as a direct consequence of an increase or decrease in coal development or in the consumption of coal by a coal-using energy complex" (90-6-205(4)(a), MCA).

a. Describe why the need for the expansion or improvement to the public facility or public service is attributable to coal-related impacts. Additionally, please provide the percentage of the project that is a result of coal impacts.

The Montana Coal Board Coal Impacted Local Governmental Units Designation Report for the 2025 Biennium (Designation Report) designated the Town of Winnett as a designated town impacted by coal development. Petroleum County and the Winnett School District are designated based on MCA 90-6-207(1)(b)(ii) and the School District is also designated based on MCA 90-6-207(1)(c).
Designation based on MCA 90-6-207(1)(b)(ii) is due to "production of an existing coal mine will increase or decrease by at least 1 million tons per year and that the new, expanded, or reduced production will

commence within 2 years of the designation."[1] Designation based on MCA 90-6-207(1)(c) is due to being located within 100 miles via the shortest all-weather public road of a qualifying mine or facility. Petroleum County and the Town of Winnett are 63 miles of Bull Mountain Mine (formerly Signal Peak Mine). The Designation Report states that from 2016 to 2022 the Bull Mountain Mine has seen large variations in coal production, exceeding 1 million tons. The Town of Winnett is 63 miles from the mine along Highway 200 and has a history of supporting the mine with residents over the years living in Winnett working at the mine. These changes directly impact local tax revenues, population dynamics, and public service demands. The proposed project's need is 100% attributable to these coal-related impacts, as the Town's limited budget prevents it from addressing infrastructure deficiencies independently.

b. Name the nearest coal development area or coal-using energy complex to your community and the road miles from yourcommunity.

The Signal Peak Mine is located 63 miles from Winnett.

c. Additional information supporting the DEGREE OF SEVERITY OF IMPACT FROM AN INCREASE OR DECREASE IN COAL DEVELOPMENT OR IN THE CONSUMPTION OF COAL BY A COAL-USING ENERGY COMPLEX.

[1] Montana Coal Board Coal Impacted Local Governmental Units Designation Report for the 2025 Biennium

8. Availability of Funds

a. Amount requested from the Coal Board: **$ 100,000.00**

b. Amount of Coal Board funds available at the time of application $____________________(#2 will be completed by Coal Board staff)

c. Explain why a coal impact grant is necessary to make the project feasible and affordable

A Coal Impact Grant is essential to make this project feasible and affordable due to the significant financial strain caused by the decline in coal development in the area. Historically, coal revenue supported many of the community's critical infrastructure needs, including road maintenance and emergency services. However, with the decrease in coal-related income, the local government and community now face a funding gap that makes it impossible to afford the necessary upgrades to equipment and services without external assistance. The Coal Impact Grant will provide the necessary funding to replace outdated and unreliable road maintenance equipment, ensuring that emergency services can respond effectively to calls and maintain safe, accessible roads for all residents. Without this grant, the community would be unable to proceed with the project, as local funding alone is insufficient to cover the costs, putting public health, safety, and welfare at significant risk.

d. What are the other proposed funding sources for theproject?

FUNDING SOURCES SUMMARY FOR……

Source	Type of Fund	Amount	Status of Commitment	Loan Rates & Terms
Gas Tax	Local Source	$5,000.00	Secured	
Carrell Grant	Local Grant Funding	$10,000.00	Anticipated	
MT Coal Impact Grant	Grant	$100,000.00	Applied	

e. If a particular proposed source of funding is not obtained, how will the applicant proceed?

Explain how the funding strategy will change if each proposed funding source is not received. (Discuss how the

loss of each of the proposed funding sources would affect the completion of the project. For instance, will the applicant wait and re-apply to the funding source, will the applicant be willing to increase the amount of debt it will incur, or will the project not move forward?)

If Coal Board funds are not available, the Town will be unable to proceed with the purchase of the dump truck at this time. The Town's current funding is already stretched thin, as most of it is allocated to maintaining essential services for Winnett residents and supporting ongoing infrastructure projects, including a large wastewater project and a chlorinator building for the water system. With limited resources available, the Town will not be able to allocate additional funds to this critical road maintenance equipment. If no other funding sources are secured, the Town will be forced to defer the project until additional resources become available, further jeopardizing public safety and infrastructure.

9. Degree of Local Effort in Meeting Needs

a. If current millage rates given are lower than the average rates levied during the previous three years, briefly explain why they are lower.

The Town has levied the maximum millage rates during the past three years.

b. Describe any local efforts to meet the public facility or public service needs by providing financial contributions to the project to the extent possible, such as local funding, donations of land, absorbing some or all-administrative costs. For non-profit organizations, describe fund- raising efforts or other in-kind assistance to the proposed project as well as usual program fund-raising efforts.

The Town has budgeted $5,000.00 of it's gas tax allocation to go towards this purchase and applied for $10,000 through the local grant funding that is available. The town is also absorbing all of the administrative costs for the project.

c. Describe past operation and maintenance budgets and practices over the long-term, including any reserves for repair and replacement.

The town works diligently to maintain a budget for adequate maintenance and repair and works to be good fiscal stewards of public dollars. The Town has cash reserves in the sewer and water funds that are in an interest earning account to be held unless in the event of an absolute emergency. Winnett has also increased the water and sewer rates within the last year. Being one of the smallest communities in coal country greatly limits the towns budget and accessibility to resources.

d. If there are indications that the problem is not of recent origin or has developed because of inadequate operation and maintenance practices in the past, explain the circumstances and describe

the actions that management will take in the future to assure that the problem will not reoccur.
This issue is not the result of inadequate operation or maintenance practices but rather a lack of funding over time, which has made it challenging to replace aging equipment. The current road maintenance equipment has simply reached the end of its usable life due to normal wear and tear. Moving forward, the Town is committed to prioritizing preventative maintenance and creating a long-term capital improvement plan to better anticipate and address future equipment needs.

e. If the project involves water, wastewater or solid waste, provide the current and projected monthly household user charges, including operation and maintenance:

i. What is the current monthly household user charge? $___________________

ii. What is the projected monthly user charge (including operation and maintenance) when the project is complete? $ __________

N/A.

f. What are your current debt obligations?

List current debt obligations. If the applicant is a water, wastewater, solid waste, or other system, which relies on rates and charges for its financial support, only debt related to that system need be entered. If the applicant is a city, county, or district that relies on general taxing authority for its financial support, or is a not-for-profit organization, debt related to the general obligations of the city, county, district, or not-for-profit organization should be entered.

CURRENT DEBT SUMMARY FOR -----								
Year Issued	Purpose	Type of Bond/ Security	Amount	Maturity Date (mo./yr.)	Debt Holder	Coverage Required	Annual Payment Amount	Outstanding Balance
1994	Sewer project		$187,600.00	2034	USDA Rural Development		$10,140.00	$85,262.25

g. What are your current assets?

List all current assets including endowments, cash, investments, certificates of deposit, accounts receivable, and any other current assets not specifically indicated. Indicate whether assets are obligated for a specific purpose and what that purpose is (i.e., Certificate of Deposit, $100,000 - reserve requirement for SRF loan, Investments, $200,000 – $100,000 of it is needed to purchase line inspection equipment in 2005).

Operating Cash: $80,000.00

STIP (investment account): $300,000.00

h. What financial accounting system do you use? **Black Mountain Software**

i. Is the applicant in compliance with the auditing and annual financial reporting requirements provided for in the Montana Single Audit Act, 2-7-501 to 522, MCA? (Tribal governments must comply with auditing and reporting requirements provided for in OMB Circular A-133).

Yes X__No____Date of last completed audit or financial report October 1st, 2024

j. If there have been audit findings within the last five years, have they been satisfactorily addressed?

Any findings have been satisfactorily addressed and the Town is in good standing Local Government Services.

.

k. Additional information supporting the DEGREE OF LOCAL EFFORT IN MEETING NEEDS.

The community operates with a very small budget and is committed to being good fiscal stewards of public dollars. Local leaders work diligently to allocate resources efficiently and prioritize essential services, despite limited funding. The Town consistently seeks out grants and alternative funding opportunities to minimize the financial burden on residents while addressing critical infrastructure and safety needs. For example, the Town has already dedicated resources to ongoing wastewater and water system projects, demonstrating its proactive efforts to meet community needs. However, without additional assistance, the Town is unable to fund the replacement of aging road maintenance equipment, which is essential for ensuring safe and reliable access throughout the community. This project reflects the Town's commitment to leveraging external resources responsibly while maintaining its strong tradition of fiscal responsibility.

10. Planning & Management

State law (90-6-207(5), MCA) requires the Coal Board to give attention "to the need for community planning before the full impact of coal development or decline is realized. Applicants should be able to show how the request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems." Therefore, pursuant to Sub-Chapter 3 of the Administrative Rules of Montana, Planning is an additional criterion the Coal Board will apply when judging applications.

a. Describe how your grant request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems related to coal impacts.

The proposed project aligns with the Town of Winnett's 2025 Capital Improvement Plan and the recently updated Growth Policy for Winnett and Petroleum County. These plans emphasize the importance of maintaining critical infrastructure to support public safety, economic growth, and community resilience. The town has recently purchased a new (used) loader that was also on the equipment list for the Capital Improvement Plan.

b. Describe how the proposed project is consistent with current plans.

c.

Plans may include a local capital improvements plan, growth policy, transportation plan, comprehensive economic development plan, or any other applicable plan. Over the past decade, production at Bull Mountain Mine has experienced dramatic fluctuations, directly impacting the local economy and public service demands. This project enhances the Town's capacity to adapt to these changes, ensuring that infrastructure remains robust and responsive to the needs of residents and visitors.

Environmental Review: N/A.

Attachments:

- **Map of Winnett and surrounding areas**
- **Storfas Invoice (includes notes on other issues)**
- **New (used) dump truck estimates**
- **2025 Capital Improvement Plan**
- **Town of Winnett/Petroleum County Growth Policy**

WINNETT

SYSTEM DESIGNATIONS

- NHS Interstate
- NHS Non-Interstate
- Primary
- Secondary
- Urban
- State Maintained
- Off System
- Alley

ROUTE SURFACE TYPE

- Paved
- Unpaved

ROUTE SIGNING

- 90 Interstate Highway
- 93 U.S. Highway
- 3 Montana Route
- 205 Route

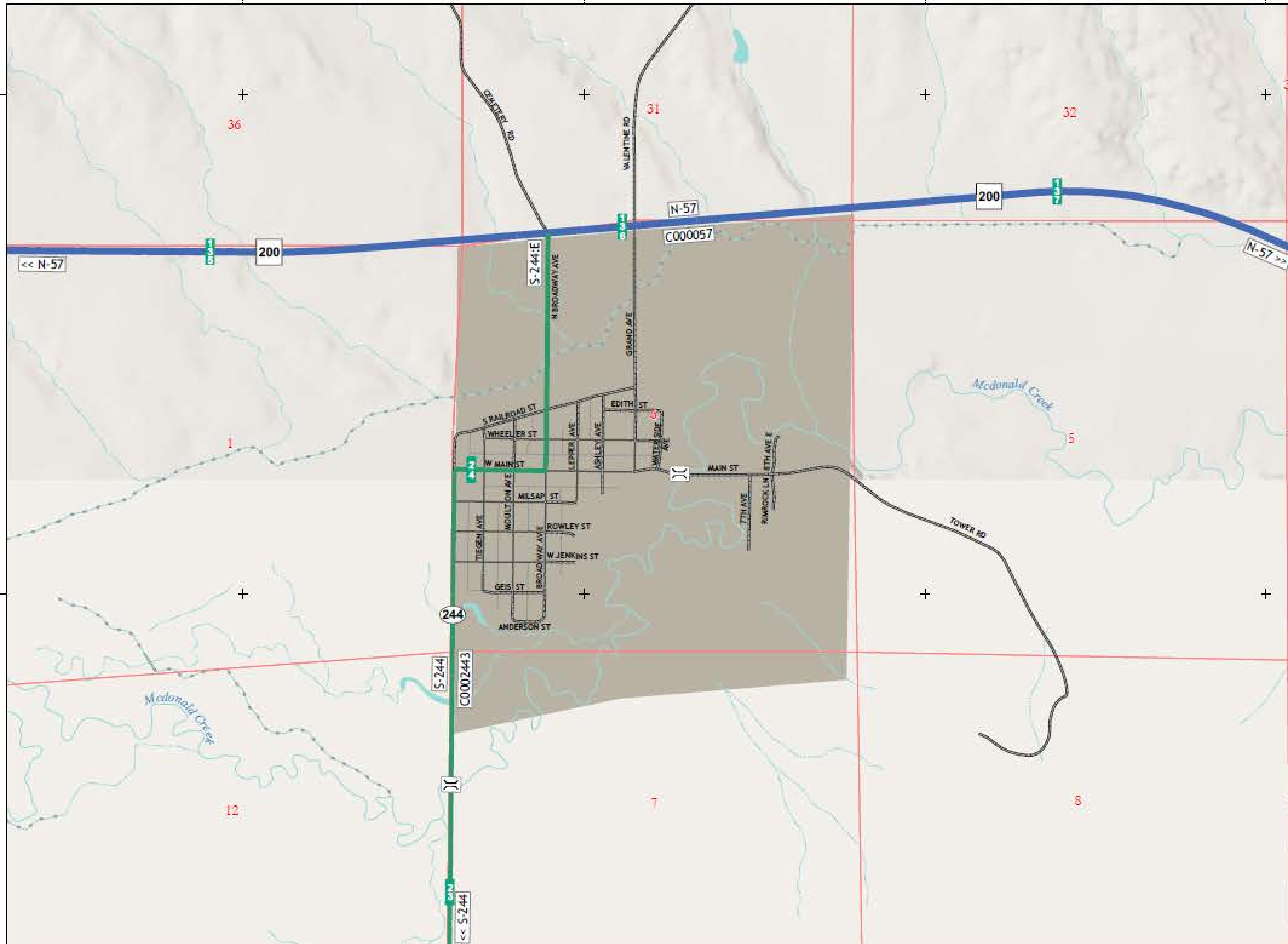
BOUNDARIES

- County Line
- City Boundary
- National Park Service
- Reservation
- National Forest Service
- State Park
- US Fish Wildlife Service

OTHER SYMBOLS

- Stream
- Canal or Ditch
- Water
- # Reference Marker
- Railroad
- Public Airport
- Bridge
- P Parking Area
- Rest Area: Year-Round/Seasonal

City Location



PREPARED BY THE
STATE OF MONTANA
DEPARTMENT OF TRANSPORTATION
GEOSPATIAL INFORMATION SECTION

Scale in Miles: 0 0.1 0.2 0.3 0.4 0.5

Scale in Kilometers: 0 0.1 0.2 0.2 0.3 0.4 0.5

NAD 1983 State Plane Montana FIPS 2500
Lambert Conformal Conic

MONTANA Department of Transportation

INC

Storfa's Service, LLC

408 1st Ave. No.
Lewistown, MT 59457
(406) 538-3406

1/16/2025 3:01:19 PM MST | **Invoice #58951** | Page:1

WINNETT PUBLIC WORKS | **Phone: 406-366-1800 DAVE HARRIS**

Service Writer : IW
Tag/State : /MT

Vehicle : 1978 GMC C6500 6.0 L 366 CID V8
VIN :
Fleet #/Driver :
Created : 11/7/2024 3:15:22 PM MST
Invoiced : 12/11/2024 9:11:38 AM MST

Code/Tech*	Description	Condition	Unit Price	Price
	Spark Plug - Copper		$5.90	$11.80
	SET TIMING,TUNE CARB			$95.00
	#2&#8 ARE LOW ON COMPRESSION, I FEEL THAT THE CAM IS GOING FLAT TOO			$0.00
Note: SEE ESTIMATE				

Labor	$95.00
Parts	$11.80
Shop Supplies / EPA	$4.75

	Total	**$111.55**
Check #9416: $111.55	**PAYMENT**	**$111.55**
	BALANCE DUE	**$0.00**

Approvals

Date & Time	Total Amount	Authorized By	Method	Employee

I hereby authorize the repair work herein set forth to be done along with the necessary material and agree that you are not responsible for loss or damage to vehicle or articles left in vehicle in case of fire, theft or any other cause beyond your control. I hereby grant you and/or your employees permission to operate the vehicle herein described on streets, highways or elsewhere for the purpose of testing and/or Inspection. An express garagekeeper's lien is hereby acknowledged on above vehicle to secure the amount or repairs thereto. All Vehicles left over 48 hrs. after repairs are completed WILL INCUR A $5.00 PER DAY STORAGE FEE. 12 Month or 12,000 Mile Warranty On Repairs.

NOTE: IF WHEELS WERE REMOVED FOR TIRES OR REPAIR THEY MUST BE RE-TORQUED WITHIN FIRST 100 MILES AFTER REMOVAL/INSTALLATION. STORFA'S SERVICE WOULD BE HAPPY TO PERFORM THIS FOR YOU OR PASS THE TORQUE INFORMATION ON TO YOU.

Customer Signature ____________________

https://www.truckpaper.com/listing/for-sale/235496107/2011-freightliner-business-class-m2-106-plow-trucks-slash-spreader-trucks

Photos (36)

2011 FREIGHTLINER BUSINESS CLASS M2 106

Compare

Plow Trucks / Spreader Trucks

View My Watch List

USD **USD $97,500**

Financial Calculator

Email Seller

Truck Location: 2939 Hwy 10 S Saint Cloud, Minnesota 56304

Seller Information

View Seller Information

Northstar Truck Sales
Contact: Doug Walz
Saint Cloud, Minnesota 56304
Visit Our Website

(320) 281-6059
Video Chat

FREESTAR Get Shipping Quotes

VIP CURRENCY. *Apply for Financing

Photos (20)

2023 FORD F750 SD

Compare

Plow Trucks / Spreader Trucks

View My Watch List

USD

USD $118,500

Financial Calculator

Email Seller

Truck Location: 16485 CR 59 Woodland, Alabama 36280

Seller Information

View Seller Information

K&S Equipment Sales

Contact: Scott Young

Woodland, Alabama 36280

Visit Our Website

(256) 954-7063

WhatsApp

Video Chat

FREESTAR Get Shipping Quotes

CURRENCY. *Apply for Financing

VIP

General

Photos (9)

2024 INTERNATIONAL CV

Compare

Plow Trucks / Spreader Trucks

View My Watch List

USD **USD $121,878**

Price entered as: CAD $175,100

Email Seller

Truck Location: 1860 Brookside Blvd. Winnipeg, Manitoba, Canada R3C 2E6

Seller Information

View Seller Information

Maxim Truck & Trailer

Contact: Sales Department

Winnipeg, Manitoba, Canada R3C 2E6

+1 888-592-9023

WhatsApp

Video Chat

FREESTAR Get Shipping Quotes

VIP

General

Photos (9)

2016 FORD F650 SD

Compare

Plow Trucks / Spreader Trucks

View My Watch List

USD **USD $98,500**

Financial Calculator

Email Seller

Truck Location: 13289 25th Ave NW Rice, Minnesota 56367

Seller Information

View Seller Information

Carco Truck & Equipment

Contact: Sales

Rice, Minnesota 56367-9325

(320) 231-0252

Video Chat

https://www.truckpaper.com/listing/for-sale/237110785/2014-freightliner-108sd-plow-trucks-slash-spreader-trucks

Refresh (Ctrl+R)

Print Share

Photos (33)

2014 FREIGHTLINER 108SD

Compare

Plow Trucks / Spreader Trucks

View My Watch List

USD **USD $97,500**

Financial Calculator

Email Seller

Truck Location: 2939 Hwy 10 S Saint Cloud, Minnesota 56304

Seller Information

View Seller Information

Northstar Truck Sales

Contact: Doug Walz

Saint Cloud, Minnesota 56304

Visit Our Website

(320) 281-6059

Video Chat

VIP

FREESTAR Get Shipping Quotes

CAPITAL IMPROVEMENTS PLAN
Fiscal Year 2024-2025

PR #	Department	Target Date	Description	Project Cost	Funding Source	Status
1	Sewer	2024	Upgrade and repair wastewater system to meet DEQ standards and regulations	$2,200,000.00	Various grants and loan	In progress
2	Water	2024	Repair chlorinator building: new pumps, level building, 80 gauge piping and plumbing, waterproof interior, repair door and siding	$45,000.00	SLIPPA grant and Carrell Foundation Grant	85% complete
3	Equipment - Loader	2024-2025	Purchase a loader to help with completion of street priorities	$210,000.00	MT Coal Impact Grant	Complete
4	Equipment – Dump Truck	2025	Purchase a working dump truck and plow attachment	$125,000.00	MT Coal Impact, local, Carrell Grant	Applying for funding
5	Streets & Alleys	2024-2025	Fill potholes, cracks and chip seal asphalt; grade alleys and apply new dirt and gravel – as time and funds allow	$10,000.00	Gas Tax & remaining BaRSSA	On going
6	Water & Sewer	2025	Back Up Generators to sustain both wells and the sewer system in the event of a power outage	$40,000.00	Homeland Security Grant potentially	Not started
7	Public Works – City Shop	2029 (?)	Construct new building		Grants	Not started
8	Old City Hall Building	2025-2029	Repair building and upgrade, eventually rent out as office or business pace potentially		Grants	beginning stages

GROWTH POLICY

PETROLEUM COUNTY

TOWN OF WINNETT

1. Purpose and Scope

1.1 Purpose

A Growth Policy is a community's growth and development plan. It evaluates existing community conditions and sets goals and future visions for housing, land use, economic development, local services, public safety, natural resources, transportation, and other unique characteristics and features of the community. A Growth Policy is not a regulation or ordinance, but it serves as the legal basis for enacting them.

1.2 Geographic Scope

Petroleum County/Town of Winnett Growth Policy takes into consideration all areas of the County.

1.3 Authority

Petroleum County Commissioners and the Town Council of Winnett, in an effort to address the most critical issues facing the County and Town now and in the near future have authorized the Petroleum County Planning Board with a representative of the Town of Winnett to develop a County/Town Growth Policy in accordance with 76-1-601-76-1-606, Montana Code Annotated (MCA). The requirements outlined in these statutes constitute the contents of this Growth Policy.

1.4 Planning in Petroleum County/Town of Winnett

Petroleum County is governed by a Board of County Commissioners and employs a County Manager. The appointed Planning Board is made up of five volunteer county residents.

The County Planning Board recently adopted subdivision regulations. The County also has road and bridge standards that are utilized in planning and governing transportation infrastructure improvements.

The Town of Winnett is a mayor/council form of government with limited resources for full time employees. Though planning efforts in the Town have been somewhat limited, it does utilize a Capital Improvements Planning process that is updated each year during budgeting. Future additional planning efforts such as participation in this Growth Policy process are important for the Town's ongoing need to upgrade infrastructure.

This Growth Policy is the result of an identified need for the community to examine the issues affecting the economy, population, and culture of Petroleum County and the Town of Winnett. The document will coordinate with existing policies and standards currently in existence.

1.5 Public Involvement

As members of the Planning Board stated while discussing community outreach, *"With less than 500 people in the County, every able bodied person serves on at least one volunteer board."* Though that situation might be somewhat burdensome at times, it is a testament to how involved citizens in the County are when it comes to making life in this ultra-rural community better for everyone. Tapping into community activities was the strategy for gaining public involvement in development of the Growth Policy, and will be the strategy for the future

Thank you to the following groups, organizations, and businesses for participating in outreach regarding the content of the Growth Policy:

- Winnett School District #1 School Board – presentation and inclusion of information about the Growth Policy and survey in newsletter
- Petroleum County Conservation District – presentation and inclusion of information about the Growth Policy and survey in newsletter
- Library Board
- Cemetery Board
- Stockgrowers Board
- Winnett Senior Citizens
- Petroleum County Ambulance Service
- Town Council
- Weed District

Two survey instruments were created in 2017 for use in assisting the planning board with identifying issues and attitudes that would help guide them in developing the Growth Policy. The results of those instruments are contained in Appendix A. Although a total of 19 individuals completed the long form survey and only 4 completed the short form survey, the planning board felt the results were likely representative of the entire population of the Town/County. The results of those surveys will be referenced throughout this document.

New surveys and reviews of the citizens of our community have taken place between 2017 and 2022 associated with the many projects that are currently taking place. These include:

Petroleum County Community Center
Revitalization of the Courthouse Building
Move and Revitalization of the old Odd Fellows Hall
Development of a new Youth Program
County History Wall in the Community Center

The community outreach during the planning of these projects will continue to guide our Growth Policy, as well.

1.6 Document Organization

The Petroleum County/Town of Winnett Growth Policy is organized in a manner that highlights the required elements of 76-1-601-76-1-606, MCA. Each section provides current information about the element as it relates to the existing conditions of Petroleum County/Town of Winnett followed by projections that may affect the future of the County. Goals and Objectives developed through the Planning Board's study of each issue, including public input, are also included in each section.

An implementation plan that takes into account each goal and objective developed is presented at the end of the document. The plan sets a timeframe for accomplishment. For future tracking, additional columns are added for regulations used in implementation, funding sources, and date completed.

2. County Background

Petroleum County is located in Central Montana and is one of the most sparsely populated areas of the United States, making it geographically and culturally unique. The extreme rural nature of the area contributed to it being "prime hunting ground for the Indians and one of the last places in Montana to be given up to the white man".

The area encompassing Petroleum County has a history of boom and bust cycles tied to its natural environment. The County is bordered by the Musselshell River to the east and the Missouri River to the north, which were instrumental in attracting settlers during the open range explosion in the late-1800s. The wide open spaces lured cattlemen and sheepmen alike, as competition for grazing land was minimal and the rivers and streams provided the necessary resources for ranching.

Attempts to settle the area and build towns failed a number of times. In 1866, the Rocky Mountain Wagon Road Company launched a freight route across the mountains south of the Missouri River to the mouth of the Musselshell. They named the town built at the end of the road Kerchival City; the Musselshell River soon washed away the little town. In March of 1868, the Montana Hide and Fur Company of Helena sent a nine member party, led by James Brewer, to plot a town and build a warehouse. They named this new settlement situated on a bluff above the river, Muscle Shell City. In 1874, the Diamond R Transportation Company built Carroll approximately 30 miles upstream from the mouth of the Musselshell. Like its counterparts, Carroll thrived for only a few years. All three towns are now covered by the waters of Fort Peck Reservoir.

The Town of Winnett is named after Walter John Winnett, who established his family ranch near an active trading post in Montana Territory in 1879. Winnett established a freight line business to transport supplies to the settlement, and eventually his ranch became the center of growth for the area.

The 1880s saw the open range boom as well as developing settlements. The cattlemen and sheepmen ran their stock on the open grasslands with few competitors. The Junction City-Maginnis Stage Road traveled through the area to where gold was discovered in 1879 in the Judith Mountains. The Flatwillow Crossing, which developed into the town of Flatwillow, complete with a hotel, general store, saloon, school, community hall and even a baseball team, served as a station on this route.

In 1910, when the homestead boom began, Fergus County still encompassed all of present day Petroleum County. Routes to the area consisted of a few roads, passable only in good weather.

The largest waves of settlers rolled into the Winnett area during 1910 and again from 1912 to 1918. The railroad was not completed to Winnett until 1917 so most of initial homesteaders came in by stage from Lewistown or Musselshell or many simply walked in. They would come in, find their land and then go back out to Lewistown or Musselshell to file their claim. Once the railroad was complete it greatly aided new homesteaders in reaching the remote lands of what was to become Petroleum County.

While homesteaders continued to arrive until the 1930s, an exodus began in 1918. In just six years since the majority of homesteading began, the land filled, the people realized the impossibility of surviving on 160 acres on the unforgiving lands and began to leave. The end of World War I, falling market prices, and the flu epidemic of 1918 contributed to this mass departure. Also, years of drought, and the resulting economic hardships led to bleak years prior to 1920.

The tides turned in February 1920, however, when an oil discovery again brought hope and excitement to the young town. The discovery, located just west of the Musselshell River near the communities of Mosby and Cat Creek, slowed the departure of outgoing homesteaders and created boomtowns of Winnett and Cat Creek. This oil strike generated the first commercial oil field in Montana, and led to a significant influx of homesteaders and companies. It was this oil strike that led to the county name of Petroleum County.

Residents voted to secede from Fergus County on November 4, 1924, and the new county government began operating as Petroleum County on February 22, 1925 with Winnett as the county seat. The growth and the accompanying optimism from the oil boom and county separation lasted only briefly. Winnett went from an estimated population of 2,000 in 1923 to 408 in 1930.

The Great Depression in Montana began with a severe drought in 1929 that reached disastrous proportions by 1931. Governor John Erickson wrote that the people were "in rather a desperate condition. The grain crops and feed crops are practical failures."

The 1930s and the Great Depression gave way to World War II and more prosperous years but the local government in Petroleum County continued to struggle. The debt it accrued during the 1920s by building roads and other services multiplied during the Depression. The decrease in privately owned property led to a drop off in property tax operating revenue for the county. At the start of the 1940s, the county asked Roland R. Renne, president of Montana State College (now Montana State University), to investigate another form of government for the struggling region. He suggested the county manager form and the county adopted it in 1942. Petroleum is the only county in Montana that operates under a county manager form of government.

The town and county continued to work to improve the community. In the 1960s the first community pool was built, in the 1970s the county courthouse was extensively remodeled and a new school addition was completed, with the public library moving into the school to become the only school-community library in the state. The town completed a new water and sewer system in the 1980s. The largest torosaurus skull yet found was extracted from Petroleum County in 2001.

Ranches in Petroleum County occupy large acreages by necessity. With an average of 13 inches of moisture annually which contributes to a lack of forage or crops, it takes a lot of acres to make a sustainable livestock or farming operation. There are also areas of dry land farming and minimal irrigated land because there are a minimal number of creeks or streams flowing through the county.

The community is proud of its clean air, clean water, and access to the outdoors. This safe, tight-knit community boasts local services that provide basic necessities, an award-winning school, and opportunities for all ages. The community is shaped by the active participation of its residents which allows opportunity for everyone to be involved in the decision-making of various aspects of the community and sets this community apart from larger, urban areas.

3. Population

3.1 Demographics

Figure 1. Demographics

Petroleum County Population	519
Male Population	277
Female Population	242
Estimated Median Household Income	$40,000
Estimated Per Capita Income	$28,220
Estimated Population in Workforce	340
Occupied Housing Units	333

*Figures approximated based on US Census Bureau figures (as percentages) multiplied by the 519 population

Petroleum is the least populated County in Montana with a total population of 519 at the July 1, 2021 US Census Population Estimate. Approximately 313 people (60%) live outside the Town limits of Winnett, the County seat and only town in the County.

For much of the last 90 years, the County population has gradually declined since its highest census-recorded population in 1930 of just over 2000 residents. That population number reflected the oil boom of the time but was short-lived when the oil boom did not meet the expectations of the oil exploration industry and the Great Depression caused a significant decline in population. Homesteaders with hopes of making their living in agriculture discovered that the acreage allotted for homesteads was far too small to make a living in the semi-arid land of the county and the drought also forced large numbers of those county residents to leave the area to seek opportunities elsewhere.

However, the population growth during the 2020 - 2021 time period shifted what was otherwise a steady population from 2010 - 2020. A former slow but steady decline in population in Petroleum County continues to be attributed to individuals seeking employment and economic opportunities in other areas of the state or country. Modernization of agricultural practices requires fewer people and, with agriculture as the primary economic driver of the County, fewer opportunities for employment are available. Ranches in the County, though still primarily family run operations, have consolidated and require fewer employees. Other issues identified as barriers to growth have included a lack of housing and medical care.

As of 2020, the median age in the County is 49.6, with most of the population being between the ages of 35 and 74. Adults over the age of 65 make up over 28.5% of the population, while children under 18 years make up only 14.3% of the population.

3.2 Projections

Census information is somewhat conflicting given the estimated population of the County by the ACS. That survey shows a decline in population in Petroleum since 2020 but, according to projections compiled by the Census and Economic Information Center through the Montana Department of Commerce, Petroleum County was expected to increase in population since 2020 with a continued steady increase over the next ten years with an estimated population of 591 in 2030.

With limited employment opportunities, housing, or medical care, fewer young families have migrated to the area in the past; however that trend seems to have reversed in the last couple of years. It is suspected that the population will either steady at current rates or perhaps will continue to grow. Retirement aged adults may find the County/Town a relatively inexpensive option for living expenses covered by fixed incomes which may increase the population over the age of 65. However, as medical issues arise, elderly residents may continue to be forced to seek assisted living facilities outside the County.

3.3 Goals and Objectives

GOAL

In the near term (over the next 5 years) stabilize population at or above current levels and in the long term (over the next 10-20 years) grow the population by 5%. This translates to a net gain in residents of approximately 75 individuals.

OBJECTIVES

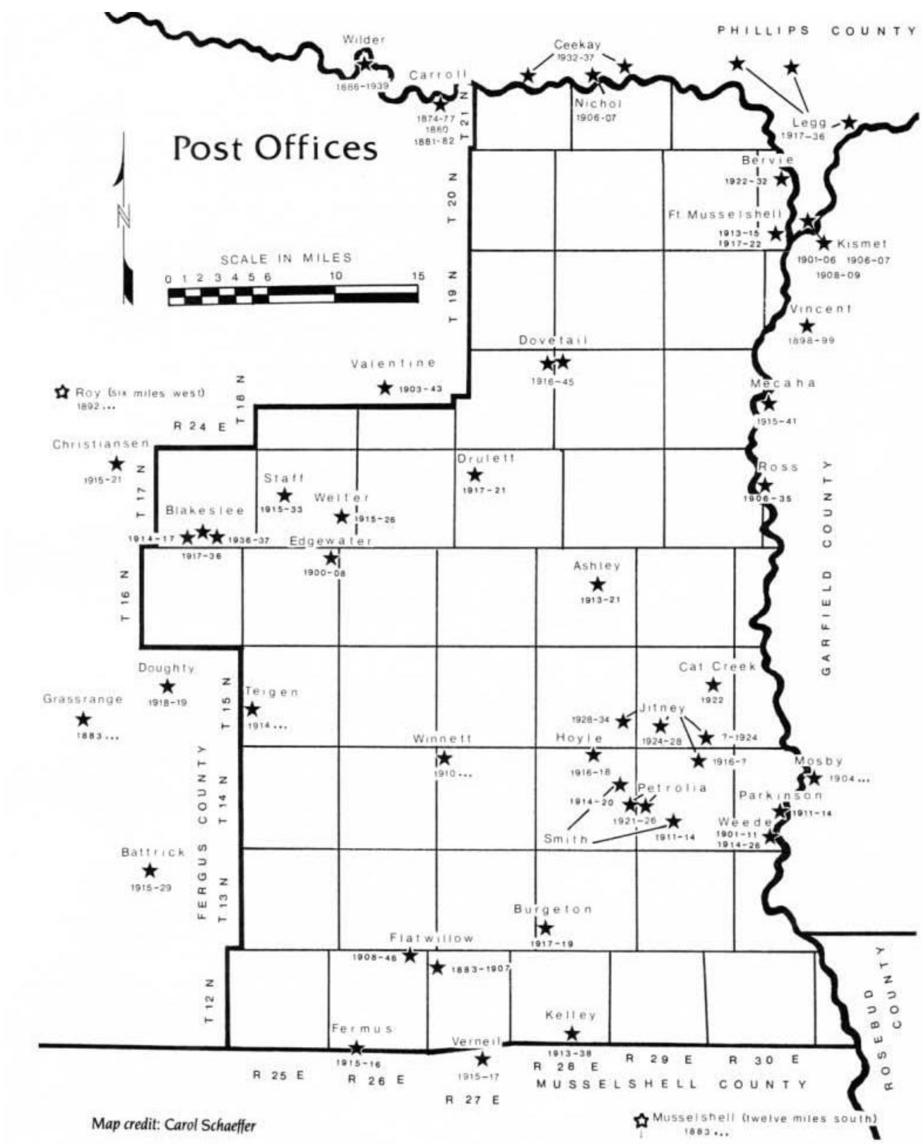
- Encourage aesthetic improvement efforts to foster community pride and to present our best community to possible new residents.
- Support the needs of the Winnett School District
- Support policies that encourage local employment.
- Identify areas for future growth within the Town of Winnett and help facilitate extension of municipal capital improvements when appropriate.
- Actively engage young adults in community leadership positions.
- Seek community marketing activities that emphasize the beauty, solitude, small town atmosphere, and recreational opportunities in the area in an attempt to attract new businesses (such as telecommuters) and their families.
- Support efforts that maintain agriculture production at a rate that supports families.
- Identify economic development activities that encourage local job creation.

4. Land Use

4.1 Land Description

Petroleum County encompasses 1,067,757 acres South and West of the confluence of Musselshell and Missouri Rivers. Geographically, the County is approximately the size of the state of Rhode Island. Approximately 615,420 (57.6%) acres are privately owned and 452,337 acres are publicly owned by a variety of entities including the Montana State Department of Natural Resources and the United States Department of Interior. Specifically, the US Fish and Wildlife Service owns the CMR lands which has 56,254 acres while the US Bureau of Land Management lands tally to 331,488 acres. Winnett is the only incorporated Town in Petroleum County and is the County Seat.

Figure 2. Historic Post Office Locations Map Evidence of the once populous area.



4.2 Existing Land Use

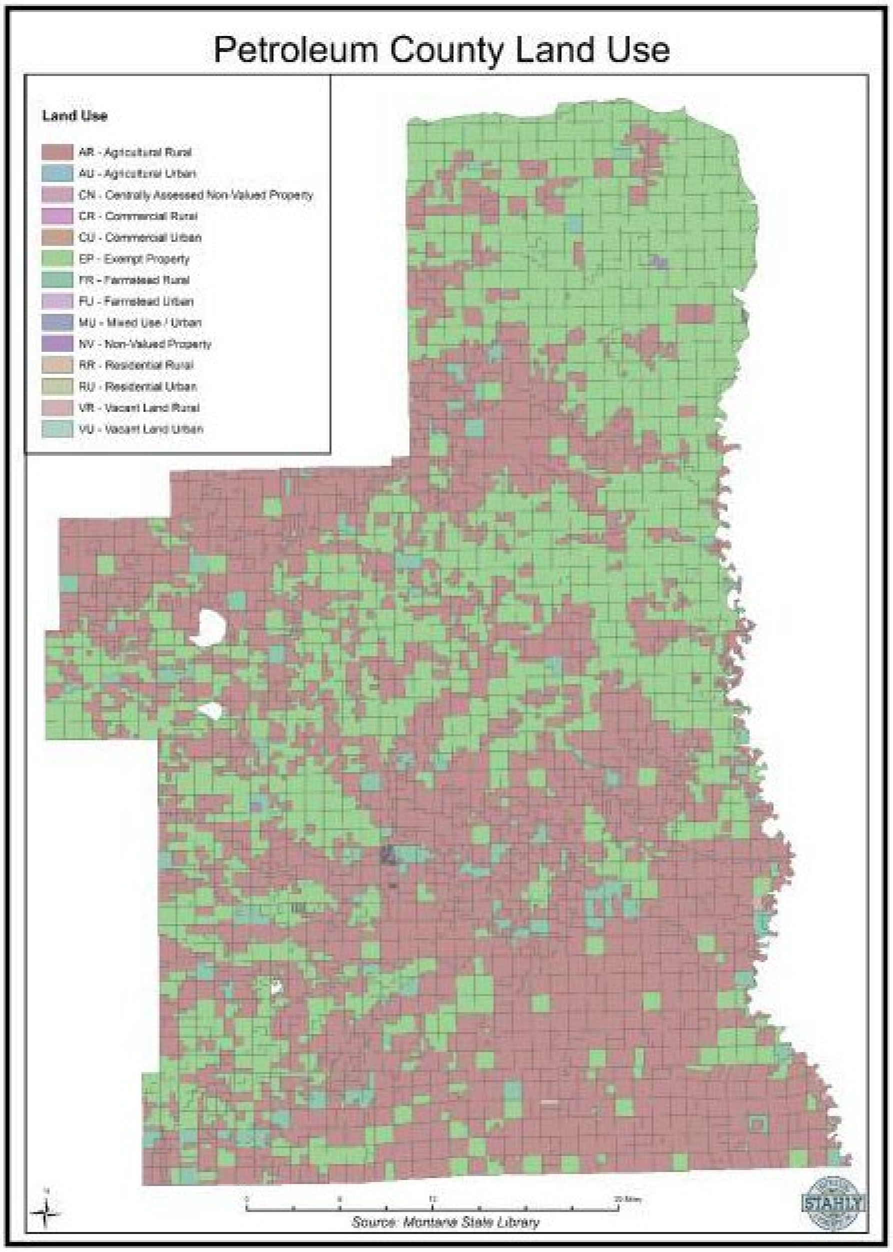
Land Ownership

Land use classification definitions have been determined by the Montana State Legislature. These classifications and definitions can be viewed in depth on the Montana Department of Revenue's website at the following link: https://revenue.mt.gov/property-types

Residential property consists of single family residences including trailers, manufactured homes, and rental multi-family dwelling unit. Commercial property consists generally of income-producing property such as office buildings, restaurants, shopping centers, motels, etc.

Agricultural property is classified as such based on ownership, parcel size, and agricultural use.

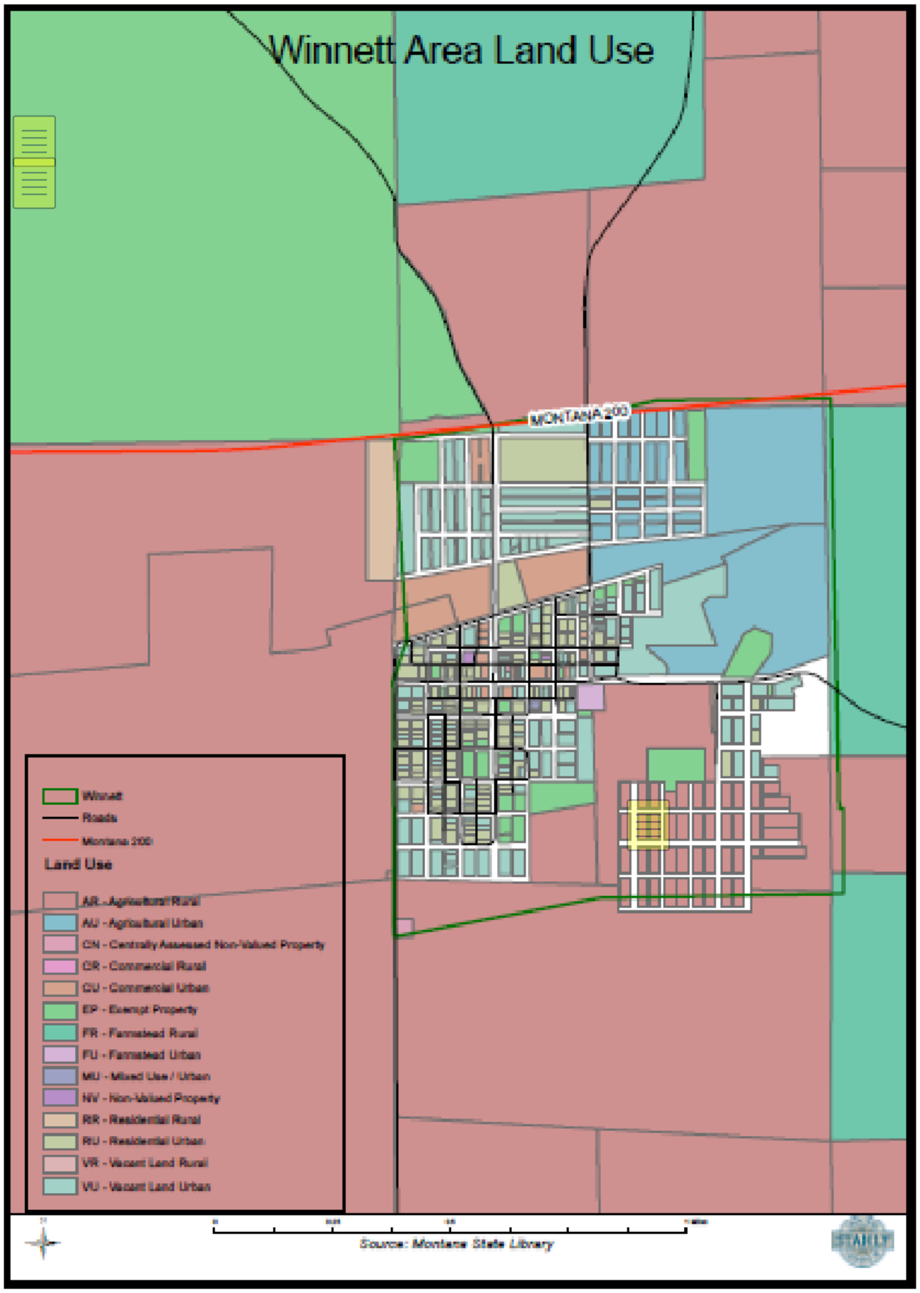
Figure 3. Petroleum County Land Use, 2017



The most prevalent land use classification in the County is Agricultural Rural, which totals 576,640 acres or 53.8% of the County. The next more prevalent land use classification is Farmstead Rural, which totals 34,483 acres or 3% of the County. Other land classifications including Commercial Rural, Residential Urban, Commercial Urban, Vacant Land Urban, and Residential Rural make up the remaining parcels in the County.

The Town of Winnett is mostly comprised of parcels classified as Residential Urban, Agricultural Urban, and Vacant Land Urban, as illustrated in Figure 4.

Figure 4. Winnett Area Land Use



State and Federal agencies including the Bureau of Land Management (BLM), the MT Department of Natural Resources and Conservation, and Montana Fish Wildlife and Parks own and manage lands within Petroleum County. Table 1 details all public land ownership including acreage and percent of total acres. This information was obtained from the Montana State Library and the Montana Natural Heritage Program, which obtains its information from state and federal agencies.

Table 1. Public Land Ownership

Name	Acres	% of total acres in the County
USDI Fish Wildlife Service	56,254	5%

USDI Bureau of Land Management	331,488	31%
State of Montana	191	< 1%
State of Montana Trust Lands	63,791	6%
Local Government	696	< 1%
Total Public-Owned Land:	**452,337**	**42%**
Total Privately-Owned Land:	**615,420**	**58%**
Total Acres in County:	**1,067,757**	

4.3 Future Land Use Projections

Future land use in the County is expected to remain primarily Agricultural Rural where livestock ranching will be the prevalent use of the land. Agricultural families in Petroleum are aging and facing the difficulties of passing their operations on to younger generations, causing opportunities for outside investors to purchase those lands. Many of those large parcels may continue to operate in agriculture but are usually staffed with employees rather than owners.

As parcels of land are being sold to recreationalists and absentee owners buy land in Petroleum County, we will seek opportunities to engage these new landowners in our community and invite them to be part of the solution of providing more opportunities for area producers. Research has found that most absentee landowners are currently (as of 2022) either keeping their land in production, employing local managers, or leasing their land to local producers; however, over time this could change and should be monitored. Fostering opportunities for young families to get into viable agricultural operations would potentially maintain the agricultural economy of the County and build a strong foundation for a new crop of landowners who will develop roots to weather the challenges of doing business in agriculture.

Additionally, large parcels of land are being sold as small parcels of land geared toward recreational use instead of agriculture. Often, unfortunately, those bits of land are generally no longer used for production agriculture, and so there is an additional loss to the county.

Future land use in the town of Winnett is expected to remain similar to existing land use, much of which is residential with only a few parcels being used for commercial applications. For the future of land use in Winnett, we would like to see an increase of commercial applications on the main thoroughfares of town.

Recognizing agriculture as the primary industry of the county, the Right to Farm legislation will be used as one form of protection.

> 76-2-901. Agricultural activities -- legislative finding and purpose. (1) The legislature finds that agricultural lands and the ability and right of farmers and ranchers to produce a safe, abundant, and secure food and fiber supply have been the basis of economic growth and development of all sectors of Montana's economy. In order to sustain Montana's valuable farm economy and land bases associated with it, farmers and ranchers must be encouraged and have the right to stay in farming. (2) It is therefore the intent of the legislature to protect agricultural activities from governmental zoning and nuisance ordinances.

Overpopulation of certain wildlife leads to overgrazing and trampling and limits the production that is necessary to ensure a secure food supply. Bison in Petroleum County will continue to be classified as livestock as per Petroleum County Resolution No. 11, A Resolution Declaring Buffalo or Bison in Petroleum County as Domestic Livestock, and an Ordinance by Petroleum County Conservation District to declare all bison/buffalo within Petroleum County to be livestock, 19-01.

Petroleum County is dependent on revenue from taxes on private lands, the livestock that graze those lands or the equipment used for that agricultural operation. It is imperative to our ability to sustain our county operations that when State or Federal agencies acquire, sell or trade lands that our county suffers no net loss of deeded lands so that our tax base does not diminish due to the ability of a government agency to increase its land holdings. When a government agency acquires deeded acreage within Petroleum County, it should offer an equal amount of acreage of its land holdings within Petroleum County to the public to purchase. In this way, Petroleum County will have no net loss of deeded lands.

Petroleum County will not endorse any federal or state monument, wilderness, or wildland designations unless it has support of the Petroleum County constituents and the Petroleum County Commissioners.

4.4 Policy, Regulatory, and Financial Items

There are a variety of tools that can be used by the County and Town to implement land use goals and objectives. This section is intended to define those tools. Not all land use policies and regulatory tools are appropriate for rural Montana communities and, therefore, local government must carefully consider the use of each of these in their deliberations regarding land use decisions.

Policies that can be used to implement future land use goals and objectives are:
- Long range planning
- Targeted Economic Development District (TEDD)
- Prime farmland/agricultural preservation

Regulatory tools that can be used to implement and enforce future land use goals and objectives are:
- Subdivision regulations including design standards
- Zoning regulations
- Conservation easements
- Floodplain regulations
- Buildings for Lease or Rent regulations

Financial items that can be used to implement the future land use goals and objectives are:
- Grants
- Taxation changes
- Land acquisition
- Capital Improvements Plans
- Targeted Economic Development (TED) Districts
- Tax Increment Finance (TIF) Districts

- Education towards and development of more valuable commodities that thereby make ranches / farms more profitable
- Historic tax credits
- New market tax credits
- Regional / multi-county Port Authority

4.5 Goals and Objectives

GOAL

Preserve existing land uses by encouraging compatible development.

OBJECTIVES

- ❖ Maintain updated subdivision regulations to reflect changes in state requirements or land use patterns.
- ❖ Adopt state mandated Buildings for Lease or Rent regulations.
- ❖ Consider zoning or other policies that may limit the type of development allowed
- ❖ Encourage the enforcement of existing ordinances that encourage the visual appearance of our community
- ❖ Encourage the voluntary preservation of open space, wildlife habitat, and domestic livestock in the County.
- ❖ Encourage local government involvement in working with oil and gas and alternative energy developers to preserve land use.
- ❖ Support the continued classification of bison as livestock.
- ❖ Coordinate land use policies and infrastructure development to preserve water resources.

GOAL

Promote agriculture and preserve the agricultural use of existing private, state, and federal lands.

OBJECTIVES

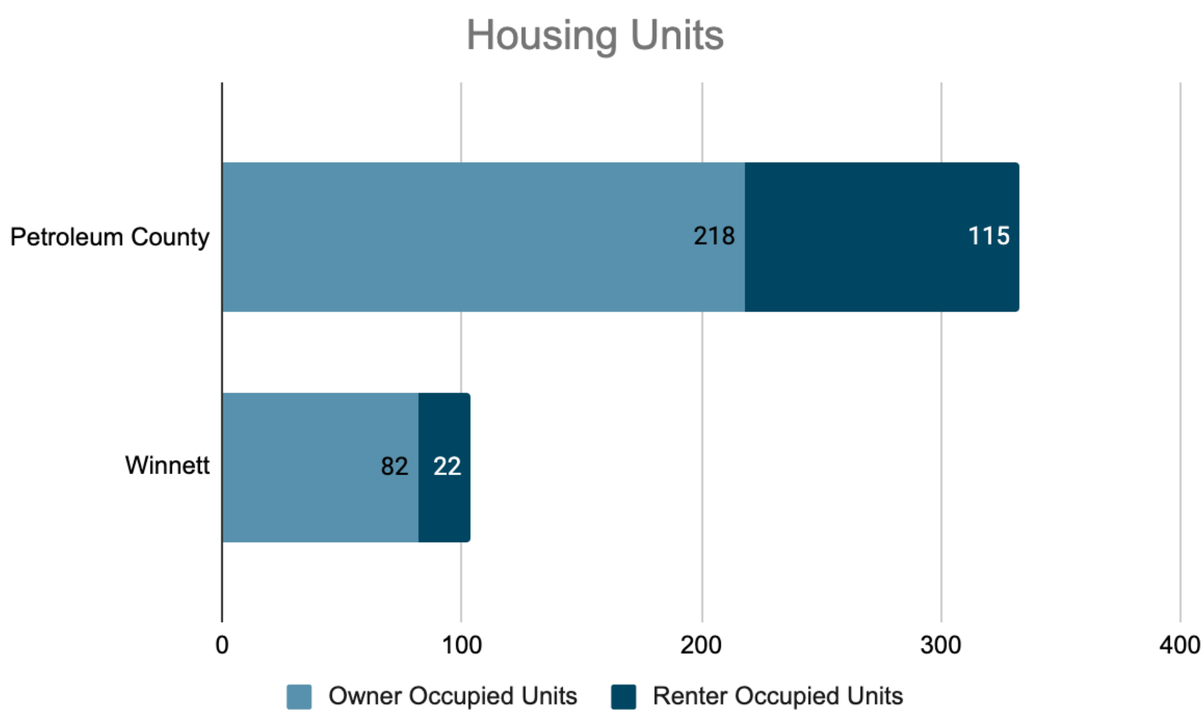
- ❖ Support the development of the area's agricultural resources.
- ❖ Consider adopting zoning or other policies that would regulate rural residential developments.
- ❖ Identify opportunities for providing education on land use practices.
- ❖ Invoke Right to Farm legislation where appropriate.

5. Housing

5.1 Current Characteristics and Conditions

Petroleum County, combined with the Town of Winnett, has a total of 333 housing units serving 212 households, according to the 2020 Census. Multi-unit structures account for only 2.7% of the housing units. Overall, access to homeownership and rentals, as well as the affordability of housing, currently appears to be a non-issue for residents of the subject area. Improvement to the quality of housing would potentially add to the attractiveness of the County and Town as an area for growth.

Figure 5. Housing Units



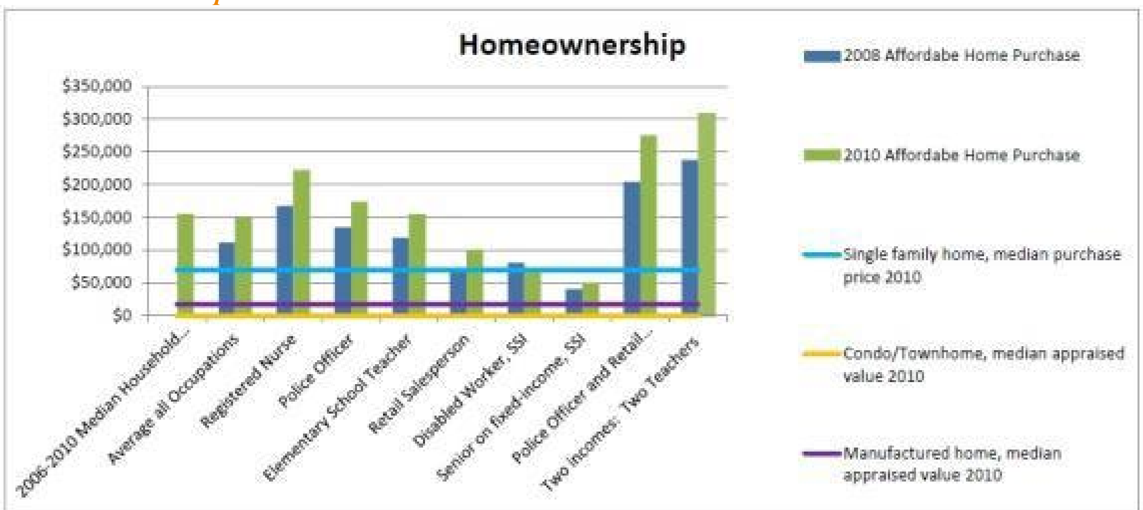
Although the population in Petroleum County was essentially unchanged between 2010 and 2020, the County was among other rural Montana counties with a decline in the percentage of home ownership. The number of owner occupied units decreased during this time frame, as well as the number of total occupied housing units; however, with an owner occupied rate of 66%, Petroleum County is slightly above the average for Montana, with the average state rate of homeownership at 69%.

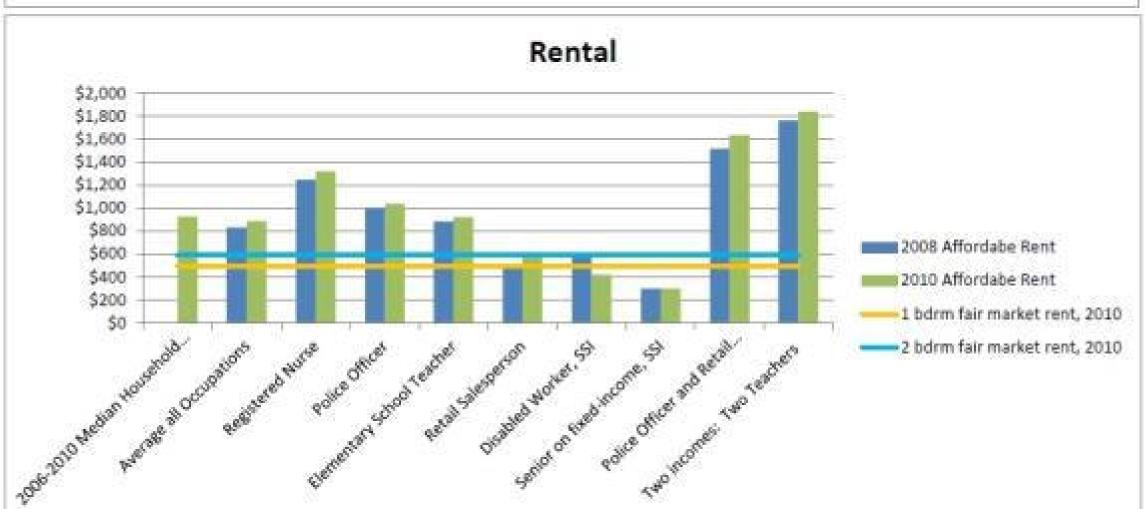
Decreased home ownership levels between 2000 and 2020 were a result of several factors in Montana, according to the Montana Board of Housing. "Although Montana's foreclosure rate was about half of that of the nation, many areas, like Flathead County, suffered high foreclosure rates.

Tightened credit, along with increased underwriting criteria for mortgage loans that were put into effect nationwide after the housing bust, has also contributed to lower levels of homeownership rates in the State."

Housing affordability is generally measured by the ratio of home owner costs to total household income. Housing is considered to be "affordable" if home owner costs, which include mortgage payments, real estate taxes, utilities, insurance, and various other fees, are less than 30% of the total household income. Affordable housing is often in the form of multi-family properties.

Figure 6. Homeownership

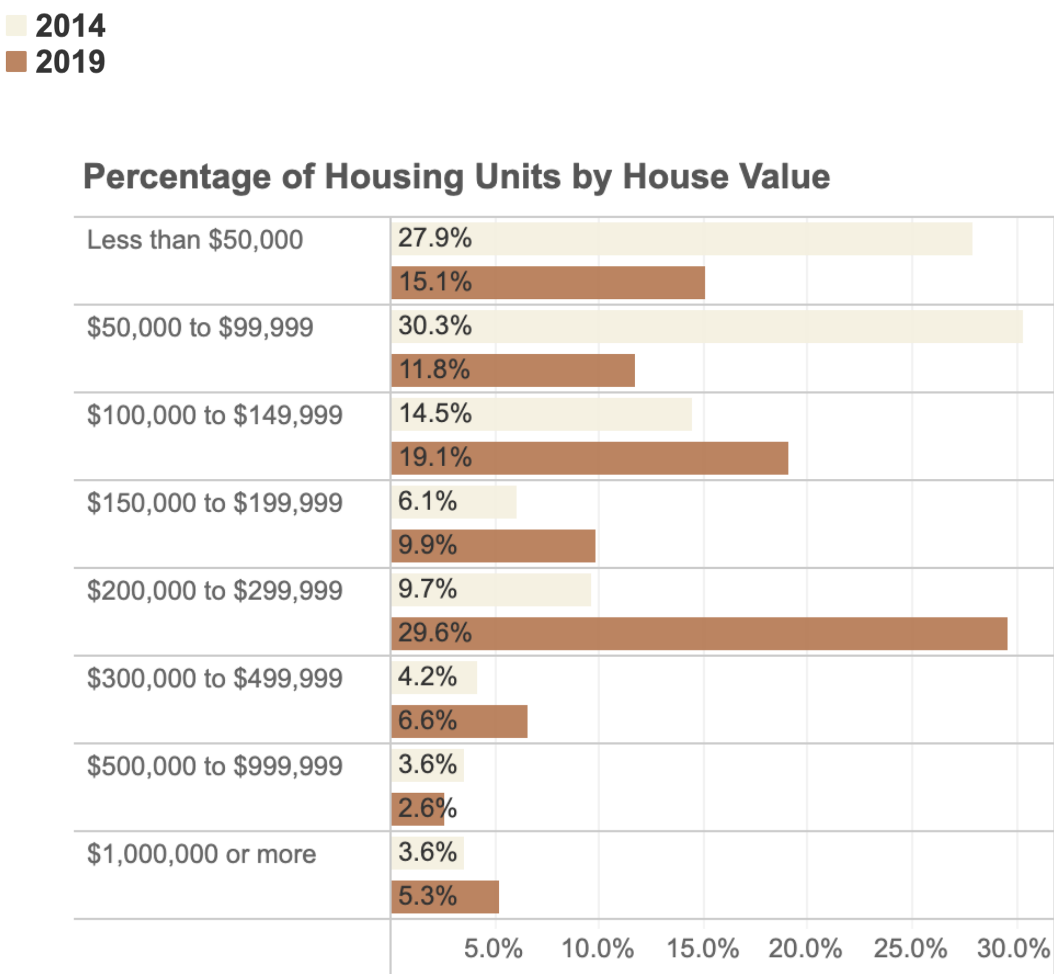


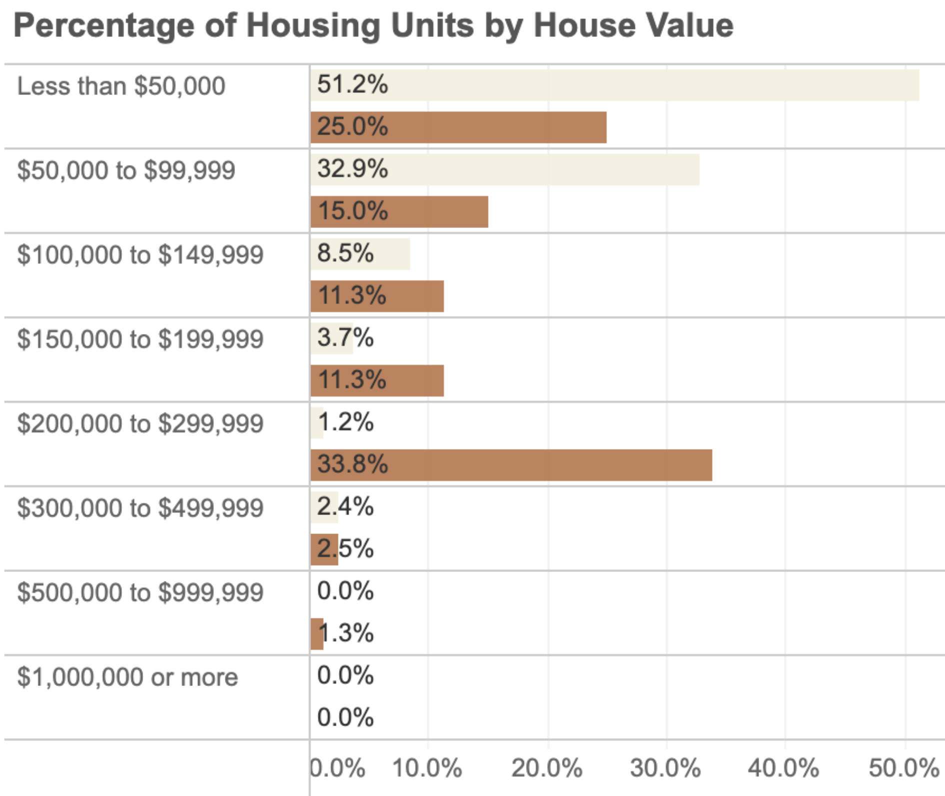


Petroleum County's Median Household Income of $40,000 reflects a 15.0% poverty level, according to the U.S. Census Bureau. The Town of Winnett has Median Household Income of $35,250, which reflects a 11.4% poverty level. As of 2022, both the County and the Town have 40% and 60% of residents, respectfully, that qualify as Low to Moderate Income according to the Montana Department of Commerce. Housing Choice Vouchers, which are distributed through the Montana Department of Commerce Housing Division, allow low income families to pay no more than 30% of their income in rent, and disperses the remaining rent directly to the landlord. Currently, there are only six federally assisted rental units in Petroleum County.

According to the ACS, the median value of owner-occupied units in the County was $155,700 in 2020, which is a 46% increase from 2010, when the median value was $106,800. According to the American Community Survey (ACS) 5-Year Data Profile Housing Trend data, the following graphs display home values in Petroleum County & Winnett, respectively.

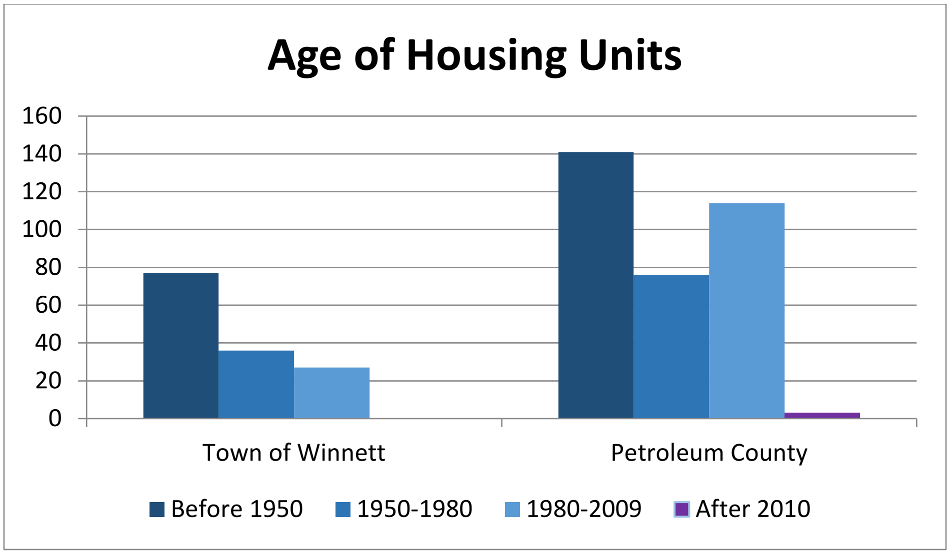
Figure 7. Home Values, Petroleum County & Winnett





Most of the County is rural in nature, and in general, is comprised of older housing which does not provide the same investment value as housing in larger cities and towns. According to the Comprehensive Economic Development Strategy (CEDS) written by Snowy Mountain Development Corporation in 2012, a major challenge in the general region surrounding Petroleum County is the deterioration of the aging housing stock. "Approximately 45% of the homes in the area were built prior to 1940, and many are in need of repair or improvements." In addition, homes in rural communities typically need rehabilitation and retrofitting for energy efficiency. Petroleum County does not impose any building permit requirements other than those required by the State of Montana for the buildings erected in the County.

Figure 8. Age of Housing Units



5.2 Anticipated Future Housing Issues

Out-migration in the Central Montana Region has caused loss of young families and fewer children; however, longevity improved among older residents and rural counties, like Petroleum County, have high populations of seniors. That disparity is expected to increase in the coming years, and housing that supports the needs of seniors will be in demand.

In order to attract young individuals and families seeking to relocate or return to the area, there will be a need for quality, affordable housing; however, it must be noted that with an increase in senior or up-to-date housing that attracts population to the area, there needs to be corresponding improvement in services that support the health and well-being of that population group. This includes medical and emergency services, fire protection, and law enforcement. Many of these services are performed by local volunteers, which, in general, average over 45 years old. It is critical that younger members of the population become engaged in volunteering or it may become more difficult to staff emergency and fire protection service agencies.

Aging housing stock means homes in rural communities need rehabilitation and retrofitting for energy-efficiency. Furthermore, there is a lack of land or affordable lots suitable to support development of new housing where infrastructure is readily available in Winnett. These factors contribute to housing availability that is not desirable and, therefore, not conducive to growth.

Snowy Mountain Development Corporation (SMDC) provides homebuyer education and counseling for NeighborWorks Montana, which is designed to prepare first-time homebuyers for the issues that come with homeownership. The mission of NeighborWorks Montana is to create opportunities for families to live in affordable homes.

Other housing resources that would be available to residents of Petroleum County include:

- Montana Department of Commerce (MDOC):
    - Federal Community Development Block Grants (CDBG) managed by MDOC
        - CDBG Large-Scale Multi-Family Housing Development and Rehabilitation Grants

        - CDBG Small-Scale Single-Family Housing Rehabilitation Grants
    - HOME grants – provided by HUD and MDOC
        - Homebuyer Assistance
        - Affordable Housing Development and Rehabilitation Grants
    - Housing Trust Fund – construction, rehabilitation, and preservation of affordable rental housing for extremely low income families

5.3 Goals and Objectives

GOAL

Meet housing needs for all age, income, and special needs groups.

OBJECTIVES

- ❖ Seek resources to improve housing quality, condition, and availability.
- ❖ Support efforts to build affordable homes and rentals.
- ❖ Support efforts to provide options for senior housing including housing efforts to keep medically fragile individuals in the community.
- ❖ Require universal design elements in housing assisted by federal or state resources.
- ❖ Seek assistance in incorporating accessibility in home design including retrofitting existing homes with ADA compliant features to help elderly or disabled residents remain in their home.
- ❖ Work with housing agencies and lenders to promote programs for home improvement and rehabilitation.
- ❖ Provide information about programs for low-income residents on loan and grant programs for home improvement.
- ❖ Encourage the compilation of a resource directory of weatherization programs and energy audits through the State, utility companies, and senior services.

6. Economic Development

6.1 Employment

Petroleum County's primary industry which employs the most individuals is agricultural production. According to the 2017 Census of Agriculture, the County had 104 farms, with 592,558 acres in farmland, a decrease of 14% from 689,752 acres in 2012. The market value of agricultural products sold totaled $17,761,000, down 44% from 2012, when value of products was $31,604,000, and government subsidies to farm operators funded an additional $861,000. Government appropriations include such items as crop insurance premiums, and disaster, conservation, and commodity subsidies.

Other employers with more than just a few employees in the County include the School District, local government and local businesses. Farm and ranch and other seasonal businesses find it difficult to hire seasonal employees. The remoteness of the County, limited employment opportunities, goods and services all have an effect on the overall economy of the area.

Unemployment in the County is 2.3% as of June 2022, which is lower than the State unemployment rate of 2.6%. Although there are currently few businesses outside of agricultural production that require a labor force in the County, a lack of eligible workers for new businesses may be an issue.

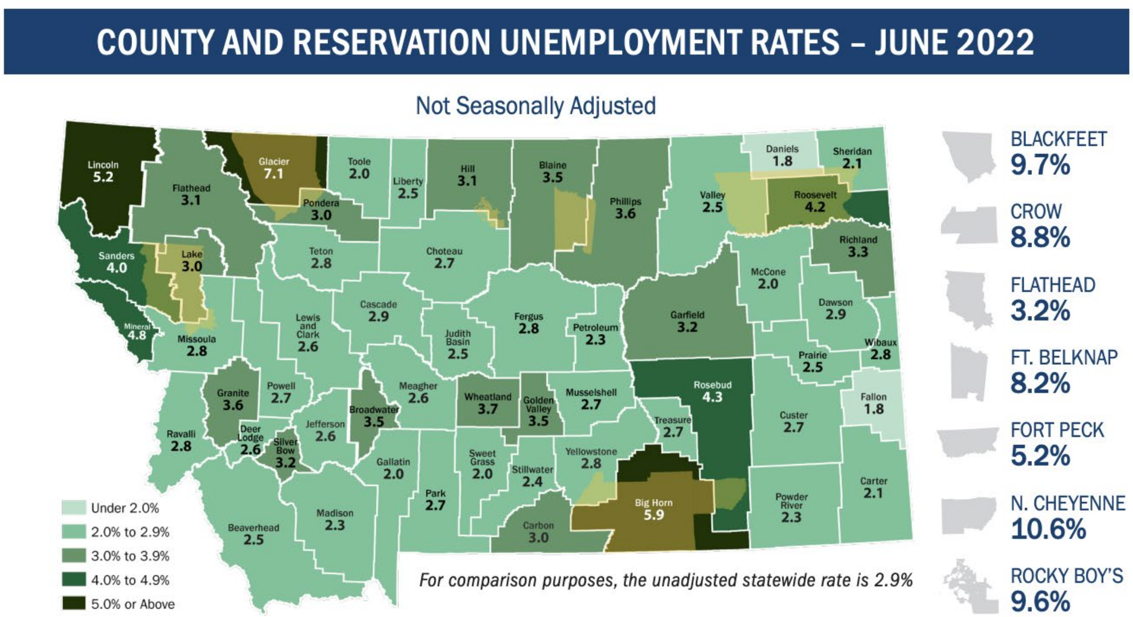
Of the total County population of 519 residents, 263 are over the age of 16 and 257 are currently working. As of 2017, privately-employed workers make up 51% of the employed labor force, 27% are self-employed, and 22% are employed with the State, County, or Town government.

Table 2. Petroleum County Industries

Petroleum County Industries	
Agriculture	
Top Agriculture Producers, 2017	
Grains, Dry Beans and Dry Peas Sales (Dollars)	$1,962,000
Additional Crop Sales (Dollars)	$1,307,000
Top Livestock Producers, 2017	
Cattle, Including Calves Sales (Dollars)	$14,346,000
Occupations, 2019	
Management, business, science, and arts	94
Sales and office	33
Farming, fishing & forestry (natural resources)	39
Education, instruction & library	15
Business & financial	9
Industries, 2019	
Agriculture, Forestry, Fishing & Hunting	131
Retail Trade	24

Educational Services	22
Public Administration	14
Accommodation & Food Services	7
Employment Status	
Population 16 years and over	65.6%
Civilian labor force - Employed	257
Civilian labor force - Unemployed	6
Armed Forces	0
Not in labor force (2017 figure)	148
Females 16 years and over	63.9%

Figure 9. Montana County and Reservation Unemployment Rates



6.2 Income

The Montana Department of Commerce Census and Economic Information Center reports median household income as of 2019 in Petroleum County is $51,250. Income for County residents fluctuates with agricultural markets.

An average of 15.0% of the population has income below poverty level, although 10.0% of children under the age of 18 are considered in poverty, according to the 2019 ACS.

Table 3. Petroleum County Median Income, 2017

Petroleum County Income and Benefits	
Mean earnings (dollars)	$47,344

Mean Social Security income (dollars)	$13,731
Mean retirement income (dollars)	$14,197
Mean Supplemental Security Income (dollars)	$0
Mean cash public assistance income (dollars)	$4,900
Median family income (dollars)	$49,107
Mean family income (dollars)	$57,038

6.3 Future Projections for Economic Development

Declining population in Petroleum County is likely attributable to mechanization and consolidation of agricultural activities. This has resulted in a loss of jobs, which caused workers and young people to move away from their small hometowns in search of employment and education. Urban areas and urban-adjacent non-metro counties in the region have been growing due to in-migration. It is not anticipated that this trend will change significantly in the future.

The county does not have enough jobs to provide for young families; consequently the senior population continues to grow disproportionately, school enrollment is declining, and local businesses have fewer customers. County residents would like to see a stronger economy, preferably based on local agricultural, the attraction of new industry, and opportunities for tourism. Some of the jobs available, generally part time, seasonal and low paying cannot be filled. Promoting the opportunity to enjoy a rural lifestyle while still earning good wages could attract telecommuters to the community. This might be particularly true for information technology experts who can perform their job remotely.

There is very little opportunity in the County for natural resource extraction and the employment opportunities that industry might provide. Gravel resources may provide some economic values. Alternative energy resources like wind are also not a likely source of economic development. Wind energy projects are developed by companies that seek out the areas with the strongest wind resource but also review other critical factors like access to land, access to the transmission lines, ability to sell the electricity, and public engagement other significant development factors.

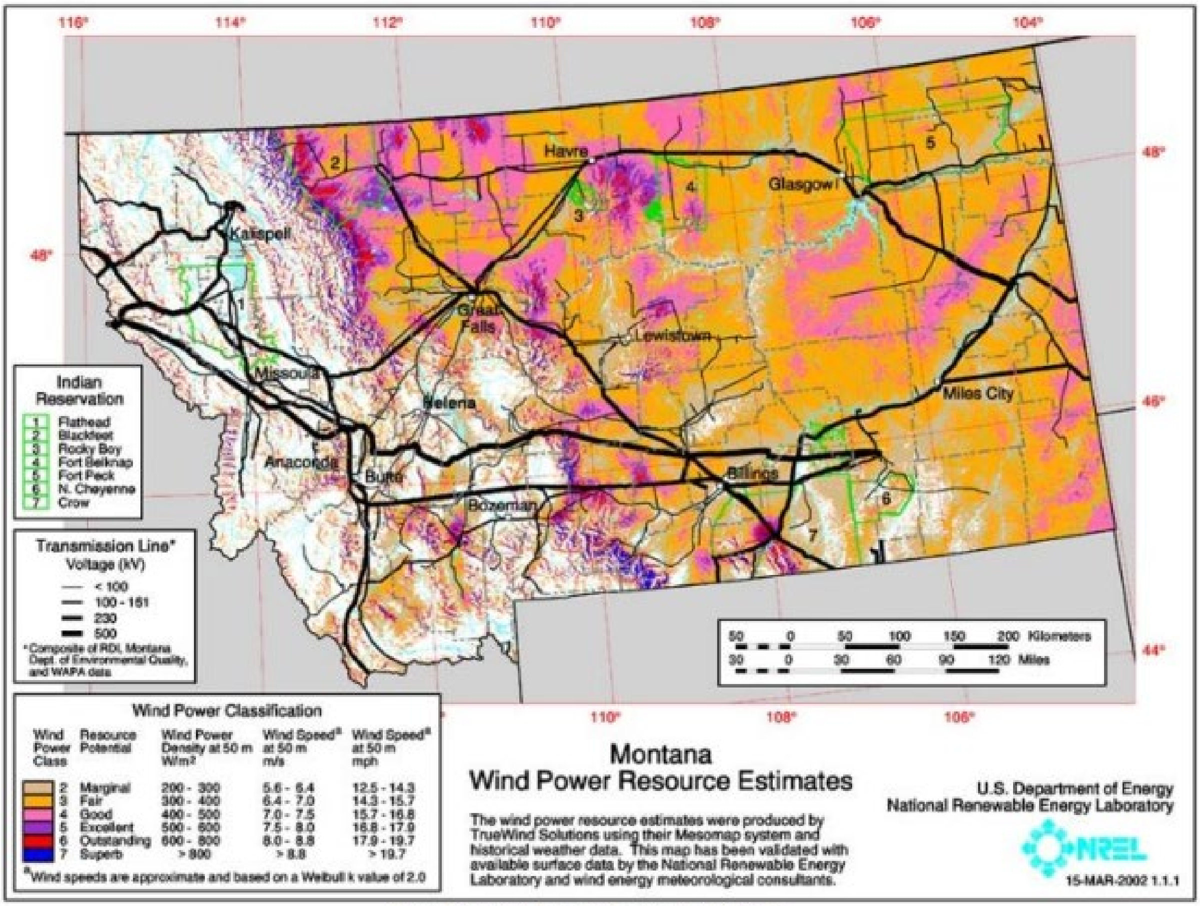


Figure 10 - NREL Wind Resource Map (50m)

Figure 10. Montana Wind Power

Due to the lack of population, industry, and employment it is critical that the County, which has a large amount of state and federal land in its land base, continues to receive Payment In Lieu of Taxes (PILT). This form of payment from the Federal government that takes the place of full tax payment is subject to congressional approval. Failure of this program without a viable replacement would be devastating to the operation of Petroleum County government. The formula for calculating a county's PILT payment is also in need of revision as the payment for an acre of federal ground in Petroleum County is significantly less than the annual tax payment that would be received on an acre of private ground of similar assessed value. This denies the county tens of thousands of dollars each year that they would have seen if the acres were privately owned and taxed.

6.4 Goals and Objectives

GOAL

Encourage retention of wage earners in the County.

OBJECTIVES

❖ Identify economic development activities that encourage local job creation.

- County and Town governments collaborate to support economic development projects including infrastructure, community amenities and housing for workforce.
- Encourage business retention and expansion by identifying business needs and supporting "buy-local" programs.
- Maintain County and Town budgets at a level that will support infrastructure such as water, sewer, roads and bridges and that maintains a safe, healthy, and attractive environment such as fire and police protection and weed management.

GOAL

Provide for diversification and broadening of the economy.

OBJECTIVES

- Support the development of markets for new and existing agricultural businesses, including agritourism and ecotourism opportunities, as well as other potential businesses.
- Support increased resources for agricultural research that supports growth of agribusinesses and improves competitiveness of growers.
- Create and market a business climate that would attract home businesses and telecommuters. Promote the area's solitude, family-friendly atmosphere, beauty, and recreational opportunities that might attract non-traditional wage earners to move to the area.
- Support expanded broadband and cellular service infrastructure within the County.
- Support new and expanding means of employment to include small scale economic development activities.
- Seek local Montana Job Service presence to fill existing seasonal and full time jobs and/or provide education on jobs that could be performed remotely.
- Support efforts to offer workforce training.
- Promote opportunities for economic development based on recreational activities.

7. Local Services

7.1 Fire Protection

Fire protection within Petroleum County is primarily provided by the Winnett Volunteer Fire Department. The Department's station is located in Winnett and has 24 volunteer firefighters. In addition to the equipment and resources available from this service unit, Petroleum County has support equipment available.

In 1985, Petroleum County entered into the State/County Cooperative Fire program with the Department of Natural Resources and Conservation (DNRC), in which the State signed an agreement with the County to provide support in the matters of organization, planning, equipment, prevention, training, and fire suppression support.

The Bureau of Land Management (BLM) Central Montana Fire Zone has fire protection responsibility for 3.5 million acres of land within their coverage area. In addition, they provide assistance to other agencies during the fire season, such as USDA Forest Service, Montana DNRC, and the counties within the zone.

In addition, the County has mutual aid agreements with surrounding counties, BLM, and State Lands, as well as a verbal agreement with the Charles M. Russell National Wildlife Refuge. There is a Petroleum County Cooperative Fire Management Plan.

In 2004 the County, assisted by Snowy Mountain Development Corporation, developed and adopted a Wildland-Urban Interface Wildfire Mitigation Plan in an attempt to reduce the potential for wildfires that may threaten population, structures, infrastructure, and ecosystems in the County.

7.2 Law Enforcement

Law enforcement services in Petroleum County are limited to the Petroleum County Sheriff's Department, which is located in the town of Winnett. At this time, the Sheriff's Department employs a full-time Sheriff, a full-time Deputy Sheriff, and four volunteer Sheriff's reserve officers. The Sheriff's Department is located in the County Courthouse. There is no jail located within Petroleum County; therefore, jail facilities in Lewistown serve the County.

The County does not have a full time County Attorney, but utilizes the Fergus County Attorney when needed. The County also employs one Justice of the Peace.

7.3 Disaster Emergency Services

Petroleum County has a part-time Disaster Emergency Services (DES) coordinator, located in the County Courthouse. The DES coordinator serves as a point of contact for all matters involving state assistance with Emergency Management. An Emergency Operations Plan has been developed by the County in cooperation with the Town of Winnett.

The Petroleum County Emergency Operations Plan establishes the concept of operations and primary functions for managing disasters and emergencies in Petroleum County, Montana including the Town of Winnett. This plan provides an overview of the Petroleum County approach to emergency operations and serves as the foundation for standard operating procedures and other agency documents.

Through a cooperative agreement between the counties, Fergus County Sheriff's office operates the 911 dispatch for Petroleum County, which includes law enforcement, emergency medical calls, and fire calls.

7.4 Public Health

Petroleum County is part of the Central Montana Health District, which serves five counties in Central Montana. The main office for the Health District is located in Lewistown. Services offered include Immunization and Maternal Child Health, Communicable Disease Prevention, and Comprehensive Cancer Control. The County Sanitarian is also located in this office. The Central Montana Health District also regularly sends medical personnel to Winnett to do checkups on children and senior citizens.

In addition, the Central Montana Medical Center and the Central Montana Community Health Center, both located in Lewistown, provide a full range of medical services to the surrounding communities. Citizens of Winnett and Petroleum County often utilize public health facilities in Roundup, Billings and Jordan as well.

Using Covid funding a Tele health room has been set up in the basement of the county courthouse. The room, which can be used by all county residents but was built with senior citizens in mind, is set up with all necessary video chat technology and soundproof walls to help insure patient privacy. A local EMT, who shall remain unnamed and awesome, volunteers time to help patients use the equipment in the room. When the Petroleum County Community Center is finished, this service will be transferred to a room in their building, which may also be used for in person check ups.

Ambulance services respond to medical emergencies in Petroleum County. Ambulance services are provided by Petroleum County Ambulance volunteers, who are responsible for a 1,500 square-mile service area.

The South Central Regional Mental Health Center operates in eleven (11) counties within Montana, including Petroleum County. It is a registered non-profit corporation dedicated to mental health and chemical dependency care in the area.

7.5 Social Services

Social services in Petroleum County are provided by the Central Montana Health District, as well as the Central Montana Medical Center and the Central Montana Community Health Center. All facilities are located in Lewistown.

Senior citizens in Petroleum County are supported by the Area II Agency on Aging, which serves a total of eleven Montana counties. Some services provided include home and community based services, state health insurance counseling, senior advocate, and the aging and disability resource center.

Other than telehealth, there are currently no medical services other than County and volunteered staffed emergency services in the County. Residents of the County must travel to other urban centers (Lewistown, Roundup and Billings are the closest) for medical care including pharmacy services.

7.6 Education

There is currently one public schools in Petroleum County, serving approximately 62 students in elementary and secondary grades (K-12). The school is located in Winnett. There are no post-secondary education facilities within the county. Student enrollment in the County appears to be at a steady decline in enrollment. The high school graduation rate in the County is approximately 96.6%, which is significantly higher than the state average of 86%.

7.7 Noxious Weed Management

The Petroleum County Weed District's goals are to:

1. Bring together those responsible for weed management within Petroleum County.
2. Improve common management objectives.
3. Facilitate effective treatment and proficiency efforts along geographic boundaries with similar land types.
4. Understand and eradicate problem species.
5. Encourage landowners to contact the weed department for weed control.

The District cooperates with private landowners, county government, state agencies, federal land management\agencies, other interested agencies and individuals to help assist with control of noxious weeds and provide education on weed management.

7.8 Land Conservation

The Petroleum County Conservation District is a board comprised of five county elected officials and two appointed city officials tasked with the conservation of the county's natural resources. Through education, outreach and program and project development the District works hard to put local common sense natural resource conservation on the ground and to educate the current and future producers and landowners on natural resource conservation all while helping them to continue sustainability in their businesses. It regularly partners with other conservation districts, watershed groups, stakeholder groups, state and federal agencies, as well as some NGO's and nonprofits to put conservation on-the-ground.

7.9 Communications

Mid-Rivers Communications is the local carrier providing communication service to Petroleum County. In addition to local phone service, Mid-Rivers provides high speed internet, cable television, and cellular telephone service. Cell service within the county is spotty at best but has improved vastly in the past decade. Verizon service also works within the county. Most rural residents are dependent on satellite service for television. Mid-Rivers has plans to have fiber optic service to the town of Winnett by 2018 but it is going to be 2030 before all the rural residents are expected to receive service. Currently only parts of the county and the school have the fiber optic service which provides any real high speed internet service.

7.10 Future Need for Additional or Improved Services

It is anticipated that 28.5% of the population in Petroleum County is 65 years of age and older, indicating the demand for public health and social services will continue to increase. Concern that an increased population that is aging would put additional stress on medical, emergency, and law enforcement services, a balanced approach to improving these services needs to be considered before it is crucial.

7.11 Goals and Objectives

GOAL

Promote public health and social services in Petroleum County and the Town of Winnett to serve the needs of the citizens.

OBJECTIVES

- Investigate opportunities and develop ways to provide primary medical services for residents of the County. Support visiting medical programs.
- Identify incentives that could be provided to medical professionals as a way to draw them to the County.
- Endorse a community paramedics training program.
- Seek health care services to serve elderly residents locally rather than forcing individuals in need of care to move to surrounding cities.

GOAL

Provide adequate emergency services in Petroleum County and the Town of Winnett.

OBJECTIVES

- Encourage volunteers for fire and emergency services.
- Encourage community involvement in supporting emergency services provided by the Petroleum County Ambulance and Fire Department.
- Consider costs of emergency services and protection when considering new developments (i.e. subdivisions).

GOAL

Provide for the public service needs of the community at reasonable and acceptable cost to the taxpayers.

OBJECTIVES

Maintain County and Town budgets at a level that will support local services such as emergency services, law enforcement, weed management, social services, and education that maintains a safe and healthy environment for residents without an excessive tax burden.

GOAL

Reliable high speed internet for all residents of Petroleum County.

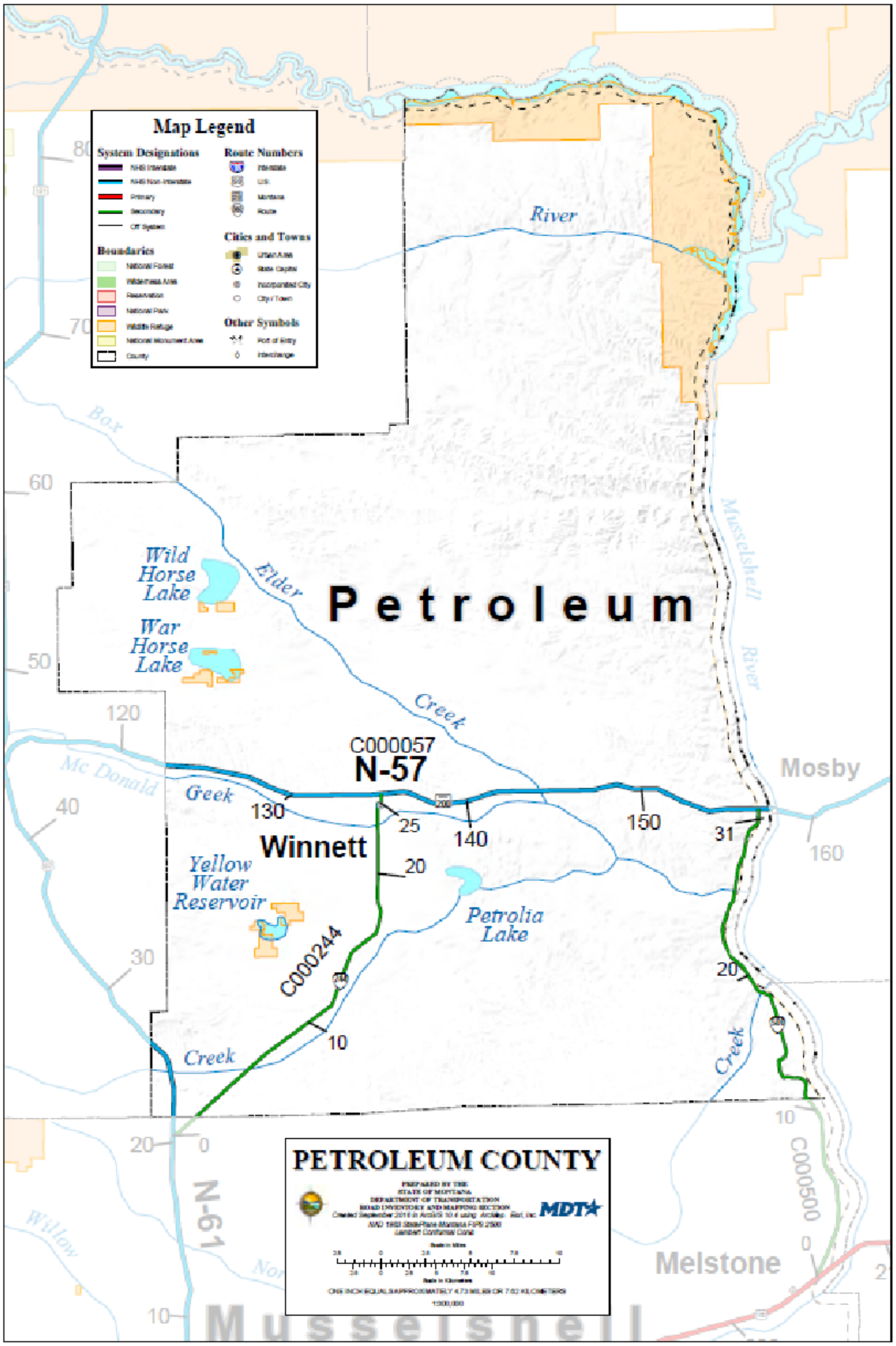
OBJECTIVES

Work with officials from state and federal agencies to encourage legislation to provide faster speed at affordable rates to those in both the municipal and rural parts of the County.

8. Public Facilities

8.1 Transportation

Figure 11. MDT-Petroleum County



Petroleum County transportation facilities consist of an extensive network of roads and bridges, in addition to a local airport facility, which is discussed in further detail below.

The road system within the county consists of approximately 52 miles of on-system State of Montana maintained highways, in addition to secondary routes and 585 miles of local county roads that are the maintenance responsibility of the Petroleum County Road Department.

Petroleum County currently has 24 bridges over 20' that are inspected biennially by the Montana Department of Transportation (MDT). Although the bridges are inspected by MDT, the structures located on local county roads remain the fiscal responsibility of the County, both for inspection and maintenance. Many of our bridges and their supporting infrastructure are starting to age and will be in need of more maintenance in the next five years.

The MDT Statewide Transportation Improvement Program for 2022-2026 lists the following project in the Right of Way and Incidental Construction Phase:

- Main Street-Winnett – Reconstruction of approximately 0.84 miles of Secondary 244.

8.2 Water Supply

The Musselshell River runs along the eastern border of the County and Fort Peck Reservoir on the Missouri River runs along the north boundary of the County. Lakes and storage reservoirs located in the County include Petrolia Lake, Yellow Water Reservoir, War Horse Lake, and Wild Horse Lake. Flatwillow Creek, Boxelder Creek, and McDonald Creek are three primary creeks that typically run year around providing irrigation and stock water. Seasonal creeks include Pike Creek, Blood Creek, Yellow Water Creek, and Elk Creek.

Petroleum County currently has one public water system in the Town of Winnett, as indicated by the Montana Department of Environmental Quality. The system is a community system, sourced primarily from ground water, and serves approximately 187 individuals.

Statistics from the Ground Water Information Center of the Montana Bureau of Mines and Geology indicate 674 total wells in Petroleum County, with 127 being for domestic use. In Montana, most individual wells are not required to be filed with the state, although that may change in the future depending on state legislative issues. To assure a water right, filing with the state is necessary.

Table 4. Petroleum County New Wells

County Well Data per Year (New Wells Only)	Number
2022	5
2021	4
2020	6
2019	6
2018	4
2017*	7
2015	2
2014	3
2013	5
2012	6
2009	18
2008	4
2007	6
2006	1
2005	5
2004	6
2003	3
2002	60
2001	16
2000	8
1999	4
1998	10

** Data not available for 2016*

Table 5. Petroleum County Well Usage

Type of Well	Number
Unknown	8
Waterflood	48
Industrial	48
Public Water Supply	5
Test Well	1
Unused	3
Monitoring	102
Irrigation	38
Geotech	2
Stock Water	408
Domestic	127

Total*	790
*Number may be different from County total since one well may have several reported water uses.	

8.3 Waste Water Treatment

The Town of Winnett is responsible for an aerated, three-cell lagoon system which discharges from the facility into McDonald Creek. The current wastewater system is scheduled for improvements in the next two years. Individual county residents with septic systems are permitted by Montana DEQ and/or the County Sanitarian.

8.4 Courthouse

The building that currently acts as the Petroleum County Courthouse was constructed in 1916-1917, and was originally occupied by a number of local businesses. In 1930, the building was remodeled as the courthouse, and in 1943 the County purchased the building from the estate of the original owner. The building is currently in a state of slight disrepair with a growing list of deferred maintenance to be addressed at a future date. The vacant and underutilized space in the Courthouse presents an opportunity to potentially meet community needs and create a revenue stream for the County to help offset building maintenance costs.

8.5 Fire Hall/EMS/Town Hall

Winnett maintains a Town Hall / Emergency Services Building which was built in the mid 1980's. This new building is located in the center of town and houses the equipment for the ambulance service as well as the fire department service. The Winnett city office is also housed in the building along with the local weed board. It has a large meeting room used by the various services and the city council for monthly meetings.

Fire protection within Petroleum County is primarily provided by the Winnett Volunteer Fire Department. The Department's station is located in Winnett. In addition to the equipment and resources available from this service unit, Petroleum County has support equipment available.

8.6 Airport

Petroleum County is home to the Winnett Airport, located two miles southwest of Winnett. The airport consists of a 3,130-ft long turf runway, and is publicly owned and maintained by Petroleum County. There are approximately 130 aircraft operations per year, comprised of 77% local general aviation and 23% transient general aviation. The airport is unattended and open to the public.

The current aviation uses of the airport include, but are not limited to:

- Crop dusting
- Grasshopper control
- Predator control
- Game counting
- Livestock management
- Potential new pilots (flight training)
- Emergency medical

8.7 Cemetery

There are numerous cemeteries scattered about Petroleum County that document the history of the settlement of the region with the names of many of the earliest residents as well as multiple generations of families that lived their lives in the community in the past 100 plus years. Many of the homesteader cemeteries are now nothing more than small fenced off parcels of land at the edge of a field or pasture and are only visited by the descendants who have returned to learn of their ancestors. Some are simply family or neighborhood cemeteries such as the Shay Cemetery, Ashley Cemetery or the Cat Creek Cemetery. The Flatwillow Cemetery is one of the oldest in the community while the Winnett Cemetery is the largest cemetery in the community. Both of those cemeteries are still maintained by local volunteers and governed by boards that were established in the early 1900's.

8.8 County/Town Shops

The Town of Winnett and Petroleum County each have an equipment shop.

8.9 Refuse Site

Petroleum County's refuse site was closed in the mid-1990's. Residents currently get garbage service from Lewistown.

8.10 Library

The Winnett Public Library, located in Winnett, was formally established in 1958, and became a county library with a tax base, an appointed board of trustees, and improved resources. In 1974, the library became the first combined elementary-high school-public library in the state, and has been in operation since that time.

The Library currently has a Director, Library Assistant, Story Hour Instructor, and History Committee, as well as a Board of Trustees and a number of volunteers.

8.11 Community Senior Centers

A Petroleum County seniors' organization was formed several years ago and is a project of the Area II Agency on Aging which has an office in Roundup, Montana. The local group has a board that meets regularly as well as with other county boards to conduct business. Some Federal and State funding is available to underwrite the meals and activities of the county organizations. The primary activity in Petroleum County is providing meals every Thursday at noon at a very reasonable price. Once a month, prior to the meals, blood pressure testing is available and seasonally Flu Shots are provided. This all occurs in the Senior Center which is in the basement of the county courthouse. The seniors also use the Center for card playing and special programs. The new Petroleum County Community Center, due to be completed in late 2022 / early 2023, may have the capacity to accommodate future growth and needs for the seniors spatially and programmatically. This single-level space would be more physically feasible to serve the needs of our community's senior population.

8.12 Petroleum County Community Center

In August of 2017, a volunteer committee formed with the dream of building the Petroleum County Community Center (PCCC). Soon after, PCCC established an account with the Petroleum County Endowment under the Central Montana Foundation umbrella, where donors could give tax deductible donations. While they began raising money for the center, the community was surveyed for what they wanted in the center, land parcels were donated and purchased for the building site, and PCCC received a planning grant for preliminary architectural work.

The PCCC committee shared their vision at the 2019 Winnett All-Class Reunion. Larry Carrell, a 1958 graduate of Winnett High School, was in attendance and told PCCC committee members he was interested in the project and would like to meet with them. The committee had no idea Larry and his wife, Kathi, were planning to donate $5 million to the project (a donation of $4.5 million, along with a dollar-for-dollar match of $500,000). The total would provide funds for building the community center, as well funds for a permanent endowment for PCCC to maintain the structure. Soon after the committee was informed of the Carrell donation, they started the process of becoming a 501(c)(3).

Early in 2021, PCCC received $1.6 million from the Bruno and Evelyne Hill Betti Foundation to fund the Betti Foundation Youth Program. This gift provided startup funding and an endowment for long-term sustainability. A part time director for the Bettie Youth Program was hired, as well as a part time director for PCCC. The Betti Youth Program started in September of 2021. Later that year the Betti Foundation donated another $1.41 million for an endowment for the community center.

PCCC has three different size meeting rooms: the Rebecca Room is the smallest, and houses the Betti Youth Program, as well as smaller group meetings; the Wesley room provides a space for the Senior Citizens to meet every Thursday, and is a great area for meetings and potluck gatherings; the Carrell Hall has a stage, and can be used for large meetings, weddings, funerals, reunions, gym activities, and many other purposes.

The office suite consists of the PCCC office, a medical office, rental office, and restroom.

PCCC's kitchen serves events in the building, as well as those needing a commercial kitchen to rent.

Another feature of the community center is the Heritage Wall; a space for locals and visitors to learn about and share history of our community.

Petroleum County Community Center strives to provide and maintain a gathering place for present and future generations. The facility is available for cultural, social, economic, educational, and recreational events. PCCC endeavors to create a space that feels welcoming, safe, and accessible.

8.13 Future Need for Additional or Improved Facilities

It is estimated that 28.5% of the population in Petroleum County is 65 years of age and older, indicating that the demand for community senior centers and ADA compliant facilities will continue to increase.

According to results obtained from the public survey taken in conjunction with development of this Growth Policy, the facilities noted as most important for the County/Town to maintain were roads/streets, bridges, the courthouse/senior center, the library, the town hall, and the emergency services hall.

Based on the survey and community discussions, additional facilities benefitting the area could be a refuse site and a community center that allows for multiple uses such as a clinic, daycare, or museum.

Also, based on community feedback, potential future uses of the airport could expand to also include:

- Fire
- Emergency
- Corporate
- Hunters
- Regional and Nationwide Recreationalists
- Flight Training Schools

In order to accommodate growth and potential uses, the airport will need improvements to the runway, the addition of fuel service, and possible accommodations. A relocation of the airport might be considered to meet future needs.

8.14 Goals and Objectives

GOAL

Systematically plan and budget for capital improvements within the Town and County to efficiently maintain and upgrade public infrastructure as needed.

OBJECTIVES

- ❖ Prepare and utilize Comprehensive Capital Improvements Plans (CCIP) for Petroleum County and the Town of Winnett.
- ❖ Continue to update CCIP annually as County/Town needs change.
- ❖ Support upgrades of public facilities for ADA compliance. Investigate opportunities for assistance for private upgrades.
- ❖ Support the Town of Winnett in their efforts to plan, fund, and build water, sewer, roads, and utilities through state and federal funding mechanisms.
- ❖ Encourage leveraging additional resources for infrastructure through private/public partnerships.
- ❖ Consider policies that require developers to pay a proportional share for infrastructure upgrades and expansion.
- ❖ Consider upgrades to the airport infrastructure to accommodate growth and meet future needs.

GOAL

Maintain the existing County roads and bridges efficiently, economically, and based on standard criteria.

OBJECTIVES

- ❖ Follow the recommendations for maintenance and improvements to the County transportation system outlined in the CCIP.
- ❖ Encourage securing financial assistance as available from programs that may help leverage local funds in the maintenance of County roads and bridges (i.e. TSEP, FLAP, TA, etc.)
- ❖ Work with state and federal agencies to improve road conditions affected by use due to public lands access.
- ❖ Encourage County staff and officials to communicate with MDT personnel on a regular basis in order to take advantage of MDT road, bridge, and transportation alternative programs.
- ❖ Stay apprised of funding opportunities.

9. Natural Resources

9.1 Land Cover

Petroleum County consists mainly of grassland, floodplain, and outcrops of small rock formations in addition to the expansive agricultural land. The Missouri Breaks have a large presence in Petroleum County. The Breaks are a vast area of rolling hills, buttes, rock outcroppings, scattered forests and massive prairie flats that surround the Missouri River. Although the Missouri Breaks has no clearly defined border it is an area that generally lies to the east of Fort Benton, to the north of Winnett and to the south and west of Fort Peck Lake. Much of the Missouri Breaks area is completely uninhabited as it lies within the Charles Russell Wildlife Refuge.

9.2 Rivers, Streams, Lakes, Wetlands, and Watersheds

The Musselshell River runs along the eastern border of the County and Fort Peck Reservoir runs along the north boundary of the County. Other lakes located in the County include Petrolia Lake, War Horse Lake, Wild Horse Lake, and Yellow Water Reservoir. Flatwillow Creek, Elk Creek, McDonald Creek, Box Elder Creek are primary creeks that typically run year around providing irrigation and stock water.

9.3 Fish and Wildlife

Fish and wildlife are abundant in the County and consist mainly of white-tailed deer, mule deer, pronghorn antelope, elk, as well as pheasants, sage grouse, other wild game birds, and songbirds.

9.4 Sand and Gravel Resources

There are 16 permitted open-cut mine and gravel sites located within the County. Nine are permitted by the county road crew and seven are privately permitted. A map detailing the location of the sites is shown below in Figure 12.

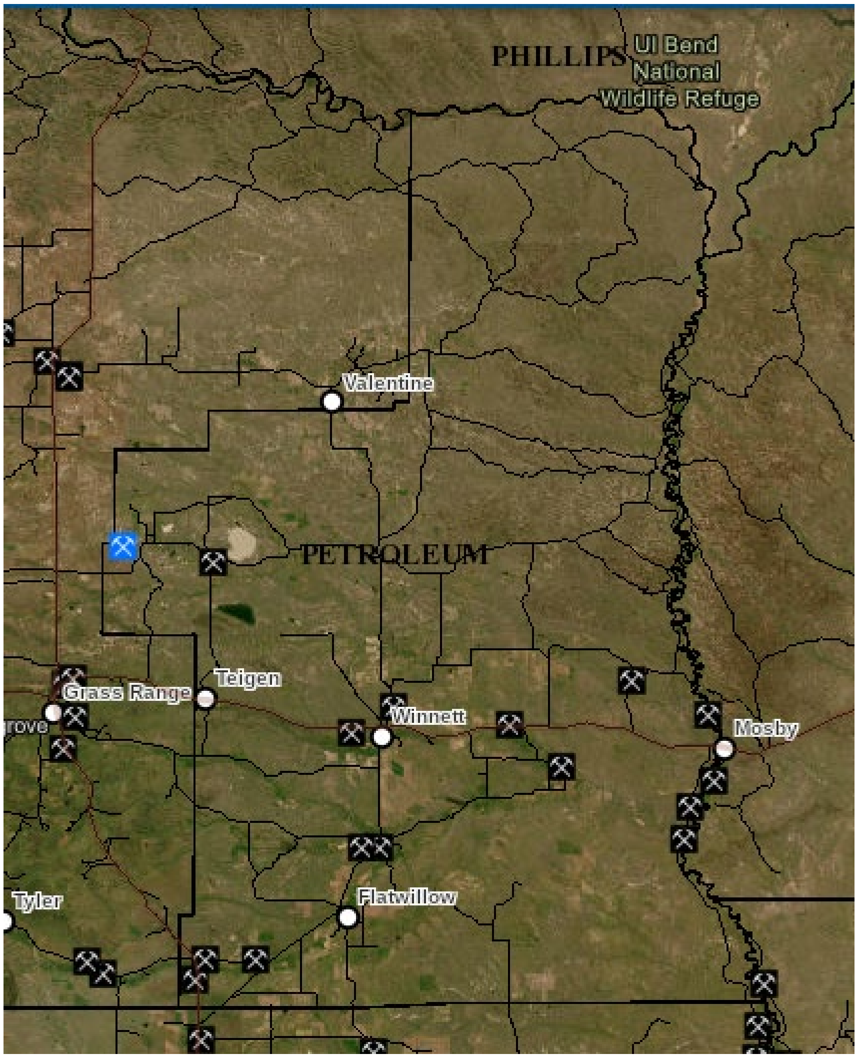


Figure 12. Petroleum County Gravel Sites

9.5 Wildland-Urban Interface

In 2004, Petroleum, Judith Basin, and Fergus Counties in conjunction with Snowy Mountain Development created a Wildland Urban Interface Wildfire Mitigation Plan. According to the plan, approximately 75% of all fires in Petroleum County since 1980 have been ignited by nature. The rate of human-ignited fires is below both the state and national averages. The County's low population as well as agrarian economy and wildfire educated residents all attribute to this low percentage.

The majority of the fire-prone landscape in the County is along the northeastern portion. The plan stated four basic opportunities to reduce the loss of life and structures to wildfire including prevention, education, readiness, and adopting building codes.

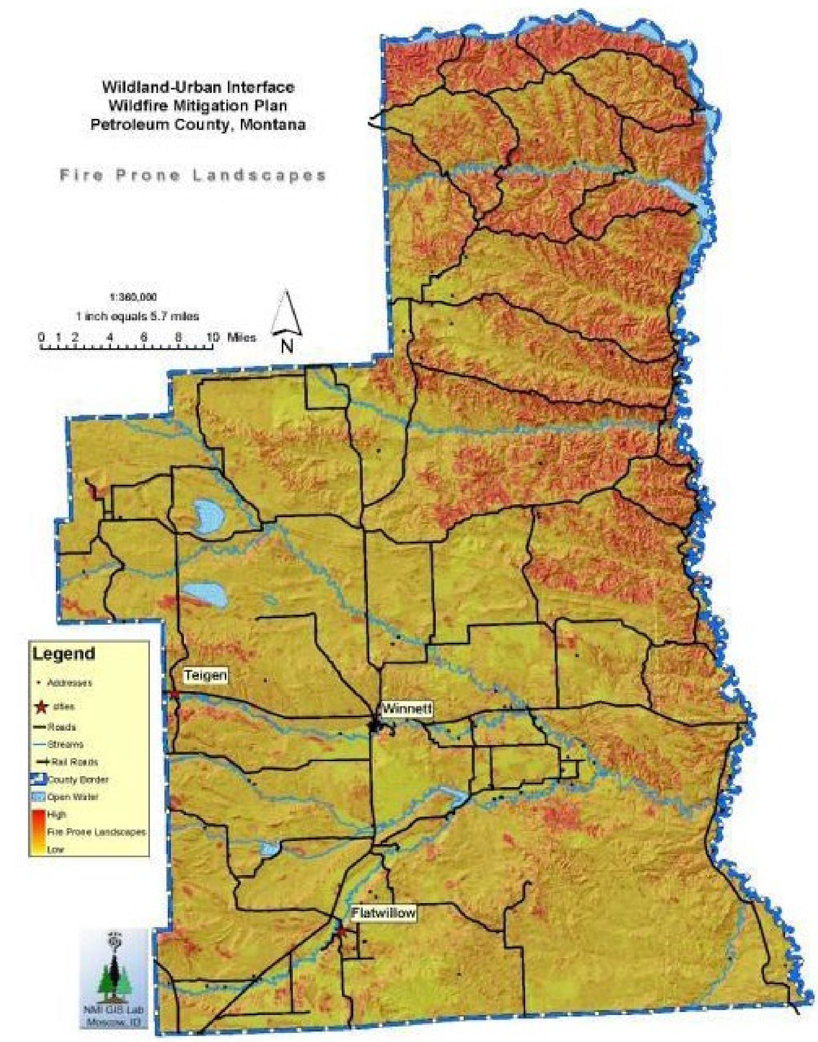


Figure 13. Wildland-Urban Interface

9.6 Mining

A primarily copper mining prospect called Annie Laurie is located in the Northeast part of the County.

9.7 Energy

The County has 2 currently producing oil well operators, 8 currently producing oil leases on file (2017 data for leases), and 9 producing oil wells on file. The total number of wells on file is 717. The total number of barrels of oil produced in 2020 was 12,680 and the MCF of gas produced in the year was 0, according to the Montana Board of Oil & Gas Conservation.

9.8 Climate and Soils

Petroleum County gets an average of 13 inches of total precipitation. There are approximately 201 sunny days with a July average high of 87 degrees Fahrenheit and a January average low of 9 degrees Fahrenheit.

Geologically, the County contains a petroleum-bearing anticline which divides the County into two regions. Hill Creek formation and Bear Paw shale make up the northern half while older cretaceous rocks make up the southern half.

9.9 Future Projections

Future projections for the County and Town are not anticipated to change from their current state. The County does not anticipate an influx of mining or alternative energy production at this time; however it is possible that potential oil and gas energy production increases over the next five years.

9.10 Goals and Objectives

Goal

Provide for long term function of natural systems and resources, recognizing a diversity of uses for those systems and resources.

OBJECTIVES

- Collaborate and coordinate with state and federal agencies to share GIS data collected on Petroleum County lands and water.
- Update subdivision regulations to include current legislative changes in order to mitigate impacts on the natural environment.
- Follow the County/Town Disaster and Emergency Mitigation Plan (CDEMP) which addresses response to a growing Wildland Urban Interface (WUI) in order to prepare the County for wildfires or other natural disaster related emergencies. Review the WUI and CDEMP on a regular basis and update as needed.
- Encourage programs to combat invasive species populations.
- Work with public agencies to ensure best management practices of public lands to preserve habitat, limit erosion, and provide low impact recreational opportunities.
- Work with FWP to control wildlife populations as regulated by existing law.
- Collaborate with state and federal agencies when planning for wildfire suppression activities.

GOAL

Control weed populations.

OBJECTIVES

- Improve range productivity.
- Preserve native vegetation.
- Reduce risk of wildfire and potential for erosion.

GOAL

Collaborate with state and federal agencies to explore opportunities to utilize natural resources to the benefit of the County, local tax payers, and public land users.

OBJECTIVES

- Engage in regular communication with CMRWR, USFWS, FWP, DNRC, and BLM
- Advocate for local presence of federal agencies to foster collaborative relationships.

10. Recreational Access

10.1 Access Sites

Surrounding Fort Peck Reservoir in the Northern part of the County is the Charles M. Russell National Wildlife Refuge Complex. This area provides hunting and fishing opportunities. The War Horse National Wildlife Refuge, is comprised of 1,152 acres and was established in 1958. It is open to hunting of migratory game birds, upland game birds, and big game. It is also an attraction for hiking, fishing and wildlife observation.

Other privately owned campgrounds include Crooked Creek Recreation Area and Campground, which is located on the southeast portion of the Missouri River just west of Fort Peck Lake. This campground, open year-round, offers a boat ramp with dock and 20 campsites. Dovetail Campground, another privately owned campground, is North of Winnett, MT at the junction of 79th Trail and Crooked Creek Road. Campgrounds located in Winnett are the Hilltop Campground on the north edge of Winnett and the Northern Hotel Campground. All campgrounds are heavily used by hunters and fisherman throughout the year.

10.2 Local Recreational Facilities

The Town operates the George D. Ore Memorial Park and Winnett Swimming Pool, with financial support from The Town of Winnett and Petroleum County as well as private donors. This is the only public swimming pool in the county and well beyond. Besides extensive local use, neighboring communities bring their children for swimming lessons and recreation, joined by their parents and grandparents participating in exercise programs and fun. The land for this pool was donated by the Phillips family in 1962 with the original pool being built by community volunteers. The last major upgrade, which was funded by grant funding, took place in 1981. Funds are presently being raised for much needed repairs and improvements

10.3 Issues Identified

The primary issue with recreation in Petroleum County is the amount of traffic using County infrastructure such as roads and bridges, decreasing the expected lifespan of these critical County-maintained facilities. As more recreationalists travel both to and through the County, the County will need to identify facilities used and create a maintenance plan to address concerns, involving State and Federal agencies as needed.

10.4 Projections for Future Access

Petroleum County recognizes the rights of the general public and government agencies to access public lands. The County will continue to provide the access currently available through the network of county roads and highways. This will be done while protecting the rights of our landowners to control the use of their private lands and private roads.

10.5 Goals and Objectives

GOAL

Collaborate on recreational opportunities issues.

OBJECTIVES

- Improve relations between landowners and recreationalists while maintaining the private property rights of the landowners.
- Maintain communication with State and Federal agencies.
- Work with public agencies to procure grant funding to help offset the cost of recreationalists.
- Honor the rights of the general public and government agencies to access public lands recognizing the great access provided in this county by our existing network of county roads and highways while protecting the rights of our landowners to control the use of their private lands and private roads.

GOAL

Encourage change at the legislative level to benefit Counties with high recreational traffic

OBJECTIVES

- Work with officials from state and federal agencies to encourage legislation to provide increased law enforcement during peak recreational seasons such as hunting, fishing and camping.
- Encourage the legislature to evaluate public agencies ability to provide support to local governments in high traffic recreational areas.

11. Coordination with Local Jurisdictions and Agencies

11.1 County/Town Coordination

Section 76-1-601(3)(g) MCA requires that a growth policy include a statement concerning how a local government will cooperate with other jurisdictional entities in implementing its growth policy. Since this Policy is a cooperative effort between Petroleum County and the Town of Winnett, the only incorporated town in the County, it will be implemented by both entities.

11.2 State and Federal Agencies

State and Federal agencies have the potential to impact resources and influence the use and development of land in Petroleum County. In addition to a large amount of federally owned land managed by the Bureau of Land Management and the Department of Natural Resources and Conservation, the C.M. Russell Wildlife Management Area and fisheries and wildlife management areas overseen by Fish Wildlife and Parks affect recreational opportunities which influence tourism and quality of life.

During development of this Growth Policy agencies operating within the County were invited to a public meeting (agenda in Appendix B). Those agencies represented included:

- Bureau of Land Management (BLM)
- Department of Natural Resources and Conservation (DNRC)
- C.M. Russell Wildlife Management Area (CMRWM)
- Fish Wildlife and Parks (FWP)
- Montana Department of Environmental Quality (DEQ)
- Petroleum County Conservation District

Each agency was asked to respond to five areas of concern with regard to the Growth Policy:

1. Information and facts about each agency's presence and role in the County including statistics regarding land managed by each agency and how that land use may affect other agency land or private land owners. What personnel live or perform their job as members of the community.
2. Discuss any projected change in agency organization or land use in the next five to ten years.
3. Address any policy decisions that may affect residents, businesses, or governments within Petroleum County in the next five to ten years.
4. Discuss the possibility of cooperative funding or projects that the County might work with them on to improve landowner relations or services to county residents or tourists (economic development, roads and bridges, law enforcement, trails, access, etc.).
5. Identify ways to improve communication and cooperation between County/Town government and state and federal agencies doing business in the County.

Agency personnel appreciated the opportunity to provide input and encouraged the Planning Board and local government leaders to continue to invite them to similar "soundings" to improve communication between County/Town government and state and federal agencies doing business in the County..

12. Implementation Plan

Implementing a strategy for reaching the goals and objectives stated in the Growth Policy is critical to making the document a useful tool for planning the future of Petroleum County. There are a variety of tools that can be used for implementation. These include regulatory and policy tools, available funding or fiscal tools, and training or educational tools that County government can use. This section lists implementation tools including a mandatory statement by State Law describing how the governing body will review subdivisions within the County. All other tools are contained herein for informational purposes only.

In this section a plan for future review and update of this Growth Policy is also stated.

Finally, an action plan is outlined based on the goals and objectives set for each of the required elements of 76-1-601 through 76-1-606, Montana Code Annotated (MCA) contained in this Growth Policy. The action plan assigns a timeframe to follow through on implementation.

12.1 Implementation Tools

Regulatory Tools

LOCAL REVIEW OF SUBDIVISIONS

Subdivision regulations control the creation of new lots by imposing design and infrastructure standards and by establishing procedures for local government and public review. Regulating the division of land ensures that the development has appropriate services and does not adversely affect resources. Because of the possibility for adverse effects on resources, subdivisions will be reviewed for compliance to the Petroleum County Growth Policy as well as compliance with subdivision regulations recently adopted by the County. As with all regulatory tools, subdivision regulations are most effective with consistent use.

As per §76-3-501 et. Seq. MCA, which requires local government to establish subdivision regulations and outlines the minimum requirements for those regulations, the County completed the process of updating new regulations which are compliant through the 2015 legislative session changes.

As per §76-3-608(3)(a), MCA, the governing body must review proposed subdivisions considering the effect on the following review criteria:

- Agriculture;
- Agricultural water user facilities;
- The natural environment;
- Wildlife;
- Wildlife habitat;
- Local Services; and
- Public health and safety

Petroleum County Subdivision Regulations that describe each of these criteria as well as the subdivision evaluation process and requirements for public review are available in their entirety at the Petroleum County courthouse.

ZONING

Zoning is a commonly used tool for implementing land use policy. Zoning describes the control by authority of the use of land and the buildings that may be placed there. Areas of land are divided by appropriate authorities into zones within which various uses are permitted.

In addition to the more traditional form of zoning, jurisdictions have explored other zoning approaches that can be used to regulate development of property. Some of these alternatives are described below.

Development Design Standards

Development design standards include site and building design standards adopted in zoning regulations. These standards are generally adopted with the intent of preserving and enhancing community character. State law supports the use of design standards if they are objective, reasonable, and applied uniformly throughout a community. Considerations for implementing design standards should include the level of administrative review required and the potential for increased development costs.

Agricultural Zoning

Agricultural zoning is commonly used to restrict land uses to resource extraction and production activities. Other agricultural protection zoning mechanisms include voluntary agricultural districts, agricultural area buffers, area-based zoning or density zoning, fixed area-based allowance zoning and sliding scale area-based allowance zoning.

Interim/Emergency Zoning

Interim zoning is specifically authorized in State law. It is a temporary land use control that expires unless replaced with permanent regulations. Interim zoning means a temporary emergency zoning that is conducted while the local government makes revisions to existing zoning ordinances, or creates and adopts a final zoning plan or zoning ordinance, or addresses some other local policy issue in the state. It helps to preserve the status quo or at least to limit the extent of change that can occur from the zoning activities. It is also termed as stopgap zoning. Emergency zoning may be put in place by the County Commissioners.

DECAY ORDINANCE

Decay ordinances are enacted to protect the general public from decaying structures that are deemed unsafe and inhabitable by a building official.

FLOODPLAIN REGULATIONS

Floodplain regulations restrict development in areas within the 100-year floodplain of a watercourse in order to protect the watercourses and their flood storage areas, as well as the public health, safety, and welfare.

Considerations for Regulatory Enforcement

Regulatory or code enforcement programs ensure that property owners comply with a jurisdiction's land use regulations. The County Planner will receive complaints and forward them to the planning board for consideration. The Planning Board will make recommendations to the County Commissioners.

Fiscal Tools

CAPITAL IMPROVEMENTS PROGRAM

A Comprehensive Capital Improvements Plan (CCIP) is used as a budgeting and financial tool by the County to establish long term goals for maintaining, improving, or building new public facilities. The document identifies specific projects, costs, priorities, timetables, and funding sources, and includes all public facilities owned or maintained by the local government. The importance of a CIP for land use planning is the critical connection between where and when infrastructure is provided and what the desired land use pattern is for a community or neighborhood. It is recommended that a full CCIP be prepared every 10 years at a minimum to include a full study of the capital needs of the county.

IMPACT FEES

Impact fees are charged to a developer by local government at the time of development or building permit review to pay for the impacts of new development on off-site capital facilities such as public sewer, roads, fire, or emergency services. Developing a fair and equitable impact fee program can be complex and often requires local governments to obtain outside assistance. Developers or applicants should expect a comprehensive review of long-term costs to the County.

STATE AND FEDERAL GRANTS OR LOANS

Grant programs are a key means of implementing public policy regarding affordable and accessible housing, infrastructure extension, economic development, historic preservation, health and human services, crime victim assistance, environmental remediation, and provision of support to low- and moderate-income households and special needs populations. Acquisition and administration of grants for use by the County includes applying for and complying with the requirements of grant contracts; conducting needs assessments and program evaluations; coordinating community responses to identified needs; and seeking resources for the purpose of addressing a variety of community development issues.

Funding Agency Alphabet Soup:
TSEP=Treasure State Endowment Program
CDBG=Community Development Block Grants
RRGL=Renewable Resource Grant and Loan
RD=USDA Rural Development
INTERCAP= Intermediate Term Capital Program
SRF=State Revolving Fund
BSTF=Big Sky Trust Fund

The County may also play a role in the acquisition of state and federal grants for local non-profit organizations. This may include sponsorship and/or assistance with grant writing and administration, and providing technical assistance and direct service program administration. Involving local non-profit organizations in needs assessment and other county planning activities may provide a valuable partnership for addressing community development issues.

Grant and loan opportunities commonly used by local governments include:

- Treasure State Endowment Program (TSEP): planning and construction grants for infrastructure including bridges, water systems, and wastewater systems, solid waste management, and storm water management.
- Community Development Block Grant (CDBG) Program: planning and construction grants for infrastructure, public facilities, housing, and economic development. CDBG eligibility for construction grants is tied to the benefit the projects will provide for low to moderate income individuals.
- Department of Natural Resources and Conservation (DNRC) Renewable Resource Grant and Loan (RRGL) Program: planning and construction grants for public facility projects including drinking water, wastewater and solid waste development and improvement projects. Other renewable resource projects that have been funded include irrigation rehabilitation, dam repair, soil and water conservation and forest enhancement.
- MDT Transportation Alternatives (TA): grants to improve access to alternative transportation routes along Montana's highways. This can include sidewalks, trails, community gateway features, lighting, and historic rehabilitation.
- USDA Rural Development (RD): planning and construction loans and grants for communities with fewer than 10,000 people. Grant amounts are dependent on Median Household Income.
- State Revolving Fund (SRF): low interest loans used to maintain and improve drinking water systems and water pollution control projects.

TAX INCREMENT FINANCING AND TARGETED ECONOMIC DEVELOPMENT DISTRICTS

Tax increment financing (TIF) is an important fiscal tool that allows jurisdictions to finance certain kinds of development costs within a Targeted Economic Development (TED) District.

12.2 Growth Policy Timeframe

Annual Review

The Petroleum County Planning Board will review the Growth Policy on an annual basis and provide a Status Report to the County Commissioners. The Status Report will include:

1. Status of goals, objectives and actions suggested in the Growth Policy.
2. Recommendation/assessment of goals to be addressed in the following year.
3. Evaluation of need to revise the Growth Policy.

Condition for Revising the Growth Policy

This Growth Policy is based on existing conditions and anticipated future conditions. It is impossible to project every potential scenario and, therefore, the policy needs to be flexible to accommodate future issues. The Planning Board will review the Growth Policy and determine if changes are needed under the following conditions:

- Major proposed actions made outside of County authority with potential to significantly affect implementation of the stated goals, policies, and strategies in this growth policy.

- Any actions that might affect the health, safety, and welfare of citizens that were inadequately addressed in the growth policy.
- New development proposals not provided for in the plan.
- Priorities that need to be reassessed to take advantage of new opportunities such as grants, partnerships, and State and Federal programs.
- Additional public input suggesting the need for changes.
- Changes in state law regarding growth policies.
- Court cases and/or litigation that set legal precedent in Montana for growth policies.
- Individual neighborhood plans developed in accordance with state law (76-1-601) that is mandated as amendments to the current growth policy.
- Planning Board evaluation of implementation measures and progress, and determination that modifications would enhance the effectiveness of the growth policy.

Process for Revising the Growth Policy

County Commissioners will be notified in writing by the Planning Board prior to commencing work on the revision.

The Planning Board will follow the process outlined in State Law (MCA 76-1-602 through 76-1-603) for adopting a Growth Policy to provide revisions. The Board will conduct a public meeting on the revisions prior to making their recommendation to the County Commission for adoption. The County Commission will follow the provisions of State Law (MCA 76-1-604) to adopt, revise, or reject the changes to the Growth Policy.

12.3 Action Plan

The Action Plan is a matrix intended as a snap shot of the Goals and Objectives outlined in the Growth Policy. It defines each goal and objective and sets a timeframe for accomplishment. For future tracking, additional columns are added for regulations used in implementation, funding sources, and date completed.

Timeframe is limited to:

- Ongoing or Ongoing as Opportunities Arise – indicates something the county or other entities are already involved in or are encouraged to become involved in as circumstances, funding, or other opportunities arise
- Near term (1-5 years)
- Mid-term (5-10 years)
- Long term (<10 years)

Insert goals and objectives tables here.

13. Bibliography

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Petroleum County Wildland-Urban Interface Wildfire Mitigation Plan, 2004

Petroleum County Pre-Disaster Mitigation Plan

Pages of Time: A History of Petroleum County, Montana, Petroleum County Public Library, 1993.

Montana, C. (2010). *Crooked Creek Campground*. Retrieved from Central Montana: http://centralmontana.com/listings/17944.htm

Montana History Foundation, http://www.mthistory.org

Federal Aviation Administration Information, http://www.airnav.com

http://www.bestplaces.net/climate/county/montana/petroleum

Montana Department of Agriculture and Publicity, *The Resources and Opportunities of Montana*

www.drillingedge.com/montana/petroleum-county

Petroleum County: A Brief History in Images

American Wind Energy Association: http://www.awea.org

14. Goals Met Since 2017

Population

- Stabilize population, 5% growth
- Seek resources to improve housing quality, condition, and availability
- Support efforts to build affordable rentals

Job growth

Telehealth

Applicant 1012-Big Horn County

The applicant is requesting $155,620.87 of a total project cost of $202,620.87 in Coal Board funds for Boiler and Fire Systems Replacements at Big Horn County Library. The request to the Board is 76% of the total project cost. The applicant is a designated unit.

Coal Board Grant Applicant #1012 Big Horn County
Staff Report / March 2025 Meeting

Applicant: Big Horn County
Project: Boiler and Fire Systems Replacements at the Big Horn County Library
Coal Board Funds Requested: $155,620.87
Total Project Cost: $202,620.87

I. General Project Information

A. Eligibility:
- The applicant is a local government, which is eligible according to 90-6-205(4), MCA.
- The project would assist the applicant in providing a safe and warm public library for the community, which is eligible according to 90-6-205(4), MCA.

B. Application Items:
- The Coal Board Application form was complete.
- A Technical Memo was provided.

C. The applicant is a designated unit according to 90-6-207, MCA.

D. Location of applicant:
- The applicant lists Absaloka, Spring Creek and Decker Mines as the nearest coal development areas and those are all located within 100 miles of Hardin, the county seat.
- The applicant is located in the southeast corner of the state.

E. Grant funding history:
- The applicant has been awarded $5,985,481.00 in Coal Board funds since 2009, based on historical information available in the Commerce projects database.

II. Coal Board Statutory Criteria (90-6-206, MCA) *For the following, provide bulleted analysis of the project against the criteria based on facts in the application.*

A. Need: Explain how the assistance that is required to eliminate or reduce a direct and obvious threat to the public health, safety, or welfare has been caused as a direct result of coal development or decline (Coal Board Application and Guidelines, p. 15).
- The application shows a need for the boiler system replacement as the current system is outdated and damaged making it challenging to maintain a comfortable and safe environment for patrons and staff.
- The current boiler system experiences frequent breakdowns, leading to unplanned closures and disruptions in library services.
- The current fire alarm system is damaged, outdated and no longer up to city code. This poses a significant risk to the health and safety of patrons, staff and the library's valuable collections.

- There is clear documentation that the current condition of the library fire alarm system violates state health and safety standards. A fire inspection identified that it is not in compliance with the International Fire Code (IFC) 2021, Section 907.

B. Severity of Impact: Explain why the proposed project or governmental services or facilities "are needed as a direct consequence of an increase or decrease in coal development or in the consumption of coal by a coal-using energy complex" (Coal Board Application and Guidelines, p. 16).
   - Big Horn County is the largest coal-producing county in Montana and is therefore affected by both increases and decreases in coal production.
   - The library serves as a crucial public facility, providing essential services and resources to a significant portion of the county's population.

C. Availability of funds: What amount of funds is available in light of the total request submitted (Coal Board Application and Guidelines, p. 17).
   - Revenues and appropriation from the legislature related to the Coal Natural Resource account are currently $670,680.00. Total requested grants for this meeting are $1,171,178.39.

D. Degree of local effort: As applicable, what bonding, millage effort, or user charge has been made in the past, those currently being made, and what effort has been made to secure funds from other sources to answer needs (Coal Board Application and Guidelines, p. 17).
   - The applicant is asking for 76% of this project to be funded by a Coal Board grant. The administration of the grant will be performed by the applicant.
   - The current millage rate from the application is $259.57, listed for 2024-2025, which is higher than the average rates from the previous two years, $198.11 (2023-2024: $230.81, 2022-2023: $165.42).
   - Based on the most recent audit submitted (2023), Commerce staff identified several concerns related to financial management.

E. Planning and Management: 90-6-207(5), MCA requires the Coal Board to give attention "to the need for community planning before the full impact of coal development or decline is realized. Applicants should be able to show how the request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems." Therefore, pursuant to Sub-Chapter 3 of the Administrative Rules of Montana, planning is an additional criterion the Coal Board will apply when judging applications. (Coal Board Application and Guidelines, p. 20).
   - Applicant states that the coal mining industry in Big Horn County has been declined. With the volatility of the coal industry, securing financial support now is urgent in the Big Horn County Library plan in order to enhance its facility and services.
   - The last Growth Policy was done in 2014. However, the County was recently awarded a Coal Board Impact Grant to update its Growth Policy (work will continue throughout the calendar year).
   - Big Horn County also applied for a Growth Policy Update through the DOC's CDBG-Planning Program. However, their application was denied because applicant currently has an Open CDBG Project (2024 Housing Needs Assessment). During a staff follow-up call with the County, Commissioner Larry Vandersloot and his team stated that they will be applying for CDBG Funds again in the next round (Spring 2025).
   - The County has completed a Comprehensive Capital Improvements Plan in 2020.

- A 2022-2027 Comprehensive Economic Development Strategy was developed by Beartooth RC&D Economic Development District. In it, bolstering library services was mentioned, in order to improve literacy, counseling, training, and supporting after-school programs to boost students' skills and job readiness. These strategies cannot be implemented at the library if it is unsafe or has to close due to lack of heat.

III. Staff Summary

Commerce staff does not recommend funding until the Growth Policy has been updated. Big Horn County has a Coal Board grant for the Growth Policy project but it has not been completed and therefore does not meet required statutory criteria.

SUMMARY INFORMATION

1. **NAME OF APPLICANT(S):**
   Big Horn County, Montana

2. **AMOUNT OF COAL IMPACT GRANT REQUESTED:**
   $155,620.87

3. **TOTAL PROJECT COST:**
   $ 202,620.87

4. **NAME OF PROJECT:**
   Library Boiler and Fire Systems Replacement

5. **TYPE OF PROJECT:**
   Public Building Repair: Purchase and Installation of Equipment

6. **CHIEF ELECTED OFFICIAL OR AUTHORIZED REPRESENTATIVE:**
   Lawrence Pete Big Hair, Presiding Officer
   Board of Commissioners – Big Horn County
   121 W 3rd, Room 301
   P.O. Box 908
   Hardin, MT 59034
   406-665-9700
   pschenderline@bighornCountymt.gov

7. **PRIMARY ENTITY CONTACT PERSON:**
   Anika Risener, Director
   Big Horn County Library
   419 N Custer Avenue
   Hardin, MT 59034
   406-665-9741
   arisener@bighornCountymt.gov

8. **OTHER CONTACT PERSONS:**
   Lawrence Jace Killsback, Director
   Big Horn County Economic Development and Housing
   121 W 3rd, Room 308
   P.O. Box 908
   Hardin, MT 59034
   406-665-9811
   lkillsback@bighornCountymt.gov

MONTANA
DEPARTMENT OF COMMERCE

Montana Coal Impact Grant Program Application

Submitted to the Montana Coal Board

by

Big Horn County Library

for

Boiler and Fire Systems Replacement

Date submitted: January 27, 2025

Big Horn County
Montana

THE COAL IMPACT GRANT APPLICATION FORM SUBMITTED BY BIG HORN COUNTY LIBRARY

CERTIFICATION

To the best of my knowledge and belief, the information provided in this application and in the attached documents is true and correct.

In accordance with Section 90-6-205, MCA, the applicant is eligible for Coal Board grants and has the statutory authority to make expenditures to provide for the particular service or facility.

Name: **Lawrence Pete Big Hair**

Title: **Presiding Officer, Board of Commissioners – Big Horn County**

Signature: L BigHair

Date: 1-27-2025

SUMMARY INFORMATION

1. **NAME OF APPLICANT(S):**
   Big Horn County Library (BHCL)

2. **AMOUNT OF COAL IMPACT GRANT REQUESTED:**
   $155,620.87

3. **TOTAL PROJECT COST:**
   $ 202,620.87

4. **NAME OF PROJECT:**
   Library Boiler and Fire Systems Replacement

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9. MILLAGE RATES:

Fiscal Year	Taxable Valuation	% Percent Change from Previous Year	Total Current Year Authorized Mill Levy	Current Year Actual Mill Levy	Carry Forward Mills Available
FY 22-23	$22,130,068	-2.90%	266.57	**165.42**	101.15
FY 23-24	$23,707,343	7.13%	273.10	**230.81**	42.29
FY 24-25	$23,425,995	-1.19%	284.39	**259.57**	24.82

10. AMOUNT OF COAL GROSS PROCEEDS TAX:

Division	Mills	FY 2023	FY 2024	FY 2025
General Fund	22.39	$1,534,561	$1,464,196	$1,363,048
Entitlement	1.43	$98,141	$93,640	$87,172
Bridge	0.99	$67,943	$64,828	$60,350
Medical Facilities	2.08	$142,750	$136,204	$126,795
Refunding Bonds	2.68	$183,928	$175,494	$163,371
Internal Service Health	2.98	$204,517	$195,139	$181,658
Road	29.27	$636,198	$607,026	$565,092
University Mills	6.00	$411,778	$392,897	$365,755
Elementary General	28.00	$1,921,633	$1,833,519	$1,706,858
Elementary Retirement	7.48	$513,350	$489,812	$455,975
High School General	17.00	$1,166,706	$1,113,208	$1,036,307
High School Transportation	0.84	$57,649	$55,006	$51,206
High School Retirement	3.52	$241,577	$230,500	$214,576
SD # 1	0.25	$17,157	$16,371	$15,240
SD # 2	0.02	$1,373	$1,310	$1,219
H.S. General	7.81	$535,998	$511,421	$476,091
H.S. Transportation	0.55	$37,746	$36,016	$33,528
L.G. Debt Service	2.22	$152,358	$145,372	$135,329
H.S. Comp Insurance	0.74	$50,786	$48,457	$45,110
H.S. Adult Education	0.09	$6,177	$5,893	$5,486
Totals	**116.31**	**$7,982,325**	**$7,616,308**	**$7,090,166**

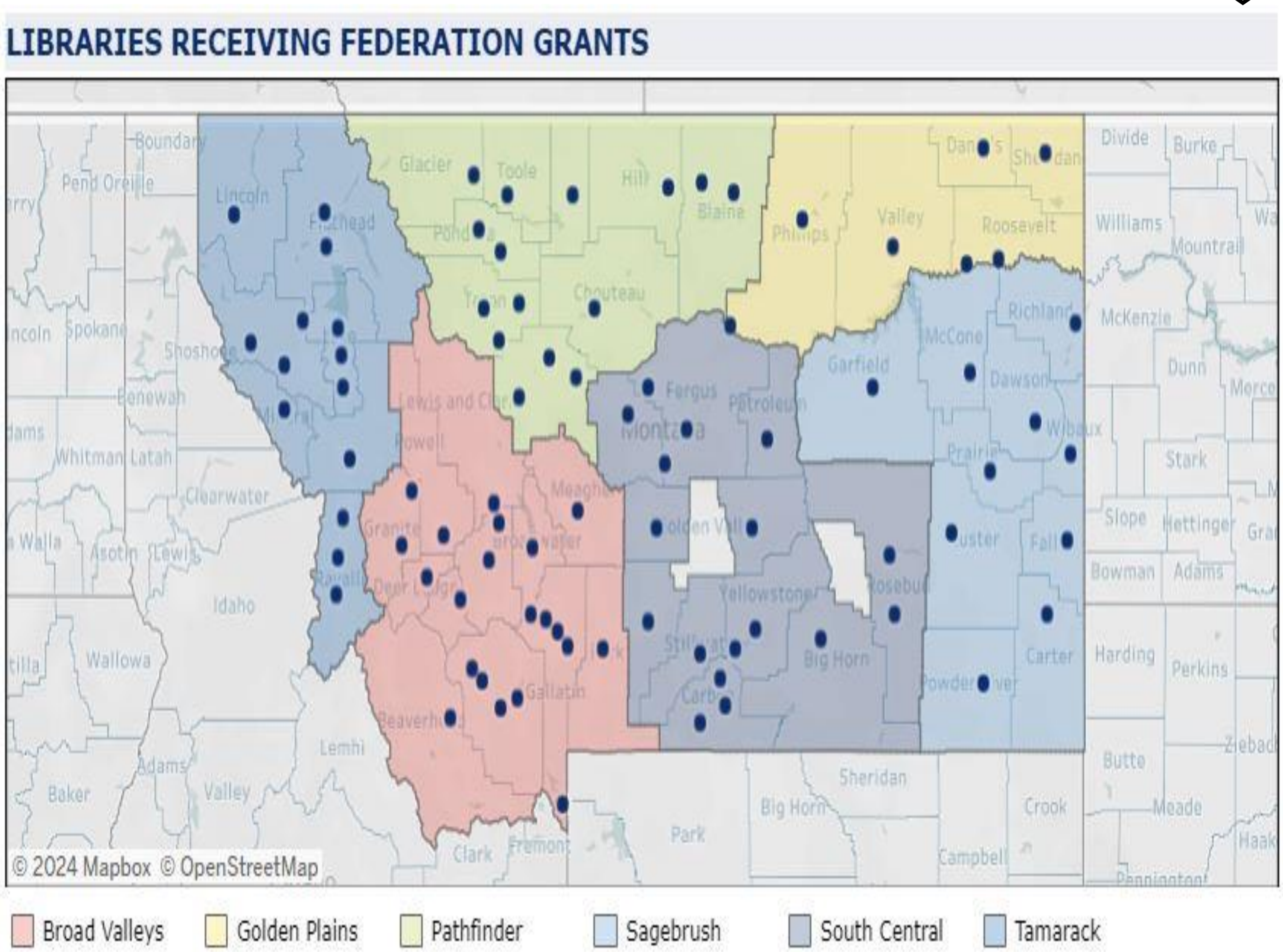
In Fiscal Year 2024, Big Horn County received $7,616,308 in coal gross proceeds tax and in Fiscal Year 2025 the total was $7,090,166. Approximately 34% of annual coal gross proceeds tax is allocated to County Department budgets with approximately 66% going to our County Schools.

Coal gross proceeds taxes are allocated specifically to governments where coal mines are located, which are the Crow Indian Reservation and Big Horn County. The Westmoreland's Absaloka Coal Mine proceeds are earmarked for the Crow Tribe of Indians as per capita payments for their tribal citizens. At the same time, the Big Horn County's allocation is distributed based on the 1986 Tax Levy to support County government activities related to general operations, roads, bridges, medical facilities, refunding bonds, internal service health, and school funds.

Currently, Big Horn County is utilizing all available coal gross proceeds for general operating purposes, which are authorized through our annual budgeting process. Big Horn County is considered the most coal-reliant County in the United States. While the County saw an increase in Coal Gross Proceeds Tax between 2022 and 2023, the drastic downturn in the coal industry has significantly hit the County's financial position. The vast majority of the County is federal land held in trust by the U.S. Government for the Crow Tribe and it is not included in Payment in Lieu of Taxes (PILT). Historically, coal taxes have been used to lower the tax burden for County citizens and businesses and are meant to provide for the purchase of capital assets.

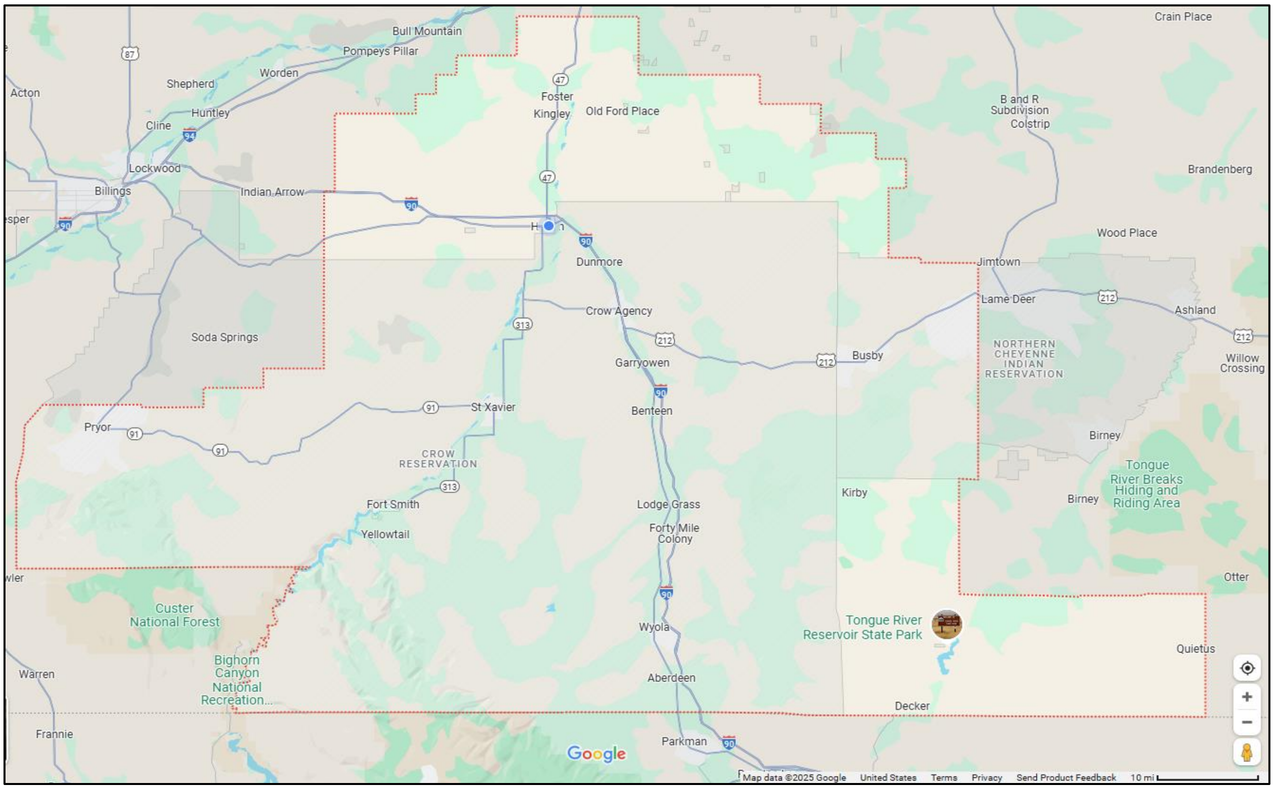
11. MAPS:

A map showing libraries and their respective Montana State Library Federations Regions.



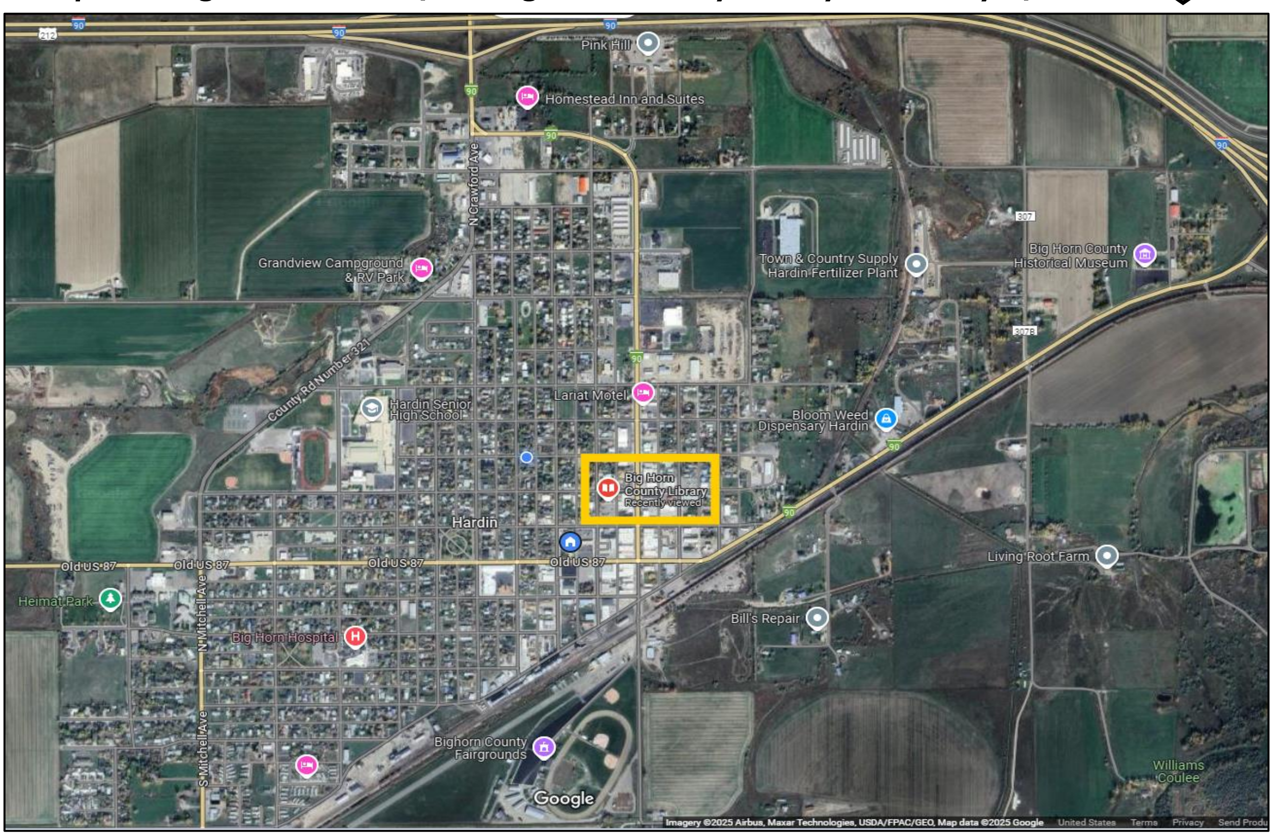
Source: Montana State Library

A map showing the boundaries of Big Horn County in southeastern Montana. ⇩



Source: Google Maps

A map showing the location of the Big Horn County Library in the City of Hardin. ⇩



Source: Google Maps

12. BRIEF PROJECT SUMMARY FOR BIG HORN COUNTY LIBRARY

Historical Information: The Big Horn County Library (BHCL) is located at 419 North Custer Avenue and is the cornerstone of the historic town of Hardin, Montana. Big Horn County is one of Montana's largest counties with a massive geographical size of 3.2 million acres, including the Crow Indian Reservation (46% of County land) and the Northern Cheyenne Indian Reservation (6% of County land).

The BHCL's origins date back to 1909 when local women began fundraising efforts to establish a public library and by 1912, a small library was opened in the home of Walter and Ella Fearis. With the support of a mill levy passed in 1914 and a generous donation from Andrew Carnegie, the current library building was constructed and opened its doors in 1919. The library's Neoclassical architecture, designed by C.L. Pruett, remains a testament to the community's dedication to education and cultural enrichment. The BHCL was remodeled in 1948 and 1973, with a major renovation and expansion taking place in 1987. Through decades other enhancements and projects took place in order to remain compliant with federal laws like the installation of an elevator, or upgrading computers and security systems to keep pace with advances in technology.

The building is 12,500 square feet of which 10,000 square feet is used to provide free services to the general public. Over 13,000 Big Horn County citizens make up the service population who are from long-time generational County families, newcomers to the land, and enrolled tribal members of the Crow Tribe of Indians and the Northern Cheyenne Nation. The BHCL welcomes many tourists, visitors, and schools to partake in library activities and resources throughout the year. During the COVID-19 Pandemic in early 2020, the BHCL lost 33% visitors dropping to 33,521, and has been on a slow progress since. However, last year the BHCL reached a major milestone by making full recovery with the number of 50, 173 visitors in 2024. ***See Table Below.***

Table 1. BHCL Visitation Rates for 2019-2024

Year	Number of Visitors
2019	50,252
2020	33,521
2021	36,204
2022	38,965
2023	39,841
2024	50,173

It is estimated that over 250,000 tourists annually visit the County to take advantage of the many recreational attractions and historical areas such as the National Park Services' Little Big Horn Battlefield and the Big Horn Canyon. Other sites include the Battle of the Rosebud Historical Site, Chief Two Moons Monument, Yellowtail Dam, Tongue River Reservoir, Pryor Mountain Horse Range, Big Horn River, the Historic Hardin Depot, and Big Horn County Museum. Cultural events such as the Crow Fair Powwow and Rodeo, Northern Cheyenne Chiefs Powwow and Rodeo, Battle of the Little Big Horn Reenactments, and various historical and social gatherings draw additional visitors every year.

The BHCL holds a special place in the hearts of Hardin residents and the broader Big Horn County community, it is more than just a repository of books; it is a focal point for the city of Hardin and the surrounding Crow Indian and Northern Cheyenne reservations. The library serves a diverse population providing essential services such as internet access, educational programs, and community events. The BHCL is the only officially recognized public library in the County and remains a safe haven for children, a resource for job seekers, and a gathering place for residents of all ages and backgrounds. The library's role is especially crucial in a community that faces socioeconomic challenges, offering free access to information and resources that empower individuals and families.

Recently the BHCL established a "library closet", which is a branch of the BHCL, in the Town of Lodge Grass where County residents living within the Crow Indian Reservation have the same access to services, internet, educational programs, and books available in the building space provided by community partners. The BHCL plans to establish more closet libraries on both reservations in the following communities: Crow Agency, Pryor, Fort Smith, Muddy Cluster, and Busby. However, because these reservation towns are located on federal trust lands, the County has to cover the entire cost without any tax revenues to support this undertaking.

<u>Problem:</u>
The current boiler system and fire alarm system at the BHCL are damaged and outdated. They need to be replaced because they put County residents' health and safety at risk.

On January 13, 2025, the Deputy State Fire Marshall inspected BHCL's fire alarm system reporting that the fire panel was damaged beyond repair and in violation of local City building code standards. The damage occurred on November 26, 2024 when the bathroom on the top floor was vandalized causing the entire building to flood. The inspection identified the fire alarm system as damaged and inoperable, and that the system could not properly alert the building patrons and staff in the event of a fire outbreak. Due to the nonfunctioning fire alarm system, the BHCL is required to conduct hourly inspections of the property to ensure public safety throughout the building.

The existing boiler system, built in 2007, provides heating during the harsh Montana winters. However, it has suffered extensive wear and tear and has become obsolete with industry standards. Frequent breakdowns and inefficient operation have led to inconsistent heating, which has caused discomfort for library users and increased operational costs. Additionally, the outdated system poses safety risks, including potential leaks and malfunctions that could lead to hazardous conditions.

The boiler system is not adequate in keeping the facility warm, leaving the library environment unsafe and open to potential health risks to staff and patrons, particularly the most vulnerable populations of children and elders. Both of these system issues threaten the physical safety of the library building and its occupants and jeopardize the preservation of valuable historical documents and resources it houses.

<u>Proposed Solution:</u>
We propose the installation of a new, state-of-the-art boiler system and fire alarm system for the BHCL. These new systems will enhance reliability by ensuring consistent and dependable heating and proper fire notification throughout the library. New systems will improve energy efficiency to reduce energy consumption and lower utility costs, contributing to the library's sustainability goals.

New boiler and fire alarm systems will increase safety by eliminating the risks associated with the old, damaged system, providing a healthier and safer environment for all. Investing in a new boiler system and a new fire alarm system for the BHCL is essential to address the serious deficiencies of the current systems and bring them up to code. These upgrades will not only improve the comfort and safety of our patrons and staff but also enhance the library's ability to serve the community effectively. The primary goal of this project is to ensure the health and safety of all who use and work at the BBHCL.

A quote for the cost of equipment and labor to replace the fire alarm system is included in Exhibit A. However, because the County was unable to obtain a quote specific for the proposed boiler system in time for this application, a previous quote with detailed information for the County Road Department Building is attached to be used to reflect the estimated cost of installing two new Lochinvar boilers in the BHCL. See Exhibit A.

13. PROJECT BUDGET AND IMPLEMENTATION SCHEDULE:

A. Project Budget Form:

The total estimated cost for the BHCL's purchase and installation of a new boiler system is estimated at $155,411.46 and the replacement upgrade of the fire alarm system is $45.209.41, totaling $202,120.87.

ADMINISTRATIVE COSTS	**SOURCE:**	**SOURCE:** Big Horn County Library	**SOURCE:** MT Coal Board	**TOTAL**:
Grant Administration	**$**	**$ 1,000.00**	**$**	**$1,000.00**
Office Costs	**$**	**$ 500.00**	**$**	**$ 500.00**
TOTAL ADMINISTRATIVE COSTS	**$0**	**$1,500.00**	**$0**	**$1,500.00**
ACTIVITY COSTS:				
Equipment Cost	**$**	**$**		**$**
Construction Cost	**$**	**$ 45,000.00**	**$155,620.87**	**$**
Contingency	**$**	**$**	**$**	**$**
TOTAL ACTIVITY COSTS	**$0**	**$ 45,000.00**	**$155,620.87**	**$200,620.87**
TOTAL PROJECT COSTS	**$0**	**$ 46,500.00**	**$155,620.87**	**$202,120.87**

B. Project Budget Narrative:

ADMINISTRATIVE COST

Grant Administration Cost: **$1,000.00**

BHCL Director will manage the grant and be responsible for administrative duties related to reporting, communicating, and payments related to the project.

Office Cost: **$500.00**

Any cost associated with the administration of the grant that includes use and purchase of office supplies, mail services, printing, and internet access.

Source of Funds: **Big Horn County Library Funds $1,500.00**
TOTAL $1,500.00

ACTIVITY COSTS

Equipment Cost: **$ 0**

Equipment cost are included with the Construction Cost. Quotes for replacing both the boiler system and the fire alarm system include parts and labor as costs associated with the purchase and installation of two Lochinvar units and a new fire alarm panel.

Construction Cost: **$200,620.87**

Construction cost includes the expense of replacing the old boiler system and fire alarm system with the purchase and installation of new a boiler system and a new fire alarm system. The price quotes are provided in Exhibit A. Construction cost include the use of BHCL's Capital Improvement Fund Savings.

Source of Funds: **Big Horn County Library Funds $ 45,000.00**
Coal Impact Grant Program Funds $155,620.87
TOTAL $200,620.87

TOTAL ACTIVITY COSTS: $200,620.87

TOTAL PROJECT COSTS: $202,120.87

C. Implementation Schedule:

IMPLEMENTATION SCHEDULE FOR BIG HORN COUNTY LIBRARY BOILER AND FIRE SYSTEM REPLACEMENT												
	QUARTERS 2025				QUARTERS 2026				QUARTERS 2027			
TASK	1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH
PROJECT START-UP												
A. Sign contract with Coal Board.		X										
B. Secure approval of other funding – **Complete.**			X									
C. Submit progress reports and drawdown request.			X	X	X	X						
PROGRAM IMPLEMENTATION												
A. Purchase equipment.			X									
PROJECT CLOSE-OUT												
A. Coal Board administrative staff conduct on-site monitoring of the project.				X								
B. Submit project completion report.				X								
C. Include project in audits.				X								

14. DESCRIPTION OF RELATIONSHIP TO COAL BOARD STATUTORY GRANT CRITERIA

A. Need

1. Does a serious deficiency exist in a basic or necessary community public facility or service?

Yes, a serious deficiency exists in the BHCL's boiler system. BHCL serves as a crucial hub for education, information, and community engagement, providing essential services to residents of all ages. However, the library's current boiler system is outdated and damaged, posing significant challenges to maintaining a comfortable and safe environment for patrons and staff.

The outdated and unstable boiler system has created significant challenges that impact the library's ability to function effectively and safely. The current boiler system, which is almost 20 years old, experiences frequent breakdowns, leading to unplanned closures and disruptions in library services. On average, the system fails 3-4 times per month, requiring emergency repairs that strain the library's budget and resources because antiquated replacement parts are scarce and expensive. During colder months, the boiler is incapable of maintaining consistent temperatures throughout the library, resulting in uncomfortable conditions for patrons and staff. Over the past year, the library has spent approximately $6,500 on emergency repairs and maintenance, diverting funds from other critical programs and services. The boiler poses potential safety risks, including the possibility of leaks and malfunctions. These issues not only jeopardize the physical safety of patrons and staff but also create an environment that is not conducive to learning and community activities. ***See the Attached Maintenance and Repair Records in Exhibit A.***

A serious deficiency also exists with BHCL's fire alarm system because the current fire alarm plane is damaged, outdated, and no longer up to city code, posing significant risks to the health and safety of patrons, staff, and the library's valuable collections. The fire alarm system is over 20 years old and does not meet current city codes and safety standards. This obsolete fire system is not equipped to handle modern fire safety requirements, increasing the risk of inadequate response in the event of a fire. The fire panel has experienced multiple malfunctions over the past year, including false alarms and failure to activate during routine tests. Today, the system is inoperable raising serious concerns about significant safety hazards in an emergency. In the event of a fire, the system will fail to alter occupants, putting patrons, staff, and the library's collections at risk. This could result in substantial property loss, injuries, or even fatalities. The current system's non-compliance with city fire safety codes means the library is at risk of penalties and potential closure until the deficiencies are addressed. This non-compliance also impacts the library's insurance coverage, potentially leading to higher premiums or denial of claims in the event of a fire.

2. Have serious public health or safety problems that are clearly attributable to a deficiency occurred, or are they likely to occur, such as illness, disease outbreak, substantial property loss, environmental pollution, safety problems, hazards, or health risks?

Yes, serious public health and safety problems have occurred and are likely to continue occurring due to the antiquated boiler system. The deficiencies of the boiler system pose significant risks, including health hazards, safety problems, and potential property damage. The inconsistent heating provided by the boiler has led to uncomfortable and potentially unsafe conditions, especially during the colder months. Patrons, including children and the elderly, are at risk of health issues such as cold-related illnesses and respiratory problems due to prolonged exposure to cold temperatures within the library. The damaged boiler has been linked to poor indoor air quality, with increased levels of dust and pollutants circulating in the library. This can exacerbate respiratory conditions such as asthma and allergies among patrons and staff.

The aging boiler system is prone to leaks, which cause water damage, mold growth, and structural issues. These leaks also pose a direct safety hazard to both patrons and staff, increasing the risk of slips, falls, and exposure to mold-related health problems. The malfunctioning boiler has an increased risk of overheating and electrical faults, which could potentially lead to a fire. This presents a serious safety threat to everyone in the building and could result in substantial property loss. The boiler operates inefficiently, consuming excessive amounts of energy and contributing to higher greenhouse gas emissions. This not only increases the library's carbon footprint but also contributes to environmental pollution, impacting the broader community. The serious public health and safety problems attributable to the boiler system necessitate immediate action. Replacing the boiler is essential to ensure a safe, healthy, and comfortable environment for all BHCL patrons and staff. ***See the Attached Maintenance and Repair Records in Exhibit A.***

Serious public health and safety problems have occurred and are likely to continue occurring due to BHCL's damaged fire alarm system. The deficiencies in the current system pose significant risks in the event of a fire, which could lead to increased exposure to smoke and toxic fumes for patrons and staff. This can cause respiratory issues and other health problems, particularly for vulnerable populations such as children and the elderly. There are serious public health and safety problems that are attributable to the damaged fire alarm system and it is essential to replace the system to ensure the health and safety of patrons, staff, and the library's collections, as well as to comply with city fire safety codes. ***See the Attached Maintenance and Repair Records in Exhibit A.***

3. Is there clear documentation that the current condition of the public facility or service (or lack of a facility or service) violates, or may potentially violate a state or federal health or safety standard?

Yes, there is clear documentation that the current condition of BHCL's fire alarm system violates a state health and safety standard. The Deputy State Fire Marshall conducted a fire inspection and identified Fire Code Violation 907: Fire Alarm Systems. The fire alarm system is not in compliance with the International Fire Code (IFC) 2021, Section 907.1, which covers the application, installation, performance, and maintenance of fire alarm systems and their components in new and existing buildings and structures. The specific requirements for existing buildings are outlined in Section 907.9.

The inspection report noted that the alarm panel is not working due to water damage. This deficiency needs to be addressed to bring the system up to code. Failure to correct the listed violation(s) will result in additional action as required by law, including prosecution for a misdemeanor offense under MCA TITLE 50, Chapter 61.

An inoperative fire alarm system poses significant safety risks to patrons, staff, and the library's collections. In the event of a fire, the lack of a functioning alarm system could lead to delayed evacuation, increased risk of injury or fatalities, and substantial property loss. The current condition of the fire alarm system at BHCL violates state health and safety standards, as documented in the recent fire inspection report. Addressing this violation is essential to ensure the safety of all library patrons and staff, as well as to comply with legal requirements. In the meantime, the BHCL staff is mandated to conduct hourly inspections throughout the building in place of having a working and compliant fire alarm system. ***See the Inspection Report in Exhibit B.***

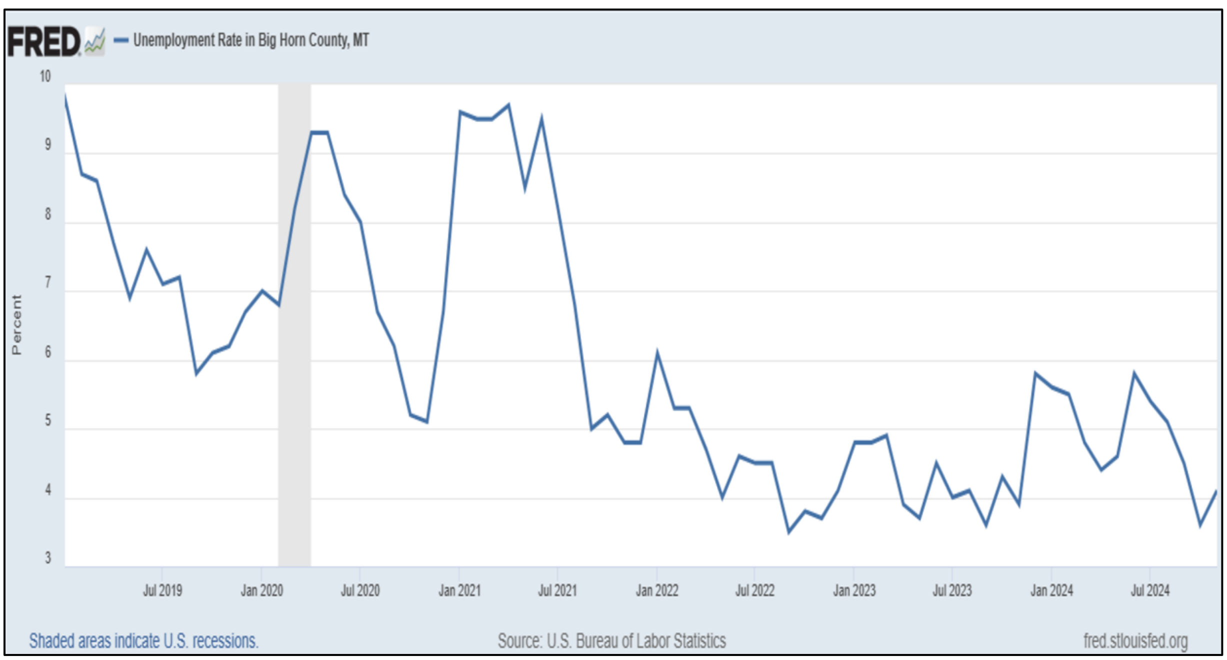
4. Describe how the need for the expansion or improvement of the public facility or public service is attributable to coal-related energy complexes to your community and the road miles from your community.

Big Horn County, located in southeastern Montana, has been significantly influenced by coal-related energy production. County taxpayers historically enjoyed low tax rates with coal mining accounting for a large share of the budget. However, the decline in the demand for coal has hit the County hard in recent years and will continue to have a detrimental effect on unemployment and job insecurity, tax rates, and population numbers.

The presence of coal-related energy complexes, such as the Absaloka Coal Mine, Spring Creek Mine, and the Hardin Powerplant, profoundly impact the community's infrastructure and public services. Absaloka Coal Mine, located 30 miles away on the Crow Indian Reservation, has been a significant source of employment and revenue for the region by employing over 100 persons; whereas Spring Creek Mine located 80 miles away near Decker, MT employs over 250 persons. In 2023, Montana mined approximately 28 million tons of coal, accounting for 5% of all U.S. coal production. Big Horn County is responsible for producing over 19.5 million tons accounting for 7% of Montana's coal production.[1]

Based on the Montana Coal Board's Coal Impacted Local Governmental Units Designation Report for the 2025 Biennium, Big Horn County is designated as a local government unit impacted by coal development based on MCA 90-6-207 (1)(d)(i).[2] Essentially, Big Horn County is designated because the West Decker Mine, which is located in Big Horn County, closed and "ceased all significant mining". According to Federal Reserve Economic Data (FRED), created and maintained by the Research Department at the Federal Reserve Bank of St. Louis, Big Horn County's unemployment rate has seen some drastic swings since 2014, from a high of 15.5% in June 2017 to a low of 3.5% in September 2022.

As illustrated in the graph below, Big Horn County's unemployment rate jumped from 5.1% to 9.6% immediately following the closure of the Decker Mine. Although unemployment rates are currently hovering at about 5%, the pending closure of the Absaloka Coal Mine will create an impact that ripples throughout the County.



Source: https://fred.stlouisfed.org/series/MTBIGH3URN#0

The need to replace the boiler system at the BHCL is directly attributable to the effects of these coal-related energy complexes. The economic decline due to the decline of coal-related activities has strained public services and infrastructure, including the maintenance and upgrading of essential facilities like the BHCL. The fluctuating coal industry has led to population

[1] MT-Coal-Tonnage-Report.pdf

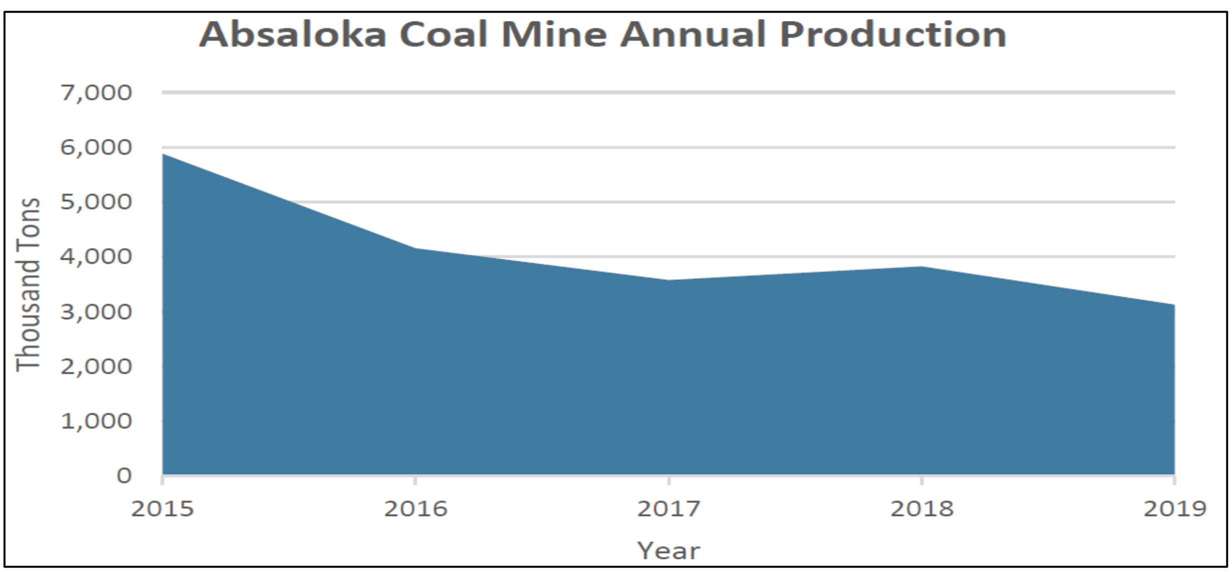
[2] Accessed online at https://commerce.mt.gov/_shared/comdev/COAL/docs/Board/CB-Impacted-Units-List-2025Bi.pdf and https://commerce.mt.gov/_shared/comdev/COAL/docs/Board/CB-Impacted-Governmental-Units-Designation-Report-25Bi-July-23-Update.pdf

shifts, with periods of growth during peak production and declines during downturns. These shifts have placed varying demands on public facilities and services, such as the BHCL.
The need for a reliable and efficient boiler system and fire alarm system is critical to ensure the BHCL can continue to provide a comfortable and safe learning environment for patrons. The transportation of coal and related materials has contributed to the wear and tear of local infrastructure, including roads and public buildings. Heavy truck traffic and rail transport associated with coal mining and power generation have accelerated the deterioration of these facilities. Coal-related activities have also had environmental and health impacts on the community. Air and water pollution from coal mining and combustion have raised concerns about public health and environmental quality. A reliable and efficient boiler system is essential to maintain indoor air quality and ensure the health and safety of library patrons and staff.

B. <u>Degree of Severity of Impact from an Increase or Decrease in Coal Development or In the Consumption of Coal by A Coal-Using Energy Complex</u>

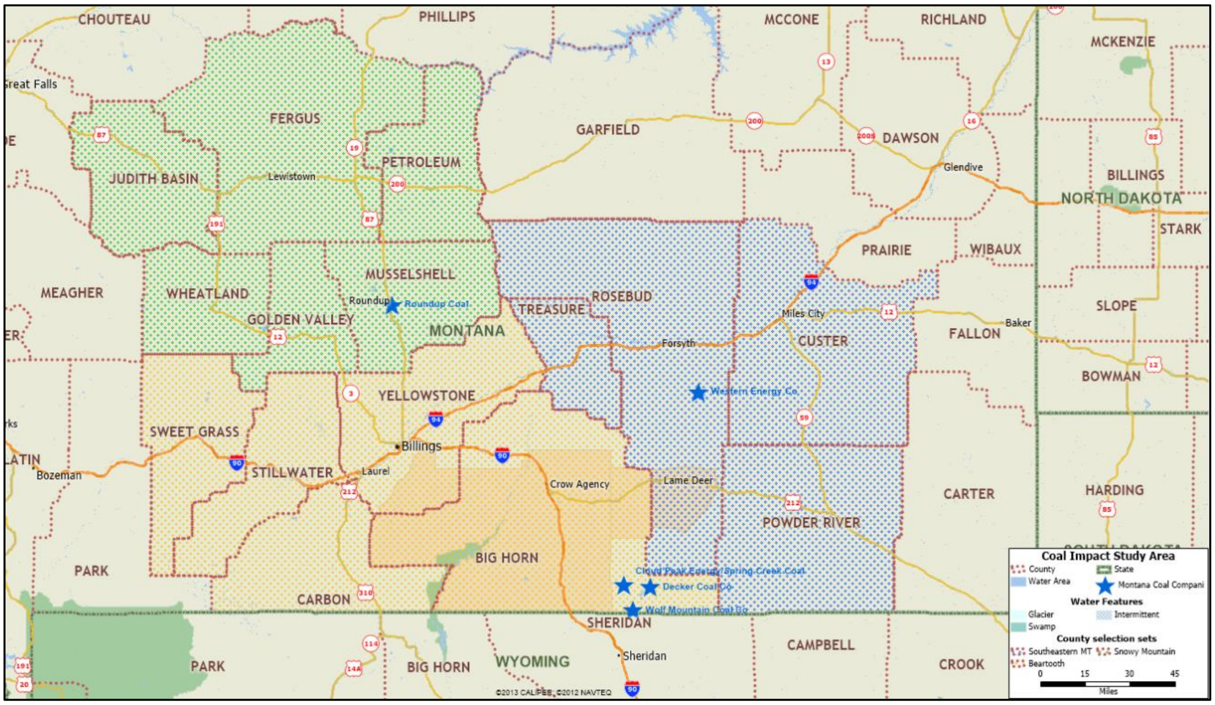
1. Describe the severity of the coal-related impacts including how coal is affecting rates of change in the statistics (e.g., population, employment, property taxes) and provide supporting documentation.

As the largest coal-producing county in Montana, Big Horn County more than qualifies to receive coal impact assistance. The Decker Coal Mine located in the County closed in 2021 after its owner, Lighthouse Resources, filed for bankruptcy. The Absaloka Coal Mine, owned by Westmoreland Mining, is located in Hardin, the county seat. This mine is one of four coal mines still operating in Montana and currently produces approximately 1-2 million tons annually. Its customer base has been reduced to just one customer – the Sherburne County Generating Station (Sherco) plant owned by Xcel Energy. The plant shut down one of its coal units in 2023 and will shut down the remaining two coal units in 2026 and 2030, signaling the end of the Absaloka Coal Mine. Because Westmoreland became a privately held company in 2019, production data after 2019 is not publicly available. However, the Mine Safety and Health Administration did report on mine operations in 2023 showing that the Absaloka Coal Mine produced 2,036,461 million tons of coal and employed 101 people.



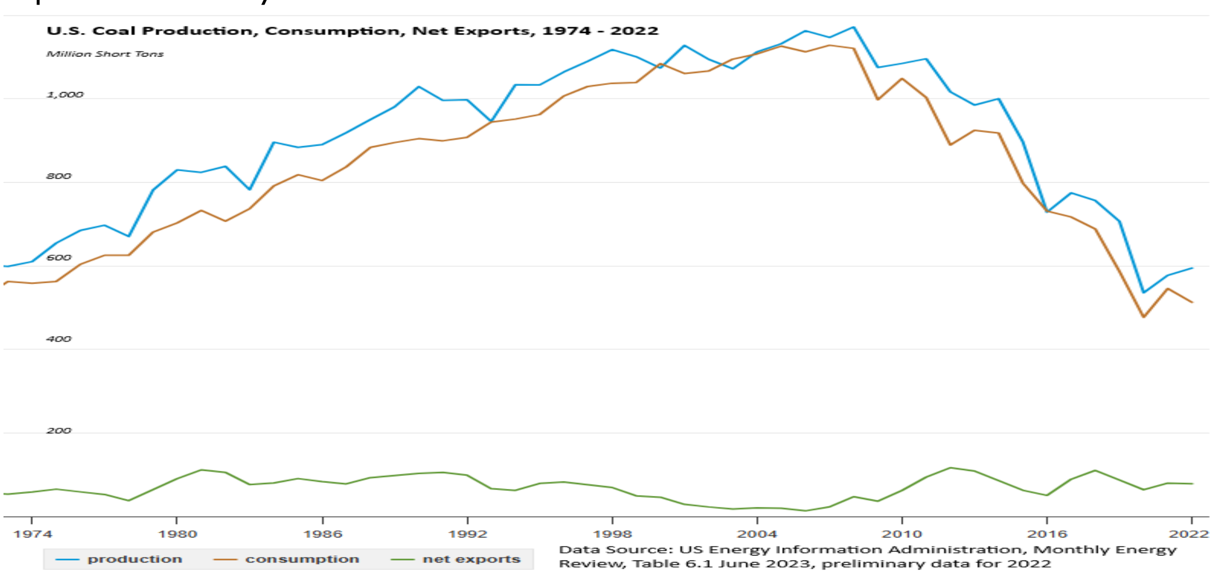
Source: ***https://miningdataonline.com/property/82/Absaloka-Mine.aspx***

According to the 2022-2027 Beartooth Resource, Conservation, and Development (R&CD) District's Comprehensive Economic Development Strategy (CEDS), which Big Horn County is part of, mining activity is and has been prevalent in the region. However, Big Horn County is most at risk with renewable energy sources becoming more of a national focus due to recent changes in the coal industry. Big Horn County is part of the 15-county region in eastern Montana that is considered Montana's Coal Country (pictured below). Key projects identified in the CEDS include participating in an annual energy summit with Coal Country Coalition members.



Source: https://www.nado.org/wp-content/uploads/2017/12/Coal-Country-Coalition-Report-FINAL-3-17.pdf

According to the U.S. Energy Information Administration, between 2015 and 2022, both coal production and consumption for the U.S. declined by approximately 34%, while net exports increased by about 25%.



Source: https://www.eia.gov/energyexplained/coal/imports-and-exports.php

The coal industry's ongoing volatility will continue to impact Big Horn County and its communities. Closure of the Decker Coal Mine in 2021 and reduced production at the Absaloka Coal Mine have impacted the population of Big Horn County. A decreasing population generally leads to a decline in tax revenue, which results in reduced funding for local governments. With fewer residents, there are fewer people earning wages, resulting in lower income tax collections. A shrinking population can also lead to lower demand for housing and commercial properties, reducing property values. As property values decline, so does the revenue generated from property taxes. Additionally, vacant properties may not contribute to tax revenue at all if they are abandoned. With a declining population, businesses may experience reduced demand for their products or services, leading to lower profits and, consequently, lower business tax revenues. Some businesses might even relocate or close entirely, further shrinking the tax base. Additionally, a smaller tax base may place a larger financial burden on the remaining population, potentially forcing more people to move away, exacerbating the cycle. A shrinking tax base makes it challenging for local governments to generate revenue and fund essential services without increasing taxes and/or finding alternative revenue sources.

2. Is the entire community, or a substantial percentage of the residents of the community, seriously affected by the deficiency or at risk, as opposed to a small percentage of the residents?

Yes, the entire community, a substantial percentage of the County residents, is seriously affected by the deficiency of the boiler and fire alarm systems at the BHCL. The library serves as a crucial public facility, providing essential services and resources to a significant portion of the county's population. Big Horn County has an estimated population of approximately 13,000 residents. The county seat, Hardin, has a population of around 3,676 residents[3]. The library serves not only the residents of Hardin but also the surrounding rural areas and both the Crow Indian Reservation and the Northern Cheyenne Indian Reservation, making it a vital resource for a large portion of the County's population. There are approximately 3,691 households in Big Horn County[4]. The library provides essential services such as access to books, educational programs, internet access, and community events, which are utilized by a significant number of these households.

The boiler system affects the library's ability to maintain a comfortable and safe environment, particularly during the colder months. Similarly, the damaged fire alarm system puts a significant number of community residents at risk in the event of a fire. The library is especially important for vulnerable populations, including children, the elderly, and low-income families. Approximately 31.1% of the County's population is under the age of 18, and 14.5% are 65 years and older[5] These groups rely heavily on the library for educational resources, social interaction, and a warm, safe place to spend time.

C. <u>Availability of Funds</u>

1. Amount requested from the Coal Board: $155,620.87

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[3] U.S. Census Bureau QuickFacts: Big Horn County, Montana

[4] U.S. Census Bureau QuickFacts: Big Horn County, Montana

[5] U.S. Census Bureau QuickFacts: Big Horn County, Montana

2. Explain why a coal impact grant is necessary to make the project feasible and affordable.

According to Montana Department of Commerce data, there were 13,387 people residing in Big Horn County when the 2015-2019 American Communities Survey was conducted. This includes 3,609 households, 59% of which are Low and Moderate Income (LMI)[6]. Based on this data set, the median household income in Big Horn County was $49,859 with 25.5% poverty. The government considers families with housing costs exceeding 30% of household income to be "housing-cost burdened." High housing costs may create financial difficulty in paying for other necessities. 30.7% of families in Big Horn County have mortgage costs exceeding 30% of their household income, while 23% of families pay rent that exceeds 30% of their household income[7]. Given this information, increasing mills and tax rates to fund this project would create financial hardship for a County that is already struggling.

An important factor to consider in understanding the County's financial condition can also be attributed to the unique land status distinction between state-taxable lands and federally exempt reservation land. Because almost half of the County (46%) is within the exterior boundaries of the Crow Tribe Indian Reservation, taxation opportunities are restricted compared to other Montana counties. Despite this circumstance, the County remain committed to providing essential resources, programs, and services to the entire County population regardless of their land status even when there are no expected tax revenues to support these functions or improvements.

3. What are the other proposed funding sources for the project?

This Coal Board funding request is 70% of the project's total cost. Big Horn County will provide the remaining 30% of the funds needed.

FUNDING SOURCES SUMMARY				
Source	**Type of Fund**	**Amount**	**Status of Commitment**	**Loan Rates & Terms**
Coal Board	Grant	$155,620.87	Application submitted on January 27, 2025	Not applicable
Big Horn County Library	Cash	$45,000	BHCL Capital Project Fund Committed	Not applicable
Big Horn County Library	Cash	$1,500	BHCL In-Kind Support Committed	Not applicable

4. If a particular proposed source of funding is not obtained, how will the applicant proceed?

If a Coal Impact Grant is not awarded for BHCL Boiler and Fire Alarm Systems Replacement, the County will continue to seek financial assistance in funding the project. This will delay the County's opportunity to reassess its evolving needs, trends, priorities, and resources and leave the County to deal with real health and safety risks to its citizens who utilize the BHCL.

[6] Accessed online at https://commerce.mt.gov/Infrastructure-Planning/Resources/Census-and-Target-Rate.
[7] 11 Accessed online at https://headwaterseconomics.org/apps/economic-profile-system/30003.

In the past, the BHCL received 11 mills for its operations. However, today, the BHCL receives 5 mills with the County allocating an additional 6 mils to the library operations. However, the County has provided the BHCL with 50% of its annual marijuana tax as a supplement to its budget. The BHCL is moving toward being independent of coal tax proceeds for its operation and is developing a strategic plan to become self-sufficient in the near future by securing additional financial resources through grant-writing and fundraising endeavors. The BHCL plans on hosting future fundraising projects in 2025 with a Spring Pancake Social, Summer Seafood Boiler, and Fundraising Cans (created by children).

D. Degree of Local Effort in Meeting Needs

1. Provide the current fiscal year millage rates for those for the three years immediately preceding the year of application. Please state the mill value for each of those three years. Specifically list how many mills and each year's total mill value. If current millage rates given are lower than the average rates levied during the previous three years, briefly explain why they are lower.

Fiscal Year	Taxable Valuation	% Percent Change from Previous Year	Total Current Year Authorized Mill Levy	Current Year Actual Mill Levy	Carry Forward Mills Available
FY 21-22	$22,790,474	-1.12%	252.86	**164.60**	88.26
FY 22-23	$22,130,068	-2.90%	266.57	**165.42**	101.15
FY 23-24	$23,707,343	7.13%	273.10	**230.81**	42.29
FY 24-25	$23,425,995	-1.19%	284.39	**259.57**	24.82

Mill Leavy Previous Three Years' Average: 264.18
Taxable Valuation Previous Three Years' Average: $22,875,961.67
Mills and values for the previous three years were, on average, less than the current year's mills and values.

2. Describe any local efforts to meet the public facility or public service needs by providing financial contributions to the project to the extent possible, such as local funding, donations of land, absorbing some or all administrative costs.

Big Horn County has previously demonstrated its willingness to contribute financially to the Big Horn County Library by allocating 6 mills of the total 11 mills used to manage the facility and its services. Also, the County has allocated 50% of its marijuana tax to the BHCL's annual budget. By funding this request with Coal Board Impact Program Grant funds, the Coal Board will allow the BHCL to repair and upgrade its building to address health and safety risks as part of its overall infrastructure improvements.

3. Describe past operation and maintenance budgets and practices over the long-term, including any reserves for repair and replacement.

Big Horn County officials establish the County's budget annually. They create an initial budget by incorporating revenue forecasting and departmental budget requests. During this stage, potential gaps are identified, and essential services are prioritized. Public input and stakeholder engagement are encouraged through public hearings and community meetings. Based on public input, adjustments and revisions are made, which may include reducing funding requests, deferring projects, or proposing alternative revenue sources. The County Commissioners then adopt and implement the final budget, monitoring it throughout the year. The primary goal of the budgeting process is to balance fiscal responsibility with service provision, ensuring that the budget supports community needs within available resources.

4. If there are indications that the problem is not of recent origin, or has developed because of inadequate operation and maintenance practices in the past, explain the circumstances and describe the actions that management will take in the future to assure that the problem will not reoccur.

Routine maintenance is performed on BHCL facility fixtures and equipment as required. With regular use comes normal wear and tear on most fixtures and equipment, and along with advances in technology, functions and equipment become obsolete. The boiler and fire alarm systems are outdated and inadequate as a result of the passage of time.

5. If the project involves water, wastewater or solid waste, provide the current and projected monthly household user charges, including operation and maintenance:

a. What is the current monthly household user charge? $______________

b. What is the projected monthly user charge (including operation and maintenance) when the project is complete? $ ___________

Not Applicable.

6. What are your current debt obligations?

There are no current debt obligations for Big Horn County.

<u>CURRENT DEBT SUMMARY FOR BIG HORN COUNTY</u>								
Year Issued	Purpose	Type of Bond/ Security	Amount	Maturity Date (mo/yr)	Debt Holder	Coverage Required	Annual Payment Amount	Outstanding Balance
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7. What are your current assets?

Based on the Statement of Net Position included in the audit completed 03/22/2024 for the year ending 06/30/2023, Big Horn County's assets are as follows:

Cash and equivalents	$7,319,639	
Investments	$11,023,244	
Receivables		
Taxes and assessments		*$1,832,632*
Ambulance (net allowance for uncollectibles of $4,682,407)		*$578,725*
Governments		*$936,509*
Other		*$24,564*
Inventories	$456,695	
Prepaids	$838,762	
Capital assets		
Land		*$4,783,041*
Capital assets, net of accumulated depreciation		*$41,391,902*
TOTAL ASSETS	**$69,185,713**	

Source: Statement of Net Position for Year Ending 06/30/2023 https://mtlgsb.my.site.com/s/auditreport/a09Hs00000bFkSbIAK/fy2023-big-horn-county?tabset-76678=2

8. Is the applicant in compliance with the auditing and annual financial reporting requirements provided for in the Montana Single Audit Act, 2-7-501 to 522, MCA? (Tribal governments must comply with auditing and reporting requirements provided for in OMB Circular A-133).

Yes _X_ No___ Date of last completed audit or financial report March 25, 2024

9. If there have been audit findings within the last five years, have they been satisfactorily addressed?

Findings from the Fiscal Year 2022-2023 audit include:

- Segregation of Duties: Unresolved, repeat from previous audit for year ending 06/30/2022
- Equipment Purchases Not Bid: Unresolved, repeat from previous audit for year ending 06/30/2022
- Credit Card Processing
- Voted Levy Calculations
- Minutes: Unresolved, repeat from previous audit for year ending 06/30/2022
- Noncompliance with Procurement and Suspension and Debarment
- Requirements, Coronavirus State and Local Fiscal Recovery Funds: Unresolved, repeat from previous audit for year ending 06/30/2022
- Records Management: Unresolved, repeat from previous audit for year ending 06/30/2022
- Grant Management
- Year-End Inventory Not Conducted

- Budgets: Unresolved, repeat from previous audit for year ending 06/30/2022
- Justice of the Peace: Unresolved, repeat from previous audit for year ending 06/30/2022
- Elected Official Wages
- Budget Amendments: Unresolved, repeat from previous audit for year ending 06/30/2022

Big Horn County has a corrective action plan in place with a proposed completion date of 03/31/2024 to address these findings.

Findings from the Fiscal Year 2021-2022 audit not yet listed include:

- Single Audit Reporting Package: Resolved
- Sheriff Longevity: Resolved

Big Horn County has a corrective action plan in place with a proposed completion date of 03/31/2024 to address these findings.

10. Additional information supporting the DEGREE OF LOCAL EFFORT IN MEETING NEEDS.

As reported by the Montana Department of Revenue, Property Assessment Division, Big Horn County's median residential property value in 2023 was $83,750, which is a 25%increase from the previous year[8]. Higher property values translate to higher property taxes. The median value measures the "middle" value, meaning that half of the values are higher than the median and half of the values are lower.

According to the U.S. Census Bureau, median household incomes for Big Horn County were 23.4% lower than that of Montana and 35.6% lower than that of the U.S. Additionally, the percentage of persons in poverty in Big Horn County are approximately twice that of the state and national percentages.

E. Planning & Management

1. Describe how your grant request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems related to coal impacts.

Due to declining revenues from reduced coal mining and a shrinking tax base from population loss, Big Horn Library County must be granted financial support to upgrade, modernize, and install new boiler and fire alarm systems. This grant request will help the County fund this essential infrastructure need for a historic building that offers priceless resources and services for the most vulnerable population. The grant's impact will be a tremendous endeavor in supporting local services and public facilities. Given the volatility of the coal industry, securing financial support now is urgent in the BHCL plan to enhance its facility and services.

[8] Accessed online at https://mtrevenuedev.wpengine.com/dor-publications/median-property-value-changes-bycounty/#2023ResidentialProperty.

2. Describe how the proposed project is consistent with current plans.

Big Horn County Growth Policy 2014

Big Horn County was recently awarded a Coal Board Impact Grant to update the 2014 Growth Policy. This work has begun and will continue throughout the calendar year with the help of Beartooth Resource, Conservation, and Development (RC&D).

Big Horn County Comprehensive Capital Improvements Plan (CCIP)

The 2014 Growth Policy was used as the primary basis in the formulation of the 2020 Comprehensive Capital Improvements Plan (CCIP). Many of the individual projects identified in the CCIP coincide with the County goals presented in the Growth Policy, including:

- Providing for the long-term infrastructure needs of the County and;
- Providing for compatibility of land uses with consideration of public health and safety, provision of adequate infrastructure, and character of the surrounding area.

The Big Horn County Comprehensive Capital Improvement Plan does not specifically address the replacement of the library boiler system and fire alarm system; however, the CIP states "A capital improvement plan identifies the county needs with respect to capital improvements, estimates costs of the needs, identifies potential sources of funding to meet those needs, prioritizes the needs, and establishes a schedule or time frame for implementing the needs."

Beartooth Resource, Conservation, and Development (RC&D) Comprehensive Economic Development Strategy (CEDS)

Big Horn County is an active member of the Beartooth RC&D Economic Development District. The 2022-2027 Comprehensive Economic Development Strategy (CEDS) developed by the District includes a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The analysis identified two threats aligned with the decrease in coal development in the region, including:

- Natural resource regulation and pressure to reduce fossil fuel usage, potentially causing higher base load cost for industry and reducing tax revenue, and;
- Reduction in revenue for local and state governing bodies.

The CEDS outlines goals that address the SWOT. Workforce development is one of these goals. Strategies to address this goal include improving communication and collaboration with regional stakeholders to increase the alignment of education, industry, and workforce development. One way to do this is by encouraging County programs to integrate Science, Technology, Engineering, and Math (STEM) into educational services. Quality of life is another CEDS goal. Strategies to address this goal include providing equitable access to childcare and quality education. Action steps to achieve this goal include bolstering library and other County programs to obtain grants to improve literacy, counseling, training, and facilities and supporting afterschool programs that improve students' skills and job readiness. These strategies and action steps cannot be implemented at the Big Horn County Library if it is unsafe or has to close due to lack of heat resulting from malfunctioning boilers.

Exhibit A

- Fire Alarm Proposal from Mountain Alarm Fire & Security

- Boiler Quote: Encode Energy Control Devices provided a previous quote used for Big Horn County Fire Department's new boiler system which is presented as an estimate for BHCL Boiler System (Same system for similar building' square feet)

- Boiler Repairs/Services Invoices:
  - 12/18/2023;
  - 09/18/2024;
  - 11/13/2024

FIRE | SECURITY | ACCESS | VIDEO | AUTOMATION | MONITORING

Proud to be part of

proposal

Prepared By:

Mountain Alarm - Billings
Shane Brown
Life Safety Specialist - Commercial
3477 Mountain Pass Road
Billings, MT, 59102
406-245-4946 1177
406-248-7698
shaneb@mountainalarm.com

Big Horn County Library (Fire) Upgrade
419 N Custer Ave
Hardin, MT 59034
Proposal 179746-1-0

Submitted: 1/3/2025

Big Horn County Library-Fire
Anika Risener
406-665-9743
arisener@bighorncountymt.gov

1-888-349-3455 • MOUNTAINALARM.COM

The Leader in Fire, Life Safety, and Security Solutions

SCOPE OF WORK

This proposal is to replace the entire fire system with a new fire code approved system. Included in the price is parts, labor, programming and testing of the new system.

The current panel was damaged due to a water leak. Unfortunately, due to the age of the panel it is discontinued and can no longer be replaced or supported. That means we can not put a replacement into its place and all of the current fire devices are not compatible with a new panel.

In situations like this we are required to put in a new system that meets current fire codes. That means we will need to remove old devices, run all new wiring and put up new devices.

This new system is still subject to AHJ approval.

If any other parts or labor are required to complete the project the additional cost would be on a change order at time plus materials.

Fire

QTY	Description
1	Vigilant FACP W/ Enclosure
1	Dialer/Modem two telephone line connections
20	DET, INTEL, SMOKE, OPTI
1	ADDRESSABLE DUCT SMOKE DETECTOR
1	Air Sampling Tube 42"
1	LCD, ANNUM, W/COMM CNTRL, RED, EN
14	ADDR PULL DBL ACT KEY RESET
4	Control Relay Module, Standard Mount
13	Indoor 2-Wire LED Horn Strobe, Wall Mount, Red
3	Strobe, Standard-candela, Indoor, Ceiling Mount
10	Wire, 16/2 Strand Non Shield Plenum
1	14/2 Fire Plenium 1000 Ft. White

System Investment

Total Proposal Amount $45,209.41

THIS IS NOT AN INVOICE. DO NOT PAY. INVOICE TO BE PROVIDED.

Deposit Due in Advance **$22,604.70**
Balance Due Upon Completion **$22,604.71**

ACCEPTANCE OF PROPOSAL

SYSTEM TOTAL	$45,209.41

Acceptance of proposal - The above prices, specifications, and conditions are satisfactory and are hereby accepted (subject to credit approval.) You are authorized to do the work as specified.

Pricing is valid for 7 days from the date proposal was submitted to contractor/customer.

Progress Billing will be applied to this proposal.

Big Horn County Library-Fire		Mountain Alarm - Billings	
Company	Date	Company	Date
Authorized Signature		Authorized Signature	
Printed Name	Title	Printed Name	Title
406-665-9743		406-245-4946 1177	406-248-7698
Phone	Fax	Phone	Fax
arisener@bighorncountymt.gov		shaneb@mountainalarm.com	
Email		Email	

TERMS AND CONDITIONS

This proposal is subject to the Pye-Barker General Terms and Conditions located at https://pyebarkerfs.com/generalterms. By signing or receiving services under this proposal, you acknowledge that you have reviewed such terms and conditions and that they will be incorporated into the proposal by reference. This proposal, including the incorporated General Terms and Conditions, contains the complete and final agreement between the parties with respect to the subject matter hereof.

Encode Corporation
111 Florine Lane
Billings, MT 59101-3409
Tel. 406-245-2520
encode@encodecorp.com

ENCODE
ENERGY CONTROL DEVICES

CUSTOMER QUOTATION NO. 1412

Quote No:	1412
Quote Name:	Boiler Replacement
Site:	Road Department
Site Contact:	
Date:	06/07/2023
Valid Until:	06/10/2023

Big Horn County Commissioners
Big Horn County - Hardin
Board of Commissioners
PO Box 908
Hardin MT 59034-0908

Description
Encode Corporation proposes to provide and install two new Lochinvar boilers, one 400K BTU and one 600K BTU. The 400K BTU boiler will heat the building when there is a light load. As the temperature outside gets colder and the 400K unit cannot keep up, the 600K BTU boiler will come on and the 400K unit will shut down. As the outside temperature continues to drop, the 600K and 400K boilers will both run when needed and will give you three stages of heating and the most efficient us of the boilers. Existing pumps will be re-used. Electrical is included. Gas piping to the building is not included and is by others.

This includes:
Boilers, Permit, Valves, Switches, Controls, Sensors, Expansion tank, Neutralization kits, Piping (water and gas inside the building), Insulation, Freight, Labor, Electrical, Operational start-up and check-out.

Boiler Replacement

Sub-Total ex Tax	$155,411.46
Tax	$0.00
Total inc Tax	$155,411.46

Adder #1 - Convert Main Office Air Handler to DDC
Encode Corporation proposes to convert existing pneumatic controls to KMD Digital electronic control operation.

This includes controller, temperature sensors, thermostat, actuator, valve, enclosure, relays, wire, programming and labor.

Sub-Total ex Tax	$5,511.70
Tax	$0.00
Total inc Tax	$5,511.70

Adder #2 - North Shop Stall Fan Heater Install
Encode Corporation proposes to replace two existing hydronic fan heaters. Existing units to be replaced with new 139K BTU hydronic fan heaters.

This includes: Vertical fan heaters, wire, piping, scissor lift rental, mounting material and labor.

Sub-Total ex Tax	$11,610.08
Tax	$0.00
Total inc Tax	$11,610.08

Adder #3 - Boiler Room Hot Water Replacement
Encode Corporation proposes to replace the existing hot water heater in the boiler room. Encode will install a new 50gal natural gas water heater. Unit will be direct vented through side wall with low profile termination kit. This will include a stainless steel recirculation pump kit to provide constant hot water in locker rooms.

This includes: Water heater, vent termination kit, piping, recirc pump, vent piping, and labor.

Encode Corporation
111 Florine Lane
Billings, MT 59101-3409
Tel. 406-245-2520
encode@encodecorp.com

ENCODE
ENERGY CONTROL DEVICES

CUSTOMER QUOTATION NO. 1412

Adder #3 - Boiler Room Hot Water Replacement

Sub-Total ex Tax	$19,665.43
Tax	$0.00
Total inc Tax	$19,665.43

Section Sub-Total ex Tax	$192,198.67
Tax	$0.00
Section Total inc Tax	$192,198.67

Please let me know if you have any questions or if we can be of service in any aspect. Thank you.	**Sub-Total ex Tax**	$192,198.67
	Tax	$0.00
	Total inc Tax	$192,198.67

Encode Corporation
111 Florine Lane
Billings, MT 59101-3409
Tel. 406-245-2520
encode@encodecorp.com

ENCODE
ENERGY CONTROL DEVICES

PLEASE PAY BY	AMOUNT	INVOICE DATE
01/17/2024	$826.82	12/18/2023

INVOICE NO. 44558

Big Horn County Commissioners
Big Horn County - Hardin
Board of Commissioners
PO Box 908
Hardin MT 59034-0908

FUND ____________
ACCOUNT ____________
OBJECT ____________
INITIAL ____________
DATE ____________

Job No.: 9062
Site: Library
Job Name: Pump for Library Leaking
Site Contact: Austin
Site Phone: 406-679-2411
Order No.: Austin

Description
Austin called, and reported a pump leaking at the Big Horn County Library.
10/30/2023 Robert P Victor
Looked at leaking pump. Ordered Rebuild kit.
11/09/2023 Robert P Victor
Re-built pump and re-installed.

Commercial - Service

Item	Quantity	Unit Price	Total
Flange Gasket Set	1.00	$21.42	$21.42
Seal Kit for PL-55B	1.00	$284.90	$284.90
Body Gasket	1.00	$10.50	$10.50
Regular Time	6.00 hrs	$85.00	$510.00
		Total	$826.82
		Incl. Tax of	$0.00

Please pay from invoice. No statement will be issued. Thank you.

Sub-Total ex Tax	$826.82
Tax	$0.00
Total inc Tax	$826.82
Amount Applied	$0.00
Balance Due	$826.82

How To Pay

INVOICE NO. 44558

Mail
Detach this section and mail check to:
Encode Corporation
111 Florine Lane
Billings, MT 59101-3409

Credit Card (MasterCard or Visa)
Pay Online encodecorp.simprosuite.com/payment/
Please call 406-245-2520 *to pay over the phone.*

DUE DATE: 01/17/2024 **AMOUNT DUE:** $826.82

Page 1/1

RCI Energy, Inc.
Hardin, MT 59034

Invoice

Date	Invoice #
9/18/2024	5482

Phone #	406-665-4275

Bill To
Big Horn County Library PO Box 908 Hardin, MT 59034

Thank You for Your Business.

Project/Job	P.O./W.O. #	Terms
Library		Net 30

Date	Description	Quantity	Rate	Amount
6/7/2024	Customer called stating pump making loud noise. Trouble shot and found faulty pump bearings. Pump design and research of air handling equipment. Ordered replacement materials. (Nick)	3.50	125.00	437.50
8/20/2024	Pump layout for building. Primary hydronic air handler (Nick)	2.00	125.00	250.00
9/4/2024	Drained Boiler system, removed old pump and flanges (Will)	4.00	125.00	500.00
9/6/2024	Piped in new pump (Will)	4.00	125.00	500.00
9/6/2024	Pump flange installation	2.50	125.00	312.50
9/6/2024	High Velocity forged brass pump flange	2.00	266.17	532.34
9/6/2024	UPS42-100SF 3 speed stainless steel circulator pump 115v 9h IMU	2.00	1,286.00	2,572.00
	2220.			
	SEP 20 2024			
1.5% Finance Charge on Accounts After 30 Days		Total		$5,104.34

9/30/24 [illegible]

RCI Energy, Inc.
Hardin, MT 59034

Invoice

Date	Invoice #
11/13/2024	5590

Phone #	406-665-4275

Bill To

Big Horn County Library
PO Box 908
Hardin, MT 59034

Thank You for Your Business.

Project/Job	P.O./W.O. #	Terms
Library		Net 30

Date	Description	Quantity	Rate	Amount
10/25/2024	Hy Vent 1/8 NPT	1.00	28.55	28.55
10/25/2024	Hy Vent 1/4 NPT	1.00	102.67	102.67
10/25/2024	Boiler start up, went through sequence of operation, set up new pump speed. (Nick)	2.00	125.00	250.00
10/25/2024	Boiler start up, set up pump speed. Boiler supply return water targeted at 20 degrees differential. Okay at this time. Pump speed set at 1 (Will)	2.00	125.00	250.00

RECEIVED
NOV 13 2024
By

1.5% Finance Charge on Accounts After 30 Days	**Total**	$631.22

11/15/24 4:47

Exhibit B

- Fire Inspection Report – Deputy State Fire Marshall

STATE OF MONTANA

DEPARTMENT OF JUSTICE

DIVISION OF CRIMINAL INVESTIGATION

FIRE PREVENTION AND INVESTIGATION SECTION

Keith Kober
Deputy State Fire Marshal
Billings, Mt 59107
1-406-896-4388
406-439-1600
Keith.kober@mt.gov

Fire Inspection
01-13-2025

Inspection Number: **01-13-2025T0736Kober**
Occupancy Inspected: **Hardin Library**
Occupancy Classification: **Assembly**
Occupancy Address: **419 N Custer Ave, Hardin, MT, 59034, USA**
City: **Hardin**
Proprietor: **Anika Reisner**
(RP) Phone: **(406) 665-1808**
(RP) Email: **arisener@bighorncountymt.gov**

A fire inspection was conducted at the location referenced above to identify violation(s) of the Fire Code adopted by the State of Montana. This document serves as written notice of the inspection. You are ordered to correct all listed violation(s) within ________ days. A follow-up inspection may occur at this time to ensure compliance and update records. Failure to comply will result in additional action as required by law including prosecution for a misdemeanor offence in accordance with MCA TITLE 50, Chapter 61.

Owner/Employee: Anika Risener **Inspector: Keith Kober**

Violation 1031: Escape/Rescue Windows

See IFC 2021 section 1031 for full text.

Inspector Notes: When upgrading alarm system add automatic door closers (magnetic release) to doors

Violation 1013.1/1013.3: Exit Signs Required; directional signs required illuminated

IFC 2021, 1013.1 Where required. Exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel. The path of egress travel to exits and within exits shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to the occupants. Intervening means of egress doors within exits shall be marked by exit signs. Exit sign placement shall be such that any point in an exit access corridor or exit passageway is within 100 feet (30480 mm) or the listed viewing distance of the sign, whichever is less, from the nearest visible exit sign. (See IFC 2021 Section 1013.1 for exceptions.) 1013.3 Illumination. Exit signs shall be internally or externally illuminated

Inspector Notes: Replace batterys in exit signs or replace fixture

Violation 907: Fire Alarm Systems

IFC 2021, 907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of Section 907.2 are applicable to new buildings and structures. The requirements of Section 907.9 are applicable to existing buildings and structures.

Inspector Notes: Alarm panel not working due to water damage. Needs to be serviced and brought up to code

Violation 315.3: Disorderly Housekeeping

IFC 2021, 315.3 Storage in buildings. Storage of materials in buildings shall be orderly and stacks shall be stable. Storage of combustible materials shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

Image for Violation 907

Image for Violation 315.3

Page: 4 of 4

Letters of Support

- Big Horn County Commissioners
- City of Hardin
- Beartooth Resources Conservation and Development

BIG HORN COUNTY
BOARD OF COUNTY COMMISSIONERS

January 27, 2025

Montana Department of Commerce
Montana Coal Board
301 S. Park
Helena, Montana 59620

RE: Montana Coal Impact Grant Program Application for the Big Horn County Library

Dear Montana Coal Board:

The Big Horn County Commissioners hereby support the application for the Montana Coal Board Grant Program funding to purchase and install new and updated boiler and fire alarm systems for the Big Horn County Library. Replacing these crucial systems will meet compliance standards with City and County codes and, most importantly, keep our County citizens warm and safe while utilizing library services.

The County has worked with the Library's Board of Directors to combine resources and efforts to keep our beloved library a focal point in our community. Thank you for considering this grant application.

Sincerely

L Big Hair
Lawrence Big Hair
Presiding Officer

George Real Bird III
Member

Larry Vandersloot
Member

Po Box 908, Hardin, MT 59034

Office: (406) 665-9700 • bighorncountymt.gov • bighorncounty@bighorncountymt.gov

MAYOR
Joe Purcell

POLICE CHIEF
Paul M. George Jr.

PUBLIC WORKS DIRECTOR
Michael Hurff Jr.

FINANCE OFFICER/CITY CLERK
Andrew Lehr

01/27/2025

Dear Coal Board:

I am writing to express my strong support for the grant application submitted by the Big Horn County Library for the replacement of its boiler heating system and fire alarm systems. As the Mayor of Hardin, I recognize the critical role that our historic library plays in the community, serving as a cornerstone for education, culture, and public engagement.

The Big Horn County Library, established in 1909, is not only a repository of knowledge but also a cherished landmark that reflects the rich history and heritage of our town. However, the aging infrastructure of the library, particularly its boiler heating system and fire alarm system, poses significant challenges to maintaining a safe and comfortable environment for our patrons and staff.

The Big Horn County Library is more than just a building; it is a hub of learning, connection, and inspiration for residents of all ages. By supporting this grant application, you will be investing in the future of our community, ensuring that the library remains a safe, welcoming, and efficient space for generations to come.

I wholeheartedly endorse the Big Horn County Library's request for funding to replace its boiler heating system and fire alarm system. Your support will make a profound difference in preserving this historic institution and enhancing its ability to serve the people of Hardin.
Thank you for your consideration.

Sincerely,

Joe Purcell

Mayor of Hardin

City of Hardin 406 N Cheyenne Hardin MT 59034 Phone (406) 665-9260 Fax (406) 665-2719

BEARTOOTH
RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

January 24, 2025

Dear Members of the Montana Coal Board:

I am writing on behalf of Beartooth RC&D to express our enthusiastic support for the grant application submitted by the Big Horn County Library. This grant seeks funding to replace the library's outdated boiler heating system and fire alarm system, both of which are critical to maintaining the safety and functionality of this historic and vital community resource.

Working with rural communities throughout the Beartooth region, we understand that public libraries can be a centerpiece of a town, a place for a variety of social and educational events. The Big Horn County Library is such a place. It is a foundation for community development, educational support, cultural enrichment, and public engagement. However, with time, the library has suffered significant challenges maintaining and servicing its boiler heating system and fire alarm system.

The current boiler heating system is inefficient and unreliable. Frequent breakdowns during the harsh Montana winters result in inconsistent heating, which disrupts library operations and creates an uncomfortable environment for patrons and staff. Replacing this outdated system with a modern, energy-efficient boiler will provide a reliable heating solution, reduce operational costs, and contribute to the library's sustainability efforts.

Equally important is the need to upgrade the library's fire alarm system. The existing fire panel is inoperable and poses a risk to the safety of library users and staff. A modern fire alarm system is essential to ensure timely alerts and facilitate swift evacuation in case of emergencies.

We feel these items are not just important but critical to the safety and wellbeing of Big Horn County's residents. We urge you to give thoughtful deliberation to the Big Horn County Library's application. Thank you for your consideration.

Sincerely,

Joel Bertolino

Joel Bertolino
Executive Director

Building
Stronger
Communities

Beartooth RC&D
Beartooth Resource Conservation & Development Area, Inc.

128 So. Main St.
P. O. Box 180
Joliet, MT 59041

PHONE 406-962-3914
FAX 406-962-3647
WEBSITE www.beartooth.org

Technical Memorandum

January 23, 2025

To: Montana Coal Board

From: Lawrence Jace Killsback, Economic Development & Housing Director

Subject: Replacement of Boiler System and Fire Alarm System at the Big Horn County Library

---

Introduction:
The Big Horn County Library (BHCL) is a local government and under 90-6-205(4), MCA and is applying for Coal Impact Grant Program funding to assist in redeveloping a public building according to 7-6-2527(24), MCA. The BHCL is located at 419 North Custer Avenue and is the cornerstone of the historic town of Hardin, Montana. Big Horn County is one of the largest counties in the state, with a massive geographical size of 3.2 million acres, including the Crow Indian Reservation (46% of County land) and the Northern Cheyenne Indian Reservation (6% of County land).

The building is 12,500 square feet of which 10,000 square feet is used to provide free services to the general public. Over 13,000 Big Horn County citizens make up the service population who are from long-time generational County families, newcomers to the land, and enrolled tribal members of the Crow Tribe of Indians and the Northern Cheyenne Nation. The BHCL welcomes many tourists, visitors, and schools to partake in the library activities and resources. It is estimated that over 250,000 tourists annually visit the County to take advantage of the many recreational attractions and historical areas. The library serves a diverse population providing essential services such as internet access, educational programs, and community events. The BHCL is the only officially recognized public library in the County and remains a safe haven for children, a resource for job seekers, and a gathering place for residents of all ages and backgrounds. The library's role is especially crucial in a community that faces socioeconomic challenges, offering free access to information and resources that empower individuals and families.

Project Overview:
Problem: The current boiler system and fire alarm system at the BHCL are damaged and outdated. They need to be replaced because they put County residents' health and safety at risk. On January 13, 2025, the Deputy State Fire Marshall inspected BHCL's fire alarm system reporting that the fire panel was damaged beyond repair and in violation of local City building code standards. The damage occurred on November 26, 2024 when the bathroom on the top floor was vandalized causing the entire building to flood. The inspection identified the fire alarm system as inoperable, and that the system could not properly alert the building patrons and staff in the event of a fire outbreak. Due to the nonfunctioning fire alarm system, the BHCL is required to conduct hourly inspections of the property to ensure public safety throughout the building.

The existing boiler system, built in 2007, provides heating during the harsh Montana winters. However, it has suffered extensive wear and tear and has become obsolete with industry standards. Frequent breakdowns and inefficient operation have led to inconsistent heating, which has caused discomfort for library users and increased operational costs. Additionally, the outdated system poses safety risks, including potential leaks and malfunctions that could lead to hazardous conditions.

The boiler system is not capable of keeping the facility warm, leaving the library environment unsafe and open to potential health risks to staff and patrons, particularly the most vulnerable populations of children and elders. Both of these system issues threaten the physical safety of the library building and its occupants and jeopardize the preservation of valuable historical documents and resources it houses.

Proposed Solution: We propose the installation of a new, state-of-the-art boiler system and fire alarm system for the BHCL. These new systems will enhance reliability by ensuring consistent and dependable heating and proper fire notification throughout the library. New systems will improve energy efficiency to **r**educe energy consumption and lower utility costs, contributing to the library's sustainability goals.

New boiler and fire alarm systems will increase safety by eliminating the risks associated with the old, damaged system, providing a healthier and safer environment for all. Investing in a new boiler system and a new fire alarm system for the BHCL is essential to address the serious deficiencies of the current systems and bring them up to code. These upgrades will not only improve the comfort and safety of our patrons and staff but also enhance the library's ability to serve the community effectively. The primary goal of this project is to ensure the health and safety of all who use and work at the BHCL.

Alternatives Considered:
No Action Alternative: This alternative involves maintaining the current boiler heating system and fire alarm system without any upgrades. This would result in continued safety risks, non-compliance with city and county codes, and higher operational costs due to inefficiency and frequent repairs.

Partial Upgrade Alternative: This alternative involves upgrading only one of the systems, either the boiler heating system or the fire alarm system. While this would reduce some risks and improve efficiency, it would not fully address the safety and compliance issues.

Alternative Heating and Fire Safety Solutions: This alternative involves exploring different heating solutions such as electric or geothermal systems and alternative fire safety measures. However, these options may be more costly and complex to implement in a historic building.

Cost Benefit Analysis:
Total Project Cost: $202,602.87
Coal Impact Grant Amount Requested: $155,609.87
Big Horn County Library Contribution: $46,500.00

Cost

1. Boiler Heating System Replacement:
    - Estimated Cost: $155,411.46 – based on the cost to replace the boiler system for the Big Horn Fire Department Building with similar square footage.
    - Details: Includes the cost of a new high-efficiency boiler system large enough to effectively heat a 13,000 square feet historic building, installation, removal of the old unit, and any necessary plumbing and electrical work. Purchase of 2 Lochinvar Boiler Units with professional installation to meet City codes and standards.
2. Fire Alarm System Replacement:
    - Estimated Cost: $45,209.41

- Details: Includes the cost of the following components and installation:
  - 1 Vigilant FACP W/ Enclosure
  - 1 Dialer/Modem with two telephone line connections
  - 20 DET, INTEL, SMOKE, OPTI
  - 1 Addressable Duct Smoke Detector
  - 1 Air Sampling Tube 42"
  - 1 LCD, ANNUM, W/COMM CNTRL, RED, EN
  - 14 ADDR PULL DBL ACT KEY RESET
  - 4 Control Relay Module, Standard Mount
  - 13 Indoor 2-Wire LED Horn Strobe, Wall Mount, Red
  - 3 Strobe, Standard-candela, Indoor, Ceiling Mount
  - 10 Wire, 16/2 Strand Non Shield Plenum

3. <u>Additional Costs:</u>
   - Project Management and Oversight: $1,500
4. <u>Total Estimated Costs: $202,602.97</u>

   Funding Sources:
   Montana Coal Board Impact Grant: $155,620.87
   Big Horn County Commission Contribution: $46,500 (including personnel time for grant management and processing)
   Insurance Coverage: To help cover any additional costs

<u>Benefits</u>

1. <u>Safety and Compliance:</u>
   - Improved Safety: Ensures the safety of patrons and staff by providing reliable heating and fire detection, while reducing risk of system failures and associated hazards.
   - Code Compliance: Brings the library up to current city and county codes, avoiding potential fines and legal issues.
2. <u>Operational Efficiency:</u>
   - Energy Efficiency: A new high-efficiency boiler reduces energy consumption, leading to lower utility bills with an estimated annual saving of approximately $5,000.
   - Reduced Maintenance Costs: Modern systems require less frequent repairs and maintenance, saving on operational costs. Estimated annual savings on maintenance are approximately $2000.
3. <u>Community Impact:</u>
   - Enhanced Comfort: Provides a comfortable environment for library users, especially during colder months, encouraging more frequent visits and longer stays.
   - Increased Usage: A safe and comfortable library attracts more visitors, increasing community engagement and usage of library resources. This can lead to higher participation in library programs, services, and events.
4. <u>Economic Benefits:</u>
   - Job Creation: The project creates jobs for local contractors and service providers during the installation phase, contributing to the local economy.
   - Long-term Savings: Reduced energy and maintenance costs free up funds for other library programs and services, enhancing the overall value provided to the community.
5. <u>Health and Well-being:</u>
   - Mental Health Support: A warm and safe library environment supports the mental health and well-being of patrons, providing a refuge during extreme weather conditions.

- Safe Refuge: The library provides a safe place for the community in the event of a fire or other emergencies, such as power outages and extreme cold spells.

<u>Project Timeline:</u> Completion Time - 6 months

Discussion:
The antiquated and unstable boiler system is almost 20 years old and has created significant challenges that impact the library's ability to function effectively and safely. With constant breakdowns that have led to disruptions in library services on an average of 3-4 times per month, an increase in cost in personnel and emergency repairs has strained the library's budget and resources at approximately $6,500 in the past year alone. These issues not only jeopardize the physical safety of patrons and staff but also create an environment that is not conducive to learning and community activities

In addition to the boiler system, a serious public health and safety problem exists with an inoperable fire alarm system for the building. There are significant risks to life and property in the event of a fire and it is essential to replace the system to ensure the health and safety of patrons, staff, and the library's collections, as well as to comply with city fire safety codes. The Deputy State Fire Marshall conducted a fire inspection and identified Fire Code Violation 907: Fire Alarm Systems due to the alarm panel not working as a result of water damage.

The coal industry's ongoing volatility will continue to impact the County. A decreasing population generally leads to a decline in tax revenue, which results in reduced funding for local governments. With fewer residents, there are fewer people earning wages, resulting in lower income tax collections. A shrinking population can also lead to lower demand for housing and commercial properties, reducing property values. As property values decline, so does the revenue generated from property taxes. Additionally, vacant properties may not contribute to tax revenue at all if they are abandoned. With a declining population, businesses may experience reduced demand for their products or services, leading to lower profits and, consequently, lower business tax revenues. Some businesses might even relocate or close entirely, further shrinking the tax base. Additionally, a smaller tax base may place a larger financial burden on the remaining population, potentially forcing more people to move away, exacerbating the cycle.

There were 13,387 people residing in Big Horn County when the 2015-2019 American Communities Survey was conducted. This includes 3,609 households, 59% of which are Low and Moderate Income (LMI). The median household income was $49,859 with 25.5% poverty. 30.7% of families in Big Horn County have mortgage costs exceeding 30% of their household income, while 23% of families pay rent that exceeds 30% of their household income. Given this information, increasing mills and tax rates to fund this project would create financial hardship for a County that is already struggling.

Another important factor to consider in understanding the County's financial condition can also be attributed to the unique land status distinction between state-taxable lands and federally exempt reservation land. Because almost half of the County (46%) is within the exterior boundaries of the Crow Tribe Indian Reservation, taxation opportunities are restricted compared to other Montana counties. Despite this circumstance, the County remains committed to providing essential resources, programs, and services to the entire County population regardless of their land status even when there are no expected tax revenues to support these functions or improvements.

Conclusion
The replacement of the damaged and outdated boiler heating system and fire alarm system at the Big Horn County Library is essential to ensure the safety, comfort, and well-being of the community. The project will have a significant positive impact on the library's operations and the quality of life for residents. The project aligns with the goals of the Montana Coal Board Impact Grant program and will provide significant benefits to the community. The total project cost of $202,602, supported by 155,411 and Big Horn County contributions of $46,500, represents a sound investment in our community's future.

Environmental Review Form

Environmental Review Form

1. **Alternatives:** Describe reasonable alternatives to the project.

   No Action Alternative: This alternative involves maintaining the current boiler heating system and fire alarm system without any upgrades. This would result in continued safety risks, non-compliance with city and county codes, and higher operational costs due to inefficiency and frequent repairs.

   Partial Upgrade Alternative: This alternative involves upgrading only one of the systems, either the boiler heating system or the fire alarm system. While this would reduce some risks and improve efficiency, it would not fully address the safety and compliance issues.

   Alternative Heating and Fire Safety Solutions: This alternative involves exploring different heating solutions such as electric or geothermal systems and alternative fire safety measures. However, these options may be more costly and complex to implement in a historic building.

2. **Mitigation:** Identify any enforceable measures necessary to reduce any impacts to an insignificant level.

   No enforceable measures are necessary to reduce impacts.

   Proper Disposal of Old Systems: Ensure that all components of the old boiler and fire alarm systems are disposed of in accordance with environmental regulations to prevent contamination.

   Energy Efficiency Measures: Select high-efficiency equipment to reduce energy consumption and emissions.

   Safety Compliance: Ensure that the new fire alarm system meets all safety codes and standards, including regular maintenance and testing.

3. **Is an EA or Environmental Impact Statement (EIS) required?** Describe whether or not an EA or EIS is required and explain in detail why or why not.

   No EIS or EA is required because the project qualifies for a Categorical Exclusion.

4. **Public Involvement:**

   The proposed project and its potential impacts were discussed in public meetings held at the Big Horn County Courthouse on January 23, 2025 at 9:30AM. The meeting was advertised on local bulletins and the county's website. The public meeting allowed for public comments and feedback on the project. No comments were submitted.

Final Approval: The Montana Coal Impact Grant Program Application was approved by the Big Horn County Commission on January 23, 2025.

5. **Person(s) Responsible for Preparing:**

Lawrence Jace Killsback, Director of Economic Development and Housing for Big Horn County

6. **Other Agencies**:

No other agencies.

Authorized Representative,

L B. Hair

Lawrence Pete Big Hair
Title: Presiding Officer

Date: 1-27-2025

ENVIRONMENTAL REVIEW CHECKLIST		
NAME OF PROJECT:		Big Horn County Library Boiler and Fire Alarm Systems Replacement Project
PROPOSED ACTION:		Replace Out Dated and Damaged Boiler System and Fire Alarm System
LOCATION:		Big Horn County, Montana
Key Letter:		
N: No Impact; **B:** Potentially Beneficial; **A:** Potentially Adverse; **P:** Approval/Permits Required; **M:** Mitigation Required		
PHYSICAL ENVIRONMENT		
Key	1	Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity)
N		*Response and source of information: NA*
Key	2	Hazardous Facilities (e.g., power lines, hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)
N		*Response and source of information: NA*
Key	3	Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)
N		*Response and source of information: NA*
Key	4	Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)
N		*Response and source of information: NA*
Key	5	Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)
N		*Response and source of information: NA*
Key	6	Floodplains & Floodplain Management (Identify any flood plains within one mile of the boundary of the project.)
N		*Response and source of information: NA*
Key	7	Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)
N		*Response and source of information: NA*
Key	8	Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)
N		*Response and source of information: NA*
Key	9	Vegetation & Wildlife Species & Habitats, including Fish and Sage Grouse (e.g., terrestrial, avian and aquatic life and habitats) https:\\sagegrouse.mt.gov
N		*Response and source of information: NA*
Key	10	Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish or wildlife)
N		*Response and source of information: NA*
Key	11	Unique Natural Features (e.g., geologic features)
N		*Response and source of information: NA*
Key	12	Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways, and Public Open Space
N		*Response and source of information: NA*

HUMAN ENVIRONMENT		
Key	1	Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics
N		*Response and source of information: NA*
Key	2	Nuisances (e.g., glare, fumes)
N		*Response and source of information: NA*
Key	3	Noise -- suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads)
N		*Response and source of information: NA*
Key	4	Historic Properties, Cultural, and Archaeological Resources
N		*Response and source of information: NA*
Key	5	Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density)
N		*Response and source of information: NA*
Key	6	General Housing Conditions - Quality, Quantity, Affordability
N		*Response and source of information: NA*
Key	7	Displacement or Relocation of Businesses or Residents
N		*Response and source of information: NA*
Key	8	Public Health and Safety
N		*Response and source of information: NA*
Key	9	Lead Based Paint and/or Asbestos
N		*Response and source of information: NA*
Key	10	Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact: *NA*
N		*Response and source of information: NA*
Key	11	Local & State Tax Base & Revenues
N		*Response and source of information: NA*
Key	12	Educational Facilities - Schools, Colleges, Universities
N		*Response and source of information: NA*
Key	13	Commercial and Industrial Facilities - Production & Activity, Growth or Decline.
N		*Response and source of information: NA*
Key	14	Health Care – Medical Services: *NA*
N		*Response and source of information: NA*
Key	15	Social Services – Governmental Services (e.g., demand on)
N		*Response and source of information: NA*
Key	16	Social Structures & Mores (Standards of Social Conduct/Social Conventions)
N		*Response and source of information: NA*
Key	17	Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts)
N		*Response and source of information: NA*
Key	18	Energy Resources - Consumption and Conservation
N		*Response and source of information: NA*
Key	19	Solid Waste Management
N		*Response and source of information: NA*
Key	20	Wastewater Treatment - Sewage System
N		*Response and source of information: NA*
Key	21	Storm Water – Surface Drainage
N		*Response and source of information: NA*

Key	22	Community Water Supply
N		*Response and source of information: NA*
Key	23	Public Safety – Police
N		*Response and source of information: NA*
Key	24	Fire Protection – Hazards
N		*Response and source of information: NA*
Key	25	Emergency Medical Services
N		*Response and source of information: NA*
Key	26	Parks, Playgrounds, & Open Space
N		*Response and source of information: NA*
Key	27	Cultural Facilities, Cultural Uniqueness & Diversity
N		*Response and source of information: NA*
Key	28	Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)
N		*Response and source of information: NA*
Key	29	Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)
N		*Response and source of information: NA*
Key	30	Is There a Regulatory Action on Private Property Rights as a Result of this Project? (Consider options that reduce, minimize, or eliminate the regulation of private property rights.)
N		*Response and source of information: NA*

Applicant 1013-City of Forsyth

The applicant is requesting $200,000 of a total project cost of $3,482,871 in Coal Board funds to Construct a New Water Tank and Install a Booster Pump. The request to the Board is 5% of the total project cost. The applicant is a designated unit.

Coal Board Grant Applicant #1013 City of Forsyth
Staff Report / March 2025 Meeting

Applicant: City of Forsyth
Project: Construct a New Water Tank and install a Booster Pump
Coal Board Funds Requested: 200,000.00
Total Project Cost: $3,482,871.00

I. General Project Information

A. Eligibility:
- The applicant is a local government, which is eligible according to 90-6-205(4), MCA.
- The project would assist the applicant in providing safe and clean drinking water for the community.
- The following citation authorizes the applicant to make expenditures to provide for the proposed governmental service or facility:
  - Water or sewer project: 7-13-4304, MCA

B. Application Items: *Note whether application includes the following requirements.*
- The Coal Board Application form was complete.
- A Technical Memo was provided.

C. The applicant is a designated unit according to 90-6-207, MCA.

D. Location of applicant:
- The applicant lists Talen Energy's two-unit power station, Rosebud Coal Mine and Rosebud Power Generation Station as the nearest coal development area or coal using energy complex. They are 35 and 28 miles from Forsyth respectively.
- Forsyth is the county seat of Rosebud County.

E. Grant funding history:
- The applicant has been awarded $783,000.00 in Coal Board funds since 2009, based on historical information available in the Commerce projects database.

II. Coal Board Statutory Criteria (90-6-206, MCA) *For the following, provide bulleted analysis of the project against the criteria based on facts in the application.*

A. Need: Explain how the assistance that is required to eliminate or reduce a direct and obvious threat to the public health, safety, or welfare has been caused as a direct result of coal development or decline (Coal Board Application and Guidelines, p. 15).
- The application states that a serious deficiency does exist in the community's water system, as it cannot provide adequate fire flow to two planned subdivisions east of downtown.
- Fire protection for people living in a retirement community are entirely dependent on a booster station for their water. There is no water storage, and the large fire pump is inoperable.

- Department of Environmental Quality (DEQ) standards (8.2.1, p.150) require a system to be designed to maintain a minimum normal working pressure of 35 psi. The current system experience pressure drops below and is in clear violation of DEQ standards.

B. Severity of Impact: Explain why the proposed project or governmental services or facilities "are needed as a direct consequence of an increase or decrease in coal development or in the consumption of coal by a coal-using energy complex" (Coal Board Application and Guidelines, p. 16).
   - The population of Forsyth has decreased due to the closure of units 1 and 2 at Colstrip but new residents have been moving into the community due to its location and the outdoor activities available.
   - A large wind farm project drew temporary workers as well.
   - The "boom-bust" cycle has affected this community for over 50 years, as it relates to natural resource development.

C. Availability of funds: What amount of funds is available in light of the total request submitted (Coal Board Application and Guidelines, p. 17).
   - Revenues and appropriation from the legislature related to the Coal Natural Resource account are currently $670,680.00. Total requested grants for this meeting are $1,171,178.39.

D. Degree of local effort: As applicable, what bonding, millage effort, or user charge has been made in the past, those currently being made, and what effort has been made to secure funds from other sources to answer needs (Coal Board Application and Guidelines, p. 17).
   - The applicant is asking for 5% of this project to be funded by a Coal Board grant.
   - The current millage rate from the application is $294.30, listed for 2024-2025, which is higher than the average rates from the previous three years, $274.83 (2023-2024: $271.88, 2022-2023: $286.72, 2021-2022: $265.91).
   - Based on the most recent audit submitted (2024), Commerce staff identified no concerns related to financial management.

E. Planning and Management: 90-6-207(5), MCA requires the Coal Board to give attention "to the need for community planning before the full impact of coal development or decline is realized. Applicants should be able to show how the request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems." Therefore, pursuant to Sub-Chapter 3 of the Administrative Rules of Montana, planning is an additional criterion the Coal Board will apply when judging applications. (Coal Board Application and Guidelines, p. 20).
   - Coal production has increased 4% in the City of Forsyth. However, decline in the oil, gas, and timber industries in Rosebud County has resulted in a reduction of residents in this region. As a result, the County has facilitated the development of a wind farm, attracting some workers and permanent employees to live in Forsyth. In addition, as value-added energy options emerge at Colstrip, this will place Forsyth in the bullseye of housing workers and providing services.
   - Forsyth completed a Capital Improvements Plan, in which a water tank is mentioned.
   - Also, a water tank is mentioned in their Growth Plan in order to provide a safe, adequate, and reliable source of water.
   - Finally, this project is noted on the Southeastern Montana Development Corporation Infrastructure Needs list as a Priority A, since adequate fire protection is not available for a portion of Forsyth residents.

III. Staff Summary

Commerce staff recommend funding because the application materials are complete and meet the required statutory criteria.

Appendix A: Coal Board Application

THE COAL IMPACT GRANT APPLICATION FORM SUBMITTED BY CITY OF FORSYTH

CERTIFICATION

The chief elected official or executive officer of the applicant must sign the application certifying that to the best of the official's knowledge and belief, the information provided in the application and the attached documents is true and correct.

The chief elected official or executive officer of the applicant must also certify that, in accordance with Section 90-6-205, MCA, the applicant is eligible for a Coal Impact Grant and has the authority to administer and make expenditures to provide for the proposed service or facility.

CERTIFICATION

To the best of my knowledge and belief, the information provided in this application and in the attached documents is true and correct.

In accordance with Section 90-6-205, MCA, the applicant is eligible for Coal Board grants and has the statutory authority to make expenditures to provide for the particular service or facility.

Name: Dennis Kopitzke

Title: Mayor, City of Forsyth

Signature: Dennis Kopitzke

Date: 1-27-25

SUMMARY INFORMATION

1. NAME OF APPLICANT(S):
   City of Forsyth

2. AMOUNT OF COAL IMPACT GRANT REQUESTED $200,000

3. TOTAL PROJECT COST: $3,482,871

4. NAME OF PROJECT:
   New Water Tank and Booster Pump

5. TYPE OF PROJECT:
   Public Infrastructure – Water Infrastructure

6. CHIEF ELECTED OFFICIAL OR AUTHORIZEDREPRESENTATIVE:
   Dennis Kopitzke, Mayor
   City of Forsyth
   PO Box 226
   Forsyth MT 59327-0226
   PH 406-346-2251
   cityforsyth@rangeweb.net

7. PRIMARY ENTITY CONTACT PERSON:
   Dennis Kopitzke, Mayor
   City of Forsyth
   PO Box 226
   Forsyth MT 59327-0226
   PH 406-346-2251
   cityforsyth@rangeweb.net

8. OTHER CONTACT PERSONS:
   Julie Emmons Stoddard or Sarah Kisman
   SEMDC
   PO Box 1935
   Colstrip, MT 59323
   Julie – 406-853-6900
   Sarah – 406-346-2251
   julie@semdc.org
   skisman@semdc.org

9. MILLAGE RATES:

24-25	294.30	$2,233,625
23-24	271.88	$2,336,405
22-23	286.72	$2,089,062
21/22	265.91	$2,122,899
20/21	251.38	$2,144,723
19/20	246.03	$2,068,231
18/19	243.50	$2,025,873

10. AMOUNT OF COAL GROSS PROCEEDS TAX:
$0

11. MAPS:
See attached **Exhibit A**

12. BRIEF PROJECT SUMMARY:

Construct a new water storage tank with booster pump for the City of Forsyth.

13. PROJECT BUDGET AND IMPLEMENTATION SCHEDULE:

A. Project Budget Form:

The proposed project budget ***must*** include a breakdown of all major project costs, and a description of the proposed source and use of all funds. Designate the total budget of any proposed project as either "Administrative/Financial Costs" or "Activity Costs: (such as engineering or construction). Administrative Costs may not exceed 10% of the total project cost. Refer to the description of expenditure categories shown below that outline the expenditures that may be part of the budget. The Administrative/Financial Costs cover the expenses of administering a local project, including the cost of local government personnel involved with managing the project; the cost of the local project audit; and other contractual costs for professional services (such as hiring a project manager) that may be associated with administration of the program.

Administrative/Financial Costs must be reasonable and appropriate to ensure cost-effective and proper management of the project. Any proposed Administrative/Financial Costs must be eligible, fully supported, and adequately explained. Applicants which propose to contract for project management assistance with a consultant or other entity must specifically itemize this amount in the Administrative Budget and explain it.

	PROJECT BUDGET					
	Completed by: Julie Emmons Stoddard	For: City of Forsyth, MT	Date: 01/21/25			
ADMINISTRATIVE/ FINANCIAL COSTS	SOURCE: ARPA/ SLFRF	SOURCE: MCEP	SOURCE: RRG	SOURCE: Coal Board	SOURCE: Local/ Intercap	TOTAL:
Grant Administration	* $	$	$		$	$
Audit	$	$	$		$	$
Professional Services	$	$	$		$	$
TOTAL ADMINISTRATIVE/ FINANCIAL COSTS	$	$	$		$	$
ACTIVITY COSTS:						
Water Tank Design	$125,760		$		$	$125,760
Construction Engineering	$153,111	$				$153,111
Construction	$1,268,450	$219,638	$111,176	$200,000	$665,736	$2,465,000
Contingency	$140,441	$	$		$598,559	$739,000
TOTAL ACTIVITY COSTS	$1,657,579	$218,368	$111,176	$200,000	$1,264,295	$3,482,871
TOTAL PROJECT COSTS	$1,657,579	$218,368	$111,176	$200,000	$1,264,295	$3,482,871

■

B. Project Budget Narrative:

Estimate For Construction Activities – See Attached **Exhibit B** for detailed information and estimated costs
All costs on the budget are associated with construction.

C. Implementation Schedule: **See Next Page**

Each applicant must submit an implementation schedule that describes the overall schedule for project completion.

IMPLEMENTATION SCHEDULE FOR CITY OF FORSYTH												
	QUARTERS 2025				QUARTERS 2026				QUARTERS 2027			
TASK	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**	**1st**	**2nd**	**3rd**	**4th**
PROJECT START-UP												
A. Sign contract with Coal Board		X										
B. Secure approval of other funding	X											
C. Submit progress reports and drawdown request. (Progress reports quarterly if no draws submitted)			X	X	X	X	X	X	X			
PROJECT CONSTRUCTION												
A. Project Bidding/Bid Opening		X										
B. Bid Award		X										
C. Order Tank/Associated Parts & Materials		X										
D. Install Water Mains				X								
E. Install Water Tank and Booster						X	X					
F. Final Inspection								X				
PROJECT CLOSE-OUT												
A. Coal Board administrative staff conduct on-site monitoring of the project								X				
B. Submit project completion report.								X				

14. DESCRIPTION OF RELATIONSHIP TO COAL BOARD STATUTORY GRANTCRITERIA

The Coal Board bases awards on the following four statutory criteria (90-6-206, MCA). In addition, State law (90-6-207(5), MCA) requires attention be given to the need for community planning before the full impact of coal development or decline is realized.

A. Need

Explain how the assistance that is required to eliminate or reduce a direct and obvious threat to the public health, safety, or welfare that has been caused as a direct result of coal development or decline. (90-6-206, MCA)

1. Does a serious deficiency exist in a basic or necessary community public facility or service? Examples include emergency services such as police, fire or ambulance services. Describe the nature and frequency of occurrence and provide supporting documentation.

   A serious deficiency does exist in the community's water system. The water system cannot provide adequate fire flow and therefore, fire protection, to the Quincer Subdivision (two planned subdivisions at the end of Rosebud St), located east of downtown. Additionally, the only fire pump for this area is inoperable and the only service pump for the area does not have back up power.

2. Have serious public health or safety problems that are clearly attributable to a deficiency occurred, or are they likely to occur, such as illness, disease outbreak, substantial property loss, environmental pollution, safety problems, hazards, or health risks? Describe the nature and frequency of occurrence and provide supporting documentation.

   Fire protection for people living in the Riverview Villa Retirement Community in the Quincer Subdivision, in the southeast portion of the city, are entirely dependent on a booster station for their water. There is no water storage in the Upper pressure zone and the large fire pump is inoperable. Furthermore, there is only one service pump available and no back-up power. The booster station lost power in late 2021, causing the area to lose pressure and go without water until an emergency powerline could be placed. In a worst-case scenario, losing power and therefore water could be disastrous for the retirement community and the subdivision.

3. Is there clear documentation that the current condition of the public facility or service (or lack of a facility or service) violates, or may potentially violate, a state or federal health or safety standard? If yes, describe the standard being violated. If the proposed project is necessary to comply with a court order or a state or federal agency directive, describe the directive and attach a copy of it.

   There is currently no fire protection at the Riverview Villa Retirement Community due to the lack of storage and it only has one fire pump that is not operational. DEQ standards (8.2.1, p.150) require a system to be designed to maintain a minimum normal working pressure of 35 psi. The 2022 PER indicates (p.7-1) that the Quincer subdivision (where the retirement community is located) experiences pressure drops below the DEQ standard of 35 psi in clear violation of DEQ standards.
   https://deq.mt.gov/files/Water/WQInfo/Documents/Circulars/Circulars/2022DEQ-1_FINAL.pdf

4. Describe how the need for the expansion or improvement to the public facility or public service is attributable to coal-related impacts and provide supporting documentation. Include the nearest coal development areas or coal-using energy complexes to your community and the road miles from your community.

   A. Talen Energy's two-unit 1,400 MW power station located within the City of Colstrip which is 35 miles from Forsyth.

B. Rosebud coal mine produces approximately 8 million tons of coal which is adjacent to the City of Colstrip which is 35 miles from Forsyth.
C. Rosebud Power Generation Station is north of Colstrip (28 miles from Forsyth) within seven miles of the city limits.
E. Forsyth is located in the coal producing county of Rosebud which is also adjacent to the coal producing counties of Musselshell and Big Horn.

B. Degree of Severity of Impact from an Increase or Decrease in Coal Development or In the Consumption of Coal by A Coal-Using Energy Complex

Explain the rapidity of growth or decline and subsequent development of the problem and the number of people affected. (90-6-205(4)(a), MCA) and 8.101.301(2)(b), ARM.

1. Describe the severity of the coal-related impacts including how coal is affecting rates of change in community statistics (e.g., population, employment, property taxes) and provide supporting documentation.

Since the closing of units 1 and 2 at Colstrip, the population of the City of Forsyth has decreased. The overall decrease would be much greater but, in the years following the Covid Pandemic, Forsyth experienced new residents moving into the community because of its' location along I-94 between Billings and Miles City, the vast number of outdoor activities available, and availability of housing. Additionally, a large windfarm project in northern Rosebud County drew temporary workers for a few years' time – some of which have become permanent employees at the new development and reside in Forsyth. Forsyth is also an aging hub. In the SEMDC region of southeastern Montana, it is one of the few communities that has a full transition of housing as people age. It offers Independent Living units for retirees to downsize from larger homes after families are gone, assisted living units, a skilled care facility, and also has a hospital and medical services. This allows the elderly to age in place and not be faced with leaving the community.

Forsyth is home to the second highest number of employees that work at the Colstrip coal mine and power plants which is approximately 35 miles away. It is also the county seat for Rosebud County. Forsyth receives no Coal Gross Proceeds tax revenue although it has been faced with impacts from Colstrip such as the provision of housing and demand for school services, medical services, water, sewer, etc. While it is difficult to estimate the exact percentage that is a result of coal impacts, it can surely be substantiated that Forsyth has been directly impacted by Colstrip and other coal communities through the expansion and contraction of the coal industry and has no real tax revenue from the development to offset impacts.

As the county seat for Rosebud County, Forsyth has endured the boom-bust cycle directly linked to natural resource development for well over 50 years. The local economy is grounded in coal; from mining and extraction to shipping as Forsyth was once one of the switchyards for Burlington Northern and had many Burlington Northern employees in the community. The school and community have benefited tremendously from coal. Well-being and quality of life are directly connected to these economic drivers. Forsyth has been home to many of the seasonal and long-time coal plant and mine workers. Our local businesses have relied on the coal power plant and mine workers to fill hotels, shop at businesses, eat at restaurants, and attend the public school system. In fact, most of our current and important institutional infrastructure is due to coal.

Since 2018, the student enrollment has dropped from 383 students to a current number of 298 - 85 student reduction in 5 years.

2. Is the entire community, or a substantial percentage of the residents of the community seriously affected by the deficiency or at risk, as opposed to a small percentage of the residents? Describe the number or percentage of people and households affected by the problem and that would be served by the project.

The City of Forsyth lacks redundancy throughout the entire water system. The entire distribution system is currently reliant on a single tank with a single 12" AC transmission line connecting the tank to the rest of the system. Having a second tank can ensure that if the current water tank or AC main go down temporarily the community will still have access to water. In addition to redundancy, there is currently no storage in the Upper Zone of the system. Providing storage is recommended to provide superior reliability and fire protection.

Availability of Funds

3. Amount requested from the Coal Board: $200,000

4. Explain why a coal impact grant is necessary to make the project feasible and affordable.

Forsyth is facing some serious infrastructure repair needs at the present time. The city is involved with making some much needed water upgrades/repairs for which a complete PER has been completed. The overall cost of those upgrades was originally estimated at $4 million. The City of Forsyth committed to funding that cost with ARPA funds, other grant programs, and cash reserves. However, that original cost has now escalated to between $5-6 million. Additionally, the City of Forsyth is having to complete a levee recertification required by FEMA. The cost of this project is $6.5 million. To fund the cost of the levee recertification, it is possible a special improvement district will be formed so citizens will pay a portion of the cost. The City of Forsyth has secured grants but needs matching funds of $2 million. Between the water upgrades and levee recertification, the community is facing additional cost burdens for individuals in the way of the special improvement district and a substantial rate increase for water users to help pay for the water projects.

5. What are the other proposed funding sources for the project?

FUNDING SOURCES SUMMARY FOR CITY OF FORSYTH

Source	Type of Fund	Amount	Status of Commitment	Loan Rates & Terms
Coal Board Grant	Grant	$200,000	Pending	N/A
ARPA	Grant	$1,657,579	Firmly Committed	N/A
SLFRF	Grant	$30,183	Firmly Committed	N/A
MCEP	Grant	$219,368	Firmly Committed	N/A
RRGL	Grant	$111,176	Firmly Committed	N/A
City of Forsyth/SRF or Intercap Loan	Cash and/or loan	$1,264,295	Pending	N/A
Total		$3,482,871		

6. If a particular proposed source of funding is not obtained, how will the applicant proceed?

C. Degree of Local Effort in MeetingNeeds

1. Provide the current fiscal year millage rates and those for the three years immediately preceding the year of application. Please state the mill value for each of those three years. Specifically list how many mills and each year's total mill value. If current millage rates given are lower than the average rates levied during the previous three years, briefly explain why they are lower.

The average of the three most previous years of mills levied is 274.84 and the current year mills are 294.30 so the current millage rate is NOT lower than the average of the three most previous years.

24-25	294.30	$2,233,625
23-24	271.88	$2,336,405
22-23	286.72	$2,089,062
21/22	265.91	$2,122,899
20/21	251.38	$2,144,723
19/20	246.03	$2,068,231
18/19	243.50	$2,025,873

2. Describe any local efforts to meet the public facility or public service needs by providing financial contributions to the project to the extent possible, such as local funding, donations of land, absorbing some or all-administrative costs. For non-profit organizations, describe fund-raising efforts or other in-kind assistance to the proposed project as well as usual fund-raising efforts.

The City of Forsyth is contributing a substantial amount to this project via cash reserves and an Intercap or SRF loan. ARPA funding and SLFRF funding allotted to the city are being dedicated to the funding proposal. Additionally, Southeastern Montana Development Corporation is contributing grant writing and administration on behalf of the City of Forsyth. Coal Board funds represent just 5.7% of the total project cost. All other funds are secured other than loan funds for any gap in funding.

3. Describe past operation and maintenance budgets and practices over the long term, including any reserves for repair and replacement.

The City of Forsyth has operated and maintained their system adequately. They also have established reserves for repair and replacement. A growth plan was completed in 2021, and a capital improvement plan was finalized in 2023. The overall analysis of the water system was a recommendation from the capital improvement plan. A PER for that system was initially completed almost simultaneously with the capital improvement plan. This PER ranked the importance, urgency, and estimated costs of the projects. Annually, the City of Forsyth has been able to dedicate approximately $500,000 as a set aside for the water tank project. Unfortunately, the elevated costs seen during the period from 2022 to 2025 have been substantial. Costs are exceeding the ability of the community to generate revenue.

4. If there are indications that the problem is not of recent origin or has developed because of inadequate operation and maintenance practices in the past, explain the circumstances and describe the actions that management will take in the future to assure that the problem will not reoccur.

The upgrades currently planned are not because of inadequate operation or maintenance. The City of Forsyth has maintained and upgraded their water system as they have been able. Forsyth engaged in a complete evaluation of the water system and is planning to make the recommended/required repairs and upgrades. The new water tank, which is only a portion of the project, would be an enhancement to provide adequate fire protection to the Quincer S/D and east end of town as well as redundancy to the whole water distribution system. The City has a budgeting process to ensure that adequate charges are incurred so that reserves can be accumulated for maintenance and debt coverage.

5. If the project involves water, wastewater or solid waste, provide the current and projected monthly household user charges, including operation and maintenance:
   a. What is the current monthly household user charge? $ 2000 gallons or less is $56/mth, Water increases $2.56/1000 gallons after that.
   b. What is the projected monthly user charge (including operation and maintenance) when the project is complete? Approximately $70/month. A complete recommendation is being worked through right now and the user rate increase has not passed yet.

6. What are your current debt obligations?

List current debt obligations. If the applicant is a water, wastewater, solid waste, or other system, which relies on rates and charges for its financial support, only debt related to that system needs be entered. If the applicant is a city, county, or district that relies on general taxing authority for its financial support, or is a not-for-profit organization, debt related to the general obligations of the city, county, district, or not-for-profit organization should be entered.

CURRENT DEBT SUMMARY FOR CITY OF FORSYTH

Year Issued	Purpose	Type of Bond/ Security	Amount	Maturity Date (mo./yr.)	Debt Holder	Coverage Required	Annual Payment Amount	Outstanding Balance
2014	Waste-Water Imp	SRF	$1,624,000	01/01/2034	US Bank		Varies Approx $99,000.00	$777,000.00

7. What are your current assets?
   See Attached **Exhibit C**

8. Is the applicant in compliance with the auditing and annual financial reporting requirements provided for in the Montana Single Audit Act, 2-7-501 to 522, MCA? (Tribal governments must comply with auditing and reporting requirements provided for in OMB Circular A-133).

   Yes x No_____Date of last completed audit or financial report: 06/30/23

9. If there have been audit findings within the last five years, have they been satisfactorily addressed?
YES – any audit findings have been addressed and the City is in good standing.

10. Additional information supporting the DEGREE OF LOCAL EFFORT IN MEETING NEEDS.

The community has put forth a substantial amount of effort securing grant funding, contributing cash reserves, and they will be raising rates to facilitate repayment of a loan for the project as well.

D. Planning & Management

State law (90-6-207(5), MCA) requires the Coal Board to give attention "to the need for community planning before the full impact of coal development or decline is realized. Applicants should be able to show how the request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems." Therefore, pursuant to Sub-Chapter 3 of the Administrative Rules of Montana, Planning is an additional criterion the Coal Board will apply when judging applications.

1. Describe how your grant request reasonably fits into an overall plan for the orderly management of the existing or contemplated growth or decline problems related to coal impacts.

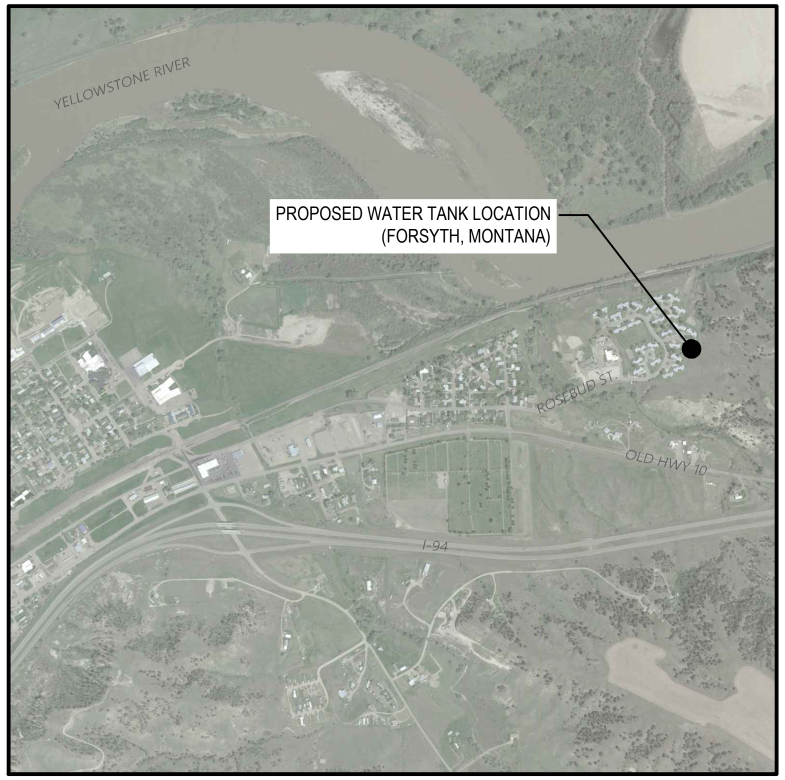
Assuring the City of Forsyth has an adequate and safe water supply fits into plans for either decline or expansion. For years, coal production has been expected to decline but based on figures for the most recent reporting period it has increased 4%. In July of 2018, the level of employment was 3,711 persons and in July of 2023, that level of employment had decreased to 3,352 persons. The decline in the oil, gas and timber industries in Rosebud County has affected the current population through a decline in residents to share the costs of local government services and in the general economic decline of the region. But, more significantly, **there has been a loss of 359 jobs as measured by the level of employment statistics.** This has devastating impacts on businesses, employers, and employees as well as to taxpayers, in general. The economy is suffering, and we have been working to diversify available jobs and build back tax base. Rosebud County has worked to replace some of the tax revenue and commerce lost by facilitating the development of a wind farm in northern Rosebud County. Workers and permanent employees at the facility have found housing in Forsyth and the region. As further value-added energy options emerge at Colstrip, Forsyth will no doubt have increased pressure as it has experienced in the past. There are numerous options for future development since the transmission lines that transport energy are located in Colstrip. A nearing Grid United project will extend those transmission lines through Rosebud, Custer and Fallon counties to facilitate transporting electricity east instead of just west. This will again place Forsyth in the bullseye of housing workers and providing services.

2. Describe how the proposed project is consistent with current plans.

This water tank project is noted in the Capital Improvement Plan (CIP) for Forsyth and providing a safe, adequate and reliable source of water is noted in the Growth Plan as the community moves forward. Additionally, this project is noted on the Southeastern Montana Development Corporation Infrastructure Needs list as a Priority A since adequate fire protection is not available for a portion of Forsyth residents.

Exhibit A

Map



REV NO	DATE	BY	DESCRIPTION

FORSYTH WATER IMPROVEMENTS (TANK & BOOSTER STATION)
CITY OF FORSYTH
FORSYTH, MONTANA

OVERVIEW EXHIBIT

DRAWN BY: SVW
CHECKED BY: --
SURVEYED BY: --
DESIGNED BY: --
PROJECT NO: WR22-00-096.04
DATE: 01/22/2025

Interstate Engineering
1610 Poly Drive
PO Box 20953
Billings, MT 59104
(406) 256.1920
www.interstateeng.com

INTERSTATE ENGINEERING
Professionals You Need, People You Trust.

SECTION
EX
01
SHEET NO.

X:\2022\WR\00\WR22-00-096.04-Forsyth_Water_Tank\20_CADD_WR2200096.04\090_Exhibits\20250122_FSTANK_Tank_Location_Prelim.dwg 1/22/2025

Exhibit B

Updated Cost Estimate

Original PER Completed in 2022

Project	Forsyth Tank and Booster	Proj. No.	WR2200096.04
Subject	Preliminary Opinion of Probable Construction Cost		
By		Date	1/9/2025
Checked		Date	
		Sheet	1

Schedule 1: Water Mains

Item	Description	Unit	Quantity	Estimated Unit Price	Estimated Total Price
101	General Requirements and Mobilization	LS	1	$ 81,000.00	$ 81,000.00
102	Traffic Control	LS	1	$ 15,000.00	$ 15,000.00
103	Temporary Water Service	LS	1	$ 20,000.00	$ 20,000.00
104	Exploratory Excavation	HR	20	$ 400.00	$ 8,000.00
105	Remove Asphalt Pavement	SY	550	$ 12.00	$ 6,600.00
106	Remove Concrete Curb and Gutter	LF	150	$ 20.00	$ 3,000.00
107	Remove Concrete Sidewalk	SF	200	$ 10.00	$ 2,000.00
108	Remove PRV and Vault	EA	1	$ 8,000.00	$ 8,000.00
109	Cap Existing Water Main	EA	4	$ 500.00	$ 2,000.00
110	Connect to Existing 6" Water Main	EA	3	$ 6,000.00	$ 18,000.00
111	Connect to Existing 12" Water Main	EA	1	$ 8,000.00	$ 8,000.00
112	6" C900 PVC DR 18 Water Main (Open-Cut)	LF	700	$ 140.00	$ 98,000.00
113	6" C900 PVC DR 18 Water Main (Horizontal Directional Drill)	LF	250	$ 360.00	$ 90,000.00
114	8" C900 PVC DR 18 Water Main (Open-Cut)	LF	830	$ 150.00	$ 124,500.00
115	6" Gate Valve	EA	2	$ 4,500.00	$ 9,000.00
116	8" Gate Valve	EA	2	$ 5,500.00	$ 11,000.00
117	Fire Hydrant Assembly	EA	1	$ 16,000.00	$ 16,000.00
118	1" Water Service Connection	EA	2	$ 1,500.00	$ 3,000.00
119	1" Curb Stop	EA	2	$ 1,200.00	$ 2,400.00
120	1" Water Service Pipe	LF	160	$ 65.00	$ 10,400.00
121	6" Pressure Reducing Valve and Vault	EA	2	$ 50,000.00	$ 100,000.00
122	Type 2 Trench Bedding	CY	100	$ 100.00	$ 10,000.00
123	Import Trench Backfill	CY	100	$ 50.00	$ 5,000.00
124	Asphalt Pavement Restoration	SY	550	$ 110.00	$ 60,500.00
125	Concrete Curb and Gutter	LF	150	$ 100.00	$ 15,000.00
126	Concrete Sidewalk	SF	50	$ 40.00	$ 2,000.00
127	Concrete Driveway	SF	150	$ 45.00	$ 6,750.00
128	Landscape Restoration and Seeding	SY	800	$ 10.00	$ 8,000.00
Preliminary Opinion of Probable Construction Cost					$743,000.00
Contingency (30%)					$223,000.00
Total Preliminary Opinion of Probable Construction Cost - Schedule 1, Water Mains					**$966,000.00**

Schedule 2: Water Tank

Item	Description	Unit	Quantity	Estimated Unit Price	Estimated Total Price
201	General Requirements and Mobilization	LS	1	$ 159,000.00	$ 159,000.00
202	Site Grading	LS	1	$ 60,000.00	$ 60,000.00
203	Foundation Soil Improvements	LS	1	$ 150,000.00	$ 150,000.00
204	Glass Fused to Steel <u>or</u> Fusion Powder Coated Steel Pedestal Tank	LS	1	$ 600,000.00	$ 600,000.00
205	Electrical Installations	LS	1	$ 50,000.00	$ 50,000.00
206	Inlet/Outlet Piping	LS	1	$ 20,000.00	$ 20,000.00
207	Overflow Piping and Weir	LS	1	$ 10,000.00	$ 10,000.00
208	Mixer	LS	1	$ 60,000.00	$ 60,000.00
209	Passive Cathodic Protection System	LS	1	$ 20,000.00	$ 20,000.00
210	Immersion Heater	LS	1	$ 60,000.00	$ 60,000.00
211	Gravel Surfacing	SY	1,700	$ 50.00	$ 85,000.00
212	Overflow Pad and Ditch	LS	1	$ 10,000.00	$ 10,000.00
213	Chain Link Fence and Gate	LS	1	$ 30,000.00	$ 30,000.00
214	Landscape Restoration and Seeding	SY	1,200	$ 8.00	$ 9,600.00
Preliminary Opinion of Probable Construction Cost					$1,324,000.00
Contingency (30%)					$397,000.00
Total Preliminary Opinion of Probable Construction Cost - Schedule 2, Water Tank					**$1,721,000.00**

Schedule 3: Booster Pump Replacement

Item	Description	Unit	Quantity	Estimated Unit Price	Estimated Total Price
301	General Requirements and Mobilization	LS	1	$ 48,000.00	$ 48,000.00
302	Pump House Interior Demolition	LS	1	$ 50,000.00	$ 50,000.00
303	Install Piping, Valves, Pumps	LS	1	$ 180,000.00	$ 180,000.00
304	Electrical Installations	LS	1	$ 80,000.00	$ 80,000.00
305	Integrated Controls	LS	1	$ 40,000.00	$ 40,000.00
Preliminary Opinion of Probable Construction Cost					$398,000.00
Contingency (30%)					$119,000.00
Total Preliminary Opinion of Probable Construction Cost - Schedule 3, Booster Pump Replacement					**$517,000.00**

Total Preliminary Opinion of Probable Construction Cost - Schedules 1, 2, 3	**$3,204,000.00**

Notes: Engineer's opinions of probable Construction Cost are to be made on the basis of Engineer's experience and qualifications and represent Engineer's estimate as an experienced and qualified professional generally familiar with the construction industry. However, because Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over contractors' methods of determining prices, or over competitive bidding or market conditions, Engineer cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by Engineer.

Exhibit C

Assets

Proprietary funds—Fees are charged to customers for services provided—whether to outside customers or to other units of the government—these services are generally reported in proprietary funds. Proprietary funds are reported in the same way that all activities are reported in the Statement of Net Position and the Statement of Activities. In fact, the enterprise funds (a component of the proprietary funds) are the same as the business-type activities we report in the government-wide statements, but provide more detail and additional information, such as cash flows.

Fiduciary funds—Fiduciary funds are used to account for resources held for the benefit of parties outside the government. Fiduciary funds use the accrual basis of accounting. We exclude these activities from the other financial statements because we cannot use these assets to finance our operations.

THE GOVERNMENT AS A WHOLE

As noted earlier, net position may serve over time as a useful indicator of a government's financial position. The following net position schedule provides a summary of the City's governmental and business-type activities.

NET POSITION:	Governmental Activities		Business-type Activities		Total	
	2023	2022	2023	2022	2023	2022
Current and other assets	$ 3,970,516	$ 3,750,065	$ 2,969,730	$ 2,818,472	$ 6,940,246	$ 6,568,537
Capital assets	2,107,986	2,115,113	3,416,262	3,382,684	5,524,248	5,497,797
Total assets	6,078,502	5,865,178	6,385,992	6,201,156	12,464,494	12,066,334
Deferred outflows	59,246	69,680	94,917	90,984	154,163	160,664
Other liabilities	264,767	457,092	28,685	31,285	293,452	488,377
Long-term liabilities	459,041	411,870	1,633,060	1,502,508	2,092,101	1,914,378
Total liabilities	723,808	868,962	1,661,745	1,533,793	2,385,553	2,402,755
Deferred inflows	24,938	121,350	39,955	158,451	64,893	279,801
Net position:						
Net investment in capital assets	2,107,986	2,100,420	2,493,262	2,389,684	4,601,248	4,490,104
Restricted	2,987,472	2,766,760	-	-	2,987,472	2,766,760
Unrestricted	293,544	77,366	2,285,947	2,210,212	2,579,491	2,287,578
Total net position	$ 5,389,002	$ 4,944,546	$ 4,779,209	$ 4,599,896	$ 10,168,211	$ 9,544,442

The largest portion of the City of Forsyth's net position, $4,601,248, reflects the net investment in capital assets (land, buildings, machinery and equipment, etc.). The City of Forsyth uses these capital assets to provide services to citizens; consequently, these assets are not available for future spending. Although the City of Forsyth's net investment in capital assets is reported net of related debt, it should be noted that the resources needed to repay this debt must be provided from other sources, since the capital assets themselves cannot be used to liquidate these liabilities.

An additional portion of the City of Forsyth's net position, $2,987,472, represents resources that are subject to external restrictions or enabling legislature on how they may be used. A majority of the restricted net position is related to the special projects fund. Fund balance is restricted through the City charter. Additionally, resources are set aside for debt service required for the issuance of revenue related debt. The remaining balance of unrestricted net position, $2,579,491, may be used to meet the government's ongoing obligations to citizens and creditors.

Exhibit D

Support

Letters

Forsyth Development Foundation

Riverview Villa
PO Box 398
Forsyth, MT 59327

January 26, 2025

Montana Department of Commerce
Coal Board
301 S. Park
Helena, MT 59620

Dear Coal Board Members,

I am writing on behalf of the Board of Directors of the Forsyth Development Foundation (FDF). The FDF has leased the old Air Force housing facility from the City of Forsyth for more than 25 years. The property now known as Riverview Villa provides 50+ housing units for retirees. This is not a subsidized facility, but is self-supporting through rent of the units.

The FDF Board of Directors is wholly in support of the City of Forsyth's application for a Coal Board grant for a water tower which will be built on the Riverview Villa site. This project has been in the works for more than 20 years. It will benefit all of the residents on the east end of the City including those living in Riverview Villa.

Please give this project your approval.

For the Forsyth Development Foundation,

Robert Martelle

Robert J. Martelle
President

Southeastern Montana
Development Corporation
www.semdc.org
www.montanamadepossible.com

Southeastern MONTANA Development Corporation
Growing Montana ~ One Job At A Time

PO Box 1935
6200 Main Street
Colstrip, MT 59323
Phone / Fax: (406) 748-2990

January 23, 2025

Dennis Kopitzke, Mayor
City of Forsyth
PO Box 226
Forsyth, MT 59327

Re: Letter of Support - City of Forsyth - MT Coal Board Application

Dear Mayor Kopitzke:

As the Executive Director for Southeastern Montana Development (SEMDC), I am strongly endorsing the Montana Coal Board Grant Application sought by the City of Forsyth. SEMDC fully supports your efforts to improve your **Community Water Infrastructure**, especially the **Water Tank Project**.

As you may know, SEMDC is a regional non-profit economic development group that was formed in 1997 to encourage economic activity in the four (4) Counties of Custer, Powder River, **Rosebud**, and Treasure. Our track record has documented over 1,181 jobs created or retained and nearly $92 million dollars in project assistance since 1997. Since 2005, we have been designated by the State of Montana as a Certified Regional Development Corporation (CRDC) and the federal Economic Development Administration (EDA) as an Economic Development District.

The following are important criteria concerning the **Forsyth Water Infrastructure and Tank Project**:

1) Water Infrastructure and Flood Issues have always been a Significant and Ongoing Challenge in the Forsyth community and have hampered many economic and community opportunities in the past,

2) The SEMDC Infrastructure Needs List has identified Six (6) Water Infrastructure Projects at nearly $18 million in the Forsyth community. The Water Tank project is one of these six,

3) The City of Forsyth has been a Member of SEMDC since 1997 and

4) Public Health and Safety are now at Risk in Forsyth without these needed water upgrades.

Thus, SEMDC strongly supports the City of Forsyth Coal Board application for the Water Tank Project.

Sincerely

Jim Atchison
Executive Director

Preliminary Engineering Report

Water System Improvements

JANUARY 2022
IE#Y21-00-152

INTERSTATE ENGINEERING

PO Box 20953 / 1211 Grand Ave., Ste. 6
Billings, Montana 59102

I, Lowell J. Cutshaw, hereby certify that this Preliminary Engineering Report was prepared by me or under my direct supervision. I further certify that I am a Registered Professional Engineer under the Laws of the State of Montana.

PRELIMINARY

____

Date ______January 13th, 2022__________

Table of Contents

Figures

Tables

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EXECUTIVE SUMMARY

ES-1: INTRODUCTION

The city of Forsyth has an excellent record for providing high quality water to its residents. The 2019 Sanitary Survey attributes this to both good operations and the city's commitment to providing upgrades as needed.

Despite excellent operations, jamming of the intake pipe occurred in 2011 and 2013. Quick actions by the operations staff allowed the city to install temporary pumping while the city worked to clear the blocked pipe. In 2013 this process took over 6 weeks. It was indeed fortunate that the loss of the intake line occurred in the spring and not during the winter when the river may freeze over completely making access for temporary pumps dangerous, if not impossible.

Fear of losing the intake pipe during a winter when the river would be frozen led to the hiring of Interstate Engineering to carry out a Preliminary Engineering Report (PER) to find a long-term solution. The PER has grown into a comprehensive study looking at all water system assets including treatment, storage and distribution.

Concurrent with the development of this PER, the city has begun a program for replacing hydrants and valves, along with replacing curb stops where leaks are known. In addition, the city developed a comprehensive short-lived assets list, and its funding is planned within this PER. Funding for the short-lived assets replacement amounts to roughly half of the suggested rate increase.

ES-2: BACKGROUND

Lack of groundwater quantity and its poor quality have forced the city to use a surface water treatment plant. Surface water treatment is more costly in capital, operations and management than the use of groundwater.

The basic water intake system was constructed in 1931, around the time of the construction of the Cartersville Dam. This dam provides roughly 8 feet of water above the intake pipe. This distance protects the intake from ice flows and the flow of timbers during floods. There have never been any screens for the system, but a simple an open pipe extending from the riverbank.

The intake building, constructed in 1931, was upgraded in 1976, though the original caisson that forms the wet well has been in place since 1931. The 1976 project placed a new concrete floor atop of the 1931 floor, but that new floor's support depends on the 1931 supports. In addition, a hanging lower section is also suspended from that same floor and old supports. Photographs of the supports are alarming due to the readily seen advanced corrosion of the supports and exposed reinforcing bar.

In 1999, a dive crew filmed the pipe interior and a diver video-taped the exposed pipe end at the river's edge. Corrosion was seen and an off-set or damaged joint was found at the location where the 22.5-degree elbow is located. The exterior of the pipe was found to be in relatively good condition, and it is noted that the pipe produced prior to 1950 was over twice as thick as that produced today. Divers have been used by the city in clearing the intake pipe.

ES-3: BASIC FINDINGS

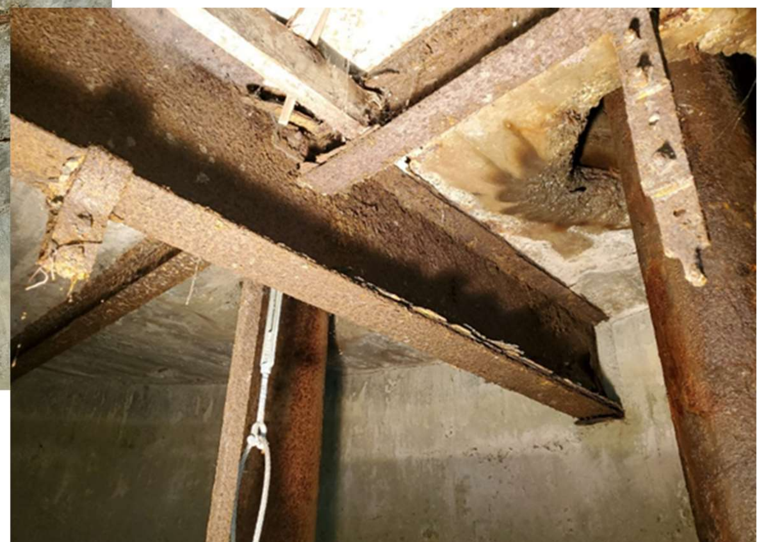
The PER begins by examining the environmental resources present. This is significant for this project since work may be required within the Yellowstone River and within the existing levy that protects the city. The appendix includes supporting correspondence and provides an environmental review record for the recommended first phase of construction.

The PER found that the population of the city has fluctuated throughout the past century, peaking around 1980 at 2,553. However, population has since decreased, and is currently estimated at 1,647, though this is thought to be a high estimate as many coal and railroad-related jobs have recently been lost in the area. The PER establishes two populations for use in the study. First, a slight increase in population is used when estimating water system improvements. However, when calculating user rates, it is assumed that the decreasing population trend will continue. In this manner, the city can protect itself from decreasing numbers of rate payers.

A major finding of the study is the very high water leakage, which actually averages approximately 35% of all water produced by the plant during the winter months. Main breaks, as would be expected, are fairly common. The city is served almost entirely by Asbestos-Cement (AC) pipe located in soils that are corrosive to (leach) cement. The pipe, believed to have been installed in the 1960s, is well past the 50-year life.

The PER found that the controls system for the water treatment plant is now obsolete. The manager notes that the manufacturer no longer provides replacement parts. In operating a surface water treatment plant it is imperative that the system have proper controls for ensuring high-turbidity water is never released into the system, and that filters, clarifiers (tube settlers) and chemicals are all operated for optimal quality. Release of high-turbidity water exposes the users to potential contamination from serious bacteria and protozoa such as giardia, or cryptosporidium. In addition, the system must present dependable alarms for operators to be notified immediately of any system failure. The PER concludes the full replacement of the control system is imperative. Such a change will also provide for better energy efficiency as variable frequency drives (VFDs) are proposed for the pumps.

The intake structure was found to be in very poor to dangerous condition.
Figures on the following page show the advance corrosion.



Figures ES–1, 2 Advanced Corrosion to Intake Floor Supports

Figure ES-3 (Right)–Precarious Lower Level Suspended from Floor Above

Figure ES–4 (Below)-Offset Joint to 1931 Intake Pipe

The greatest need was found to be replacement of the floor in the intake and protecting the intake from future clogging. The PER goes into great detail examining options for improving or replacing the intake system. River morphology was examined in Section 2.4.3 using records and maps as early as 1968 and a series of aerial photographs beginning in 1985 (See Appendix O). This research was essential for determining appropriateness of the current intake location. The existing location has been determined to be optimum. The presence of the Cartersville dam provides excellent water depth.

ES-4: ALTERNATIVES CONSIDERED AND SELECTED

The PER examined several options for pipeline replacements, finding AWWA C900 pipe to be the optimal material. Open-cut trench installation was found to be the best method of installation. Ductile iron pipe with petroleum-resistant gaskets would be used where petroleum product may be found at documented or un-documented leaking underground storage tank sites. The minimum pipe size is proposed at 8-inches due to lack of savings in using a smaller pipe and much greater expandability of 8-inch over 6-inch. Larger pipe was found necessary for the line in Oak Street where all water from the plant enters the distribution system. This area experiences high flows and currently as much as 10 psi is lost in this first section of pipe if all pumps are running at the WTP. Loss of that pipe would eliminate the only connection from the WTP to the distribution system.

The above fundamentals were incorporated into the pipeline recommendations included as Alternate **AC-2, full AC pipe replacement**. Due to the extremely high cost of pipeline replacement, AC-2 is subdivided into several phases.

As noted previously, the **full replacement of controls at the WTP** is needed as soon as possible as the existing system is obsolete and replacement parts are no longer produced. There were no reasonable alternatives found other than full replacement.

The existing Upper Zone booster pump station has only one service pump and one fire pump. However, the fire pump cannot be operated. Shortly after the pump was activated in October 2021, the power meter blew up and the power company had to install a temporary power line while the Upper Zone residents lost pressure. This booster station was installed in the 1980s and still has the original pumps. Since there is only one operational pump, the net firm capacity of the booster station is zero (0). Alternated **BP-3 provides an upgraded booster station, a relatively small, elevated water storage tank is proposed, and a generator**. This configuration guarantees maintained pressure and allows for expansion of the Upper Zone to include the Quincer Subdivision, where pressures can drop below 35 psi. The PER examined alternatives from the 2009 PER in which this improvement was originally proposed through an alternative analysis. The recommendation from the 2009 PER was reviewed and is concluded as valid; with only minor modifications made by this PER. Excerpts from the 2009 are included in the Appendix.

The land surrounding the existing 1 million gallon (MG) water storage tank is eroding. The PER finds that it would be money well-spent to provide some erosion control measures around the tank now, before the hill that supporting ground erodes any further. This is a very low-cost item (**ST-2, Phase 1**, less than $25,000) that did not warrant great detail in discussion.

Work at the intake was examined in detail. First, different alternatives were considered for the in-river portion of the intake system (IR- Alternatives). It was found that the main force in jamming of the intake pipe was the unnecessarily high velocity with which water is drawn into the wet well. **All options included adding VFDs and more appropriately sized pumps to maintain a slower intake velocity**, which should prevent gravels from building up inside the pipe. Sands and sediment may still enter the pipe, and a blow-down system is included in all of the on-shore (OS-) alternatives. It is worth noting here that the controls at the WTP need to be upgraded so the plant can run during the night, allowing for the slower velocity at the intake.

For in-river scenarios where no screen is placed in the river, use of a tee was found sufficient to limit intake velocities to 0.5 ft./s on peak day, as is recommended by the state (**IR-A**). In options where a screening system would be installed within the river (similar to Glendive and Laurel) option **IR-B** is used for the in-river system and no tee is necessary.

Several alternatives were examined for constructing a new intake pipe. Concerns with the deep open cutting and dewatering through the levy led to the examination of using horizontal directional drilling (**HDD**) to place the pipe into the river and then tie into the intake structure. This solution (**IP-3**), was actually lower in cost than open-cutting a trench, even when using divers to assist in the placement of the pipe.

After conclusively determining that the existing location was ideal for the intake, six options were examined in detail for the full system. Each of the alternatives include the new intake pipe (IP-3) except for OS-8. Figure ES-5 (shown later) shows the location of all intake alternatives that were considered in detail. Many more are discussed in Section 4.

A summary of intake alternatives examined in detail are presented in the following table.

Table ES- 1 Intake Alternatives Considered in Detail

Alternative	New On-Shore Structure	Rehabilitate Ex On-Shore Structure	Screens Within On-Shore Structure	IR-A Add Tee at End Of Intake Pipe	IR-B In-River Structure with Screens	IP-3 New Intake Pipe Using HDD
OS-4	X		X	X		X
OS-5	X				X	X
OS-6		X	X	X		X
OS-7		X			X	X
OS-8		X		X		
OS-8P		X		X		X
All Alternatives include a blow-down line, new pumps, and at least a new operations floor and roof						

The evaluation process does not consider capital cost as much as the Net Present Value, which includes the salvage value after 20 years. Mechanical components would have an expected life of 20 years and, although the true life of all pipe and structural work should be 80 to 100 years, a net life for all components is estimated at 40 years. Even when limiting the life to 40 years, the Net Present Value analysis gives very high weight to the salvage value since the discount rate is actually -0.1%. For practicality, the following table is provided to show the true capital cost, allowing the reader to know how much would need to be invested today for funding each alternative.

Alternative	Capital Cost	NPV with Salvage Value	NPV w/o Salvage Value	Screens Included?	New Intake Pipe Included?
OS-4	$ 3,210,000	$ 1,578,250	$ 3,151,485	X	X
OS-5	$ 4,139,000	$ 2,051,943	$ 4,080,485	X	X
OS-6	$ 1,949,000	$ 935,272	$ 1,890,485	X	X
OS-7	$ 3,330,000	$ 1,639,438	$ 3,271,485	X	X
OS-8	$ 1,002,000	$ 421,977	$ 913,061		
OS-8P	$ 1,610,000	$ 731,994	$ 1,521,061		X
All Alternatives include a blow-down line, new pumps, and new operations floor and roof					

Table ES- 2 Intake Alternatives Costs

Noting that costs are a major concern to any city, the final evaluation of alternatives weighted costs as half of the total evaluation. Environmental concerns weighed about 20% of the total alternative decision-making process.

Table ES-3 shows the decision matrix used to determine the best solution for the city of Forsyth, all factors considered. For a full discussion on how factors are chosen and weighted, see Section 5.2 and discussion of the "Triple Bottom Line" evaluation.

Based on the decision matrix, the recommended intake alternative was OS-6. The chosen alternative will keep the existing wet well structure but provide a new roof and floor. The system will also add screens to protect pallid sturgeon fry from entering the system and, by keeping organics lower, should also assist with taste and odor control. Sump pumps will be used to keep sediment under control and decrease the need to enter the wet well in the future. In a break from the more common practice of placing screens within the river, screens are proposed to be place in the onshore structure.

ALTERNATIVE DECISION MATRIX FOR FORSYTH INTAKE
(INCLUDES LIFE CYCLE COSTS WITH SALVAGE VALUES)

CRITERIA-->	Technical/Construc Feasibility		Environmental Impact		Financial Feasiblity (NPV)		Public Health and Safety		Operation and Maintenance		Aesthetics & Pub Pref		
WIEGHING FACTOR->		4		10		25		3		4		4	
ALTERNATIVE	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	**TOTAL**
OS-4	9	36	9	90	2.3	56	9	27	10	40	9	36	**285**
$1,578,250													
OS-5	9	36	7	70	1.0	24	9	27	9	36	7	28	**221**
$2,051,943													
OS-6	7	28	9	90	4.9	124	9	27	10	40	9	36	**345**
$935,272													
OS-7	7	28	7	70	2.4	60	9	27	9	36	7	28	**249**
$1,639,438													
OS-8	3	12	5	50	9.0	226	4	12	3	12	3	12	**324**
$421,977													
OS-8P	6	24	6	60	5.6	141	9	27	10	40	9	36	**328**
$731,994													

Table ES- 3 Intake Alternatives Decision Matrix

Figure ES-5 shows the location of the selected alternative OS-6 and the other alternatives considered in detail.

Figures ES-6 and ES-7 show the simplified plan and profile views of the Intake rehabilitation. Final design may change the layouts, but the drawings below provide a general guide. Sump pumps (not shown) will discharge to an existing pipe leading to the sludge drying beds. The controls area has been separated from the main floor area due to concerns with humidity, helping extend the life of the controls. The same room would house the compressor with the separation providing some sound protection to workers in the main floor area.

The intake improvements include connecting to the new intake pipe and providing a second wall pipe. that second penetration would allow for easy connection to a potential second intake pipe, placed higher that would draw water during very high-water periods (May – June). This option of providing a wall penetration and pipe during Phase 1 is relatively low-cost at this juncture since the system will be exposed for installation of the new intake pipe below. However, it is believed that other improvements such as the blow-down system and reducing inlet velocity will be sufficient to avoid clogging issues in the future, and the higher intake pipe will hopefully never be required. Figure ES-8 shows locations of all Phase 1 components.

Figure ES - 5 Intake Alternatives' Location

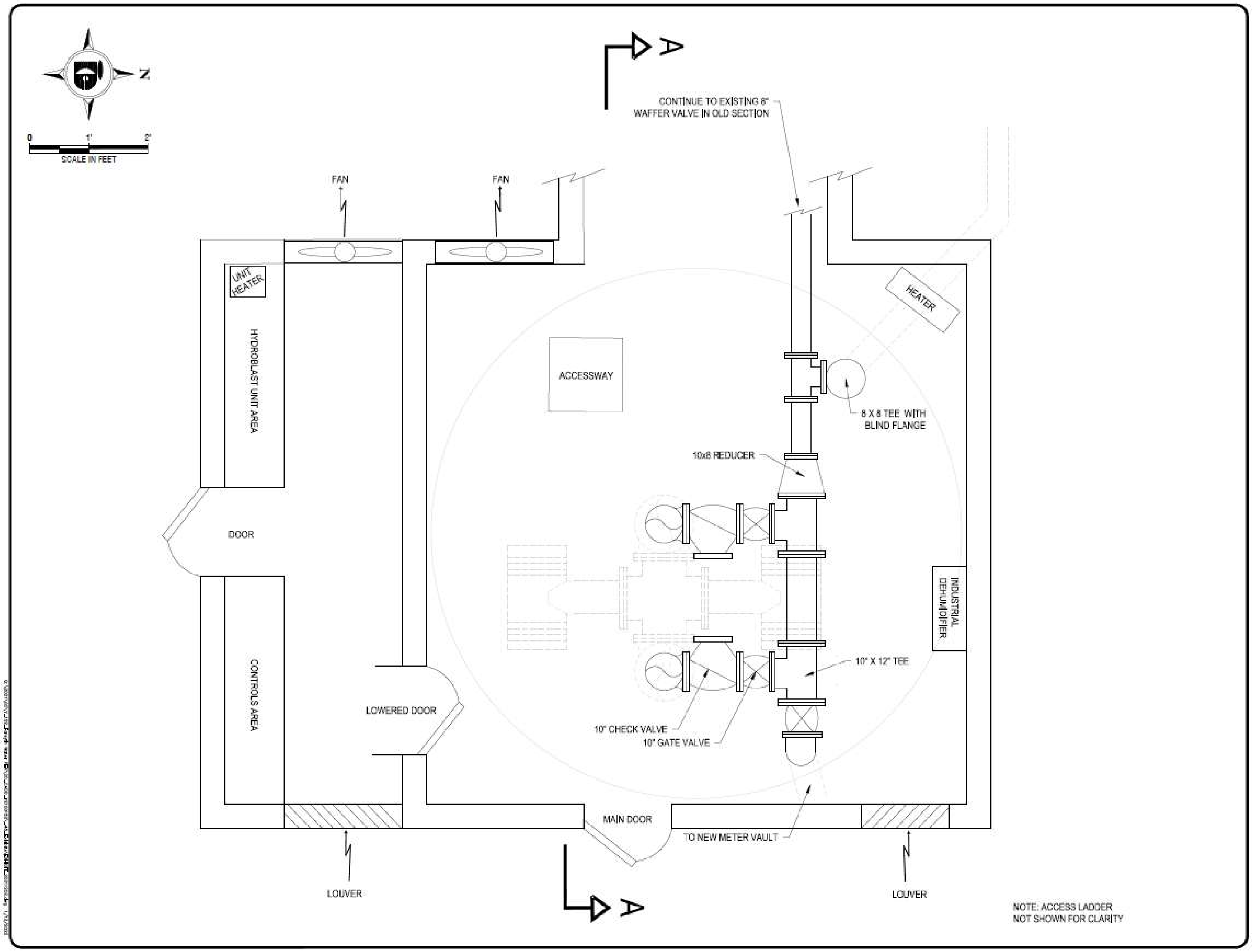


Figure ES - 6 Chosen Alternative Plan Schematic

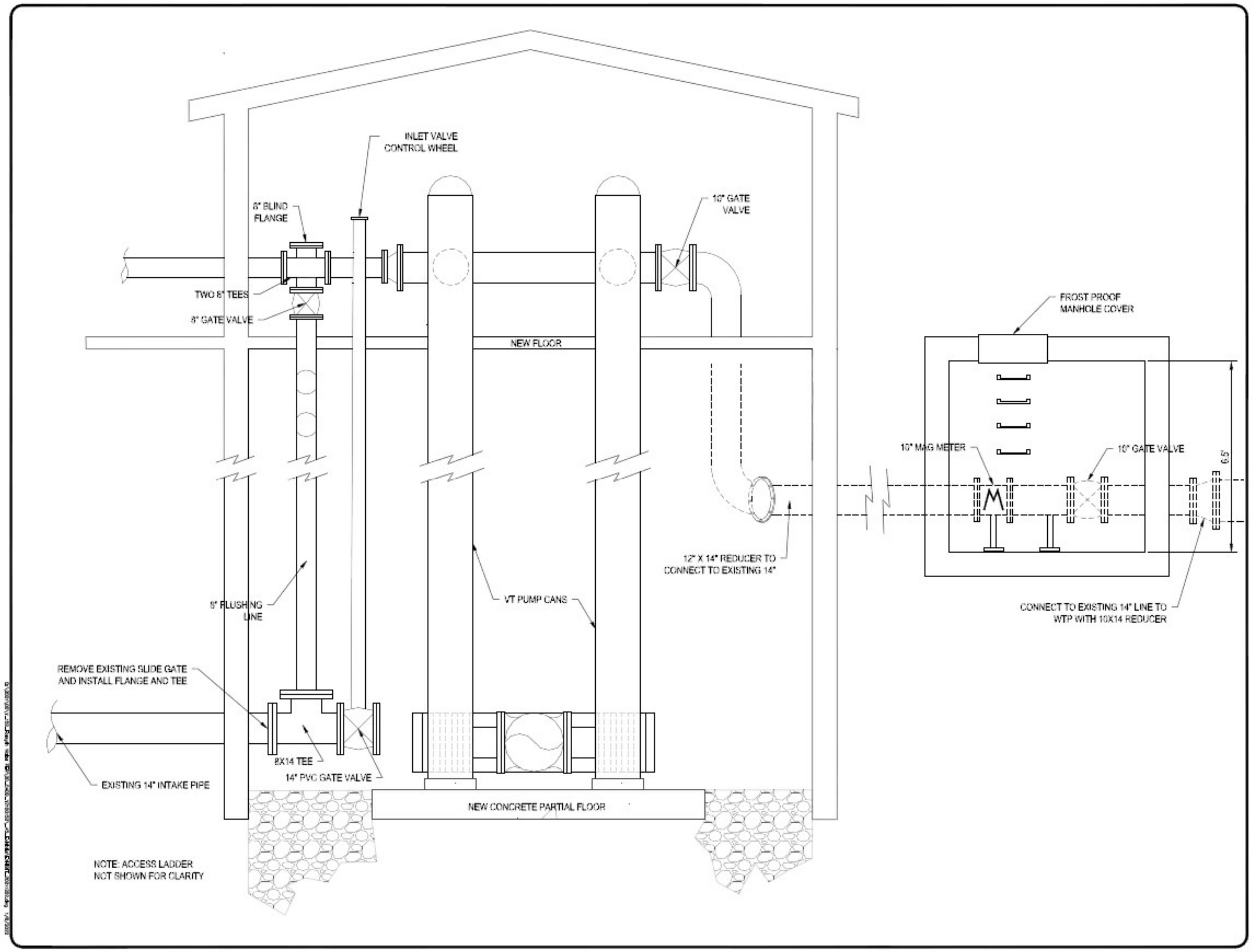


Figure ES - 7 Selected Alternative Profile View

Figure ES - 8 Locations of Phase 1 Components

ES-5: IMPLEMENTATION

Costs associated with full pipe replacement were quite high. To correct all deficiencies in one project would not be realistic due to extremely high resulting user rates. For this reason, it was necessary to implement improvements based on immediacy of the need. The project is therefore to be constructed in phases. Phasing also presents the advantage of optimizing the leveraging of funds for grants.

Costs for each phase are presented in Section 6. Capital Costs for the first phase is presented below in Table ES-4

PHASE 1 - FORSYTH WATER SYSTEM IMPROVEMENTS					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	Alternate OS-6 (Intake)	LS	1	$ 1,360,000.00	$ 1,360,000.00
2	Furnish and Install WTP Control System	LS	1	$ 700,000.00	$ 700,000.00
3	Alternate AC-2, Phase 1 (Oak St Pipe Replacement)	LS	1	$ 57,470.00	$ 57,000.00
4	Alternate ST-2, Phase 1 (Erosion Control at the Existing Water Storage Tank Site)	LS	1	$ 23,760.00	$ 24,000.00
5	Alternate BPS-3 (Booster Station, 80k Elevated Storage Tank, and Pressure Zone Expansion)	LS	1	$ 1,094,000.00	$ 1,094,000.00
Preliminary Opinion of Probable Construction Cost					$3,235,000.00
Contingency (15%)					$485,000.00
Geotech					$25,000.00
Design Engineering					$324,000.00
Construction Engineering					$453,000.00
Legal and Admin					$81,000.00
Total Preliminary Opinion of Probable Project Cost					**$4,603,000.00**

Table ES- 4 Phase 1 Cost Summary

Detailed costs are presented in Section 4. A proposed **schedule** for phase 1is included in Section 6, Table 6-5.

Phase 1 will:

- Provide a long-term, **dependable water source** by providing a new intake pipe and renovations to the intake building, along with its pumping and screening system.
- Provide **new controls at the WTP** to provide a long-term solution to management of the water production facility, which is currently in a precarious state since it may be impossible to replace any components that fail as the manufacturer no longer supports that antiquated system.
- Provide a **start of the AC pipe replacement program**, including a critical pipe that leads from the WTP to the distribution system in Oak Street where

there is a sharp loss in pressure is experienced. Loss of this pipe would be disastrous to the community as there would be no means of routing water to the community or storage tank. In addition, a problematic section of pipe would be replaced in the NW section of the city.

- Provide a new **booster station with generator** to be installed at the existing booster station site and provide **80,000 gallons in elevated storage**. These improvements will prevent the loss of pressure that is experienced during a power outage. The new system will expand the Upper Zone (higher pressure) to include the Quincer subdivision, which currently can experience pressure drops below the DEQ standard of 35 psi.
- Although not part of Phase 1 specifically, the rate increase associated with Phase 1 also **includes the funding of replacing short-lived assets**. That work will include repair of valves, which will be important for later pipeline replacements by allowing for better isolation of pipe sections. This fund and schedule is presented in the appendix and includes replacement of all mechanical components (pumps, control valves, etc.) appropriately scheduled. Having a fund for continuous replacement program is paramount to a true long-term solution.

Costs for phases 2 through 4 are included in Section 6. Phase 2 would add important improvements to the distribution system and include the lining of the 1 MG storage tank interior. Phases 3 and 4 include the remainder of the pipeline replacement. Practicality may require that Phase 4 be broken up into yet more phases as dictated by financing

Potential funding plans are presented in Table ES-5. The preferred funding package is highlighted in yellow. However, grants don't always pan out. Although the preferred scenario would only require a rate increase of approximately $12.44, the city has been advised, and is actively seeking, to increase rates to approximately $14.50. Roughly half that amount is needed for the short-lived assets replacement program. See the appendix for the resolution regarding financing of phase 1 and short-lived assets replacement.

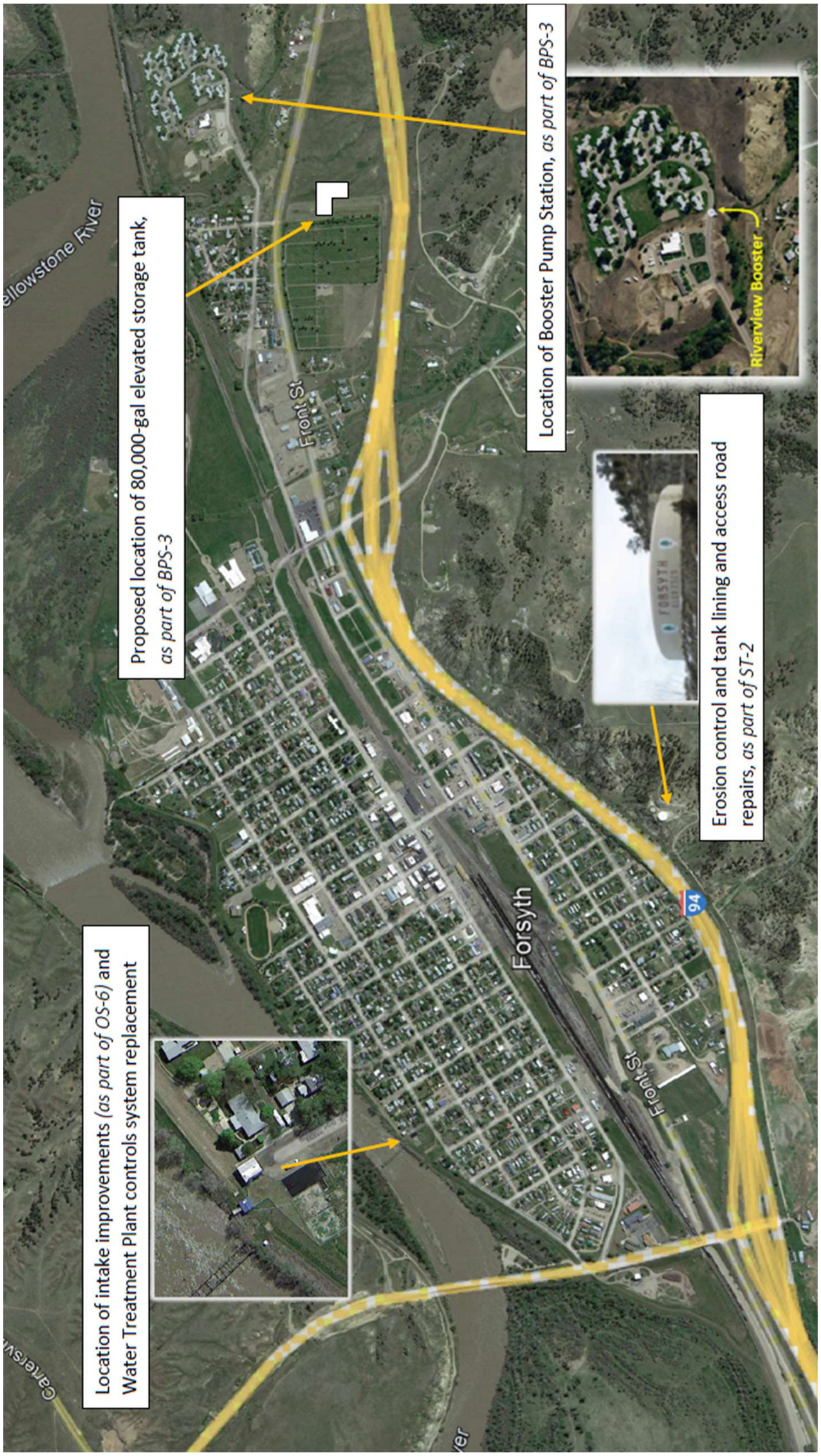


Figure ES - 8 Phase 1 Improvements Map

Forsyth Phase 1 Funding Plan							
loan interest rate =	2.75%			term in years =			20
Total Capital Cost-->	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00
Funding Plan	ARPA $2M, DNRC-RRGL Grant, MCEP, Coal Board, $250k City	ARPA $2M, DNRC-RRGL Grant, MCEP, $200K City	ARPA $2M, MCEP, $200K City	ARPA $2M, $250K City	ARPA only	ARPA $2M, MCEP, Coal Board, DNRC, $250K City	Loan, $250k City, Dedicated Funds
ARPA	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	
Local Fiscal Recover Funds	$428,549	$428,549	$428,549	$428,549	$428,549	$428,549	$428,549
Minimum Alocation Grants	$420,652	$420,652	$420,652	$420,652	$420,652	$420,652	$420,652
Coal Board	$100,000					$100,000	
City Cash	$250,000	$200,000	$200,000	$250,000		$250,000	
DNRC	$125,000	$125,000				$125,000	
MCEP	$500,000	$500,000	$500,000				
LOAN Base	$778,799	$928,799	$1,053,799	$1,503,799	$1,753,799	$1,278,799	$3,753,799
Loan Reserve and Orig Fees	$27,258	$32,508	$36,883	$52,633	$61,383	$44,758	$131,383
Bond Council/Legal	$31,152	$37,152	$42,152	$60,152	$70,152	$51,152	$112,614
Total Loan for Forsyth*	$806,057	$961,307	$1,090,682	$1,556,432	$1,815,182	$1,323,557	$3,885,182
Total Project cost	$4,630,258	$4,635,508	$4,639,883	$4,655,633	$4,664,383	$4,647,758	$4,734,383
Annual Cost Summary:							
Loan Payment	$52,935	$63,131	$71,627	$102,214	$119,206	$86,920	$255,147
Loan Reserve Coverage at 10%	$5,294	$6,313	$7,163	$10,221	$11,921	$8,692	$25,515
Total Increase for Debt Service/yr	$58,229	$69,444	$78,790	$112,435	$131,127	$95,612	$280,661
O&M Change per Year (slight reduction, but add Compressor Power)	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Short-Lived Assets (annual replacement cost)--See Appendix	**$94,867**	$94,867	$94,867	$94,867	$94,867	$94,867	$94,867
Total annual Increase	**$154,096**	**$165,311**	**$174,657**	**$208,302**	**$226,994**	**$191,479**	**$376,528**
EDUs (assumes slight decrease in paying population)	1032	1032	1032	1032	1032	1032	1032
Cost/EDU/yr	$149	$160	$169	$202	$220	$186	$365
Cost/EDU/mo	**$12.44**	**$13.35**	**$14.10**	**$16.82**	**$18.33**	**$15.46**	**$30.40**
total ARPA Requested	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$0**
ARPA Construction Match	**$2,630,258**	**$2,635,508**	**$2,639,883**	**$2,655,633**	**$2,664,383**	**$2,647,758**	**$3,885,182**
Expended Funds for Project							
Preliminary Engineering Report (PE	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Total ARPA Match	**$2,680,258**	**$2,685,508**	**$2,689,883**	**$2,705,633**	**$2,714,383**	**$2,697,758**	**$3,935,182**
Total Project Cost	**$4,680,258**	**$4,635,508**	**$4,639,883**	**$4,655,633**	**$4,664,383**	**$4,647,758**	**$3,885,182**
Match Contribution Committed as Percen	**57.3%**	**57.9%**	**58.0%**	**58.1%**	**58.2%**	**58.0%**	**101.3%**
Note that DWSRF interest rates are now at 2.5%. Using the more conservative 2.75% does not change match value							

Table ES- 5 Phase 1 Funding Options

The PER was presented to Council at their XXX meeting, then again at a public hearing XXXX, 2022. The Council voted to approve the PER on ______________

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SECTION 1 PROJECT PLANNING

1.1 Problem Definition

The city of Forsyth is the seat of Rosebud County in Eastern Montana, located approximately 100 miles west of Billings along I-94. The city has provided water and sewer services and provided upgrades as required. Unfortunately, the water intake system for the city has been damaged both by age (corrosion) and by impact from debris passing along the Yellowstone River. Inspection video shows damage to the pipe leading from the river to the wet well, which appears to be an offset joint. The end of the pipe appears to be an open mechanical-joint bell-end with no screening.

Of particular concern to Forsyth is the filling-in of the 100-year-old cast iron intake line from the river, which occurred in 2011 and 2013. The intake has been out of use for periods of 6 to 7 weeks. The city has been able to have a pump distributor provide pumping from the river as a temporary fix while the city worked to unclog its intake pipe. Fortunately, this did not occur when the river was completely frozen over, when water access through the ice would have been at best very dangerous, or worst, impossible. There are no alternate water sources. Loss of water would present a huge public health problem with no water in which drink or flush waste.

In addition to failure of the intake pipe, the structural integrity of the intake's onshore pumping facility is also a major concern. Repairs or full replacement of the intake system is the city's highest priority due to public health and safety concerns.

The water distribution system is nearly all asbestos-cement (AC) pipe. Gradual leaching of the cement in the AC pipe leads to brittleness and failures. The life of AC pipe is generally accepted as 50 years (see excerpts from an HDR study included in the appendix). Breaks have become frequent in Forsyth's AC pipe, even in locations with a 6 – 6 ½-ft bury. Operators note that the pipe was installed in the 1950s or 1960s, making it 50 – 70 years old. A summary of the many breaks is given in Section 2 that includes 13 break events (some with more than one break/leak found) from 2008 to 2015. Milder winters have led to fewer breaks recently, but the leaching of cement from the AC pipe will likely lead to a sharp increase once the area experiences a harsh winter (soil heave is likely responsible for the actual breaks of the weakened pipe).

Another concern is the condition of the Riverview Booster Station. This lift station is poorly designed with an undersized hydro tank and it's one supply pump running 24-hours per day at very low frequency (VFD never reaches 40 Hz). The large (40 HP) fire pump is not used due to concerns of its power draw. That large pump was run in October of 2021 for the first time in over a decade and there was a subsequent explosion of the electric power meter. Northwest Energy cited the city for the repair costs, saying the damage was caused by the pump. That loss of the meter and power led to complete loss of water and pressure to the entire Riverview Villa Retirement Community for a day, presenting a serious health hazard where contamination could enter the system at any leak-point. There is no backup water supply pump, only an unusable fire pump.

The city has been able to keep its aging water treatment system in operation with major upgrades in 1976 and 1993. The controls for the water treatment plant (WTP) are quite old and it is no longer possible to obtain replacement parts from the manufacturer (Allen Bradley RSLogix SLC500 system). Spare parts must be found from now defunct systems elsewhere.

There are also concerns with the chlorination system, where a leak in 2018 injured an operator, sending him to the hospital for treatment (he was released that day). The issue was corroded circuitry that caused the heater to come on and stay on, leading to higher pressure in the chlorine gas vessels and the inevitable leakage. Ventilation and heating controls need to be revised to avoid another injury.

The water storage tank has had regular inspections, the most recent inspection documenting the need for new coating and noting structural concerns with the roof. In addition, the hill that the tank sits on erosion prone and lacks stabilization.

In summary, the main issues facing the city's water system are:

- Deteriorating 100-year-old cast iron intake pipe
- Clogging of the intake (rendering it inoperable for up to 7 weeks)
- Safety concerns with the deteriorating onshore structure
- Very high breakage frequency in the distribution system's old AC pipe
- Zero (0) firm capacity at the Riverview Booster Station (no backup pump)
- No fire protection at the Riverview Villa Retirement Community (no storage, single fire pump is not operational)
- Unusable valves and hydrants in the distribution system
- Unsafe chlorination room
- Obsolete controls at the WTP
- Eroding soils around the water storage tank

- Existing water storage tank requiring coating and repairs
- The road up to the water storage tank can become impassable at times

Concerns associated with the intake led to the hiring of Interstate Engineering, initially to conduct a Preliminary Engineering Report (PER) concentrating on the intake. However, upon early investigation it has been found necessary to also examine the Riverview Booster Station, distribution system, storage and the water treatment plant (WTP)

1.2 Location

Forsyth, Montana lies in Rosebud County, along Interstate 94, at the junction with Montana Highway 12. Forsyth exists as one of the few population hubs in Montana's greatest oil producing region (mainly being Richland and Fallon counties).

Technical locations are as follows:

- Coordinates: 46°15'59'N 106°40'40'W
- County: Rosebud
- City Range: 40E and 41E City Townships: 6N
- Elevation 2,520 ft
- Area: 1.17 sq miles
- Water Treatment Plant and Intake: NW ¼, S23, T06 N, R40 E

Nearly all of Forsyth's population is situated on a relatively flat area bordering the Yellowstone River to the north and broken hills to the south. Interstate 94 runs along the SE portion of the city.

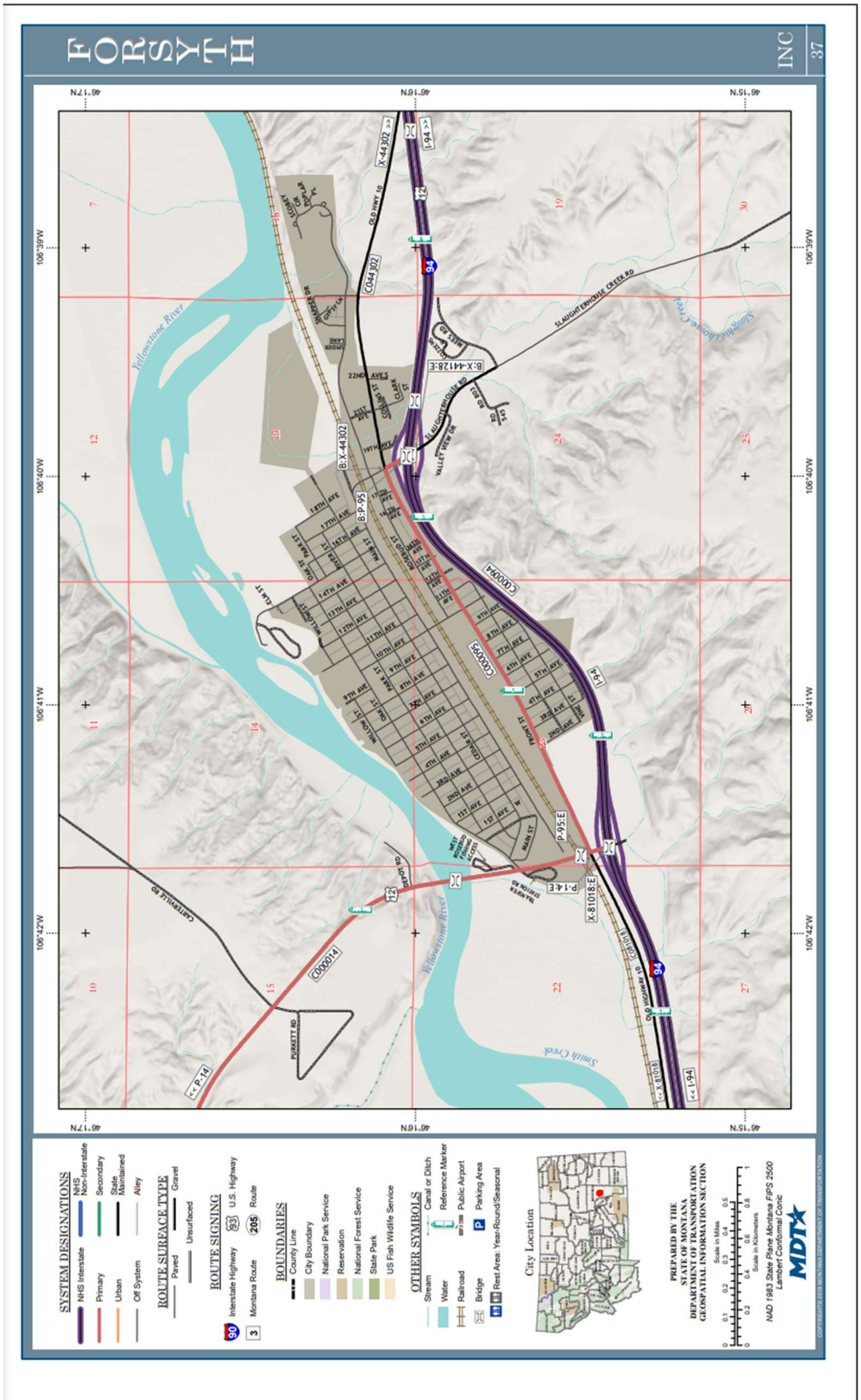

Figure 1-1: Forsyth City Limits

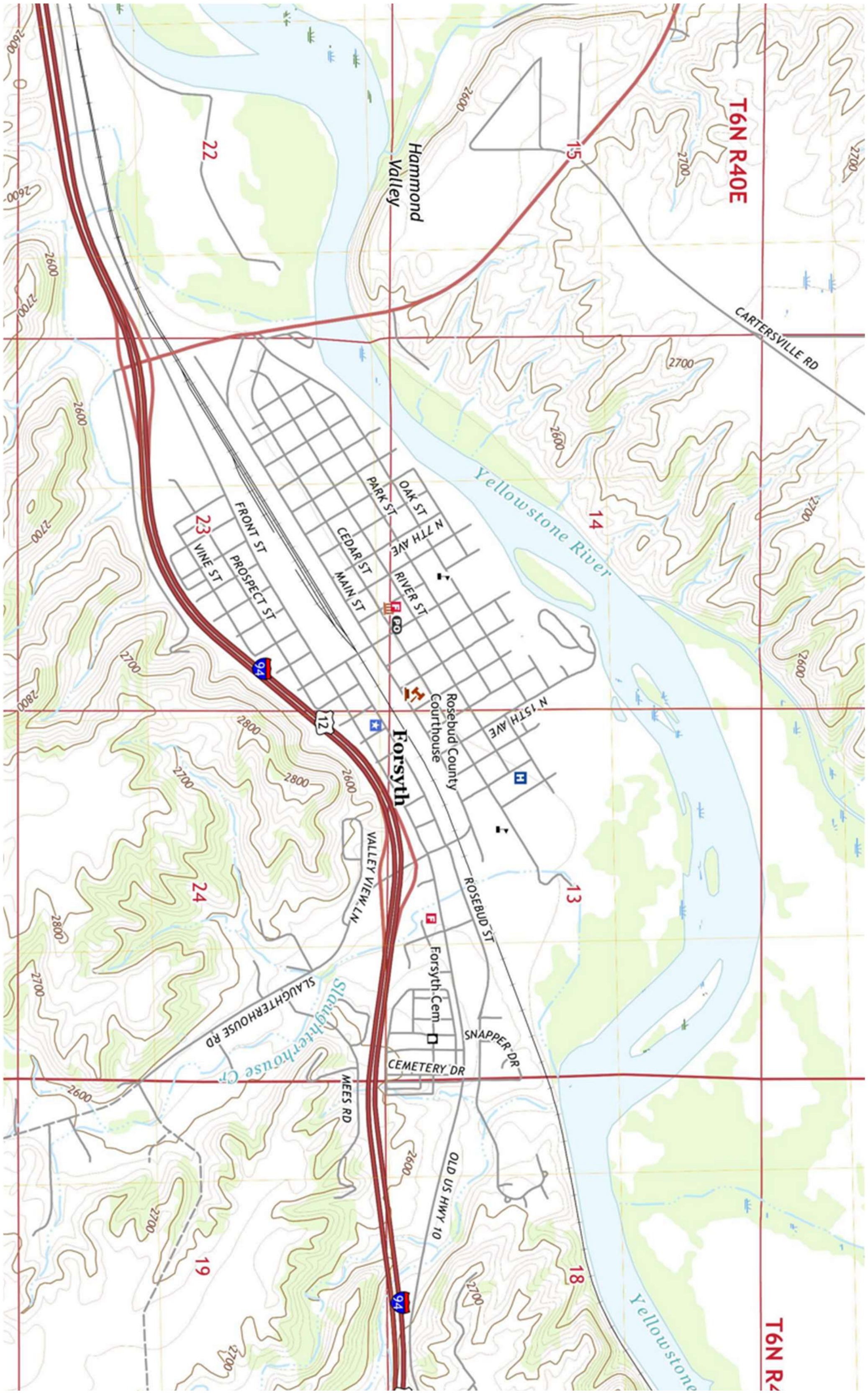

Figure 1-2: Forsyth Elevations per USGS Topographic map, 2020

1.3 Environmental Resources Present

The following subsections provide a brief description of the environmental resources within the project and the city.

This project could impact the environment to varying degrees, depending on the chosen alternative for the intake. This report found that the chosen alternative would have no long-term significant impact, assuming no unforeseen issues are identified after the discovery phase of the intake design.

The current intake system has no inlet grate/mesh/etc., to protect Pallid Sturgeon or any other aquatic wildlife from entering the system, other than the pump inlet screens which might not protect against entrance of the smallest fry. Any improvement to this system would be done in accordance with Pallid Sturgeon protection requirements and would thus decease the potential for environmental damage caused by the existing water intake.

The least impact alternative would be one where there was not a need to disturb the river more than once, and an alternative that protects the Pallid Sturgeon—a concern noted by the USFWP. Avoidance of cofferdams would also be better for the environment.

Due to the nature of the intake portion of the project, the USFWP, USEPA and the Army Corps of Engineers provided a very detailed discussion of potential impacts. Those letters, along with data from the USDA NRCS, were used extensively in the research for this section of the report.

1.3.1 Land Use

Forsyth sees irrigated farmland along the north bank of the Yellowstone River to the west and east of town. Once removed from the river bottom flat lands, the surrounding hill country sees a mix of dry land farming and broken rangeland. The town was gradually constructed around the railroad that splits the city into NW and SE halves. Interstate 94 runs along the southeastern edge of the city and is the interstate highway connecting the oil resources within the state and through North Dakota.

No land will be converted to a different use as part of any proposed improvements.

1.3.2 Surface Water

The Yellowstone River constitutes the northern edge of Forsyth. The river supplies the city and surrounding agricultural areas with irrigation and municipal water. Less than a mile downstream from the Forsyth Intake and

Water Treatment Plant, Cartersville Dam & Irrigation Canal serves to divert irrigation flow to downstream agricultural operations. The Cartersville Dam is an earthen dam spanning the entire river acting to decelerate and divert natural flows while allowing the river to overtop and continue flowing downstream without continued human monitoring/control. This dam was constructed in the 1930s by the Cartersville Irrigation District.

Proximal to the city, Slaughterhouse Creek, Smith Creek, Armells Creek, Big Porcupine Creek, and multiple additional small, seasonal drainages empty into the Yellowstone River. The Yellowstone remains the only navigable river in the area.

Any work within the Yellowstone River (hereafter referred to as the river), would require permitting from the State DNRC, as well as the Army Corps of Engineers (ACE). Work at the existing intake structure would also require a permit from ACE due to its location on the riverbank.

During construction for the proposed project, in addition to the DNRC and ACE permits, the Contractor will be required to prepare and maintain a Stormwater Pollution Prevention Plan (SWPPP) that will identify Best Management Practices (BMPs). These BMPs will be implemented throughout the project to minimize erosion and soil movement due to wind and precipitation.

Please see Appendix A for environmental-related correspondence with various agencies that may have an environmental or cultural concern.

1.3.3 Groundwater

There are wells around Forsyth, but all are very low yielding. Review of the Montana DNRC GWIC site show several wells over 10 gpm, but research into the actual well logs showed that the sustainable yield was very low. For example, a 1943 well drilled for the city went 352 feet and had no yield (some flow was encountered at shallower depth, but low production and not considered suitable for drinking). This is perhaps why the city has remained using surface water.

The LDS Church well indicates a yield of 20 gpm on the GWIC site. However, the well log shows that it was tested at 20 gpm for 3 hours, but during those 3 hours, the well dropped from 120 ft to 225 feet, very near the bottom of the well. Thus, the actual sustainable yield would be far less than 20 gpm. Two wells were constructed for the Town & Country Club, each showing a yield of 20 gpm, but again, the 20 gpm was only tested for 2 hours, and there was significant change in water level.

The well log for the Weslyn Church well indicated 50 gpm yield (the highest found in research). However, that well was *tested* at 50 gpm for 2 hours and during that time dropped from 8 feet to 18 feet—but the well was only 21 feet deep. Such a test simply shows that a sustainable yield would be far less than 50 gpm at that elevation and location.

No water quality data was found for the groundwater, other than a mention of hardness in the 1943 well log, but the lack of use of wells for drinking water shows that there is no desire for using the area's groundwater. The same has held true for nearby Hysham, an even smaller community that also continues to use surface water.

Due to very low yields and public distaste for the groundwater in the region, wells would not be considered an appropriate alternative for the water system.

Groundwater elevation can be a problem with utility work, particularly for deep sewer lines. The depth of groundwater is seasonal, and this should be taken into consideration during bidding. Based on drill logs, the level can be as high as 7 feet below ground level.

Groundwater in areas of pipeline replacement can vary throughout the seasons. Soil borings should be conducted on new large-scale pipeline replacement projects and compared with other soils reports that may have previously been conducted in the vicinity during other seasons. Contractors bidding any project should be provided with as much seasonal data on groundwater levels as possible.

See Section 2.4.1 for additional discussion of water rights.

1.3.4 Riparian Habitat/Stream Morphology

Montana Fish, Wildlife, & Parks returned a single page letter, dated December 15, 2021, providing locations of two nearby eagle nest and detailing permitting requirements for work done within the river. USFWS provided Interstate Engineering with a 6-page letter, dated November 30, 2021, listing threatened and endangered species in the region and well as wildlife protection guidelines to be considered during project design and construction. These letters are included in Appendix A and will be referenced throughout this study, particularly regarding environmental and wildlife concerns.

The morphology of the river is extremely important with regard to committing public dollars to a new intake or rehabilitating the existing intake. Maps were found from 1968 through the present and will be displayed in Section 2.4.3

when evaluating the best location for the intake. In short, it was found that the channel that includes the existing intake has been extremely consistent over the past 50 years, and judging from the fact that it was the selected site (likely around 1910) and was never changed, it is concluded that the site has been ideal for over 100 years. The inlet pipe from the river has not been removed or acted on during those 100+ years. The pipe was filmed in 1999 and 2004 and inspected by divers. The quality of the 2004 filming (that included diver-filmed footage) was fairly high quality and, though there is an offset joint between the intake building and the river, the end of the pipe appears to have been undisturbed for its 100+ year history.

Outside of the intake project, further work would take place within existing city rights-of-way.

1.3.5 Floodplains

The city of Forsyth falls under FEMA FIRM panel 300070B. The intake and water treatment plant are included within this area. The surrounding area, outside of Forsyth city limits is considered “Rosebud County Unincorporated Areas” under FEMA FIRM 300069 with the stretch of river directly bordering the town being delineated as FIRM panel 3000690028B. Rosebud County does not have a published Flood Insurance Study (FIS) to reference for floodplain elevations within the project area.

Work at the intake would be expected to be within the floodplain, and flow-way. Any structures constructed as part of any project would be required to rise 3 feet above the floodplain and provided with the proper protections for any portion below that level. Any intake construction project will require review and approval of the floodplain administrator.

1.3.6 Public Health

It is not anticipated that this project will negatively impact public health, but only have positive impacts. The loss of the existing intake would be catastrophic to the city. This would not only stop production of water for drinking, but also water used for flushing toilets and other sanitary needs and all fire protection.

Persons living in the Riverview Villa Retirement Community, at the southeast-most portion of the city, are entirely dependent on a booster station for their water. There is no water storage in this Upper pressure zone and the large fire pump is inoperable. Furthermore, there is only one service pump available and no back-up power. This booster station lost power in late 2021, causing the area to lose pressure and go without water until an emergency powerline could be placed.

The continuing breakages and repairs of AC pipe throughout the city creates low-pressure situations in which contamination may enter the city water supply through leak-points.

Continued erosion around the existing Forsyth Hill water storage tank presents an ongoing public health and safety. A structural failure of the tank itself or the existing transmission pipe leading to the tank would directly threaten the interstate highway as well cause a loss of consistent water service and fire protection city wide until repairs could be made.

1.3.7 Air Quality: Clean Air Act

Construction activities may present very minor short-term air quality concerns due to emissions from construction equipment and dust caused by the movement of equipment. Best management practices will be used to control air quality issues during any construction. All construction equipment will be required to comply with Federal and Local emissions standards. If the equipment must travel on gravel roads, the Contractor would be required to apply water to the roads to minimize the creation of dust.

Upon completion of any new structure, project site would be seeded to help prevent erosion or the formation of blow dust and soils.

Once construction is complete, no additional impacts to air quality are anticipated.

1.3.8 Odor

No odor issues are anticipated.

1.3.9 Solid or Hazardous Waste

Generation of new hazardous wastes from an intake construction project is not expected. If the chosen alternative involved elimination of the existing onshore structure, concrete from the demolition of the existing intake might or might not be usable as rip rap, depending on whether or not the old concrete from pre-1930's contained reinforcing bar (rebar). However, looking ahead in this report, it was not recommended that the old structure be demolished.

AC pipe that is exposed during the replacement of the line will need to be bagged and hauled to an appropriate landfill that accepts this waste. The only other additional waste is packaging from the materials that will be incorporated into any of the proposed projects. This waste is similar to household waste and proper disposal consists of placing the waste in a landfill. Any solid waste generated during construction including garbage waste and AC pipe will be the responsibility of the Contractor to remove and dispose of properly. Maintenance of the job site would be covered in project specifications.

1.3.10 Socio-Economic Issues

The city of Forsyth is being hit with economic hardships related to both coal and the railroad, as well as due to cancelation of income-generating events due to the COVID pandemic.

The Southeast Montana Development Corporation (SEMDC) has documented losses of jobs due to the closing of the BNSF switchyard and the decrease in coal production and demand.

US Census Bureau data compiled for Forsyth and Rosebud County was used along with SEMDC data to provide socio-economic information. This data includes demographics (see Section 1.4 for population trends), employment, and income.

The table below provides the latest income and target rates available from the Montana Department of Commerce as of 11/15/2021. Target rates will be covered in much greater detail later in this report.

Selected Geography	Forsyth city
Associated County	*Rosebud County*
Population	1,495
Total Households	720
Median Household Income	$41,328
Low & Moderate Income Percent	35.4%
Percent Poverty	13.4%

Target Rates

Water & Wastewater	$79.21
Water Only	$48.22
Wastewater Only	$31.00
Solid Waste Only	$10.33

The benefits of a reliable intake will serve the entire population equally. The pipeline replacements will best serve those in the communities where the improvements are made, but also better protect all customers from potential contamination that can occur during pipeline repairs. Protection of the water storage facility impacts all citizens. Work at the Riverview Booster Station will primarily assist those living in the Riverview Villa Retirement Community, but also decrease the chances of contamination in the entire

City and avoid having an out-of-control fire within the city that could spread elsewhere.

This project will likely be paid for through grants and long-term loans from the State of Montana and federal government. Repayment of the loan will be accomplished through the system user rates.

1.3.11 Permits Required

A building permit from the State of Montana would be required for any new structure. Plans of all improvements, including pipeline replacements will require approval by the Montana Department of Environmental Quality.

The Contractor will be required to prepare and maintain a Stormwater Pollution Prevention Plan (SWPPP). This plan will be submitted to the State for review and comment before it is implemented.

The USFWP letter includes requirements for careful coordination with specific state and federal agencies (see the following sub-section and Appendix A for the entire letter).

Correspondence form the Army Corps of Engineers notes that a permit will be required for work for any structure or work in, over, under or affecting the Yellowstone River. All proposed work to take place in or around the Yellowstone River will be permitted as required by the Department of the Army (See Appendix A for correspondence). Principally, work addressing the existing intake system will be subject to permitting as it relates to its intrusion on the Yellowstone River.

It should be noted that the recent intake constructed in Laurel that included a large cofferdam in the Yellowstone and several miles of pipeline did not require an EIS. Many of the above are discussed further elsewhere within these subsections of Section 1.3 and covered through the Environmental Checklist and Environmental Review Record (See Appendix A).

A Joint application may be made for the Conservation District 310 permit, the USACE 404 permit, MTFWP SP 124 Permit, MT DEQ 318 (turbidity) Authorizations, County Floodplain Administrator floodplain permit, and MT DNRC Navigable River Land Use License. A copy of that Joint Application is included in Appendix A.

1.3.12 Wildlife, Threatened and Endangered Species and Fisheries

Section 1.3.4, above, discusses the correspondence received from USFWS. The complete letter (6 pages) is available for reference in Appendix A. The item of highest consequence to the project as it currently stands is protection of Pallid Sturgeon within the Yellowstone River. Accordingly, the following excerpt from USFWS is included:

"Pallid Sturgeon occur in the Yellowstone River downstream of Forsyth. The Cartersville Dam generally functions as a barrier to upstream migration by this species and the City's existing intake structure in upstream of this dam. We recommend that if a new intake structure is proposed, it be located upstream of Cartersville Dam. We also recommend that any improvements to the existing or construction of any new intake structure include screening to minimize the potential for entrainment or impingement of native fishes (including pallid sturgeon in the event that Yellowstone River conditions or future recovery actions allow passage of the species into the project area). We also have the following general recommendations to minimize the potential for effects to pallid sturgeon:

- *Avoid in-channel work in the Yellowstone River. In unavoidable, conduct such work outside of the May 15 -July 15 pallid sturgeon migration and spawning season.*
- *Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.*
- *Avoid filling, channelizing, or degrading streams, floodplains, and wetlands.*
- *Implement sediment, erosion, and contaminant control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible)."*

These above recommendations/requirements will be met when designing and constructing improvements to the existing intake infrastructure.

Further discussion is provided regarding the protections of migratory birds and Bald and Golden Eagles. While these recommendations will be followed at all times, these animals are not particularly threatened by the work proposed in this report.

The same can be said for the other two threatened of endangered species listed as occurring in Rosebud County, Montana: Whooping Crane and Monarch Butterfly. Precautions will be made to protect these species, but conflicts are not anticipated due to the nature and location of the proposed work.

The area to be disturbed does not include Sage Grouse habitat (see map provided in Appendix A), which includes the city of Forsyth as an exempt community.

1.3.13 Parks & Rec/Historic Sites/Cultural Inventories/Open Spaces

See Section 1.3.18 for specific listings of registered historic features.

Upstream from the intake and WTP is West Rosebud Park and Fishing access. Downstream from the intake and WTP is East Rosebud Park with campground and fishing access. Both recreation areas, and their associated boat traffic, must be accounted for during any proposed construction along or in the river.

1.3.14 Wild and Scenic Rivers

The Yellowstone River is the longest non-dammed river in the United States. Review of the USFWP letter and Section 1.3.12 previously presented demonstrates the importance of this river to the environment, particularly with regard to fish and wildlife.

Impact of the river requires careful consideration whenever choosing an alternative for the intake. In addition, noting that there are many boats and sportsmen using the river, the final intake configuration must include consideration of boater passing over (as with the existing submerged system) or around (as needed for the crib and barrel-type system such as used by Billings) the portion of the intake within the river, and minimizing sedimentation release during and after construction. See also Section 1.3.12 for information about important spawning times for the Pallid Sturgeon (May – June). Although those times coincide with the heaviest river flows and would not be a preferred time for divers or contractors to enter the river, the restrictions associated with that timeline and the Pallid Sturgeon should be included in final design plans.

As will be presented later in this PER, maps and aerial photographs have been reviewed for a timeline covering the past 50 years.

See also Section 1.3.11 previously for additional discussion of working in the river.

1.3.15 Energy

Short term energy consumption for the proposed project is estimated to be minimal. Energy consumption will consist of fossil fuel consumption by construction equipment and/or transportation of workers and divers, which will be temporary.

No change in the long-term energy consumption, other than some savings associated with the use of variable frequency drives (VFDs) on the pumps.

1.3.16 Soils Geological Conditions

See the topographic map presented earlier for contours in the Forsyth area. See Appendix A for soils data and soils maps. The text below provides excellent information on the area geology and portions italicized are inserted from the Source Water Delineation and Assessment Report of 2002 geographic setting, geology (p 5 – 7):

*"**Geographic Setting***

Forsyth is located in the non-glaciated Missouri Plateau portion of the Great Plains physiographic province of North America (Rocky Mountain Association of Geologists, 1972). This area is also designated as the non-glaciated central ground-water region of the United States (Heath, 1984). The elevation at Forsyth is approximately 2,526 feet above mean sea level and the town is located immediately next to the Yellowstone River (Figure 1a and 4). The Yellowstone River valley is about one-half mile wide at the town location and a little more than a mile wide on either side of Forsyth. Topographic relief in the vicinity of Forsyth is low with highlands rising about 200 to 300 feet above the river valley. Many of the creeks and tributaries to the Yellowstone have moderately incised channels.

Geology

This section provides an overview of the geology and hydrology of the vicinity of Forsyth. Reports used for this section include Lewis and Roberts (1978), Stoner and Lewis, 1980, and Vuke et al (2001). The geology of the area can be used to determine the locations, boundaries, and hydraulic properties of local aquifers. An understanding of hydrogeologic conditions also provides an explanation for the sensitivity of local aquifers to potential contamination sources. Geology is not just important for understanding the hydrologic conditions related to ground water but it is also valuable for public water supplies that use surface water. For example, the timing and runoff patterns of streams are influenced in part by the geology within a watershed. Watersheds with large areas of low hydraulic conductivity bedrock tend to respond quickly to precipitation and snowmelt events. Hydrographs from streams within such a watershed show numerous high flow peaks or spikes. On the other hand, streams within watersheds underlain by bedrock that has high hydraulic conductivity tend to have more subdued hydrographs, that is, fewer and more rounded high flow peaks. Infiltration of precipitation and snowmelt waters makes the high flow events rise more gradually and have more rounded peaks. Surface water quality can also be affected by the geology within a watershed and *information in this section can be useful for gaining a better understanding of factors that control erosion and sedimentation.*

Unconsolidated alluvium is present in the Yellowstone River valley and in many of the tributaries to the Yellowstone. The alluvium consists of lenses of unconsolidated clay, sand, and gravel. As much as 25 feet of alluvium is present in the Yellowstone River valley and up to 13 feet is present in some of the tributaries in the neighborhood of Forsyth (Vuke et al (2001). The Yellowstone River alluvium yields economic quantities of water to wells and in most places represents an unconfined aquifer. Terrace deposits are also present within the main river valley and the tributaries. Some of the terraces are between 2 and 350 ft. above the streams and are considered to be Quaternary age, ranging from Pleistocene to Recent (Vuke et al (2001). These terrace deposits consist of gravel, sand, silt, and clay and range in thickness from 15 ft., to as much as 50 ft. in some places. Other terrace deposits are present above the Quaternary terraces. The higher terraces are considered to be Tertiary in age, ranging between Pliocene to Pleistocene (Vuke et al, 2001). The older terrace deposits consist of up to 30 ft. of gray gravel and sand. As in other areas of Montana, the terrace deposits can yield water to wells, particularly if agricultural irrigation water is applied on the upper terrace.

Bedrock exposed at the land surface in the vicinity of Forsyth ranges in age from Upper Cretaceous to Recent (Vuke et al (2001). South and northeast of Forsyth, the Fort Union, Hell Creek, and Lance formations dominate the landscape. The Fort Union can be up to 1,000 feet thick in the area and can be divided into three members in descending order: the Tullock, Lebo Shale, and Tongue River. There are outcrops of red metamorphosed sedimentary rocks within the Fort Union Formation southeast of Forsyth. These beds are referred to as "clinker" and formed when underlying coal beds were ignited and baked the sandstone, siltstone, and shale beds. In some places the heat was so intense that the overlying rocks were metamorphosed into rock resembling volcanic rocks known as scoria. The Hell Creek Formation (Upper Cretaceous) is below the Fort Union, ranges between 200 and 300 feet thick, and contains beds of silty shale, mudstone, sandstone, and coal. Generally, the Hell Creek is more fine grained and contains less coal than the overlying Fort Union. Sandstone beds are more abundant in the lower part of the Hell Creek Formation. The Lance Formation lies between the Hell Creek and Fox Hills formations in this area. The Lance consists of medium grained sandstone lenses interbedded with shale. A conglomerate unit is located near the base of the Lance. The

Lance can be up to 300 feet thick. The Fox Hills Formation (Upper Cretaceous) lies below the Lance and is marked by a light-colored sandstone bed ranging in thickness from 30 to 150 feet. The sandstone is known as the Colgate Member and is present over large areas in this region. The lower part of the Fox Hills is made up of sandstone, sandy shale, silty shale, and carbonaceous shale. Thickness of the entire Fox Hills is up to 200 feet thick in this area.

The Porcupine Dome is located north of Forsyth. Within the center and along the flanks of the Porcupine Dome there are older Cretaceous formations exposed at the surface including the Fox Hills Formation, Bearpaw Shale (also known as the Prairie Shale in some locations), Judith River Formation, Clagget Shale, and Gammon Shale. All of these bedrock formations consist of complex mixtures of sandstone, siltstone, shale, and coal. With the exception of the Porcupine Dome where bedrock formations dip between 4 to 6 degrees, bedrock is relatively flat-lying.

An examination of well logs in the area indicates that some wells are completed in the Cretaceous bedrock formations. These wells tend to be deep, greater than 100 feet, and yield smaller amounts of water than shallower wells completed in the alluvium. Generally, there are four primary aquifers in this area that include: 1) the alluvial and terrace deposits within stream valleys, 2) the upper 200 feet of the Fort Union Formation, 3) sandstone beds within the lower Fort Union Formation, and 4) the lower Hell Creek – upper Fox Hills Formation (Colgate Member). Sandstone beds within the Lance Formation would be included in group 4. Water from formations below the Bearpaw or Pierre Shale tend to have high total dissolved solids and are too saline for domestic and stock water use."

See Appendix A for maps showing the corrosivity of the area soils to steel and to concrete.

The consistency of the river channel at the existing intake site has been demonstrated through the past 100+ years by review of maps and noting the longevity of the intake system for decades prior to the oldest map located.

Some erosion at the intake site has taken place as can be seen from aerial views of the vicinity. However, the earliest intake portion was a low-river-level direct inlet made of concrete. Additional concrete in the area appears to be protecting the area. The 1931 addition was constructed on the south side of the circa-1910 structure, set back at least 30 feet from the river during high water. That earlier structure provides erosion protection.

Beyond the intake, proposed pipeline replacement project locations consist principally of flat residential areas. One additional stretch of pipe exists in a very steep area. This length of pipe connects the existing Hilltop Storage Tank to the distribution system.

1.3.17 Vegetation, Noxious Weed Control

The existing vegetation at the intake site consists of native and planted grasses and shrubs, with parkland and man-made structures in the vicinity of the Intake. Other improvements recommended in this report take place within city limits in areas that have been previously developed.

When disturbing some vegetation for grading and construction activities, the topsoil supporting the vegetation will be stockpiled and protected from erosion and weeds during construction. Once construction is complete, the topsoil will be restored and new vegetation will be seeded. The area will be protected from erosion and weeds until the new vegetation is established to match its surroundings. Procedures will be specified in the contract documents to prevent the transplant of noxious weeds to the project site during construction work and/or monilization.

1.3.18 Cultural Resources

Feature Name	Type	Street Address	NR #	Date Listed
Forsyth Bridge	Site	3rd Ave. at the Yellowstone River	90000090	2/11/1990
Forsyth Water Pumping Station	Building	3th Ave. at the Yellowstone River	90000087	2/11/1990
Herman and Hannah Anderson House	Building	209 S. 7th Ave.	90000084	2/11/1990
Brotherhood of Locomotive Engineers Hall	Building	262 S. 7th Ave.	90000086	2/11/1990
Claude O. Marcyes House	Building	390 S. 7th Ave.	90000088	2/11/1990
Blue Front Rooming House	Building	1187 Main St.	90000085	2/11/1990
First Presbyterian Church and Manse	Building	1160--1180 Cedar St.	90000089	2/11/1990
Rosebud County Courthouse	Building	1250 Main St.	86000807	4/16/1986
Rosebud County Deaconess Hospital	Building	N. 17th Ave.	79001425	11/15/1979
Forsyth Main Street Historic District	District	Roughly bounded by Cedar St., 11th Ave., Main St. and 8th St.	90000081	2/11/1990
Forsyth Residential Historic District	District	Roughly bounded by Cedar St., 11th Ave., Willow St., 12th Ave., Oak St., and 14th Ave.	90000082	2/11/1990

Table 1-1 Registered Historic Places in Forsyth

According to Montana's National Registry of Historic Places, the Forsyth Water Pumping Station (NR # 90000087) and the no-longer-used Forsyth Bridge (NR # 90000090) are registered historic features within the project area. Within Forsyth city limits, there are an additional seven (7) registered historic features alongside two registered historic districts. A table shown below detailing each feature.

Letters of Inquiry were sent out to the Montana Historic Preservation Office (SHIPO). A response was received from Damon Murdo of SHiPO (see Appendix A).

It is SHPO's position that any structure over 50 years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. This would include the existing intake structure. Accordingly, the structure should be preserved if found to be in good enough condition as not to present a hazard. This would be determined during the final design. If the structure were to be significantly change or destroyed during construction, coordination with SHiPO will be required.

If the Contractor discovers any previously unknown cultural resources, work will be stopped immediately, and the appropriate historical society will be notified before work resumes.

1.4 Population Trends

Population trends for project become an important aspect in terms of facility sizing and adequacy of its components, conveyance, and treatment. The Montana Department of Commerce provided historic population data for Forsyth, including 2020 Census data.

The design year will be set as 20 years from the date of completion of construction. Considering funding timelines, it is estimated that any construction would occur in or around 2024, after all plan and environmental approvals, bidding, construction, and close-out is completed. Thus, **the 20-year design year is established as 2045, the year following full project completion.**

The population in Forsyth peaked in 1980 at 2,553 before steadily shrinking to 1,647 in 2020. Table 1-2, below, shows the yearly population fluctuations for the city of Forsyth over the past 20 years.

The 2011 population spike can be attributed to regional growth due to oil expansion in the Bakken and Baker areas. A countering sharp decrease was found in 2020 as the boom days ended and the railroad cut jobs resulting from the BNSF closing of their switchyard.

As previously discussed, the project is being driven by the elements outlined in Section 1.1 of this Chapter. Population trends are important to consider in terms of the current facilities and growth/decline populations that the area is experiencing.

Table 1-2 City and County Historical Populations

FORSYTH HISTORICAL POPULATION			
CENSUS YEAR	POPULATION	10-YEAR CHANGE (%)	ANNUAL AVERAGE CHANGE (%)
1910	1398	-	-
1920	1838	31.5%	2.77%
1930	1591	-13.4%	-1.43%
1940	1696	6.6%	0.64%
1950	1906	12.4%	1.17%
1960	2032	6.6%	0.64%
1970	1873	-7.8%	-0.81%
1980	2553	36.3%	3.15%
1990	2178	-14.7%	-1.58%
2000	1944	-10.7%	-1.13%
2010	1777	-8.6%	-0.89%
2020	1647	-7.3%	-0.76%

ROSEBUD COUNTY HISTORICAL POPULATION			
CENSUS YEAR	POPULATION	10-YEAR CHANGE (%)	ANNUAL AVERAGE CHANGE (%)
1910	7985	-	-
1920	8002	0.2%	0.02%
1930	7347	-8.2%	-0.85%
1940	6477	-11.8%	-1.25%
1950	6570	1.4%	0.14%
1960	6187	-5.8%	-0.60%
1970	6032	-2.5%	-0.25%
1980	9899	64.1%	5.08%
1990	10505	6.1%	0.60%
2000	9383	-10.7%	-1.12%
2010	9233	-1.6%	-0.16%
2020	8329	-9.8%	-1.03%

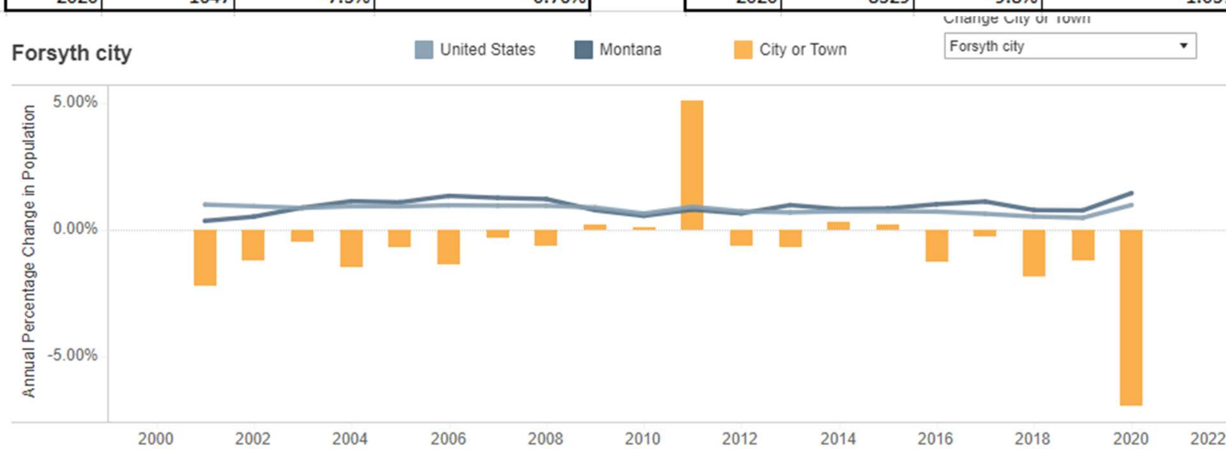

Figure 1-3: Recent Forsyth population trends, 2000-2020

Another population boom may or may not occur in the more central Bakken areas, but likely not for Forsyth where support for the oil industry was relatively minor. Forsyth has always been more impacted by coal, which is not expected to see significant increases in production in the foreseeable future.

The loss of railroad jobs associated with the closing of the switchyard are also not likely to be revived.

It is essential not to overestimate populations when calculating user rates. If a Town must incur additional debt for needed improvements, it is important that there be enough users over the remaining after 20 years to be able to pay off that debt.

<u>Population does not play a major role in sizing waterlines or storage.</u> Pipeline sizing is largely dictated by fire flows, which are quite a bit higher than peak

day or even peak hourly flows. The population will largely control the average water usage rate for the year, and in particular usage from October through May. Summer water system usage is largely dictated by lawn watering, which also strongly influences the peak day demand. The peak day demand is of particular importance since all components of the water supply and treatment systems are based on that peak day demand. Storage and pipeline sizing are based on peak day demand, in associations with the diurnal usage curve throughout that peak day, and, often more significantly, on fire flow demands.

For planning purposes, it is concluded that the population changes may fluctuate between positive or negative, within the following logical limits:

- The population seems to have stabilized to a level consistent without a boom-bust effect acting upon it. It is conceivable that no further growth will *likely* occur through 2025. However, considerations must be made to ensure that designs for longer-life equipment is not undersized.
- A renewed boom for oil exploration or temporary increased population associated with pipeline construction could bring the population up, at least temporarily. To provide a reasonable estimate of maximum potential growth, an **annual increase of 1.12% per year through 2045 is found in reaching a population as high as 2,174, to match the 1990 Census population,** the highest seen in the past 30 years. Though such an increase is unlikely, based on 30 years of trends, it does not increase costs significantly when used in the design of pipelines or storage, which are primarily sized based on fire protection, as noted in the previous discussion. Sizing for intake screens would be for still a higher population since that component cost is about 90% due to construction costs other than the materials/size consideration, and future upgrades would be extremely costly.
- A Design population of 2,174 was determined for use in design purposes of all components with a more conservative figure used for the intake screens (since the pumps will only have a 20 – 30 year life, it is not necessary to size them for higher than a population of 2,174, though if pump cans are used they must be of sufficient diameter to later house the largest pump). Such a component should be designed for what is referred to as "Full anticipated build-out", or rather the largest reasonable potential growth. **The design population for intake screens will be assumed at 2,600**, just above the peak population, which was realized in 1980.

- A continued downward trend should be used for estimating the number of rate payers that will be available for paying down any debt incurred from a construction project. **The current annual rate of decrease is 0.73% and** seems to be stabilizing. At this rate of decline, the *average* population for repayment of debt would be found in year 2035 and **the design population for calculating debt is 1,470**.

In summary:

- Design Year: 2045
- Design Population 2045 for most water system components: 2,174
- Design Population full build-out (for intake screens): 2,600
- Design Population for debt service calculation: 1,470, estimated based on current trends through 2035, the average year of any loan repayments

The intake and WTP components are sized to meet the peak day demand and any waste generated at the WTP including filter backwashing.

Forsyth Estimated Population over the Planning Period				
Census Year	Population	Future Design Population	Future Design Population	Future Low Estimate Population
2000	1944			
2010	1777			
2020	1647			
2035				1470
2045		2174		
Full Grow-Out			2600	
% Change		**32.0%**	**57.9%**	**-10.7%**
***Data Based on US Census Bureau through 2020**				

Table 1-3: Forsyth Projected Population

1.5 Community Engagement

Planning

A great deal of planning has been done through the city with the assistance of the Montana Department of Commerce (DOC) and the Southeastern Montana Development Corporation (SEMDC).

With SEMDC, in 2020, the city updated the area Comprehensive Economic Development Strategy (excerpts included in the appendix). The need for recertification of the Levy protecting the city had the most votes for the top priority and is currently being addressed. The second highest concern was the intake, for which this PER is the first step.

The SEMDC Infrastructure Needs List gives the highest priority in Forsyth to its intake. SEMDC has provided economic analyses for the city and county and assisted with applications for ARPA funding in 2020.

The city has conducted a capital improvements plan (CIP), which was updated in 2020 (see the appendix). In late 2020, the city hired engineers for the water system and for general engineering assistance.

Also in 2020, the city hired a new systems operator/manager who has begun an ambitious replacement schedule for valves and hydrants and curb boxes (to be discussed further in Section 2). The city recognizes that an aging system needs regular replacements and is fully funding the replacements without outside grant assistance. The city now has a short-lived assets catalog and schedule for replacement. Looking ahead, the **rate increase for Phase 1 includes creating a fund of over $94,000 per year for conducting replacement of short-lived assets over the next 20 years**. See the appendix for the short-lived assets catalog, costs, and schedule.

The city assisted the Insurance Services Office (ISO) in their evaluation of the water system in 2020 (see the appendix XX), providing numerous tests of its hydrants. The ISO report used that information in updating its Public Protection Classification for the water system and firefighting system. The city water system had one sharp concern, that being lack of regular maintenance of the hydrants and valves. The new operator has since put in a strict maintenance regimen for the exercising of valves and hydrants.

The city currently has no outstanding debt on its water system. This has allowed the water rates to remain just below the MDOC Target Rate (discussed in greater detail later). However, the high cost of maintaining a surface water treatment plant has kept rate fairly high. The new program for short-lived assets replacement and match for the proposed Phase 1 project (developed through this PER) will bring the city's user rates well above the Target Rate. On January 10, 2022, the city passed Resolution 2022-R02 that approves the council to seek grants and loans associated with the project and pursue raising rates by an average of $14.50 per equivalent dwelling unit (EDU).

Although this PER concentrates on the water system, it is worth noting that the city has dedicated resources to the wastewater system, as well as other municipal projects. The city currently pays about $99,250 annually for debt service for its sewer system on a 2014 SRF loan.

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SECTION 2 EXISTING FACILITIES

2.1 Location Maps

Forsyth's water system consists of the Water Treatment Plant (WTP), Montana Public Water System identification Number MT0000215, including intake, a waterline distribution system that consists of mostly Transite-AC pipe with PVC used for repairs, high service distribution pumps within the WTP provide treated water to the finished water storage tank south of town, the Riverview Booster Pump creates its own pressure zone serving the subdivisions inside the re-purposed military base on the east end of town.

This section begins with a brief description of the facilities and photographs of system components. More detailed analysis and history of the system components is described in subsequent chapters.

Figure 2-1: Water System Components Map has been provided by the State DEQ and, along with others in this Section, reprinted with their approval.

Figure 2-2: Riverview Booster Station shows a closer identifying view of the only booster station within the water distribution system and has also been provided by the State DEQ.

System Components are identified in Figures 2-1 and 2-2 according to the State's designated identification numbers as follows:

- IN002 – Intake (includes PF001, the Raw Water Pump Station within)
- TP002 – The Water Treatment Plant (surface water treatment by conventional processes)
- PF001 – 3-Stage Vertical Turbine Pump (included in TP002 map location)
- PF002 – Riverview Booster Station (centrifugal jockey pump on VFD and fire pump)
- ST001 – 1MG Water Storage Tank (welded steel reservoir)
- DS001 – Distribution System (encompassing entire town)

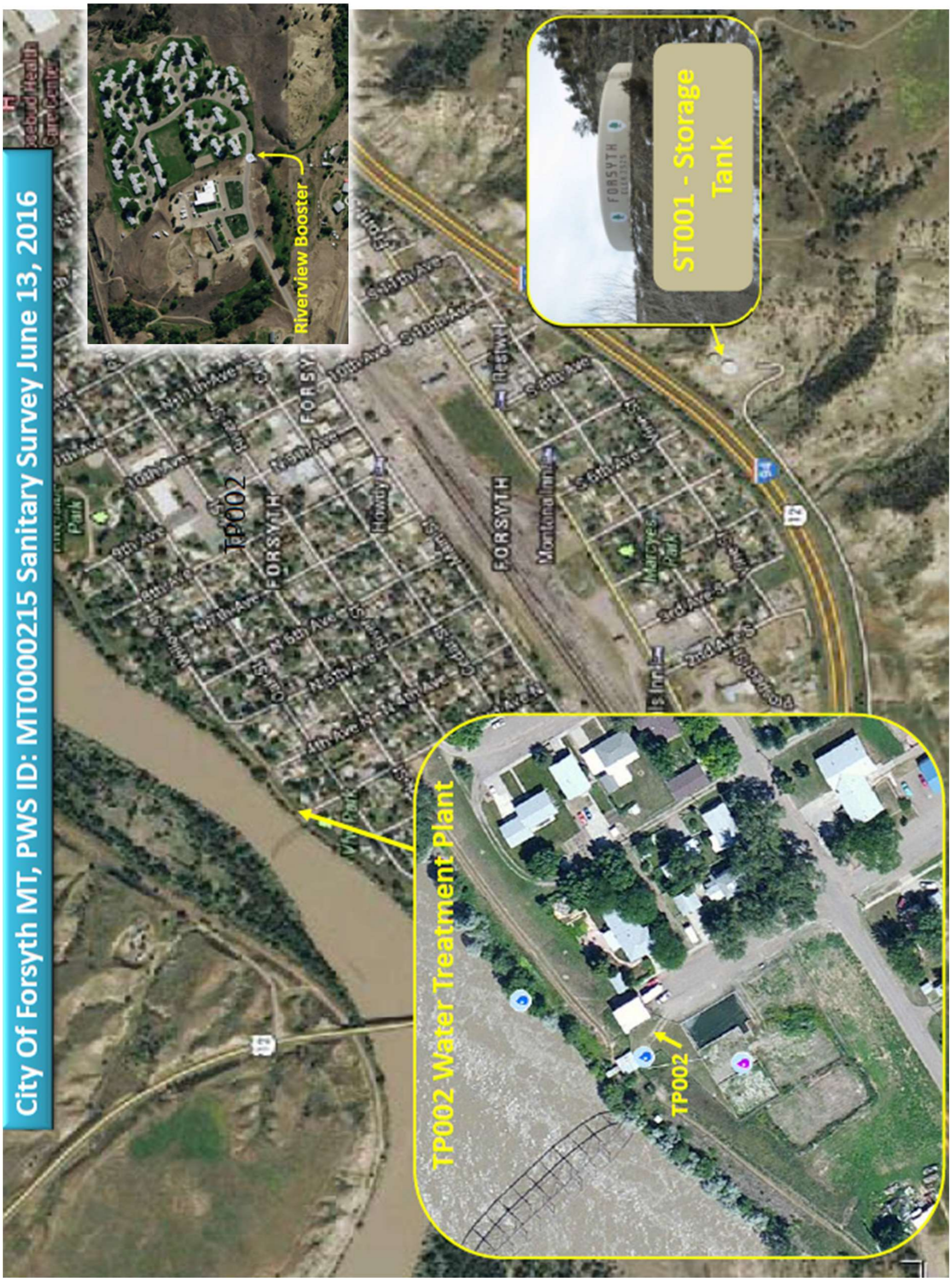

Figure 2-1: Water System Component Locations from San Survey

2.2 History

Forsyth was established in 1876 as the first settlement on the Yellowstone and served as a transportation hub for steamboats, then the Northern Pacific Railroad and eventually Interstate Highway 94. Since its development as a population center in the 1880's, Forsyth has maintained its population below 2,600 residents with peaks and valleys along the way (See section 1.4 Population).

The Forsyth water treatment infrastructure was originally established in the early 1900s, including the 14-inch cast iron intake pipe that remains in service today. The system saw major improvements in 1931,1976, and 1993.

The treatment system has remained conceptually the same since the 1976 upgrade, with some improvements in 1993. However, the large drop in population from the late 70s to today helps the system remain operational and free of any chemical or bacteriological violation for at least the last 15 years. The most significant problems associated with water production are age-related issues facing the intake.

The pipe within the city is almost entirely asbestos-cement, also referred to as AC-pipe or "Transite Pipe," a popular brand of AC pipe. Nearly all pipe is believed to have been installed in the 1960s. The AC pipe is beyond its useful life and breaks are frequent during harsh winters, as will be discussed further in this report.

2.3 Water System Demands

See Section 2.5 later for the current connections and equivalent dwelling units (EDUs) in Town.

2.3.1 Residential and Commercial Water Demands

Section 1.4 discussed population trends and noted that due to the boom/bust cycles, the population has fluctuated recently, as in the past. Since a water system must be designed to meet the peak day demand, it is important to consider a "boom" cycle in design. However, when there is an economic downturn and a decrease in population, the number of paying customers that remain in the city to keep up with payments on debt may decrease. Section 1.4 concluded:

- Design Year: 2045
- Design Population 2045 for most water system components: 2,174
- Design Population full build-out for intake screens: 2,600

- Design Population for debt service calculation: 1,470, estimated based on current trends through 2035, the average year of repayments

It is worth noting that the peak water usage days are typically found to be more heavily influenced by the dryness of the summer/month than by the population. This phenomenon is not surprising since the largest usage of water is often for lawn watering. Since short-term populations tend to move into apartments or temporary housing, there is not as great of a peak day lawn watering usage by that population.

The city provided excellent data (and compiled it, as well) for water usage over the last 3 years. As can be seen, the drought of 2020/21 had a more significant impact than population change. The following figure, curtesy of Andy Sullivan, the operations director, shows demand rising sharply in the summer of 2021, even though population had decreased.

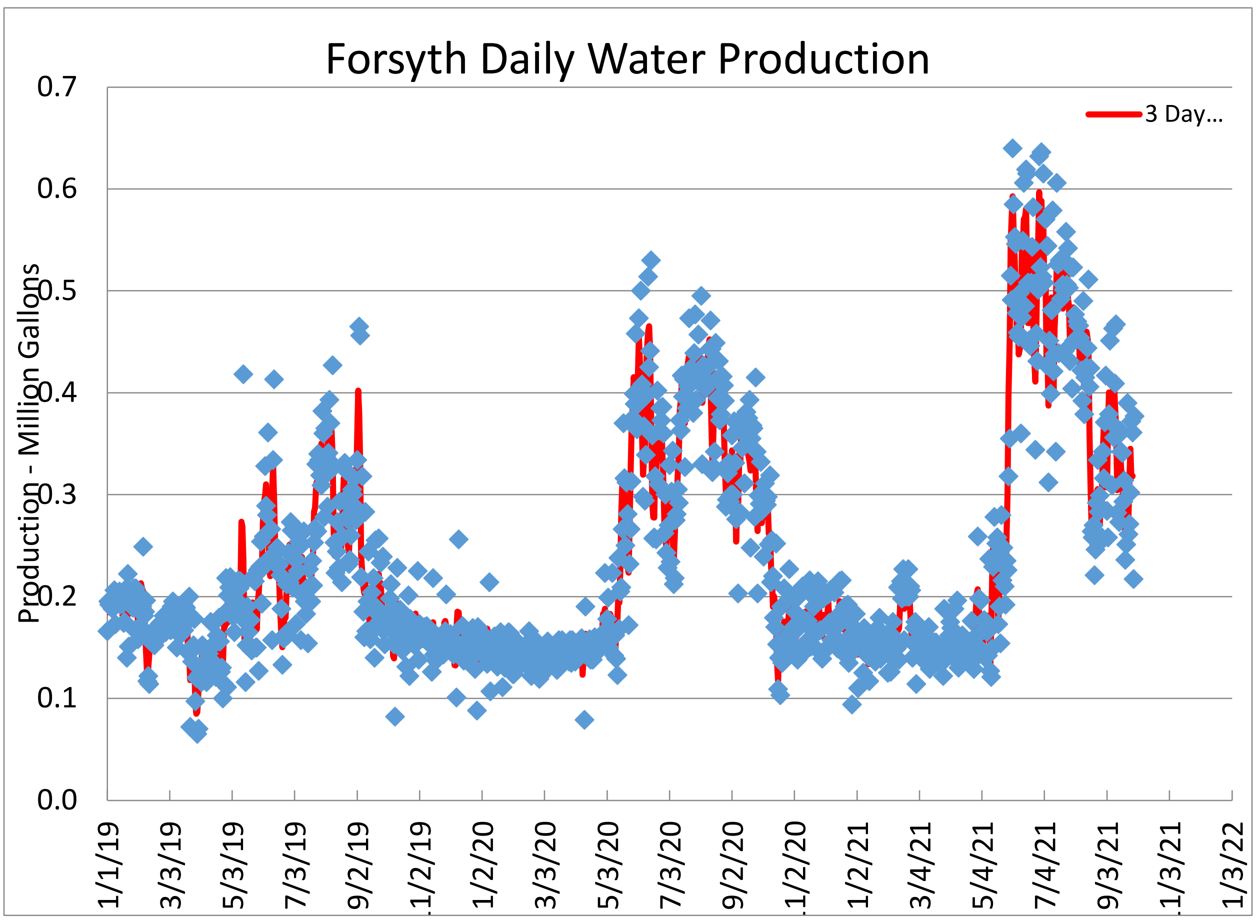

Figure 2-2: Forsyth Daily Water Production

2.3.2 Unaccounted for Water and Leakage

The city provided excellent records of both water production (after accounting for backwash water) and water sales. Figure 2-3 below, provided by the city, demonstrates the difference between the two.

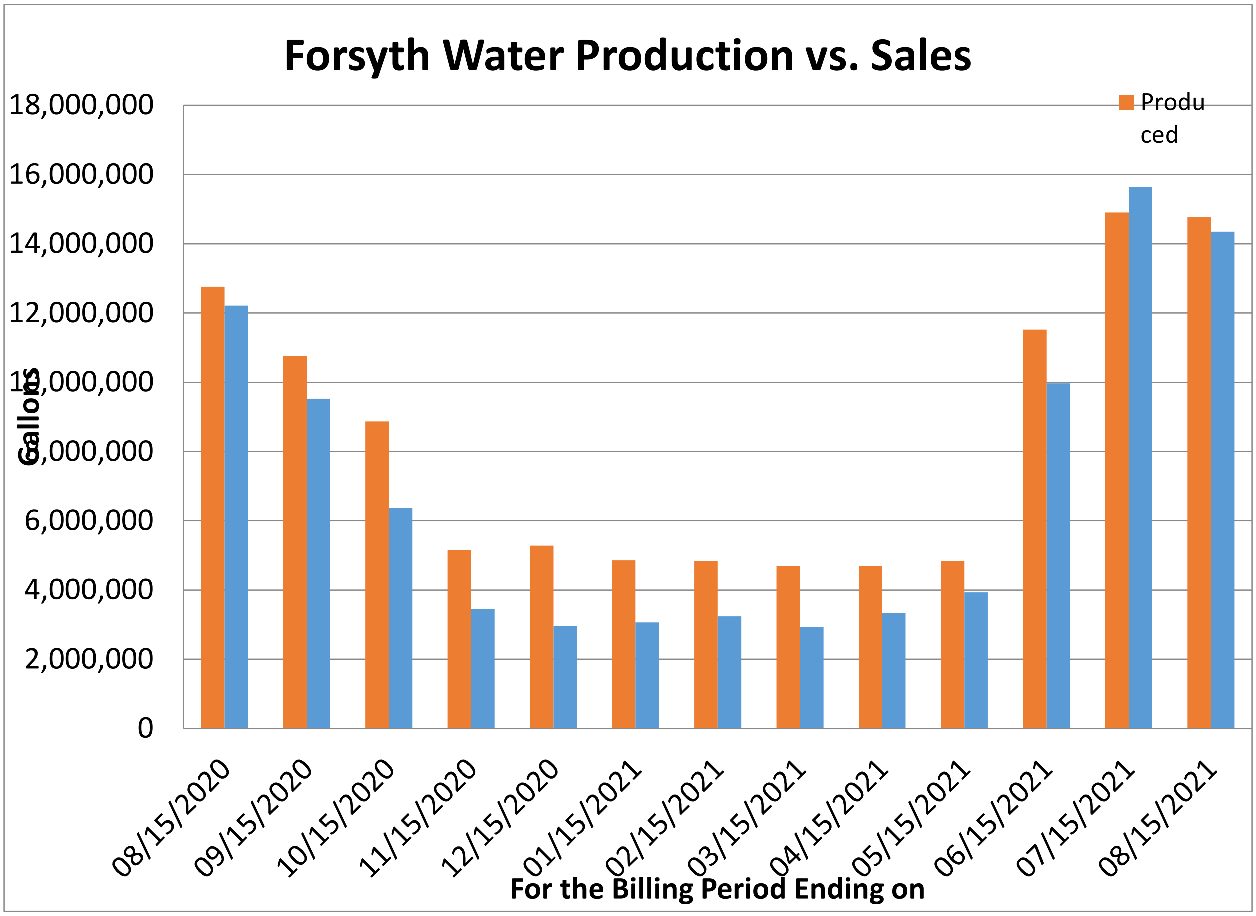

Figure 2-3 Forsyth Water Production Vs Sales

Illegal taps would be expected to follow the typical usage curve for the entire City, and any unmetered city water used for watering lawns or filling pools, would be expected to be highest during the summer. However, the figure above clearly shows that the differential is fairly consistent, as would be in the case of leakage. Leakage quantity is based on the leak size and system pressure, which would not vary throughout the year.

The fact that the leakage amounts are actually higher in the winter demonstrates that there are more actual breaks in the winter, as would be expected due to soil heaving. It should be noted that hydrants were not being tested during this time period (a number of hydrant flows were conducted in July, 2020, which are used for the calibration of the hydraulic model, but prior to the billing and production periods given in the chart).

Using the raw data, the yearly loss through leakage was very high at 16.9 million gallons (MG), roughly 46,000 gallons per day! This represents about 23% of all water produced annually, and 35% of all water produced during the winter.

As will be discussed further in Section 3, leakage not only represents a significant increase in production costs, but more importantly defines a serious public health theat. Openings in a water system expose the system to contamination if there is a loss of pressure due to a main break (and shutting off an area around to pipe to gain access), and the subsequent drawing in of surrounding groundwater. Another loss of pressure can occur when the booster station loses power.

2.3.3 Average Daily Demand

For calculating the average daily demand, the last three years of usage data was used. That timeline begins in 2018, with the near peak population of the last several decades. As noted earlier, the biggest demand period was very recent, a result of the 2021 drought.

The average monthly demand over the past three years was 7.03 MG. The average day demand was 240,000 gallons per day (gpd).

The actual peak day was realized during the drought, with two occurrences at 6/23/21 and 7/1/21 at 640,000 gpd. This represents a peak day peaking factor of 2.67, which is actually low for a small community. To be conservative and be more in line with more typical peaking factors for smaller cities, **a peak day peaking factor of 3.25 is used**.

Reviewing the population data provided in Section 1.4, the average population over the three-year period is found to be roughly 1700 for 2019 (population estimates vary due to the sharp changes realized). The average consumption of gallons per capita per day (gpcd) is **141 gpcd**, of which approximately 23% was due to system leakage.

2.3.4 Peak Hour Demand

The peak hourly flowrate is calculated based on anticipated fluctuations in demand throughout that highest demand day. Figure 2-4 provides a view of a typical diurnal curve.

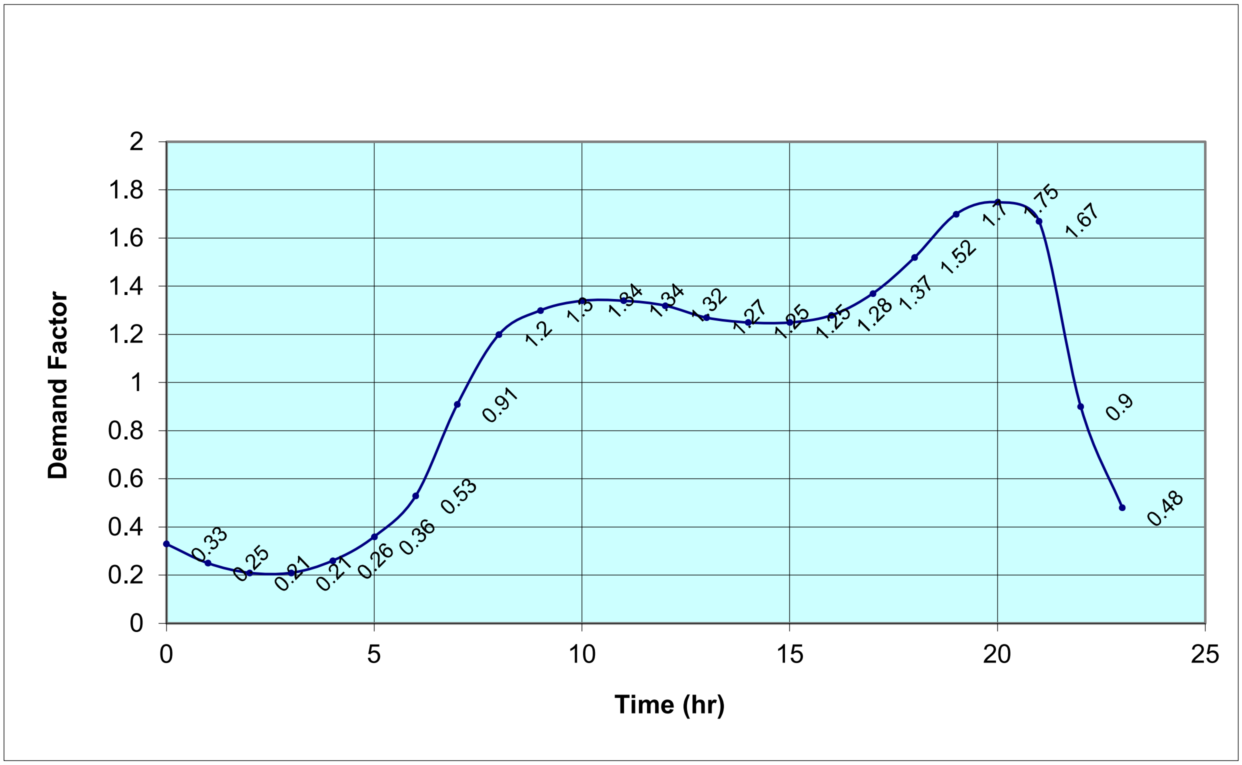

Figure 2-4 AWWA Diurnal Demand Curve

The peak hourly demand would be expected to occur on the peak day, around 4:00-5:00 PM, and be roughly 1.75 times the average demand for that peak day.

Noting again that smaller population groups exhibit a wider range of peak use, a **peak hour peaking factor of 2.25 will be assumed here** when multiplied by the peak day demand, or 7.31 when multiplying by the average day demand. Peak hour influence, along with using the diurnal curve above, does become important when conducting a detailed elapsed period simulation (EPS) to verify that the storage tanks do not fall dangerously low during a peak day. The minimum goal in al hydraulic capacity analyses is to be able to begin each day with all tanks full and always maintain sufficient water for fire protection in the water storage tanks.

For the city of Forsyth, the fire flow demands are high enough that hourly variances in other demands do not play a critical role in design of the tank capacity.

The higher water demand during peak hours is typically provided by water storage and water treatment plant design is governed by peak day demand. The intake system must be designed for peak day demand, plus water used for filter backwashing and evaporation from water exposed in the sedimentation ponds. The actual amount of water for backwashing vs production will change with the seasonal effectiveness of the pre-sedimentation ponds; evaporation rates will obviously fluctuate with seasons.

For a reasonably conservative estimation, the intake should be designed for a minimum of 110% of the peak day demand. However, the difficulty, cost, and environmental concerns that go with any intake make it best to design the intake for the highest demand in the foreseeable future. This demand would be based on the full grow-out discussed previously in Section 1.4 and further discussed in Section 4.2.2.

Forsyth Population and Water Demand Summary			
Base Data			
Peaking factor for peak day	3.25		
Peaking factor for peak hour	2.25		
current population	1700		
2045 population	2174		
grow out population	2600		
Calculated Demands			
Type	**MGD**	**GPM**	**gallons per person per day**
Current Water Usage			
Average Day	**0.240**	**166**	**141**
Peak Day (WTP Design)	**0.54**	**374**	
Peak Hour	**1.21**	**842**	
Future Water Usage			
Average Day *1	**0.31**	**213**	**141**
Peak Day (WTP Design) *1	**0.69**	**479**	
Peak Hour *1	**1.55**	**1077**	
Intake Design Day *2	**0.82**	**572**	
See 2.2 for fire flow demands. Pipelines and water storage tanks and reservoirs are sized based on the diurnal curve associated with peak days/hours and fireflows. Note also that the population used for calculating debt payments is different per Section 1.4			
*1 Based on maximum population projection of 2,174 persons, year 2045			
*2 Design for Intake based on full grow-out of 2600 persons, see **Section 1.4**			

Table 2-1 Current and Projected Water Usage Summary

2.3.5 Water System Fire Flow Demands

Fire Flows, or Needed Fire Flows (NFF), is that amount of water needed to provide fire protection for a given building type. The NFF is typically provided by the Insurance Service Office (ISO) and provided to the Fire Department.

However, the actual best design of a water system must take into consideration numerous factors and the actual fire flow that should be designed for should only be concluded after discussions with the local fire chief and examination of other alternatives such as fire suppression sprinklers in buildings with high NFFs.

AWWA manual M31, Distribution System Requirements for Fire Protection is consulted for design criteria.

From AWWA M31:

Exceptions to Fire Flow Limits

There are some exceptions to the required fire flow. For example, if a community has a large concentration of housing units with required fire flows not in excess of 1,500 gpm (95 L/sec) and a small number of properties require an increased level of flow (3,500 gpm [221 L/sec]), it would not make good economic sense to provide 3,500 gpm to those isolated properties. The community's governing body would be advised to simply develop ordinances and regulations that require those isolated properties to provide for their own private fire protection, to reduce the fire flow requirement by using a higher level of sprinkling, or to provide on-site storage and pumping capabilities to meet their own fire suppression needs.

It was indeed fortunate to have the 2021 ISO Public Protection Classification Report available. This was used along with conversations with Cal McConnell, the fire chief, and Andy Sullivan, the utilities director/operator and manager to conclude the following:

- Per discussion with the Director of Utilities and the fire chief, Sprinklers encouraged to be installed in high occupancy buildings.
- The ISO sets its "Basic Fire Flow" for a community based on the fifth highest needed fire flow (NFF), which for Forsyth is 3,000 gpm.
- Per review of the ISO Public Protection Classification Report, dated February 1, 2021, it is found that the fire department has trucks capable of significant firefighting, including having 3 engine companies in service. This meets the ISO's Basic Fire Flow requirement of 3,000 gpm for the city (see pages 12 and 13 of the ISO report). The water system and

fire department are found to have capacity to meet the ISO Basic Fire Flow requirements.

- The biggest factor in not receiving a higher score from the ISO was lack of paid firefighters and lack of training. Although the water system scored well, lack of inspection and flow testing were the main reasons for not receiving a higher score. Inspections, valve and hydrant replacement and testing needs are now being met through the new operations manager and funding by the city.

- The hydrants nearest the highest NFF structures were actually tested by the city in 2015, and included in the report. See page 24 of that report for the table titled "Hydrant Flow Data Summary." Available fire flows (AFFs) were found severely lacking at several locations as shown in Figure 2-5 below.

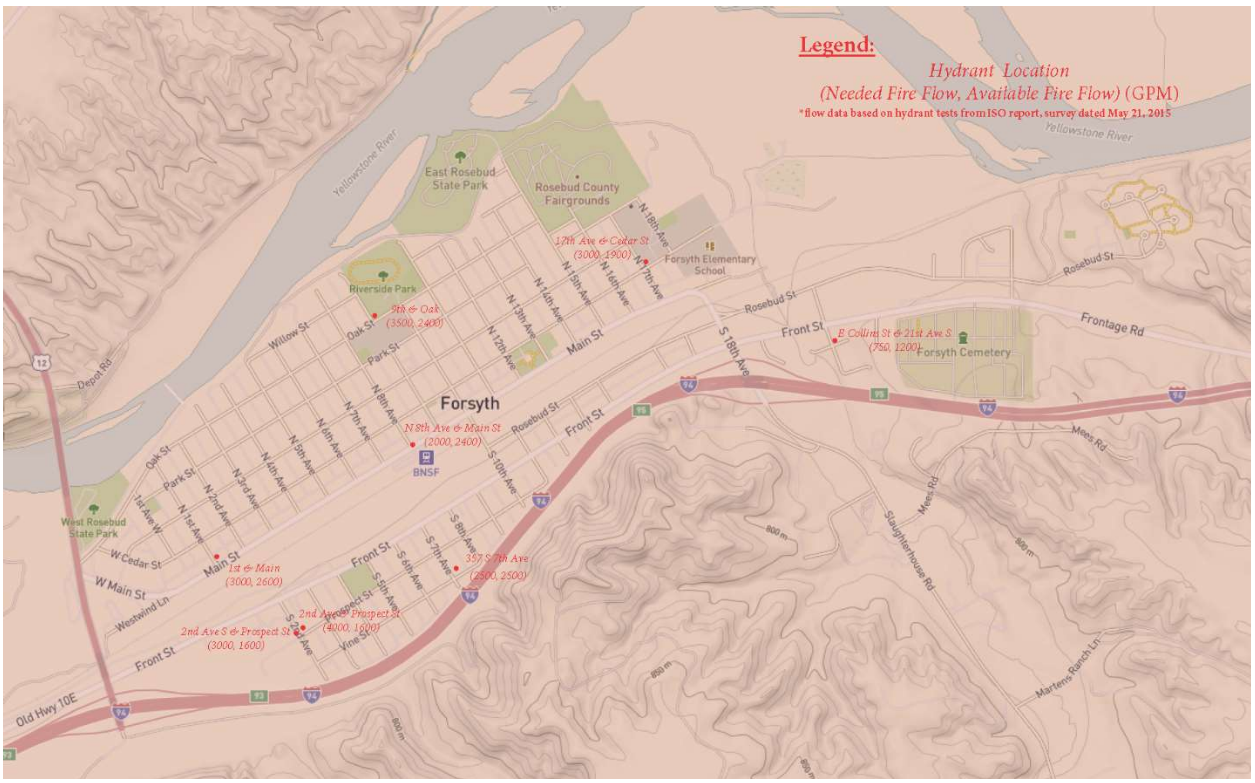

Figure 2-5: ISO Fire Flow Data, 2015

The 2009 PER did not have the advantage of the 2021 report or 2015 data, and the revisions to the more recent NFFs. In 2009 it was estimated that the NFF for the Main Street area was 4,500 gpm. However, as shown in the map above, the highest NFF is now the Rails Inn, at 4,000 gpm, located well away from the Main Street area, and situation near the frontage road. The two structures evaluated on Main Street had NFFs of 3,000 and 2,000 gpm.

The high NFF and small distribution system lines in the area (4-inch, 6-inch and 8-inch AC and Cast Iron Pipe) make it impossible to deliver such a high volume of water to the Rails Inn site. The water distribution system's limitation combined with limitations of a volunteer fire department (described in the ISO report) lead to the conclusion that The Rails Inn would be far better served by the installation of fire suppression sprinklers within its building. The structure, and sadly, life, could be lost prior to the fire department's arrival.

Even with adequate capacity to meet a 3,500-gpm needed fire flow or higher, a school or community center is best served by addition of a fire-suppression sprinkler system.

A sprinkler system is activated immediately, and directly at the site of the fire, whereas there is a very delay in having a fire department notified, travel to the station and travel to the site. Costs of retrofitting a building for sprinklers can average about $4 - $8/square foot. The cost of sprinklers is generally appropriately paid by the building owner, and for a school the cost would be placed on the school District, or through state assistance as might be available.

Fire flow demands for all types of residential units up to two stories and for one- and two-family units is summarized in table 2-2 below. The fire flow needed for tightly spaced one- and two-unit housing is 1400 gallons per minute for a period of 2 hours. Based on the age, closeness of structures and size, the downtown area would be expected to have all buildings at 2,500 NFF or higher (see figure XY previously presented for higher NFFs). AWWA Fire Flow criteria per AWWA Manual 31 used in this study are presented in Table 2-2.

Table 2-2: Fire Flow Criteria per AWWA

Fire Flow Criteria from AWWA M31

Duration of a Fire Event, Depending on NFF	
From AWWA M31, Table 1-1 "Fire Flow Durations"	
Needed Fire Flow (NFF)	Duration
gpm	Hours
Less than or equal to 2,500	2
3,000 - 3,500	3

From AWWA M31, Table 1-6	
"NFF for One- and Two-Family Dwellings"	
Distance Between Buildings	NFF
ft	gpm
More than 100	500
31 - 100	750
11 - 30	1000
Less than 11	1400

2.4 Condition of Existing Facilities

This section will look at the city's water facilities broken-out into various system components. The basis for the evaluation is the future high-population estimates and required water supply for all facilities as presented in Section 2.3.

2.4.1 Water Rights, and SWDAR

Water rights are presented in Table XXX below. The city has a water rights claim dated 1973, which provides up to 3,000 gpm and 345.4 Ac-ft/yr. This rate of extraction far exceeds the projected need for the intake. The annual volume corresponds to exactly 0.31 MGD, the projected high-population average demand for 2045. The city also has a Provisional Permit, dated for 1978 that adds 2432 gpm and a substantial yearly allowance of 3,920 Ac-ft/year. Thus, it is concluded that the city has ample water rights for extraction of river water.

Groundwater sources were reviewed previously in Section 1.3. As noted, the Town did pursue a groundwater source in the 1940s but was unsuccessful due to lack of yield. Poor quality in the vicinity and low yields have eliminated use of groundwater as a main supply for the city. The city has only 12 gpm and 48 Ac-ft/year of rights for groundwater to be used for "Lawn and Garden" irrigation.

The Forsyth Source Water Delineation and Assessment Report of 2002 (SWDAR) includes more detailed information of the water rights. Original water rights documents can be found on the DNRC GWIC website http://wrqs.dnrc.mt.gov/ and searching for "Forsyth".

The 2002 Source Water Delineation Assessment Report (SWDAR) contains substantial details of geology and hydrogeologic conditions. As a Surface Water, the source is automatically considered a "High Source Water Sensitivity" supply.

Pursuant to the Administrative Rules of Montana (ARM), the Yellowstone River is classified as B-3 surface water. Through the State of Montana,

> *"B-3 surface water must be maintained suitable for drinking, culinary and food processing purposes after conventional treatment for the removal of naturally present impurities. These waters must all be maintained as suitable for bathing, swimming, and recreation; growth and propagation of salmonoid fishes and associated aquatic life, waterfowl, and furbearers; and agriculture and industrial water supply"* (Forsyth SWDAR 2002).

The spill response region extends ½ mile downstream and a full 10 miles upstream of the Forsyth intake and includes the shoreline of the Yellowstone River and parts of both Porcupine and Armells Creek. Land cover in this area is predominately irrigated farmland, and dry, broken rangeland (see Appendix A). Table 5 of the SWDAR provides a list of the significant potential contaminant sources in the region while Table 9 presents a susceptibility assessment of each.

The highest concerns and "Susceptibility" were mismanagement of agricultural chemical use and potential spills from the railroad or highway (specifically on/across the HW 12 bridge located 0.5 miles upstream of the Intake). Maps are included in the SWDAR, available from the city.

A full Hazard Mitigation Plan has been provided by the city but is far too lengthy for inclusion in the appendix. That information is available from the city or the engineer.

Table 2-3 Forsyth Water Rights

The Montana Department of Natural Resources & Conservation

Water Right Query System

Home » Water Resources Division » Water Rights Query »

Water Rights Web Guide
Videos: How to Use the Query System | How to Search by GEOCODE or Township, Range, and Section

[Modify Existing Search][New Search]

Click here for Water Right Data Explanations
If you have problems, contact the DNRC Waterrights Help.

Query: (Owner LIKE 'Forsyth, city of') AND ((Water Right Status = 'ACTIVE') OR (Water Right Status = 'SEVERED'))

Default

Water Right	Map	Abstract	Doc Image	WR Type	Status	Version	Purpose	Enforceable Priority Date mm/dd/yyyy	Src	Src Name	Means of Diversion	Owner	Flow Rate	Volume	Acres	Div Count	Use Count	Irr Count	Res Count	Issue Remarks	Record Last Updated mm/dd/yyyy
42KJ 212608 00	View	View	View	STATEMENT OF CLAIM	ACTIVE	2	MUNICIPAL	6/30/1973	S	YELLOWSTONE RIVER	PUMP	FORSYTH, CITY OF	3000 GPM	345.4		1	5		0		10/04/2021
42KJ 21285 00	View	View	View	PROVISIONAL PERMIT	ACTIVE	2	MUNICIPAL	12/6/1978	S	YELLOWSTONE RIVER	PUMP	FORSYTH, CITY OF	2432 GPM	3920		3	6		0		10/04/2021
42KJ 58879 00	View	View	View	GROUND WATER CERTIFICATE	ACTIVE	1	LAWN AND GARDEN	12/17/1984	G	GROUNDWATER	WELL	FORSYTH, CITY OF	75 GPM	12	4.8	1	1		0		10/04/2021
42KJ 63222 00	View	View	View	PROVISIONAL PERMIT	ACTIVE	1	IRRIGATION	6/22/1987	S	YELLOWSTONE RIVER	PUMP	FORSYTH, CITY OF	350 GPM	35	14	1	1	1	0		10/04/2021

Download *Excel users: Convert dates to numbers after download for proper sorting.

Divisions

Board of Oil & Gas
Conservation and Resource Development
Director's Office
Forestry
Reserved Water Rights Compact Commission
Trust Lands Management
Water Resources

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2.4.2 Intake

The greatest concern with the Forsyth water treatment and distribution system is its intake. The intake system has failed twice due to the intake pipe clogging. The intake structure itself was originally constructed in the early 1900s with an additional super structure was built in the early 1930s.

2.4.2.1 Structure

Figure 2-7: Forsyth Intake, Aerial View

Figure 2-6: Forsyth Intake, Pre-1931 Structure

Figure 2-9: Forsyth Intake, Hatch View of Substructure

Figure 2-8: Forsyth Intake Structure, Internal View

Figure 2-10: Intake Wet Well Upper Floor Supports, Picture 1

Figure 2-11: Intake Wet Well Upper Floor Supports, Picture 2

Figure 2-13: Intake Wet Well Upper Floor Supports, picture 3

Figure 2-12: Intake Wet Well Upper Floor Supports, picture 4

Figure 2-14: Intake Wet Well Upper Floor Supports, picture 5

Figure 2-15 Intake Hanging Platform, view from above

The above photos demonstrate the dangerous conditions at the intake structure. Exposed and corroded reinforcing bar loses its tensile strength as the corrosion advances. Since the floor base is fully under tension, the floor is in danger of collapsing. This threatens the lives of anyone inside whether above or below the floor when it does collapse.

There is no forced ventilation in the structure neither above or below the floor. This is a hazard since oxygen can be used up by natural microbial action in the water. In October 2021 the city purchased gas (and oxygen) detectors, which are now being used whenever a confined space is entered such as the lower wet well platform. Any improvements should include forced air ventilation.

2.4.2.2 Intake Pipe and Screen; Elevations, Plugging History

The intake pipe has existed in its current state since the improvements to the structure in 1931. This single pipe is 14" cast iron with two 22.5-degree bends **raising** it from the riverbed to enter the intake structure. From the 1931 Intake structure addition plans, the intake pipe enters the sub structure through the river-side external wall 32' below the ground-level floor elevation. Through video documentation of the intake pipe, it has been determined the pipe was damaged and has a joint off-set. The intake pipe is shown in the figure below.

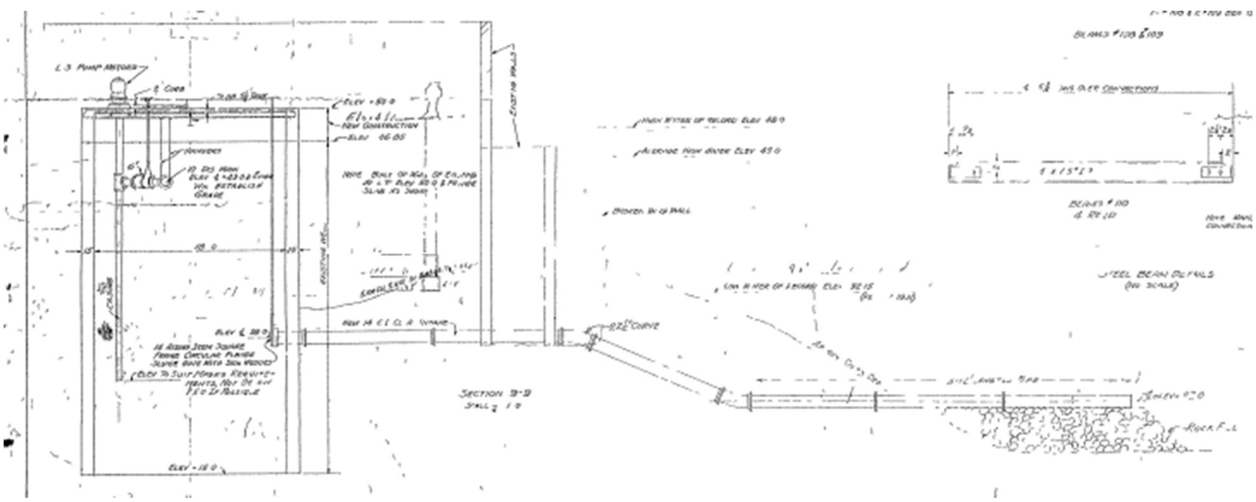

Figure 2-16 Intake Pipeline from 1931 Plans

The intake pipeline was inspected using a robotic camera and professional divers in 1999. As can be seen in Appendix L and the few figures included below, the cast iron pipe installed in or about 1931 is tuberculated from corrosion. This may be cleaned periodically using a pigging device, as was done previously to remove silt, sands and small rock that jammed the system.

Figure 2-17 14-inch Intake Line Damaged and Offset Joint

Corrosion is not terribly alarming in the 14-inch cast iron pipe since old cast iron pipe was constructed quite thick in the 1920s and 1930s. Although not currently considered an emergency situation, the pipe is approaching 100 years in age and will need to be replaced soon since loss of this only line connecting the city and the river would be catastrophic to the city . The offset joint shown in the figures in Appendix L appears to be in a buried joint, the first of the two 22.5 degree bends leading towards the river. Therefore, it is not likely to be damaged further by logs or other drifting debris.

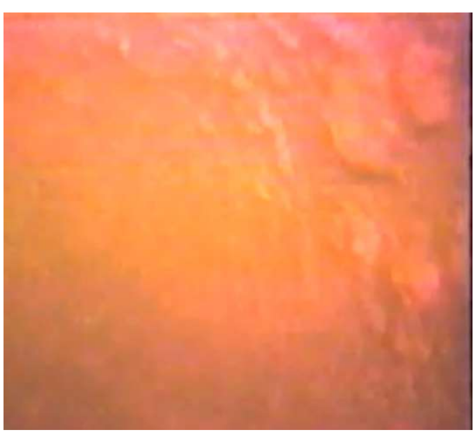

Figure 2-18 Tuberculation from Corrosion of 14-inch Intake Pipe

The intake pipe rises from the intake point in the river up through two 22.5-degree bends prior to entering the intake wet well. This is unusual and allows sediment to build in the lower section of the pipe. A preferred design would have the pipe slope gradually downward toward the wet well.

The river-end of this intake pipe consists of an uncovered, unprotected flanged or MJ end. No protection cage or debris/fish screen is currently utilized on the river end of the intake pipe. Based in best available records, and view by a professional diver, no cage or screen has likely ever been utilized over the life of the intake.

The invert elevation for the river end of the intake pipe is unknown but appears to have roughly 1 foot of clearance to the river bottom, based on video-taping by the professional diver.

The river bottom by the intake is mostly rip rap with some silt. The silt only lightly covers the rock. Considering that when filmed in 1999 the location of the pipe and rock had been in place for nearly 60 years, it is concluded that high flows have sufficient scour to keep the area around the pipe from building up sediment. However, with the river being very wide due to backwater from the Cartersville dam, the scour does not appear to damage the intake pipe, nor move the rip rap sufficiently to block the inlet. This is an important finding since it indicates that the existing inlet location should not be in any danger of silting in.

Figure 2-19 Approximately 1 Foot Clearance to the River Bottom

Unfortunately, sediment and sands that are carried by high waters in suspension can and do enter the inlet pipe. This led to complete loss of the intake line during the flood years of 2011 and 2013.

Currently, the intake has two pumps, one with 1,500 gpm capacity and the other higher at approximately 2,000 gpm. Since the inlet pipe is open-ended, the velocity into the pipe is 2.8 ft/s for the smaller pump and 3.7 ft/s when the larger pump is on. These velocities exceed the maximum of 0.5 ft/s. At the high velocities, suspended sands and gravels can be drawn into the inlet pipe, eventually creating plugs in the line. The upward bend in the line prior to reaching the wet well becomes a trap for the heavier material.

Important Elevations

The 1931 drawings have elevations based on a random assignment of 50.00 feet at the base of the floor where the intake vertical turbine pumps were set. The 1976 drawings identify the actual elevation of that floor (prior to adding another floor atop of the 1931 floor, as 2522.03 ft (now 2522.45, post 1976 improvements).

Based on 1931 drawings the centerline elevation of the inlet pipe as it enters the wet well is estimated at 2500.03. Similarly, the centerline of the opening into the river based on the 1931 drawings is 6 feet lower, for an elevation of 2494.03.

There is a river gage at the bridge next to the intake. The bottom of the gage is at elevation 2504.62. A view of historic water level records indicate that the river has never reached at or near the bottom of the gage. The high differential between the inlet pipe and the bottom of the river gage is due to the Cartersville dam located just downstream of the intake

The charts below give a good view of the river's history. The location of the Cartersville Dam (also placed in the early 1930s) maintains backwater even when flows drop to all-time lows. The low flow in 2021 still registered just over 1 foot at the gage. No gage height data was available for 2001, but this had only slightly less flow than in 2021. Extrapolating using flow amounts, it is estimated that the gage height in 2001 was likely about 0.9 feet. It's worth noting that the SWDAR, completed in 2002 noted the lowest flow recorded from the 1920's until the writing of the SWDAR was 3,750 cfs. Flow during the 2021 drought barely exceeded 1000 cfs.

It can be concluded that backwater from the Cartersville dam will always supply 0.5 feet minimum at the gage. This would provide a head differential of 5.09 feet to the inlet at the wet well.

Table 2-4 Important Intake and River Elevations

Important Intake and River Elevations		
Location	**Elevation***	**Notes**
River Bottom at Inlet	2493	Estimaed from Video
14" Inlet Centerline at River	2494.03	
14" Inlet Centerline at Wet Well	2500.03	
Wet Well/Intake Original Floor	2522.03	
Wet Well/Intake Existing Floor	2522.70	8" Addition 1976
Gage at 0.0 ft	2504.62	
Maximum Historic River El.	2519.15	Gage at 14.53, May, 1978
2nd Highest Historic River El.	12.82	Gage at 12.82, June 1997
Lowest Estimate	2505.52	2001 Gage at 0.9, estimated
Design Low River El.	2505.12	
Min River El - Wet Well Inlet =	5.09	
*See Text for how Elevations were estimated		

Assuming a very low Hazen-Williams friction factor of 40 for the old and tuberculated cast iron pipe, the head loss at even 1 MGD is about 0.5 feet. Thus, it is concluded that 14-inches is a sufficient diameter and there is suitable head differential to keep sufficient flow based on backwater sustained by the Cartersville Dam.

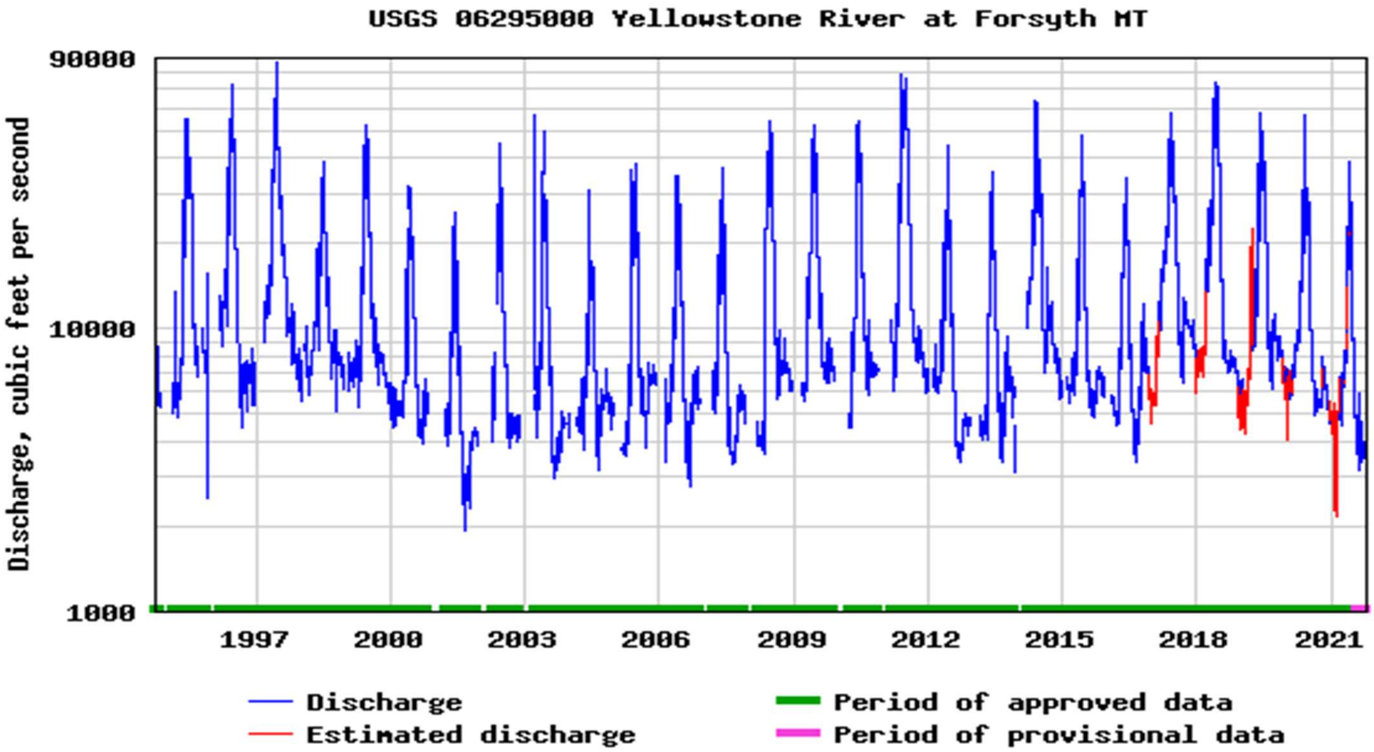

Figure 2-20 River Flows at Forsyth 1995 - 2021

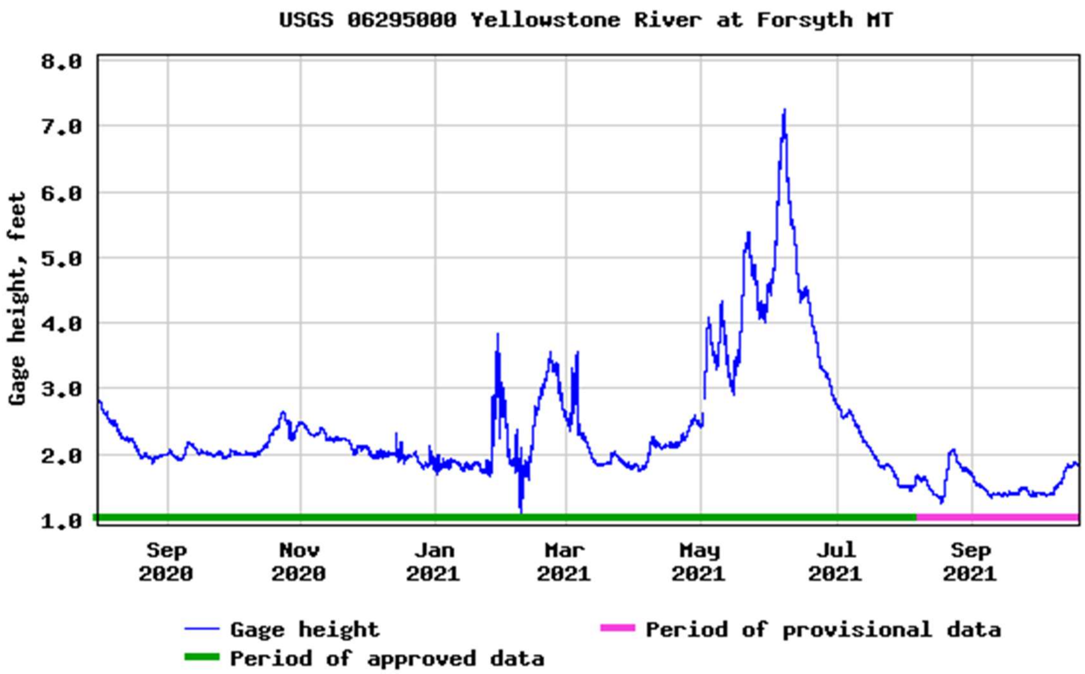

Figure 2-21 Yellowstone Gage Height at Forsyth 8/20 - 10/21

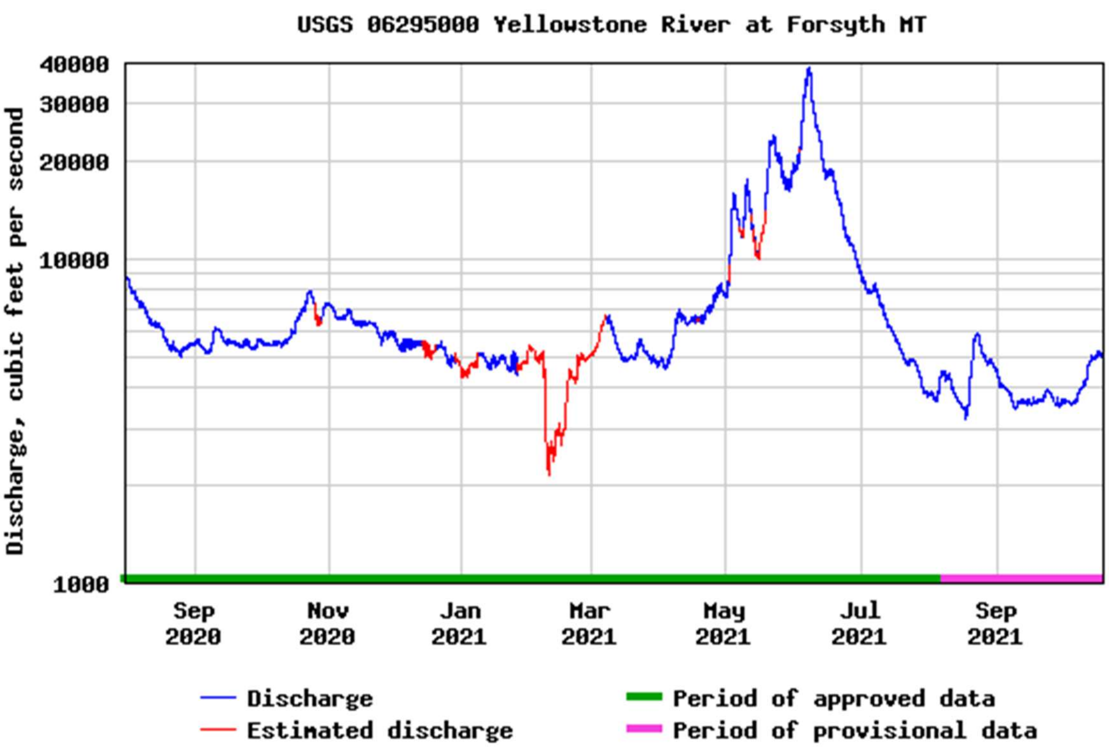

Figure 2-22 Yellowstone Discharge at Forsyth 8/20 - 10/21

The high The Submergence and historic lack of siltation outside of the pipe combine to make the current location optimal for an intake. Regardless of improvements made, any new inlet pipe should remain near the current location. However, siltation and presence of sand and small gravels have plagued the intake.

The following is a description of the two recent plugging events

- The inlet pipe completely plugged in 2011 and 2013.
- The 2011 jam required 6-7 weeks to clear the obstruction. The city had to use a rental pump to draw water over the levee and into the intake basin. The city used the intake pumps to move the water to the plant. The plant operated from 7pm to 8am in the morning. The day shift would then remove gravel and attempt to unplug the intake line.
- The city hired a large vacuum truck to help remove sands, silts and gravel, but it was unsuccessful because it couldn't draw gravel up that high. It was able to suck water and silt.
- Gravel was removed from the intake basin by bucket to about 3 ft below the intake line. A concrete bottom was never found, and it was concluded that a concrete floor does not exist for the structure.
- The line was finally cleared by jetting with the city vacuum truck. Operators noted that the rush of water created a hazardous situation for individuals trying to leave the intake well.
- The 2013 plug required two weeks of temporary pumping.
- Divers from Liquid Engineering inserted a pigging device into the intake line on the river side during the second plug event. The plug loosened and fell out of the pipe shortly after work was completed and was found on the bank.

It is indeed fortunate that the clogging events did not occur during the winter. Had this clogging event occurred with the river frozen, the situation would have proved far more dramatic, with placement of a temporary water pump questionable. This could have left the city without water for drinking or sanitary use for an extended time.

Figure 2-23: Forsyth Intake general site view (Mild Winter)

Figure 2-24: Backwater at the Forsyth Intake (Summer)

There is one area of concern about the existing system, other than structural stability. DEQ – Circular 1 notes in item 3.1.4.1 "Design of intake structures must provide for:

c. where frazil ice may be a problem, holding the velocity of flow into the intake structure to a minimum, generally not to exceed 0.5 feet per second;

The similar recommendation is made by US Fish Wildlife and Parks. Currently the velocity into the wet well is nearly 3 ft/s, greatly exceeding the 0.5 ft/s requirement. This is at least part of the reason suspended silts, sands and small gravels can enter and collect in the intake. There are two issues causing this high velocity:

- The vertical turbine pumps are oversized with one at 1500 gpm and the other at 1200 gpm, far more than the anticipated full grow-out maximum demand day.
- The inlet is a 14-inch pipe with no screen or cage.

The first issue could be controlled if VFDs were installed (along with smaller pump). The second issue could be resolved with a combination of the VFDs and placement of a tee at the end of the pipe. This could keep inlet velocity could be kept to under 0.5 ft/s by having two openings that would be hydraulically equal. Keeping the branch end tilted down should aid in the settling of sands and small gravels back to the river. This will be discussed further in the alternatives section.

Due to the important nature of keeping the pipe clean, it is further recommended that the there be a blow-down system to allow the intake line to be flushed backwards to frequently clear out any debris before it could become a problem. An access port for a pigging device would also be beneficial. It is worth noting that by installing a tee rather than a cage or screen at the inlet, the use of a pig remains possible.

Placing a second inlet at a higher elevation is another possible means of limiting the inlet velocity when the river is running high.

2.4.2.3 Intake Mechanical System

The lift station uses two 15-HP vertical turbine pumps to draw water from the wetwell and pump to the WTP for chemical mix, flocculation and settling prior to filtration.

The two 3-stage pumps are 1150 rpm, which helps explain why they have lasted so approximately 30 years without major concern. Pumps are controlled from the WTP control system.

The vertical turbine raw-water intake pumps can be pulsed in reverse to clear blockages in the column pipe and valves, and are utilized to do such sporadically. They have also been used to pump up muck and send it to the sludge drying beds (these beds are also used for settling filter backwash). The low rpm and relatively large impellers allow the pumping of the gritty water, though this is never an advisable use for vertical turbine pumps.

Figure 2-25 Low RPM Vertical Turbine Pumps at the Intake

Figure 2-26 Pipe Route to Drying Beds and Pre-1931 Portion of Intake

The figure above shown previously shows a valve wheel. This wheel controls a slide gate (shown in the figure below) that was installed by Agri-Industries to replace the original valve (likely a gate or plug valve). It is difficult to know where the gate is when raising or lowering it and the gate has come off because of this and had to be put back using divers. The gate does not provide full shut off but is sufficient for drawing down the wet well when it has needed cleaning.

The figure below shows the gate after drawing down the wet well.

Figure 2-27 Slide Gate Connection

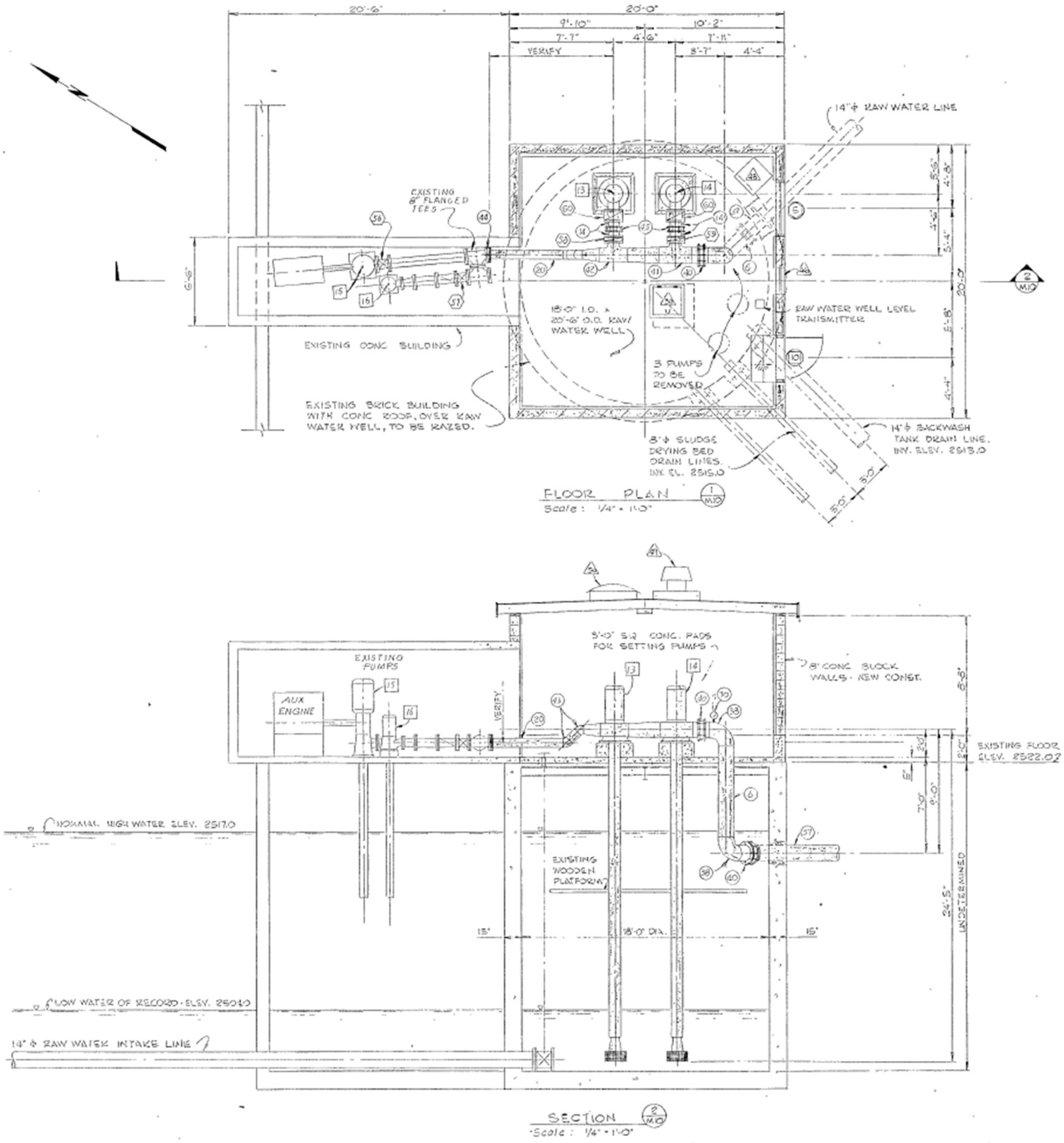

Figure 2-28: Intake structure plan and profile

It is important to note that there are some errors on the above drawing. Most importantly, there is no floor currently below the intake inlet or vertical turbine pump screens. In addition, there are several pipes that enter the wet well from the east. Those pipes are connected to an old steam vault that does not serve any known function.

2.4.3 River Morphology

Prior to conducting any design work on the Intake, it is imperative to first examine data available on changes in the Yellowstone River (the river). Proper locating of an intake can be the difference in a 100-year life, or 2-year financial disaster.

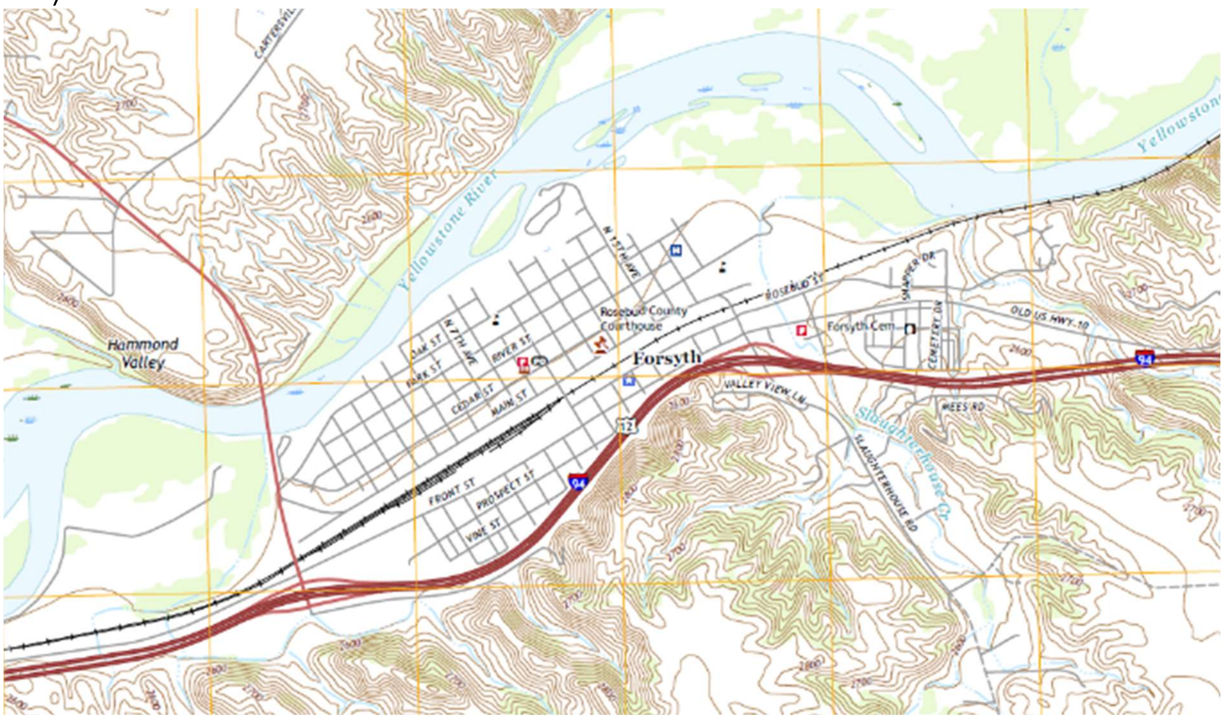

Figure 2-29: 2020 Topographic Map - Forsyth, MT

Topographic maps were reviewed dating back to 1968, 1979, 2020; along with aerial photographs from 1985, 1996, 2004, 2006, 2009, 2011, and 2014 (all included in Appendix O) to give a view of the river's movements since 1968.

The aerial photographs (1985 – 2014) show that there is a definite long-term channel where the intake is currently set. The stretch of river housing the intake is void of braiding, islands, or multiple defined channels. Additionally, the Cartersville Dam (an earthen irrigation diversion spanning the entire length of the river) was constructed in the 1930's and has since acted to decelerate river flows upstream of the dam location. This dam occurs approximately 4,300 LF downstream of the existing intake. The river's flow fluctuates dramatically throughout each year, as is to be expected with a freestone river. Regardless of flow, the river's main channel and majority current is concentrated along the southern riverbank at the location of the intake/WTP. Consequently, the intake side of the river always has reliable flow, regardless of variable river conditions. With the topographic maps and aerial imagery included in Appendix O, it appears that the river's channel character along the Intake can be assumed to be constant into the future.

The following observations are provided as reasoning for continuing to use the existing channel for the intake and any new intake as may be required.

- The existing intake location was viewed in 1999 showing neither advancement of siltation nor significant scouring of the river bottom.
- No significant channel migration or general river meandering is shown in the available mapping (1968 to present), including directly up and down stream of the intake/WTP.

2.4.4 Water Treatment Plant (WTP)

The city of Forsyth has been able to keep its aging plant operational and without any contamination events for at least the last 15 years. Water quality data show that organics may sometimes rise, but never led to a violation. In general, the public is happy with the water. The State is also pleased with the performance and dedication of the operators, noting in its Sanitary Survey of 2019:

The system is very well managed and certified operators are retained as required. The system is quite complex and the operators are commended for their dedication to delivering safe water for consumers. The evidence of pride in the water system and demonstration of knowledge by the Pat during this inspection was very much appreciated.

Considering lack of violations and noting that the city has prepared a short-lived assets list for replacement of mechanical components, the discussion on the WTP will be relatively brief.

WTP upgrades have occurred in 1976 and 1993. The most significant upgrade to the WTP was made in 1976, a time of substantial growth. By 1980 the population had risen to 2553, over 50% higher than today.

The 1976 improvements included a major expansion, bringing the system up to a full conventional treatment plant including defined pre-sedimentation, flocculation and settling using tube settlers. The improvements also included drying beds and construction of a roof over the intake pumps. A new floor was poured above the existing floor, though it appears there was no structural support added.

The 1993 improvements worked within the footprint of the plant, but added flocculators, tube settlers and a number of chemical addition points (at raw water entrance, at the pre-sedimentation basins, at the flocculators and the filters). In addition, diffusers were added for raw water entering the pre-sedimentation basins. The project also provided baffling for the clear well using woven stainless-steel baffles.

As with most WTPs, the main concern is keeping down NTUs. The city keeps monitors on all filters and the total combined flow leaving the WTP. There are no violations in anyone's memory, nor within the 15 years of data examined.

The most significant issue is keeping chlorine levels throughout the distribution system. This is largely due to the distance to the large 1 MG water storage tank. The need to keep up the residual can require higher than desired chlorine additions which can create a taste issue with customers.

As will be discussed, the main issues facing the WTP is the control system and ventilation/alarms for the chlorine room.

Pre-sedimentation Basins, flocculators, Clarifiers

The pre-sedimentation basins, flocculators and clarifiers are all directly part of the same structure and no pipe restricts flow.

Water is pumped from the intake through a chemical addition (Aquapure Alum and A50P Polymer) and discharged to the pre-sedimentation basins. These basins and the flocculators are below the operations floor. Sludge from the pre-sedimentation basins is drawn from sludge pumps and sent directly to the sludge drying beds. The clarifier area and roughly half of the area below the flocculators can be directed to a drain line using mud valves. This area does not have sludge pumps.

Figure 2-30 Forsyth Tube Settlers

After the pre-sedimentation, the water passes through four flocculators installed in parallel. Final clarification is enhanced using tube settlers. Chemical addition is possible at both the pre-sedimentation basins and the flocculators, but these locations are not currently used for chemical addition.

All components appear to work quite well, despite the age. Replacements of mechanical components will be included in a short-lived asset list to be included later in this study.

Filters

The city has three filters that operate in rotation. Each of which was reconstructed, including new underdrains, in 1976. The filters include a surface wash but not air scour. Backwash is sent to a backwash settling pond (also part of the 1976 project) with supernatant going to the intake building. Backwash and surface wash flow is approximately 2450 gpm.

Based on WTP drawings, the city has the capability to add chemicals for filter aids, but this is not typically necessary and has not been used for years. According to the 2019 Sanitary Survey, the city may also add activated carbon prior to filtration to help control organic carbon or taste and order.

The Sanitary Survey includes an excellent layout of the filter system including layering of media and anthracite and is copied on the following page. See Appendix H for the survey.

Figure 2-31 Turbidity Meters and Continuous Chlorine Monitoring

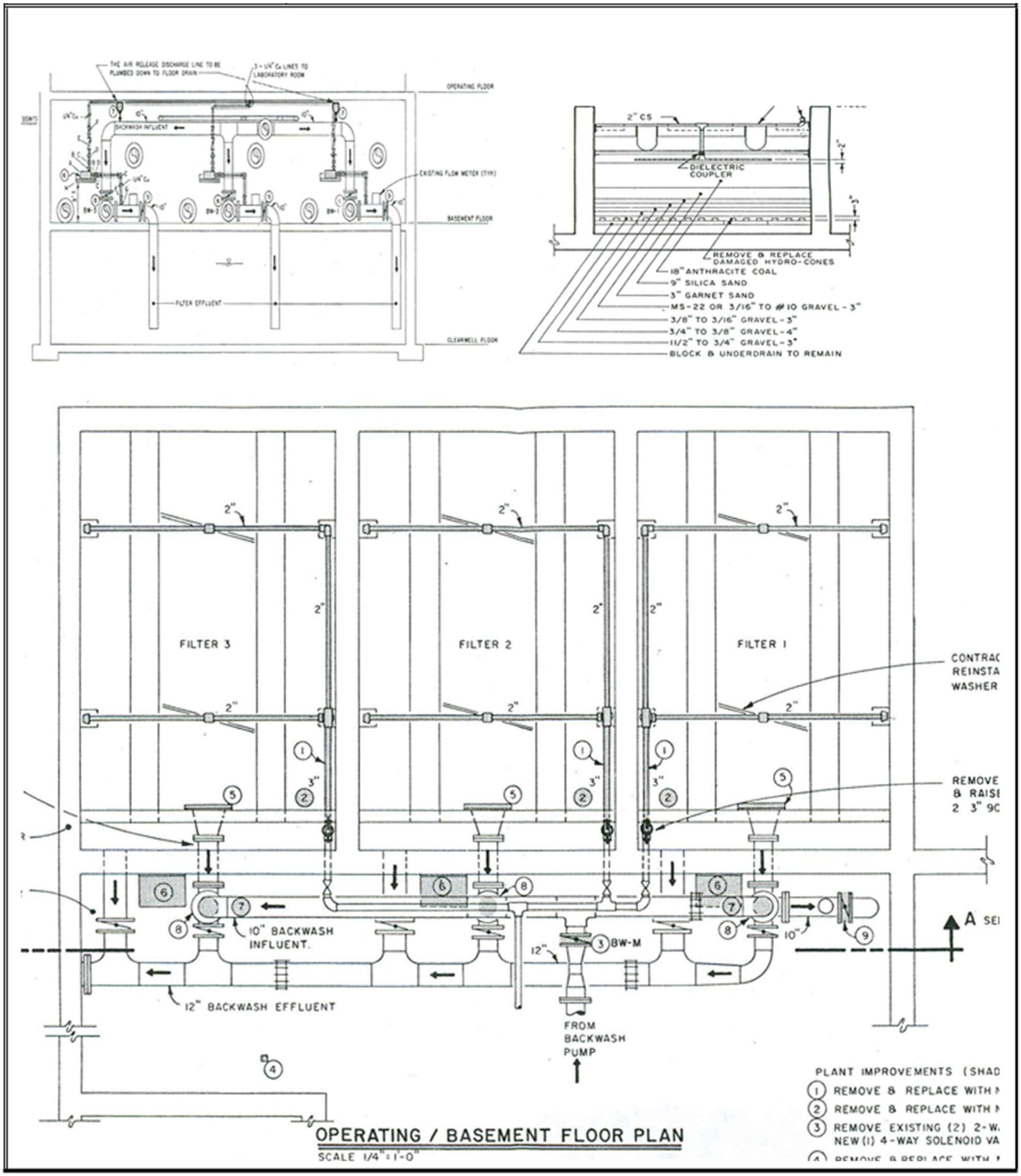

Figure 2-32 Filtration System per San Survey

Figure 2-33 Backwash Settling Basins

Chemical MCL Compliance

The WTP complies with State regulations for all organic and inorganic contaminants. No chemical violations were found in researching the past 15 years of operations.

Disinfection

Disinfection is provided using chlorine gas, supplied in 150 lb containers and stored on-site. The 2019 Sanitary Survey notes that the city uses about 4 to 5 pounds of chlorine in a typical day.

Figure 2-34 Chlorine Room (from Forsyth Sanitary Survey)

A serious incident occurred in 2018 when a heater control (thermostat) would not shut off the heater. The heater control had corroded, and there was no alarm. As the temperature in the room rose, the gas within the tanks rose in pressure and a leak occurred. When an operator opened the door he was hit with the gas and had to go to the hospital. He was later releases, but the city realized it needed to provide improvements to the ventilation and controls.

Andy Sullivan, currently the head of operations for Forsyth and formerly a chemical engineer with decades of refinery experience, has suggested two relatively simple improvements that should prevent this from recurrence. First, there should be two thermostats operating in series allowing the heater to shut off when either indicates sufficient temperature, and both must reach the low-temperature setting in order to activate the heater. In addition, a readout should be mounted outside of the building. These improvements are necessary, but relatively low-cost. The city is advised to move forward quickly. New controls (to be a recommendation of this PER) at the WTP would be provided with alarms to notify operators of a leak or temperature control failure. These combined actions should provide a very strong safeguard against future accident.

Clearwell

In 1993 woven stainless steel baffles were added to increase the contact time. The city has not had any violation for lack of sufficient contact time through at least the last 15 years.

The city uses 9187.5 gallons/ft in state reporting. The maximum level is 6.8 ft where the filters trip off. Normal operating range is 5.9-6.5 ft or 54,200-59,700 gallons.

Prior to entering the clearwell, the city has the option to add potassium permanganate for taste and odor control. This is not usually necessary. Polyphosphate is available on-site but is not currently in use and there are no lead and copper violations outstanding.

Controls

The city has an Allen Bradley RSLogix SLC500 control system. This system is now obsolete and parts are not being produced for repairs. Since all operations at the WTP go through this obsolete controller, it is imperative that it be replaced.

Timing of this may require the city to move forward as soon as possible without benefit of grant funding.

High Service Pumps

High service distribution pumps include: 1100 gpm, 1500 gpm pumps. These pumps are continuously throttled down to allow for longer contact time. Both a control valve and a manual valve are used for throttling the flow. This action burns energy without any benefit. Variable frequency drives would provide a far more effective and cost-efficient means of flow controls without any loss of energy.

By providing new controls at the WTP, it will be operational during the night to further allow the slow, and more constant movement of water, further enhancing contract time and settling.

2.4.5 Water Distribution System

The city of Forsyth has two distinct pressure zones. The lower zone, referred to as the Main Zone, serves roughly 95% of the city. The Upper Zone is served through a booster station with only one operational pump with no back-up power, and a small hydropneumatics tank with less than 100 gallons of storage. True Storage is only provided in the Main Zone with a 1-million-gallon steel storage tank.

2.4.5.1 Storage

The 2009 PER was developed without the benefit of the 2021 ISO report. That ISO report found that the highest NFF was 4,000 gpm, at the Rails Inn, and 3,000 gpm along Main Street. Logical estimates made in the 2009 PER had established an NFF of 4,500 gpm in the Main Street Area.

For reasons described in Section 2.3.5, "Water System Fire Flow Demands", the design NFF for storage is 3,500 gpm, which exceeds the ISO Basic Fire Flow requirements of 3,000 gpm and would be sufficient storage supply to serve all structures listed by the ISO, with the lone exception of the Rails Inn.

Based on Circular DEQ-1 "Standards for Water Works," Section 7.01.a,

a. *the minimum allowable storage must be equal to the average day demand plus fire flow demand…"*

The issue of the high NFF at the Rails Inn was discussed with the fire chief and water operations manager. The use of 3,500 gpm as the target NFF for the city was agreed to by all parties, thereby complying with item 7.01.c,

c. *Where fire protection is provided, fire flow demand must satisfy the governing fire protection agency recommendation…"*

See correspondence in **Appendix XXX** regarding design fire flows.

Based on the state standards, and noting that a 3,500-gpm fire would require a duration of 3 hours per Section 2.3.4, and noting that the average day demand for the design year of 2045 was established as 0.31 MGD per Section 2.3.3, the required storage for Forsyth is calculated as:

3,500 gal/min X 3hr X 60min/hr + 310,000 gallons = 940,000 gallons of storage required.

The existing 1 MG tank quantity meets the State requirement for the Main Zone, and if pumped through the booster station, also can meet the needs of the Upper Zone. Note that this is conservative in that the high service pumps at the WTP can provide over 1,500 gpm (high flows from the WTP are only possible if the system is allowed to slow its production rate and allow for more time in the clearwell by operating during the night).

Upper Zone

There exists a higher zone that currently consists of the Riverview Villa Subdivision. This subdivision includes approximately 25 duplexes. Spacing of the duplexes is roughly 11 feet apart at the closest encounters. Needed fire flow may be calculated conservatively as 1,400 gpm, for a duration of 2 hours.

If there are pumps drawing from the Main Zone, with a firm capacity (capacity with the largest pump out of service) of 1,400 gpm, the storage requirement would be met by the Main Zone tank. Without such fire pumps, the Upper Zone would require its own dedicated water storage tank.

Average day water demand in the Upper Zone of approximately 14,000 gallons (10 gpm) is negligible compared with the NFF. The required storage ***without fire pumps*** is calculated as:

14,000 + 1,400 X 2 X 60 = 182,000 gallons.

This amount can be greatly decreased if dependable fire pumps are installed at the booster station with back-up power.

There are **advantages** to having storage in the Upper Zone beyond just fire protection. Stored water is also stored energy which allows the area to be serviced when the booster station is out of service. In addition, proper valving (backpressure sustaining/pressure reducing combinate valve) could allow the water to pass back into the Main Zone to augment water from the existing water storage tank, or accept water from a pressure surge in the Main Zone. A major advantage is being able to take the Main Zone tank temporarily out of service.

Combined with the installation of VFDs at the WTP, these additional advantages provided by the properly valved, new Upper Zone water storage tank should make temporarily shutting down of the existing 1 MG tank for repairs far easier and safer to manage.

There are **disadvantages** also associated with an Upper Zone tank, especially cost. An additional tank would bring additional concerns about maintaining chlorine residual, stagnation and freezing. This is particularly problematic when noting that the winter demand would be only about 6,000 gallons per day. If the tank were 182,000 gallons (the quantity needed if there were no fire pumps for 1,400 gpm Fire Flow for 2 hours plus average day demand), the tank would take a month to use up the average gallons stored, even if the booster station was not in use. Valving and attentive operations could help but keeping residual and avoiding freezing would be very difficult.

If 1,000 gpm was provided by a fire pump, the total required storage would be decreased by 120,000 gallons. This is a reasonable amount of fire flow from pumps and would have no significant impact on the lower zone from which the pumps draw, since it is connected all the way to the 1 MG tank through 12-inch pipe. Wisely using a combination of pumps and storage **would allow the area to be served by only 80,000 gallons of storage**. Since the tank would be elevated, this would be a significant cost savings. This would also leave 20,000 gallons for the average day demand of both the current Riverview Villa Subdivision, and expansion to the Quincer Subdivision.

Computer modeling was completed for this scenario previously as part of the 2009 PER and excerpts are included in the Appendix.

Managing residual chlorine for a large tank serving a small area would strongly suggest providing most of the fire flow through fire pumps, especially since it has no significant impact on the lower zone from which it draws.

Existing Storage Tank Condition

The Forsyth Hill Welded Steel Reservoir holds 1 million gallons and is the backbone of the distribution system. The reservoir site is located on the east side of Interstate 94 on a dead-end road. Due to its remote location, the site is unfenced. The reservoir was noted in the Sanitary Survey as being in "good" condition, which is the highest rating in the standardized form for a reservoir's condition. The tank is inspected every 5 years. The only concern noted by the latest inspection in the 2019 inspection report was minor tank corrosion which will be monitored going forward. From the 2019 Sanitary Survey, Gerald Gernand remarks:

The ladder and hatch are locked and secure. The storage facility overflow is screen. The tank rides on the system and communicates with the plant telemetry system. The storage tank integrity, site security and potential sanitary risks are managed through the professional management and operations of the Forsyth public water supply operators. Proper maintenance procedures, operation and inspections are routinely performed assuring the operational readiness of the public water supply.

Not mentioned within the 2019 Sanitary Survey but still an item needing attention, there are several areas of soil erosion proximal to the water storage tank. These areas include the western (downhill) side as close as 15 feet from the western edge of the tank and at the north edge of the tank between the currently used tank and the abandoned concrete tank. In this second instance, the erosion has exposed a steel ring that runs approximately 15" outside the vertical edge of the steel water tank. In this same location, a low spot bordering the tank wall is experiencing ponding during precipitation events.

The water storage tank does not have mixing capability and the inlet also serves as the outlet. This situation minimizes mixing and allows for loss of chlorine residual, while increasing the threat of freezing. The tank is often operated half-full during the winter months.

A mixing mechanism is recommended to allow for greater use of the existing tank capacity. In addition, and in accordance with the latest inspection, the tank interior should be prepared and coated.

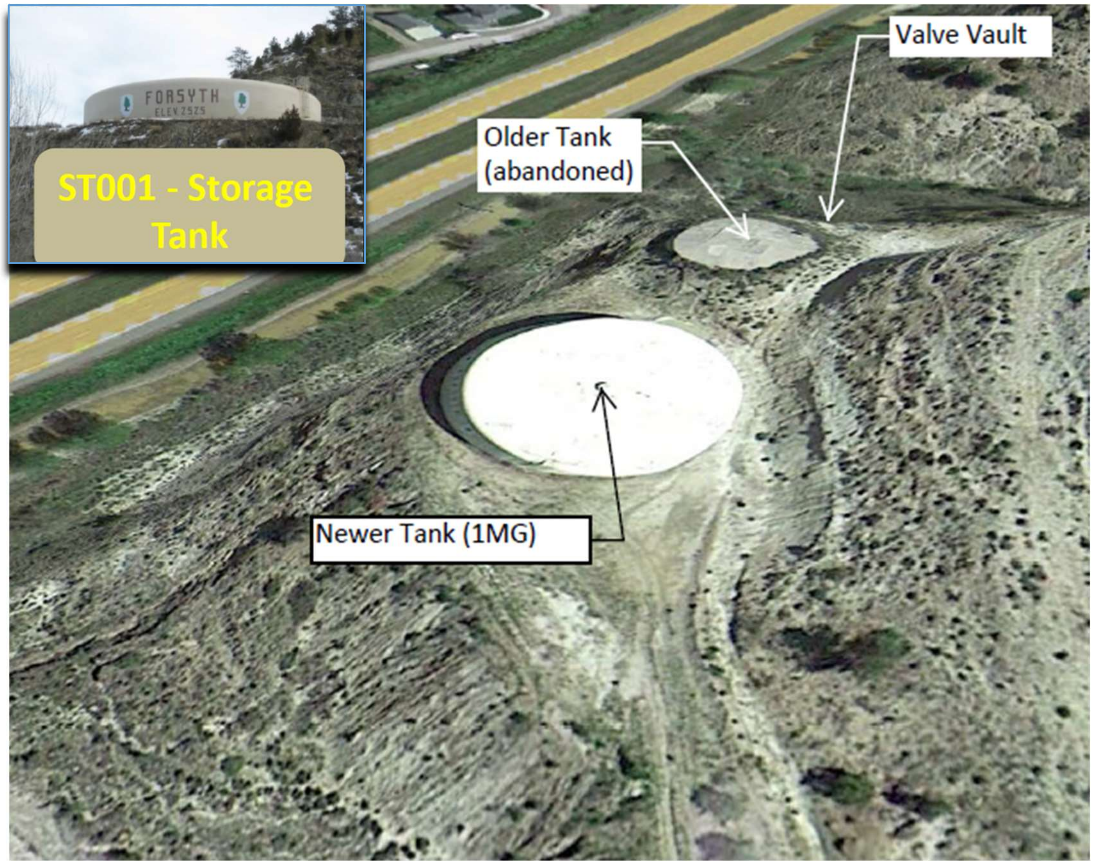

Figure 2-35: Forsyth Hill 1 MG Water Storage Tank

2.4.5.2 *Riverview Booster Station*

Forsyth's Main Zone is pressurized by the high service pumps at the water treatment plant, with that pressure maintained by the 1 MG water storage tank. That system does not currently provide adequate gravity pressures to the entirety of Forsyth city limits.

The Riverview villa booster station is used to provide adequate pressure to the Upper Zone, which currently consists of the Riverview Villa Retirement Community. This neighborhood is composed of 25 duplex apartments and has since been repurposed from what was once a military base. This booster station consists of a single inoperable 40 HP, 650 gpm fire pump, and a 10 HP jockey pump with an approximate capacity of 200 gpm. The smaller pump runs 24 hours a day controlled by a VFD (the frequency is always under 40 Hz, showing that the pump is over-sized). With only a small hydropneumatic water tank, loss of that pump would leave the system without pressure in less than a minute.

The booster pump facility has several existing concerns including the lack of pumping redundancies, and lack of backup power supply. "DEQ Circular 1 – Standards For Water Works" Chapter 6 design requirements are not currently met for the existing pumps.

Figure 2-36: Riverview Villa Retirement Community and Existing Booster Pump Station

According to Northwest Energy, the single fire pump cannot be operated due to power supply restrictions. The pump was started in September 2021, but the following week the meter blew out and power was lost. Although Northwest Energy blamed the pump for this issue, it is difficult to envision why such an event would occur a week after the starting and stopping of the pump. In any event, there is no back up fire pump.

The outage showed the absolute dependency on the booster station. Fortunately, a new temporary power service was provided within 24 hours, but that is not an acceptable condition as it opens the system to greater threat from contamination and community sanitation is compromised.

In summary, important issues face the city for use of the booster station:

- Firm capacity of the pump station is 0 (no backup supply for the small pump and the larger fire pump cannot be used.
- Any loss of power would cause immediate loss of the booster station
- Firefighting capacity for the entire retirement community is non-existent since the single fire pump cannot be operated and remains off-line (even if usable, its capacity is less than half the NFF).

To protect the public health and meet the state's standards it will be necessary to

1 Provide a second pump for daily operations and
2 Either provided
   a. A permanent generator on-site and two fire pumps at 1,400 gpm each, or
   b. Provide either a new water storage tank at 182,000 gallons, or Provide a smaller tank (80,000 gallons) and appropriately sized fire pumps (1,000 gpm) to meet the NFF of 1,400 gpm when used in combination. This combination would be far less costly and easier to manage chlorine residuals and therefore an alternative analysis will not be conducted in Section 4.

The adjacent Quincer subdivision has pressures that drop below 35 psi. The 2009 PER recommended that this area also be included in the Upper Zone. That determination of that PER had strong public support, and this action is supported by this PER, and does not require re-visiting. An advantage of adding the Quincer subdivision would be better operations of the water storage tank for keeping up chlorine residuals, while maintaining the DEQ minimum design pressure of 35 psi within that subdivision.

2.4.5.3 Pipe Distribution Network

The water distribution system is nearly all asbestos-cement (AC) pipe. Gradual leaching of the cement in the AC pipe leads to brittleness and failures. The life of AC pipe is generally accepted as 50 years (see excerpts from an HDR study included in the appendix). Breaks have become frequent in Forsyth's AC pipe, even in locations with a 6 – 6 ½-ft bury. Operators note that the pipe was installed in the 1950's or 1960s, making it 60 – 70 years old. A summary of the many breaks is shown below (Figure X-XX), including 13 break events (some with more than one break/leak found) from 2008 to 2015. Milder winters have led to fewer breaks recently, but the leaching of cement from the AC pipe will likely lead to a sharp increase once the area experiences a harsh winter (soil heave is likely responsible for the actual breaks of the weakened pipe). Also included below are graphics detailing plan view locations of these pipe breaks along with locations and flow testing results for hydrants tested as part of the 2015 ISO report. A previous section, 2.4.5.1 Storage, discusses deficiencies in Available Fire Flow versus the 2015 ISO report's specified Needed Fire Flow. Those results are presented in Figure X-XX below.

The figure below, Figure 2-37, provides a layout of the distribution system.

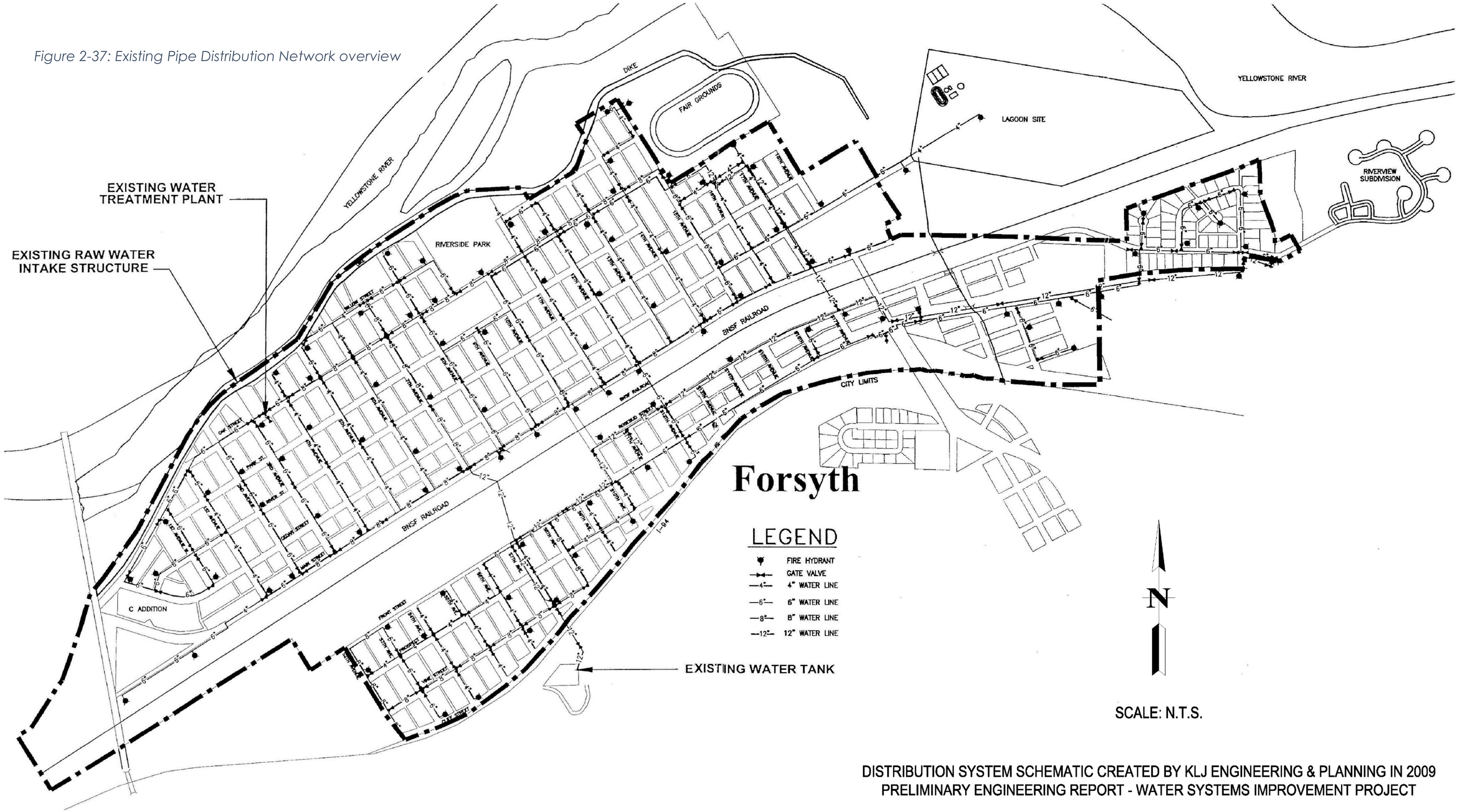

Figure 2-37: Existing Pipe Distribution Network overview

DISTRIBUTION SYSTEM SCHEMATIC CREATED BY KLJ ENGINEERING & PLANNING IN 2009
PRELIMINARY ENGINEERING REPORT - WATER SYSTEMS IMPROVEMENT PROJECT

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FORSYTH WATER DISTRIBUTION EXHIBIT
FORSYTH PER
FORSYTH, MT

Table 2-5: Recent Pipe Repair Records

Forsyth Water Main Breaks

	Year	Location	Pipe Size	Pipe Material	Notes
1	2008	S 9th & Front	4 or 6"	AC	
2	2009	10th & Oak	6"	AC	
3	2009	12th & Oak	4, 6, or 8"	AC	
4	2010	Rsebud & Barracks	12"	AC	
5	2011	10th & Oak	6"	AC	
6	2011	7th & Main	8"	AC	
7	2011	S 14th & Front	12"	AC	
8	2012	17th & Cedar	6"	AC	1 of 3 breaks on pipe at winter. Difficult to isolate due to drawing quality, system complexity, and finding valves. Almost lost water to entire city.
9	2012	17th & Cedar	6"	AC	2 of 3 breaks on pipe at winter.
10	2012	17th & Cedar	6"	AC	3 of 3 breaks on pipe at winter. Section replaced with PVC.
11	2013	12th & Main	4, 6, or 8"	AC	
12	2014	Snapper	6"	AC	
13	2015	S 21st & Clark	6"	AC	

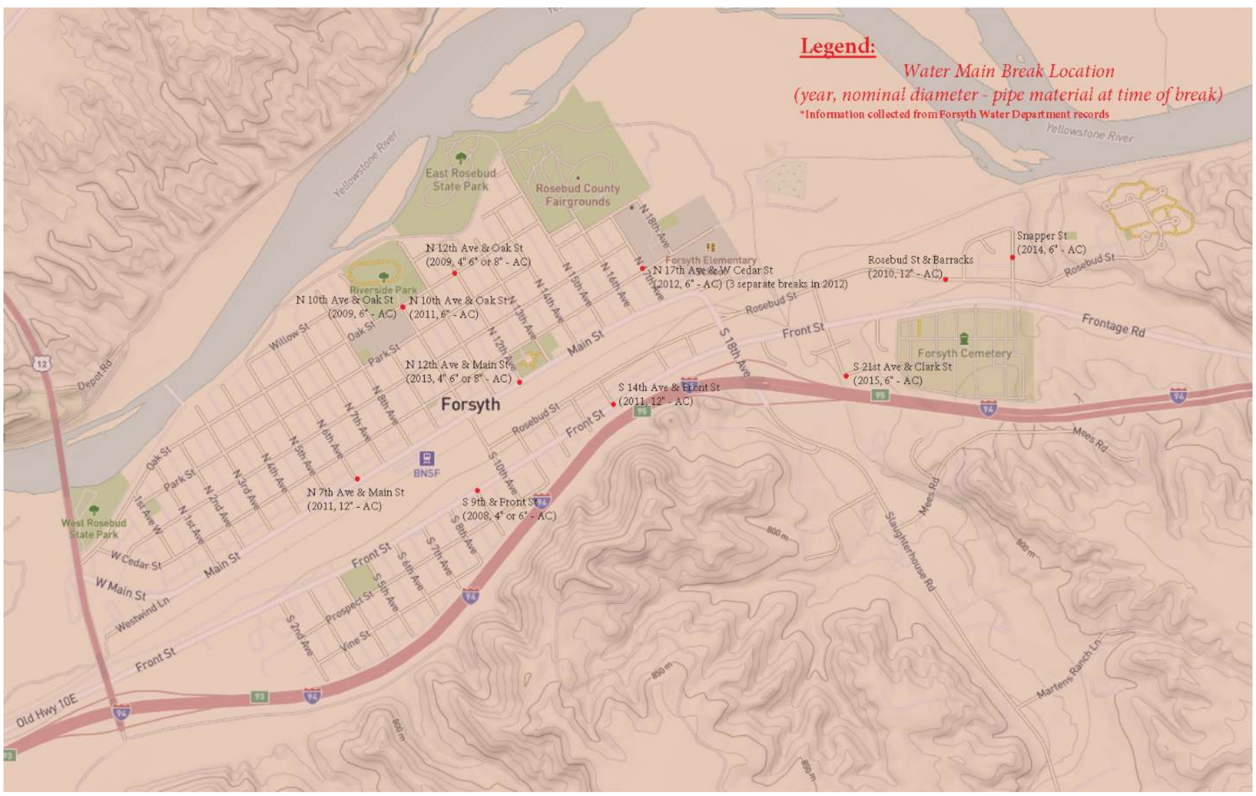

Figure 2-38 Most Recent Pipe Break Locations

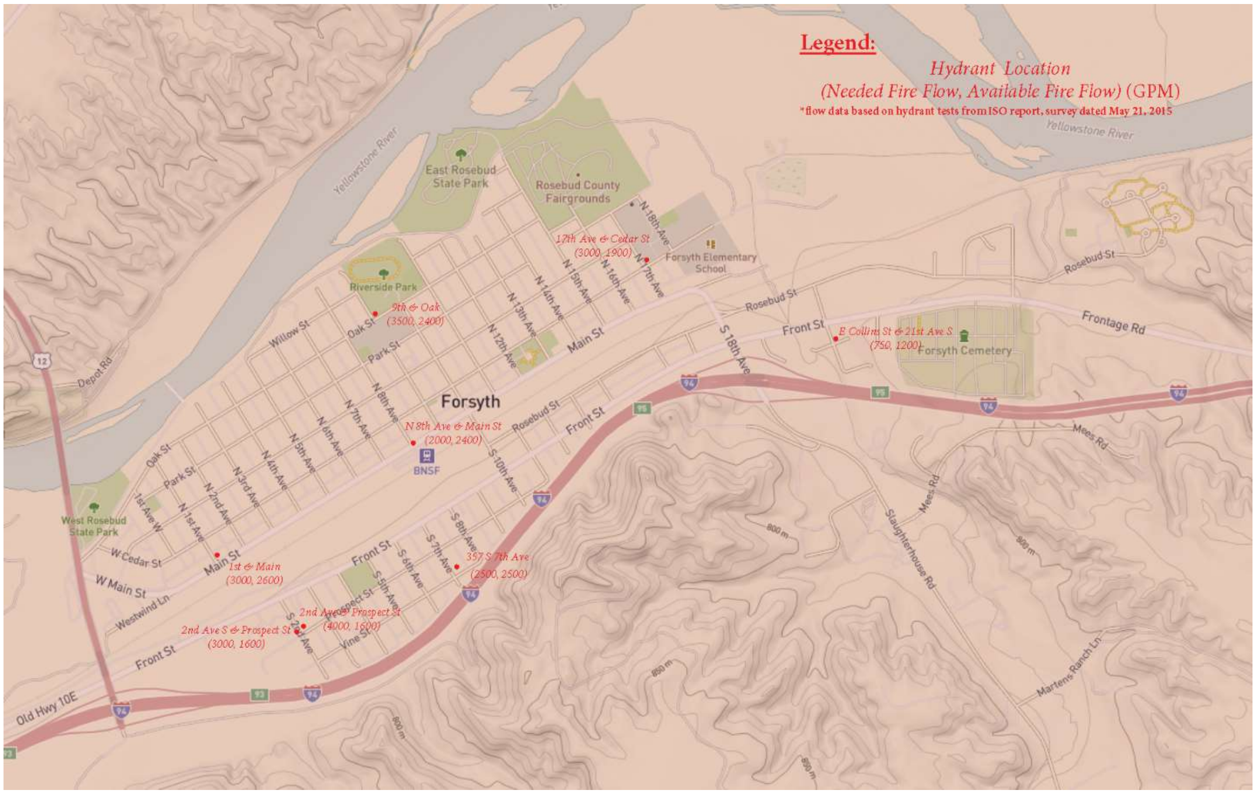

Figure 2-39 Hydrant Flow Test Results

Figure 2-39, directly above, provides the locations and Available Fire Flow hydrant test results. As shown, four (4) of the seven (7) test locations were not supplying the Needed Fire Flow (NFF) as specified by the 2015 ISO Report. These existing system capabilities create a health and safety hazard in the case of a structural fire in several areas of the city. These deficiencies are indicative of further shortcomings in adhering to DEQ-1, 8.2 Water Main Design as it relates to minimum required water pressures and fire protection.

The existing 12-in transmission main running between the Forsyth Hill storage tank and Interstate 94 has been an item of concern for the water district in that the pipe cover has been washed away two times in the past, once from a tank overflow issue and due to erosion. This length of pipe is installed on a steep grade with erosion prone soils. In the event of a failure along this pipe section, the highway below is placed in a position of massive vulnerably due to flooding and/or the possibility of slope collapse should a below grade pipe rupture occur uphill from the roadway. Further, this pipe is the only connection between the existing 1 MG storage tank and the entire water distribution system. A loss of this transmission pathway would cripple the entire water system nearly instantaneously. Protecting the integrity of this pipe section must be treated as an item of importance.

The hydraulic analysis modeling used during the completion of the 2009 Water Improvement PER was procured for use in this 2022 PER as well.

2.4.5.4 Bulk Water

The city currently operates a bulk water supply along the east side of the Water Treatment Plant. No issues were found by the State when the system was reviewed in 2019 as part of the Sanitary Survey.

Figure 2-40: Bulk water station at WTP

2.4.5.5 Water Meters

The city is entirely metered with Sensus Radio-Read meters. User rates are based on meter size and water usage when the base usage amount is exceeded. Comparison of water production and sales for winter and summer show that there are no significant unmetered water uses (very low percentage in the summer when a city might be irrigating parks or flowing hydrants, and consistently high leakage percentage in the winter).

2.4.6 Summary of Deficiency Findings for the Water System

- The intake structure presents a danger of having the floor cave-in, resulting in complete loss of water supply.
- The intake pipe has clogged two times in the last 10 years leading to incorporation of temporary pumping (up to 6 weeks) while the jam is corrected. The use of temporary pumps would be impossible, or nearly so, during winter when the dammed water freezes over.
- The WTP control system is outdated, and parts are not available from the manufacture for replacements (currently similar old systems must be found and parts harvested from them).
- Leakage is very high in the distribution system, accounting for 35% of all water produced in the winter.
- Aging Transite-AC distribution piping has been experiencing several breaks a year and leakage is well-documented based on water production and sales.

- There is approximately 23,600 feet of 4-inch AC in the distribution system, which is beyond its useful life. This piping does not comply with DEQ standards for pipelines feeding hydrants, and severely limits fire flow.
- Frozen valves within distribution system caused by lack of routine exercise. Frozen valves exacerbate water loss and repair cost when main breaks occur.
- Multiple identified leaking hydrants within system
- Damage to Intake pipe within channel
- No intake redundancy leaves water supply vulnerable to intake clogging.
- Structural damage to substructure of intake pump housing creates potential for structural failure/costly repairs/supply interruptions in the future
- There is no redundancy or backup power at Riverview Booster Station leaving Riverview Villa Retirement Community vulnerable to fire during system wide emergency, and complete loss of water.
- The Riverview Booster Station does not have an operable fire pump and only has one pump for sustaining pressure, which runs 24-hours/day.
- The Quincer Subdivision (adjacent to the Riverview Villa subdivision) has low pressures (below 35 psi)
- Erosion around the Forsyth Hill Welded Steel Reservoir, left unmitigated, could threaten the water supply along with lower elevation flooding and highway damage.
- The existing 1 MG Forsyth Hill water storage tank is beginning to experience corrosion inside the tank and will need to be re-coated in the near future.

2.5 Financial Status of Existing Facilities

2.5.1 Equivalent Dwelling Units and User Rates

The city of Forsyth operates their rate structure for water and sewer on a flat base rate, depending on the service line size, plus a usage fee. The base charge is multiplied by the equivalent dwelling units of the service (EDUs). EDUs are calculated by taking the square of the service line diameter and dividing by the square of the diameter for a ¾-inch service line. This system of charging provides an equitable distribution of costs for the degree of service available at any building.

In addition to the base rate (multiplied by the EDUs), each service is charged for the actual amount of water used, after reduction of the allowance of minimum use associated with a given service line size.

Table 2-3 below provides the total number and size of service lines currently active in Forsyth and the associated EDUs. As noted in Section 1.4, the potential for a drop in population is real, and therefore, when considering rate changes, it is recommended that the EDUs used in calculations drop to the low-population estimate determined in Section 1.4 to represent a minimum rate payer population of 1470 for the average payment year of 2035. This would lower the number of EDUs to approximately 1032 EDUs. This is a slight, but necessary precaution to ensure rates are sufficient. Hopefully, population will increase rather than decrease, but in planning rates it is always best to be conservative, and the overall trend in population has been downward for the last few decades.

Table 2-6 Forsyth Equivalent Dwelling Units

Forsyth EDUs as of 11/30/21

Meter Size	# of Meters	EDU/meter	EDUs
5/8"	43	1	43.0
3/4"	897	1	897.0
1"	19	1.79	34.0
1 1/4"	2	2.77	5.5
1 1/2"	4	4	16.0
2"	18	7.14	128.5
3"	2	16	32.0
Totals	985		**1156**
Value if for serving a population of approximately 1647			
For 2035 population of approximately 1470, estimate:			**1032**

The city has provided its financial information for the water and sewer enterprise funds, including expenditures and income. See Appendix K for the city's financials for the past three years, along with the resolutions for rate increases discussed above. The city's Water Revenue Fund finances are further discussed in Section 6, including a summary of debt payments and reserves.

The average cost per residential user is an important parameter used by several grant agencies in order to assess need. A reasonable assumption for family usage is 6,000 gallons per month per household. The actual figure would be higher in the summer and lower in the winter.

Tables 2-4 and 2-5 provide the water and sewer rates as of December 2021. The average user's average monthly payment is calculated at the bottom of each table.

Table 2-7 Forsyth Water User Rates

Forsyth Montana Water Rate and History

	Effective September 2003	Effective March 2007
Water		
Meter Size - inch	Base Rate	
0.75	$18.90	$24.50
1	$33.83	$49.00
1.25	$52.73	$73.50
1.5	$75.60	$98.00
2	$134.95	$171.50
3	$302.40	$392.00
10	$478.40	
Meter Size - inch	Gal inc. in Base	
0.75	2,000	2,000
1	3,580	4,000
1.25	5,580	6,000
1.5	8,000	8,000
2	14,280	14,000
3	32,000	32,000
10	350,000	
$/1,000 gal over base	$2.35	$2.35
If average 6,000 gallons per month, cost/month is calculated:		
1 EDU = $24.50 + [(6,000 - 2,000)/1,000] X $2.35		**$33.90**

Table 2-8 Forsyth Sewer Rates

Forsyth Montana Sewer Rate and History			
	Effective	Effective	Effective
	September 2003	March 2007	April 2013
Meter Size - inch	Base Rate		
0.75	$13.46	$21.50	$31.50
1	$24.09	$43.00	$56.39
1.25		64.5	$94.50
1.5	$53.84	$86.00	$126.00
2	$96.10	$150.50	$220.00
3	$215.36	$344.00	$504.00
10	$13.46		
Meter Size - inch	Gal inc. in Base		
0.75	3,000	2,000	2,000
1	5,100	4,000	4,000
1.25		6,000	6,000
1.5	12,000	8,000	8,000
2	21,300	14,000	14,000
3	48,000	32,000	32,000
10	By Unit		
$/1,000 gal over base	$2.48	$2.48	$2.48
If average 6,000 gallons per month, cost/month is calculated:			
1 EDU = $31.50 + [(6,000 - 2,000)/1,000] X $2.48		**$41.42**	

The average user would pay a monthly total of $33.90 + $41.42 per month, or a total of **$75.32/month for combined water and sewer** billing.

Actual income values will be used in assessing future financial needs. However, the above analysis of residential rates is important in working with certain grant agencies.

See Appendix K "City Financials" for:

- Last three years of budgets and Expenses
- Last three years of Revenue
- Audit Excerpts Showing a Summary of All Funds On-Hand and Invested
- Resolution for Establishment of Current Water Rates
- Resolution for Establishment of Current Sewer Rates
- Census and Target Rates 2015 (ACS Estimates)
- Short Lived Assets and Replacement Schedule
- Resolution 2022-R02 to pursue grants and a rate increase of $14.50/EDU

2.5.2 Target Rates

Target rates were briefly discussed along with populations and median household incomes (MHIs) in Section 1. Prior to requesting grants from certain funding agencies, the city is expected to have rates that meet a given Target Rate, which is established by the MDOC based on the latest data from the ACS. Target rate is the expected combined average cost of residential water and sewer service needed for grant eligibility. It is based on a percentage of the median household income estimated by the ACS.

The Montana Department of Commerce has established Target Rates for the city of Forsyth as follows:

Water: $48.22

Sewer: $31.00

Combined: $79.22

The above is based on a median household income (MHI) of $41,328. These figures are current as of 12/1/2021. It is anticipated that the MHI will drop significantly since the job loss in Forsyth and Rosebud County has been dramatic as coal production slows and the railroad closed its switching station in Forsyth (See Section 1.3.10 "Socio-Economic Issues").

The current combined rate is $75.42, just under the MDOC Target Rate. However, it is anticipated that the rates will need to rise significantly above the Target Rate to fund needed improvements.

Looking ahead, the Council signed a resolution to pursue increasing water rates by an average of $14.50 per user (see Appendix K for Resolution 2022-R02). This would place the city at roughly 114% of the Target Rate.

2.5.3 Current and Projected Budgets, and Short-Lived Assets

The city has implemented an aggressive replacement program for leaking curb boxed, frozen valves, and non-functioning hydrants. For this reason, the cost of O&M is expected to rise for the next few years.

However, in the long term, this action will curb O&M costs as the proposed improvements will create a decrease in operation and maintenance costs. However, portions of the recommended projects will likely include some degree of loan.

Future loans would likely be through the State Revolving Fund and carry a 20- or 30- year term at 2.75% interest. That debt service, along with required additional coverage that may be needed in a restricted reserve will need to be included in projecting future budgets.

The city does not currently have any debt service. Table XXX below provides a view of income and expenses for several years, and the averages. The city began committing depreciation funds for work on the intake in the budgets from 2016 – 2019, as a precursor to moving forward with the replacement project. This amount is deducted to determine true operational and maintenance costs.

Table 2-9: Water Revenue Fund Expense and Income

Water Revenue Fund Expense and Income

YEAR-->	16/17	17/18	18/19	**19/20**	3-year or 4-year Average
Expense	$ 373,753	$ 407,435	$ 451,629	$ 416,080	
Amt to Dep	$ 21,622	$ 32,916	$ 33,782	$ -	
Net true expended	$ 352,131	$ 374,519	$ 417,847	$ 411,463	**$ 388,990**
Income fr Billing	Not Available	$ 410,322	$ 392,731	$ 424,567	**$ 409,207**
Net Income/(Loss) Before Investment Income	Not Available	$ 35,803	$ (25,116)	$ 13,104	**$ 7,930**
Other Income Sources					
Interest	Not Avail.	Not Avail.	Not Avail.	$ 18,535	
Change in Invest Value	Not Avail.	Not Avail.	Not Avail.	$ 28,081	
Net Change, All Income and Expenses (2019/20 Only)				**$ 59,720**	
See Appendix K for detailed financials					

Income from billing is provided separate from the total income, since bond council prefers to examine income based on user rates. However, income from investments were notable in 2020, based on review of the audit and is included at the bottom of the table.

It is readily concluded that the Town has maintained adequate billing to maintain operations. However, the infrastructure has steadily aged and some components are badly in need of replacement. A major capital improvements project will require the city to seek higher rates, as will be discussed in Section 6 and summarized in the Executive Summary.

The city recently created a short-lived assets list and schedule for replacements. This all-important replacement program and its funding is essential for the city to become self-sustaining. That table including costs and scheduling is included in Appendix K. Funding of that 20-year program is to be included in any rate increase that might be associated with the recommended capital Improvements for the water system.

2.6 Water/Energy/Waste Audits

Excellent records of water production and water sales allowed a water and a waste (leakage) audit to be done as part of this PER. See Section 2.3.2. That section showed there is not much, if any unmetered water being used (based on high unaccountable water percentages in the winter). The audit showed that the system averages a 23% loss of all water produced due to leakage. The percentage rises to 35% in the winter when sales are lower, but the leakage remains constant.

A specific energy audit has not been conducted. However, in conducting this PER two significant energy savings were identified. First, the high service pumps are continuously throttled by using valves, thereby eliminating energy that had just been used to power the pumps. Use of variable frequency drives for the high service pumps would make the pumps much more energy efficient. Similarly, although VFDs have other benefits for being installed within the intake building, they will also conserve energy.

2.7 Summary

This PER agrees with the 2019 Sanitary Survey and finds that Forsyth staff has done an exemplary job of maintaining its facilities. However, there are very serious concerns with the overall system including:

- A dangerous situation has developed at the intake making it unsafe and unreliable since the flooring is in danger of collapse. Loss of the floor would eliminate the use of the Intake and would lead to serious injury or death to anyone inside at the time of the collapse.
- The 90+ year old cast-iron intake pipe has clogged twice in the past 10 years, causing up to a 6-week shut down and need for temporary pumping (would be extremely difficult or impossible in a harsh winter).
- Entrance velocity at the intake is well over the 0.5 ft/s limit (2.8 to 3.7 ft/s), which leads to conveyance of silts, sands and even gravels into the pipe where it builds up and can cause a total blockage of the intake
- Obsolete controls at the WTP threaten complete failure of that system and the manufacturer no longer provides repair components. In addition, the plant cannot be operated unattended, requiring more rapid movement through the plant than would otherwise be necessary. Failure of controls at the chlorination system recently sent an operator to the hospital. New controls would include alarms to prevent that from happening in the future.
- Deteriorating AC pipe throughout distribution system is demonstrated by numerous breaks and roughly 25% water loss through leakage.
- Low pressures in the Quincer subdivision violate DEQ standards
- Lack of storage in the Upper Zone (Riverview Villa), and no backup power at the booster station are serious concerns. Lack of a backup supply pump puts the firm capacity of the booster station at 0 gpm.
- Corrosion within the existing Forsyth Hill storage tank needs to be addresses.
- Continued erosion of the area around the Forsyth Hill storage tank needs to be addressed as soon as possible, and would not be a major expense.
- Extremely high leakage rates for the pipe network, frozen valves, and inoperable hydrants make repairs extremely difficult (the city has begun a replacement program in accordance with its short-lived assets list, included in the appendix), which will help in managing repairs).
- Concerns with the stability of the 12-inch main from the Forsyth Hill storage tank to the Interstate (I-94) crossing below, which has had its cover washed away twice, make this line a high priority for replacement, but may require temporary shut-down of the water storage tank, making this replacement timing best after installing VFDs

at the WTP and construction of a new proposed 80,000 storage tank is placed in the Upper Zone with valving to allow smooth operation.
- Energy and operator time are both wasted by using throttling to reduced energy (pressure & flow) from the high service pumps. This also limits the Contact Time.

Some excellent progress was also noted, including

- The city invested in divers to video tape the inside and outside of the intake pipe
- The city regularly has the 1 MG Forsyth Hill storage tank inspected
- The city has begun a regular valve exercising program and is actively replacing curb boxes while setting up funds to help with hydrant and valve replacements in the coming years. Hydrants and now being flowed at least annually, and the city has developed a short-lived assets list (Appendix K) and is seeking a rate increase to fund that program over the next 20 years (see appendix and later discussions).
- Operations have been exceptional, as noted in the 2019 Sanitary Survey.

SECTION 3 NEED FOR PROJECT

3.1 Health, Sanitation and Security

The health of the Forsyth community is taken very seriously. Outstanding efforts are continuously made by the excellent operations and maintenance staff to keep the existing plant in full compliance with federal and state water quality standards.

While the Forsyth water treatment plant and its staff have consistently produced high quality water, aging infrastructure and the dangerous situation in the intake building threatens the city's ability to produce water. Numerous pipeline breaks and extremely high water-leakage rates frequently expose the city's water system to contamination.

3.1.1 The Intake

The Forsyth Intake is not reliable. The intake is fed by a single 14-inch cast iron pipe installed in 1931. The inlet side of this pipe does not have a protective cage surrounding it, nor does it have screening to protect aquatic wildlife from being drawn into the treatment system. Of significant concern is that the inlet velocities far in excess of the DEQ required 0.5 ft/s maximum, and reach 3.7 ft/s with the largest pump on, and higher still if both pumps are operated. The high velocities can keep even gravels suspended, leading to clogging.

According to video inspection of the intake pipe, an offset joint is present along its length. The cause is unknown. Further, the intake system has no integrated means of clearing intake clogs. Subsequently, the system has clogged on several occasions as detailed previously in the report, once requiring 6 weeks to clear. Had this occurred in winter when the river will completely freeze over in this area, temporary pumping might have been impossible until crews could get the equipment to break through the ice and remain on site for continuous breaking.

The floor upon which the pumps are set was placed directly atop of the floor constructed in 1931. Concrete in that base floor has spalled badly and the exposed reinforcing bar is very corroded. The beams used in 1931 for support of the original floor, and later the newer floor from 1976 are highly corroded. Failure of the floor is an extremely serious concern. A lower deck hangs suspended by that same floor.

Loss of the floor could result in death or at least serious injury to those within the building at the time. In addition, water supply would be lost to the entire city. Temporary water supply would take at least several days to a week to install, since water would need to be taken all the way to the plant (the pumps in the intake could not be used after the floor collapsed). Considering that it could take a year or more to get approvals, plans and construction of a new intake, winter would bring serious problems to the temporary water system since the river will freeze-over solid.

3.1.2 The WTP

The water treatment plant functions fairly well as illustrated by water test data and there have been no water quality violations over at least the past 15 years. This is more a testament to good operations than anything else.

The controls at the WTP are obsolete and replacement parts are no longer provided by the manufacture. This is a huge concern, and the system needs to be replaced. The new system should include alarms to prevent the chlorine incident that sent an operator to the hospital and provide security to the plant.

Loss of alarms and proper controls could lead to the escape of insufficiently treated water. This is a serious concern since if controls monitoring turbidity meters and the associated relays fail, then turbid water **potentially containing bacterial, or protozoa may enter the system**. These contaminants are normally removed through filtration and can survive chlorine for exceptionally long periods, especially giardia, which form protective oocysts and cryptosporidium.

The new control system would include VFDs and alarms as necessary for the plant to operate at a slower rate and unattended, thereby allowing for greater contact time and enhanced settling. Slower operations at the WTP would be in sync with the intake pumps, allowing them to operate slower and prevent entrance of gravels and most sands from the intake pipe.

Actual system components such as sludge pumps and control valves have a limited life. The city recently took the initiative to do a catalog of all mechanical components and now have a replacement schedule for all pumps, control valves, and meters, along with media replacements. The city will need to raise rates for this action and is currently dedicated to doing so (cost estimates for User Rate increases include the cost for funding the short-lived assets replacement over the next 20 years). See the Appendix K for the short-lived assets and resolutions to seek a rate increase.

3.1.3 Transite Asbestos-Cement Distribution Pipe

The city has experienced 13 distribution main breaks since 2008 on transmission lines ranging in size from 4" to 12". Pipe breaks are repaired using PVC but requires shutting down sections of the city for each repair. The original Transite-AC piping is 60-70 years old. In addition to the piping of the existing distribution system being generally old, the city is aware of multiple frozen valves within the system (exhibit of inoperable valves included in the Appendix. These mainline valves are no longer operable due age. Lack of adequate valving causes much wider swaths of the city to be shut down during repairs and replacements. The extremely high leakage rate and loss of interior pressure during shut-down for repairs makes the distribution system open for **bacterial contamination to enter** through the leakage points. Breaks typically occur in winter where leakage amounts to 35% of all water produced!

From 2021 into the future, the city has established a valve exercise schedule to eliminate further valve freeze from occurring. Currently inoperable valves will need to be replaced, and more added. Bringing inoperable valves back into operation will limit damage, reduces repair time, and minimize the degree of pipe exposed to bacterial contamination when main breaks occur.

AC, or Transite Pipe (the brand name of AC pipe by Johns-Manville Corp, or JM) has a useful life of only 50 years, as G. Eric Williams of HDR Engineering notes in his study "*Asbestos Cement Pipe – What if it Needs to be Replaced?*". That conclusion of a 50-year life, and often that study, is referenced in nearly all publications dealing with AC Pipe life found through various web searches. An exception was found on a website for Exponent Engineering that quoted the Chrysotile Institute (Chrysotile is also known as "white asbestos" the type of asbestos used in AC pipe) suggesting a lifespan of 70 years, but noted actual service life depends largely on pipe condition and working environment. Given the wide use of the HDR study and lack of any conflict of interest associated with the HDR research, and given the lack of use of the Chrysotile study, a 50-year life is considered the better estimate. All soils in the Forsyth area were found to be corrosive to cement, leaching it out of the AC pipe—see Appendix A for figures showing soil corrosivity to both steel and concrete. This combined with the numerous pipe breaks concludes the AC pipe in Forsyth is well past its useful life.

With the continuous leaching of the cement from the AC pipe, breaks and exposure to contamination will accelerate with the return of more normal winters. Even if winters were to stay mild, the corrosion will lead to accelerated breaks and exposure.

Additionally, multiple known hydrants within the system are experiencing leakage. This is being triaged by flushing and pumping out stagnant water on a recurring, ongoing basis. These leaking hydrants need to be exposed and repaired/replaced to eliminate further leakage within the system.

Another associated health and safety threat come for the repair of broken mains is difficulty to fully disinfect prior to re-pressurizing of the system, unless the pipe is replaced completely between two valves. However, replacement of long lines, spanning a block or more, in order to resolve a leak is almost never the case. Every leak repair or segment replacement requires shutting off a pipe segment, leading to loss of pressure in that segment. Without a positive interior pressure, contamination can enter the system through any other leak in the pipe or gaskets. Environments in a trench are less than optimal, generally involving a lot of water and mud and an operator under a great deal of stress and an overpowering feeling of urgency to get the system back in operation. While it is good to do the repair as quick as possible, contamination can enter a distribution system during the repair, even after gallant attempts to fully swab all exposed pipe, since chlorine swabbing does not generally go on for a full block or more.

Public safety is a serious concern as a pipe break, which is by far more common in the winter, can lead to a sudden icing of nearby roads and walkways. In addition, unseen leaks can erode the ground below a roadway leading to a sudden and unexpected collapse of a road section and/or damage nearby structures. This is a serious concern with the extremely high leakage rates in Forsyth.

Lastly, the 4-inch pipes need to be upsized in order to meet the state standards for minimum pipe size serving hydrants, under DEQ Circular 1 – Standards for Water Works, Section 8.2.2, which states:

> ***8.2.2 Diameter***
>
> *The minimum size of water main for providing fire protection and serving fire hydrants must be six-inches in diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure specified in Section 8.2.1.*

In summary, removal of the remaining AC pipe is required due to public health and safety concerns including:

- Potential bacterial or protozoan contamination from contaminated water drawn into the pipe through gaskets or cracks during any repair or where high headloss of rushing water to a break creates low or negative pressures at higher elevations,
- There is a high potential for contamination resulting from repairs of broken pipelines that may not be completely disinfected prior to placement back in operation, and
- Acceleration of break frequency is anticipated and associated public health and safety risk as the universal corrosion continues through the remaining lines at approximately the same rate.

3.1.4 Water Storage Tanks

The single 1-MG finished water tank is routinely inspected. The 2019 sanitary survey made no negative remarks about the function of the storage tank. The tank itself is not an item of concern within the PER, other than requiring new interior coating per the last inspection report and the need to control the ongoing erosion surrounding the tank.

The land area surrounding the tank structure is experiencing erosion that has become increasingly threatening to the tank structure itself. While the integrity of the water system is not currently under direct threat of erosion-caused damage, recommendations are made within this report to repair erosion damage in targeted areas and discourage future erosion.

A second pressure zone exists in the northeast corner of town feeding the Riverview Villa subdivision. The city has long wanted to improve pressure in the adjacent Quincer area, where pressures can dip below 35 psi. Considering that the existing booster station feeding the Riverview Villa subdivision needs substation revision, it may be best to combine the two areas into the Upper Zone. There is currently no storage in the Upper Zone. Providing some degree of storage is recommended in order to provide far superior reliability (the existing booster station has one functional pump only and no backup power) and fire protection. With proper valving, it would be possible to allow temporary use of that new Upper Zone tank to allow shut down and drainage of the 1 MG tank for needed re-coating and work on the 12-inch supply main.

This would be supplied by an elevated water tower and would initially feed the Riverview Villa Retirement Community as well serve to be a redundant water supply to Forsyth Hill pressure zone should that steel tank reservoir be taken offline for maintenance/repairs/etc. The city of Forsyth lacks redundancy throughout its entire water system.

3.2 Aging Infrastructure

The Forsyth intake sub-structure was originally constructed in the early 1900s. The existing structure that currently houses the vertical pump system feeding the WTP was constructed in the early 1930s. The ceiling of the basement-level sub structure is showing alarming wear to the structural concrete and beams and reinforcing bar, which would normally be covered by the cement, are badly corroded. This is a high-priority item to address. Vibration from the pumps along with constant humidity create a vulnerable situation for a weakened load-bearing structure (see previous discussion).

The Forsyth distribution system has extremely high leakage rates, averaging 23% of all water produced annually and 35% during the winter months (actual rate of leakage is constant, but the lower usage in the winter causes that loss to be seen as a higher overall percentage).

In the event of rupture along a transmission line, frozen isolation valves, or lack of isolation valves increase the area that will lose service during repair and increase the severity of water loss before the rupture can be isolated and drained. The majority of pipe in the system is Transite Asbestos-Cement, passed its design life. All breaks and leaks in the system are replaced with PVC. All proposed major replacements would also utilize PVC.

Leakage not only represents a significant increase in production costs, but more importantly defines a serious public health theat. Openings in a water system expose the system to contamination if there is a loss of pressure due to a main break (and shutting off an area around to pipe to gain access), and the subsequent drawing in of surrounding groundwater. Another loss of pressure can occur when the booster station loses power.

The WTP is gaining, but the city has provided excellent maintenance as was noted in the 2019 Sanitary Survey.

3.3 Reasonable Growth

The population and growth of the system was previously discussed in detail in Section 1.4 of this report. Due to boom-and-bust history of Forsyth and the region, the population growth and potential reductions were both examined. This study finds that it would be prudent to base rate increases on a paying public equal to the population estimated to occur during the contraction phase of a bust. The recent job losses throughout Rosebud County, documented by SEMDC, show that the coal and rail industries are no longer reliable long-term employers.

The WTP and Intake are appropriately sized to meet the demands of the higher potential population estimate described in Section 2. Improvements are therefore those necessary due to extreme age, and not heavily influenced by growth.

To be conservative, facilities will be sized for the higher population, while the Town takes precautions to be financially prepared for the lower "bust" population when it comes to repaying long-term loans.

Projected water system demands were presented in Section 2.3.

The EDUs were discussed in Section 2.5. That discussion will be expanded and funding will be discussed in subsequent sections of this report.

3.4 Summary of Needs by Priority

Based on immediacy of the need by considering degree of impact from failure, health and environmental need, and sustainability, the following priorities according to need are established as follows:

1. Intake structural repairs (avoid serious injury, avoid complete shutdown of the entire water supply),
2. Prevent future clogging of the intake line (avoid shut down of water supply),
3. Riverview Booster station firm capacity needs to be raised from 0; need backup power supply and storage,
4. Replace controls for the WTP, upgrade the chlorine room (may be completed by the city), and use energy efficient VFDs for the intake and high service pumps,
5. Replace inoperable valves and hydrants,
6. Replace the 12-inch main that has previously been undercut from erosion form the 1 MG tank to the valve before the interstate crossing,
7. Re-coat the interior of the 1 MG water storage tank and provide erosion control,
8. Replace all AC pipe (will need to be phased due to costs; highest priorities may be included in other projects of higher priority), and
9. Continue annual meter and curb box replacements (by city), as well as pump and mechanical component replacements in accordance with the city's Short-Lived Assets schedule (also all by the city).

Some smaller portions of any particular need, such as replacing a particularly problematic stretch of pipe (but not all pipe), could be included in a phase of construction with items of higher priority.

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SECTION 4 ALTERNATIVES SCREENED

In this section alternatives will be screened to determine their feasibility, cost effectiveness, and overall performance in terms of system upgrades or issue mitigation. Although this section will detail several alternatives not all will be explained in detail or further discussed in Section 5, due to being deemed unfeasible. The reason for an alternative to be deemed unfeasible will be part of the discussion in this Section 4 only.

This section will first describe the features of the water system that are being considered for upgrades or rehabilitation, followed by the design criteria that governs each of those features.

Those systems that have feasible alternatives will be discussed in further detail will follow at the end of the section with a full comparative analysis in Section 5.

4.1 Water Distribution System

All existing Transite-AC pipe within the Forsyth water distribution system must be replaced. Due to the magnitude of this task, the replacement of distribution lines will be done in phases. Areas deemed most critical will be addressed first. These priority areas have one or more of the following characteristics:

- have experienced breakages in the last 10 years,
- have gate valves/hydrants that are not operable, and/or
- have an undersized existing AC pipe diameter that hinders fire protection.

Since the cost difference in placing 6-inch vs 8-inch is very small (all trenching, paving, etc. is the same for both), all replacement PVC distribution pipe will be 8-inch diameter or in high fire flow demand areas, larger. This general upsizing will increase distribution capabilities of the entire system, reduce head loss (energy), and increase available fire flow. Along improvement corridors, service lines and curb stops will often be replaced, depending on the age of each and conditions found. Service lines will not be upsized during replacement, and only the city-owned portion of the service lines would be replaced (to the curb box).

4.1.1 AC-1 Do-Nothing Alternative

The need for replacing the remaining cast-iron pipe was discussed in the previous section. One concern is high potential for contamination to enter the system especially during repairs of leaks. Another concern is lack of fire protection in the western Main Street and Rails Inn areas especially, and compliance with the state requirements included in DEQ Circular 1 – Standards for Water Works, that do not allow for connecting hydrants to 4-inch pipe.

Section 3.1 also noted that the deteriorating condition of the pipes is expected to accelerate.

The high degree of concern for human health and safety and eventuality of complete failure eliminates the Do-Nothing Alternative from further consideration. Therefor AC-1 will not be further evolved through Description, Design Criteria, Map, etc.

4.1.2 AC-2 Replace All Existing Transite-AC Distribution Pipe

Due to health and safety concerns, replacement of all Transite-AC pipe is required.

AC-2 Description

As detailed throughout this report, the existing distribution system is beyond its service life. The distribution system is showing signs of age throughout in the form of leakage, breakages, and valve freezing. This being so, the entire system of AC piping and similarly aged appurtenances must be replaced. This is a large undertaking and will be phased according to budget constraints and priority. It is anticipated the entire project will span four or more phases, lasting multiple construction seasons. The first phase, which is to be addressed as soon as practicable, is detailed below.

Design Criteria

This section on "Design Criteria" will examine the various materials, methods of construction and sizing. Demands were included previously in Table 2-1.

Regulatory Design Criteria-General:

The Distribution system design requirements are presented in Section 8 of the DEQ Circular 1. Sizing of improvements is determined based on sizes needed to maintain needed pressures, especially during a fire event. For example, in design of storage, the elevation of the tank or pump capacity is set so the storage system will maintain between 35 to 60 psi during normal operations (up to peak hour demand), and a minimum system pressure of 20 psi throughout the system during a fire event. Design of distribution systems is stipulated by Chapter 8 of Circular DEQ 1 "Standards for Water Works." Pressures are discussed in Section 8.2.1 of that circular.

The following are excerpts from Circular DEQ 1: *Standards for Water Works*.

Paragraph 8.2.2, Diameter, states, "*The minimum size of water main for providing fire protection and serving fire hydrants must be six-inch diameter.*" This is also reinforced by Paragraph 8.4.3, "Hydrant Leads."

Paragraph 8.2.4, Dead Ends, notes the need to try to avoid situations where a pipeline dead ends and recommends the use of loops.

Section 8.4.1, Hydrants Location and Spacing, notes that hydrant spacing should be placed at all intersections. The standard requires coordination with the fire protection agency (typically the recommendations range from 350 to 600 feet for residential areas).

As noted previously, Paragraph 8.2.3, Fire Protection, states, "*When fire protection is to be provided, system design must be such that fire flows and facilities are in accordance with the recommendations of the fire protection agency in which the water system is being developed, or in the absence of such a recommendation, the fire code adopted by the State of Montana. Water mains not designed to carry fire-flows may not have fire hydrants connected to them.*" This has been discussed in previous sections. Design for the Business and Historic Districts would use 2,500 gpm to 3,500 gpm as the needed fire flow (NFF). This would be distributed over two hydrants.

Design for construction should be done in strict conformance with the latest Circular DEQ – 1 "Standards for Water Works" and The Montana Public Works Standard Specifications, and include Standard Conditions and Standard Modifications as required by pertinent funding agencies and authorities have jurisdiction.

The Uniform Plumbing Code, the Uniform Fire Code, and Life Safety Code must be adhered to as well as all the state's design requirements included in Section 8 of Circular DEQ 1. Plans for any proposed pipelines will require approval from the Montana Department of Environmental Quality prior to construction. Publications of the AWWA, particularly *Manual 31: Distribution System Requirements for Fire Protection* and *Manual 32: Computer Modeling of Water Distribution System* also provide guidelines for distribution systems. Plans must also be approved by the Montana Department of Transportation (MDT) as part of the permitting process to construct in MDT rights of way.

Several replacement ***materials*** are available, each with its preferred application.

High Density Polyethylene Pipe, or **HDPE** provides excellent flexibility and ease of installation. It's best used for very long pipelines that have few connections. it is more difficult to tap into than Ductile Iron or PVC pipe and requires special materials for installation and operator training. For this reason, it is not recommended for in-town pipelines. It should not be included as an "as-equal" material.

Ductile Iron Pipe, or **DIP**, is slightly more resistant to corrosion than cast-iron or steel pipe, and often can be sufficiently protected from corrosion using a polyethylene wrap (single or double-wrapped). As a system, DIP is actually more flexible than PVC since there is up to 5 degrees of angle adjustment allowed for both push-on and mechanical-joint DIP. Where corrosion is more of a concern, as it is in Forsyth, DIP lines can be joined with a metallic jumper line and the DIP pipe system can be provided with corrosion protection using a current or placement of sacrificial anodes along the line. However, these corrosion protection means are costly and in Forsyth, the simple use of polyethylene wrap would not be sufficient.

DIP has an advantage over PVC for use in areas where petroleum leaks are found nearby, though special gaskets would be required.

All DIP should be a minimum class 300 psi or class 52, depending on classification system adopted. Although this would exceed pressure requirements the thicker pipe provides a higher level of safety against long-term corrosion and makes tapping easier than for thinner-walled DIP.

Caution is noted for use of any metal pipe as all soils in Forsyth were found to be "Highly Corrosive" for metal pipe (See Appendix A). The only instance in which DIP should be used is in areas contaminated by petroleum product.

Buried **Steel Pipe** has a higher susceptibility to corrosion than DIP and is typically provided with costly corrosion protection, including a factory installed wrap. Above-grade steel pipe can be very easy to work with, especially in a WTP since it is easy to weld items such as restraint lugs to it (much of the pipe in the Forsyth WTP and Intake is welded steel). Special skill is required in welding steel pipe sections end-to-end, but this does provide excellent flexibility in the design of booster station and WTPs. In the case of Forsyth, AC-2 option, all pipe considered is to be buried and no real advantage is seen in its use for the proposed projects. It should not be included as an "as-equal" material.

Looking forward, in design of the Intake improvements welded steel, though generally considered appropriate in bigger cities, it is not recommended for Forsyth due to lack of welding expertise at the city and highly corrosive soils.

PVC (AWWA C900) is generally the material of preference with municipal water systems in Montana. It is light, which makes it easy to transport and handle, and is relatively inexpensive. There could be times during a spike in petroleum costs, and/or a spike in demand for PVC pipe that might make DIP less costly than PVC. PVC is also non-corrosive, which is a great advantage over metallic pipe, especially in cities such as Forsyth where all soils are highly corrosive.

PVC pipe does not require highly specialized personnel to work with. AWWA C900 PVC is therefore the material of preference for the Forsyth water project. AWWA C900 pipe is sold either by the pressure rating or the dimension ratio (DR). The required pressure rating or DR must be clearly given in the project specifications based on the highest anticipated pressure. AWWA C900 is far superior to **common PVC pipe used in irrigation, typically referred to as "SDR" or "ASTM" PVC pipe**. The AWWA has a safety factor of 4, verses a factor of only two for the other PVC pipe, and requires use of virgin PVC material in its formation. In addition, AWWA pipe has "Cast-iron Pipe Size," which is the water industry standard and provides a greater inside diameter than other PVC. Only AWWA C900 should be allowed for PVC pipe.

AC-2 Pipe Replacement Method

Due to the deterioration characteristics of AC pipe and the high number of service connection needing to be inspected and likely replaced, open-trench removal and replacement of existing AC pipe for new PVC pipe is recommended in this report. CIPP lining of several sections of existing pipe, namely the 14" cast iron intake pipe and the 12" transmission line between Forsyth Hill storage tank and I-94, were explored. In talks with a local contractor, these sections of pipe were found to be impossible to CIPP line in their current condition. Use of CIPP is not recommended for use on any pipe carrying potable water due to high VOCs and lack of NSF approval.

A jack-and-bore pipe installment will be required to cross underneath the BNSF railroad line bisecting N. and S. 12th Avenue where an existing 6" AC pipe will be unsized to 8" PVC. Jack-and-bore installation methods will also be used when crossing the BNSF railroad at 7th Avenue. In this instance, the 12" AC pipe will be replaced with a matching 12" PVC pipe.

AC-2 Pipe Sizing

The minimum allowable pipe diameter for pipe serving hydrants is 6-inches. It is worth noting however, that the capacity of an 8-inch pipe is roughly twice that of the 6-inch pipe. Review of bid tabulations show that the overall increase in project cost in areas that are paved (as is the case for all 4-inch AC pipe to be removed), is considerably less than 10% per foot, since costs for asphalt restoration and mobilization would not change.

It is considered a prudent investment to provide all 8-inch pipe wherever 4-inch is being replaced. Using 8-inches as a minimum would provide better service for existing customers and allow for further future expansion at only about 10% additional cost, at most

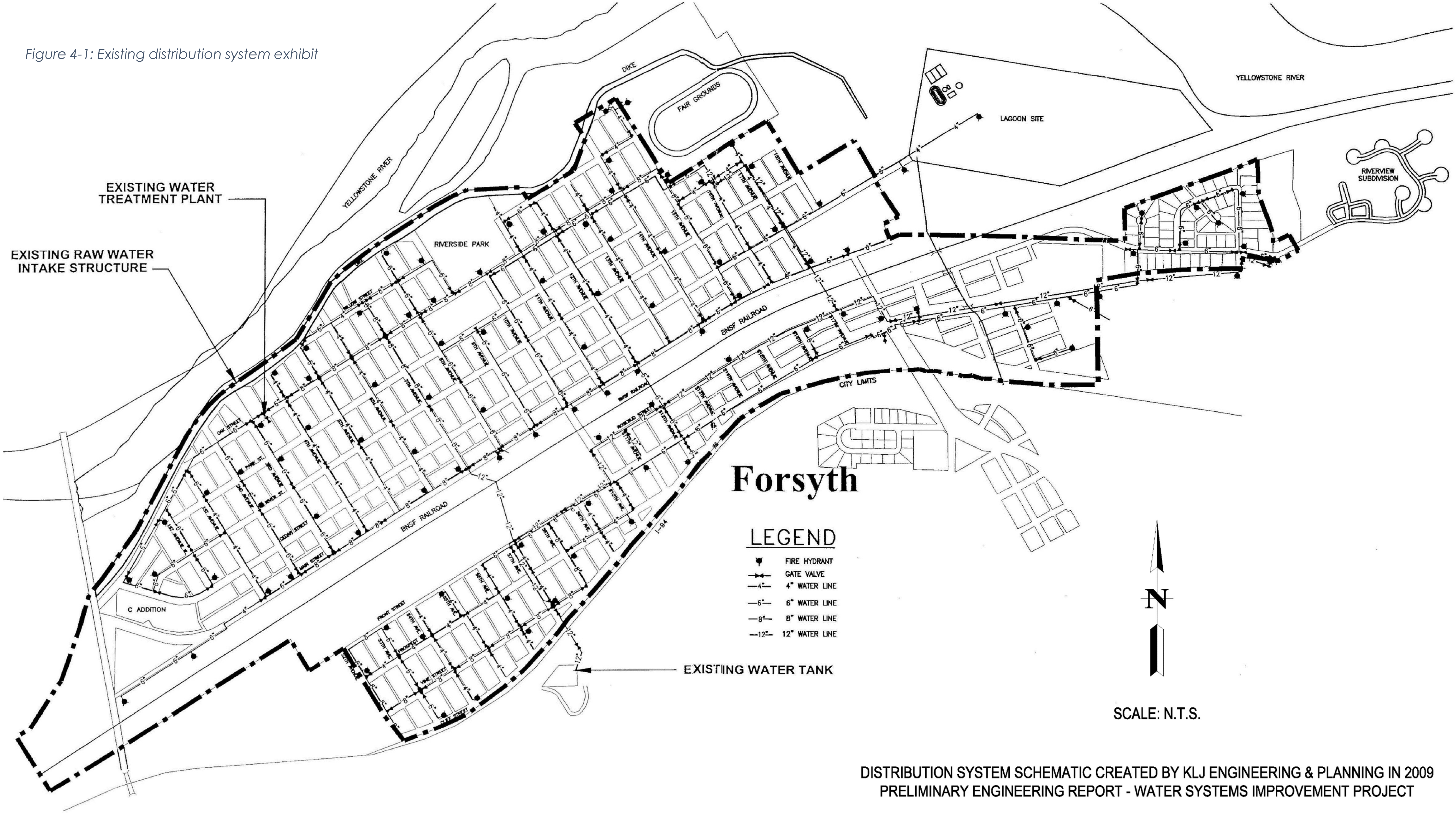
Fire flow requirements must be considered when sizing replacement pipe in the system. Specifically, the primary transmission route from the Forsyth Hill storage tank to the Rails Inn (Front St. & 2nd Ave. S.) will be upsized to 10" PVC along the entire transmission corridor. This is done to correct the 1400 GPM deficiency in available fire flow at the hydrant serving the Rails Inn.

As mentioned in the section above, existing 12" AC pipe will be replaced with 12" PVC pipe. Distribution pipe will not be sized exceeding 12" nominal diameter anywhere within the distribution system.

AC-2 Map

See the following page

Figure 4-1: Existing distribution system exhibit



DISTRIBUTION SYSTEM SCHEMATIC CREATED BY KLJ ENGINEERING & PLANNING IN 2009
PRELIMINARY ENGINEERING REPORT - WATER SYSTEMS IMPROVEMENT PROJECT

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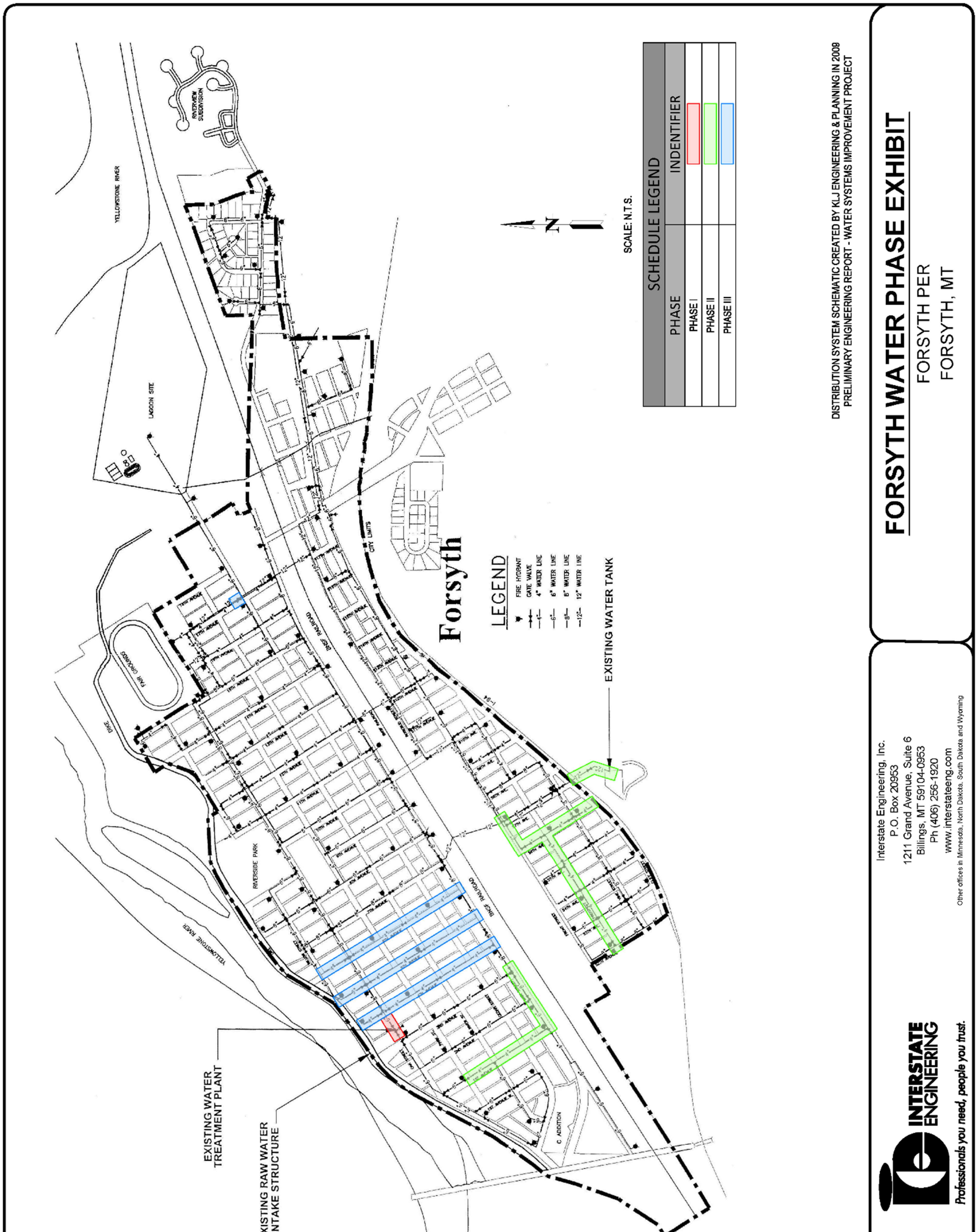


Figure 4-2: Proposed Phasing of Alternate AC-2

Included above are Figure 4-1 showing the existing distribution system schematic (which was first used in the 2009 Water System Improvements PER and has been carried over to this current report as no meaningful changes to the distribution system have occurred since the 2009 report was completed) and Figure 4-2 illustrating the locations to be addressed in each of the first three project phases (discussed further in Section 6). Alternate AC-2 - Phase 4 is not shown in Figure 4-2 because that phase includes all existing distribution pipe not included in the first three phases.

AC-2 Environmental Impacts

All existing AC pipe replacements would be within the existing City right-of-way and in previously disturbed areas.

A project-wide General Permit for Stormwater Discharges Associated with Construction Activities will be required.

Interstate Engineering contacted applicable agencies that might want to advise, set special requirements, or coordinate with the City regarding an environmental impact. Each agency was sent a map of the proposed city improvements, all proposed improvements are within City right-of-way or taking place on City owned property. In the likely event that several years pass before a given phase of construction takes place, the process of soliciting comment from agencies will be repeated during the specific design phase of that project.

There are no environmental considerations that would suggest further reconsideration of the Do-Nothing alternative previously eliminate

AC-2 Land Requirements

All improvements regarding replacement of existing Transite-AC distribution lines and connected appurtenances will occur within city right-of-way. No land transfers, acquisitions, or leases will be required to complete the proposed improvements. Crossing the BNSF railroad during replacement/upsizing of the existing 6" AC distribution line running between N. and S. 12th Ave. will require proper permitting and insurance through BNSF, the same requirements must be met when replacing the 12" AC distribution mainline crossing the railroad at 7th Avenue.

AC-2 Potential Construction Problems

Railroad crossing requirements have been previously discussed. Undocumented LUST sites must be considered by the city and the contractor. Special design and construction considerations must be made in locations with hydrocarbons present in the excavation corridor.

Groundwater is always a design and construction consideration in river bottom areas. Geotechnical site investigations prior to design and bidding on each individual phase of distribution pipe replacement would likely be required to identify areas in need of dewatering measures during construction. Considering the age of much of the utility infrastructure in the city, discovery of previously unidentified underground pipelines and substructures should be viewed as a likelihood during construction.

AC-2 Sustainability Considerations

Water and Energy Efficiency:

The proposed improvements would provide a savings of water. Currently, 35% of treated water leaving the plant is lost to leakage and pipe breaks within the system during winter months. Loss within the system would be brought down, likely by a full magnitude with a complete replacement of distribution piping. The savings in energy, both that of electricity and fuel consumption required to complete pipe repairs, and water usage would be significant.

Green Infrastructure:

Replacement of existing AC pipe with PVC will allow for up to 100 years of maintenance free service. As noted above, a reduction in repairs and maintenance amounts to a reduction in energy consumption, engine emissions, early replacement of petroleum-based driving services, and construction caused noise pollution.

AC-2 Cost Estimates

AC-2: Replacement/Upsize of all existing distibution piping					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements & Mobilization	LS	1	$ 898,420.00	$ 898,420.00
2	Traffic Control	LS	1	$ 15,000.00	$ 15,000.00
3	Temporary Water Service	LS	1	$ 100,000.00	$ 100,000.00
4	Remove existing AC Pipe & appurtances	LF	40,000	$ 18.00	$ 720,000.00
5	8"-12" water main install	LF	40,000	$ 65.00	$ 2,600,000.00
6	8"-12" gate valve	EA	80	$ 1,500.00	$ 120,000.00
7	misc pipe appurtances	EA	80	$ 2,200.00	$ 176,000.00
8	Replace existing water service & curb stop	EA	899	$ 2,200.00	$ 1,977,800.00
9	Asphalt concrete pavement (4") (10' wide)	SY	55,000	$ 40.00	$ 2,200,000.00
10	remove existing 6" hydrant	EA	117	$ 400.00	$ 46,800.00
11	install new 6" hydrant	EA	117	$ 5,800.00	$ 678,600.00
12	Remove & Replace Concrete Curb and Gutter at service connection	EA	500	$ 700.00	$ 350,000.00
13					$ -
Preliminary Opinion of Probable Construction Cost					**$9,883,000.00**
Contingency (15%)					$1,482,000.00
Geotech					$25,000.00
Design Engineering					$988,000.00
Construction Engineering					$1,384,000.00
Legal and Admin					$247,000.00
Total Preliminary Opinion of Probable Project Cost Alt 4 - Phase 2					**$14,009,000.00**

Figure 4-3: AC-2 cost estimate, Replacement/Upsize of all existing distribution piping

Operation and Maintenance

In Conclusion:

- Based on public health and safety concerns, all existing Transite-AC pipe within the water distribution system must be replaced. The Do-Nothing Alternative is not considered viable.
- Acceptable materials of construction are PVC AWWA C900 with Ductile Iron fittings and appurtenances. Special material considerations may be made to accommodate pipe placement in soils with hydrocarbons present. Any ductile iron pipe placed as part of these improvements will require corrosion protection.
- All new pipe installed as part of this work will be no less than 8” nominal diameter.
- Due to the magnitude of replacing the entire existing distribution system, the work will be done in multiple phases spanning multiple construction seasons.
- All design and construction will be completed in accordance with MT DEQ Circular-1 specifications.

4.2 Intake Basics

The intake system is examined in three steps.

1. the In-River portion of the intake, which includes all components leading into the intake pipe. Alternatives have a prefix **IR-**
2. The intake pipe leading from the In-River portion to the pumping system, with alternatives having a prefix **IP-**
3. The pumping system and associated structure (also noted as On-Shore) alternative systems are identified with an alternative prefix **OS**-. Each OS- alternative includes associated IR- and IP- alternatives.

Costs for a new intake structure can be enormous. West of Forsyth, the recently constructed intake in Laurel exceeded $11 million. Forsyth has only about 1/4th the population of Laurel, but the costs of cofferdams would still be similar. Due to the limited financial resources and environmental concerns, the city of Forsyth must look at working as much as possible outside of the river. Accordingly, the design must be approached carefully and with considerable attention to re-using what can be re-used.

The city of Forsyth has already completed excellent research for the intake. In 1999 the intake pipe was videotaped using a robotic camera. A diver was waiting at the end of the inlet pipe within the river. Fortunately, the water was very clear on the day of the inspection. Photos are included in Section 2.

Environmental review will depend on the amount of disturbance needed. If significant work is needed within the river, it is possible that an environmental impact statement (EIS) would be required, especially if it is necessary to provide a Crib and Barrel Intake in the middle of the river (with bridge access), or find a new location for a side-channel type intake. In any event, it will be necessary to provide a solution that is the **Least Environmentally Damaging Practicable Alternative (LEDPA)**.

4.2.1 Basic Design Criteria, Timing, Environment, and Permits:

Design criteria for any intake includes the same design flow determined in Section 2.3, which notes the peak day demand for the system for 2045, the design year is 0.69 MGD. However, since the intake would be expected to last at least several decades longer, it was concluded that 0.82 MGD would be the design flow for the Intake. Due to losses (backwash, etc.) within the WTP, at a minimum, the intake should be designed for 110% of that flow, or .902 MGD. Since VFDs would be used on new pumps, the flow rate could remain very constant.

Below are pertinent requirements of the State of Montana for Intakes.

Per DEQ – Circular 1

3.1.2 g

g. source intake location(s) must be based on a source water assessment report conducted in accordance with Section 1.1.7.1.

3.1.4 Structures

3.1.4.1 Design of intake structures must provide for:

a. withdrawal of water from more than one level if quality varies with depth;

b. separate facilities for release of less desirable water held in storage;

c. where frazil ice may be a problem, holding the velocity of flow into the intake structure to a minimum, generally not to exceed 0.5 feet per second;

d. inspection of manholes every 1000 feet for pipe sizes large enough to permit visual inspection;

e. occasional cleaning of the inlet line;

f. adequate protection against rupture by dragging anchors, ice, etc.;

g. ports located above the bottom of the stream, lake, or impoundment, but at sufficient depth to be kept submerged at low water levels;

h. where raw water pumping wells are not provided, a diversion device capable of keeping large quantities of fish or debris from entering an intake structure; and

I. when buried surface water collectors are used, sufficient intake opening area must be provided to minimize inlet head loss. Selection of backfill material must be chosen in relation to the collector pipe slot size and gradation of the native material over the collector system.

5.1.2

f. Where conditions warrant, for example with rapidly fluctuating intake turbidity, coagulant and coagulant aid addition may be made according to turbidity, stream current, or another sensed parameter.

In their letter from January 29, 2020, the US Fish Wildlife and Parks letter notes:

Water velocity at the intake screen should not exceed 0.5 feet per second.

And adds:

Best Technology Available standards should be applied to intake design to minimize the potential for pallid sturgeon entrainment and impingement at all life stages. Minimally, an intake screen with a mesh opening of ¼ inch or less (⅛-inch mesh or less if a Johnson or Johnson-type screen/intake is selected) should be installed, inspected annually, and maintained.

The existing on-shore structure has a lower deck within a **confined space**. Any replacement or major structural design should, wherever possible, have mechanical components accessible in the main building with appropriate accessibility and ventilation.

Based on discussions with operators it is recommended that, where possible, sump pumps should be provided.

These would provide for intermittent pumping to help alleviate the build-up of sediment and avoid the need to send workers to the lower areas of any on-shore pumping facility, or at least reduce the frequency.

Timing of work is also important for design. As noted in the previously quoted USFWP letter of January 29, 2020 for a similar project in Miles City,

• In anticipation of future increased pallid sturgeon use/spawning above the intake, Project design should consider accommodation of potential future pallid sturgeon larval monitoring activities (potential temporary small-mesh net placement locations, etc.).

• In-stream work should be avoided during the May 15-July 15 pallid sturgeon migration and spawning season.

…

• Necessary removal, destruction, or trimming of trees, saplings, or snags along the Yellowstone River should be avoided between June 1 and July 31, where possible, to minimize the potential for impacts to northern long-eared bats.

From the above, it would be crucial to not allow construction in-River until after July 15, and caution be used from June 1 – July 31 for disturbances of long-eared bat habitat, unless a survey indicated it was not present.

The above few paragraphs would provide the time limit for beginning work within the river at July 15. Fortunately, the river would generally still be dropping in elevation at this time through the next spring. The window for working in the river would be from July 15 until ice begins flowing in the river, making continuation too dangerous.

A number of **permits are required** for work that touches within the Yellowstone River, including:

- Conservation Districts (local government) - 310 permits
- MT Fish, Wildlife and Parks (state government) - SP 124 permits
- County Floodplain Administrators (local government) - floodplain permits
- US Army Corps of Engineers (federal government) - Section 404/Section 10 permits
- MT Department of Environmental Quality (state government) - 318 (turbidity) Authorizations
- MT Department of Natural Resource and Conservation (state government) - Navigable river land use licenses and easements

A joint application may be used for the above and may be found at the website: http://dnrc.mt.gov/licenses-and-permits/stream-permitting

A copy of the comprehensive application is also included in Appendix A.

4.2.2 Approach to Evaluating Intake Alternatives

The following sections will break out the potential types of improvements to create an effective intake system.

Section 4.3 will concentrate on improvements that may be made to the system at the point of entry of the water, generally referred to as in-river (IR-) alternatives.

Section 4.4 will examine alternatives to carry water from the river to the wet well on-shore for pumping, generally referred to as intake pipe (IP-) alternatives.

Section 4.5 will examine different alternatives for an on-shore structure to carry water to the WTP. Those On-Shore (OS-) alternatives will include appropriate in-river (IR-) and pipeline (IP-) alternatives. At that point all viable alternatives will be compared and a decision matrix completed in Section 5.

4.3 Point of Intake (In-River Portion)

The use of screens, as typically provided through **Johnson Screens,** would be beneficial for the prevention of having fry (young fish) move through the system. Currently, there is no such screening. The existing inlet pipe is simply an open Mechanical Joint (MJ) bell end.

Forsyth has an advantage of having a very low population for a surface water plant. Accordingly, it could be possible to place the screens within the existing on-shore structure, or a new structure, since the screens would be considerably smaller than used for other intake systems along the Yellowstone.

Three main issues exist with the inlet pipe, including:

1. Jamming of the inlet pipe with gravels, sands and silts.
2. No screen and inlet velocities at 2.9 – 3.7 ft/s, greatly exceeding the maximum allowable of 0.5 ft/s and allowing gravels to enter
3. The pipe is over 90 years old and has, at least, 1 off-set joint

Currently the inlet velocity at the opening in the pipe when an intake pump is in operation is about 2.9 ft/s, at the pumping rate of 1,500 gpm, or 3.7 ft/s when operating the 2,000-gpm pump. It is standard practice for the city to operate at this high flow and only operate the system a few hours a day.

To meet the DEQ requirement of 0.5 ft/s maximum, the city would need to limit flow to about 265 gpm, at the entrance or entrances.

By placing a tee at the end of the inlet pipe and providing smaller pumps or placing VFDs on the existing pumps, and running the plant longer, the flow rate could be dropped considerably.

If ran for 24 hours, this the flow through the two ends of a tee at 265 gpm each would equate to about 0.76 MGD, exceeding even the highest day demand design estimated in Section 2.3. at 479 gpm (0.69 MGD). That was for the high population estimate for design year 2045.

Figure XX shows the Hjulström-Sundborg diagram showing the relationships between particle size and the tendency to be eroded, transported, or deposited at different current velocities that even suspended gravels may be carried into the existing intake pipe when velocities are in range of 2.9 – 3.7 ft/s (88 to 112 cm/s)

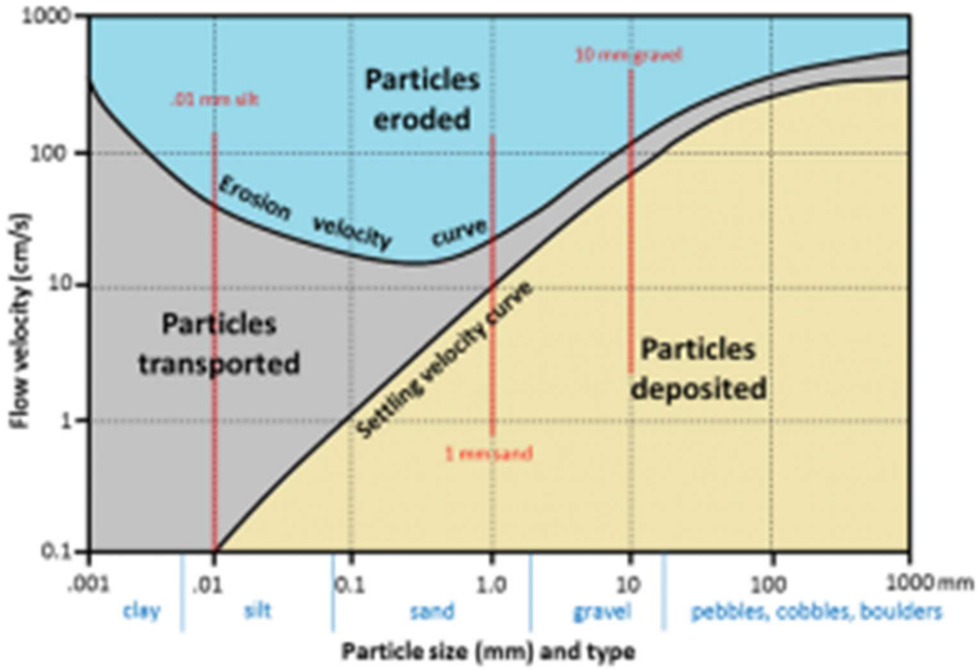


Figure 4-4 Intake Vel vs Particles Carried

Silts and some sands could still be carried at even 0.5 ft/s, but these could also be flushed back out much more easily than gravels. As will be seen later in this Section 4, all alternatives include a mechanism to use both intake pumps to flush back any sediment.

This slower operation would also benefit treatment by slowing settling time considerably and adding time to the CT calculation, ensuring each day started with a full clearwell that has already had contact time. This change in operations would only be possible with automation installed to meet Circular DEQ-1's Policy on "Policy on Automated/Unattended Operation of SW Treatment Plants". As noted earlier, the plant does need to replace its obsolete control system, and in doing so it could meet the criteria given in that policy.

4.3.1 Alt IR-A Place 14-inch Tee at Existing Inlet, VFDs for Pumps

Description

This alternative provides a very quick and low-cost solution to the issue of inlet velocity. In doing so, it should also eliminate the entrance of suspended gravels and much of the sand that enters.

Placing a tee at the end of the pipe would allow two entrances with the same hydraulic dynamics. Thus, the flow into each of the two open branches would be expected to be equal. This would provide a net flow of 530 gpm into the inlet while keeping the velocity under 0.5 ft/s.

The tee could be connected to the exposed mechanical joint filmed by the Divers in 1999, which appeared to be in good shape. This would provide minimal environmental disturbance.

Figure 4-5 Intake Pipe Inlet in Good Condition

A major advantage to this alternative is that the city could still clear the line using a pigging device. If a cage or other screen were installed, a pig would not be able to pass through. Another advantage is that the installation would be very quick and not impact operations during construction.

The disadvantage is that the pipe is not replaced. However, if that pipe were replaced in the future, having added the tee would not present any difficulty, or loss of investment. It would be preferable to replace the old cast iron intake pipe, but this may be cost prohibitive as that would also require demolishing the original structure (now part of the existing structure) and construction of the cofferdam. While replacement of this pipe, and the elimination of the bends is desirable, it can be developed as a later phase project to keep costs down for the initial phase. Inclusion of the pipe replacement and the necessary cofferdam would significantly delay the project due to environmental permitting. It is considered prudent to first install the relatively inexpensive tee, while seeking funding and permitting for the new pipe.

Maps – See figures presented in Section 2.1 and the executive summary for the location of the existing inlet pipe. Figure 4-3 below shows the Inlet structure from 1976 (Blue Roof) and the adjacent pre-1931 structure with the red line showing estimated pipe location and length based on the videotaping of that line in 1999.

Figure 4-6 Intake Location

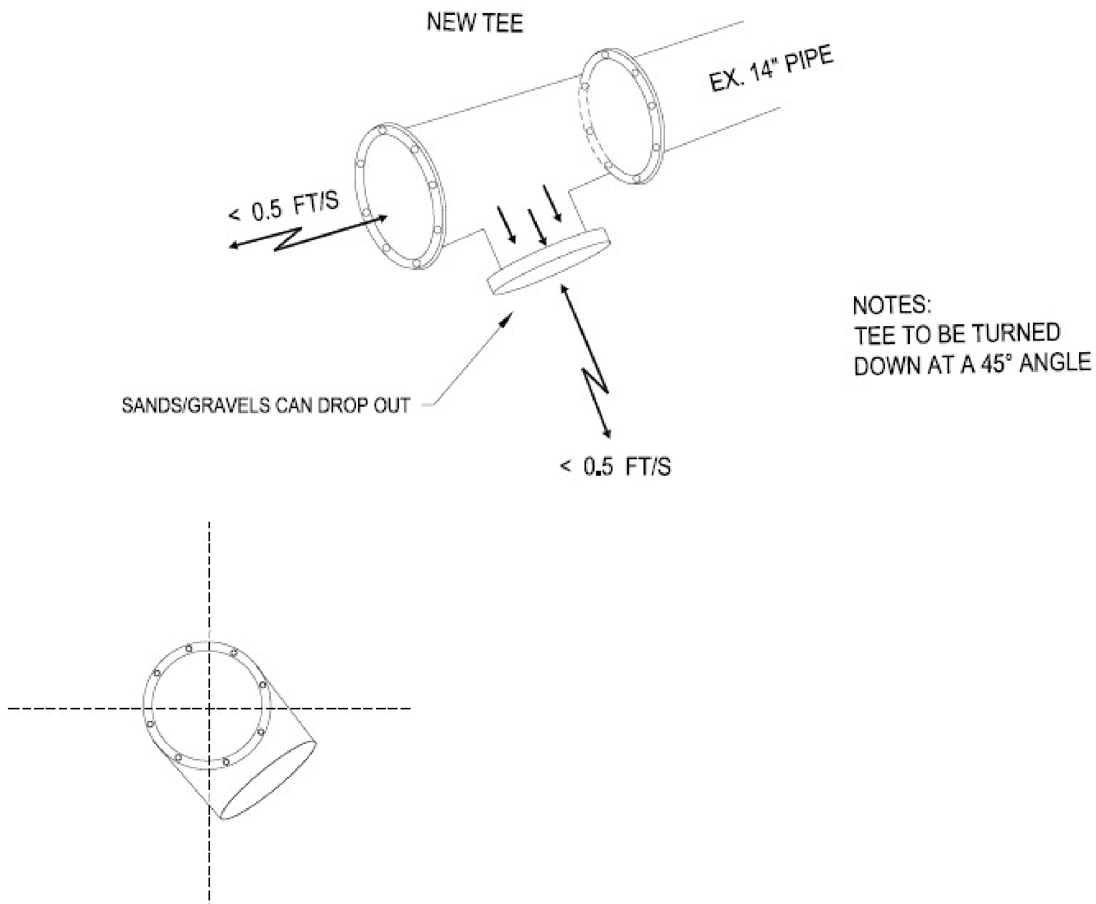
Environment. The environmental impact of the work above would be insignificant. This alternative does not require any disturbance of any land, riparian or other.

Lowering the inlet velocity to 1/5th its current level will allow ease of movement of any fish back from the wetwell and to the river. Having drastically reduced the amount of debris that would enter the pipe, there is less debris that would ever need to be flushed out.

To best protect the pallid sturgeon, screens with 0.1- inch opening would be beneficial, and comply with the wishes of the USFWP (See Appendix A for their letter). Although the USFWP does not feel that the pallid sturgeon is an issue for waters upstream of the Cartersville Dam, it does recommend making provisions now for screening due to the potential for having improvements allow for passage of pallid sturgeon around the dam.

With this option IR-A screens could be placed in the future, with very little lost investment from the placement of the tee. As will be discussed later in this section, it may be possible to place screens inside the on-shore river structure.

Figure 4-7 In-River Intake IR-A Layout



Land Requirements

There are no new land requirements associated with Alt IR-A.

Potential Construction Problems

Construction would be quite easy, especially if done later in late summer or early fall when water levels are lowest, and visibility is optimum. Flooding and ice flow would not present a threat. This is also after the spawning season for pallid sturgeon (May 15 – July 15). Divers have accessed this site in the past and current was not an issue at all. Due to being in the water ponded by the Cartersville Dam, river current is especially slow at this location.

This work, to be done by professional divers with a crane to lower the tee and hold it in place, should not encounter significant construction problems.

Sustainability

The use of VFDs on the intake pumps **will provide energy savings**. This alternative has essentially no other energy impact, and in that sense is very green and sustainable for water production.

Use of a tee instead of a cage-type screen keeps the velocity down, while still allowing for pigging of the line.

This alternative offers a very low-cost solution to the intake velocity. Because it is such a low-cost solution, it would pair well with a future replacement line since the only lost cost would be that for the installation of a single tee (the VFDs would still be required). Similarly, if screens were required to be installed in the river (see discussion under "Environment"), there would be no significant loss of expenditure.

Costs

Capital costs are minimal for the addition of the tee. Installation of the VFDs would be a recommendation of any alternative.

Section 5 will take another look at Alternatives IR-A as it would fit with various other improvements to make the new intake system, including changes at the existing wetwell structure or construction of a new structure.

Table 4-1 Capital Cost for Alt IR-A Use of Tee

Forsyth Alt IR-A In-River Tee Installation (and VFDs)					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
Mile City Alt IR-A In-River Repair Existing Inlet Only					
1	General Requirements and Mobilization	LS	1	$ 7,100.00	$ 7,100.00
2	Divers, Crane and Instal of Tee*	LS	1	$ 65,000.00	$ 65,000.00
3	Permitting	LS	1	$ 6,000.00	$ 6,000.00
Preliminary Opinion of Probable Construction Cost					$78,000.00
Contingency (15%)					$12,000.00
Design Engineering					$7,800.00
Construction Engineering					$9,000.00
Legal and Admin					$2,000.00
Total Preliminary Opinion of Probable Project Cost					**$101,000.00**
*Installation of Tee is credited back in option IP-2B					
	VFDs included in all OS- Alternatives				

4.3.2 Alt IR-B In-River Intake w/Screens

Description

This alternative provides Johnson screen within a submerged concrete structure. The screens are periodically cleaned using an air burst. This type of screen and structure is common along the Yellowstone River, with similar systems in Glendive and Laurel, Montana.

For Forsyth, this system depends on the stability of the Cartersville Dam and the river's stability, i.e., not meandering, and that the location will remain below damaging ice and timbers, or be structurally strong enough to endure intermittent contact with ice and timbers. Loss of the Cartersville Dam, for whatever reason, would negatively impact any alternative, but this Alt IR-B is a very large financial undertaking and if the head provided by the dam was lost, the investment would also essentially be lost.

Finer screens can be placed inside a protective concrete structure that acts similarly to a "crib", such as the Laurel intakes installed in 2003 and 2017, and the Glendive Intake installed in 1999. Each of those submerged in-River intake points include a series of Johnson Screens inside a concrete structure with openings to allow water and sediment through it, or a concrete base with steel railings. The finer Johnson Screens within the concrete structure require air jets (and potentially hot water) to remove buildup of foreign materials or clogged frazzle ice.

IR-B would connect to the existing pipe, with the new concrete and screens structure within 10 feet of that connection. It would be preferable to replace the old cast iron pipe, but this may be cost prohibitive as that would also require demolishing the original structure (now part of the existing structure) and further construction of the cofferdam. While replacement of this pipe, and the elimination of the bends is desirable, it can be developed as a later phase project to keep costs down for the initial phase.

Figure 4-8 Johnson Screens and Support Used in Glendive

Figure 4-5 shows the supports constructed for an array of Johnson screens that were placed for the Glendive intake point. A similar structure was used in Laurel, but with instead of steel rails along the sides, the Laurel encasement included all sides made of formed concrete and a concrete lid provided. Conversations with Aqseptance Group, the owners of Johnson Screens, suggests the Glendive system of protection. Aqseptance notes that having a more open system keeps water movement continuous and avoids potential sediment and formation of eddies within the structure. Costs would be similar for either enclosure and the optimum system would be determined during final design. The Forsyth system has a major advantage over the Glendive and Laurel systems in that the water is always about 8 feet deep. This allows for smaller screens than possible at the shallower depths.

Figure 4-6 provides a layout of a concrete-enclosed array such as originally used at Laurel, but includes the bolted top that was corrected a few years after installation. It is very similar to the system shown in Figure 4-5, used for Glendive. Two screens are shown in Figure 4-6, but as few as one might be used based on correspondence with Aqseptance, though at least 3 were used in Laurel. Cost estimates are based on having two to be conservative and provide some redundancy. The half-dome system provides the greatest area at the deepest portion, making it much more effective at periods of low river water. However, the lower-cost fully round screens are more economical in deeper water such as found in Forsyth. Fully round screens from Glendive were shown previously.

IR-B would reconnect to the existing 14-inch intake system, or could be connected to a new pipe. Laurel had two failures of its system. The first was the loss of the concrete top, which was corrected within several months (the original was not bolted to the top and it is theorized that the air burst caused the top to move and allow it it be caught in debris that passed by later.

The second failure was due to meandering of the river. The meandering issues that plagued Laurel has been shown to not apply to the Forsyth site, and the issue with the top would be avoided by proper design or using the open structure as constructed for Glendive.

Maps

See Figure 4-6, below, for the location and layout for the proposed structures for all alternatives to be considered in detail, within and out of the river. This same figure may be referenced in later sections for all alternatives mapping. It does not include alternatives that are examined but eliminated from detailed evaluation later in Section 5. See Appendix O for maps showing the river morphology over the years.

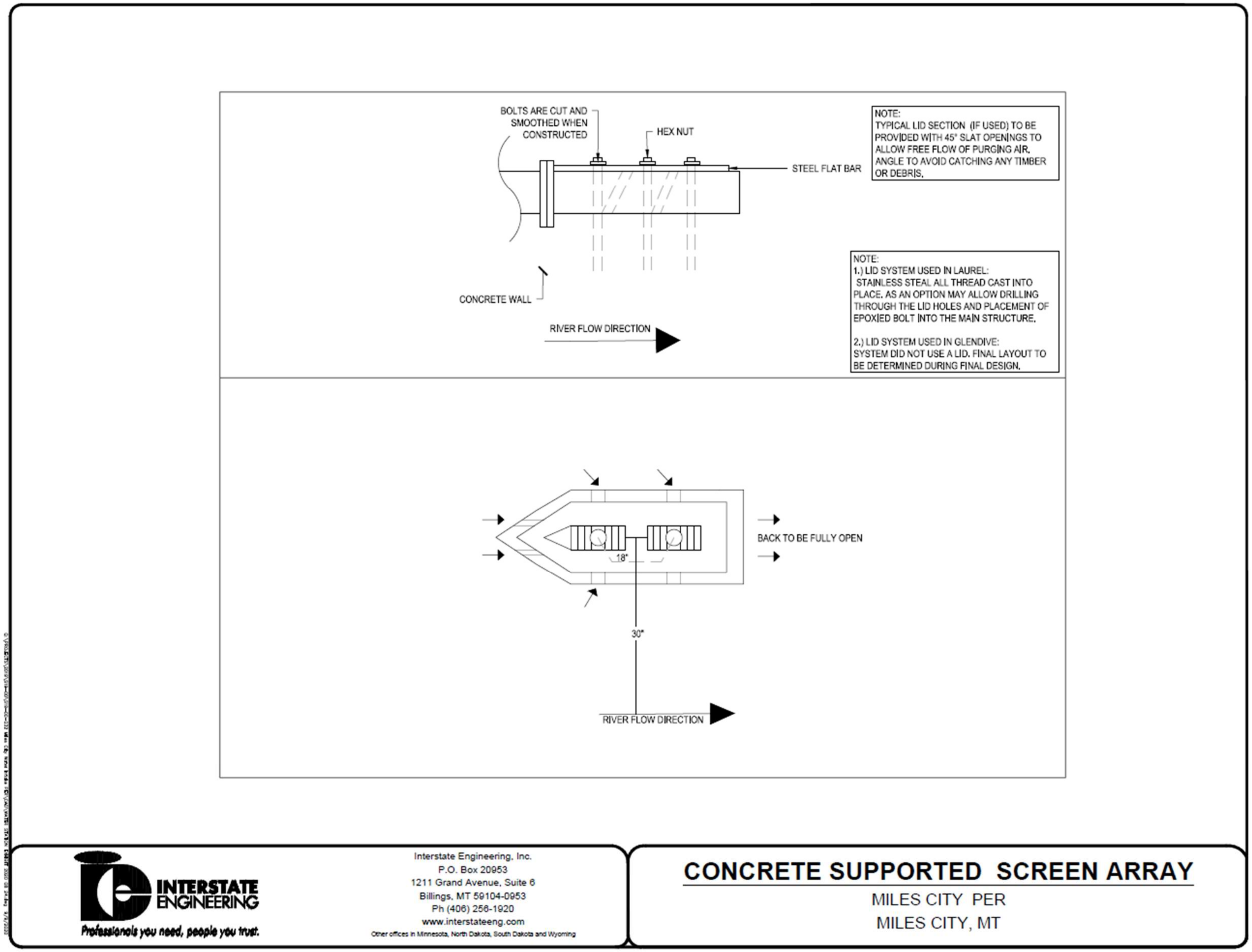


Figure 4-9 Concrete Supported Screen Array

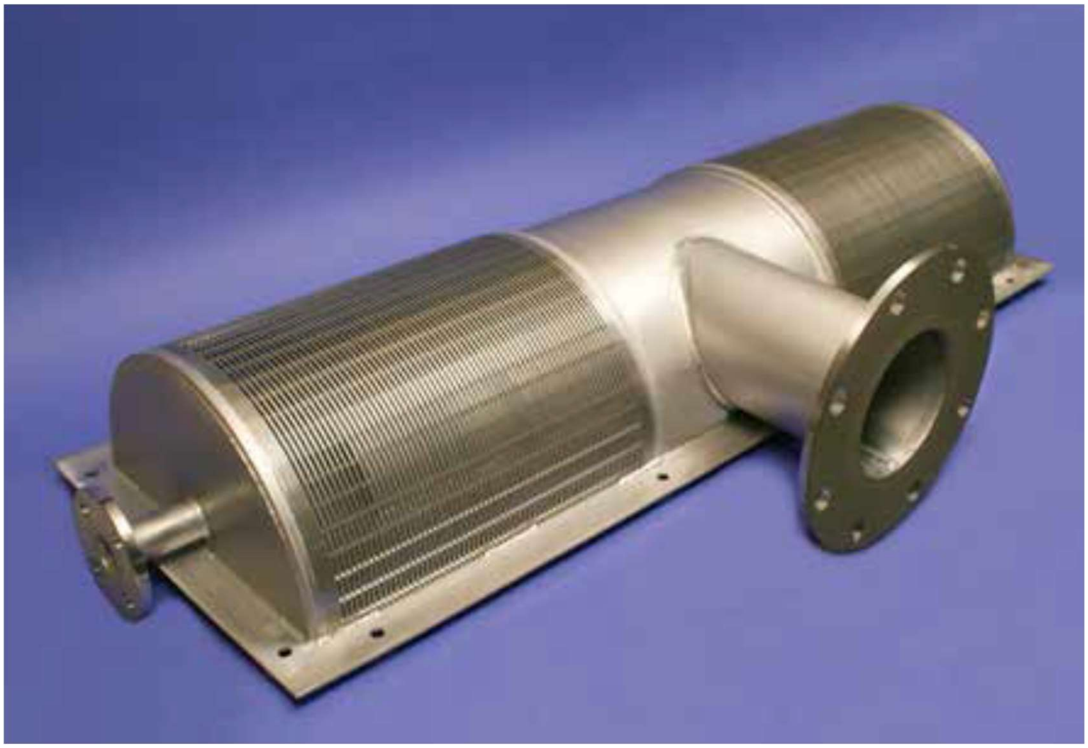


Figure 4-10 Half-Dome Screen not Required for Forsyth (good submergence)

Environment.

The environmental impact of the work would be negligible for the long-term. However, short-term impacts would be more significant.

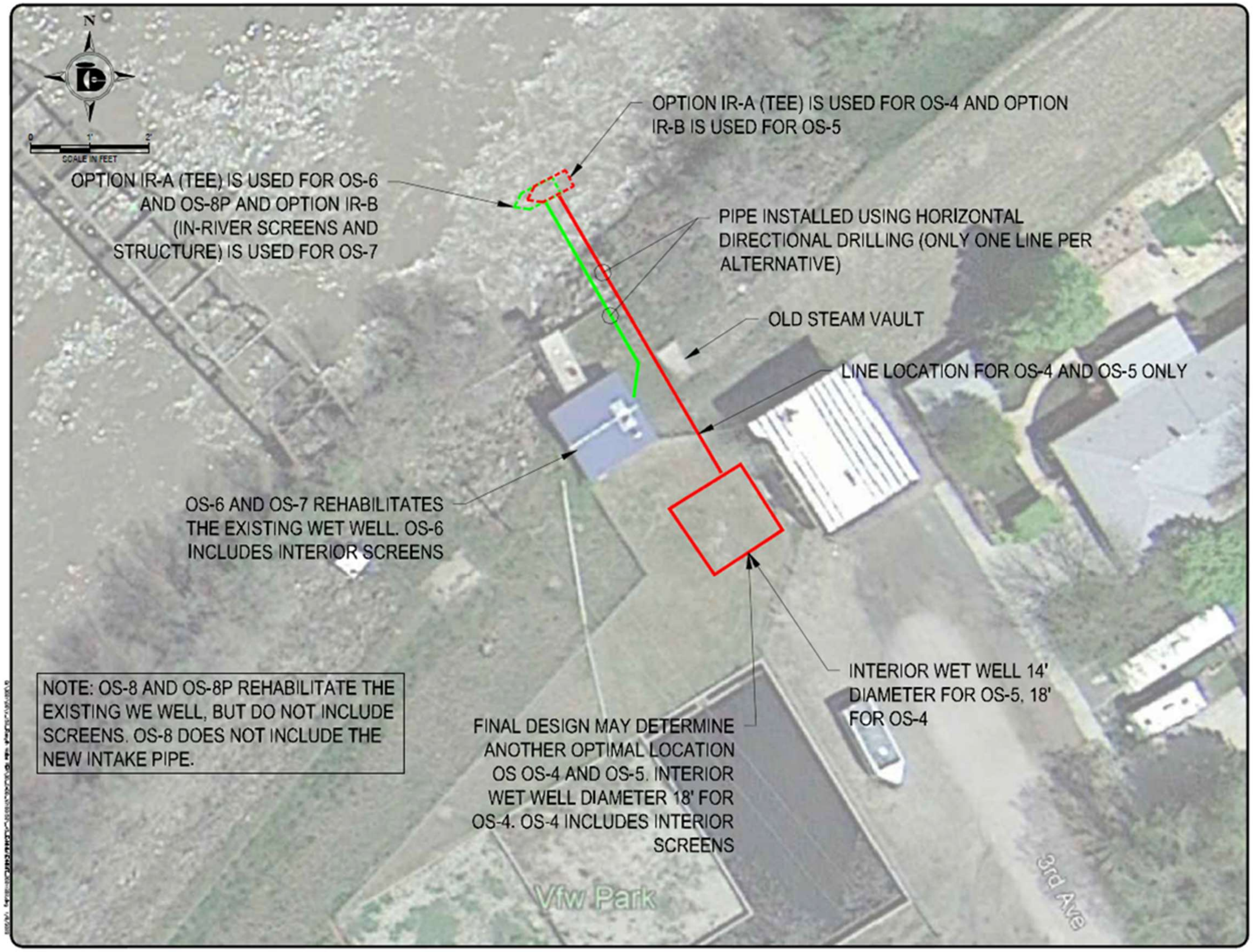
As noted in the letter from USFWP, November 30, 2021:

> *In-stream work should be avoided during the May 15-July 15 pallid sturgeon migration and spawning season.*

That restriction should be easy to avoid, since the river would be high during that time period, and construction would best not begin before July 15. If properly scheduled no impact would be anticipated.

Boaters may be surprised to see the bubbling at the intake site when the air blast occurs. This is a somewhat negative feature. This could actually be dangerous for someone swimming above the air release, as it would be extremely difficult or impossible to swim through as the swimmers body would sink due to the sharp decrease in buoyancy resulting from the bubbles (this is the same concern that operators must caution against at wastewater plants around diffuser systems).

Figure 4-6 Location of all Alternatives, Including In-River, Pipe and On-shore Portions



Intake systems with Johnson Screens having 1/10th or 1/8th inch slots are costly, though the screens themselves are relatively inexpensive. The high cost of this alternative is for construction in-River, generally requiring a cofferdam, and providing an air purge system and possibly a hot water system. Neither air purging or hot water addition have been required for the Forsyth in-River intake systems used since before 1931, but the smaller opening associated with small slots make the use of an air purging system essential.

It is significant that the existing intake system has not had significant issues with frazzle ice or algae. This may largely be due to the depth of the inlet pipe. That depth also protects the inlet pipe from ice flows.

The costly addition of the hot water systems typically used in the Yellowstone, such as the previous intake in Laurel (was not included in the newest structure due to cost) and Glendive. However, the depth of water in Forsyth and lack of previous issues leads to not recommending hot water for Forsyth (would still have the air burst cleaning system).

Land Requirements

There are no new land requirements associated with Alt IR-B, though permits for use of the river are required as discussed previously.

Potential Construction Problems

The potential issues with this alternative include river current, though generally very mild, and weather conditions, such as ice flow, along with compliance with the environmental concerns previously noted above. It will be essential to conduct in-River improvements between July 15 and October for safety and to limit costs of a much larger cofferdam.

Although work would not likely have significant impact on the Pallid Sturgeon spawning, it would be best to avoid the May 15-July 15 window suggested by FWP, especially considering water could still be high in early July.

Dewatering will be a major concern and may greatly impact costs. However, the same conditions were found at virtually all new in-River intakes along the Yellowstone.

Sustainability

This alternative has essentially no energy impact beyond limited fossil fuel consumption during construction, other than operating the air purge system. Calculations show that the power required for the compressor mechanism should not exceed 5 Kilowatt-hours per day (cost of just under $500/year), and in that sense this alternative is considered very green and sustainable for water production.

This alternative provides a long-term, proven intake system, which does address the question of the Pallid Sturgeon protection. IR-B provides a low-maintenance system in a location that has not demonstrated problems in the past with weather or recreationists.

The Johnson Screens could result in some reduction of organic carbons entering the system, helping maintain Trihalomethanes low, thus making the entire water treatment system more sustainable for years to come, without providing pre-oxidation chemicals to reduce organic carbons. Forsyth has had taste and odor problems in the past that are dealt with using permanganate and/or activated carbon. Those issues may be lessened by the reduction of organics entering the system. The low-energy nature of this system and additional benefits that may allow Forsyth to avoid more chemical addition, make this alternative very "**Green**".

Cost Estimates

The following discussion and estimates refer to IR-B only.

Final design will determine the actual layout, but the layout being used was provided by Johnson Screens after consultation with the engineer and using known water levels. The screens themselves are not the major cost of this alternative. By far the biggest cost is construction of the cofferdam and working in the river. Screens are sized for 100% redundancy at full grow-out (the highest population estimate)

Costs for IR-B assumes that the on-Shore lift station includes all pipe to the proposed on-shore system to be discussed in the next section of this report. The pipe included in the table includes all pipe to reach the on-shore portion and therefore provides a slightly elevated cost. Actual comparisons of combinations of on-shore and In-River systems, and the connecting intake pipe, will be provided in Section 5 for the final selection of the project.

Table 4-2 Capital Costs for In-River Alternate IR-B

Forsyth Alt IR-B In River System with Johnson Screens					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 86,000.00	$ 86,000.00
2	Exploratory Excavation	HR	30	$ 540.00	$ 16,200.00
3	Cofferdam/Shoring, Approx. 80 ft	LS	1	$ 300,000.00	$ 300,000.00
4	Intake Concrete and Steel Screen Encasement	LS	1	$ 360,000.00	$ 360,000.00
5	Johnson Screens and Interconnection using anit-zebra mussle z-alloy	EA	2	$ 35,000.00	$ 70,000.00
6	Connect to Ex Pipe or IP Alternative Pipe	LS	1	$ 8,000.00	$ 8,000.00
7	12-inch Pipe Casing for Air Purge	LF	100	$ 240.00	$ 24,000.00
8	Air Purge Lines (within 12-in casing)	LF	200	$ 35.00	$ 7,000.00
9	Type 2 Bedding	CY	10	$ 42.00	$ 420.00
10	Imported Backfill	CY	400	$ 44.40	$ 17,760.00
11	EA and Permitting Incl DNRC, ACE, mscl (no EIS)	LS	1	$ 60,000.00	$ 60,000.00
12	Air Purge System Compressor and automatic control included with OS-Alts				$ -
					$ -
	Note: For OS-5 Need to include IP option for new pipe at time of placement				$ -
	Cost for VFDs and new air-purge system are included in cost for all OS- Alternatives.				$ -
	Purge pipelines only beyond the ex structure are included herein.				$ -
Preliminary Opinion of Probable Construction Cost					$949,000.00
Contingency (15%)					$142,000.00
Geotech					$25,000.00
Design Engineering					$95,000.00
Construction Engineering					$133,000.00
Legal and Admin					$24,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,368,000.00**

Section 5 will take another look at Alt-B as it would fit with various other improvements to make the new intake system, including changes at the existing wetwell structure or construction of a new structure.

Operations and Maintenance

O&M costs are relatively negligible. There should be no need to provide any maintenance on the system for several decades. The only new cost would be power to operate the compressor at the on-shore structure, as is necessary to clear algae and frazzle ice. This energy cost amounts to less than $1,000 per year for the compressor.

4.3.3 IR-C Construct an inlet Macro-Screen/Cage

Construction of an inlet shield or screen in a cage-like manner would lessen the inlet velocity. However, this would prevent use of a pigging device in the intake line to the on-shore structure since it would get trapped in the cage. In addition, this provides greater area for getting caught in timbers or ice flows, which could tear the screen and damage the pipe.

Considering that a simple tee would be sufficient to lower the velocities once better controls were installed, and that this system would not offer any better environmental advantages over the IR-A, nor any cost savings, this alternative IR-C is eliminated from further consideration.

4.3.4 Alt IR-D Side Channel Intake

This alternative provides protection of the inlet from moving waters that carry destructive ice and logs. The alternative would need to be used in conjunction with an on-shore structure that includes screens inside (OS-4 or OS-6). Screens could be placed in the new pond formed by the channel but silting in of the channel would be a major concern.

The Billings "Side Channel Intake" is a familiar intake of this type. Although the Billings channel connection to the river needs to be dredged at least on an annual basis, Billings uses this system, originally installed in 1914, most of the time in favor of its in-river crib intake within the river. Figure 4-16 provides a view of the Billings side channel intake and crib and barrel intake nearby (the crib and barrel option is discussed in Section 4.5 since it includes pumping).

Side channel intakes with ponds for settling are often used by irrigation systems, which require settling of sands and silts (especially sand, which clogs sprinkler heads). This is probably the most ideal type of intake for irrigation, where a feeder dam is provided and which would only draw water in late spring and summer.

Icing-up and siltation of the channels can lead to more serious issues when a community water system is dependent on daily use of an intake for all seasons. Silting would be a greater concern at Forsyth than Billings due to added silt load typical as the Yellowstone progresses form the Park (upper Yellowstone) to the confluence with the Missouri (Lower Yellowstone). Billings has the advantage of a separate intake that may be used during dredging operations or if the channel supply is cut off for any other reason. Billings also has equipment and maintenance budget available for dredging.

The need to dredge deep into the river, as Billings must do annually, would be a significant environmental impact. Due to the need to dredge annually, this alternative may not be considered a Least Environmentally Damaging Practicable Alternative (LEDPA). Cost, particularly O&M for dredging and equipment, high likelihood of seasonal shutdowns and high environmental impact eliminate this option for further consideration for Forsyth.

Figure 4-11 Billings' Two Intakes - Side Channel and Crib and Barrel

Billings' Two Intakes: Side Channel System (see inset) and In-River Crib & Barrel Structure (lower right)

Figure 4-12 Sharp Slopes Define the Levy's Edge

4.3.5 Alt IR-E - Infiltration Gallery

Infiltration galleries provide an advantage over other river intakes in that there is less exposure to natural destructive elements found in the river such as timbers during high water, and galleries provide a natural screening through natural sands and gravels, resulting in lower NTUs of the raw water delivered. These have been used mostly successfully in Big Timber (Boulder River) and Hysham (Yellowstone), though the Hysham infiltration pipe did required augmentation in the 1990s.

Worden-Ballentine used an infiltration system that drew seemingly high-quality water from surrounding agricultural areas which produced water of much better taste than found from its well. However, this water eventually became contaminated and the community now relies only on groundwater through wells.

At Hysham, water generally flows from the river to the gallery. However, water chemistry and associated quality can subtly change during the summer as the river can begin to gain water from groundwater, which changes the chemistry of the water, including much higher TDS, especially sulfates in the case of Hysham.

Early interviews were made with the city of Forsyth to explore the possibility of switching over from surface water to ground water. It was found that the groundwater was of poor quality in the area. Thus any influence from groundwater would be detrimental to water quality as it would be much higher in dissolved solids.

An issue with infiltration galleries is the eventuality of clogging from sediment (though proper bedding with gravels should long deter that eventuality). Issues with the Hysham intake included both sedimentation and rusting of the pipe. The system had to be replace and expanded in the 1990s. The gallery is approximately 2,000 feet long since it's expansion in the 1990s. The infiltration gallery would include significant disturbance to the riparian region where the pipe or pipe array would be placed. The area would be excavated, and gravels placed below and above the infiltration pipes, though the slopes are so steep this does not appear feasible anywhere near the WTP area. This is a higher environmental impact than with other alternatives.

It is significant to note that the 2017 intake at Laurel, a City with similar demands, exceeded $11 million in cost. A hydrogeologist had examined infiltration galleries and groundwater options. However, neither of those options were chosen, despite the very high cost of the chosen alternative. As will be shown, the estimated cost of a new intake system for Forsyth is far less than that of Laurel, further supporting the decision to not pursue an infiltration gallery. In addition, the Laurel site was not along an extensive levy, so permitting and accessibility would have been much easier in Laurel than would be in Forsyth.

Given the high stability of the river at the existing site and lack of any recorded damage to the inlet structure since the 1930s, it is not considered advantageous to change the type of inlet from and open pipe to an infiltration gallery.

The greatest advantage of infiltration gallery is lower NTU than in the river, and lack of further screening. However. Forsyth has excellent experience with its sedimentation system. Given the 90-year high reliability of the existing inlet system it does not seem prudent to significantly change the system. **This alternative is eliminated due to** high slopes and lack of area to establish the infiltration gallery, the environmental impact, difficulty or impossibility to obtain permits, and the eventual re-excavation and maintenance when the system inevitably begins to clog.

If issues arise with other alternatives, such as difficulty obtain approval from agencies having jurisdiction due to currently unforeseen environmental impact or other concern, it may be worth re-visiting this alternative. A deeper evaluation of this alternative would first require a hydrogeologic study of the area for seasonal changes in groundwater flow, and appropriateness of the soils.

4.3.6 IR-F Do Nothing

IR-F, the "Do Nothing" Alternative was eliminated from consideration since the existing intake pipe has very high velocities and will continue to clog. Alt IR-A provided a very low-cost solution, so it would not be justifiable to ignore the issues. Both IR-A and IR-B were found technically feasible

IR-E, "Do Nothing" is eliminated from further consideration.

4.4 Intake Pipeline Alternatives

Basics Description

At some point in time, the existing 14-inch line will require replacement. The most recent copy of the 1999 inspection is clearer and shows that the inside of the pipe is not as bad as originally thought based on examination of the lower quality film seen previously. In addition, the newer copy includes footage of the pipe taken by a diver. That view was very clear and showed the condition of the inlet (an open mechanical joint) to be very good.

Review of cast iron wall thicknesses for pipe constructed pre-1950s shows that the pipe is roughly 4 times the thickness of modern-day ductile iron. Thus giving it a far greater corrosion allowance.

Considering that the pipe is not under any significant pressure, and that its wall thickness is far greater than what is seen today, the urgency of its replacement is somewhat diminished.

Based on the above, it can be concluded that the line does require replacement at some point. However, based on recent findings, imminent catastrophic failure is not anticipated.

Back-up Higher Intake Line Description

The city has long desired to have a higher, second inlet line. This line would only be active during high water in May and/or June. This is the time when river velocity is highest and therefore the water has the most potential for carrying suspended gravels and sands. Accordingly, this is when the intake's draw velocity must be kept minimal. Having a second inlet allows for further decrease in net velocity, thereby further reducing entrance of potential clogging materials.

This option would be very low cost if done in conjunction with placement of a new line, especially considering that it is higher than the other line and above the normal water level. This line will be included with all options considered with the exception of the Do-Nothing Alternative.

A new, higher line would also offer a portal into the wet well structure that could be used if temporary pumping was ever again needed. However, as noted earlier, temporary pumping in a harsh winter could be extremely difficult due to ice.

The new line would be provided with a tee at the point of juncture with the river, and include two blind flanges. It is anticipated that the flanges would remain in place most years, and only opened when very high water was expected (over 50,000 cfs). The blind flanges would be replaced with grills at each open end of the tee to make the pipe active. When waters dropped, the grills would be replaced with the blind flanges.

Based on flows and river gage heights, it is recommended that the second pipe enter the river (or riverbank) at an elevation of approximately 2510.62. This is 16 feet higher than the existing inlet pipe at the river, and 10 feet above the existing inlet pipe where it enters the wet well (recall, the existing inlet pipe rises approximately 6 feet through two 22.5-degree elbows prior to entering the wet well). For additional perspective, this is approximately 12 feet below the existing wet well floor.

The new line would be slightly sloping toward the wet well, eliminating the threat of clogging. The new line would drop down and connect to the lower line prior to that line entering the wet well. In this manner a second opening to the wet well is avoided. A vent should rise to the surface where the higher line bends to join the lower line.

4.4.1 Alt IP-1 Line the Existing Intake Pipe using CIPP

This is the first of three alternatives considered (one sub-alternative) to replace the old 14-inch cast iron pipe.

Through initial feasibility investigation, it was decided that CIPP lining of the existing 14-inch cast iron intake pipe will not be possible. To CIPP line a pipe, both pipe ends must be open and accessible. Being that the inlet side of the pipe is eight to nine vertical feet submerged in the Yellowstone River during low flows, access to this end of the pipe is not traditionally possible. A temporary standpipe was discussed, bringing the inlet end to the water surface, accessible by boat. However, the limiting factor remains the lack of assurance that the pipe can be successfully drained and dried to a standard enabling lining to occur. There is reasonable doubt that leakage would not be able to be overcome during lining. The risk of impossible lining conditions being discovered post-mobilization of a CIPP lining contractor is too great to continue forward with this alternative. Alt IP-1 has been eliminated.

4.4.2 Alt IP-2A Open-Cut New Intake Line Near Existing Line Route

This option would involve demolition of the pre-1931 portion of the intake, which is still connected to the current intake structure.

May be eliminated due to high cost and no real advantage over IP-2B. The same detrimental in-river environmental impacts exist in Alt IP-2A as are listed under Alt IP-2B.

4.4.3 Alt IP-2B Open Cut a New Intake Offset from the Existing Line

This option would not require the demolition of the pre-1931 structure and have less disturbance on existing operations. A potential concern in this alternative is that the intake line would need to enter the wet well structure after a bend. Fortunately, the pipe would be HDPE, which is very smooth. Since all alternatives for the on-shore structure will include a blow-down system (relatively low cost involving two valves, three fittings and approximately 40 feet of 8-inch pipe), this by itself is not considered a significant issue.

Of the IP alternatives, this option presents the greatest negative environmental impact, and by association, the greatest difficulty in permitting, since

1 A cofferdam will be required out into the river and back to the on-shore structure,
2 There would be a much greater disturbance at the bank since the older concrete portion, which now provides bank stabilization, would need to be removed.
3 Open cutting through the levy would create more riparian disturbance, and seriously disturb the levy during construction.
4 The Army Corps of Engineers (ACE) would want to be sure there was no other way to cross the levy, prior to issuing a permit.
5 Open-cutting is costly as show in the table below, when compared to horizontal directional drilling (HDD)

Table 4-3 Costs for Intake Pipe Alt IP-2B

Alt IP-2B - open cut intake pipe replacement w/ cofferdam					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements & Mobilization	LS	1	$ 44,500.00	$ 44,500.00
3	Furnish and Install Cofferdam Protection	LS	1	$ 300,000.00	$ 300,000.00
4	Remove 14" Cast Iron Intake Pipe (abandon pipe at edge of bank)	LS	1	$ 10,000.00	$ 10,000.00
5	Furnish & Open Cut Installation 14" (or 12") HDPE Intake Pipe (12" upper + 14 " lower pipe runs) Approx 15 feet bury for Lower pipe	LF	180	$ 250.00	$ 45,000.00
6	Furnish & Install inlet-end deceleration Tees	LS	1	$ 5,000.00	$ 5,000.00
7	Connect to wet-well	LS	1	$ 25,000.00	$ 25,000.00
8	Additional Permitting (applications and fees)	LS	1	$ 60,000.00	$ 60,000.00
Preliminary Opinion of Probable Construction Cost					$490,000.00
Contingency (15%)					$73,500.00
Geotech					$25,000.00
Design Engineering					$49,000.00
Construction Engineering					$69,000.00
Legal and Admin					$12,000.00
Total Preliminary Opinion of Probable Project Cost Alt 4 - Phase 3					**$718,500.00**

Considering also the very high cost when compared to HDD (following section), high environmental disturbance and difficulty in permitting, this option is eliminated from further consideration.

4.4.4 Alt IP-3 New Intake Line Using Horizontal Directional Drilling (HDD)

This alternative would use Horizontal Directional Drilling to place a new intake line. The rig would set up on the south side of the levy. The pipe would curve down to the level of the existing wet well, then travel to the river. Divers in the river would assist with pulling the drill head out and arranging placement of the pipe to be pulled back through from the river to the on-shore structure. This could be used with the existing wet well (would enter from the east) or with a new on-shore structure.

If used in association with a rehabilitation of the existing wet well, the new line would have to enter the existing wet well with a slight bend. However, unlike the current bends which create a trap, the new pipe would be smooth and consistent in slope.

A secondary intake pipe has been considered. During times of high river flow (above-average spring runoff years, etc), an inlet pipe on the channel bottom, such as the existing intake pipe, is vulnerable to unmanageable sediment capture. For this reason, consideration of a second elevated inlet pipe is purposed to act as the supplemental raw water inlet during the several spring months of peak runoff. This pipe would only be used in cases of high water or emergency (such as plugging of the primary inlet pipe) and be 12-inch diameter. This second inlet pipe could be added to the existing system after the placement of a single intake pipe as proposed and estimated for in Alternative IP-3. Presently it is believed that the decreased inlet velocity and blow-down system proposed in the On-shore alternatives (OS-4 – OS-8P) will prevent future clogging. Therefore, at this time it is considered prudent to add a wall pipe at a higher elevation but cap that pipe. In this fashion a new line could be added in the future, if found necessary, without again disturbing the wet well structure. This is a low-cost insurance and is included in estimates of the OS- alternatives.

Design Criteria

DEQ Circular 1 discusses raw water intake design criteria in Chapter 3 – Source Development. The following excerpt is include:

"3.1.4 Structures

3.1.4.1 Design of intake structures must provide for:

a. withdrawal of water from more than one level if quality varies with depth;

b. separate facilities for release of less desirable water held in storage;

c. where frazil ice may be a problem, holding the velocity of flow into the intake structure to a minimum, generally not to exceed 0.5 feet per second;

d. inspection of manholes every 1000 feet for pipe sizes large enough to permit visual inspection;

e. occasional cleaning of the inlet line;

f. adequate protection against rupture by dragging anchors, ice, etc.;

g. ports located above the bottom of the stream, lake, or impoundment, but at sufficient depth to be kept submerged at low water levels;

h. where raw water pumping wells are not provided, a diversion device capable of keeping large quantities of fish or debris from entering an intake structure; and

i. when buried surface water collectors are used, sufficient intake opening area must be provided to minimize inlet headloss. Selection of backfill material must be chosen in relation to the collector pipe slot size and gradation of the native material over the collector system."

Map

A map of the pipeline location is included in Figure 4-6.

Environmental Impact

Note that due to permitting and unknowns, it may be best to construct the new line in a second phase, which would be possible in scenarios that keep the existing wet well. This would allow work to move forward much more quickly on the badly needed improvements inside the existing structure. However, work on the new pipeline must be done in conjunction with any on-shore/pumping alternative that includes constructing a new wet well.

When considering the two methods of placing a new intake pipe at this location, being open cut versus horizontal directional drilling, environmental impact is an item of heightened concern. While not an uncommon practice when doing work on intake systems, open cut installation utilizing cofferdams to divert flow and create a water-free work area carries a high-degree of environmental disruption and should be avoided whenever possible. The amount of environmental disruption/damage to the river system and the levy caused by horizontal directional drilling in this instance would be minimal in comparison to that of an open-cut pipe installation. Some turbidity would be introduced to the water way when the drill head was exposed into the river bottom at the end of the drilling stretch. This would be minimal relative to the river bottom disturbance caused by the placement of a cofferdam to surround the open-cut working area. Because of this, HDD would be the Least Environmentally Damaging Practicable Alternative for replacement of the intake line leading from the river channel to the wet well.

Further, any disruption to the riverbank and river channel bottom from excavation during open-cut pipe installation allows for a higher risk of erosion caused by river flow at that disturbed area post-construction. Increased erosion adds turbidity to the river. Importantly, it also heightens the risk of the intake pipe filling with sand and gravel causing clogging and system wear. This re-compacted excavation corridor, even when re-compacted to specification, is at a higher risk than the surrounding area of experiencing detrimental erosion at the site of the pump house structure. Avoidance of this risk would require further engineering and construction costs to reinforce the intake pipe pathway and the riverbank section protecting the pump house. Simply considering the construction costs of open cut pipe installation of the intake pipe is approximately 300% that of horizontal directional drilling, the open-cut option would not be considered further. The addition of the detrimental environmental effects and the cost of accompanying permitting and mitigation create an obvious choice between the alternatives.

Land Requirements

No land acquisition/transfer would be required to do this work.

The USACE has jurisdiction over waters of the U.S. Because of this, coordination with and permission from the U.S. Army Corps of Engineers will be sought when designing any improvements taking place along the bank of the Yellowstone River or through the levy.

Potential Construction Problems

The HDD process will have to contend with existing the hole while within the river. Equalization of the water would be necessary to avoid flooding into the borehole, which could destroy the walls. Per conversations with a HDD contractor, the HDPE pipe that would be pulled through the bore would first be fuse-welded on-shore, then with a boat taken to the placement site. Fortunately, there is a boat ramp nearby, and old piles from the former bridge can be used for stabilization. It is indeed fortunate that the river has very little current due to the Carterville Dam.

A detailed soils report will be required early in design. This is extremely important to the driller and there is always a potential that the site won't be conducive to this technology, despite earlier discussions with drillers. Costs are impacted based on what a driller knows vs what he has to assume. The tests should allow the driller to get as close to the river as possible for one test, then evenly space three additional. tests for about 150 feet southward. Each bore needs to be to approximately 2490, which is a few feet below the elevation for the river bottom outside of the existing inlet pipe. Depending on location with respect to the levy (on the side or on the top), the depth of the bore holes may be 25 to 32 feet in depth.

Another issue is the connection between the steam vault and the existing wet well. Although no one understands why there is a connecting line here, it does existing. Prior to moving forward with HDD, the elevation of that line will need to be established and considered. Although not shown on any plans found, the pipe can readily be seen where it enters the wet well and it should be an easy task to obtain its depth. This pipe must be avoided during the boring process.

Sustainability Considerations

Water & Energy;

Construction using HDD should allow for the least energy use in that dewatering is not a major issue.

Green

Construction using HDD is far "greener" in that major disturbance to the levy and riverbank is avoided.

Cost Estimates:

Costs for IP-3 are presented below.

Table 4-4 Costs for Alt IP-3

Alt IP-3 - Horizontal Directional Drilling intake pipe replacement					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements & Mobilization	LS	1	$ 34,400.00	$ 34,400.00
3	Furnish and Install 14" HDPE intake pipe (HDD) (lower line)	LF	150	$ 450.00	$ 67,500.00
4	Divers (connect intake pipe to drill head, include crane)	LS	1	$ 90,000.00	$ 90,000.00
5	Expose new intake pipe, connect intake to wet-well (labor and appurtenances)	LS	1	$ 80,000.00	$ 80,000.00
6	Furnish and Install 12" HDPE intake pipe (HDD) (upper line)	LF	150	$ 425.00	$ 63,750.00
7	Furnish and Install concrete inlet-end pipe anchor	LS	1	$ 3,000.00	$ 3,000.00
8	Additional Permitting (applications and fees)	LS	1	$ 30,000.00	$ 30,000.00
9	Boat rental and similar expenses	LS	1	$ 5,000.00	$ 5,000.00
10	Additional Rip Rap allowances	LS	1	$ 5,000.00	$ 5,000.00
Preliminary Opinion of Probable Construction Cost					$379,000.00
Contingency (15%)					$56,900.00
Geotech					$25,000.00
Design Engineering					$38,000.00
Construction Engineering					$53,000.00
Legal and Admin					$9,000.00
Total Preliminary Opinion of Probable Project Cost Alt 4 - Phase 3					**$560,900.00**

O&M

No significant O&M would be anticipated through at least the first 20 years following the installation of the pipe.

Construction

The engineer has been in correspondence with and HDD provider. The main concerns are soils, access for the equipment, and radius of curvature. All these were considered and the project is seen as feasible. However, a good Geotech study of soils down approximately 20 feet along the route will be needed to allow bidders to know what they will be working with. Access is optimal around 4th street and no complications are anticipated. The HDD line would actually need to extend all the way to the drilling unit. It would be cut near the intake structure. At this juncture the pipe would be placed into the on-shore structure.

4.4.5 Summary of Intake Pipeline alternatives

The above alternative discussion found that there is only one preferred alternative, that being to use HDD. This would be the lowest cost, most environmentally friendly and accordingly, the easiest to permit.

Construction could be delayed, particularly in the event that IR-A is chosen in conjunction with this overall selected alternative, since IR-A involved very little investment.

4.5 On-Shore Structures/Pumping Systems

The existing on-shore structure was found to have serious structural damage to the beams and reinforcing bar that supports the existing floor. As previously discussed, due to high velocities that can bring in silts, sands and even gravels, new pumps and VFDs are needed for the system.

If the new system includes rehabilitation of the existing structure, the floor must be replaced.

4.5.1 Alt OS-1 Location Alternatives

A major determination has already been made—the intake location is ideal. River morphology has been reviewed in detail and the existing channel appears to be very stable (see Section 2.4.3). The ponding of water by the Cartersville Dam provides excellent conditions for the intake in that river velocities are generally low and there is always good submergence at roughly 8 feet. The excellent and stable submergence is beneficial hydraulically, but also in protecting the inlet from ice and debris.

The site has likely been used for 100 years or more and there are no records of issues with damage or silting of the area around the inlet. This is confirmed by footage taken by divers in 1999.

Location alternatives are eliminated from further consideration for use with any intake option. Construction of a side channel inlet, such as used by the city of Billings (in addition to its crib and barrel system) would likely require a different location to allow for space, but environmental concerns and cost eliminate those options. The city of Billings can provide dredging of the channel inlet, which is required at least annually. This is not something that the city of Forsyth could afford, and Billings has the only intake system on the Yellowstone that provides full redundancy with a second intake.

4.5.2 Alt OS-2 New Intake with Multiple Headers and In-Line Pumps

It is not uncommon to use an array of inlet pipes, each with a separate in-line pump. This offers an advantage of redundancy if one of the units is damaged. A multiple array of pipes would be costlier than a single pipe with multiple pumps using that single line.

Observation of several systems that use multiple pipes with in-line pumps finds that when placed in-line, the pumps will be at an angle, causing uneven weight distribution on the bearings. This arrangement severely limits pump life, increasing maintenance costs, while decreasing reliability. The Glendive intake, constructed in 1999, uses this type of intake system along with screens located out in the Yellowstone River. The city of Hardin once had this arrangement, but due to difficulty with the pumps they took out the inline pumps and put in split case pumps inside the intake building.

The Glendive system has had better success than the system in Hardin, which was later changed. Bearing wear in the pumps remains a concern and replacements of pumps every few years remains a maintenance concern in Glendive. Through use of better skids pump removal has become easier, the high frequency of replacement remains the same.

By comparison, the existing system at Forsyth, like the system in nearby Miles City uses vertical turbine pumps, installed vertically, with the bowls extended down to the near the base, or just below the inlet pipe.

The Glendive pump tube array required the in-river placement of a long 36-inch header pipe, encased in concrete. Connected to this header pipe are five 28-inch casing pipes, also embedded in concrete, extending from the 36-inch line in the river up to the on-shore intake structure. The 36-inch line was excavated approximately 15 feet deep into the riverbed in order to be level with the intake screens, located approximately 200 feet further into the river. This arrangement requires the greatest disturbance to the river during construction of any of the alternatives examined. Only the intake channel alternative would potentially cause more impact on the river in the long-term. The Glendive-style system requires a great deal of concrete and pipe, so it would likely be the one of the costliest alternatives, without providing a system that was operation or maintenance friendly. Glendive operators do not recommend their intake.

Based on review of other systems, and noting capital cost, maintenance, longevity and the environmental impact concerns, placing several new inlet pipes with angled in-line pumps is not considered appropriate for the Forsyth Project due to failures and difficult maintenance seen elsewhere with this type of system, and is eliminated from consideration.

4.5.3 Alt OS-3 New Intake with Multiple Headers/Pumps Above the Floodplain

This arrangement is similar to the previously described Alt OS-2, with the exception that the pumps are located within a structure at 3 feet above the floodplain (this is currently done in Hardin, MT, following the failure of using the vertical turbine pumps at an angle). This situation results in having the suction lift varying as the river rises and falls. Pumps with Low Net Positive Suction Head requirements (NPSHR), such as split case pumps, have surprisingly low NPSHR values. However, the Yellowstone can vary significantly in elevation throughout the year, creating much lower available net positive suction head (NPSHA) during low flows.

The existing structure is at 3 feet above the highest flow recorded. Noting that vertical turbine pumps are highly efficient and lower cost than split case pumps, and offer the advantage of full submergence (no NPSHR issues), there is no advantage found associated with this alternative. Vertical turbine pumps allow and require the pump bowls to always be submerged.

It should be kept in mind that this system was installed in Hardin, only after failure of their system as described in OS-2, since the vertical turbines were installed at an angle. The Hardin layout was done as a low-cost solution since the lines were already installed at an angle to the river. The system does not use the fine screens as recommended for Forsyth.

The existing system in Forsyth has the preferred configuration of vertically-installed vertical turbine pumps. This works well regardless of river elevation since they are always submerged. Vertical turbines may also be used in cans (to be discussed in later alternatives), which provides more options.

Difficulty in maintaining prime, cavitation risk due to variable NPSH, and lack of use with screens eliminate this option due to poor technical feasibility.

4.5.4 Alt OS-4 and OS-5 New On-Shore Structure, Vertical Turbine Pumps

The current design at Forsyth has operated for perhaps up to 100+ years without negative impacts from the river, other than clogging of the intake pipe. OS-4 and OS-5 would replace the existing structure with a new, similar structure adjacent to it.

OS-4 Background and Description

Alternative OS-4 would need to include screens within the structure. OS-5 would include a new inlet pipe and IR-B (screens in another structure within the river) and not require screens in the on-shore structure. Each would require a new inlet pipe.

Either of these options would provide a similar product as to what is currently in use at Forsyth, as well as in Laurel, Miles City and Glendive. Both Alternative OS-4 and OS-5 are considered proven technically viable and will be examined further in detail.

Maps

General site areas were presented in Figure 4.6 previously during the discussion on in-river portions of the project but includes locations of on-shore alternatives OS-4 and OS-5, as well as for OS-6 and OS-7, OS-8 and OS-8P.

Alternative **OS-4** and **OS-5** would each provide a new intake building parallel and perhaps 20 feet south and east of the existing system. This would allow continued use of the system throughout construction.

For permitting, environmental concerns, and safety concerns with the levy, it is assumed that the structure would need to be constructed on the south side of the levy. In this manner, the original levy is not cut all the way through. Combining this alternative with HDD allows minimal disturbance to the levy and riverbank.

An old Steam Vault is located roughly 20 feet east of the existing intake. Based on observation, this structure may be hydraulically connected to the existing wet well, but is not connected to the river. This structure predates the 1931 plans and its former use is not actually known. The structural condition for this deep vault has never been evaluated. However, should OS-4 or OS-5 be recommended, it is recommended that final design conduct an evaluation to examine the feasibility of using this vault. Unfortunately, no plans have been found for the vault.

The basic construction of OS-4 would have sheeting and shoring for the main on-shore construction. Since a new structure is being proposed, these alternatives would include a new inlet pipeline. The new line would be constructed without the bends placed in 1931.

Upon Completion, the existing structure would need to be demolished, since the floor presents a very real danger. The walls and roof and all mechanical and electrical components would be taken down and the wet well should be filled with sand. However, it would also be feasible to place a new floor above the wet well to preserve this potential future access point.

See ES-6 and ES-7 for the schematic layout of the proposed on-shore pumping system structures. The schematics are not repeated for later alternatives where there is similarity between OS-4 or OS-5 (as will be the case for OS-6, 7, 8, and 8P). Although final design might change the layout somewhat, the alternatives presenting a new structure are very similar to the rehab of the old structure. The main difference is a smaller diameter (14-feet vs 18-feet) caisson for a new structure that includes IR-B, with the screens placed in the river.

The interior pipe would essentially be the same for all alternatives OS-4 through OS-8P. OS-5 would differ in that there would not be screens in the lower portion and the diameter of the wet well would be 14-ft, rather than18-ft. OS-5 will include a blow-down operated using the turbine pumps, and also have an air-burst system that continued out to the structure within the river (per IR-B). The blow-down would only be for sediment flushing as pigging would not be an option for alternatives using in-river screens.

Design Criteria

Design Criteria would be as discussed in Section 4.2.2. These alternates provide an advantage in that they allow the existing system to fully operate without any temporary pumping throughout construction.

Both OS-4 and OS-5 meet the maximum flow velocity of 0.5 ft/s.

Environmental Impacts

Impacts to the environment from work on a new intake structure are expected to be considerably more than alternatives that do not have as much excavation or disturbance to the levy and riparian areas. However, long-term impact is expected to be reasonable, despite the large number for permits required. Accordingly, OS-4 and OS-5 each provide a potentially Least Environmentally Damaging Practicable Alternative (LEDPA). However, the need to excavate so deep adjacent to the levy raises strong concerns about gaining permission from the Army Corps of Engineers.

OS-4 would have less impact than OS-5 since there is no structure placed in-river and the air blast would not be seen or threaten potential swimmers or boaters.

Greater temporary Impact would be expected with OS-5 in the river as cofferdams would need to be constructed from the new intake up to the channel currently being used and expanded at the location of the intake opening (discussed earlier for intake pipe options).

New riprap and stabilization will be required where excavation is made into the river to avoid erosion at the disturbed bank. However, the diver's filming around the existing intake pipe area show the riverbank and shore to be very stable.

Permits

Permits and times allowed for being in the river would be required as discussed extensively in Sections 1.3 and 4.2.2.

The impact to the river would be limited to during construction and greatest with OS-5, where the new intake in-river structure would be placed, if required.

A significant concern may be working within the levy. The Army Corps of Engineers would be expected to have significantly more concern with work being done on and within the levy.

Land

Land would be required based on the final location of the intake housing the pumps, but the city owns all land that the project would conceivably extend to. No land purchase would be required. However, the levy will fall under US Army Corps of Engineers (ACE) for permitting and this could be a major, if not fatal setback since that levy protects the entire City of Forsyth.

Construction Problems

These two alternatives would not be considered free of construction problems. As noted in Section 4.3, the HDD process will have to contend with exiting the hole while within the river. The engineer has confirmed the feasibility in discussions with an HDD contractor who has completed such work with the assistance of divers. Equalization of the water would be necessary to avoid flooding into the borehole, which could destroy the walls. Per conversations with a HDD contractor, the HDPE pipe that would be pulled through the bore would first be fuse-welded on-shore, then with a boat taken to the placement site. Fortunately, there is a boat ramp nearby, and old piles from the former bridge can be used for stabilization of a boat or barge. It is indeed fortunate that the river has very little current due to the Carterville Dam.

These alternatives mirror what was done in 1931. However, construction of the new facility would begin after the pipe was placed using HDD. The end would need to be cut and plugged prior to attempting to constrict and dewater the area of construction.

As was likely found in the 1930s, dewatering a hole deep and wide enough to support the new structure will be a major cost.

In fairness to the contractor, contract wording may include caveats to allow delay if River flows are unusually high at the anticipated start date. This would not however impact the timing of the bore.

Shoring must be designed by a professional engineer licensed in Montana.

Sustainability

These two alternatives both offer excellent sustainability in that each provides a system like that which has worked since the 1930s, with the exception that the system is deteriorating from age, and clogging. Having a new pipe without vertical bends (and a new blow-down system) should keep the inlet pipes free of debris.

The vertical turbine pumps to be used in the on-shore system provide the greatest **power efficiency** of any pump, and by providing the pumps in the vertical positions (some options would have them slanted and in an encasement) they will have long lives relatively maintenance free. The ability to use a new screening system either in the river (OS-5) or within the on-shore structure (OS-4) provides a "**green**" solution in that fish, pallid sturgeon in particular, are provided the greatest degree of protection feasible. There is no visible change to the Yellowstone River associate with OS-4, and only the bubbling from the air burst system associated with OS-5.

Each alternative proposes to use VFDs with vertical turbine pumps, not only to control inlet velocities, but to provide better energy management and smoother overall operations.

Operation and Maintenance

O&M costs are expected to be minimal. An air-purging system, called a "Hydroburst" system by the manufacturer, would be required and always be online. This system provides sudden bursts of air into the screens to push out algae or other materials, including frazzle ice, that may adhere to the outside of the screen.

The only new operation and maintenance cost would be associated with running the Hydroburst system. No significant other O&M, including power costs, is expected to be greater or significantly lesser than for the existing intake (use of VFDs will provide some degree of power savings, but it would not significantly impact the overall O&M budget). The following table provides a summary of O&M costs and their 20-year present worth. Discount rates are the "Real Discount Rates" as included in Appendix C of OMB Circular No. A-94. Section 5 provides a more detailed description of discount rates and terms such as Uniform Series. **O&M costs are identical for all alternatives using Johnson Screens**. There is no additional O&M change for the remainder of the intake system.

Use of VFDs will provide some degree of power savings, but it would not significantly impact the overall O&M budget. There is expected O&M savings due to the provisions made to avoid clogging of the intake line. This is a savings estimated to occur by avoiding clogging of the line every 10 years, including

Temporary pumping system for 4 weeks	$10,000
Divers	$15,000
Pigging Specialists and process	$10,000
Operator time cleaning out intake	$4,000
Total	$39,000

Calculations for the power used for the compressor use a 3 HP compressor operating 5 minutes per hour, with additional operator's time at 2 hours per month (runs automatically). Operator costs for O&M assume $25 per hour with a multiplier of 2 for benefits for a total of $50/hour. See the appendix for additional detail on O&M estimates.

Table 4-5 O&M Costs On-Shore Alts OS-4 and OS-5

PV of O&M and Uniform Series of Annual Repair/O&M Change				-0.5%	discount rate	20 yr
				-1.1%	discount rate	10 yr
				-1.6%	discount rate	5 yr
				-0.5%	discount rate	annual over 20 yr
				-0.6%	discount rate	15 yr
PV of 20 years of compressor power and maintenance time (all Alternatives with screens); savings by avoiding clogging of intake						
		$ 1,442.58	per year	($242/yr power+ 24 man-hr/yr @ $50/hr incl benef)		
Item	annual	PV of annual	Every 5 yrs	Every 10 yrs	Every 20 yrs	PV total
O&M power and maintenance of compressor	$ 1,442.58	$ 30,423	$ -	$ -	$ -	$ 30,423
O&M savings for not having to bypass and clean intake line	$ -	$ -	$ -	$ (39,000)	$ -	$ (88,939)
Negative values indicate savings						
All other O&M including pumps not changed from existing intake level						
USPW(O&M) Total PV of Annual Series and Intermittent O&M; (-) indicates savings						$ (58,515)

The negative O&M cost indicates a net savings.

Capital and NPV Costs are presented in below. The NPV cost will be explained in Detail in Section 5. The NPV was included in the following tables for ease of reference in the future. It may be ignored prior to review of Section 5.

Table 4-6 Capital and NPV Costs OS-4

Forsyth OS-4 New On-Shore System with Screens Inside					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 204,000	$ 204,000
2					$ -
3	Exploratory Excavation	HR	30	$ 540	$ 16,200
4	Sheeting/Shoring/dewatering for new structure	LS	1	$ 300,000	$ 300,000
5	Concrete form and Place-Base, Walls, Floor (18-ft dia)	CY	110	$ 2,800	$ 308,000
6	Above-Floor Structure incl Roof, mounts, minor penn.	SF	600	$ 480	$ 288,000
7	Wall Pipes - 10 "dsg and 12/14" Intakes	EA	3	$ 8,000	$ 24,000
8	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
9	Vertical Turbine Pumps, Cans	EA	**2**	$ 60,000	$ 120,000
10	8" Check Valves	EA	2	$ 1,800	$ 3,600
11	8" Gate Valves	EA	4	$ 1,400	$ 5,600
12	Pipe spools, fittings	LS	1	$ 30,000	$ 30,000
13	Sump Pumps and associated controls/pipe	EA	2	$ 5,200	$ 10,400
14	6-foot Mag Meter Vault Incl. 10-inch Gate Valve, 10X14 reducer	LS	1	$ 16,000	$ 16,000
15	10-inch Mag Meter	EA	1	$ 26,000	$ 26,000
16	Controls, incl. VFDs, SCADA conn. (in addition to WTP controls upgrade)	LS	1	$ 85,000	$ 85,000
17	Heating and Ventilation	LS	1	$ 20,000	$ 20,000
18	Electrical, Lighting, Security	LS	1	$ 16,000	$ 16,000
19	Fencing	LS	1	$ 20,000	$ 20,000
20	Air Purge System incl. Compressor and Controls	LS	1	$ 55,000	$ 55,000
21	Additional Air Purge Line Casing (portion beyond included in IR-B)	LS	40	$ 160	$ 6,400
22	Additional Air Purge Lines (within 12-in casing)	LF	80	$ 35	$ 2,800
23	Waste Line for sump pumps to connect to the ex line that runs to the drying beds	LS	1	$ 6,000	$ 6,000
24	Demo/fill ex structures	LS	1	$ 50,000	$ 50,000
25	Type 2 Bedding	CY	**5**	$ 35	$ 180
26	Imported Backfill	CY	80	$ 37	$ 2,960
27	Deep Trench Plugs	EA	4	$ 5,000	$ 20,000
28	Landscape Restoration and Seeding	SY	500	$ 5	$ 2,500
29	Access Ladder with cage	LS	1	$ 22,000	$ 22,000
30	***New Intake Pipe IP-3***	LS	1	**$ 380,000**	$ 380,000
31	**Cost of Tee to effectively include IR-A as part of IP-3**	EA	1	$ 35,000	$ 35,000
32	Johnson Screens and Interconnection using anit-zebra mussle z-alloy	EA	2	$ 35,000	$ 70,000
33	Concrete base for Johnson Screens	LS	1	$ 50,000	$ 50,000
34	Connecting pipe Screens to Pump Cans	LS	1	$ 15,000	$ 15,000
35	EA and Permitting Incl DNRC, ACE, mscl (no EIS) Not Previously Included in IP-3	LS	1	$ 8,000	$ 8,000
36					$ -
Preliminary Opinion of Probable Construction Cost					$ 2,251,000
Contingency (15%)					$ 338,000
Geotech					$ 25,000
Design Engineering					$ 225,000
Construction Engineering					$ 315,000
Legal and Admin					$ 56,000
Total Preliminary Opinion of Probable Project Cost					**$ 3,210,000**
	NPV				
	Total Capital Cost in Year 2022				**$3,210,000**
	USPW (O&M)				**-$58,515**
	NPV Before considering salvage value				**$3,151,485**
	SSPW(S), based on:	40	yr life, -0.1% Discount Factor		$1,573,235
	NPV after accounting for salvage value				$1,578,250

Table 4-7 Capital and NPV Costs On-Shore Alt OSI-5

Forsyth OS-5 New On-Shore System with Screens In-River (IR-B)					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 264,000	$ 264,000
2					$ -
3	Exploratory Excavation	HR	30	$ 540	$ 16,200
4	Sheeting/Shoring/dewatering for new structure	LS	1	$ 300,000	$ 300,000
5	Concrete form and Place-Base, Walls, Floor (16-ft dia)	CY	80	$ 2,800	$ 224,000
6	Above-Floor Structure incl Roof, mounts, minor penn.	SF	480	$ 480	$ 230,400
7	Wall Pipes - 10 "dsg and 12/14" Intakes	EA	3	$ 8,000	$ 24,000
8	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
9	Vertical Turbine Pumps, Columns, dsg Heads	EA	**2**	$ 40,000	$ 80,000
10	8" Check Valves	EA	2	$ 1,800	$ 3,600
11	8" Gate Valves	EA	4	$ 1,400	$ 5,600
12	Pipe spools, fittings	LS	1	$ 30,000	$ 30,000
13	Sump Pumps and associated controls/pipe	EA	2	$ 5,200	$ 10,400
14	6-foot Mag Meter Vault Incl. 10-inch Gate Valve, 10X14 reducer	LS	1	$ 16,000	$ 16,000
15	10-inch Mag Meter	EA	1	$ 26,000	$ 26,000
16	Controls, incl. VFDs, SCADA conn. (in addition to WTP controls upgrade)	LS	1	$ 85,000	$ 85,000
17	Heating and Ventilation	LS	1	$ 20,000	$ 20,000
18	Electrical, Lighting, Security	LS	1	$ 15,000	$ 15,000
19	Fencing	LS	1	$ 20,000	$ 20,000
20	Air Purge System incl. Compressor and Controls	LS	1	$ 55,000	$ 55,000
21	Additional Air Purge Line Casing (portion beyond included in IR-B)	LS	40	$ 160	$ 6,400
22	Additional Air Purge Lines (within 12-in casing)	LF	80	$ 35	$ 2,800
23	Waste Line for sump pumps to connect to the ex line that runs to the drying beds	LS	1	$ 6,000	$ 6,000
24	Demo/fill ex structures	LS	1	$ 50,000	$ 50,000
25	Type 2 Bedding	CY	**5**	$ 35	$ 180
26	Imported Backfill	CY	80	$ 37	$ 2,960
27	Deep Trench Plugs	EA	4	$ 5,000	$ 20,000
28	Landscape Restoration and Seeding	SY	500	$ 5	$ 2,500
29	Access Ladder with cage	LS	1	$ 22,000	$ 22,000
30	***New Intake Pipe IP-3***	LS	1	**$ 380,000**	$ 380,000
31	**Intake with IR-B (Includes anti-zebra mussle z-alloy)**	LS	1	**$ 949,000**	$ 949,000
32	EA and Permitting Incl DNRC, ACE, mscl (no EIS) in additional to that included in IR-B and IP-3	LS	1	$ 8,000	$ 8,000
33					$ -
Preliminary Opinion of Probable Construction Cost					$2,907,000.00
Contingency (15%)					$436,000.00
Geotech					$25,000.00
Design Engineering					$291,000.00
Construction Engineering					$407,000.00
Legal and Admin					$73,000.00
Total Preliminary Opinion of Probable Project Cost					**$4,139,000.00**
	NPV				
	Total Capital Cost in Year 2022				**$4,139,000**
	USPW (O&M)				**-$58,515**
	NPV Before considering salvage value				**$4,080,485**
	SSPW(S), based on:		40	yr life, -0.1% Discount Factor	$2,028,541
	NPV after accounting for salvage value				$2,051,943

INTERSTATE ENGINEERING

4.5.5 Alt OS-6 and OS-7 Rehabilitate the Existing On-Shore Intake Structure

The floor of the existing on-shore structure was found to be rapidly deteriorating. It is difficult to give a firm timeline for the demise of the structure's floor, but it should be considered dangerous. All significant equipment including pumps and controls are supported by this floor.

The remainder of the structure, though old, appears to be in reasonable condition. There is no exposed reinforcing bar in the 18-foot diameter caisson, and review by a structural engineer found that the wet well caisson could be reused.

Description

Alternatives OS-6 and OS-7 look at rehabilitating the structure. The alternatives differ in that OS-6 is used in conjunction with IR-A and has screens placed inside the wet well. OS-7 is used in conjunction with IR-B and does not have screen inside the wet well, but rather are in the river.

A structural engineer has provided two options for the rehabilitation of the floor. One would provide a new floor consisting mostly of steel grating. The other would have a concrete floor. Either would be feasible and there is not a sharp difference in cost. Operator preference and costs can be reexamined during the final design, but the options are presented in the Section.

The system would be provided with piping to allow for the system to blow-down water back into the inlet pipe for cleaning. This would be a very low-cost safeguard against future clogs. However, as discussed earlier, use of VFDs and a double-inlet point through use of a tee should greatly lessen the threat of future clogging.

Design Criteria

Design Criteria would be as discussed in Section 4.2.2.

Both OS-6 and OS-7 meet the maximum flow velocity of 0.5 ft/s.

Map

See Figure 4.6 for the location of the proposed project. See figure ES-6 and 7 for similar layouts of the facilities.

Environmental Impacts

Impacts to the environment from work on the existing intake structure would be minimal Accordingly, OS-6 and OS-7 each provide a potentially Least

Environmentally Damaging Practicable Alternative (LEDPA). However, by avoiding any significant work within the river or riverbank, OS-6 provides the very least environmental impact of all alternatives.

New riprap and stabilization will be required where excavation is made into the river (OS-7) to avoid erosion at the disturbed bank. However, the diver's filming around the existing intake pipe area show the riverbank and shore to be stable.

Permits

Permits and times allowed for being in the river would be required as discussed extensively in Sections 1.3 and 4.2.2.

The impact to the river would be limited to during construction and only applies to OS-7, where the new intake in-river structure would be placed.

A significant concern may be working within the levy. The Army Corps of Engineers would be expected to have significantly more concern with work being done on and within the levy.

If a new line were installed to the river, permitting would be somewhat more difficult, but still considered to not be a major setback. As determined earlier, the method would be HDD. However, at the point of entering the wet well, a deep excavation with shoring would be required adjacent to the existing structure. The area disturbed would be much less than with OS-4 and OS-5, but still significant. Options that re-use the existing structure have the convenience of constructing the new pipe as part of a later phase. Keeping distant from the river for the excavation is expected to be preferred by the Army Corps of Engineers.

Land

No land purchase would be required. However, the levy will fall under US Army Corps of Engineers (ACE) for permitting.

Construction Problems

Construction problems would be minimal for OS-6 since there is no work in the river other than the placement of a tee.

Temporary pumping would be needed throughout the construction of the new floor and placement of the new pumps (OS-7) or new pumps, screens and pump cans (OS-6).

For both alternatives OS-6 and OS-7, the work at the existing structure would be fairly easy since the roof would be taken out, then the floor would be demolished. The contractor would have to plan the floor demolition, since all the materials would need to be removed.

OS-6 would require the prefabrication of the screens and pump cans assembly. These would be placed on a concrete base that also may be preconstructed and lowered into place once the old floor was demolished.

Both alternatives would include drilling a 12- or 14-inch hole for the lower new intake pipe. If the new pipe is not to be done in conjunction with the on-shore work, the hole would be drilled and a new wall pipe installed with a blind flange for ease of future use for a very easy connection. A second 12-inch penetration would be made higher in the structure and provided with a blind flange for potential future use of a higher intake pipe in conjunction with the lower pipe.

Sustainability

These two alternatives both offer excellent sustainability in that each provides a system similar to that which has worked since the 1930s, with the exception that the early system is deteriorating from age, and clogging.

The vertical turbine pumps to be used in the on-shore system provide the greatest **power efficiency** of any pump, and by providing the pumps in the vertical positions (some options would have them slanted and in an encasement) they will have long lives, relatively maintenance free. The ability to use a new screening system either in the river (OS-7) or in the on-shore structure (OS-6) provides a "**green**" solution in that fish, pallid sturgeon, are provided the greatest degree of protection feasible. There is no visible change to the Yellowstone River associated with OS-6, and only the bubbling from the air burst system associated with OS-5.

Each alternative proposes to use VFDs, not only to control inlet velocities, but to provide better energy management and smoother overall plant operations.

Operation and Maintenance

O&M costs are expected to be minimal. An air-purging system, called a "Hydroburst" system by the manufacturer, would be required and always be online. This system provides sudden bursts of air into the screens to push out algae or other materials, including frazzle ice, that may adhere to the outside of the screen.

The only new operation and maintenance cost would be associated with running the Hydroburst system. No significant other O&M, including power costs, is expected to be greater or significantly lesser than for the existing intake (use of VFDs will provide some degree of power savings, but it would not significantly impact the overall O&M budget). The following table provides a summary of O&M costs and their 20-year present worth. Discount rates are the "Real Discount Rates" as included in Appendix C of OMB Circular No. A-94. Section 5 provides a detailed description of discount rates and terms such as Uniform Series. **O&M costs are identical for all alternatives using Johnson Screens.**

Table 4-8 O&M Costs On-Shore Alts OS-6 and OS-7

PV of O&M and Uniform Series of Annual Repair/O&M Change				-0.5%	discount rate	20 yr
				-1.1%	discount rate	10 yr
				-1.6%	discount rate	5 yr
				-0.5%	discount rate	annual over 20 yr
				-0.6%	discount rate	15 yr
PV of 20 years of compressor power and maintenance time (all Alternatives with screens); savings by avoiding clogging of intake						
		$ 1,442.58	per year	($242/yr power+ 24 man-hr/yr @ $50/hr incl benef)		
Item	annual	PV of annual	Every 5 yrs	Every 10 yrs	Every 20 yrs	PV total
O&M power and maintenance of compressor	$ 1,442.58	$ 30,423	$ -	$ -	$ -	$ 30,423
O&M savings for not having to bypass and clean intake line	$ -	$ -	$ -	$ (39,000)	$ -	$ (88,939)
Negative values indicate savings						
All other O&M including pumps not changed from existing intake level						
USPW(O&M) Total PV of Annual Series and Intermittent O&M; (-) indicates savings						$ (58,515)

Capital and NPV Costs are presented below. As previously noted, the NPV cost will be explained in Detail in Section 5. The NPV was included in the following tables for ease of reference in the future. It may be ignored prior to review of Section 5.

Table 4-9 Capital and NPV Cost for OS-6

Forsyth OS-6 Rehab Ex Structure with Screens in the Intake Structure					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 124,000	$ 124,000
2					$ -
3	Exploratory Excavation	HR	30	$ 540	$ 16,200
4	Expansion of Existing Structure for Compressor and controls	SF	260	$ 300	$ 78,000
5	New Roof, ceiling	SF	600	$ 150	$ 90,000
6	New Floor	SF	300	$ 500	$ 150,000
7	Wall Pipes - 10 "dsg and 12/14" Intakes	EA	3	$ 8,000	$ 24,000
8	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
9	Vertical Turbine Pumps, Cans	EA	**2**	$ 60,000	$ 120,000
10	8" Check Valves	EA	2	$ 1,800	$ 3,600
11	8" Gate Valves	EA	4	$ 1,400	$ 5,600
12	Pipe spools, fittings	LS	1	$ 30,000	$ 30,000
13	Sump Pumps and associated controls/pipe	EA	2	$ 5,200	$ 10,400
14	6-foot Mag Meter Vault Incl. 10-inch Gate Valve, 10X14 reducer	LS	1	$ 16,000	$ 16,000
15	10-inch Mag Meter	EA	1	$ 26,000	$ 26,000
16	Controls, incl. VFDs, SCADA conn. (in addition to WTP controls upgrade)	LS	1	$ 85,000	$ 85,000
17	Heating and Ventilation	LS	1	$ 20,000	$ 20,000
18	Electrical, Lighting, Security	LS	1	$ 15,000	$ 15,000
19	Fencing			$ -	$ -
20	Air Purge System incl. Compressor and Controls	LS	1	$ 55,000	$ 55,000
21	Additional Air Purge Line Casing (portion beyond included in IR-B)	LS	0	$ 160	$ -
22	Additional Air Purge Lines (within 12-in casing)	LF	0	$ 35	$ -
23	Waste Line for sump pumps to connect to the ex line that runs to the drying beds	LS	0	$ 6,000	$ -
24	Demo/fill ex structures	LS	0	$ 50,000	$ -
25	Type 2 Bedding	CY	5	$ 35	$ 180
26	Imported Backfill	CY	80	$ 37	$ 2,960
27	Deep Trench Plugs	EA	3	$ 5,000	$ 15,000
28	Landscape Restoration and Seeding	SY	350	$ 5	$ 1,750
29	Access Ladder with cage	LS	1	$ 22,000	$ 22,000
30	***New Intake Pipe IP-3***	LS	1	**$ 380,000**	$ 380,000
31	**Cost of Tee to effectively include IR-A as part of IP-3**	EA	1	$ 35,000.00	$ 35,000.00
32	EA and Permitting Incl DNRC, ACE, mscl (no EIS) in additional to that included in IP-3	LS	1	$ 2,000	$ 2,000
33					$ -
Preliminary Opinion of Probable Construction Cost					$1,360,000.00
Contingency (15%)					$204,000.00
Geotech					$25,000.00
Design Engineering					$136,000.00
Construction Engineering					$190,000.00
Legal and Admin					$34,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,949,000.00**
	NPV				
	Total Capital Cost in Year 2022				**$1,949,000**
	USPW (O&M)				**-$58,515**
	NPV Before considering salvage value				**$1,890,485**
	SSPW(S), based on:	40	yr life, -0.1% Discount Factor		$955,213
	NPV after accounting for salvage value				$935,272

Table 4-10 Capital and NPV Costs for OS-7

Forsyth OS-7 Rehab Ex Structure with Screens in River (IR-B)					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 212,000	$ 212,000
2					$ -
3	Exploratory Excavation	HR	30	$ 540	$ 16,200
4	Expansion of Existing Structure for Compressor and controls	SF	260	$ 300	$ 78,000
5	New Roof, ceiling	SF	600	$ 150	$ 90,000
6	New Floor	SF	300	$ 500	$ 150,000
7	Wall Pipes - 10 "dsg and 12/14" Intakes	EA	3	$ 8,000	$ 24,000
8	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
9	Vertical Turbine Pumps, Columns, dsg Heads	EA	**2**	$ 40,000	$ 80,000
10	8" Check Valves	EA	2	$ 1,800	$ 3,600
11	8" Gate Valves	EA	4	$ 1,400	$ 5,600
12	Pipe spools, fittings	LS	1	$ 30,000	$ 30,000
13	Sump Pumps and associated controls/pipe	EA	2	$ 5,200	$ 10,400
14	6-foot Mag Meter Vault Incl. 10-inch Gate Valve, 10X14 reducer	LS	1	$ 16,000	$ 16,000
15	10-inch Mag Meter	EA	1	$ 26,000	$ 26,000
16	Controls, incl. VFDs, SCADA conn. (in addition to WTP controls upgrade)	LS	1	$ 85,000	$ 85,000
17	Heating and Ventilation	LS	1	$ 20,000	$ 20,000
18	Electrical, Lighting, Security	LS	1	$ 15,000	$ 15,000
19	Fencing			$ -	$ -
20	Air Purge System incl. Compressor and Controls	LS	1	$ 55,000	$ 55,000
21	Additional Air Purge Line Casing (portion beyond included in IR-B)	LS	0	$ 160	$ -
22	Additional Air Purge Lines (within 12-in casing)	LF	0	$ 35	$ -
23	Waste Line for sump pumps to connect to the ex line that runs to the drying beds	LS	0	$ 6,000	$ -
24	Demo/fill ex structures	LS	0	$ 50,000	$ -
25	Type 2 Bedding	CY	**5**	$ 35	$ 180
26	Imported Backfill	CY	80	$ 37	$ 2,960
27	Deep Trench Plugs	EA	3	$ 5,000	$ 15,000
28	Landscape Restoration and Seeding	SY	350	$ 5	$ 1,750
29	Access Ladder with cage	LS	1	$ 22,000	$ 22,000
30	***New Intake Pipe IP-3***	LS	1	**$ 380,000**	$ 380,000
31	**IR-B**	LS	1	**$ 949,000**	$ 949,000
32	EA and Permitting Incl DNRC, ACE, mscl (no EIS) in additional to that included in IP-3	LS	1	$ 16,000	$ 16,000
33					$ -
Preliminary Opinion of Probable Construction Cost					$2,336,000.00
Contingency (15%)					$350,000.00
Geotech					$25,000.00
Design Engineering					$234,000.00
Construction Engineering					$327,000.00
Legal and Admin					$58,000.00
Total Preliminary Opinion of Probable Project Cost					**$3,330,000.00**
	NPV				
	Total Capital Cost in Year 2022				**$3,330,000**
	USPW (O&M)				**-$58,515**
	NPV Before considering salvage value				**$3,271,485**
	SSPW(S), based on:	40	yr life, -0.1% Discount Factor		$1,632,047
	NPV after accounting for salvage value				$1,639,438

4.5.6 Alt OS-8 and OS-8P Rehabilitate the Existing On-Shore Intake Structure Only

This alternative does not include any provisions for providing a future screen. Alternative OS-8 is limited to providing a flushing line for the existing intake and replacing the floor, pumps and controls. OS-8P is the same as OS-8, but includes a new intake pipe.

This low-cost alternative does not have any provisions for future placement of screens within the structure. It is used in conjunction with IR-A (adding a tee to the existing pipe within the river). No provisions are made at this time for replacing the inlet line for OS-8 (IP-3 is NOT included), but this is included in OS-8P (IP-3 IS included).

As noted earlier, the diver's filming around the existing intake pipe area show the riverbank and shore to be stable.

Permits

Permits should not be difficult for OS-8, as the only time spent within the river would be to attach a new tee at the end of the existing intake pipe. No disturbance would be made to any riparian area. No excavation would take place at the intake building. However, due to the close vicinity to the river, a joint permit would still be required.

OS-8P would require additional permitting, but no major issues would be expected since the pipe is installed using HDD.

Land

No land purchase would be required. OS-8 completely avoids excavation within the levy. OS-8A would include the excavation to tie into the existing wet well.

Maps

See Figure ES-5 for locations of OS-8 and 8P.

Construction Problems

Construction problems would be minimal for OS-8 and OS-8P since there is no work in the river other than the placement of a tee, and no excavation done at the intake structure for OS-8.

Temporary pumping would be need throughout the construction of the new floor and placement of the new pumps. A deep excavation with shoring and dewatering will be required for the tie-in associated with OS-8P.

Work at the existing structure would be fairly easy for each since the roof would be taken out, then the floor would be demolished. The contractor would have to plan the floor demolition, since all the materials would need to be removed.

OS-8 does not address replacement of the existing pipe. It might later become necessary to line the existing pipe, which is possible, but may be difficult if the existing pipe collapsed. Fortunately, the cast iron pipe constructed prior to the 1950s was quite thick and full collapse, though possible, is not considered likely in the near future.

Sustainability

Alternative OS-8 addresses the two main needs: controlling sediment in the intake pipe (providing a blow-down system and reducing the inlet velocity to under 0.5 ft/s), and replacing the existing floor portion of the existing on-shore structure. Since it does not provide screens, it may eventually become necessary to construct IR-B. IP-3, the construction of a new intake pipe should then be done simultaneously with IR-B for ease of permitting and to provide the new intake pipe.

Alternative OS-8P includes resolution of the two needs described in the previous paragraph, and also provides the replacement of the intake pipe. OS-8 and OS-8P differ from Alternatives OS-4 – OS-7 in that there are no screens. Since screens are not mentioned as required, these are potentially feasible. However, lack of a new intake pipe make alternatives OS-8 risky. For this reason OS-8 will not rank well when compared to other options in technical feasibility, operation and maintenance, or public preference.

The vertical turbine pumps to be used in the on-shore system provide the greatest **power efficiency** of any pump, and by providing the pumps in the vertical positions.

Since this alternative does not provide a new screening system either in the river it does not provide as "**green**" of a solution as other alternatives.

Each alternative proposed to use VFDs, not only to control inlet velocities, but to provide better energy management and smoother overall plant operations.

Operation and Maintenance

No new O&M costs are associated with this alternative.

Use of VFDs will provide some degree of power savings, but it would not significantly impact the overall O&M budget. There is expected O&M savings due to the provisions made to avoid clogging of the intake line. This is a savings estimated to occur by avoiding clogging of the line every 10 years, including:

Temporary pumping system for 4 weeks	$10,000
Divers	$15,000
Pigging Specialists and process	$10,000
Operator time cleaning out intake	$4,000
Total	$39,000

The O&M savings are identical for OS-8 and OS-8P and are presented below. The savings is attributed to lack of clogging, based on installation of the blow-down piping.

Table 4-11 O&M Costs for OS-8 and OS-8P

PV of O&M and Uniform Series of Annual Repair/O&M Change OS-8				-0.5%	discount rate	20 yr
				-1.1%	discount rate	10 yr
				-1.6%	discount rate	5 yr
				-0.5%	discount rate	annual over 20 yr
				-0.6%	discount rate	15 yr
PV of 20 years of compressor power and maintenance time (all Alternatives with screens); savings by avoiding clogging of intake						
		$ -	per year	($242/yr power+ 24 man-hr/yr @ $50/hr incl benef)		
Item	annual	PV of annual	Every 5 yrs	Every 10 yrs	Every 20 yrs	PV total
O&M power and maintenance of compressor (N/A)	$ -	$ -	$ -	$ -	$ -	$ -
O&M savings for not having to bypass and clean intake line	$ -	$ -	$ -	$ (39,000)	$ -	$ (88,939)
Negative values indicate savings						
All other O&M including pumps not changed from existing intake level						
USPW(O&M) Total PV of Annual Series and Intermittent O&M; (-) indicates savings						$ (88,939)

Capital and NPV Costs are presented in the tables below. It is important to keep in mind that the costs for OS-8 do NOT include important features such as screens or a new intake pipe. As previously noted, The NPV cost will be explained in Detail in Section 5. The NPV was included in the following tables for ease of reference in the future. It may be ignored prior to review of Section 5.

Table 4-12 Capital and NPV Costs for OS-8

Forsyth OS-8 Rehab Ex Structure, No Screeens					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 63,000	$ 63,000
2					$ -
3	Exploratory Excavation	HR	5	$ 540	$ 2,700
4	New Roof, ceiling	SF	400	$ 150	$ 60,000
5	New Floor	SF	300	$ 500	$ 150,000
6	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
7	Vertical Turbine Pumps, Dsg Heads, etc.	EA	**2**	$ 40,000	$ 80,000
8	8" Check Valves	EA	2	$ 1,800	$ 3,600
9	8" Gate Valves	EA	4	$ 1,400	$ 5,600
10	Pipe spools, fittings	LS	1	$ 30,000	$ 30,000
11	Sump Pumps and associated controls/pipe	EA	2	$ 5,200	$ 10,400
12	6-foot Mag Meter Vault Incl. 10-inch Gate Valve, 10X14 reducer	LS	1	$ 16,000	$ 16,000
13	10-inch Mag Meter	EA	1	$ 26,000	$ 26,000
14	Controls, incl. VFDs, SCADA conn. (in addition to WTP controls upgrade)	LS	1	$ 85,000	$ 85,000
15	Heating and Ventilation	LS	1	$ 15,000	$ 15,000
16	Electrical, Lighting, Security	LS	1	$ 8,000	$ 8,000
17	Fencing			$ -	$ -
18	Waste Line for sump pumps to connect to the ex line that runs to the drying beds	LS	0	$ 6,000	$ -
19	Landscape Restoration and Seeding	SY	200	$ 5	$ 1,000
20	Access Ladder with cage	LS	1	$ 22,000	$ 22,000
21	**IR-A**	EA	1	$ 78,000.00	$ 78,000.00
22	EA and Permitting Incl DNRC, ACE, mscl (no EIS) in additional to that included in IR-A	LS	1	$ 2,000	$ 2,000
23					$ -
					$ -
					$ -
Preliminary Opinion of Probable Construction Cost					$690,000.00
Contingency (15%)					$104,000.00
Geotech					$25,000.00
Design Engineering					$69,000.00
Construction Engineering					$97,000.00
Legal and Admin					$17,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,002,000.00**
	NPV				
	Total Capital Cost in Year 2022				**$1,002,000**
	USPW (O&M)				**-$88,939**
	NPV Before considering salvage value				**$913,061**
	SSPW(S), based on:		40	yr life, -0.1% Discount Factor	$491,084
	NPV after accounting for salvage value				$421,977

Table 4-13 Capital and NPV Costs for OS-8P

Forsyth OS-8P Rehab Ex Structure, Add IP-3, but No Screeens					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 102,000	$ 102,000
2					$ -
3	Exploratory Excavation	HR	5	$ 540	$ 2,700
4	New Roof, ceiling	SF	400	$ 150	$ 60,000
5	New Floor	SF	300	$ 500	$ 150,000
6	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
7	Vertical Turbine Pumps, Dsg Heads, etc.	EA	**2**	$ 40,000	$ 80,000
8	8" Check Valves	EA	2	$ 1,800	$ 3,600
9	8" Gate Valves	EA	4	$ 1,400	$ 5,600
10	Pipe spools, fittings	LS	1	$ 30,000	$ 30,000
11	Sump Pumps and associated controls/pipe	EA	2	$ 5,200	$ 10,400
12	Wall Pipes - 10 "dsg and 12/14" Intakes	EA	3	$ 8,000	$ 24,000
13	Flush System incl. 8" and 14" gate valves, fittings	LS	1	$ 32,000	$ 32,000
12	6-foot Mag Meter Vault Incl. 10-inch Gate Valve, 10X14 reducer	LS	1	$ 16,000	$ 16,000
13	10-inch Mag Meter	EA	1	$ 26,000	$ 26,000
14	Controls, incl. VFDs, SCADA conn. (in addition to WTP controls upgrade)	LS	1	$ 85,000	$ 85,000
15	Heating and Ventilation	LS	1	$ 15,000	$ 15,000
16	Electrical, Lighting, Security	LS	1	$ 8,000	$ 8,000
17	Fencing			$ -	$ -
18	Waste Line for sump pumps to connect to the ex line that runs to the drying beds	LS	0	$ 6,000	$ -
19	Landscape Restoration and Seeding	SY	200	$ 5	$ 1,000
20	Access Ladder with cage	LS	1	$ 22,000	$ 22,000
21	***New Intake Pipe IP-3***	LS	1	**$ 380,000**	$ 380,000.00
22	**Cost of Tee to effectively include IR-A as part of IP-3**	EA	1	$ 35,000	$ 35,000
23					$ -
Preliminary Opinion of Probable Construction Cost					$1,120,000.00
Contingency (15%)					$168,000.00
Geotech					$25,000.00
Design Engineering					$112,000.00
Construction Engineering					$157,000.00
Legal and Admin					$28,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,610,000.00**
	NPV				
	Total Capital Cost in Year 2022				**$1,610,000**
	USPW (O&M)				**-$88,939**
	NPV Before considering salvage value				**$1,521,061**
	SSPW(S), based on:		40	yr life, -0.1% Discount Factor	$789,068
	NPV after accounting for salvage value				$731,994

4.5.7 Alt OS-9 Crib and Barrell Intake Within the River

This type of inlet provides a structure within the river, forming a protective "crib" around the actual inlet pipe. Raw water, filtered through screens, is pumped directly from the in-river structure to the WTP. There are numerous variations of this type of structure. There is one currently still used by the city of Billings (See figures in Section 4.3.4), though it is more of a back-up to the Side-Channel inlet intake system. This type of intake is very common along the Great Lakes where large cities connect to this type of structure through a long and deep tunnel (provides intake water from a mile or more outside of the more polluted waters adjacent to a city's shoreline). In lake applications there is no threat from currents and moving ice or timbers. Pumps are located either within the structure or at a second structure on land, or at the actual WTP connected by a pipe from the Intake.

Figure 4-13 Defunct Crib and Barrel System in Laurel

Billings noted issues with the screening at their existing crib intake. The original pre-1990s Laurel Intake was similar in design and near the plant (that now-defunct structure is shown to the left). The Laurel structure has been completely silted in and two new intakes have since been constructed for Laurel. The newest Laurel intake was located further upstream and also uses a structure similar to that described in Alt IR-B, as did the second in-River intake structure.

This crib and barrel arrangement provides protection from ice and timbers by concrete bulk and having wide bar screens at the exterior prior to the finer interior intake screens within the structure. The finer screens are accessible within the structure giving and advantage to operators during harsh winters. This is preferable to sending jets of air or hot water to clear screens without actually being able to see the screens. Cleaning of the screen can be done in the same manner, but problems would be more visible where there is physical access to the finer screens. Remote screens require use of divers to inspect them, assuming there is access through any protective cover.

A disadvantage of placing a significant structure within the river is unforeseen impacts from slight changes in currents that can lead to silting in. Such a structure is also a potential boating hazard.

The Laurel intake shows that this type of structure has questionable sustainability within a river. Costs for the longer construction period within the river would be quite high.

No advantage is found for this type of system over those presented earlier.

The environmental impact would be considerable and placing an obstruction in the Yellowstone River with no notable advantages over other systems eliminates this alternative from being considered LEDPA. Given that Laurel did not want to explore this option during either of its two subsequent intake projects, that Billings prefers its in-channel system to its crib and barrel system, and considering that permitting may not be possible, this system is eliminated from further consideration.

4.5.8 Alt OS-10 Groundwater

Groundwater was discussed in detail in Section 1.3.3. Of note, "a 1943 well drilled for the city went 352 feet and had no yield (some flow was encountered at shallower depth, but low production and not considered suitable for drinking). This is perhaps why the city has remained using surface water."

Other wells were very unproductive and interviews with operators leads to the conclusion that even if there were sufficient yields (there is not), the quality would not be acceptable. Although having a surface water treatment system for a city with such a low population would not generally be considered a good financial investment, Forsyth does not have any alternative.

Due to extremely low yields and poor quality, this alternative is eliminated from further consideration.

4.5.9 Alt OS-11 Do-Nothing

High dependence on the Intake and deteriorating structural integrity led to the determination that the Do-Nothing Alternative is not acceptable. No further review of this option is required.

4.5.10 Summary of Findings for Pumping Facilities (On-Shore) Alternatives

Of the 11 alternatives reviewed, four provide full solution to the long-term needs of the city. These were OS-4, OS-5, OS-6 and OS-7. OS-8 is a minimal improvement that does not address screening or the intake pipeline replacement, but does provide a reasonable solution to the clogging of the system and provides a new floor to sustain new pumps and protect operators. OS-8 would eventually require the addition of the intake pipe (IP-3). OS-8P includes the intake pipe. It is not definite that screens will ever actually be required since, although based on local anecdotal evidence, pallid sturgeon do exist above the Cartersville Dam, the state may or may not ever require provisions be made for the finer screens. Thus OS-8 and OS-8P are technically feasible, though OS-8 is only barely so since it does not address the old intake pipe.

Alternatives OS-4 through OS-7 include providing a new low intake pipe and new high intake pipe from the river, though for alternatives 6 and 7 this may be delayed to allow additional time for permitting and to acquire additional funding. The existing pipe would be used until a new pipe were installed. The pipe could easily be added to OS-8 when funding became available.

Each alternative includes a blow-down system. All would include sump pumps for regular clearing of the wetwell sediment (pumped to the existing line to the sludge settling basins)

Alternatives OS-4 and OS-5 include a new intake structure for housing the pumps. Alternatives OS-6, OS-7, and OS-8 include rehabilitation of the existing intake.

Alternatives OS-4 and OS-6 would have screens inside the on-shore structure and use vertical turbine pumps installed within a pump can. Alternatives OS-5 and 7 would be combined with IR-B with screens in the river and use vertical turbine pumps with standard mounting. OS-8 would not include provisions for screens.

Options for two different types of floors (pertains to OS-6, OS-7 and OS-8) have been evaluated by a structural engineer. However, the final decision (concrete floor or steel or fiberglass grating) will be determined during final design since cost differences were not too great and this would allow the operators additional time to consider their preference.

Tables 5-4 and 5-5 presented during the comparison/ranking of the alternatives provides excellent tabular summaries of the alternatives.

4.6 Installation of New Booster Pump Station with Storage Tank

4.6.1 BPS-1 Do-Nothing Alternative

The Riverview Villa booster pump station does operate effectively in its existing condition. Proper operation is only possible under perfect conditions. The booster station has no backup power supply, and it has no water storage to serve its pressure zone. Additionally, the 40 HP, 650-gpm fire pump is currently inoperable leaving a single 10 HP jockey pump, limited to 200 GPM, as the only supply pump in the event of a fire. That pump must run 24 hours per day to maintain system pressure even when only a few gallons per minute are required. The VFD controlling that pump does not exceed 40 Hz, demonstrating how inefficient the pump is (grossly oversized for normal demands, grossly undersized for fire protection).

Additionally, the Quincer subdivision, located directly west of the Riverside Villa retirement Community, experiences pressures dropping below the required 35 psi threshold during normal operations. This subdivision is supplied via gravity transmission from the existing Forsyth Hill Storage Tank. Adding service to the Quincer subdivision from the Riverview Booster station would create reliable pressure, bringing the area into compliance with DEQ minimum pressure requirements.

For the reasons listed above, the option to leave the booster pump station as-is would be irresponsible. A “Do Nothing” alternative will not be considered further.

4.6.2 Selection of Storage Tank Materials, Location

The 2009 Water System PER explored multiple options for the location of an additional finished water storage tank to service the upper pressure zone on the eastern edge of Forsyth. Several locations were proposed within that report, some being ground level tanks constructed in the hills east of the Riverside Villa subdivision and one option being an elevated tank directly east of the cemetery.

Ultimately, the 2009 PER concluded the most feasible option for tank location was directly east of the cemetery. This plot of land is currently owned by Rosebud County but a 2009 Memorandum of Understanding regarding a proposed land transfer from the County to City for the purpose of constructing an elevated water tank servicing the upper pressure zone was created and has been included in the Appendix F.

Discussions and conclusions from the 2009 PER were considered sound and appropriate. Therefore, there is no need for a detailed evaluation of water storage materials or locations. Excerpts pertaining to that feature of the study are included in Appendix M.

4.6.3 BPS-2 Abandon Existing BPS, construct new BPS west of Quincer Subdivision, construct storage tank east of Cemetery

Description

The second option to provide increased service pressure to Quincer subdivision is as follows: remove the existing Riverview BPS from service and install a new pre-engineered BPS at the northwest corner of the cemetery within the Frontage Road right-of-way. The new parallel transmission line required in alternative BPS-3 would no longer be necessary to provide reliable service pressure to the Quincer Subdivision from the BPS. The new booster pump station will include a portable emergency generator on site to maintain reliable service in the event of power loss. As with BPS-3, BPS-2 also proposes a new elevated storage tank (80,000 gal), filled from the proposed BPS to serve the entire upper pressure zone, and provide emergency water supply in the event of a functional failure of the BPS or a loss of the onsite emergency generator. Fire flow capacity will be drawn from both the 1,000 GPM capacity of the proposed BPS and from the proposed elevated storage tank.

Design Criteria

Montana DEQ Circular 1 design criteria are the same between Alternative BPS-2 and BPS-3. See Section 4.6.4 for the detailed design criteria for each.

Construction Methods

Construction of the new elevated water storage tank is relatively straight-forward. All panels are produced off-site at the factory for maximum control. The foundation would be constructed on-site. Inspection of coating can be difficult, and the project specifications must include use of a qualified and independent inspector.

The booster station may similarly be constructed mainly off-site and brought in as a ski-mounted unit. A foundation and minor structure would be sized to accept the unit.

No serious construction issues are anticipated. However, a soils (Geotech) analysis with three deep bores are recommended in the area of the water storage tank to identify bearing pressure and conditions of the soils all the way to bedrock.

Sizing

The proposed elevated storage tank east of the cemetery is specified to be 80,000 gallons. All newly placed transmission line directly to/from the tank will be 12-inch PVC. Although there is sufficient storage in the 1 MG storage tank in the Main Zone for all areas, some minimal storage is needed in the Upper Zone in order to keep the area from losing pressure, protect against water hammer, and provide some unpumped fire protection. In addition, this tank will be used when repairs are needed at the Main Zone to limit pressure surges within the main zone.

Fire pumps are a very low-cost and practical alternative to providing high volumes of costly and difficult to maintain elevated storage (freezing/chlorine residuals). The booster pumping station is located on a 12-inch main that runs all the way to the 1 MG storage tank, and use of the fire pumps will have minimal impact on pressures anywhere in the main zone due to lack of any substantial headloss in the 12-inch pipe.

Concerns previously discussed regarding difficulty in maintaining chlorine residual limit the amount of water desirable for this storage tank that serves a relatively small area. The figure of 80,000 gallons is a minimal amount that should be manageable for maintain chloring residual and provided the surplus water needed to combine with the 1,000 gpm pump(s) to maintain a 1,400 gpm NFF for two (2) hours.

No advantage is found in using a larger water storage tank since the fire pump are used, and the new booster station will have reliable back-up power in the form of a generator.

The proposed BPS will house two matching 100 GPM service pumps and two matching 1,000 GPM fire flow pumps with VFDs. Final design may alter this is somewhat if it is determined best to have more uniform pumps. One option during final design would be to have all four pumps of the same size. This is easily done since the pumps will send water to the water storage tank and therefore the volume may be quite a bit higher than current abilities of the existing pump.

Map

The following figure shows the proposed location for the new 80,000-gallon water storage tank.

Figure 4-14: BPS locations, existing & proposed

Environmental Impacts

Conventional environmental protection procedures must be followed during construction. A SWPPP will be required from the contractor prior to starting construction. If areas with localized hydrocarbons present in excavated soils are encountered, bentonite trench plugs may be required to prevent runoff during excavation. All work associated with this alternative will take place in previously developed areas and away from any water way.

A project-wide General Permit for Stormwater Discharges Associated with Construction Activities (2018 version is the latest as of this writing) will be required.

Interstate Engineering has contacted applicable agencies that may want to advise, set special requirements, or coordinate with the city regarding an environmental impact. Each agency was sent a map of the proposed city improvements, all proposed improvements are within City right-of-way or taking place on City owned property. In the likely event that several years pass before a given phase of construction takes place, the process of soliciting comment from agencies will be repeated during the specific design phase of that project.

Land Requirements

All work on the booster station will be conducted within City right-of-way, the proposed BPS will be constructed without requiring property acquisition or transfer. The storage tank location has been agreed upon in writing by the city and county for a transfer to the city, though final transfer and filing will still be necessary.

Potential Construction Problems

As noted previously, no serious construction issues are anticipated. However, a soils analysis with three deep bores are recommended in the area of the water storage tank to identify bearing pressure and conditions of the soils all the way to bedrock.

Sustainability Considerations

Water and Energy Efficiency

The proposed alternative provides energy efficiency by incorporating variable frequency drives. This allows the use of optimum pumping ranges. The ramping-up feature of a VFD decreases the amount of power needed to initially turn the motor. This sharply decreases the amperage that needs to be supplied to the booster station and helps avoid power surges elsewhere.

Green Infrastructure

The proposed alternative is very green in that it provides power savings throughout the use of VFDs on the pumps, but also taxes the power grid less since a large surge in power is not required to start the motor.

Cost Estimates

The table below provides the estimated cost for this alternative.

Table 4-14 Alternative BS-2 Capital Costs

BPS-2: Construction of new booster station west of Quinzer subdiv., abandon existing booster station, install generator, construct elevated storage tank **Tank location East of Cemetery**					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 137,200.00	$ 137,200.00
2	Furnish and Install Packaged Booster Station	LS	1	$ 300,000.00	$ 300,000.00
3	Elevated storage tank	Gal	100,000	$ 4.00	$ 400,000.00
4	Abandon existing Riverview BPS	LS	1	$ 15,000.00	$ 15,000.00
5	Booster station enclosure	SF	300	$ 300.00	$ 90,000.00
6	Connect BPS to existing booster station	LS	1	$ 7,500.00	$ 7,500.00
7	Furnish & Install Concrete Foundation	LS	1	$ 50,000.00	$ 50,000.00
8	Site Improvements - Elevated tank	LS	1	$ 50,000.00	$ 50,000.00
9	Chainlink security fence with three strand barb wire top	LF	500	$ 40.00	$ 20,000.00
10	Chain Link Gate	EA	1	$ 7,500.00	$ 7,500.00
11	12" PVC, connect elev tank to system	LF	520	$ 100.00	$ 52,000.00
12	Construction of elevated storage tank (epoxy-coated steel)	GAL	80,000	$ 4.00	$ 320,000.00
13	Furnish & Install new portable generator unit at existing Riverview BPS	LS	1	$ 60,000.00	$ 60,000.00
14					$ -
Preliminary Opinion of Probable Construction Cost					$1,509,000.00
Contingency (15%)					$226,000.00
Design Engineering					$151,000.00
Geotech site investigation					$15,000.00
Construction Engineering					$211,000.00
Legal and Admin					$38,000.00
Total Preliminary Opinion of Probable Project Cost					**$2,150,000.00**

Operations and Maintenance

Operation and maintenance will decrease with this alternative by use of more efficiently designed pumps combined with the energy efficient VFDs. In addition, the existing pumps were installed in the 1980s and replacement is long overdue.

Although some O&M savings will be realized by less power, it is not anticipated to be substantial. The replacement costs of the pumps have been eliminated from the short-lived assets list as this capital improvement will provide new pumps with an anticipated life of 20-years.

Combined with cathodic protection, the epoxy coating should last well beyond 20 years and require no maintenance during that time.

Operations will need to be acutely aware of chlorine residuals in the Upper Zone. This concern was central to the decision to limit the tank size. Chlorine would be added optionally at the booster station, but it is best if the system could operate in a fashion that would allow the water storage to empty at least 25% or more prior to refilling. The tank will include an active mixer for freeze protection.

Conclusion:

Improving system reliability and available pressures in the upper pressure zone of Forsyth is necessary. The current BPS is not capable of providing acceptable fire suppression flows for the Riverview Villa Retirement Community and pressures in the adjacent Quincer Subdivision can drop below 35 psi.

The entire distribution system is currently reliant on a single tank with a single 12" AC transmission line connecting the tank to the rest of the system. Having a second tank, even at a higher elevation, can alleviate much of the worry of temporarily shutting down the 1 MG tank for interior coating. This requires specialty valves, but the tank can both act as a surge suppressor and a peak water supply source to augment the high service pumps at the plant.

Relocating the upgraded Riverview Booster Station to serve the Quincer subdivision as well as the Riverview Villa subdivision while adding minimal transmission line will require constructing a new BPS west of the Quincer subdivision. The addition of an elevated storage tank east of the cemetery allows for servicing and maintenance to the Forsyth Hill Tank without putting undue stress on the distribution system. Replacement of the existing Riverview Booster Station and constructing the proposed elevated storage tank will provide adequate fire suppression flow to both Quincer and Riverview Villa subdivisions, increasing public safety.

4.6.4 BPS-3 Replace BPS in existing location, install distribution pipe to Quincer Subdivision, construct storage tank east of Cemetery

BPS-3 Description

Upgrading the booster pump capabilities would consist of removal and salvage of the existing pump system and installation of pre-engineered booster pump station in its place. A new transmission line would then be installed from the booster pump station to the Quincer subdivision. This line would be 8-inch PVC and run parallel to the gravity line feeding the Riverview Booster Pump Station. The addition of this transmission line would provide reliable pressure to Quincer subdivision without relocating the Booster Pump Station.

The upgraded booster pump station will house a portable emergency generator on site to maintain reliable service in the event of power loss. A second finished water storage tank would be constructed to provide emergency water supply to this upper pressure zone. The proposed tank will be located east of the cemetery and will connect to an existing 12" transmission main at the northeast corner of the cemetery in the Frontage Road right-of-way. This elevated tank would be filled by the upgraded Riverview Booster Pump Station.

Importantly, the construction of a second water storage tank allows for maintenance work (or emergency repairs) to the existing 1 MG Forsyth Hill tank without putting serious stress on the WTP plant and entire distribution system. Improvements and maintenance to the Forsyth Hill tank and existing 12" transmission line between the tank and the highway are proposed within this report. The construction of second tank on the eastern end of Forsyth create much easier logistics for completing work on the Forsyth Hill tank. A lack of storage redundancy creates vulnerability to the system that could be alleviated under this proposed alternative.

BPS-3 Design Criteria

Buried transmission pipe connecting the new BPS to the Quincer subdivision will be installed in accordance with DEQ-1. These design requirements are detailed in Section 4.1.2 in this report. Transmission piping should be 8-inch C900 PVC with ductile iron appurtenances.

The booster pump will be sized to provide pressures greater than 35 PSI to the service area composed of the Quincer and Riverview Villa subdivisions during normal demands. During fire flow demands, the system pressure must remain above 20 PSI throughout. as specified by the DEQ and in accordance with ISO.

Montana DEQ Circular 1 discusses design requirements for pumping facilities in Chapter 6. While the majority of Chapter 6 has relevance to booster pump design, Section 6.4 is specifically tailored to the design of Booster Pumps and is included as follows:

6.4 BOOSTER PUMPS

In addition to the applicable sections of Section 6.3, booster pumps must be located or controlled so that:

a. they will not produce negative pressure in their suction lines;

b. the intake pressure is in accordance with Section 8.2.1 when the pump is in normal operation;

c. automatic cutoff pressure must be at least 20 psi in the suction line, under all operating conditions, unless otherwise acceptable to MDEQ. Pumps taking suction from ground storage tanks must be equipped with automatic shutoffs or low pressure controllers as recommended by the pump manufacturer;

d. automatic or remote control devices must have a range between the start and cutoff pressure that will prevent excessive cycling;

e. a bypass is available; and f. pumps installed in the distribution system must maintain inlet pressure as required in Section 8.2.1 under all operating conditions. Pumps taking suction from storage tanks must be provided adequate net positive suction head.

6.4.1 Duplicate pumps

Each booster pumping station must contain not less than two pumps with capacities such that peak demand, exclusive of fire flow, can be satisfied with the largest pump out of service. With all pumps in service, the pumps must be capable of providing the maximum daily demand plus fire flow demand of the system.

6.4.2 Metering

All booster pumping stations must be fitted with a flow rate indicator and totalizing meter.

Additionally,

6.5 AUTOMATIC AND REMOTE-CONTROLLED STATIONS

All automatic stations must be provided with automatic signaling apparatus, which will report when the station is out of service. All remote-controlled stations must be electrically operated and controlled and must have signaling apparatus of proven performance.

Adherence to the *MT DEQ-1 Chapter 7 – Finished Water Storage* will be used when designing the proposed elevated storage tank. Generally, the proposed storage tank must be large enough to supply the service area with the equivalent water quantity of the average day demand plus fire flow demand. The fire flow demand has been determined from the 2015 ISO report. MT DEQ-1 Chapter 7 further provides design requirements for tank location and design components.

7.0.1 Sizing

Storage facilities must be sufficient, as determined from engineering studies to supplement source capacity to satisfy all system demands occurring on the maximum day, plus fire flow demands where fire protection is provided.

a. The minimum allowable storage must be equal to the average day demand plus fire flow demand, as defined below, where fire protection is provided.

b. Any volume less than that required under a. above must be accompanied by a Storage Sizing Engineering Analysis, as defined in the glossary. Large non-residential demands must be accompanied by a Storage Sizing Engineering Analysis and may require additional storage to meet system demands.

c. Where fire protection is provided, fire flow demand must satisfy the governing fire protection agency recommendation, or without such a recommendation, the fire code adopted by the State of Montana.

d. Each pressure zone of systems with multiple pressure zones must be analyzed separately and provided with sufficient storage to satisfy the above requirements.

e. Excessive storage capacity should be avoided to prevent water quality deterioration and potential freezing problems.

7.0.2 Location of reservoirs

a. The lowest elevation of the floor and sump floor of ground level reservoirs must be placed above the 100-year flood elevation or the highest flood of record, whichever is higher, and at least two feet above the ground water table. Sewers, drains, standing water, and similar sources of possible contamination must be kept at least fifty feet from the reservoir. Gravity sewers constructed of water main quality pipe, pressure tested in place without leakage, may be used for gravity sewers at distances greater than 20 feet and less than 50 feet.

b. The bottom of ground level reservoirs and standpipes should be placed at the normal ground surface. If the bottom of a storage reservoir must be below the normal ground surface, at least 50 percent of the water depth must be above grade. The top of a partially buried storage structure must not be less than two feet above normal ground surface. Clearwells constructed under filters may be exempted from this requirement when the total design gives the same protection from contamination.

c. Fully buried plastic or fiberglass storage reservoirs designed specifically for potable water must be installed in accordance with the manufacturer's recommendations. The bottom elevation must be above the ground water table and above the 100-year flood plain.

BPS-3 Construction Methods

Standard means and methods of utility and structural construction are anticipated for this work. Open-cut trenching will be utilized for all pipe installation. There are no constructability conflicts at the site for the proposed water storage tank. Traditional structural construction practices may be utilized.

BPS-3 Sizing

The proposed elevated storage tank east of the cemetery is specified to be 80,000 gallons. All newly placed transmission line will be 8-inch PVC. See Section 4.6.3 for detailed discussion on the sizing of the new water storage tank as that is equally applicable to this alternatives.

Map

The figure below provides the location of BPS-3 and associated elevated water storage tank.

Figure 4-15: Aerial View, BPS-3 feature locations

Figure 4-16: Existing location of BPS to be replaced, BPS-3 (entrance to Riverview Villa Subdivision)

Environmental Impacts

Conventional environmental protection procedures must be followed during construction. A SWPPP will be required from the contractor prior to starting construction. If areas with localized hydrocarbons present in excavated soils are encountered, bentonite trench plugs may be required to prevent runoff during excavation. All work associated with this alternative will take place in previously developed areas and away from any water way.

A project-wide General Permit for Stormwater Discharges Associated with Construction Activities (2018 version is the latest as of this writing) will be required.

Interstate Engineering has contacted all applicable agencies that may want to advise, set special requirements, or coordinate with the city regarding an environmental impact. Each agency was sent a map of the proposed city improvements, all proposed improvements are within City right-of-way or taking place on city-owned property (or county-owned in the process of transference to the city, in the case of the water storage tank). In the likely event that several years pass before a given phase of construction takes place, the process of soliciting comment from agencies will be repeated during the specific design phase of that project.

Land Requirements

As mentioned previously, the proposed location of the elevated water storage tank must be transferred from Rosebud County to the city of Forsyth. This has been agreed upon previously and presents no issue. All other land involved in this project is home to existing City infrastructure and will require no additional action for construction to begin.

Potential Construction Problems

The possibility exists that an undocumented LUST site could be discovered during construction excavation. In this case, the contractor will be required to substitute PVC transmission pipe for Ductile Iron Pipe and hydrocarbon-resistant gaskets.

A soils analysis with three deep bores are recommended in the area of the water storage tank to identify bearing pressure and conditions of the soils all the way to bedrock.

Sustainability Considerations

Water and Energy Efficiency

The proposed alternative provides enhanced energy efficiency by incorporating variable frequency drives. This allows the use of optimum pumping ranges. The ramping-up feature of a VFD decreases the amount of power needed to initially turn the motor. This sharply decreases the amperage that needs to be supplied to the booster station and helps avoid power surges elsewhere.

Green Infrastructure

The proposed alternative is very green in that it provides power savings throughout the use of pumps, but also taxes the power grid less since a large surge in power is no longer required to start the motor.

Cost Estimates

The table below presents the estimated capital cost for this project alternative.

BPS-3: Construction of new booster station at current BPS location, install generator, install transmission line to Quinzer parallel to existing trans main line. **Tank location East of Cemetery**					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 99,437.00	$ 99,437.00
2	Remove existing BPS infrastructure	LS	1	$ 50,000.00	$ 50,000.00
3	Furnish and install new BPS infrastructure	LS	1	$ 250,000.00	$ 250,000.00
4	Parallel line to Quinzer, furnish and install (8" PVC)	LF	1,150	$ 65.00	$ 74,750.00
5	8" gate valve, furnish and install	EA	2	$ 1,500.00	$ 3,000.00
6	misc 8" bends	LS	1	$ 3,000.00	$ 3,000.00
7	Connect to exisiting water main/BPS	EA	2	$ 1,500.00	$ 3,000.00
8	Asphalt concrete pavement (4") (10' wide)	SY	1278	$ 40.00	$ 51,120.00
9	Furnish & Install Concrete Foundation	LS	1	$ 50,000.00	$ 50,000.00
10	Site Improvements - Elevated tank	LS	1	$ 50,000.00	$ 50,000.00
11	Chainlink security fence with three strand barb wire top	LF	500	$ 40.00	$ 20,000.00
12	Chain Link Gate	EA	1	$ 7,500.00	$ 7,500.00
13	12" PVC, connect elevated tank to system	LF	520	$ 100.00	$ 52,000.00
14	Construction of elevated storage tank (epoxy-coated steel)	GAL	80,000	$ 4.00	$ 320,000.00
15	Furnish & Install new portable generator unit at existing Riverview BPS	LS	1	$ 60,000.00	$ 60,000.00
Preliminary Opinion of Probable Construction Cost					$1,094,000.00
Contingency (15%)					$164,100.00
Design Engineering					$109,400.00
Construction Engineering					$153,000.00
Legal and Admin					$27,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,547,500.00**

Operations and Maintenance

Operation and maintenance will decrease with this alternative by use of more energy efficient VFDs. In addition, the existing pumps were installed in the 1980s and replacement is long overdue.

Although some O&M savings will be realized by less power, it is not anticipated to be substantial. The replacement of the pumps has been eliminated from the short-lived assets list as this capital improvement will provide new pumps with an anticipated life of 20-years.

Combined with cathodic protection, the epoxy coating should last well beyond 20 years and require no maintenance during that time.

Operations will need to be acutely aware of chlorine residuals in the Upper Zone. This concern was central to the decision to limit the tank size. Chlorine could be added optionally at the booster station, but it is best if the system could operate in a fashion that would allow the water storage to empty at least 25% or more prior to refilling. The tank will include an active mixer for freeze protection.

Conclusion:

Improving system reliability and available pressures in the upper pressure zone of Forsyth is necessary. The current BPS is not capable of providing fire suppression flows for the Riverview Villa Retirement Community. This is a public health concern. However, the greatest need is to maintain pressure when power is lost.

Additionally, the distribution system as a whole is reliant on a single tank with a single 12" AC transmission line connecting the tank to the rest of the system. Reconstructing the booster station in its existing location requires less land development as the structural foundation is existing.

Locating the new BPS in this location requires the placement of a transmission line running between this BPS and the Quincer subdivision. The addition of an elevated storage tank east of the cemetery provides system redundancy allowing for servicing and maintenance to the Forsyth Hill tank without putting stress on the distribution system. Replacement of the existing Riverview Booster Station will provide adequate fire flow to both Quincer and Riverview subdivisions, increasing public safety.

4.7 Existing Storage Tank

4.7.1 ST-1 Do Nothing

Currently, the Forsyth Hill Storage Tank (discussed in Section 2.4.5 "Water Distribution System") is experiencing multiple issues that will lead to significant detrimental effects the city's water system if left unaddressed. Specifically,

- the land immediately surrounding the storage tank's footprint is experiencing erosion,
- the gravel access road needs regrading and erosion repair, and
- the storage tank interior is experiencing corrosion, as documented recently by divers.

Left unmitigated, all three of these items above will evolve to threaten the quality of water service provided. Corrosion of the tank interior threatens the tank's structural integrity. Further erosion around the tank's foundation creates structural vulnerability as ultimately will lead to structural failure of the 1-million-gallon tank which is perched above an interstate highway. Total structural failure of this tank would be a catastrophic disaster to critical infrastructure and threaten the health and safety of Forsyth residents. These threats are separate from the obvious sustained loss of the only water storage tank currently existing in the water distribution system.

Reliable service is impossible without the use of this tank. Finally, less dire but still an item of importance, the access road must provide reliable access to the tank. The tank requires consistent inspection and maintenance. Further, the tank must be reachable in quick order should an emergency develop. For these reasons, a Do-Nothing alternative is not acceptable and will not be considered further.

4.7.2 ST-2 Erosion Control, Repairs, and Tank Lining

Description

Alternative ST-2 addresses all three items of concern outlined above. Two phases will be needed to accomplish these repair/maintenance items.

Phase 1 consists solely of erosion control immediately surrounding the tank's footprint. This will be accomplished by the installation of an underdrain surrounding the circular tank. This action will eliminate ponding and reduce surface erosion during precipitation events. Additionally, the underdrains will outlet at the location of the existing tank overflow outlet. This outlet location shall be further reinforced with erosion control rip rap to reduce erosion along the outlet flow pathway. Currently, surface water flow around the tank is uncontrolled. This causes erosion channels to be cut into the downhill side of the earthen bench that the tank sits on. Future repairs become cheaper when the surface water flow is captured and released at a specific, armored outlet location.

As discussed previously, tank inspections have been completed regularly by the city. The most recent tank inspection calls for re-lining the tank interior in the near future. Following this recommendation, application of a polyurethane complete interior lining is proposed along with related preparatory work. Additionally, a submersible tank mixer will be added. These tasks are highly feasible and straightforward, with no real alternative solution.

Likewise, repair of the tank access road is a straightforward process and relatively inexpensive as one element of all improvements discussed within this report. Eight (8) inches of aggregate surface course would be furnished placed after road crown has been re-established with dirt moving equipment. Erosion control and surface water drainage measures are included in this proposed work. The entire 4,500 LF length of access road is recommended to be improved as part of this work.

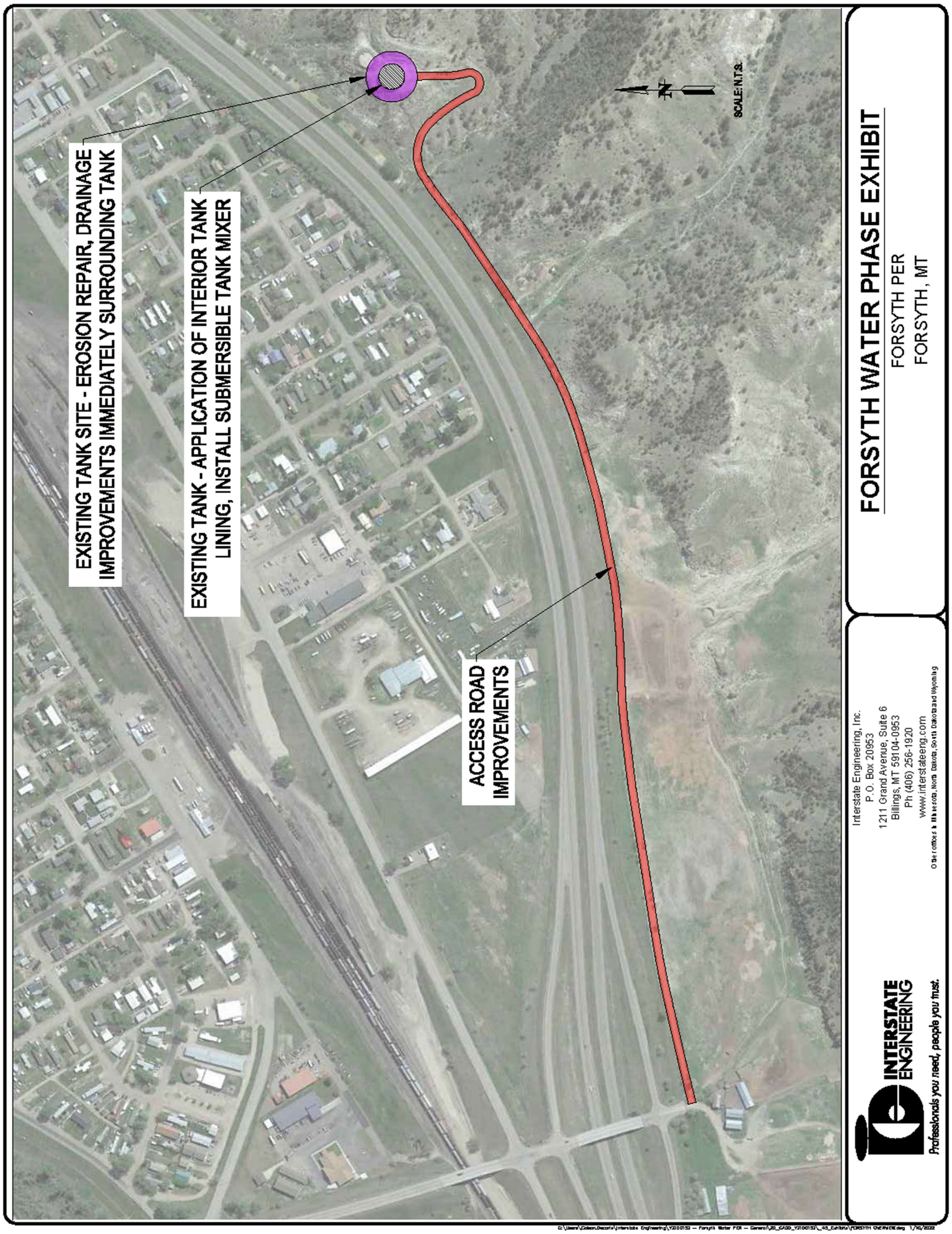
Construction Methods

All proposed work can be accomplished by conventional construction methods using common equipment and labor practices.

The project would be split between two phases. Phase 1 to address erosion and drainage directly surrounding the tank; Phase 2 to be composed of the remaining work: interior lining of the tank and installing a submersible tank mixer as well as improving the entire length of the access road.

Map

The figure on the following page provides an exhibit of all proposed work included in Alternative ST-2.



Environmental Impacts

Figure 4-17: Alternate ST-2 site location

Environmental impacts of the proposed work are limited to those of typical minor construction work, being temporary noise pollution and emissions from construction equipment during operation. Proper materials handling and waste disposal procedures will be specified when furnishing and installing tank lining materials. Site cleanup and proper disposal of construction materials will be required following completion of construction activities.

Based on the installation time period, the existing tank is expected to be void of lead-based paint. This eliminates environmental impacts and potential health risks of removing paint or working in proximity to the existing tank. A test should be done however prior to final design and included in the appendix to re-assure bidders (keeping costs down with the added certainty of the test), and protect the city from liabilities.

Land Requirements

No land purchases or transfers are required for this proposed work. All associated property in owned and managed by the city of Forsyth, with the exception of a portion of the road, for which the city has an easement.

Potential Construction Problems

The storage tank will need to be drained and dried to prepare for and apply tank lining material. This can best be accomplished once the proposed 80,000-gallon elevated storage tank is constructed and operational, east of the cemetery as recommended elsewhere within this report. Without the redundant storage of a second tank within the system it would be more difficult to maintain adequate water service to the city when the Forsyth Hill Storage Tank is temporarily off-line. The proposed new WTP controls would provide VFDs for the high service pumps (to be included as part of Phase1) and further assist in smoothing operations during the time the large water storage tank is out of service. Construction must still be done quickly and efficiently as to minimize the time Forsyth Hill storage tank is out of service.

Sustainability Considerations

Water and Energy Efficiency

Storage is essential to operating a municipal water system during peak demands throughout a summer's day and providing water during a fire event. Storage allows the water treatment and supply systems to be designed for the 24-hour peak day demand, rather than the peak hour, or for a 2-to-3-hour fire event. Storage therefore makes the system much more energy efficient. Proper maintenance of the tank to best ensure a long life is part of proper water management and energy efficiency.

Green Infrastructure

Corrosion rehabilitation and re-lining of the Forsyth Hill tank interior will extend the useful life of the existing tank. Water storage capabilities must be maintained and extending the useful life of existing infrastructure is always a better alternative than a full removal and replacement of infrastructure after a given items useful life has expired.

Erosion control is the most obvious "green" benefit of ST-2 in that maintaining the soils in place will also result in less sediment wash-out to the Yellowstone River.

Cost Estimate

The following table provides the estimated capital cost of the project. All components are expected to have a 20-year life.

In Section 6 the costs will be divided into ST-2 Phase 1 (erosion control), and ST-2 Phase 2 (coating and road work).

Table 4-15: Alternate ST-2 cost estimate

Alternate ST-2: Forsyth Hill Storage Tank repair and maintenance					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 73,000.00	$ 73,000.00
2	Erosion Control excavation/re-grade (15' wide * 1' deep around tank)	CY	200	$ 15.00	$ 3,000.00
3	Underdrain Pipe (4" dia, ASTM F758 PVC), granular backfill (ASTM D2321 Class IA, IB, or II), Filter fabric (AASHTO M288 Class II)	LF	300	$ 25.00	$ 7,500.00
4	Overflow Pipe Outlet & Underdrain Outlets, single basin (MDT Type I - 12" minus) (24" section depth)	TON	40	$ 150.00	$ 6,000.00
5	Overflow Pipe Outlet & Underdrain Outlets (2) rip rap basin - bedding (MDT Type II - 2" minus) (12" section depth)	CY	13	$ 130.00	$ 1,630.00
6	Excavation relating to rip rap placement	CY	30	$ 15.00	$ 450.00
7	Separation fabric	SY	120	$ 10.00	$ 1,200.00
8	Seeding of disturbed areas	ACRE	2	$ 900.00	$ 1,800.00
9	Interior tank preparation	LS	1	$ 150,000.00	$ 150,000.00
10	Furnish & Application of polyurethane interior tank lining & primer	LS	1	$ 390,000.00	$ 390,000.00
11	Subgrade Preparation, access road (4,500 LF, 12' wide) (re-establish crown, blade and roll)	SY	6000	$ 7.00	$ 42,000.00
12	Aggregate Surface Course (8" section depth)	TON	1867	$ 22.00	$ 41,070.00
13	Misc access road drainage improvements	LS	1	$ 10,000.00	$ 10,000.00
14	Submersible tank mixer	LS	1	$ 75,000.00	$ 75,000.00
Preliminary Opinion of Probable Construction Cost					$803,000.00
Contingency (15%)					$120,000.00
Geotech					$25,000.00
Design Engineering					$80,000.00
Construction Engineering					$112,000.00
Legal and Admin					$20,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,160,000.00**

Operations and Maintenance

The proposed project is a one-time cost. The only recurring cost would be scheduled tank inspections at an interval 3 – 5 years, which is already budgeted for by the city.

Conclusion

The Forsyth Hill water storage tank is the primary (and currently the only) finished water storage infrastructure within the Forsyth water distribution system. Protecting the structural integrity of the tank interior as well as the tank's structural foundation must be addressed as soon as is practicable. Also paramount, reliable vehicle access to the tank must always be maintained. Improvements to the single access road will be addressed during the same construction period as other tank improvements. The total cost, as shown above, is estimated at $1,160,000 but is proposed to be completed in two phases as explained further in Section 6 of this report.

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SECTION 5 SELECTION OF AN ALTERNATIVE

5.1 Introduction

This section will evaluate alternatives presented in Section 4 and recommend preferred alternatives. Criteria for evaluation are discussed in detail in Section 5.2. As described in the Uniform Preliminary Engineering Report Guidelines, Net Present Values are very important. However, there are other considerations that require examination. The use of "**triple bottom line analysis**" is recommended by the MDOC in its Uniform PER Guidelines, and with good reason. This will be discussed further Section 5.2, following a brief introduction in this Section 5.1.

5.1.1 Distribution System – AC Pipe Replacement, Alternate AC-2

A complete replacement of the existing AC pipe distribution system is recommended as part of Alternative AC-2, though replacements will need to be completed in phases as funding allows. Phasing will be executed in a targeted manner with priority placed on areas experiencing inadequate available fire flow and/or faulty valving/hydrants. Four (4) phases proposed in this report involve removal and replacement of existing distribution pipe with PVC pipe at a minimum of 8-inches in nominal diameter.

Citing that there were no other potential alternatives (all other alternatives were eliminated in Section 4.1), the selection process for alternatives within the distribution system is considered complete. The further evaluation of pipeline replacement alternatives in this Section 5 will be limited to determination of NPV Costs associated with the chosen alternative AC-2 and its respective phases.

Various materials and installation methods were examined and the only reasonable options found were AWWA C:900 PVC pipe placed by open-trench construction. Ductile iron pipe with specialty gaskets would be required where hydro-carbon contaminated soils are encountered.

5.1.2 Water Treatment

The city provides remarkable operations and maintenance and have kept its 1976 WTP operating with very few upgrades beyond the 1993 upgrades to its existing system (no new treatments included). Lack of any quality issues for at least the past 15 years is a testimony to the effectiveness of the existing treatment system.

Like all conventional treatment plants, the Forsyth WTP includes many mechanical components. Items such as pumps, motors, meters, and testing equipment all have limited lives. In conjunction with the development of this PER, the city has developed a short-lived assets inventory and schedule for replacement of all such components. Final estimates for a rate increase include the cost of funding the replacements in that schedule (ss the appendix).

The one component that must be replaced and updated right away is the control system. No viable alternatives were found other than complete replacement and modernization of the control system. Replacement parts for the existing system are no longer produced and if anything goes wrong with the obsolete system, it can only be repaired by locating a similar system elsewhere and taking parts from that system. As an added benefit, use of VFDs will allow for greater control of the processes for enhanced settling and filtration, along with optimizing contact time.

Based on upgrades in the region, an estimate of $700,000 is used to completely overhaul the existing control system, and provide VFDs to the high service pumps (VFDs for the intake are covered under the next section.

5.1.3 Water Supply

The water supply system was broken-out into three distinct parts.

1) The supply point of intake
2) The intake pipe
3) The pumping system and structure.

From separate analysis of these three functioning points, six (6) alternatives were chosen for more detailed analysis. Summarized in Table 5-1, below, the alternatives look at using Johnson screens (OS-8 and 8P do not include those screens), and whether to place them in the river or in the on-shore pumping structure; whether to construct a new on-shore pumping structure, or rehabilitate the existing structure; and whether or not to replace the existing intake pipe (only OS-8 does not).

Table 5-1 Intake Alternatives Summary

Alternative	New On-Shore Structure	Rehabilitate Ex On-Shore Structure	Screens Within On-Shore Structure	IR-A dd Tee at Er f Intake Pip	IR-B -River Structu with Screens	IP-3 New Intake Pipe Using HDD
OS-4	X		X	X		X
OS-5	X				X	X
OS-6		X	X	X		X
OS-7		X			X	X
OS-8		X		X		
OS-8P		X		X		X
All Alternatives include a blow-down line, new pumps, and at least a new operations floor and roof						

For each alternative new intake pumps with VFDs are to be provided.

Benefits of each alternative has been previously discussed in Section 4. A matrix will be used to evaluate each alternative based on criteria to be presented in Section 5.2.

Final design for the intake portion must be done with careful coordination between the city, the Engineer, the Army Corps of Engineers, Montana Department of Natural Resources (DNRC) and both the US and State departments for Fish Wildlife and Parks.

5.1.4 Booster Station and Storage

The 2009 Water System PER presented extensive analysis of possible alternatives for improving the existing capabilities of the Riverview Booster Pump Station. This 2009 analysis was utilized in making the project proposals presented in this current PER. It was the recommendation of the 2009 PER to construct an elevated storage tank directly east of the Forsyth cemetery. This recommendation is consistent with the findings on this report in terms of cost and constructability. The tank sizing recommendation in this report was made independently of the 2009 PER and the basis of this recommendation is presented previously in Section 4. Two locations for the improved booster pump station were discussed. Exhibits are available in the appendix containing excerpts from the 2009 study. Ultimately, the proposed booster pump station location was recommended to remain at existing Riverview BPS. The difference between cost estimates of the two alternatives can be viewed in Section 4.6. There was simply no advantage seen to using the more costly BPS-2 over BPS-3 and therefore a decision-making matrix is concluded unnecessary.

5.2 Evaluation Criteria and Use of a Decision-Making Matrix

The triple bottom line analysis considers financial, social, and environmental impacts. This may sometimes be referred to by using the "Three P's," of People, Planet and Profit. When conducting an analysis for a community, the "profit" is actually the lower long-term cost, or the lower present value, or net present worth (NPW) of an alternative. "People" is synonymous with "social" and "planet" considerations are found in environmental considerations.

Mitigation of some unwanted social or environmental impacts can often be done by project changes, resulting in added cost. It is important to note that all alternatives that reach this point in the study are considered feasible both for social (people) and environmental (planet) concerns. Accordingly, cost—especially life cycle costs, or net present value (NPV)—is in many cases inextricable from social and environmental impacts.

Each alternative was previously evaluated separately in detail as part of Section 4. In this Section 5, each will be reviewed together as part of each individual evaluating concern is presented. For example, instead of discussing operations separately for each alternative, now each alternative will be comparatively discussed under operations, in order to best compare alternatives with respect to each other. This section will include the items of Human Health and Safety, Technical Feasibility, Expandability, and a very significant consideration for this project—the environmental impact.

A matrix will be developed to provide the comparisons discussed in the following subsections. Only the cost estimate is considered completely objective. The reader may wish to reassess the findings of this report using other scoring or weighting of other criteria.

5.2.1 Net Present Value and Important Economic Factors

This discussion on Economics is very important to understand what is being compared. Five main factors will be discussed before application to the comparative matrix, notably:

- Net Present Value (NPV)
- Indexing
- Discount Factor
- Salvage Value (and it's discounting)
- Annualized Costs (which can be made to include periodic costs)

This section will also note where detailed economic analysis is or is not necessary.

This discussion provides the basis for the first factor in a triple bottom line analyses: "financial feasibility and benefit."

An important note is that the analyses presented here are comparative. Therefore O&M costs are only applicable where there is a difference in O&M between alternatives being considered. Following selections of alternatives, actual *net* influence on existing budgets will be summarized in the final chapter of this study.

Net Present Value (NPV) includes **Capital cost**, **PV of 20-years of O&M costs**, and **salvage value**. Salvage value will be a major factor in describing the actual net present value of work needed since the anticipated life of improvements far exceed the 20-year planning period.

Due to the heavy influence of salvage value on some alternatives and negative discount factors, the NPV is presented both with and without consideration of salvage value. The planning period of the net present worth, or life cycle analysis, is based on 20-years, but salvage values gives credit for the life of any structure or system. This life can reach 80 years for concrete structures (the existing structure has endured 90-years with one upgrade). In accordance with the MDOC guidelines, the salvage value is based on straight-line depreciation back to year 20, and then discounted back to present.

Similarly, it was noted that the evaluation of the pipe alternatives would show a net reduction in O&M costs (fewer leaks to repair, etc.), rather than any increase. The pipeline replacement project always shows a net decrease in O&M, that is to say, a *reduction* in corresponding NPV. There is no anticipated increase in annual O&M associated with the new pipelines or structures.

Replaced hydrants and valves would not require any new/additional annual maintenance beyond standard exercising of valves and flushing of hydrants that is currently done (no *net* difference), and the net total number of hydrants and valves is not anticipated to increase. Accordingly, **annualization of increasing O&M costs** for alternative AC-2 was not feasible**. However, the savings could be annualized.** It should also be noted that there was no alternative with regard to pipe replacement and AC-2 has already been established as the selected alternative for pipeline replacement. Accordingly, a decision matrix will not be conducted for pipeline replacements.

The annualization of O&M and NPV computed from those annualized costs (or savings) represents a uniform series present worth (**USSPW**) calculation recognized by the MDOC in the Uniform PER guidelines, while including recurring costs that occur less than annually.

With respect to O&M, it is worth mentioning again that the city has begun a short-lived assets replacement program and its annual funding of over $94,000 is included in all funding options to be explored in Section 6.

It is essential that today's highly unusual economy and low-to-negative discount factors be discussed prior to launching a present worth analysis. During the 1980s it was common to use discount factors up to and even over 8%. This was due to soaring interest rates used to combat inflation. The new world order of interest rates and inflation has changed remarkably and resulted in creating real discount factors of less than 0 for terms under 40 years. This development is nothing short of extraordinary. The repercussions for conducting a life cycle analysis is that projects allowing a delay of work no longer show a significant benefit. Using a real discount rate of -0.1% or 0.0% essentially causes an operational or maintenance cost that occurs 40 years in the future have the same present value today as its future value. In other words, there is nearly a 1:1 relationship between the value of money now to value of money 40 years from now!

Based on correspondence with the MDOC and confirmation by checking with the federal publications online (December, 2021), the following criteria will be used for discount factors, based on OMB Circular A-94, Appendix C.

> *Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2021 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost effectiveness analysis.*
>
> *Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent) for 2021*
>
> - *3-Year -1.8*
> - *5-Year -1.6*
> - *7-Year -1.4*
> - *10-Year -1.1*
> - *20-Year -0.5*
> - *30-Year -0.3*

> *Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30- year interest rate.*

From the above, a discount rate of -0.1% may be extrapolated for a 40-year cost.

Previously discussed, and in accordance with the Uniform PER Guidelines, the **salvage value** is determined using a straight-line depreciation back to the end of the 20-year cycle (20 years from today), then that value is discounted to calculate its present worth (today) using the 20-year discount rate. presented above (0.3%) to obtain the Single Payment Present Worth of the Salvage values **(SPPW(S))**. A structure with a 60-year life would have 2/3rds., or 66.7% of its value remaining at the end of 20 years. That percentage of the original cost would then be discounted back to a Single Payment Present Worth.

Annual costs over the 20-year life cycle analysis are determined using the average discount rate of the 20-year period, that currently being the 10-year rate of -1.1%. Similarly, costs for a single function every 5 years, can be discounted back to the present worth using appropriate discount factors for the time of recurring years (e.g. -1.6 for a 5-year action, -0.5% for a 20-year action). Next, the present worth of that single O&M recurring every 5 years may be distributed through conversion to part of an annualized cost (sometimes this amount is called a capital "sinking fund" as the annualized cost is used to ensure that the needed funds are raised every 5 years), and be part of the uniform series present worth (**USPW**) calculation. Accordingly, annualized costs represent both the annual cost for O&M and the recurring costs spaced years apart. The USPW provides an estimate of funding needed for all O&M (or savings realized) though the 20-year life cycle analysis, then can be used in calculating its contribution to the NPV.

The final Net Present Value is calculated as:

NPV = Capital Costs (C) +USPW (annual and intermittent O&M) – (SSPW(S))

Short-Lived Assets present items that will require replacement within the design period of 20 years. As discussed extensively earlier, the city of Forsyth operations (headed by a chemical engineering graduate from the Massachusetts Institute of Technology, or "MIT") has developed an excellent short-lived assets list including costs and timelines of replacements of all mechanical components in the system. See Appendix K.

All components proposed in this PER are anticipated to have a life exceeding 20 years. As such, the proposed Phase 1 of the improvements would eliminate the need for scheduling replacement of parts scheduled herein as part of the short-lived assets replacement plan.

5.2.2 Non-Monetary factors

This discussion provides the basis for the second two factors in a triple bottom line analyses; social (impact on/preference by people) and environmental (influence on the Planet).

In addition to costs, Section 4 presented discussions on Environmental impacts, Land Requirements, Potential Construction problems, and Sustainability Consideration (water and energy efficiency, green infrastructure and "other"). These items are predominately influencers of environment. Potential Construction problems can influence cost and environment, as well as technical feasibility.

The social, or human considerations include issues such as aesthetics, and long-term protection of human health and safety. Costs (all facets previously discussed) are also inextricable from human/social concerns since the city's people are the ones saddled with the cost. For this reason, it is extremely important that the city's residents be able to review the project, and given opportunities to ask questions and related their personal preferences. Hearings include consideration of costs per user.

5.2.3 Matrix Evaluation Criteria and Weighting

All feasible alternatives are evaluated based on financial and non-financial considerations. It is necessary to also weight the more important factors so as not to make the selection of an alternative on something that is not relatively as important as others.

Given that all project alternatives reaching this level of the study are considered feasible environmentally and socially, it is important to give a high priority to the present and long-term (**Net Present Value of Life Cycle**) costs. Given that the second two factors of the triple point analysis are at a minimum "feasible", the NPV should account for roughly half of the decision, and therefore the weighting factor used for NPV should be roughly equal to the sum of other factors for feasible projects. A weighting factor of 25 will be given to NPV.

Technical/Construction Feasibility has been discussed for alternatives under the heading of "Construction Problems", which in general were found not to be extreme. Land issues can also play a significant role in the evaluation of alternatives for this criterion, since if land cannot be found for a project, then it may no longer be feasible. Difficult-to-meet design criteria—or potential permitting issues—may also make a project less technically feasible. Long-term **reliability** is also reflected in this ranking criterion. A weighting factor of 4 will be given to life technical/construction feasibility.

Environmental Impact has been shown to be a very important concern. There are concerns with the creation of silty water (high NTU) downstream of construction. The use of a side channel that would require at least annual dredging was eliminated from consideration principally due to environmental impact. A concern with any intake option in Forsyth is the maintenance of the Pallid Sturgeon, which will lead to lower ranking on Environmental Impact for alternatives without screens. No significant long-term environmental impact is anticipated for any of the options reaching this point of the evaluation, with the possible exception of IR-A with regard to Pallid Sturgeon fry. However, since the city has never before used screens, it cannot be concluded that IR-A could not be approved during the permitting process, even without screes (OS-8P) and conversations with the State DEQ show that the State would not object to slot size, so long as the velocity entering the system is less than 0.5 ft/s.

Regarding Impacts relating directly to **greenhouse gas impacts**, and **wetland** protection, no real impact is seen in any of the alternatives reviewed. Although the project will impact the river and riverbank during construction, no wetlands are in this area (permit will still be required). Noting concerns over the Pallid Sturgeon (see letters in Appendix A), and possible permitting issues associated with IR-A, <u>a weighting factor of 10 is given for environmental impact, the second highest ranking criterion.</u>

Public Health and Safety is always a major concern with any engineered project. For water systems it is the core purpose of a project. If minimum Public Health and Safety goals are not met, the alternative or sub-alternative should be eliminated from further review. This criterion would be weighted quite high if there were significant differences in the ability of an alternative to solve the public health and safety issues. However, each alternative proposed would provide long-term water supply equally. Thus, a weighting factor of 3 will be used for this criterion.

The low weighting factor does not by any means indicated a lack of importance for Public Health and Safety.

Indeed, this is the all-important driving force behind all projects presented. The low weighting factor is simply due to the fact that all alternatives that make it to this point must already satisfy the public health and safety concerns or they would have already been eliminated.

Operations, Maintenance and Expandability is an important consideration for a small City. Alternatives that require greater frequency of maintenance or greater expertise and associated **operator training** are scored lower than those that require less operator attention or expertise Costs of O&M are included in the NPV analysis, and are not considered under this heading again. Rather, it is the complexity of O&M that is being considered in this seemingly somewhat redundant evaluation criteria. The ability to apply an improvement to future plans (expandability) is also important as that reflects the **sustainability**.

However, given that there is no difference in the O&M procedures, with the air burst system being relatively maintenance free, the weighting factor for this criterion will be established at 4.

Aesthetics and Public Preference is very important as public support is essential for funding and general good will. This criterion is determined based on an evaluation of aesthetics and input by the Council and from public hearings. The weighting factor for this criterion will be established at 4.

In summary, alternatives will be weighted as follows:

- NPV - 25
- Technical/Construction Feasibility – 4
- Environmental Impact and sustainability - 10
- Public Health and Safety – 3 (low since all achieve this goal)
- Operations, Maintenance and Expandability - 4
- Aesthetics and Public Preference - 4

Scoring for the NPV is approached as objectively as possible by comparing relative differences. For example, it would not be justifiable to score three alternatives with 1, 2, and 3 points if the respective costs were $1 million, $200,000, and $150,000. Clearly the two lower cost alternatives should be scored far better than the $1 million alternative.

To allow for an objective scoring, scores are established in the following interpolative equation:

5 x [(Lowest Cost) / (Cost) + (Highest Cost – Cost) / (Highest Cost)]

Where "Lowest Cost" is the NPV of the lowest cost of all alternatives, "Cost" is the NPV of the alternative being scored, and "Highest Cost" is the NPV of the highest cost alternative of all alternatives. When applied to alternatives with NPVs of $1,000,000; $200,000; and $150,000, the resulting scores are: 0.8, 7.8 and 9.3.

Cost is the most objective of all criteria, and with a weighting of nearly half of the total points, it greatly helps ensure a solution based on logic rather than personal preference, or bias, of the analyst.

5.3 Distribution System AC-2

5.3.1 Description

In Section 4 it was demonstrated that there were no practical solutions to issues surrounding the continued use of aging Asbestos-Cement pipe, other than full replacement

5.3.2 Costs – NPV

Table 5-2: Alternative AC-2 NPV Cost Estimate

AC-2: Replacement/Upsize of all existing distibution piping					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements & Mobilization	LS	1	$ 898,420.00	$ 898,420.00
2	Traffic Control	LS	1	$ 15,000.00	$ 15,000.00
3	Temporary Water Service	LS	1	$ 100,000.00	$ 100,000.00
4	Remove existing AC Pipe & appurtances	LF	40,000	$ 18.00	$ 720,000.00
5	8"-12" water main install	LF	40,000	$ 65.00	$ 2,600,000.00
6	8"-12" gate valve	EA	80	$ 1,500.00	$ 120,000.00
7	misc pipe appurtances	EA	80	$ 2,200.00	$ 176,000.00
8	Replace existing water service & curb stop	EA	899	$ 2,200.00	$ 1,977,800.00
9	Asphalt concrete pavement (4") (10' wide)	SY	55,000	$ 40.00	$ 2,200,000.00
10	remove existing 6" hydrant	EA	117	$ 400.00	$ 46,800.00
11	install new 6" hydrant	EA	117	$ 5,800.00	$ 678,600.00
12	Remove & Replace Concrete Curb and Gutter at service connection	EA	500	$ 700.00	$ 350,000.00
13					$ -
Preliminary Opinion of Probable Construction Cost					**$9,883,000.00**
Contingency (15%)					$1,482,000.00
Geotech					$25,000.00
Design Engineering					$988,000.00
Construction Engineering					$1,384,000.00
Legal and Admin					$247,000.00
Total Preliminary Opinion of Probable Project Cost: AC-2					**$14,009,000.00**
	NPV				
	Total Capital Cost in Year 2022				**$14,009,000**
	USPW (O&M)				**-$168,717**
	NPV Before considering salvage value				**$13,840,283**
	SSPW(S), based on:		40	yr life, -0.1% Discount Factor	$6,865,870
	NPV after accounting for salvage value				$6,974,413

Capital cost estimates for Alternative AC-2 are presented above. This work will be completed in phases as presented in Section 6. Separate cost estimates and explanations have been presented in Section 6 defining the scope of each phase.

The new PVC pipe included in AC-2 should have a 100-year life, and eliminates the frequent breaks associated with the existing AC pipe. For salvage value estimates a life of 40 years is assumed (pipe is expected to actually last 80 or even 100 years, but incidentals such as service line connections, valves, and hydrants would be expected to last only 20 – 40 years, so an overall average of 40 years is considered conservative but reasonable). The annualized O&M savings are presented below.

Table 5-3: Alternative AC-2 O + M Analysis

PV of O&M and Uniform Series of Annual Pipe Repair/O&M Change				-0.5%	discount rate	20 yr
Alternative AC-2				-1.1%	discount rate	10 yr
				-1.6%	discount rate	5 yr
				-0.5%	discount rate	annual over 20 yr
				-0.6%	discount rate	15 yr
PV of Leak Repairs Avoided (AC-2)						
Approximate Cost of Pipe Repair (excavator, labor, materials, disinfection, compaction, asphalt restoration for two repairs				$ 8,000		
Item	annual	PV of annual	Every 5 yrs	Every 10 yrs	Every 20 yrs	PV total
Repairs - 2 Leaks Fewer/year	$ 8,000	$ (168,717)	$ -	$ -	$ -	$ (168,717)
All other O&M not changed for these lines since hydrants and valve execising remains the same.						
USPW(O&M) Total PV of Annual Series and Intermittent O&M; (-) indicates savings						$ (168,717)

The new PVC pipe included in AC-2 should have a 100-year life, and eliminates the frequent breaks associated with the existing AC pipe. For salvage value estimates a life of 40 years is assumed (pipe is expected to actually last 80 or even 100 years, but incidentals such as service line connections, valves, and hydrants would be expected to last only 20 – 40 years, so an overall average of 40 years is considered conservative but reasonable).

Based on budget discussions with the operator, it is estimated that repairing a leak costs roughly $8,000 per leak, after accounting for materials, labor and especially paving (all the existing cast-iron pipe identified for replacement in this study is located under pavement). The actual cost for each circumstance is highly variable depending on size of the line, ease of shut offs, pressure, and extent of the damage. A definitive cost cannot be made since at times excavation for a single leak may lead to finding others, or it may take additional excavation and pavement disturbance to eventually come to the point of a leak. However, based on operator estimates and expenditures, $8,000 is a reasonable estimate.

As noted previously there were no viable pipe replacement alternatives. As a result, there is no need for a comparison/selection matrix.

5.4 Alternatives for Intakes

5.4.1 Description

A total of six (6) alternatives were found to merit further consideration. Each of the first four OS- alternatives (OS-4, 5, 6, and 7) includes an intake (IR-) alternative and the sole selected Intake Pipe (IP) alternative (IP-3, using HDD). OS-8 does not include a new intake pipe or screens. OS-8P does include a new pipe, but no screens. The selection of the preferred alternative will be made as objectively as possible using a decision matrix. Criteria to be used and associated weighting values were determined in Section 5.2.3.

For ease of reference, a summary of the options and their respective identifiers follow in the figure below.

Table 5-4 Intake Alternatives Summary

Alternative	New On-Shore Structure	Rehabilitate Ex On-Shore Structure	Screens Within On-Shore Structure	IR-A dd Tee at Er f Intake Pip	IR-B -River Structu with Screens	IP-3 New Intake Pipe Using HDD
OS-4	X		X	X		X
OS-5	X				X	X
OS-6		X	X	X		X
OS-7		X			X	X
OS-8		X		X		
OS-8P		X		X		X
All Alternatives include a blow-down line, new pumps, and at least a new operations floor and roof						

5.4.2 Costs - NPV

Detailed Capital and Net Present Value Costs for each alternative were previously presented in Section 4. The process of calculating the NPV was discussed in detail in Section 5.1.1, and will not be repeated here.

As noted previously, the costs are the most objective of all ranking criteria and a weighting factor of half the total is given to this important and most objective criterion.

NPV is provided for each alternative both in the individual cost tables and summarized below. The NPV and salvage values were both presented in Section 4 for each of the alternatives. Note that due to the low discount rate and long life of the alternatives, there is a great deal of influence in the NPV from salvage value. For that reason, both NPV with or without including salvage value is provided.

Table 5-5 NPV Summary for All Intake Alternatives

Alternative	Capital Cost	NPV with Salvage Value	NPV w/o Salvage Value	Screens Included?	New Intake Pipe Included?
OS-4	$ 3,097,000	$ 1,521,000	$ 3,038,000	X	X
OS-5	$ 3,877,000	$ 1,919,000	$ 3,818,000	X	X
OS-6	$ 1,790,000	$ 854,000	$ 1,731,000	X	X
OS-7	$ 3,009,000	$ 1,476,000	$ 2,950,000	X	X
OS-8	$ 903,000	$ 372,000	$ 814,000		
OS-8P	$ 1,490,000	$ 671,000	$ 7,401,000		X
All Alternatives include a blow-down line, new pumps, and new operations floor and roof					

5.4.3 Technical/Construction Feasibility

Each alternative presents a proven and effective means of providing water to the city. All can be constructed and there have been recent projects along the Yellowstone River that have been similar. Alternate OS-8 does not provide a new intake pipe or screens. Arguably, screens may in fact never be required. However, at some point the intake pipe must be replaced. Since OS-8 is not as complete as the other items, it is ranked lower than all others. However, it is technically feasible, so it is considered viable for the matrix analysis.

From a technical standpoint, the optimum alternative is the one that has the best redundancy and provides all anticipated needs for the next 20 or more years. Considering the actual life of the in-River structure will exceed many decades, it is beneficial that the alternative selected be appropriate for anticipated regulations. With this regard, systems that do not have Johnson Screens score lower due to long-term concerns.

Where Johnson screens are installed below a new permanent floor, those alternatives (OS-4 and 6) score slightly lower. Although the screens should last 100 years or more, and are far more easily accessed, they cannot be removed. Thus, all alternatives score well except for OS-8. OS-8P scores higher than OS-8 since it will never be necessary to again excavate and disturb the levy area with that alternative, and it would be conceivable that an in-river screen system could be lowered down at a later date and connected to the new pipe without constructing a cofferdam.

5.4.4 Environmental Impacts

Environmental impacts have been discussed in detail throughout this PER and do require careful attention. Alternatives that do not protect the Pallid Sturgeon (no screens) rank lower since this is not only a long-term concern environmentally but may make it difficult to obtain the necessary permits.

However, the pallid sturgeon is not as much of a concern as would be the case if the intake were downstream of the Cartersville Dam, so all alternatives are considered environmentally feasible.

Less disturbance to the river would be a benefit for OS-4 and OS-6, and especially OS-8. However, if screens were ever to be provided, OS-8 would have to install the screens in the river since the new floor will already be established. All in all, the environmental benefits/impacts seem roughly similar.

Protection of the pallid sturgeon fry is a benefit to OS-4, 5, 6, and 7. Ease of future installation of screens keeps OS-8P reasonably well-scoring, but less than those just mentioned.

Environmental concerns are discussed in Section 4 for all the alternatives considered, both for the in-River and the on-shore portions of each of the nine final alternatives.

5.4.5 Public Health and Safety

All alternatives meet the needs for providing the quantity water. For this reason, the weighting factor is low, even though public health and safety is the most important of all criteria.

Alternative OS-8 presents some risk of loss of the intake pipe. Although it is doubtful that the loss of the pipe will be a complete collapse, the mere possibility is a cause for a lower score for OS-8. Eventually the 90 year old cast iron pipe will fail. However, all other alternatives would use HDPE pipe, which will not corrode or ever experience an off-set joint that could fracture (it is all weld-joined)

Alternatives with screens (all but OS-8) may lower the organic carbons entering the system, thereby lowering the production of trihalomethanes and helping in taste and odor control.

5.4.6 Operations, Maintenance and Expandability

None of the OS- alternatives presents any serious increase in O&M. In fact, each of the alternatives should provide for less O&M since clogging should be eliminated, but even if clogging were to occur, there would be means for blowing-down the pipe and a location to add a pig. This was discussed previously and the NPV values presented earlier include costs of running a compressor for cleaning and subtract savings by avoiding future clogging.

OS-4 and OS-6 provide the screens in an accessible location, allowing those alternatives to score highest of all. OS-8P would have the lowest O&M requirements since there are no screens (this is balanced by the loss of scoring in the environmental category).

OS-8 is scored lowest since the old pipe remains. That pipe has an off-set joint and shows significant corrosion. Full failure, though unlikely in the immediate future, will eventually occur and be a major O&M problem when it does fail. The offset joint is considered potentially problematic to use of a pig in the future, though an earlier attempt was successful.

VFDs and new pumps are proposed for all alternatives making each lower in power costs.

Expandability is considered better for alternatives that provide a completely new on-shore structure.

O&M costs were extremely low compared to capital costs. Since they are low and covered by comparison of the Net Present Worth associated with the NPV, the specific O&M cost does not influence the scoring of this criteria.

5.4.7 Aesthetics and Public Preference

Once completed, the work will essentially be out of the public view. During construction, the public may be impacted by the proposed cofferdam that will extend to the proposed in-River system (OS-5 and OS-7). The aesthetics disturbance would be greater with options using IR-B. OS-5 and OS-7 present a slight public concern since the in-river structure would require the air-blast to rise in the river. A lower-cost alternative typically meets with the greatest public approval, though eventually OS-8 will have to be accompanied with a new intake pipe.

5.4.8 Decision Matrix

Based on the previous discussions, the decision matrix is completed and shown below.

Unfortunately, even with such heavy weighting on the costs, the matrix identifies three solutions to be quite similar. These are:

1 OS-6, Rehabilitate the existing structure, placing new screens below the new floor; provide a new intake pipe with a tee.

2 OS-8P Rehabilitate the existing structure, provide a new intake pipe with a tee

3 OS-8 Rehabilitate the existing structure only.

Arguably, these do not completely compare "apples to apples" as there is more supplied by OS-6, the highest-ranking alternative, and OS-8 leaves in the 1931 intake pipe, while this is replaced in all others. However, someday that expense will have to be made.

If funding is not available to do all the work included in OS-6, the work could potentially be done in phases, adding the new inlet pipe at a later date.

Table 5-6 Intake Decision Matrix with Salvage Value Considered

ALTERNATIVE DECISION MATRIX FOR FORSYTH INTAKE

(INCLUDES LIFE CYCLE COSTS WITH SALVAGE VALUES)

CRITERIA-->	Technical/Construction Feasibility		Environmental Impact		Financial Feasiblity (NPV)		Public Health and Safety		Operation and Maintenance		Aesthetics & Pub Pref		
WIEGHING FACTOR->		4		10		25		3		4		4	
ALTERNATIVE	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	Score:	Wgt Score	TOTAL
OS-4 $1,578,250	9	36	9	90	2.3	56	9	27	10	40	9	36	**285**
OS-5 $2,051,943	9	36	7	70	1.0	24	9	27	9	36	7	28	**221**
OS-6 $887,341	7	28	9	90	4.9	124	9	27	10	40	9	36	**345**
OS-7 $1,592,527	7	28	7	70	2.4	60	9	27	9	36	7	28	**249**
OS-8 $388,324	3	12	5	50	9.0	226	4	12	3	12	5	20	**332**
OS-8P $698,340	6	24	6	60	5.8	146	9	27	10	40	9	36	**333**

Cost Scoring Equation:

5 x [(Lowest Cost) / (Cost) + (Highest Cost – Cost) / (Highest Cost)]

Costs are Net Present Worth, LCC, Including Cost to Deign, Build, and Provide all Opeartion, Maintenance over the course of 20 years, and regain remaining salvage val

5.4.9 Summary of the Intake Selection Process and Result

Having evaluated all reasonable intake options, the chosen alternative is OS-6, which provides a new floor in the existing structure and installs Johnson Screens within the structure where access should be easy.

The new pipe installed by HDD would be HDPE, without bends, providing a very smooth inner-pipe surface for greatest ease of blowing down the any sediment. The pipe would slope up as is currently done, allowing for it to enter the existing on-shore structure at the same elevation.

This solution is not the lowest cost but is very complete and provides low maintenance. The lowest cost solution, OS-8, does not include a new intake pipe and therefore is not a truly complete solution and leaves the city vulnerable to a shut-down.

It should be kept in mind that this and all other alternatives included placement of new vertical turbine pumps with VFDs. The new system would cut intake velocities at the river to approximately 1/6th the current velocity. The lower velocity alone should keep gravels from again building up within the pipe. The vertical turbines will be placed in manufacture-recommended pump cans and be supported by a concrete foundation. See the Executive Summary Figures ES-6 and -7 for plan and profile views.

In the event that permits could not be acquired for the new intake pipe in a reasonable timeline, it might become necessary to do the rehab work and installation if interior screens while continuing the permitting process for the intake pipe.

5.5 Alternatives for Riverview Booster Station

The 2009 Water System Improvement PER conducted extensive alternatives analysis regarding improvements to the existing Riverview Booster Station. This report utilized the conclusions of the 2009 report is recommending the elevated storage tank at a location directly east of the cemetery. Many other tank locations and tank types were explored and analyzed in 2009.

A cost estimate comparison between to competing locations for the establishment of an improved booster station was conducted as part of this report, independent from the 2009 report. That analysis concluded that the best recommendation for placement of the improved BPS was in the same location, replacing the existing BPS.

The capital cost estimates for Alternatives BPS-2 and BPS-3 were presented in Section 4 and repeated here for discussion purposes.

Table 5-7: BPS-2 cost estimate, new booster station location

BPS-2: Construction of new booster station west of Quinzer subdiv., abandon existing booster station, install generator, construct elevated storage tank **Tank location East of Cemetery**					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 137,200.00	$ 137,200.00
2	Furnish and Install Packaged Booster Station	LS	1	$ 300,000.00	$ 300,000.00
3	Elevated storage tank	Gal	100,000	$ 4.00	$ 400,000.00
4	Abandon existing Riverview BPS	LS	1	$ 15,000.00	$ 15,000.00
5	Booster station enclosure	SF	300	$ 300.00	$ 90,000.00
6	Connect BPS to existing booster station	LS	1	$ 7,500.00	$ 7,500.00
7	Furnish & Install Concrete Foundation	LS	1	$ 50,000.00	$ 50,000.00
8	Site Improvements - Elevated tank	LS	1	$ 50,000.00	$ 50,000.00
9	Chainlink security fence with three strand barb wire top	LF	500	$ 40.00	$ 20,000.00
10	Chain Link Gate	EA	1	$ 7,500.00	$ 7,500.00
11	12" PVC, connect elev tank to system	LF	520	$ 100.00	$ 52,000.00
12	Construction of elevated storage tank (epoxy-coated steel)	GAL	80,000	$ 4.00	$ 320,000.00
13	Furnish & Install new portable generator unit at existing Riverview BPS	LS	1	$ 60,000.00	$ 60,000.00
14					$ -
Preliminary Opinion of Probable Construction Cost					$1,509,000.00
Contingency (15%)					$226,000.00
Design Engineering					$151,000.00
Geotech site investigation					$15,000.00
Construction Engineering					$211,000.00
Legal and Admin					$38,000.00
Total Preliminary Opinion of Probable Project Cost					**$2,150,000.00**

Table 5-8: BPS-3 cost estimate, booster station in existing location

BPS-3: Construction of new booster station at current BPS location, install generator, install transmission line to Quinzer parallel to existing trans main line. **Tank location East of Cemetery**

Item	Description	Unit	Quantity	Estimated Unit Price	Estimated Total Price
1	General Requirements and Mobilization	LS	1	$ 99,437.00	$ 99,437.00
2	Remove existing BPS infrastructure	LS	1	$ 50,000.00	$ 50,000.00
3	Furnish and install new BPS infrastructure	LS	1	$ 250,000.00	$ 250,000.00
4	Parallel line to Quinzer, furnish and install (8" PVC)	LF	1,150	$ 65.00	$ 74,750.00
5	8" gate valve, furnish and install	EA	2	$ 1,500.00	$ 3,000.00
6	misc 8" bends	LS	1	$ 3,000.00	$ 3,000.00
7	Connect to exisiting water main/BPS	EA	2	$ 1,500.00	$ 3,000.00
8	Asphalt concrete pavement (4") (10' wide)	SY	1278	$ 40.00	$ 51,120.00
9	Furnish & Install Concrete Foundation	LS	1	$ 50,000.00	$ 50,000.00
10	Site Improvements - Elevated tank	LS	1	$ 50,000.00	$ 50,000.00
11	Chainlink security fence with three strand barb wire top	LF	500	$ 40.00	$ 20,000.00
12	Chain Link Gate	EA	1	$ 7,500.00	$ 7,500.00
13	12" PVC, connect elevated tank to system	LF	520	$ 100.00	$ 52,000.00
14	Construction of elevated storage tank (epoxy-coated steel)	GAL	80,000	$ 4.00	$ 320,000.00
15	Furnish & Install new portable generator unit at existing Riverview BPS	LS	1	$ 60,000.00	$ 60,000.00
Preliminary Opinion of Probable Construction Cost					$1,094,000.00
Contingency (15%)					$164,100.00
Design Engineering					$109,400.00
Construction Engineering					$153,000.00
Legal and Admin					$27,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,547,500.00**

Since the components compared would be expected to have a 20-year life and relatively the same O&M as experienced at the existing station, the Capital Cost and NPV are roughly equal.

As illustrated by the above comparison of estimated capital costs for construction of an improved booster station serving (and expanding) the Upper pressure zone, there is a cost difference of 39% between BPS-2 and BPS-3 in favor of constructing the proposed booster station in the same location as the existing Riverview Booster Station. Both the alternatives shown above assume an identical 80,000-gal elevated storage tank identical locations. Due strictly to the cost savings of BPS-3 when compared to BPS-2, Alternate BPS-3 has been recommended and no further decision matrix, etc. was deemed necessary for an informed project selection. Booster Station components would be identical in each location meaning that Operations and Maintenance would not be a deciding factor between the two options.

A Do-Nothing alternative was eliminated from consideration in Section 4 due to inadequate pressures and available fire flow in the Quincer and Riverview Villa subdivisions.

Since there is no advantage of operations or service associated with the more costly BPS-2 over BPS-3, cost becomes the only consideration and no decision matrix is necessary. BPS-3 is therefore the chosen alternative.

Importantly, the residents of Forsyth are in favor of a second water tank being constructed to serve the upper pressure zone. Community support has been a large factor in the recommendation to construct the proposed elevated storage tank east of the cemetery.

5.6 Alternatives for Forsyth Hill Storage Tank

Alternative ST-1 Do Nothing could not be considered as a suitable solution regarding repair, maintenance, and improvement of the existing Forsyth Hill Storage Tank as explained earlier in this report. Alternate ST-2 was deemed the only practicable alternative and, as such, a complete alternatives analysis was not conducted. The capital cost estimate for Alternative ST-2 is presented below. The Preliminary Opinion of Probable Cost is $1.16mil, as presented in the table below.

Table 5-9: Alternative ST-2 Cost Estimate

Alternate ST-2: Forsyth Hill Storage Tank repair and maintenance					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	General Requirements and Mobilization	LS	1	$ 73,000.00	$ 73,000.00
2	Erosion Control excavation/re-grade (15' wide * 1' deep around tank)	CY	200	$ 15.00	$ 3,000.00
3	Underdrain Pipe (4" dia, ASTM F758 PVC), granular backfill (ASTM D2321 Class IA, IB, or II), Filter fabric (AASHTO M288 Class II)	LF	300	$ 25.00	$ 7,500.00
4	Overflow Pipe Outlet & Underdrain Outlets, single basin (MDT Type I - 12" minus) (24" section depth)	TON	40	$ 150.00	$ 6,000.00
5	Overflow Pipe Outlet & Underdrain Outlets (2) rip rap basin - bedding (MDT Type II - 2" minus) (12" section depth)	CY	13	$ 130.00	$ 1,630.00
6	Excavation relating to rip rap placement	CY	30	$ 15.00	$ 450.00
7	Separation fabric	SY	120	$ 10.00	$ 1,200.00
8	Seeding of disturbed areas	ACRE	2	$ 900.00	$ 1,800.00
9	Interior tank preparation	LS	1	$ 150,000.00	$ 150,000.00
10	Furnish & Application of polyurethane interior tank lining & primer	LS	1	$ 390,000.00	$ 390,000.00
11	Subgrade Preparation, access road (4,500 LF, 12' wide) (re-establish crown, blade and roll)	SY	6000	$ 7.00	$ 42,000.00
12	Aggregate Surface Course (8" section depth)	TON	1867	$ 22.00	$ 41,070.00
13	Misc access road drainage improvements	LS	1	$ 10,000.00	$ 10,000.00
14	Submersible tank mixer	LS	1	$ 75,000.00	$ 75,000.00
Preliminary Opinion of Probable Construction Cost					$803,000.00
Contingency (15%)					$120,000.00
Geotech					$25,000.00
Design Engineering					$80,000.00
Construction Engineering					$112,000.00
Legal and Admin					$20,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,160,000.00**

SECTION 6 PROPOSED PROJECT

6.1 Summary of Projects

This PER has established the selection of the following alternatives:

- AC-2: Replacement of Remaining Asbestos-Cement Pipe. Unfortunately, the cost of this undertaking is far too great for all pipe to be replaced at once, and therefore the work must be conducted in phases. The highest priority found was for a short section of pipe in Oak Street.
- Intake Alternative OS-6, which includes a new intake pipe (IP-3), an angled tee at the river water's entrance (IR-A), and rehabilitation of the existing wet well to include a means of blowing down the inlet pipe and the installation of screens within the wetwell.
- Replace the existing obsolete controls at the WTP. Due to the manufacturer no longer supporting the antiquated system, loss of any component could leave the city without the ability to treat its water. The new controls will allow the WTP to operate without an operator present, thereby allowing for greater settling time and synchrony with the new vertical turbine pumps at the intake. The new controls would include alarms to notify operators remotely in the event of an emergency.
- Provide an expanded lift station with generator and an 80,000-gallon elevated tank with associated valves and piping (BPS-3). This portion of the improvements will be used to expand the upper pressure zone to include both the Riverview Villa subdivision and the Quincer subdivision.
- Provide erosion control at the existing 1 MG tank (low cost and should be done as soon as possible); recoat the interior of that storage tank (a lower priority, and should be done after placement of the 80,000 gallon storage tank associated with BPS-3), and reconstruct portions of the access road to the tank (lower priority) (ST-2).

Section 6.3 will discuss the phasing of these needs.

6.2 Preliminary Project Design

The preliminary design for the project has been based on requirements set forth by Standards for Waterworks, Montana DEQ Circular-1, and AWWA Manual M-31 Distribution Requirements for Fire Protection, and the Uniform Plumbing Code (version currently adopted by the State). Design will need to use the Montana Public Works Standard Specifications, at minimum, for construction specifications. Contract documents will also need to include

General Conditions and all applicable Standard Modifications as may be required by funding agencies involved or other authorities having jurisdiction.

See "design criteria" included in all evaluations of each portion of the project as included in Sections 4 and 5.

The layout of the chosen alternative for the Intake (OS-6) which includes the new intake pipe (IP-3), to be installed by HDD and screens, was included in Section 4 and again in the Executive Summary.

6.3 Project Phasing and Costs

Cost restrictions and the desire to have another storage tank operational prior to shutting down the 1 MG tank for interior preparation and coating have led to the development of project phasing. The order of phasing also best ensures that the most pressing health needs are met as soon as possible. For example, a generator is included with the booster station expansion. However, that cannot be constructed in the first phase due to funding limitations. Fortunately, the generator for that project can be installed for the existing system and re-used for the expanded system when that is constructed. Accordingly, the current threat of immediate pressure loss in a power outage is averted at very little cost, and the generator is used in the final product, as well.

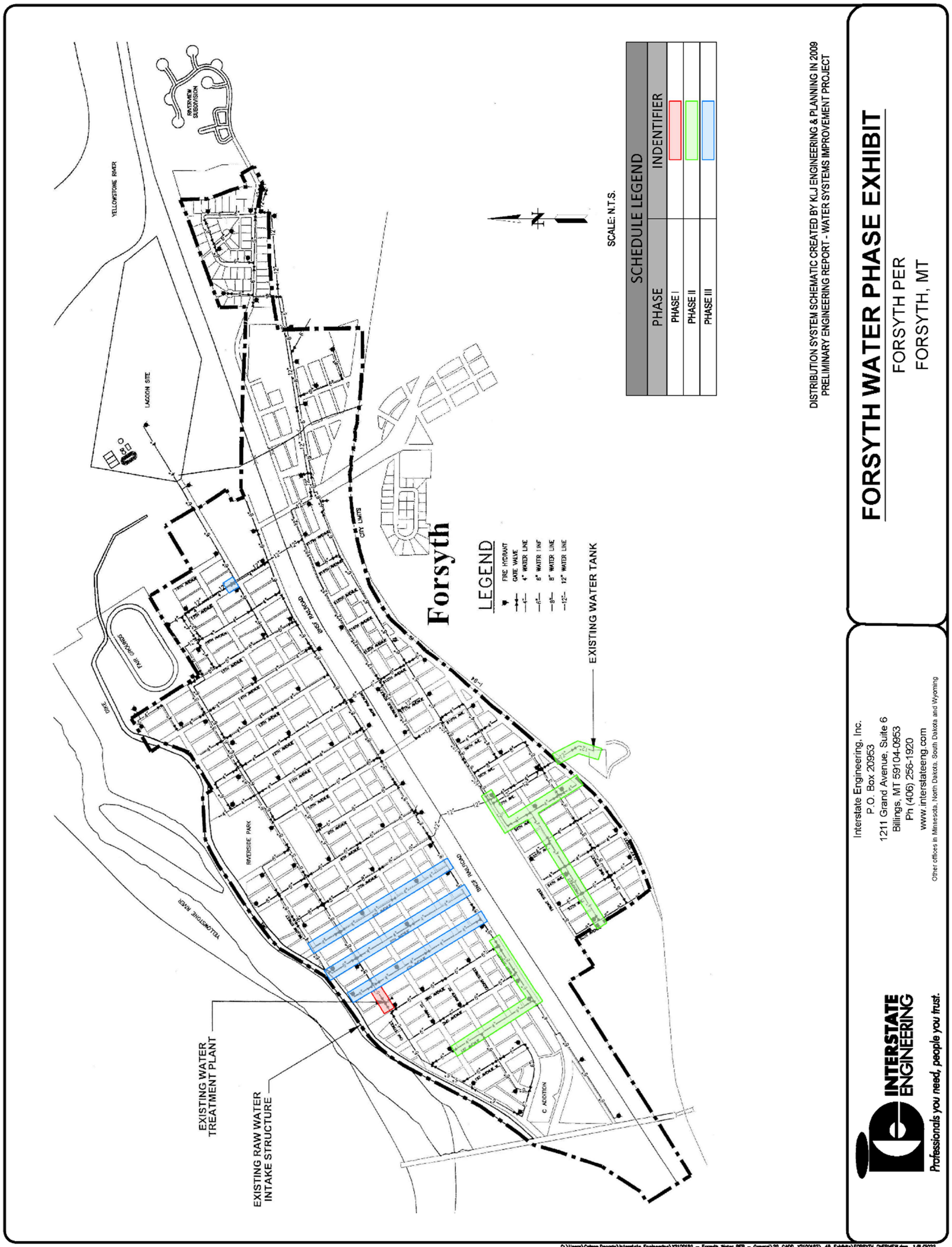

Figure 6-1: Alternate AC-2 Phasing Exhibit, phases 1 - 4

6.3.1 Phase 1

A threat of loss of water for the entire system is present in both the loss of the intake floor and pipe, along with the possible loss of controls at the WTP. Loss of pressure in the Upper Zone is possible due to lack of back-up power and zero storage. These items are, without question, those that most immediately need to be resolved.

An issue that needs addressed and does not have very substantial cost is replacement of the 6-inch main on Oak Street between N 3rd and 4th Avenue that carries all water from the WTP to the distribution system (see Figure 6-1 above). This section experiences dramatic head loss and, like the rest of system, is 60-70 years old. Loss of that pipe would eliminate the ability to pump into the system. This targeted repair provides a high amount of benefit to the system's distribution capabilities at a relatively low cost. It is a logical start to the pipeline replacement program associated with Alternative AC-2.

The existing Riverview Booster Station is not adequate to provide adequate pressures and fire protection to the Upper Pressure Zone. As such, Alternate BPS-3 shall be included in Phase 1 to expanded booster station service to both Riverview Villa Retirement Community and the Quincer Subdivision. Additionally, BPS-3 provides an additional 80,000 gallons of water storage in the form of an elevated storage tank in the Upper Pressure Zone. A portable generator will also be furnished at the new BPS to supply reliable power to the pumps and maintain pressure in times of power loss.

Table 6-1: Phase 1 Cost Estimate

PHASE 1 - FORSYTH WATER SYSTEM IMPROVEMENTS					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	Alternate OS-6 (Intake)	LS	1	$ 1,360,000.00	$ 1,360,000.00
2	Furnish and Install WTP Control System	LS	1	$ 700,000.00	$ 700,000.00
3	Alternate AC-2, Phase 1 (Oak St Pipe Replacement)	LS	1	$ 57,470.00	$ 57,000.00
4	Alternate ST-2, Phase 1 (Erosion Control at the Existing Water Storage Tank Site)	LS	1	$ 23,760.00	$ 24,000.00
5	Alternate BPS-3 (Booster Station, 80k gal Elevated Storage Tank, and Pressure Zone Expansion)	LS	1	$ 1,094,000.00	$ 1,094,000.00
Preliminary Opinion of Probable Construction Cost					$3,235,000.00
Contingency (15%)					$485,000.00
Geotech					$25,000.00
Design Engineering					$324,000.00
Construction Engineering					$453,000.00
Legal and Admin					$81,000.00
Total Preliminary Opinion of Probable Project Cost					**$4,603,000.00**

Table 6-1, above, presents the elements included in the proposed Phase 1 improvements. Detailed cost estimates of each alternative are available in Section 4 and the appendix of this report.

6.3.2 Phase 2

Phase 2 proposes completion of improvements to the existing Forsyth Hill storage tank as discussed in "Section 4.7 Erosion Control, Repairs, and Tank Lining" and targeted replacement of distribution system pipe to improve available fire flow (AFF) and avoid future breaks and potential contamination in the 1st Ave N – Main St area and the main distribution pathway between the Forsyth Hill storage tank and the Rail Inn on 1st Ave S.

Another high priority pipeline to be replaced is the single 12-inch transmission line connecting the Forsyth Hill storage tank to the rest of the distribution system (see Figure 6-1 above). That line has been plagued with wash-out of the trench in which it is buried due to problems (since corrected) at the tank vault and erosion. Place that work in Phase 2 allows for temporary shutting down of the elevated storage tank.

This phase also includes the interior re-coating of the 1 MG storage tank.

Table 6-2: Phase 2 Cost Estimate

PHASE 2 - FORSYTH WATER SYSTEM IMPROVEMENTS					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	Alternate ST-2, Phase 2 (tank lining, access road rehab)	LS	1	$ 779,070.00	$ 779,070.00
2	Alternate AC-2, Phase 2 (continued pipe replacement)	LS	1	$ 1,072,300.00	$ 1,001,100.00
Preliminary Opinion of Probable Construction Cost					$1,780,000.00
Contingency (15%)					$267,000.00
Geotech					$25,000.00
Design Engineering					$178,000.00
Construction Engineering					$249,000.00
Legal and Admin					$45,000.00
Total Preliminary Opinion of Probable Project Cost					**$2,544,000.00**

Table 6-2, above, presents the estimated project cost overview. For an itemized cost estimate of each alternative reference Section 4 of this report.

6.3.3 Phase 3

Table 6-3: Phase 3 Cost Estimate

PHASE 3 - FORSYTH WATER SYSTEM IMPROVEMENTS					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	Alternate AC-2, Phase 3 (existing 4" upsized to 8" PVC, 4th, 5th, 6th Ave.)	LS	1	$959,000.00	$ 959,000.00
Preliminary Opinion of Probable Construction Cost					$959,000.00
Contingency (15%)					$144,000.00
Geotech					$25,000.00
Design Engineering					$96,000.00
Construction Engineering					$134,000.00
Legal and Admin					$24,000.00
Total Preliminary Opinion of Probable Project Cost					**$1,382,000.00**

Phase 3, shown in Figure 6-1 previously, continues the replacement and upsizing of existing AC distribution pipe with, throughout Phase 3, exclusively 8-inch PVC. Phase 3 improvements target existing 4-inch distribution lines on 4th, 5th, and 6th Ave N. Also included in AC-2 - Phase 3 is the addition of a new fire hydrant coming from the existing 12-inch distribution pipe under 17th Avenue at Cedar Street to increase the available fire flow to satisfy the NFF requirement of the 2015 ISO report discussed previously.

6.3.4 Phase 4

Table 6-4: Phase 4 Cost Estimate

PHASE 4 - FORSYTH WATER SYSTEM IMPROVEMENTS					
Item	**Description**	**Unit**	**Quantity**	**Estimated Unit Price**	**Estimated Total Price**
1	Alternate AC-2, Phase 4 (all remaining pipe replacement)	LS	1	$ 7,088,730.00	$ 7,089,000.00
Preliminary Opinion of Probable Construction Cost					$7,089,000.00
Contingency (15%)					$1,063,000.00
Geotech					$25,000.00
Design Engineering					$709,000.00
Construction Engineering					$992,000.00
Legal and Admin					$177,000.00
Total Preliminary Opinion of Probable Project Cost					**$10,055,000.00**

Phase 4 includes the remaining AC distribution piping not previously addressed in the prior three phases. As explained in Section 4, this phase is not shown on Figure 4-2 or Figure 6-1 (identical exhibits) being that it includes any pipes not accounted for previously. This phase, given its total cost and time required to construct is anticipated to span multiple construction seasons and likely be sub-divided into additional phases.

6.4 Project Schedule

A final project schedule for phasing and project implementation could vary depending on the funding of the project. Funding is critical for a community the Forsyth's size.

Funding strategies will be further discussed later in this section. It is anticipated that the Town will utilize the Montana Drinking Water State Revolving Fund (DWSRF), sometimes referred to as only the Montana State Revolving Fund (SRF), for the loan funding source and couple this with additional sources such as the Montana Coal Endowment Program, Coal Board, DNRC, city reserves, and ARPA grants. Table 6-5 presents a proposed schedule for Phase 1.

Table 6-6, the funding plan presented later in this section, includes $250,000 cash contribution by the city. This funding is crucial in that it allows for a much-accelerated schedule as work can begin on engineering and permitting while grants are under review and in start-up.

Table 6-5 Forsyth Phase 1 Project Schedule

Action	Month	Notes
PER Draft Report to City, SRF	N/A	Completed
Contract with Engineer	N/A	Completed (Documentation included in ARAP Grant Application). Note that the $250,000 city contribution allows for early start of engineering and permitting work.
ARPA Grant Submittal	January, 2022	
Public Hearing	March, 2022	
Contact and Hire Bond Council	March, 2022	Cost paid per the city .
Comments (if any) from SRF	February, 2022	
PER Final to City	March, 2022	
Apply to Coal Board	February, 2022	.
SRF Applications Submitted	March, 2022	Documentation for inclusion on priority list already submitted.
Apply to DNRC and MCEP	April/May 2022	
Begin Design on Phase 1	April, 2022	Use city cash contribution
Submittal to DEQ	October, 2022	
Publication of FONSI	November, 2022	EIS not anticipated to be required
Legislature hearing for MCEP and DNRC grants	January 2023	
Address DEQ Comments, Final Plans Completed	January, 2023	
Awards for MCEP, DNRC, Coal Board	April 2023	Start-up begins immediately following
Advertisement for bids	April, 2023	Best time for Contractors to see the river at low level and determine means of construction. May want to sole source screens and order early (no real competition for Johnson Screens, so better to negotiate a price)
Review, certification of bids, recommendation for award	May/June 2023	
Approval to begin Construction of Phase 1	July, 2023	Construction begins. WTP controls work is not weather dependent.
Project construction management, prep draws, on-site rep throughout	Apr 2023 – December 2023, then after break	Controls installation and testing may continue through winter
Final Inspection	December, 2023	Punch List items provided and to be completed prior to final completion certification
11- month walkthrough	November 2024	11- months following substantial completion

Final draw of retainage	See Note	Upon correction of all warranty items found in 11- month walkthroughs for each schedule
Close-out, Audit	Dec 2024	

6.5 Permit Requirements

Permit requirements for the alternative were discussed previously in Sections 1.3.11.

6.5.1 Permits for work in and around the river

For the reader's convenience the list of permits is repeated herein for work in and around the river:

- Local Conservation Districts - 310 permits
- MT Fish, Wildlife and Parks - SP 124 permit
- County Floodplain Administrators - Floodplain Permit
- US Army Corps of Engineers - Section 404/Section 10 permits (possibly requiring Individual Permit)
- MT Department of Environmental Quality - 318 Authorization
- MT Department of Natural Resource and Conservation - Navigable River Land Use Licenses

A joint application may be used for the above and may be found at the website: http://dnrc.mt.gov/licenses-and-permits/stream-permitting

A copy of the comprehensive application is also included in Appendix A.

Permitting related to river and wetland disturbance is only anticipated for proposed Phase 1 of this project as all other phases do not encroach on the Yellowstone River.

6.5.2 Additional permits

Plans will be submitted to the Montana Department of Environmental Quality for review for approval to construct. Plans will concurrently be sent to the funding agencies or any other authority having jurisdiction. The structures will require a building permit from the state, as well.

The contract documents will require that the contractor secure and gain approval of a Stormwater Storm Water Pollution Prevention Plan (SWPPP), following best management practices (BMPs).

6.6 Engineer's Opinion of Probable Costs and Cost per User

A detailed *engineer's opinion of probable costs* has been presented in Section 5 for Phase 1, which includes several sub-projects (Intake, Pipe Replacement, Booster Station, Storage, Controls and Erosion Control). Costs for the subprojects are given in their respective evaluations in Section 4. These are summarized in the Executive Summary, for both capital costs and net present worth costs. Also included in the Executive Summary and Section 5 are the costs for the six alternatives examined in detail for the intake portion of the project. It should be worth noting that the cost estimating line item for "controls" would include provisions for site security (cameras, lighting, alarms).

Table 6-6 provides a funding plan for Phase 1, which requires a rate increase (see Resolution 2022-R02). Approximately half of the rate increase is due to the cost of implementing a short-lived assets replacement program that has already been initiated by the city at over $94,000 per year.

The final amount of the rate increase will be dependent upon the results of the grants applied for. With the proposed rate increase, the city will easily meet the MDOC Target Rate (making it eligible for MCEP grants and enhance its scoring of ARPA grants), while also aiding in potentially securing more loan forgiveness, if that program is extended. Table 6-6 provides several potential outcomes for the funding of the project, with the preferred plan highlighted in yellow.

The combined cost per user to conduct all debt service O&M and to provide over $94,000 per year for replacement of short-lived assets would be $12.44/EDU/mo. However, in its Resolution #2022-R02, the city began pursuing a rate increase of $14.50, to compensate if some of the grants applied for were not awarded, thus avoiding a second-rate increase.

The preferred funding plan is highlighted in yellow and includes all ARPA funding, including those amounts already available to the city, MCEP, DNRC, Coal Board, and an DWSRF Loan.

It is important to note that the city has a $250,000 cash contribution. This allows work on permitting and engineering to begin quickly while other grants are in review. This is crucial to being able to meet the schedule previously presented.

Table 6-6 Funding Plans with Cost Per User

Forsyth Phase 1 Funding Plan							
loan interest rate =	2.75%			term in years =			20
Total Capital Cost-->	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00	$ 4,603,000.00
Funding Plan	ARPA $2M, DNRC-RRGL Grant, MCEP, Coal Board, $250k City	ARPA $2M, DNRC-RRGL Grant, MCEP, $200K City	ARPA $2M, MCEP, $200K City	ARPA $2M, $250K City	ARPA only	ARPA $2M, MCEP, Coal Board, DNRC, $250K City	Loan, $250k City, Dedicated Funds
ARPA	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	$2,000,000	
Local Fiscal Recover Funds	$428,549	$428,549	$428,549	$428,549	$428,549	$428,549	$428,549
Minimum Alocation Grants	$420,652	$420,652	$420,652	$420,652	$420,652	$420,652	$420,652
Coal Board	$100,000					$100,000	
City Cash	$250,000	$200,000	$200,000	$250,000		$250,000	
DNRC	$125,000	$125,000				$125,000	
MCEP	$500,000	$500,000	$500,000				
LOAN Base	$778,799	$928,799	$1,053,799	$1,503,799	$1,753,799	$1,278,799	$3,753,799
Loan Reserve and Orig Fees	$27,258	$32,508	$36,883	$52,633	$61,383	$44,758	$131,383
Bond Council/Legal	$31,152	$37,152	$42,152	$60,152	$70,152	$51,152	$112,614
Total Loan for Forsyth*	$806,057	$961,307	$1,090,682	$1,556,432	$1,815,182	$1,323,557	$3,885,182
Total Project cost	$4,630,258	$4,635,508	$4,639,883	$4,655,633	$4,664,383	$4,647,758	$4,734,383
Annual Cost Summary:							
Loan Payment	$52,935	$63,131	$71,627	$102,214	$119,206	$86,920	$255,147
Loan Reserve Coverage at 10%	$5,294	$6,313	$7,163	$10,221	$11,921	$8,692	$25,515
Total Increase for Debt Service/yr	$58,229	$69,444	$78,790	$112,435	$131,127	$95,612	$280,661
O&M Change per Year (slight reduction, but add Compressor Power)	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Short-Lived Assets (annual replacement cost)--See Appendix	$94,867	$94,867	$94,867	$94,867	$94,867	$94,867	$94,867
Total annual Increase	**$154,096**	**$165,311**	**$174,657**	**$208,302**	**$226,994**	**$191,479**	**$376,528**
EDUs (assumes slight decrease in paying population)	1032	1032	1032	1032	1032	1032	1032
Cost/EDU/yr	$149	$160	$169	$202	$220	$186	$365
Cost/EDU/mo	**$12.44**	**$13.35**	**$14.10**	**$16.82**	**$18.33**	**$15.46**	**$30.40**
total ARPA Requested	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$2,000,000**	**$0**
ARPA Construction Match	**$2,630,258**	**$2,635,508**	**$2,639,883**	**$2,655,633**	**$2,664,383**	**$2,647,758**	**$3,885,182**
Expended Funds for Project							
Preliminary Engineering Report (PE	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Total ARPA Match	**$2,680,258**	**$2,685,508**	**$2,689,883**	**$2,705,633**	**$2,714,383**	**$2,697,758**	**$3,935,182**
Total Project Cost	**$4,680,258**	**$4,635,508**	**$4,639,883**	**$4,655,633**	**$4,664,383**	**$4,647,758**	**$3,885,182**
Match Contribution Committed as Percen	**57.3%**	**57.9%**	**58.0%**	**58.1%**	**58.2%**	**58.0%**	**101.3%**
Note that DWSRF interest rates are now at 2.5%. Using the more conservative 2.75% does not change match value							

Overall rate increases will need to be reviewed carefully by the Bond Council (also authorized by Resolution #2022-R02) and city.

The term "cost per user" is effectively synonymous with cost per EDU since 1 EDU represents a single residential user connection equivalent.

The funding scenario assumes $125,000 from the DNRC RRGL grant program, plus a $500,000 MCEP grant and $100,000 Coal Board Grant. Given the high impact of lost coal-related jobs in Rosebud County, as documented by the Southeast Montana Development Corporation (SEMC), and the high public health threat, it is believed that the MCEP and Coal Board grants should be especially competitive. Loan forgiveness from the State Revolving Fund would help offset any grants that were not approved but was not included in the above options since it is not a guaranteed program.

Table 6-7 presents a budget with funding layout suggested to maximize the ability to move forward quickly. In that budget, the readily available city contribution is used for initial design engineering and permitting, as well as professional services for grant start-up. Additional funding for the design is designated to come from the SRF loan, which is likely to be available as soon as the new user rates are approved.

Prior to council action to approve new rates, all users must be notified of the proposed changes and a public hearing held. The city's bond council will walk the city through the process to ensure that all actions meet the requirements of the Montana Code Annotated (MCA). Another strategy in funding is to keep the lower contributions limited to a one-time draw during construction, thereby enhancing the efficiency of administration.

Table 6-7 Proposed Budget Distribution - Phase 1

ARPA WATER & SEWER INFRASTRUCTURE GRANT APPLICATION

Table 2. Project Budget

Applicant Entity:	*City of Forsyth*								
Project Title:	*Forsyth Water System Improvements 2022*								
	ARPA - COMPETITIVE GRANT	**ARPA - MINIMUM ALLOCATION GRANT**	**ARPA - LOCAL FISCAL RECOVERY FUNDS**	**Montana Coal Endowment Program (MCEP)**	**Renewable Resource Grant**	**Montana Coal Board**	**State Revolving Fund Loans**	**Local Contribution**	**Total**
Grant Management									$ -
Professional Services				$ 20,000			$ 45,000	$ 10,000	$ 75,000
Legal incl. Bond Council							$ 21,152	$ 10,000	$ 31,152
Audit ***(REQUIRED)***							$ 6,000		$ 6,000
Loan Reserves/fees							$ 27,256		$ 27,256
TOTAL ADMINISTRATION	**$ -**	**$ -**	**$ -**	**$ 20,000**	**$ -**	**$ -**	**$ 99,408**	**$ 20,000**	**$ 139,408**
Project Management									$ -
Preliminary Design									$ -
Equipment									$ -
Final Design							$ 157,000	$ 167,000	$ 324,000
Construction	$ 1,515,000	$ 393,652	$ 402,549	$ 430,000	$ 125,000	$ 100,000	$ 199,649	$ 38,000	$ 3,203,850
Construction MGMT/Eng	$ 250,000	$ 27,000	$ 26,000	$ 50,000			$ 100,000		$ 453,000
Contingency (***REQUIRED***)	$ 235,000						$ 250,000		$ 485,000
Geotech								$ 25,000	$ 25,000
TOTAL ACTIVITY	**$ 2,000,000**	**$ 420,652**	**$ 428,549**	**$ 480,000**	**$ 125,000**	**$ 100,000**	**$ 706,649**	**$ 230,000**	**$ 4,490,850**
TOTAL PROJECT BUDGET	**$ 2,000,000**	**$ 420,652**	**$ 428,549**	**$ 500,000**	**$ 125,000**	**$ 100,000**	**$ 806,057**	**$ 250,000**	**$ 4,630,258**

Note: Permitting Costs are included in Construction Costs. Allocation of Local Contribution towards construction to be used for permitting
Above figures do no include the $50,000 for the PER
See Table ES-5 in the PER for the funding plan.
Financing costs ($27,256 and $31,152) and PER ($50,000) are the difference between the $4,603,000 for Phase 1 (ES-4) and the $4,680,258 in the Funding Plan, Table ES-6

INTERSTATE ENGINEERING

6.7 Annual Operating Budget, Short-Lived Assets and Income

A short-lived assets list, replacement schedule and costs, was prepared by the city and is included in Appendix K. During the development of this list, the city found that it had many mechanical components in need of replacement within the next 10 to 20 years. The city has approved seeking a rate increase that includes the $94,000+ dollars needed to keep the program operational. Funding of the short-lived assets is a crucial line item in the funding plan presented in Table 6-6 under Annual Costs Summary.

Operations and maintenance budgets were previously presented in Section 2 but are repeated below to best satisfy the Uniform PER guidelines.

Table 6-8 Water Revenue Fund Expense, Depreciation, and Income

Water Revenue Fund Expense and Income					
YEAR-->	16/17	17/18	18/19	**19/20**	3-year or 4-year Average
Expense	$ 373,753	$ 407,435	$ 451,629	$ 416,080	
Amt to Dep	$ 21,622	$ 32,916	$ 33,782	$ -	
Net true expended	$ 352,131	$ 374,519	$ 417,847	$ 411,463	**$ 388,990**
Income fr Billing	Not Available	$ 410,322	$ 392,731	$ 424,567	**$ 409,207**
Net Income/(Loss) Before Investment Income	Not Available	$ 35,803	$ (25,116)	$ 13,104	**$ 7,930**
Other Income Sources					
Interest	Not Avail.	Not Avail.	Not Avail.	$ 18,535	
Change in Invest Value	Not Avail.	Not Avail.	Not Avail.	$ 28,081	
Net Change, All Income and Expenses (2019/20 Only)				**$ 59,720**	
See Appendix K for detailed financials					

The average O&M, without including depreciation was $388,900. For planning purposes, it is advised that the city include depreciation, though with the new short-lived assets replacement program many components will already be scheduled for replacement.

Income for the water system is above the O&M costs, and recently the investments have amounted to considerable additional income.

However, as noted in Section 2, when calculating the user rates for improvements and debt service, it is generally best to only consider funds that are produced through billing. Funds from investments will decrease as the city appropriates additional cash for funding the upcoming phases presented in this PER.

6.7.1 Debt Repayment

The water revenue fund currently has no existing debt. Table 6-6, presented earlier, provides annual loan payments for principal and interest (p&i) at $52,935. In addition, a reserve account would be established and annually increased by 10% of the p&i, or $5,293.

6.7.2 Reserve

The city currently has excellent reserves, more than twice the annual operating budget. Reserves are included in the audit excerpts found in Appendix K. As noted previously, Table 6-6 establishes a funding for increasing those reserves based on conversations in the amount of 10% per payment.

The city has demonstrated excellent fiscal responsibility in that its rates have allowed for a strong reserve

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SECTION 7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Clarification of the "Selected Project"

This PER recommends four (4) phases of water system improvements as follows:

Phase 1

- Provide a long-term, **dependable water source** by providing a new intake pipe and renovations to the intake building, along with its pumping and screening system.
- Provide **new controls at the WTP** to provide a long-term solution to management of the water production facility, which is currently in a precarious state since it may be impossible to replace any components that fail as the manufacturer no longer supports that antiquated system.
- Provide a **start of the AC pipe replacement program**, including a critical pipe that leads from the WTP to the distribution system in Oak Street where there is a sharp loss in pressure is experienced. Loss of this pipe would be disastrous to the community as there would be no means of routing water to the community or storage tank. In addition, a problematic section of pipe would be replaced in the NW section of the city.
- Provide a new **booster station with generator** to be installed at the existing booster station site and provide **80,000 gallons in elevated storage**. These improvements will prevent the loss of pressure that is experienced during a power outage. The new system will expand the Upper Zone (higher pressure) to include the Quincer subdivision, which currently can experience pressure drops below the DEQ standard of 35 psi.
- Although not part of Phase 1 specifically, the rate increase associated with Phase 1 also **includes the funding of replacing short-lived assets**. That work will include repair of valves, which will be important for later pipeline replacements by allowing for better isolation of pipe sections. This fund and schedule is presented in the appendix and includes replacement of all mechanical components (pumps, control valves, etc.) appropriately scheduled. Having a fund for continuous replacement program is paramount to a true long-term solution.

Phase 2

- **Improve available fire flow** to the areas surrounding the 1st Ave N – Main St intersection and the distribution corridor leading from the Forsyth Hill storage tank to the Rails Inn (1st Ave S).
- **Replace the sole transmission line (12-inches)** connecting the Forsyth Hill storage tank and the rest of the existing distribution system.
- **Rehabilitate the interior integrity** of the Forsyth Hill storage tank with a polyurethane lining.
- **Addition of a submersible tank mixer** to the Forsyth Hill storage tank.
- **Improve access route to the existing storage tank** by regrading and adding surface course material to the existing access road while improving surface water drainage and repairing erosion damage within the travel way.

Phase 3

- Continue **replacement and upsizing of distribution piping** within the system. Specifically, upsizing existing 4-inch AC pipe along 4th, 5th, and 6th Avenue N with 8-inch PVC.
- Establish an additional fire hydrant from the existing 12-inch distribution line at 17th Ave and Cedar St to **improve available fire flow** in the area.

Phase 4

- **Replacement of all remaining AC distribution piping**, existing hydrants and associated appurtenances. This will likely be subdivided into additional phases due to cost.

7.2 Public Participation

Section 1.5, presented earlier, discusses planning efforts to date by the city, especially in water and wastewater.

The city has committed to pursuing the grants discussed in this PER, as well as a loan through the DWSRF program. The same resolution, authorizing the grant applications and use of existing ARPA funding, includes authorization to contract with Bond Council and seek a rate increase of $14.50 per month/EDU. The Council is currently scheduling those hearings and notifications and will coordinate all work towards the hearings, notifications and loans through bond council. See Appendix K for Resolution #2022-R02.

Information will be added herein regarding relevant public hearings. Hearing minutes and affidavits of publication and pertinent resolutions should be added to the appendix as the funding process continues.

7.3 Unresolved Issues and Phasing

All phasing has been discussed extensively in Section 7.1 and throughout Section 6.

Phase 4, due to its large scope, will be completed incrementally as funding and construction capabilities allow. Being that Phases 1 through 3 must be completed before Phase 4 commences and Phase 4 will take multiple construction seasons to complete, the detailed planning of Phase 4 will be completed at a later date.

Applicable permitting will be completed during the full design process of each phase individually. Construction permitting has not been addressed for any phase of this project and must be submitted after project designs are completed.

The land transfer agreement has been agreed upon, but not finalized, between Rosebud County and the city of Forsyth regarding the property required for the additional storage tank to be constructed as part of Phase 1. The 2009 Memorandum of Understanding between the county and city alleviate concerns of a "roadblock" developing during the completion of this land transfer later (Appendix F).

7.4 Land

The intake project will require several permits for work in the Yellowstone River. See the preceding paragraph regarding the water storage tank site. All other work is planned to be within existing city Right-of-Ways.

7.5 Other Funding Source Considerations

The funding options most closely examined in this PER are the Drinking Water State Revolving fund for loans, the Montana Coal Endowment Program, the DNRC Renewable Resource Grants and Loans (DNRC) program, the Coal Board and all ARPA-related grants. These are presented earlier, with detailed costs, in Table 6-7.

Another source that could be considered for similar projects is the USDA Rural Development Program (RD). It was not included in the proposed package as it is anticipated that the loan forgiveness from the DWSRF program and the loan interest rate would be more favorable than available through RD.

The Community Development Block Grant program (CDBG) is often another excellent source, but requires that the community be 51% low-to-moderate income (LMI), but the ACS estimates find that Forsyth does not meet that requirement.

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APPENDIX A ENVIRONMENTAL REVIEWS, SOILS AND MAPS

- AGENCY LETTERS AND RESPONSES
- Permitting and Joint Application
- Environmental Review Form
- Environmental Review Checklist
    - Cultural Resource Inventory
    - Grouse Habitat
    - Species of Concern
    - Leaking Underground Storage Tank (LUST) Sites
    - Land Cover and Geology
    - Wetlands
- SOILS MAPS

APPENDIX B CAPITAL COST ESTIMATES AND NPV

- Discount Rate Information and Guidance
- Cost Indexing

APPENDIX C PUBLIC PARTICIPATION DOCUMENTATION

- Public Hearing Presentation, Agenda and Meeting Minutes
- Advertising for Public Hearings
- Resolution to Adopt the PER
- SEMDC Correspondence

APPENDIX D FLOODPLAIN MAPPING (FIRM MAPS)

FEMA FIRM MAP (UNMAPPED)

APPENDIX E COST SUPPORTING DOCUMENTATION

APPENDIX F FIGURES AND TABLES FROM THE 2009 WATER PER

LAND TRANSFER MEMORANDUM OF UNDERSTANDING
ALTERNATIVES ANALYSIS – BPS AND ELEVATED TANK

APPENDIX G ADDITIONAL WATER SYSTEM MATERIALS

APPENDIX H SANITARY SURVEY 2019

2016 INDEPENDENT TANK INSPECTION
2021 INDEPENDENT TANK INSPECTION
2019 SANITARY SURVEY

APPENDIX I CENSUS DATA FOR POPULATIONS, MHI AND TARGET RATES

APPENDIX J PLANS OF INTAKE

APPENDIX K CITY FINANCIALS

- Last Three Years of Budgets including Last Three Years of Revenue vs Expenses
- Audit Excerpts Including a Summary of All Funds On-Hand and Invested
- Resolution for Establishment of Current Water Rates
- Resolution for Establishment of Current Sewer Rates
- Short-Lived Assets Inventory, Costs and Scheduling

APPENDIX L EXCERPTS FROM PLANNING DOCUMENTS

APPENDIX M FIBER OPTIC LINE LOCATIONS

APPENDIX N RIVER MORPHOLOGY

MAPS AND AERIAL PHOTOGRAPHY SINCE 1968

Montana Coal Board
Draft Meeting Minutes
December 12, 2024
Billings, MT

<u>Roll Call of Board Members:</u>

Hal Fuglevand - Absent
Pat Lorello - Present
Tim Schaff - Present
Jon Wells - Present
Catherine Laughner - Present
Sandra Jones - Present
Sandy Tutvedt - Present

<u>Montana Department of Commerce Staff Present:</u>

Becky Anseth, Infrastructure Manager
Rachel Young, Administrative Officer
Anita Proul, Executive Assistant

<u>Public Present:</u>

John Williams, Mayor of Colstrip
Ed Joiner, Rosebud Co Commissioner
Representative Gary Parry, HD 35
Mike Goffena, Musselshell Co Commissioner
Sig Pugrud, Petroleum Co Commissioner
Kathy Thompson, Stahly Engineering
George Real Bird III, Big Horn Co Commissioner
Ruth Baue, Treasure Co Commissioner
Nicole Hanson, Superintendent Lavina Pub School
Jim Atchison, SEMDC
Julie Emmons Stoddard, SEMDC
Theresa Doumitt, Project Manager
Tobin Novasio, Superintendent Hardin Pub Schools
Robie Culver, Stahly Engineering
AJ Espinoza, Road Superintendent Big Horn Co
Ruth Baker, Treasure Co Commissioner
Robert Lee, Rosebud Co Commissioner
Duane Ankney, Colstrip

<u>Call Meeting to Order</u>

0:19 Chair Wells called the meeting to order at 8:30 a.m.

0:53 Ms. Young called the roll for Board members

<u>Commerce Updates</u>

01:24 Presenter: Ms. Young

<u>Opportunity for Public Comment</u>

03:09 Chair Wells asked for any public comments on items not on the agenda, but within the Board's jurisdiction: None provided.

<u>Budget Update</u>

Cash Activity Detail – page 4 of binder

03:24 Presenter: Ms. Young

<u>Project Updates</u>

Open and Closed project status – page 6 of binder

04:54 Presenter: Ms. Young

New Applications

#1002 – Rosebud County – Test and Training Site Feasibility Study – page 9 of binder
0:08:18 Presenter: Ms. Young

#1003 – Musselshell County – Wier Building Revitalization Project – page 38 of binder
0:21:15 Presenter: Ms. Young

#1004 – Hardin Public Schools – Boiler Replacement Project – page 771 of binder
0:40:08 Presenter: Ms. Young

#1005 – City of Colstrip – Construction of Business Innovation Center – page 843 of binder
0:48:07 Presenter: Ms. Young

#1006 – Petroleum County – HVAC System County Courthouse Renovation – page 877 of binder
1:06:44 Presenter: Ms. Young

#1007 – Big Horn County – Sarpy Road Resurfacing Project – page 1186 of binder
1:22:34 Presenter: Ms. Young

#1008 – Big Horn County – Growth Policy Update – page 1438 of binder
1:34:40 Presenter: Ms. Young

#1009 – Treasure County – Firehall Remodel and Roof Replacement Project – page 1472 of binder
1:37:48 Presenter: Ms. Young

Board Action Items:

Approval of Minutes

September 12, 2024, MT Coal Board Meeting Minutes – page 1513 of binder
1:51:55 Motion: Ms. Jones – approve minutes
Second: Vice-Chair Schaff
Ms. Young called for a vote: all yes. Motion Passed.

Grant Updates

#0946 – City of Colstrip – Extension Request North End Water Loop Project – page 1517 of binder
1:52:51 Motion: Vice-Chair Schaff – approve extension request to December 2025
Second: Ms. Laughner
Ms. Young called for a vote: all yes. Motion Passed.

#0947 – Rosebud County – Extension Request for Ambulance/Extraction Equipment Purchase – page 1518 of binder
1:54:05 Motion: Vice-Chair Schaff – approve extension to March 31, 2025
Second: Ms. Jones
Ms. Young called for a vote: all yes. Motion Passed.

#0957 – Big Horn County – Extension Request for Equipment Purchase for Big Horn Co. Rural Fire Department – page 1519 of binder

1:56:08 Motion: Vice-Chair Schaff – approve extension to September 30, 2025
Second: Ms. Laughner
Ms. Young called for a vote: all yes. Motion Passed.

#0963 – Lavina Public Schools – Extension Request for Replacement of Lavina School Boiler – page 1520 of binder

1:58:48 Motion: Ms. Jones – approve extension to March 31, 2025
Second: Vice-Chair Schaff
Ms. Young called for a vote: all yes. Motion Passed.

Board Action on Grant Applications

#1002 – Rosebud County – Test and Training Site Feasibility Study – page 9 of binder

2:00:50 Motion: Mr. Lorello – fund full amount, $35,000
Second: Ms. Jones
Ms. Young called for a vote: all yes except Ms. Laughner. Motion Passed.

#1003 – Musselshell County – Wier Building Revitalization Project – page 38 of binder

2:02:07 Motion: Vice-Chair Schaff – fund $182,000
Second: Ms. Laughner
Ms. Young called for a vote: all yes except Chair Wells and Ms. Jones abstained. Motion Passed.

#1004 – Hardin Public Schools – Boiler Replacement Project – page 771 of binder

2:03:51 Motion: Ms. Laughner – fund full amount, $750,000
Second: Mr. Lorello
Ms. Young called for a vote: all yes except Ms. Jones and Ms. Tutvedt, Chair Wells abstained. Motion Passed.

#1005 – City of Colstrip – Construction of Business Innovation Center – page 843 of binder

2:05:10 Motion: Chair Wells – deny application
Second: Ms. Laughner
Ms. Young called for a vote: all yes except Ms. Jones and Vice-Chair Schaff. Motion Passed.

#1006 – Petroleum County – HVAC System County Courthouse Renovation – page 877 of binder

2:10:07 Motion: Ms. Jones – fund $50,000
Second: Mr. Lorello
Ms. Young called for a vote: Yes – Ms. Laughner, Mr. Lorello, Ms. Jones; No – Vice-Chair Schaff, Ms. Tutvedt, Chair Wells. Tie Vote, motion died.

#1007 – Big Horn County – Sarpy Road Resurfacing Project – page 1186 of binder

2:11:36 Motion: Mr. Lorello – deny application
Second: Vice-Chair Schaff
Ms. Young called for a vote: all yes. Motion Passed.

#1008 – Big Horn County – Growth Policy Update – page 1438 of binder

2:12:48 Motion: Vice-Chair Schaff – fund full amount, $37,500
Second: Mr. Lorello
Ms. Young called for a vote: all yes except Ms. Laughner and Ms. Jones. Motion Passed.

#1009 – Treasure County – Firehall Remodel and Roof Replacement Project – page 1472 of binder

2:14:00 Motion: Ms. Jones – award $100,000
Second: Vice-Chair Schaff
Ms. Young called for a vote: all yes. Motion Passed.

Opportunity for Public Comment

2:15:40 Chair Wells opened the meeting for any public comment:
John Williams, Mayor Colstrip
Ruth Baue, Treasure County Commissioner
Sig Pugrud, Petroleum County Commissioner
George Real Bird III, Big Horn County Commissioner
Mike Turley, Musselshell County Commissioner
Robert Pankratz, Musselshell County Commissioner
Tobin Novasio, Superintendent Hardin Pub Schools
Jim Atchison, SEMDC

Board Matters

Confirmation of next meeting dates and location

2:24:10 Presenter: Ms. Young

Adjournment

2:26:46 Meeting adjourned at 11:12 a.m.