



October 19, 2026

7:00 PM

AGENDA

Compliance with Open Meetings Act - *in accordance with Section 84-1412 sub section eight (8) of the Reissue Revised State Statutes of the State of Nebraska 1943, as amended, one copy of all reproducible written material to be discussed is available to the public at this meeting for examination and copying.*
Persons wishing to address the Governing Body as an agenda item shall wait to be identified by the Mayor/Presiding Officer; then, after stating their name and address for the record, may proceed to speak. No person, other than the Council and the person having the floor will be permitted to enter any discussion without the permission of the Presiding Officer. Remarks shall be limited to five minutes unless extended or limited by the Presiding Officer (Res. 2011-18, copy in book)

1. **Roll Call**
2. **Call to Order**

Compliance with Open Meetings Act – In accordance with Section 84-1412 sub section eight (8) of the Reissue Revised State Statutes of the State of Nebraska 1943, as amended, one copy of all reproducible written material to be discussed is available to the public at this meeting for examination and copying. Persons wishing to address the Governing Body on an agenda item shall wait to be identified by the Mayor/Presiding Officer; then, after stating their name and address for the record, may proceed to speak. No person, other than the Council and the person having the floor will be permitted to enter any discussion without the permission of the Presiding Officer. Remarks shall be limited to five minutes unless extended or limited by the Presiding Officer (Res. 2011-18, copy in book)

***Please silence your phones and other devices during the meeting.**

3. **Inform the public about the location of the Open Meetings Act in the Council Chambers and its accessibility to members of the public**
4. **Pledge of Allegiance**
5. **Consent Agenda**
 - 5.a. Approval of the minutes of the City Council budget hearing on Monday, September 28th
 - 5.b. Approval of the minutes of the City Council special meeting on Monday, September 28th
 - 5.c. Approval of the Treasurers Report for September
 - 5.d. Acceptance of the minutes of the Park Committee meeting on Thursday, October 1st
 - 5.e. Acceptance of the minutes of the Enhancement Committee meeting on Monday, September 28th
 - 5.f. Acceptance of the minutes of the Christmas in Calhoun meeting on Wednesday, October 14th
 - 5.g. Maintenance Report
 - 5.h. Washington County Sheriff's Statistics Report
6. **Consideration of items removed from the consent agenda if any**
7. **Bills presented for payment for October**
Public Hearing:
8. **In accordance with the published notice, it is now time to conduct the public hearing relative to hearing support, opposition, criticism, suggestions, or observations relating to THE ONE & SIX YEAR STREET PLAN FOR THE CITY OF FORT CALHOUN**

Open: _____

- **Written Comments**

- **Public Comments**

9. **Close:** _____

Presentations/guests/SDL & special requests:

10. **Lori Lammers, Enhancement Committee, request to close 15th Street at West Market Square Park on October 31st from 4:30 to 7:30 for the annual Trunk-or-Treat event**

Unfinished Business:

11. **City Engineer**

11.a. Review and approve the Fort Calhoun Force Main Hydrogen Sulfide (H₂S) Control Alternatives Evaluation developed by Embris Group

11.b. Discuss and consider next steps in regards to the recommendations from Embris Group for the H₂S Control Alternatives

Introduction of ordinances and resolutions; first, second and third readings as required:

12. **Resolution 2026-12 Adoption of the 1 & 6 Plan**

New Business:

13. **Set dates for open burn**

***Note, a BURN PERMIT will be required during this time through the Fort Calhoun Fire Department**

Motion for Adjournment:

14. **Motion_____ Second_____**
Time: _____

SEPTEMBER 28, 2026 BUDGET HEARING MINUTES

A regular meeting of the City Council of the City of Fort Calhoun, Nebraska, was held in open and public session at 6:30, on Monday, September 28, 2026, at the Fort Calhoun Council Chamber, 110 S 14th St, in Fort Calhoun, Nebraska.

Notice of the meeting was given in advance thereof by publication, said form of notice being a designated method for giving notice, an affidavit of publication being attached to these minutes.

Advance notice of this meeting was also given to the Mayor and all Council Members. The availability of the agenda was communicated in the advance notice and in the notice to the Mayor and Council Members.

In accordance with Section 84-1412 sub section eight (8) of the Reissue Revised State Statutes of the State of Nebraska 1943, as amended, one copy of all reproducible written material to be discussed is available to the public at this meeting for examination and copying.

Mayor Robinson stated persons wishing to address the Governing Body on an agenda item shall wait to be identified by the Presiding Officer; then, after stating their name and address for the record, may proceed to speak. No person, other than the Council and the person having the floor will be permitted to enter any discussion without the permission of the Presiding Officer. Remarks shall be limited to five minutes unless extended or limited and repetitive or cumulative remarks may be limited or excluded by the Presiding Officer.

Please note that the meeting minutes are not approved until the next regular City Council meeting.

On roll call, the following Council Members answered present: Kris Richardson, Bob Prieksat, and Nick Schuler. Member John Kelly was absent.

Mayor Robinson publicly stated to all in attendance that a current copy of the Nebraska Open Meetings Act was available for review and indicated the location of such copy in the room where the meeting was being held.

Mayor Robinson led those present in the Pledge of Allegiance.

With a quorum present, Mayor Robinson presided, and the clerk recorded the proceedings.

At 6:32 p.m., Mayor Robinson stated in compliance with the provisions state statute section 77-1601.02, it was now time to conduct the public hearing relating HEARING SUPPORT, OPPOSITION, CRITICISM, SUGGESTIONS OR OBSERVATIONS OF TAXPAYERS RELATING TO THE PROPOSED FISCAL YEAR 2026-2027 BUDGET

2024-2025 Actual Disbursements & Transfers	\$ 3,332,681.65
2025-2026 Estimated Disbursements & Transfers	\$ 2,943,476.70
2026-2027 Proposed Budget of Disbursements & Transfers	\$ 3,118,280.01
2026-2027 Necessary Cash Reserve	\$ 2,355,146.00
2026-2027 Total Resources Available	\$ 5,473,426.01
Total 2026-2027 Personal & Real Property Tax Requirement	\$ 715,813.09
Unused Budget Authority Created for Next Year	\$ 35,766.37

Breakdown Of Property Tax:

Personal and Real Property Tax Required for Non-Bond Purposes	\$ 500,813.09
Personal and Real Property Tax Required for Bonds	\$ 215,000.00

With there being no public comments, questions or discussion, Mayor Robinson declared the public hearing closed at 6:33 p.m.

Following a motion and vote, Mayor Robinson declared the meeting adjourned at 6:33 p.m.

Mitch Robinson, Mayor

ATTEST: Katie Knight, City Treasurer

SEPTEMBER 28, 2026 CITY COUNCIL MINUTES

A regular meeting of the City Council of the City of Fort Calhoun, Nebraska, was held in open and public session at 6:34, on Monday, September 28, 2026, at the Fort Calhoun Council Chamber, 110 S 14th St, in Fort Calhoun, Nebraska.

Notice of the meeting was given in advance thereof by publication, said form of notice being a designated method for giving notice, an affidavit of publication being attached to these minutes.

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Mayor Robinson publicly stated to all in attendance that a current copy of the Nebraska Open Meetings Act was available for review and indicated the location of such copy in the room where the meeting was being held.

Mayor Robinson led those present in the Pledge of Allegiance.

With a quorum present, Mayor Robinson presided, and the clerk recorded the proceedings.

At 6:36 p.m., Mayor Robinson stated in compliance with the provisions in State Statute Section 77-1601.02, it was now time to conduct the public hearing relating relative to hearing support, opposition, criticism, suggestions or observations of taxpayers relating to setting the final tax request at a different amount than the prior year tax request (levy):

	<u>2025</u>	<u>2026</u>	<u>Change</u>
Operating Budget	3,377,319.00	3,118,280.01	- 8%
Property Tax Request	\$ 694,093.09	\$ 715,813.09	3%
Valuation	135,963,837	144,032,325	6%
Tax Rate	0.510498	0.496981	- 3%
Tax Rate if Prior Tax Request was at Current Valuation	0.481901		

With there being no public comments, questions or discussion, Mayor Robinson declared the public hearing closed at 6:36 p.m.

Member Priksat introduced Resolution 2026-11 Approving the 2026-2027 Budget and moved for its passage and adoption. Member Richardson seconded the motion. On roll call the following voted "Aye": Richardson, Priksat, and Schuler. The passage and adoption of said Resolution having been concurred by most of all members of the Council, the Mayor declared the Resolution adopted and, in the presence of the Council, signed and approved the Resolution and the Clerk attested the passage and approval of the same and affixed her signature thereto.

RESOLUTION SETTING THE PROPERTY TAX REQUEST
RESOLUTION NO. 2026-11

WHEREAS, Nebraska Revised Statute 77-1632 and 77-1633 provides that the Governing Body of the City of Fort Calhoun passes by a majority vote a resolution or ordinance setting the tax request; and

WHEREAS, a special public hearing was held as required by law to hear and consider comments concerning the property tax request;

NOW, THEREFORE, the Governing Body of the City of Fort Calhoun resolves that:

I. The 2026-2027 property tax request be set at:

General Fund: \$ 500,813.09

Bond Fund: \$ 215,000.00

2. The total assessed value of property differs from last year's total assessed value by 5.93 percent.

3. The tax rate which would levy the same amount of property taxes as last year, when multiplied by the new total assessed value of property would be 0.481901 per \$100 of assessed value.

4. The City of Fort Calhoun proposes to adopt a property tax request that will cause its tax rate to be 0.496981 per \$100 of assessed value.

5. Based on the proposed property tax request and changes in other revenue, the total operating budget of the City of Fort Calhoun will increase (or decrease) last year's budget by -7.67 percent.

6. A copy of this resolution be certified and forwarded to the County Clerk on or before October 15, 2026.

Member Prieksat made a motion seconded by member Richardson to approve the 2026-2028 Law Enforcement Contract between Washington County and the City of Fort Calhoun. The total contract increases \$150 a month. With members Sculer, Prieksat, and Richardson voting "Aye", motion carried.

Member Prieksat made a motion seconded by member Schuler to approve the recommendation to hire Westin Buckley for the Public Works & Utilities Worker position. With members Richardson, Schuler, and Prieksat voting "Aye", motion carried.

Mayor Robinson made the following declaration regarding political signs:

OFFICIAL NOTIFICATION

CITY OF FORT CALHOUN DECLARATION

Due to recent changes in State and County Regulations related to Political Signage, the City of Fort Calhoun wants to provide open access to political signs before the upcoming general election in November. By this Declaration, Fort Calhoun stays (temporarily stops) enforcement of Article 8: Sign Regulation Section 8.05.09 as it relates to political signs for the remainder of 2026. This 28th day of September 2026.

Following a motion and vote, Mayor Robinson declared the meeting adjourned at 6:43 p.m.

Mitch Robinson, Mayor

ATTEST: Katie Knight, City Treasure

For the period ending: 9/30/2026

Fund Report

<u>Description</u>	<u>Beginning Balance</u>	<u>Revenues</u>	<u>Expenses</u>	<u>Ending Balance</u>
General	1,453,340.06	167,020.34	28,004.92	1,592,355.48
Local Sales Tax	463,092.81	27,801.66	0.00	490,894.47
Street	217,538.81	25,852.86	29,771.42	213,620.25
Police	-703,268.63	0.00	8,159.18	-711,427.81
Fire	0.00	0.00	0.00	0.00
Building	112,738.06	0.00	0.00	112,738.06
Parks	-402,805.38	25.00	3,478.16	-406,258.54
Park Board	32,312.00	0.00	0.00	32,312.00
Water	463,380.41	41,342.20	35,407.15	469,315.46
Sewer	594,332.90	44,542.66	17,335.02	621,540.54
Sewer Sinking	13,503.61	0.00	0.00	13,503.61
Lottery	149,832.65	1,194.55	0.00	151,027.20
Bond Retirement	153,801.40	69,106.53	0.00	222,907.93
Enhancement	2,660.86	0.00	0.00	2,660.86
Christmas in Calhoun	5,621.49	850.00	0.00	6,471.49
Adams St Plz Events	12,207.76	0.00	296.20	11,911.56
Total All Funds	2,568,288.81	377,735.80	122,452.05	2,823,572.56

Date Range

Starting: 9/1/2026

Ending: 9/30/2026

**City of Fort Calhoun
Parks Board
October 1, 2026 6:00 P.M.
Meeting Minutes**

1. Sara Ruthven called the meeting to order at 6:03 PM.
2. Sara announced the Open Meeting Compliance Act.
3. Board members Sara Ruthven, Jane Prieksat, Bob Lammers, Amber Pierce, and Parks Commissioner Kris Richardson were all in attendance. Larry Pringle, Karli Johnson, and James Totten were absent.
4. Approval of August Meeting Minutes moved by Bob, seconded by Jane. All voted in favor to approve.

New Business

5. Review of 2026 Projects
 - a. Pioneer Park Trail Artwork - Sara will continue to coordinate progress as weather permits.
 - b. The board would like to see the pickleball net remain until weather makes it unusable and then have it stored for the winter.
6. 2027 Outlook and Project Discussion
 - a. The board will look to pursue more tree grants as new trail construction progresses.
 - b. Privacy options for the Pioneer Park pavilion are to be explored more in early 2027.

Next scheduled Board meeting will be on February 4, 2027 at 6pm.

Adjournment:

Meeting adjournment motioned by Bob at 6:55 PM, seconded by Amber. All voted in favor to approve.

Fort Calhoun Enhancement Committee
Fort Calhoun Library
Monday, September 28, 2026 6:00pm
MINUTES

Call to Order: by Judy Boyd at 5:45pm
Announcement of Open Meeting Compliance

Present: Judy Boyd, Beth Dieteman, Nicole Fangman, Jackie Henderson,
Lori Lammers, Lynn Teeter, Rose Therkildsen

Absent: Amanda Donahoe

Minutes: Beth moved to approve the minutes from the August 31, 2026 meeting; minutes approved.

Financial Report: \$2,660.86 balance. Will have expenses for Trunk-or-Treat in October.

OLD BUSINESS

Halloween Trunk-or-Treat:

- Hot dogs and buns – purchase 300 hot dogs and buns
- Cocoa -- one more cocoa needed
- Condiments, napkins, cups – purchase condiments and napkins; have cups
- Roasters – Beth and Lynn (may need a third roaster)
- Coffee Pot – have 100 cup, Lori and Nicole will also bring coffee pots
- Drop cords, table covers, – Judy has items, others also bring drop cords
- Miscellaneous -- Large foil for roasters, gloves, clean up items
- Set up time – 4:00pm

Request City Council close 15th Street in front of Market Square Park on Halloween night and ask to include the flyer in Thursday's school packet - Lori

Fall clean-up -- after the first frost in mid-October

Suverkubbe Memorial cleanup will be done during the week of October 4, weather permitting
Move flowerpots to storage after the first frost.

Trees – winter care will include pruning the trees for height in late winter and spraying for bag worms in early spring.

Landscaping for City Hall – table until January

Christmas in Calhoun – December 12, plans are in progress

Meetings are 3rd Wednesday of the month, 6:30pm at the Longhorn

Next meeting: Monday, October 26, 2026, 6:00pm in the Fort Calhoun Library.

Adjourn: Jackie moved to adjourn the meeting; Lynn seconded. Meeting adjourned at 6:15pm.
Submitted by Lori Lammers

christmas IN CALHOUN

Wednesday, October 14, 2026

Meeting Minutes

Longhorn, 6:30 P.M.

Call to Order at 6:38 pm Open meeting announcement.

Present: Jenna Hadaway, Carson Pane, Alicia Koziol, Tim Nelson, Coleene Robinson, Mitch Robinson, Kevin Wilis, Kathy Preister, Judy Boyd, Rosie Therkildsen

Financial Report: \$6,954.28

Parade of Lights – Saturday, November 28, 2026

- Big gift sponsor? – Jenna will reach out to Ruthven's/Peitzmeier Demo

Tree Lighting – Saturday, November 28, 2026

- Gazebo & Christmas Tree
- Program – Start sending info out at beginning of November

Traveling Grinch – Saturday, November 28, 2026 – Wednesday, December 23, 2026

- Light-up donation tree
- Ideas for getting it moved around more – Deb suggested putting it out at the corners of streets for people to donate; other suggestions/ideas were to put it at the school(s) for a couple days to give teachers/families that don't live in town a chance to donate
- Mitch recommended having the check written out to the food pantry rather than the City of Fort Calhoun

Christmas in Calhoun – Saturday, December 12, 2026

- Business / Organization Events & Activities – Two businesses signed up so far; Kathy Preister is planning a Kids Scavenger Hunt during the day at the different businesses; Alicia will check with Northern Lights about Gingerbread House Contest
- Publicity Planning
- Donations: \$1,650.00 currently

Adult Scavenger Hunt

- "Christmas in Vegas"
- Need location – Possibly hold it at the Maintenance Building? Otherwise The Fort Bar

Public Comments

- Some e-mail addresses need to be added/updated – Alicia will let Katie know

Next meeting will be November 18, 2026 at 6:30 pm at the Longhorn.

Meeting adjourned at 7:23 pm.

Submitted by Alicia Koziol

City of Fort Calhoun

Field Operations Report

Reporting Period: September 18, 2026 – October 15, 2026

288 Total Hours	192 Activities	2 Personnel	8 Departments
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Executive Summary

Analysis Overview

From September 18, 2026 to October 15, 2026, City of Fort Calhoun field staff logged 192 activities totaling 288 hours. The busiest areas were Parks (97.5 hours across 66 activities), followed by Time Off (81 hours, 20 activities), Water (42.5 hours, 31 activities), and Sewer (28 hours, 31 activities), with another 26.5 hours recorded under general “All” work. Tim Nelson led activity volume with 152 hours across 130 activities, and Dan Kougias logged 136 hours across 62 activities, together accounting for all recorded work.

Crews focused heavily on day-to-day maintenance and operational support work. Tim Nelson handled shop and system tasks including working in the shop during rain delays (360 minutes), researching a new welder for the shop (120 minutes), checking manholes for water infiltration (60 minutes), and making a trip to Blair for sewer locates (180 minutes). On the water side, Nelson also completed tasks such as water reading on 14th Street (30 minutes) and processing incoming water meters (30–60 minutes), while in parks he performed park checks (60 minutes). Dan Kougias supported operations with extended shop time—stocking shelves and sweeping the floor (300 minutes)—and performed parks rounds including splash pad plaza checks and trash checks (60 minutes) and Pioneer Park checks and trash checks (60 minutes); he also completed wastewater checks and operations (60 minutes) and conducted MIG welder research for the shop (120 minutes).

No code enforcement inspections were recorded, and no inspection findings or violations were documented. Utility operations were concentrated on sewer monitoring: 24 sewage utility readings were logged, including multiple manual entry readings by Dan Kougias (e.g., 5213299, 4997019, 4834805, 4676497, and 4539621). Water and sewer support work also included field locating activity, such as Kougias's trip to Blair to locate a sewer line and locate utilities in town (180 minutes) and Nelson's sewer locate trip noted above.

Several issues were flagged that may require follow-up and scheduling. Streets equipment needs included a flat tire on the skid loader that had to be removed and taken to Blair for repair, plus a separate trip to Blair to pick up a repaired tire. On the water system side, staff noted the need to repair and reset a damaged fire hydrant barrel in front of the bank following an earlier accident; completing that repair should remain a near-term priority to restore full hydrant reliability at that location.

Key Findings

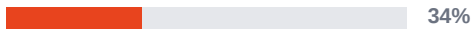
- 192 field activities recorded across 8 departments
- 2 personnel logged 288 total work hours
- 168 maintenance reports filed
- 0 code enforcement inspections
- 24 utility readings completed

Department Performance

Resource Allocation & Operational Outcomes

Parks

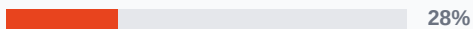
97.5h worked • 34% of total effort



Parks crews spent most of their 97.5 hours (66 activities) mowing and doing routine park checks—Tim Nelson mowed city hall and other areas and kept up on general park inspections. Dan Kougias handled repeated splash pad plaza and Pioneer Park checks with trash pickup, plus mowing at Pioneer Park, West Market Park, the trail, the splash pad area, and along Clark St. Ballfield work stayed busy too: Tim took care of ball diamond trash and bathrooms, and Dan did ballfield checks, emptied trash, and prepped the field for a game. They also watered new grass in the parks, and Dan made a run to push up the tree dump.

Time Off

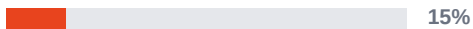
81h worked • 28% of total effort



Time Off crews spent most of their time on sick leave and comp time. Dan Kougias logged 8 hours of sick time used on 10/1. Tim Nelson took 1 hour of comp time each on 10/6, 10/8, 10/13, and 10/14. That's all that showed up in the logs provided for the 81 hours/20 activities.

Water

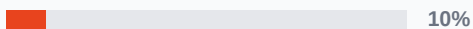
42.5h worked • 15% of total effort



Water crews spent most of their time on hydrant repair and line locating—Tim Nelson and Dan Kougias both worked on fixing/resetting the fire hydrant barrel by the bank after the accident, and they also did multiple rounds of locating and marking water lines. Tim handled a steady stream of detailed water readings (including 14th St) and processed incoming water meters on several days. Tim also knocked out the state water survey paperwork and met with Chris Brader about the rate study. Dan made a trip to Blair to locate a sewer line and check other utilities in town.

Sewer

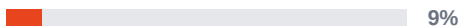
28h worked • 10% of total effort



Sewer crews spent most of their 28 hours on routine wastewater checks and plant operations—Dan Kougias handled those daily check runs throughout the week. Tim Nelson focused on the collection system, including sewer meter readings, pumphouse checks, and checking manholes for water infiltration and plugs. Tim also cleaned the wet well at the wastewater pumphouse and made multiple trips to Blair for sewer locates.

All

26.5h worked • 9% of total effort



All crews spent most of their logged time in the shop because of rain, with Tim Nelson putting in 6 hours indoors on 10/15. Tim also did 2 hours of research on a new welder for the shop on 10/14. Earlier in the month, Tim replaced the air compressor pressure switch (1.5 hours on 10/5). Only these three Tim Nelson maintenance entries were provided here (9.5 hours total), even though the header notes 26.5 hours across 13 activities.

Streets	12.5h worked • 4% of total effort
4% Streets crews spent most of their time dealing with a flat tire on the skid loader and related shop upkeep. Dan Kougias pulled the skid loader tire, hauled it to Blair for repair (with a stop at Bomgaars), and later made another trip to Blair to pick up the repaired tire. Tim Nelson also helped by removing the flat tire from the skid loader. Back at the shop, Dan stocked shelves, swept the floor, and did some research on MIG welder options for the shop.	
Utility Tracking	0h worked • 0% of total effort
0% Utility Tracking crews spent most of their time on sewage reading manual entries. Dan Kougias logged readings almost daily from 10/5 through 10/15 (including 10/6–10/9 and 10/11–10/15). Tim Nelson handled the earlier set of manual sewage readings from 9/23 through 10/3 (9/23–9/26, 9/28–10/2, and 10/3). No labor hours were recorded on these entries, but the work logged was all manual sewage meter/reading updates.	
Code Enforcement	0h worked • 0% of total effort
0% Code Enforcement crews spent most of their time with no work logged this cycle—0 hours and 0 activities recorded. There weren't any detailed notes to pull specific tasks from, so nothing like inspections, notices, or follow-ups was documented. No staff names were included in the logs, so I can't say who handled what. If you send even a quick note of what happened and who was on duty, I can turn it into a proper summary.	

Personnel Analysis

Individual Performance & Work Distribution

1. Tim Nelson

152h / 288h (53%)

Put in 152 hours, with a mix of water, parks, sewer, and shop time—did water readings (including a detailed read and 14th St), handled incoming water meters, and did water locating plus a rate-study meeting with Chris Brader. Spent a lot of time on parks work like park checks, mowing (including City Hall), watering new grass, and cleaning up the ball diamonds (trash and bathrooms). Also checked sewer manholes for infiltration, made a trip to Blair for sewer locates, researched a new welder for the shop, and even pulled a flat tire off the skid loader (with a bit of comp time mixed in).

2. Dan Kougias

136h / 288h (47%)

Dan Kougias logged 136 hours, with a lot of it spent on parks work—mowing Pioneer Park/West Market Park and the trail/splash pad/Clark St areas, doing regular splash pad plaza and Pioneer Park trash checks, watering new grass, and checking the ballfield (including prep for a game). He also handled routine wastewater plant checks/operations on several days and took a trip to Blair to help locate a sewer line/utilities (and another trip to pick up a repaired tire). Mixed in some shop time stocking shelves and sweeping, plus researching MIG welders for the shop.

Strategic Insights

Risk, Cost, Capacity & Leadership Actions

1. Equipment Tire Failures Repeating

You had two separate streets entries tied to the skid loader tire ("flat tire on skid loader" plus a second "trip to Blair, pick up repaired tire"), which is pure reactive downtime and travel. You need a preventative equipment check and tire program (weekly pressure/condition checks, on-hand spare, and/or a closer vendor) because with only 2 staff and 288 maintenance hours logged, losing chunks of time to offsite tire runs is a capacity killer.

2. Workload Concentrated On Tim

Tim Nelson carried 116 activities and 152 hours versus Dan Kougias at 52 activities and 136 hours—Tim handled ~60% of all activities while only ~53% of the hours. You need to rebalance dispatching and task ownership because this split is a single-point-of-failure risk and suggests inconsistent work-order sizing (Tim averaging ~1.3 hours/activity vs Dan ~2.6).

3. Parks Is Driving The Month

Parks consumed 97.5 hours (34% of 288) across 66 activities, the largest departmental load, ahead of Water (42.5 hours) and Sewer (28 hours). With a 2-person crew, you need a defined parks service level and a seasonal work plan, otherwise parks work will keep crowding out core street and utility maintenance that has higher public-risk consequences.

4. Hydrant Damage Response-Only

The crew repaired and reset a fire hydrant barrel "damaged in an accident earlier," which indicates you're responding after the fact instead of hardening vulnerable assets. You need a repeatable post-incident process (police/public works handoff, inspection within 24–48 hours, and cost recovery) and to identify high-exposure hydrants for protection (bollards/markers) so the same type of damage doesn't recur.

5. Code Enforcement Activity Gap

There were 0 code enforcement inspections recorded during a period with 168 maintenance reports and 192 total activities, which either means it's not being done or it's not being captured. You need leadership to confirm responsibility and start tracking even a minimal weekly inspection count, because untracked/undone inspections turn into expensive reactive cleanups that your 2-person team can't absorb.

AI-Powered Analytics

This report was generated using CityVerse AI analytics platform. AI summaries provide contextual insights based on recorded field data. For questions or support, contact your CityVerse administrator.

City Wastewater Report

Report Period: Aug 27, 2026 - Sep 29, 2026

Generated: 10/16/2026, 3:10:26 PM

Date	Time	Reading	Usage (Gallons)
Aug 27, 2026	08:47 AM	7,189,530	172,788
Aug 28, 2026	09:23 AM	7,312,524	122,994
Aug 29, 2026	04:33 PM	7,515,759	203,235
Aug 31, 2026	08:24 AM	7,737,206	221,447
Sep 1, 2026	09:00 AM	7,842,580	105,374
Sep 2, 2026	08:51 AM	7,943,268	100,688
Sep 3, 2026	09:28 AM	8,093,632	150,364
Sep 4, 2026	08:57 AM	8,225,846	132,214
Sep 5, 2026	09:55 AM	8,318,388	92,542
Sep 8, 2026	08:24 AM	8,577,960	259,572
Sep 9, 2026	08:32 AM	8,726,055	148,095
Sep 10, 2026	08:31 AM	8,835,247	109,192
Sep 12, 2026	03:52 PM	9,074,872	239,625
Sep 14, 2026	09:49 AM	9,264,455	189,583
Sep 15, 2026	09:29 AM	9,426,849	162,394
Sep 16, 2026	09:33 AM	9,590,136	163,287
Sep 17, 2026	09:05 AM	9,747,404	157,268
Sep 18, 2026	09:33 AM	9,905,408	158,004
Sep 19, 2026	04:12 PM	101,307	195,899
Sep 21, 2026	08:20 AM	325,422	224,115
Sep 22, 2026	11:03 AM	476,052	150,630

Sep 23, 2026	08:49 AM	595,465	119,413
Sep 24, 2026	09:08 AM	726,546	131,081
Sep 25, 2026	10:48 AM	893,115	166,569
Sep 26, 2026	03:23 PM	1,103,997	210,882
Sep 28, 2026	09:01 AM	1,364,000	260,003
Sep 29, 2026	08:42 AM	1,509,336	145,336

Summary

Flow:	1,509,336
Flow Total (Latest - Oldest):	4,319,806
Quarry Usage:	57,424.1
Daily Average:	128,742.06
Total Gallons:	4,377,230.1

Quarry Data

Aug 2026:	988,876.8
Sep 2026:	1,046,300.9
Difference:	57,424.1

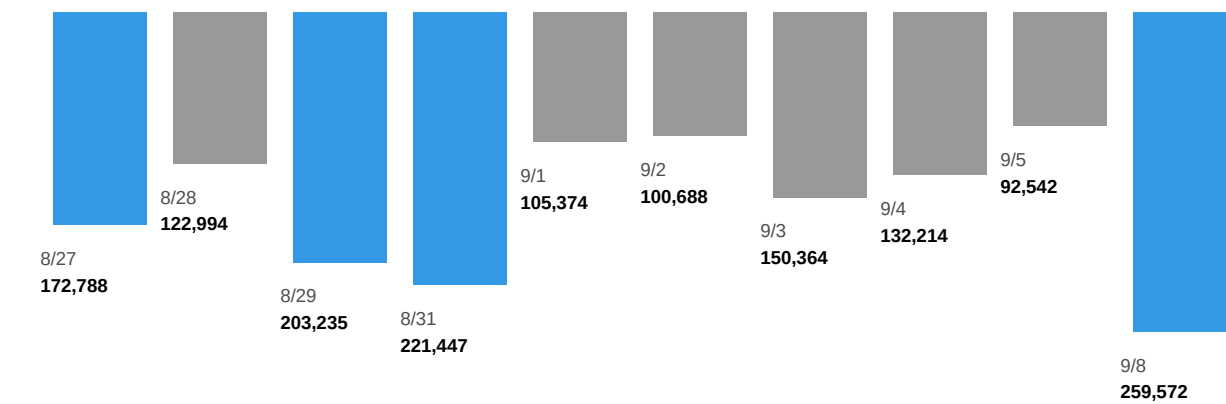
Date: 10/16/2026

Signature

City Maintenance

Analytics & Insights

Daily Usage Breakdown



Peak Daily Usage 260,003 gallons	Lowest Daily Usage 92,542 gallons	Average Daily Usage 166,392 gallons
---	--	--

Trend Analysis

INCREASING: Usage is 7.6% higher in latter half of period

Efficiency Rating: Good (based on 128,742.062 gal/day average)

Period Insights:

- Total readings captured: 27
- Date range: 35 days
- Average readings per day: 0.8
- Total consumption: 4,377,230.1 gallons



Washington County Sheriff

Contract Statistics Report for Fort Calhoun for the Month of September 2026

444 South 16th Street
Blair, NE 68008
402-426-6866

Time Frame	Time in HH:MM:SS
Total Monthly Hours	251:39:39
Average Hours Per Week	58:43:13
Average Hours Per Day	8:23:19
Week 1 Total Hours	71:59:00
Week 2 Total Hours	60:50:41
Week 3 Total Hours	58:26:49
Week 4 Total Hours	58:35:50
Week 5 Total Hours	1:47:19

Activity	Current Month	Previous Month
Warning	4	5
Citation	1	1
Parking Warning	0	0
Arrest	3	0
Accident	0	0
Business Checks	475	364
Reports	3	0

Check Approval List

10/14/2026 1:43:20 PM

City of Fort Calhoun

Page 1 of 1

<u>Pay#</u>	<u>Vend#</u>	<u>Vendor Name</u>	<u>Invoice</u>	<u>Description</u>	<u>Due Date</u>	<u>Amount</u>
5474	6	ABE'S TRASH SERVICE, INC.	2983616	TRASH SERVICE-SEPT	10/20/2026	378.47
5478	603	ACCESS SYSTEMS LEASING	43062948	STANDARD PYMT-COPIER	10/15/2026	419.28
5468		AMGL CPAS & ADVISORS	41445	BUDGET-SEPT 30, 2027	10/20/2026	5,250.00
5475		CENTRAL TAX & BOOKKEEPING SERV	30514	LOTTERY AUDIT: AUG 2026	10/18/2026	130.00
5477	50	CITY OF BLAIR	100126	GALLONS-3,730,028	10/10/2026	5,624.33
5485	396	CONOCO FLEET	115541372	MONTHLY FUEL PURCHASES	10/22/2026	579.56
5505	609	CORE & MAIN	Z628400	PARTS FOR FIRE HYDRANT	9/30/2026	767.04
5470	609	CORE & MAIN	Z729671	HYDRANT	10/16/2026	310.33
5469	609	CORE & MAIN	Z729720	HYDRANT PARTS	10/22/2026	577.50
5498		COX BUSINESS	09232026	INTERNET/PHONE SERVICES	10/10/2026	527.22
5476		CULLIGAN BOTTLE WATER OF OMAH/	5306486	WATER-CITY HALL	10/28/2026	13.00
5493		CULLIGAN BOTTLE WATER OF OMAH/	5310001	WATER	10/30/2026	7.00
5506		EMBRIS GROUP, LLC	772	ENGINEERING ASSISTANCE: SEP1	10/31/2026	668.75
5486	18	ENTERPRISE MEDIA GROUP	319503	JOB POSTING/BUDGET	10/21/2026	260.25
5487	18	ENTERPRISE MEDIA GROUP	319754	9.21 MTG MIN	10/28/2026	84.18
5488	18	ENTERPRISE MEDIA GROUP	320215	10.19 PUB HRG-SIX YEAR ROAD P	11/4/2026	10.02
5489	227	GATEWAY DEVELOPMENT CORP.	2002	2026 ANNUAL INVESTMENT-GOLD	10/30/2026	3,500.00
5480		GREENHALL COMMERCIAL LANDSCAI	46046	WMSP SOFTSCAPE	10/15/2026	8,959.95
5479		GREENHALL COMMERCIAL LANDSCAI	46064	WMSP HARDSCAPE	10/15/2026	6,898.60
5497		HYDRO HANK	202600053	MOWING: 711 N 14TH ST	10/30/2026	300.00
5473		IMMENSE IMPACT, LLC	21-1006TRN	CONTENT TRANSFER FEE-FINAL (	10/6/2026	1,525.00
5492	643	JDW MIDWEST, LLC	2509074	SEPT SERVICES	10/30/2026	301.07
5496	403	KAMB & C ENTERPRISES	216762	BI-MONTHLY PEST CONTROL	10/30/2026	67.93
5490		LEAGUE INSURANCE GOVERNMENT I	92	LIGHT MEMBER FEES: JULY 2025-	10/30/2026	108.00
5495	9	M.U.D.	10162026	MONTHLY GAS BILL	10/16/2026	100.61
5504	445	MUNICIPAL SUPPLY, INC./NE	0986581-IN	REPAIR WATERMAIN	9/30/2026	764.93
5499		NATIONAL SIGN COMPANY, LLC	IN0003343	SPEED LIMIT SIGN (2)/CHILDREN F	10/25/2026	233.00
5481	327	NE DEPT REV -WASTE REDUC	10012026	JULY 2025-JUNE 2026	10/1/2026	25.00
5484		NE DEPT REV-LOTTERY TAX	10012026	LOTTERY TAXES-JUL-SEPT 2026	10/30/2026	765.00
5471	28	NE PUBLIC HEALTH ENV LAB	610593	WATER TESTING	10/16/2026	515.00
5494		NYE TECHNOLOGY	CW16804	MONTHLY IT SERVICES	10/31/2026	292.00
5503	8	O.P.P.D.	10262026	MONTHLY ELECTRIC	10/25/2026	4,322.76
5502	421	ONE CALL CONCEPTS, INC	6090154	MONTHLY LOCATES	10/25/2026	16.36
5466	5	PAPIO-MISSOURI RIVER N. R. D.	91526	METER #1 & METER #2	10/5/2026	15,447.24
5467	5	PAPIO-MISSOURI RIVER N. R. D.	91526-2	METER #3	10/5/2026	1,369.22
5465	7	POSTMASTER	10012026	WA/SE BILLS-OCT	10/1/2026	227.50
5501	427	TALBOT LAW OFFICE	09222026	MONTHLY SERVICES	10/25/2026	1,600.00
5500	427	TALBOT LAW OFFICE	09302026	MONTHLY SERVICES	10/25/2026	375.00
5472	577	VERIZON WIRELESS	6153697859	MONTHLY CELL PHONES	10/9/2026	119.79
5483	477	VISA	09242026	ADOBE/ADVERTISING/WATER SAM	10/19/2026	3,417.30
5491	30	WASHINGTON COUNTY SHERIFF	10192026	OCT SERVICES	10/30/2026	8,159.18
						\$75,017.37

Report Selection: Check Approval List - By Vendor
 Date Range Selection: GL Posting Date
 Starting Date: 10/1/2026
 Ending Date: 10/31/2026
 Banks: All
 Bank Acct#:
 Include Printed Checks: **p**

Completed Projects (FY 25/26)					City of Fort Calhoun	
Project #	Street Name	Start	End	Description of Work	Length (mi)	Final Cost
M-288-(3)	Monroe Street	16th Street	West Corporate Limits	Concrete, Grading, Storm Sewer, Erosion Control	0.10	\$ 450,000

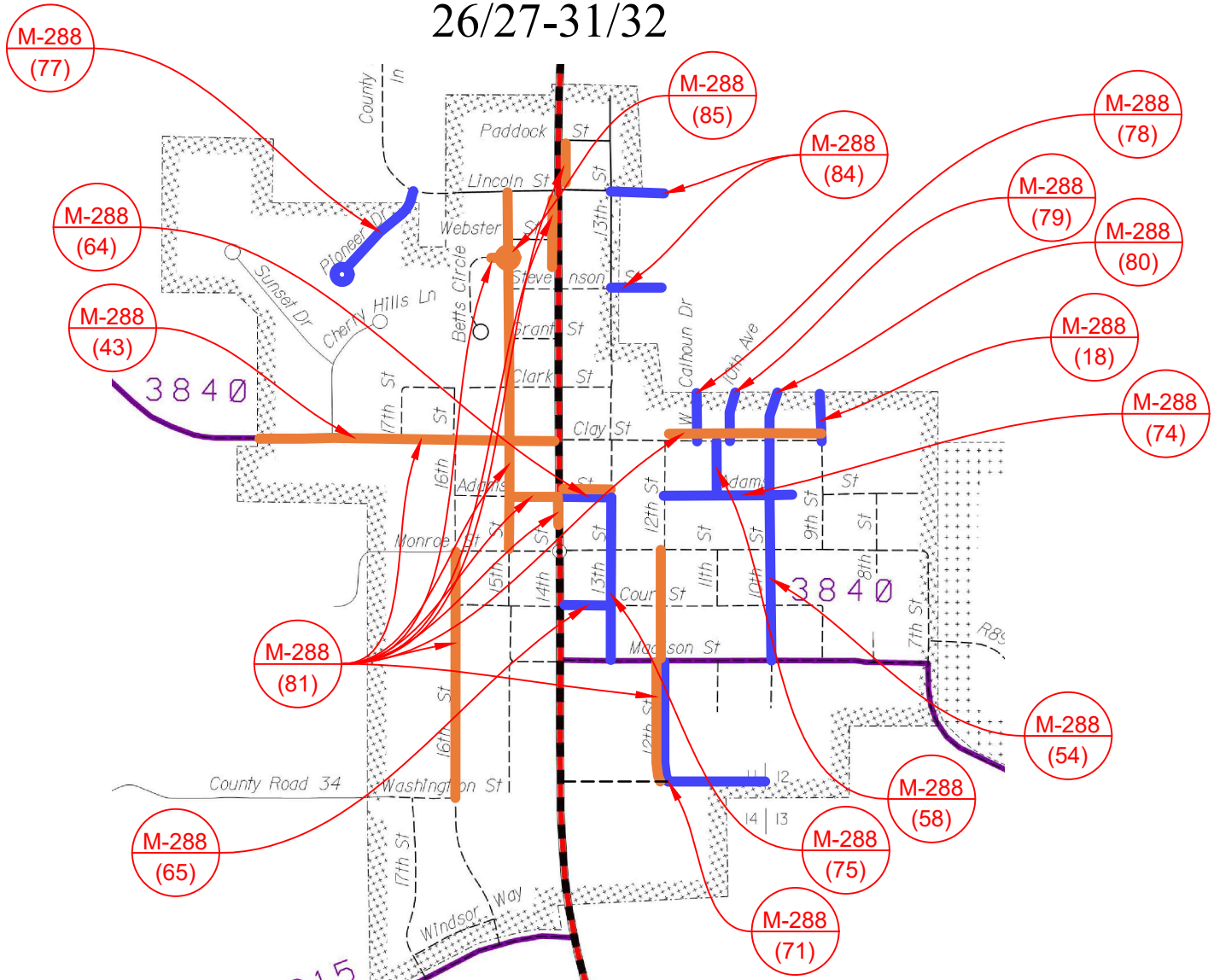
One Year Plan - Fiscal Year 2026/2027 Projects (October 1st to September 30th)					City of Fort Calhoun	
Project #	Street Name	Start	End	Description of Work	Length (mi)	Est. Cost
M-288-(81)	Adams Street	15th Street	13th Street	Sidewalk / Trail, Grading, Parking,Erosion Control	2.0	\$ 3,500,000
	15th Street	Monroe St	Lincoln St			
	Monroe St	16th Street	15th Street			
	16th Street	Washington Street	Monroe St			
	Clay Street	West Corp Limits	15th Street			
	Clay Street	12th Street	9th Street			
	12th Street	Washington Street	Monroe Street			
	14th Street	1/2 Block South of Webster St	Paddock St			
	14th Street	1/2 Block South of Adam St	Adams St			
M-288-(43)	Clay Street	West Corporate Limits	14th Street	Curb and Gutter Milling with 2" Overlay, Grading, Culvert/Ditch Section Improvements with Detention, Erosion Control	0.40	\$ 1,000,000
M-288-(85)	Betts Circle & 15th Street Intersection			Curb Inlet and Storm Sewer Repair	0.01	\$ 50,000

Six Year Plan - Fiscal Year 2027/2028 to 2031/2032 Projects (October 1st to September 30th)					City of Fort Calhoun	
Project #	Street Name	Start	End	Description of Work	Length (mi)	Est. Cost
M-288-(65)	Court Street	14th Street	13th Street	Asphalt Overlay, Curb Ramps	0.06	\$ 40,000
M-288-(54)	10th Street	Madison Street	Clay Street	Asphalt Overlay, Curb Ramps	0.29	\$ 200,000
M-288-(18)	9th Street	Clay Street	North Corporate Limits	Concrete Curb and Gutter, Grading, Storm Sewer, Erosion Control	0.06	\$ 200,000
M-288-(71)	12th Street	Washington Street	Madison Street	Concrete Curb and Gutter, Grading, Storm Sewer, Erosion Control	0.15	\$ 600,000
	Washington Street	12th Street	10th Street		0.12	
M-288-(58)	11th Street	Adams Street	Clay Street	Asphalt Overlay, Curb Ramps	0.07	\$ 40,000
M-288-(74)	Adams Street	12th Street	1/2 Block East of 10th Street	Asphalt Overlay, Curb Ramps	0.11	\$ 40,000
M-288-(75)	13th Street	Adams Street	Madison Street	Asphalt Overlay, Curb Ramps	0.22	\$ 150,000
M-288-(77)	Pioneer Drive	Lincoln St	Cul de Sac	Asphalt, Earth Shoulders, Grading, Culverts, Erosion Control Including Lincoln Street Intersection	0.15	\$ 200,000
M-288-(78)	Calhoun Drive	Clay Street	North Corporate Limits	Asphalt Overlay	0.07	\$ 40,000
M-288-(79)	10th Avenue	Clay Street	North Corporate Limits	Asphalt Overlay	0.07	\$ 40,000
M-288-(80)	10th Street	Clay Street	North Corporate Limits	Asphalt Overlay	0.07	\$ 40,000
M-288-(64)	Adams Street	14th Street	13th Street	Asphalt Overlay with Concrete Patching, Curb Ramps	0.07	\$ 40,000
M-288-(84)	Lincoln Street	13th Street	12th Street	Concrete Curb and Gutter, Grading, Erosion Control	0.2	\$ 300,000
	Stevenson St	13th Street	12th Street			

FORT CALHOUN, NEBRASKA

ONE AND SIX YEAR PLAN

FISCAL YEAR 26/27-31/32



JEO CONSULTING GROUP INC

800.723.8567



NATIONAL ROAD CLASSIFICATIONS

- OTHER PRINCIPAL ARTERIALS
- MAJOR COLLECTOR

PROJECT LEGEND

- 1 YEAR PLAN
- 6 YEAR PLAN

DRAWING NAME: FORT CALHOUN
 REVISED BY: SMD
 REVISED ON: JULY 16, 2026

Project	Project #	Stage	Funding Source	Recent Activity	Activity Needed	City Action Needed	Upcoming Deadline
Clay Street Drainage	Conceptual	Conceptual	GO Fund	Requested as a budget item in future year	Budget project for future year	Select budget year.	None
Sanitary Sewer Investigation	131216.13	Conceptual	Sewer Fund	Investigation was tabled until after manhole repairs completed.	None	None	None
West Monroe Street Paving District	131216.00 (General Engineering)	Post Construction	Paving District / Street Fund for City portion of work	No recent activity.	Monitor warranty period.	None	None
2020 7th and Monroe Intersection Improvements	131216.19	Post Construction	GO Fund	No recent activity.	Monitor warranty period.	None	None
2022 Lift Station Flood Protection Improvements	131216.28	Post Construction	HMGP / Sewer Fund	No recent activity.	Monitor warranty period.	None	None at this time.
Adams Street Corridor Phase 4 and 5	131216.29	Post Construction	Papio-Missouri River NRD/Private/Sales Tax	No recent activity.	Monitor warranty period.	None	None at this time.
Adams Street Plaza - Group B - Restroom and Shelter	131216.27	Post Construction	Sales Tax / Grants	No recent activity.	Monitor warranty period.	None	None at this time.
Transportation Alternatives (TAP) Grant	220002.00 (General Engineering)	Design	Grant / Sales Tax	Pubic meeting was held on Tuesday, October 13th at Northern Lights.	Comments received during the public meeting will be summarized and responses developed if necessary. The city should post meeting materials, comment card, and responses generated on the city's website.	None	Construction is currently slated for 2028-29.
Trail Extension Phase 3 & 4	230003.00	Post Construction	Grant / Sales Tax	No recent activity.	Monitor warranty period.	None	None at this time.
Speed Study	220002.00 (General Engineering)	Complete	GO Fund	Study was adopted. Awaiting improvements to be included in TAP grant before further implementation.	None	None	None at this time.
Bett's Circle Drainage	220002.00 (General Engineering)	Post Construction	GO Fund	Project is complete.	None	None	None at this time.
FLU Update	220002.00 (General Engineering)	Complete	GO Fund	Final FLU was adopted.	None	None	None
Forcemain H2S Control	22-002.03	Study	Sewer Fund	Final report is prepared and signed by Embris.	City should consider the study recommendations to proceed with piloting of chemical dosing.	None at this time.	Presentation of final study at October meeting.

tech memo



To: Fort Calhoun City Council

From: Lucas C. Billesbach, PE & Randy Brodner, PE

Date: October 14, 2026

Subject: Fort Calhoun Force Main Hydrogen Sulfide (H₂S) Control Alternatives Evaluation

1.0 Introduction

Background

The City of Fort Calhoun owns and operates a sanitary sewer lift station and force main that was installed in approximately 2009 and conveys wastewater approximately ten miles to the City of Blair's sanitary sewer and treatment system. The force main consists primarily of 12-inch PVC pipe with approximately 6,000 LF of ductile iron pipe (DIP) (see Appendix A for locations). The force main discharge structure is located immediately upstream of Blair's gravity sewer collection system. The existing carbon drum scrubber previously installed at the discharge location is no longer operational and is not providing meaningful odor control. Previous rehabilitation efforts have also identified corrosion of various wastewater assets believed to be associated with hydrogen sulfide generation.

Hydrogen sulfide is produced when wastewater becomes septic under anaerobic conditions. Long force mains with extended detention times are particularly susceptible to sulfide generation due to depletion of dissolved oxygen. Once wastewater is discharged from a pressurized force main, dissolved sulfides can be released as H₂S gas. The H₂S gas creates nuisance odors, presents potential worker safety concerns, and can contribute to accelerated corrosion of concrete, electrical equipment, and metallic infrastructure.

The purpose of this study is to evaluate feasible technologies for controlling H₂S generation and release and to provide recommendations for future implementation.

2.0 Existing System Description

Wastewater Conveyance System

The Fort Calhoun wastewater system conveys primarily domestic wastewater through a single regional lift station and force main system. Information compiled during this study indicates:

Parameter	Value
Force Main Length	Approximately 10 miles
Force Main Diameter	12 inches
Force Main Material	Primarily PVC with portions of DIP
Average Daily Flow	Approximately 96,000 gpd
Average Hydraulic Residence Time	Approximately 3.3 days
Average Pumping Rate	Approximately 262 gpm
Average Pumping Cycles	Approximately 52 cycles/day

The relatively long hydraulic residence time represents one of the primary factors contributing to sulfide generation within the force main. Wastewater remains under anaerobic conditions for extended periods, allowing sulfate-reducing bacteria to convert sulfate compounds into dissolved sulfides.

Existing Force Main Outfall

Field observations identified the existing force main discharge structure and odor-control facilities. The structure contains a Parshall flume that was previously used to measure wastewater flow conveyed to Blair. Flow is now monitored with a magnetic flow meter at the Fort Calhoun lift station, and the Parshall flume is no longer used for routine flow measurement. Downstream of the flume, an open channel is covered with solid grating. The existing carbon odor-control system drew air from this enclosed space. The existing carbon drum scrubber appears abandoned or non-operational and is not actively treating air released at the discharge structure.



Figure 2-1. Existing Force Main Outfall and Non-Operational Carbon Scrubber



Figure 2-2. Existing Force Main Discharge Structure and Observed Corrosion

A previous project addressed corrosion immediately upstream of the discharge structure. The force main previously discharged to a manhole located approximately 30 LF upstream of the structure, with flow conveyed

by gravity through ductile iron pipe to the outfall. The previous project replaced the ductile iron pipe, which had completely corroded away, and addressed corrosion in the upstream manhole.



Figure 2-3. Previous Ductile Iron Pipe Sections that were Replaced

Visual observations of the structure still identify significant corrosion and deterioration of infrastructure within the discharge structure. Corrosion was observed on metallic components such as the fencing and odor control equipment, electrical equipment, and wastewater infrastructure. These observations are consistent with long-term exposure to elevated hydrogen sulfide concentrations and resulting sulfuric acid formation.

During coordination for the previous project, the City of Blair requested that functional odor-control facilities be reinstalled to control odors at the discharge location and downstream within Blair's gravity collection system.

Vapor-phase treatment at the outfall could address odors released at the discharge structure but would not necessarily control odors or corrosion resulting from dissolved sulfide released farther downstream. Meeting Blair's broader downstream odor-control objective may therefore require liquid-phase treatment or other downstream measures.

3.0 Data Collection and Field Investigation

Available System Data

The following information was reviewed as part of this study:

- Record drawings
- Pump station operating data
- Flow monitoring records
- Previous rehabilitation projects
- Existing odor control equipment

- Downstream collection system information
- Applicable industry guidance documents

Embris also reviewed the United States Environmental Protection Agency publication **Detection, Control, and Correction of Hydrogen Sulfide Corrosion in Existing Wastewater Systems (EPA 832-R-92-001, September 1992)** as a technical reference for sulfide generation mechanisms and treatment technologies.

Wastewater Sampling Results

Wastewater samples were collected from the lift station influent and the force main discharge location to characterize wastewater conditions and evaluate changes occurring during conveyance through the approximately 10-mile force main. Parameters analyzed included biochemical oxygen demand (BOD₅), sulfate, sulfide, alkalinity, and pH.

Table 3-1. Wastewater Sampling Results

Parameter	Units	Lift Station Influent	Force Main Discharge
BOD ₅	mg/L	358	141
Sulfate	mg/L	218	2.6
Sulfide	mg/L	< 1.0	1.1
Alkalinity (to pH 4.5 Endpoint)	mg CaCO ₃ /L	< 400	467
pH	Standard Units (S.U.)	7.15	7.55

The analytical results indicate measurable changes in wastewater characteristics between the lift station and force main discharge locations. BOD₅ concentrations decrease from 358 mg/L at the lift station influent to 141 mg/L at the force main discharge. Sulfate concentrations decrease from 218 mg/L to 2.6 mg/L. Sulfide was reported below the 1.0 mg/L reporting limit at the lift station influent and at 1.1 mg/L at the force main discharge. Alkalinity increased from less than 400 mg CaCO₃/L to 467 mg CaCO₃/L and pH increased from 7.15 to 7.55 standard units.

The sulfide concentrations in the sampling data above do not appear to be representative of the H₂S generation observed during gas-phase monitoring. Potential factors include sample collection, preservation, handling, or hold time. Therefore, the gas-phase monitoring results are considered more representative of H₂S conditions at the outfall for purposes of this planning-level evaluation.

The wastewater sampling results, when considered together with the measured hydrogen sulfide concentrations at the force main outfall, suggest that biochemical and sulfur-cycle transformations occur during the extended detention time within the force main. These findings are consistent with conditions commonly associated with long force mains where wastewater experiences prolonged anaerobic conditions and hydrogen sulfide generation. The sampling data was provided to vendors and used to support evaluation of potential odor control and corrosion mitigation alternatives.

Blair WWTP Influent Nutrient Data

A Blair wastewater treatment plant influent sample collected August 27, 2026 reported total Kjeldahl nitrogen of 39.1 mg/L, nitrate/nitrite nitrogen of 0.67 mg/L, total nitrogen of 39.8 mg/L, and total phosphorus of 7.49 mg/L. Fort Calhoun contributes approximately 96,000 gpd, or about 10 percent of Blair's total influent flow. For planning calculations, Blair's corresponding average influent flow is approximately 960,000 gpd. The resulting existing nutrient loads are approximately 319 lb/day total nitrogen, 313 lb/day TKN, 5.4 lb/day nitrate/nitrite nitrogen, and 60 lb/day total phosphorus. The Blair wastewater treatment plant concentrations are based on a

single influent sample and may not be representative of long-term average influent conditions. The resulting impact calculations are intended solely for planning-level evaluation and comparison of treatment alternatives.

Chemical-impact calculations in this report conservatively assume that the entire added chemical constituent reaches the Blair plant. Actual concentrations will depend on reaction, biological uptake, denitrification, precipitation, deposition, dilution, and travel through the downstream collection system. Blair should confirm impacts using representative flow and loading data and pilot measurements.

Dosing Basis and Data Limitations

The available liquid-phase sampling data and gas-phase H₂S monitoring results do not provide a consistent basis for establishing the sulfide mass load within the force main. At 96,000 gpd, the measured discharge sulfide concentration of 1.1 mg/L corresponds to approximately 0.88 lb/day as sulfide, while Xylem modeling previously carried a prevention load of 13.4 lb/day. Accordingly, chemical feed rates presented in this report should be considered preliminary vendor or planning values. Final chemical selection and dosage should be established through a controlled field demonstration using concurrent measurements of flow, liquid sulfide, sulfate, pH, alkalinity, temperature, and gas-phase H₂S.

Hydrogen Sulfide Monitoring

To quantify H₂S generation at the discharge location, a temporary H₂S monitoring logger was installed at the force main outfall structure and operated for an extended monitoring period during April 2026. Monitoring data were subsequently reviewed by odor-control vendors and incorporated into treatment evaluations.

Monitoring results indicate:

- Average H₂S concentration: approximately 57 ppm
- Maximum H₂S concentration: approximately 220 ppm
- Minimum H₂S concentration: approximately 0 ppm

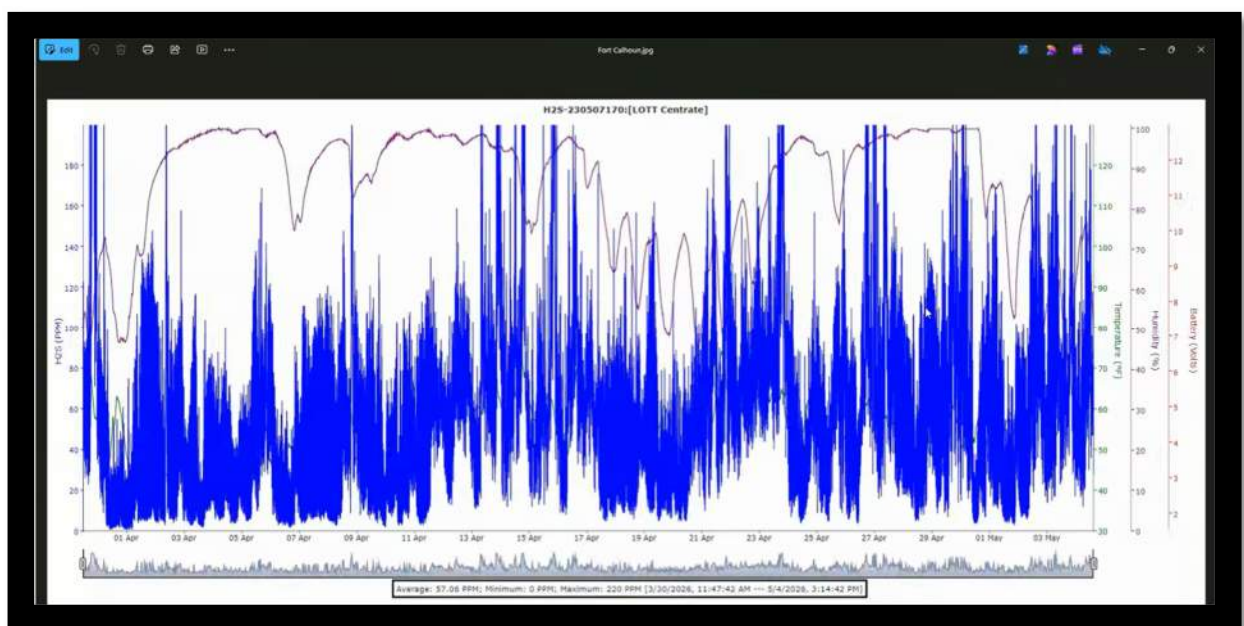


Figure 3-1. Force Main Outfall H₂S Monitoring Results, April 2026

OSHA publishes guidance regarding H₂S concentrations and associated symptoms and effects. Figure 3-2 summarizes this information for reference.

Concentration (ppm)	Symptoms/Effects
0.00011-0.00033	Typical background concentrations
0.01-1.5	Odor threshold (when rotten egg smell is first noticeable to some). Odor becomes more offensive at 3-5 ppm. Above 30 ppm, odor described as sweet or sickeningly sweet.
2-5	Prolonged exposure may cause nausea, tearing of the eyes, headaches or loss of sleep. Airway problems (bronchial constriction) in some asthma patients.
20	Possible fatigue, loss of appetite, headache, irritability, poor memory, dizziness.
50-100	Slight conjunctivitis ("gas eye") and respiratory tract irritation after 1 hour. May cause digestive upset and loss of appetite.
100	Coughing, eye irritation, loss of smell after 2-15 minutes (olfactory fatigue). Altered breathing, drowsiness after 15-30 minutes. Throat irritation after 1 hour. Gradual increase in severity of symptoms over several hours. Death may occur after 48 hours.
100-150	Loss of smell (olfactory fatigue or paralysis).
200-300	Marked conjunctivitis and respiratory tract irritation after 1 hour. Pulmonary edema may occur from prolonged exposure.
500-700	Staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes.
700-1000	Rapid unconsciousness, "knockdown" or immediate collapse within 1 to 2 breaths, breathing stops, death within minutes.
1000-2000	Nearly instant death

Figure 3-2. OSHA H₂S Concentrations and Symptoms / Effects

Source: Occupational Safety and Health Administration, Hydrogen Sulfide Hazards.

The referenced 1992 EPA publication identifies maintaining atmospheric H₂S concentrations below approximately 3 to 5 ppm as a general corrosion-control objective (**Detection, Control, and Correction of Hydrogen Sulfide Corrosion in Existing Wastewater Systems, EPA 832-R-92-001, September 1992**).

The monitoring data confirm recurring elevated gas-phase H₂S concentrations within the outfall structure and demonstrate conditions capable of causing nuisance odors and infrastructure deterioration. The monitoring was not conducted as a personal exposure assessment; therefore, worker exposure should be evaluated through site-specific safety procedures and appropriate monitoring.

4.0 H₂S Generation Mechanisms

The EPA identifies long force mains as particularly susceptible to development of septic wastewater conditions due to depletion of dissolved oxygen. Under anaerobic conditions, sulfate-reducing bacteria convert sulfate compounds into dissolved sulfides.

When wastewater discharges from a pressurized force main, dissolved sulfides can be released into the atmosphere as hydrogen sulfide gas. Hydrogen sulfide can react with moisture and contribute to sulfuric acid formation, accelerating corrosion of concrete, metals, electrical systems, and other wastewater infrastructure. Similar gas-phase conditions may develop within the force main where partial-pipe flow occurs between pumping cycles. At locations where an air/vacuum release valve admits air to relieve negative pressure, a vapor space may form above the wastewater and allow H₂S to accumulate and contact moist pipe surfaces. H₂S may also off-gas from anaerobic wastewater during conveyance and accumulate at force main high points and other locations where air or gas collects. In review of the as-built plan and profiles of the DIP sections, local high points exist within each area that DIP is installed.

The operating characteristics of the Fort Calhoun force main, including approximately 3.3 days of hydraulic residence time, create favorable conditions for sulfide generation and explain the elevated H₂S concentrations observed during monitoring.

5.0 Alternatives Evaluation

The alternatives were organized to distinguish source control at the lift station, physical protection of the ductile iron pipe (DIP) combined with downstream liquid-phase treatment, and local odor control at the outfall. Each active alternative is evaluated against the project goals of reducing H₂S-related odor and safety concerns, protecting Fort Calhoun and Blair infrastructure, limiting adverse impacts to Blair's wastewater treatment process, and providing an implementable long-term solution.

Chemical feed rates and costs remain planning-level values. Because the available liquid-phase sulfide sample and gas-phase monitoring do not provide a consistent sulfide mass balance, final chemical selection and dosage should be established through a controlled field demonstration with concurrent flow, sulfide, sulfate, pH, alkalinity, temperature, and gas-phase H₂S monitoring.

Unless otherwise noted, preliminary chemical feed rates were provided by vendors or carried forward from planning calculations and have not been independently validated by Embris.

Cost Basis. Costs presented herein are planning-level estimates based on available vendor information, preliminary chemical feed rates, and planning allowances. Chemical dosage, feed-system requirements, rehabilitation limits, and associated capital and O&M costs remain subject to confirmation through the recommended condition assessment and field demonstration. Accordingly, the costs are intended for preliminary comparison of alternatives and should be updated before selection of a permanent improvement.

Alternative 1 - No Action

Under the No Action Alternative, the city would not implement improvements to control sulfide formation, protect the DIP force main sections, or restore odor control at the outfall. The force main would continue to operate with an average hydraulic residence time of approximately 3.3 days, and the existing non-operational carbon scrubber would remain out of service.

This alternative has no initial capital cost, but it does not address the measured H₂S concentrations, existing corrosion, odor complaints, worker exposure concerns, or potential impacts to Blair's collection system. Continued deterioration and future emergency or planned rehabilitation costs would remain the City's responsibility.

Planning-Level Cost Summary

- **Capital Cost:** \$0
- **Annual Chemical Cost:** \$0
- **Other Annual O&M:** \$0 for active treatment; future emergency or planned rehabilitation costs are not quantified
- **20-Year Present Value:** Not calculated

Overall Assessment. This alternative does not meet the project objectives and is retained only as a baseline for comparison.

Alternative 2 – Chemical Injection at Lift Station for Hydrogen Sulfide Control

This alternative would install a permanent chemical storage and feed system at the Fort Calhoun lift station. Dosing at the upstream end of the force main provides the greatest length of system protection because treatment begins before wastewater enters the approximately 10-mile force main. It also requires the chemical to remain effective over the full detention time and generally results in the highest chemical demand and the greatest potential change to the wastewater delivered to Blair.

Alternative 2A – Nitrate Injection

Nitrate-based treatment suppresses sulfate-reducing activity by providing an alternate electron acceptor, thereby reducing sulfide formation before H₂S is released. This approach provides liquid-phase protection through the force main, discharge structure, and downstream gravity system. Calcium nitrate and proprietary nitrate products such as Bioxide® may be considered, with final selection based on demonstrated dosage, delivered chemical cost, equipment arrangement, and downstream nitrogen impacts.

The current lift-station planning basis carries an estimated nitrate dose of approximately 86 gallons per day. Planning costs include approximately \$150,000 for chemical feed equipment, \$125,560 per year for chemical, and \$4,800 per year for vendor support. The calculated 20-year present value at 5 percent is approximately \$1.77 million. The permanent nitrate product and associated lifecycle cost should be reevaluated following the field demonstration and receipt of current vendor pricing because chemical formulation, required dose, and delivered unit cost may differ from the current nitrate planning basis.

Planning-Level Cost Summary

- **Capital Cost:** Approximately \$150,000
- **Annual Chemical Cost:** Approximately \$125,560 per year
- **Other Annual O&M / Support:** Approximately \$4,800 per year
- **Total Annual Cost:** Approximately \$130,360 per year
- **20-Year Present Value:** Approximately \$1.77 million at 5 percent
- **Cost Basis:** Preliminary 86 gpd nitrate planning dose; subject to field demonstration and updated vendor pricing

Nitrate treatment can materially increase nitrogen loading to Blair. Coordination with Blair should address nitrate/nitrite, ammonia, TKN, total nitrogen, alkalinity, carbon demand, aeration requirements, denitrification capacity, and permit implications.

Alternative 2B – Iron Salt Injection

Iron salts react with dissolved sulfide to form insoluble iron sulfide compounds, reducing the sulfide available for conversion to H₂S gas. Ferric chloride is retained as the primary planning product because ferric sulfate would introduce additional sulfate into a system where available sulfate appears to be substantially depleted during conveyance. Other iron-based products may be considered during the demonstration if they offer operational or safety advantages.

The report carries a conservative preliminary ferric chloride feed rate of 36 gallons per day. Planning costs include approximately \$250,000 for tankage, secondary containment, feed pumps, controls, concrete work, and piping; approximately \$65,700 per year for chemical; and approximately \$4,800 per year for monitoring and support. The calculated 20-year present value at 5 percent is approximately \$1.13 million.

Planning-Level Cost Summary

- **Capital Cost:** Approximately \$250,000
- **Annual Chemical Cost:** Approximately \$65,700 per year
- **Other Annual O&M / Support:** Approximately \$4,800 per year
- **Total Annual Cost:** Approximately \$70,500 per year
- **20-Year Present Value:** Approximately \$1.13 million at 5 percent
- **Cost Basis:** Preliminary 36 gpd ferric chloride feed rate

Iron treatment may increase solids deposition in the force main or Blair gravity system and would increase iron, chloride, and sludge loading at the treatment plant. Chemical storage, corrosion-resistant materials, freeze protection, containment, and operator safety requirements should be addressed during design. pH and alkalinity should be monitored because ferric addition consumes alkalinity and may depress pH.

Alternative 2C – Sodium Hydroxide Injection for pH Adjustment

Sodium hydroxide would be injected at the lift station to maintain the wastewater at an elevated pH through the force main. This approach does not remove sulfide and is not intended to prevent all sulfide formation. Instead, elevating the pH shifts dissolved sulfide away from the volatile H₂S form and toward ionic sulfide that remain in the liquid phase. Vendor guidance indicates that maintaining a pH of approximately 9 or greater through the force main should substantially limit vapor-phase H₂S release at the transition to Blair's system.

USP Technologies provided a preliminary estimate of 10 to 25 gallons per day of 25-percent sodium hydroxide at an estimated delivered cost of approximately \$2.50 to \$3.50 per gallon. This corresponds to an estimated chemical cost range of approximately \$9,100 to \$31,900 per year. For planning comparison, a permanent sodium hydroxide storage and feed system allowance of \$200,000, with \$4,800 per year for monitoring and support, is carried pending confirmation of dosage, storage volume, materials of construction, heat tracing or insulation needs, and control requirements. Using the stated chemical-cost range, the resulting 20-year present value is approximately \$373,000 to \$657,000 at 5 percent.

Planning-Level Cost Summary

- **Capital Cost:** Approximately \$200,000 planning allowance
- **Annual Chemical Cost:** Approximately \$9,100 to \$31,900 per year
- **Other Annual O&M:** Approximately \$4,800 per year for monitoring/support
- **20-Year Present Value:** Approximately \$373,000 to \$657,000 at 5 percent
- **Cost Basis:** Preliminary 10 to 25 gpd dose of 25-percent sodium hydroxide at \$2.50 to \$3.50 per gallon

The principal advantage is potentially lower annual chemical cost and the absence of added nitrogen or iron solids. Limitations include transfer of dissolved sulfide to Blair rather than destruction of the sulfide, risk of H₂S release if pH declines downstream, chemical handling hazards, increased scaling potential, and possible impacts to Blair's aeration demand, alkalinity balance, biological treatment, and solids settleability. The full pH profile from the lift station through the Blair collection system should therefore be measured during the demonstration.

Sodium hydroxide should therefore be considered a H₂S-release-control strategy rather than a process that destroys sulfide or eliminates its formation.

Overall Assessment. Lift-station chemical injection remains feasible and avoids immediate full-scale pipe rehabilitation, but it requires year-round chemical handling and long-duration treatment. A comparative field

demonstration of nitrate, ferric chloride, and sodium hydroxide is recommended before selecting a permanent system.

Alternative 3 - DIP Lining or PVC Replacement with Downstream Liquid-Phase Treatment

This alternative combines physical protection of the approximately 6,000 LF of existing 12-inch DIP with liquid-phase chemical treatment at a location along the force main sufficiently upstream of the outfall to provide mixing and reaction time. To adequately reduce chemical demand, the chemical feed point would need to be downstream of the DIP segments, thus necessitating the need for those sections to be protected by lining or replacement. The purpose is to shorten the chemical-treatment reach and reduce chemical demand and downstream H₂S release while relying on the structural improvement to protect the upstream DIP from corrosion.

The approximately 6,000 LF of DIP identified for purposes of this planning-level evaluation represents the current assumed quantity for development and comparison of rehabilitation and replacement costs. Final rehabilitation or replacement limits should be established based on the force-main condition assessment, available record information, and targeted field verification. Accordingly, the physical-improvement costs presented below should not be interpreted as defining the final limits of construction.

Physical Improvement Options

BulletLiner rehabilitation. SAK Construction's September 10, 2026 budget quotation was \$3,000,000 for one mobilization, 13 access pits, normal cleaning and CCTV, approximately 6,000 LF of 12-inch BulletLiner, terminations, closures, and tie-ins. Applying a 20-percent planning allowance results in a planning-level project cost of approximately \$3,600,000.

PVC replacement. A planning allowance of \$400 per linear foot for 6,000 LF of open-cut 12-inch restrained-joint PVC replacement produces a base cost of \$2,400,000. Including a 25-percent contingency results in a planning-level cost of approximately \$3,000,000. It should be noted that upon review of the locations of the ductile sections that significant surface impacts would be encountered for an open-cut installation. These include possible impacts to paved roadway sections, an existing levee, a possible other private property or infrastructure improvements. Costing of these impacts is outside of the scope of this study, but they are expected to increase costs in such a manner to render this option infeasible.

Downstream Chemical Treatment Options

Nitrate injection. A preliminary vendor recommendation identified a nitrate feed rate of approximately 7.3 gallons per day at a location approximately 1,000 LF upstream of the discharge. At \$3.97 per gallon, the corresponding chemical cost is approximately \$10,600 per year. This dose has not been independently validated and should not be used for final design until the supporting model and field demonstration confirm the required reaction time and dose. For planning comparison, \$150,000 permanent feed-system allowance and \$4,800 per year for monitoring/support are carried, resulting in an approximate treatment-only 20-year present value of \$342,000 at 5 percent.

Iron salt injection. The existing report carries a preliminary downstream ferric chloride trial envelope of 2 to 36 gallons per day and an initial planning feed rate of approximately 13 gallons per day. At \$5.00 per gallon, annual chemical cost is approximately \$23,725. A planning feed-system capital allowance of \$250,000 and monitoring/support cost of \$4,800 per year are retained pending vendor review and field testing. These allowances result in an approximate treatment-only 20-year present value of \$605,000 at 5 percent.

Sodium hydroxide injection. Sodium hydroxide may also be evaluated at the downstream feed location. Locating the feed closer to the outfall could reduce the duration over which elevated pH must be maintained, but the location must still provide adequate mixing and must maintain the target pH through the discharge and

the critical portion of Blair's downstream gravity system. Pending downstream-specific demonstration results, the planning comparison conservatively carries \$200,000 for the feed system, \$9,100 to \$31,900 per year for chemical, and \$4,800 per year for monitoring/support, producing an approximate treatment-only 20-year present value of \$373,000 to \$657,000 at 5 percent. These allowances use the lift-station sodium hydroxide chemical-cost range as a placeholder and should be refined after downstream testing. The demonstration should include a downstream-feed scenario if a suitable accessible location is available.

Planning-Level Cost Summary

- **Physical Improvement Capital Cost:** Approximately \$3.60 million for BulletLiner
- **Downstream Nitrate:** Approximately \$150,000 feed-system capital; \$10,600 per year for chemical; \$4,800 per year for monitoring/support; treatment-only 20-year present value approximately \$342,000
- **Downstream Ferric Chloride:** Approximately \$250,000 feed-system capital; \$23,725 per year for chemical; \$4,800 per year for monitoring/support; treatment-only 20-year present value approximately \$605,000
- **Downstream Sodium Hydroxide:** Approximately \$200,000 feed-system capital; \$9,100 to \$31,900 per year for chemical; \$4,800 per year for monitoring/support; treatment-only 20-year present value approximately \$373,000 to \$657,000
- **20-Year Present Value:** Combined pipe + treatment present values: BulletLiner approximately \$3.94 million with nitrate, \$4.21 million with ferric chloride, or \$3.97 to \$4.26 million with sodium hydroxide
- **Cost Basis:** Final rehabilitation limits, feed location, chemical selection, and dosage remain subject to condition assessment and field demonstration

Overall Assessment. Alternative 3 provides the most direct protection against the identified DIP corrosion risk while potentially reducing the length and detention time requiring chemical treatment. It also carries the highest initial capital cost. Selection should follow condition assessment of the DIP, confirmation of rehabilitation and replacement limits, site evaluation for the downstream feed location, and comparative chemical testing.

Alternative 4 – Odor Control at Outfall Combined with Rehabilitation or Replacement of the DIP Force Main Sections

This alternative would rehabilitate or replace the existing DIP sections using the same physical improvement options described under Alternative 3 but would limit active treatment to vapor-phase odor control at the outfall. A replacement carbon adsorption system would capture air from the discharge structure and remove H₂S and other odor-causing compounds before discharge to the atmosphere.

This approach protects the DIP through lining or replacement and can provide effective local odor control. However, it does not prevent sulfide formation in the force main or reduce the dissolved sulfide load entering Blair's gravity collection system. Corrosion and odor concerns may therefore persist downstream of the controlled outfall structure.

Preliminary planning information for a SulphaSorb XL carbon system indicated media replacement approximately every three months at an estimated \$10,000 per changeout plus approximately \$5,000 labor, or about \$60,000 per year. A planning level equipment cost of \$200,000 results in an odor-control-only 20-year present value of approximately \$948,000 at 5 percent, before adding DIP rehabilitation or replacement. Combining this with the current pipe planning costs produces an approximate 20-year present value of \$4.55 million for BulletLiner plus odor control, excluding refinements to site work and future media pricing.

Planning-Level Cost Summary

- **DIP Improvement Capital Cost:** \$3.60 million for BulletLiner
- **Odor-Control Equipment Capital Cost:** Approximately \$200,000
- **Other Annual O&M / Media and Labor:** Approximately \$60,000 per year

- **Odor-Control-Only 20-Year Present Value:** Approximately \$948,000 at 5 percent
- **Combined 20-Year Present Value:** Approximately \$4.55 million with BulletLiner
- **Cost Basis:** Excludes refinements to site work and future media pricing

Overall Assessment. Alternative 4 can protect the DIP and control odor at the immediate outfall, but it provides less comprehensive downstream protection than liquid-phase treatment and requires recurring carbon media replacement. It should remain available for comparison where the city prioritizes a straightforward outfall odor-control system and Blair accepts the remaining dissolved sulfide load.

Alternative 5 - Oxygen Injection / Superoxygenation

This alternative consists of introducing oxygen directly into the wastewater stream to maintain aerobic conditions within the forcemain and suppress sulfide generation. Technologies considered included pure oxygen systems and superoxygenation technologies capable of increasing dissolved oxygen concentrations within the wastewater.

Oxygenation technologies theoretically offer significant benefits because they directly address the biological mechanisms responsible for sulfide generation. However, these systems are not commonly implemented within Nebraska wastewater collection systems and there are limited local reference installations available for comparison. The project team also identified limited familiarity among regional operators and maintenance personnel with these systems.

During preliminary discussions with vendors, this technology was discouraged due to the length of the forcemain and the inability for the injection to produce lasting results over the hydraulic retention time that is present.

Planning-Level Cost Summary

- **Capital Cost:** Not developed
- **Annual Chemical Cost:** Not developed
- **Other Annual O&M:** Not developed
- **20-Year Present Value:** Not developed
- **Cost Status:** Screened from further consideration

Overall Assessment. This alternative is screened from further consideration due to its limited implementation history within Nebraska and expected ineffectiveness.

Alternative 6 - Ozone/Oxygen Injection

This alternative involves injecting ozone into the wastewater stream to oxidize sulfides and reduce hydrogen sulfide generation. Ozone-based systems are capable of effectively reducing sulfides and controlling odors but generally require specialized equipment, process controls, and operator expertise.

Ozone treatment systems are not commonly utilized within Nebraska wastewater collection systems and few local reference installations were identified.

During preliminary discussions with vendors, this technology was discouraged due to the length of the forcemain and the inability for the injection to produce lasting results over the hydraulic retention time that is present.

Planning-Level Cost Summary

- **Capital Cost:** Not developed
- **Annual Chemical Cost:** Not developed
- **Other Annual O&M:** Not developed

- **20-Year Present Value:** Not developed
- **Cost Status:** Screened from further consideration

Overall Assessment. Due to limited regional implementation experience and expected ineffectiveness of the technology to provide meaningful treatment, this alternative is removed from further consideration.

6.0 Alternatives Comparison

Table 6-1. Alternatives Comparison

Alternative	Primary Function	Key Advantage	Primary Limitation	Status
1. No Action	Baseline	No initial capital or O&M cost	Does not address odor, corrosion, safety, or downstream impacts	Baseline
2. Lift Station Chemical Injection	Full-length liquid-phase H ₂ S control	Provides treatment through the full force main and avoids immediate DIP rehabilitation	Highest chemical demand; effectiveness and downstream impacts vary by chemical	Retained
3. DIP Lining + Downstream Liquid-Phase Treatment	Structural DIP protection plus downstream liquid-phase treatment	Directly protects DIP and shortens the chemical-treatment reach	High capital cost; feed location and chemical dosage require confirmation	Retained
4. DIP Lining + Outfall Odor Control	Structural DIP protection plus local vapor-phase treatment	Direct DIP protection with localized outfall odor control	Does not reduce dissolved sulfide entering Blair's gravity system	Retained
5. Oxygen/Superoxygenation	Biological suppression of sulfide formation	Directly targets anaerobic conditions	Treatment effect is not expected to persist through the full force main	Screened
6. Ozone/Oxygen Injection	Sulfide oxidation	Directly oxidizes sulfide	Specialized equipment and treatment effect not expected to persist through the full force main	Screened

Note: Chemical subalternatives retained under Alternatives 2 and 3 are nitrate, iron salt, and sodium hydroxide. The preferred chemical and feed location cannot be selected solely from planning calculations and should be field demonstrated and verified. Field demonstration results, DIP condition information, operator requirements, lifecycle cost, and coordination with Blair should be used to complete the final comparison.

Table 6-2. Planning-Level Cost Comparison

Alternative / Component	Capital Cost	Annual Chemical Cost	Other Annual O&M	20-Year Present Value
1. No Action	\$0	\$0	\$0 for active treatment	Not calculated
2A. Lift Station Nitrate	Approx. \$150,000	Approx. \$125,560/year	Approx. \$4,800/year	Approx. \$1.77 million
2B. Lift Station Ferric Chloride	Approx. \$250,000	Approx. \$65,700/year	Approx. \$4,800/year	Approx. \$1.13 million
2C. Lift Station Sodium Hydroxide	Approx. \$200,000	Approx. \$9,100–\$31,900/year	Approx. \$4,800/year	Approx. \$373,000–\$657,000
3. BulletLiner Rehabilitation	Approx. \$3.60 million	N/A	N/A	Approx. \$3.94M nitrate / \$4.21M ferric / \$3.97M–\$4.26M NaOH
~~3. PVC Replacement~~	~~Approx. \$3.00 million~~	~~N/A~~	~~N/A~~	~~Approx. \$3.34M nitrate / \$3.61M ferric / \$3.37M–\$3.66M NaOH~~
3A. Downstream Nitrate	Approx. \$150,000	Approx. \$10,600/year	Approx. \$4,800/year	Approx. \$342,000 treatment only
3B. Downstream Ferric Chloride	Approx. \$250,000	Approx. \$23,725/year	Approx. \$4,800/year	Approx. \$605,000 treatment only
3C. Downstream Sodium Hydroxide	Approx. \$200,000	Approx. \$9,100–\$31,900/year	Approx. \$4,800/year	Approx. \$373,000–\$657,000 treatment only
4A. Carbon Odor Control Only	Approx. \$200,000	N/A	Approx. \$60,000/year	Approx. \$948,000
~~4B. PVC Replacement + Carbon odor-control equipment~~	~~Approx. \$3.00 million pipe + \$200,000 odor-control equipment~~	~~N/A~~	~~Approx. \$60,000/year~~	~~Approx. \$3.95 million~~
4C. BulletLiner + Carbon	Approx. \$3.60 million pipe + \$200,000 odor-control equipment	N/A	Approx. \$60,000/year	Approx. \$4.55 million
5. Oxygen / Superoxygenation	Not developed	Not developed	Not developed	Not developed
6. Ozone / Oxygen Injection	Not developed	Not developed	Not developed	Not developed

Note: Costs presented above are planning-level estimates and are not uniformly developed across all alternatives. “Not developed” indicates that sufficient information is not currently available to establish a reliable planning cost, while “N/A” indicates that the cost category is not applicable to the identified component. Present values shown are calculated over a 20-year period using a 5-percent discount rate. Alternative 3 costs are presented by component because the permanent downstream chemical, dosage, feed location, and feed-system requirements remain subject to confirmation through field demonstration. No Action excludes future emergency repair, rehabilitation, or replacement costs. Accordingly, the present-value estimates should not be interpreted as a complete lifecycle cost ranking of all alternatives.

7.0 Additional Investigations and Confirmations

7.1 Force Main Condition Assessment

A free-swimming smart-ball-type inspection, such as the INGU Piper system, should be considered before finalizing the extent of DIP rehabilitation or replacement. The inspection can be deployed through the operating force main and may identify wall-loss anomalies, gas or air pockets, deposits, and changes in pipe response that can assist with locating transitions between PVC and DIP. The results would help determine whether the observed DIP deterioration is widespread or concentrated at locations associated with gas accumulation or other hydraulic conditions.

Preliminary budget information provided for the approximately 10-mile force main identifies about \$55,000 for owner/self-performed deployment with one technician providing field instruction and support, or about \$105,000 for contractor-performed deployment and field services. Both approaches include post-inspection analysis and reporting. Continuous flow requirements, insertion and retrieval configuration, supplemental water needs, and the ability to maintain transport of the tool at the current pumping rate should be confirmed before authorization.

Following review of the inspection results, targeted excavation and direct wall-thickness verification may be warranted at selected anomalous and non-anomalous DIP locations. A preliminary allowance of less than approximately \$50,000 was identified for such a verification program, excluding unusual excavation or restoration conditions.

The condition-assessment results should be used to refine the extent of DIP requiring rehabilitation or replacement and to update the planning-level costs presented in Section 5. Where inspection results identify areas of concern, targeted excavation and direct wall-thickness measurements should be used as appropriate to verify the observed condition before final rehabilitation limits are established.

7.2 Chemical Injection Demonstration

A controlled field demonstration at the lift station is recommended to compare calcium nitrate, ferric chloride, and 25-percent sodium hydroxide under comparable operating and monitoring conditions. USP Technologies provided preliminary budget information of less than \$20,000 for chemicals, temporary dosing equipment, and monitoring services associated with a short-term comparative trial. The scope and budget should be confirmed before authorization, including the extent to which laboratory analyses, temporary connections, mobilization, Blair sampling, and final reporting are included.

The demonstration plan should be coordinated with Blair before testing begins, including agreement on downstream monitoring locations, constituents of concern, sampling frequency, and the performance and downstream-impact criteria that will be used to evaluate each chemical. This coordination should provide a common basis for determining whether each treatment approach is feasible and acceptable for Fort Calhoun's force main and Blair's downstream collection and treatment system.

The demonstration should establish the dose-response relationship, required treatment residual or target pH, chemical consumption, reduction in gas-phase H₂S at the outfall, persistence of treatment through the force main, potential downstream impacts, and projected annual chemical cost for each treatment approach. Monitoring should include chemical feed rate, force-main flow, liquid sulfide, sulfate, pH, alkalinity, temperature, gas-phase H₂S, and applicable downstream constituents at Blair. The test plan should establish baseline conditions and comparable operating periods for each chemical and should define the performance criteria used to determine whether each treatment approach warrants further consideration.

If Alternative 3 remains under consideration, the demonstration should also evaluate whether chemical addition at an accessible downstream location can provide adequate mixing and treatment before the outfall.

Downstream testing is particularly important for confirming the preliminary nitrate dose, developing an iron-salt dose, and determining whether sodium hydroxide can maintain the required pH through the critical downstream reach.

8.0 Findings

Based on review of system information, field observations, wastewater sampling, H₂S monitoring, vendor coordination, and alternatives evaluation, the following findings were developed:

1. The approximately 3.3-day hydraulic residence time creates conditions favorable for sulfide generation, and outfall monitoring confirmed average H₂S concentrations of approximately 57 ppm with peaks near 220 ppm.
2. The existing outfall carbon scrubber is non-operational, and corrosion has been observed at the discharge and in DIP components.
3. No Action does not meet the project objectives.
4. Lift-station chemical injection with nitrate, iron salt, or sodium hydroxide can be implemented without immediate full-length DIP rehabilitation but requires permanent chemical handling and treatment over the full force main detention time.
5. Physical protection of the DIP through lining or PVC replacement can be paired with downstream liquid-phase treatment to shorten the chemical-treatment reach and may reduce chemical demand while addressing the identified DIP corrosion risk.
6. Physical protection of the DIP combined with outfall odor control can address local odor and pipe condition but does not reduce dissolved sulfide entering Blair's gravity system.
7. Oxygen/superoxygenation and ozone/oxygen injection are screened because vendors do not expect treatment to persist over the force main detention time.
8. Available condition and sulfide data are not sufficient to finalize rehabilitation limits, chemical selection, or dosage without additional investigation and field testing.

9.0 Recommendations

Embris recommends that the city first conduct the proposed comparative chemical-injection demonstration to confirm the feasibility and effectiveness of nitrate, ferric chloride, and sodium hydroxide treatment. The demonstration should establish preliminary design dosage, treatment performance, monitoring requirements, potential downstream impacts, and expected operating costs for the alternatives tested. Before testing begins, the demonstration plan should be coordinated with Blair, including agreement on downstream monitoring locations, constituents of concern, and the criteria that will be used to evaluate treatment performance and potential impacts to Blair's collection and treatment system.

In parallel with or following the chemical demonstration, the City should consider completing the proposed condition assessment of the force main to better define the condition and extent of the existing DIP sections and determine whether rehabilitation or replacement is warranted. Targeted excavation and direct wall-thickness verification should be performed where warranted by the inspection results. The condition-assessment results should then be used to refine the rehabilitation or replacement limits and associated planning-level capital costs.

Pending completion of these investigations, the City should inspect the existing discharge structure and associated wastewater, electrical, structural, access, and metallic components and address conditions

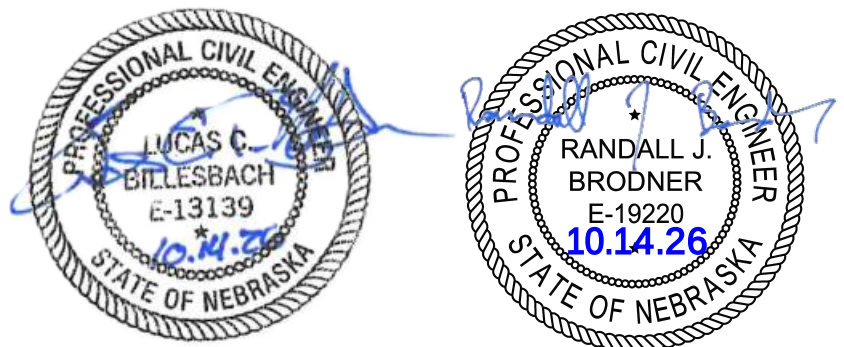
determined to require near-term corrective action. This inspection should focus on identifying deterioration that warrants attention while the longer-term H₂S-control improvements are being evaluated.

If the City elects to rehabilitate or replace the DIP sections, Embris recommends advancing a downstream in-line chemical-injection system generally consistent with Alternative 3, provided the field demonstration confirms that a feasible downstream feed location can achieve the required treatment performance and is acceptable to Blair. The permanent feed location should be downstream of the rehabilitated or replaced DIP and sufficiently upstream of the outfall to provide adequate mixing and treatment before discharge to Blair's system.

If the City elects not to rehabilitate or replace the DIP sections, Embris recommends advancing chemical injection at the lift station generally consistent with Alternative 2 so that treatment begins before wastewater enters the force main.

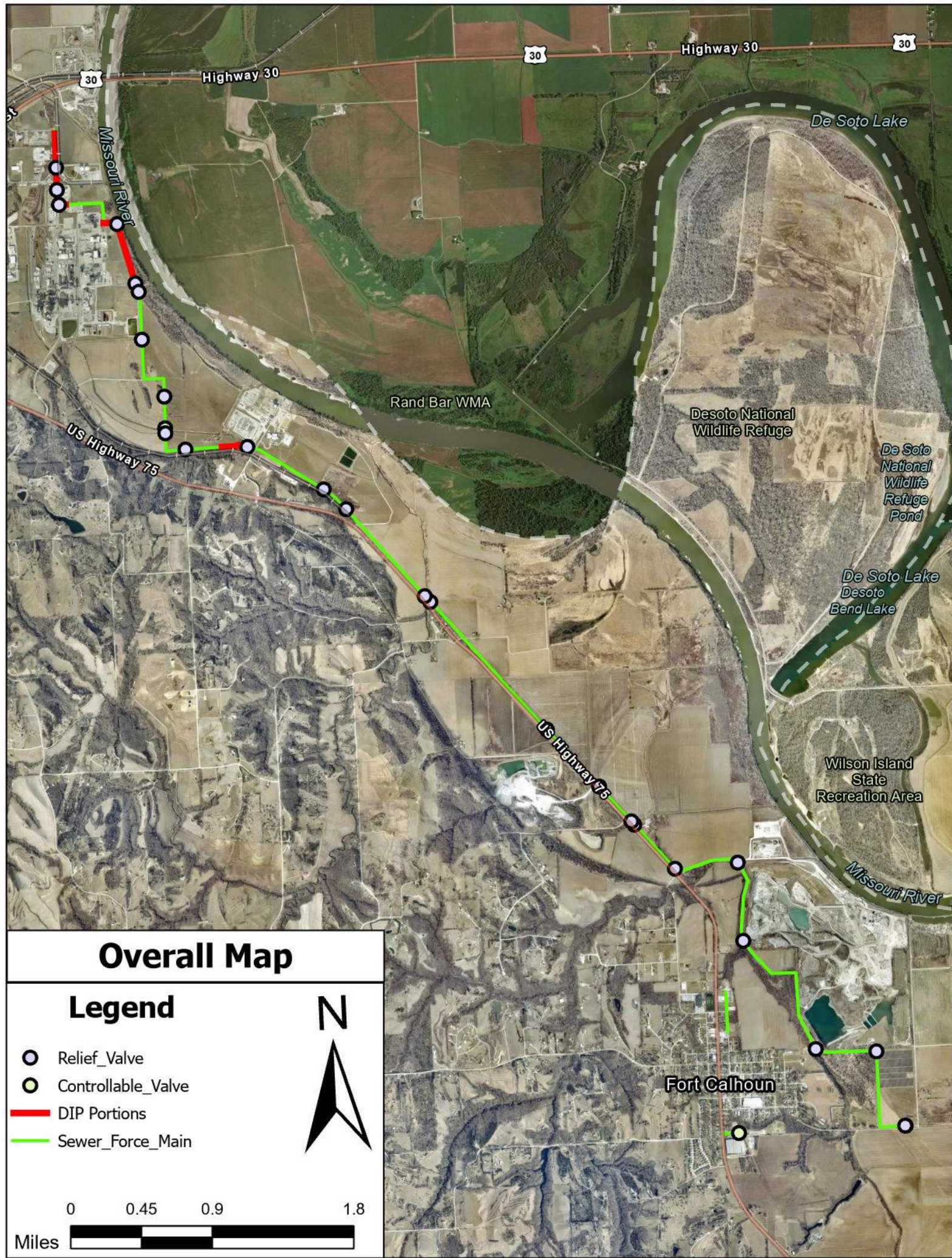
Alternative 4 should remain available as a supplemental or contingency measure if localized outfall odor control is required and Blair accepts the remaining dissolved sulfide load entering its collection system. Alternatives 5 and 6 should remain screened from further consideration.

Final chemical selection, feed location, rehabilitation limits, equipment sizing, capital cost, annual O&M cost, and lifecycle cost should be established following completion of the chemical demonstration, force-main condition assessment, and coordination with Blair.



appendix A

Force Main Maps with DIP Locations

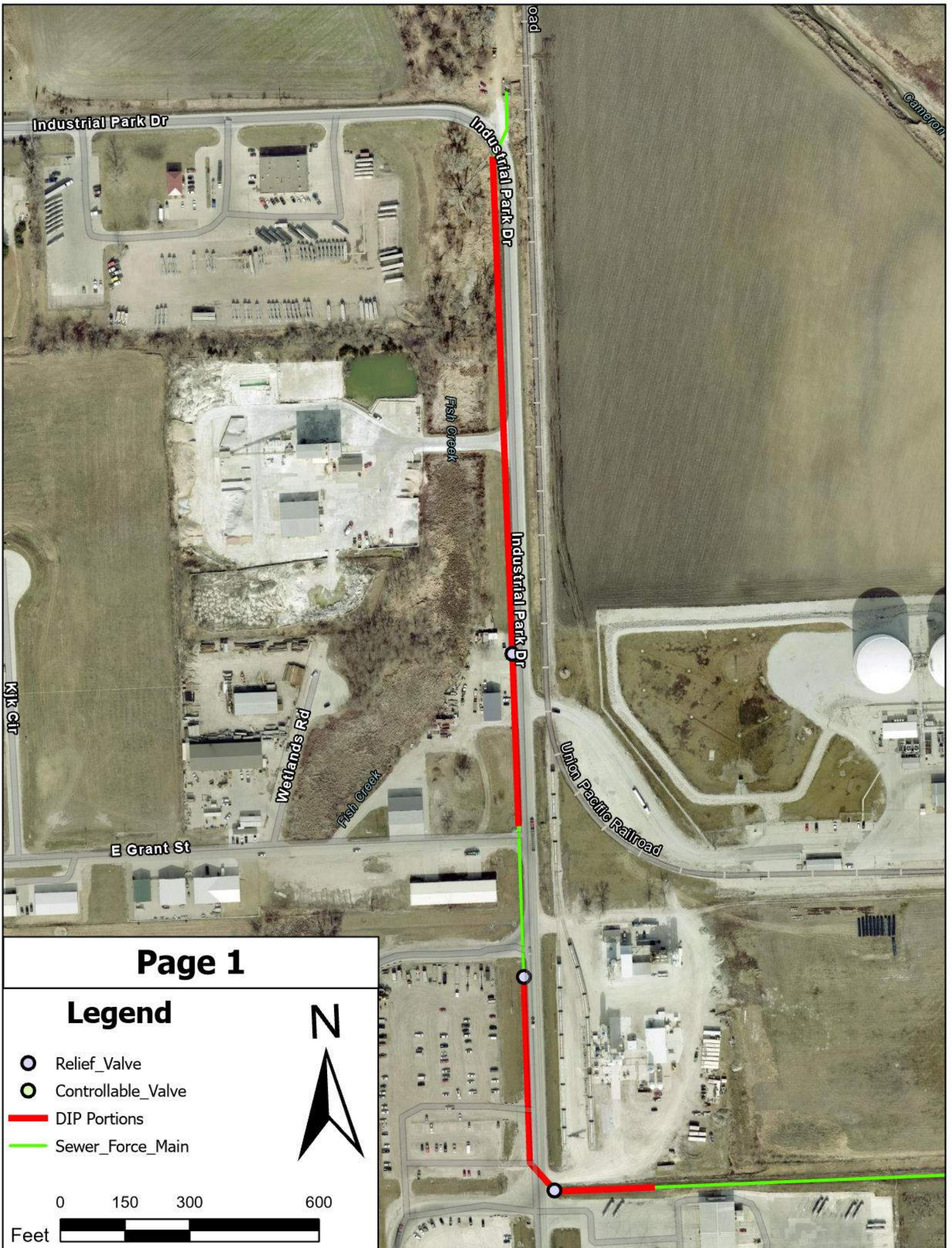


Overall Map

Legend

- Relief_Valve
- Controllable_Valve
- DIP Portions
- Sewer_Force_Main





Page 1

Legend

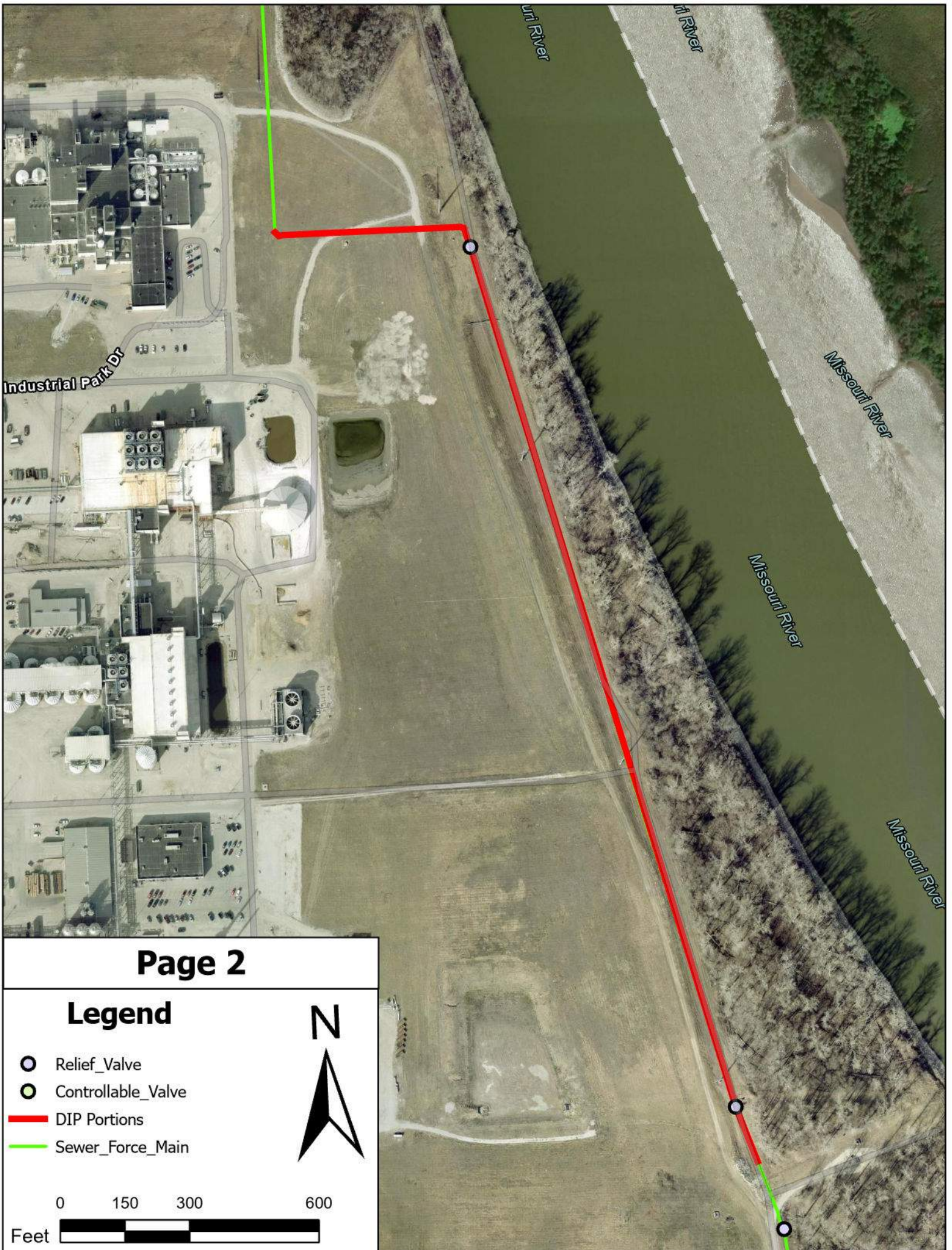
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- Controllable_Valve
- DIP Portions
- Sewer_Force_Main



0 150 300 600

Feet

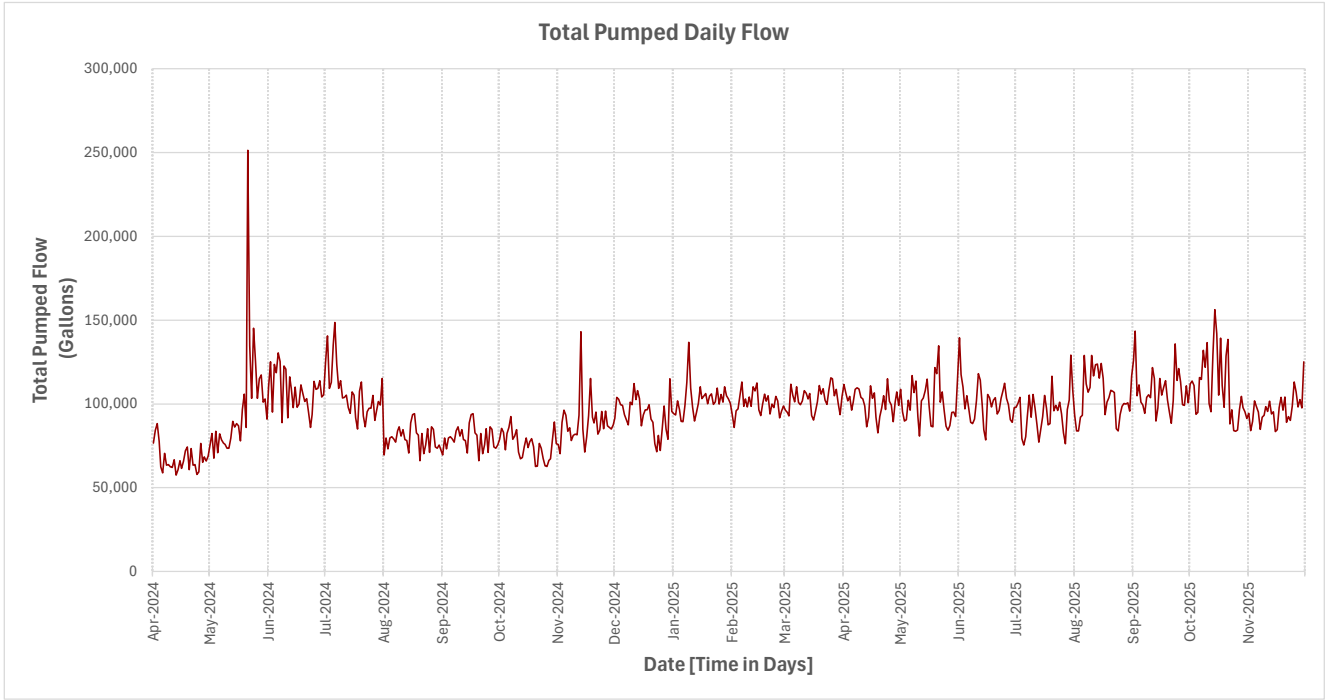




appendix B

Pumping Data and Hydraulic Residence Time Analysis

Fort Calhoun Lift Station - Summary of Pump Data							
Month / Year	Avg. Total Gal/Day	Avg. FM Hydraulic Residence Time (days)	Avg. Daily Total Pumping Hours (hours / day)	Avg. Daily Pumping Rate (gpm)	Avg. Daily Total Pumping Cycles	Avg. Time Between Cycles (min)	Avg. Pump Cycle Length (min)
Apr 2024	67,265	4.6	4.9	230.7	40.7	36.1	7.3
May 2024	97,678	3.4	6.1	282.1	48.9	30.1	7.5
Jun 2024	107,819	2.9	5.8	309.7	53.4	27.1	6.6
Jul 2024	106,740	2.9	5.9	313.2	54.0	27.0	6.6
Aug 2024	79,581	3.9	5.8	228.8	47.8	30.4	7.3
Sep 2024	79,581	3.9	5.8	228.8	47.8	30.4	7.3
Oct 2024	75,405	4.1	5.6	233.0	43.1	33.9	7.9
Nov 2024	88,735	3.5	6.7	221.2	50.9	28.5	7.9
Dec 2024	93,781	3.3	6.0	272.9	52.2	28.3	7.0
Jan 2025	102,456	3.0	6.0	298.9	54.8	26.6	6.6
Feb 2025	100,323	3.1	5.6	301.3	54.5	26.7	6.2
Mar 2025	103,151	3.0	5.6	321.6	53.4	27.4	6.4
Apr 2025	101,100	3.1	5.3	320.1	52.6	27.6	6.0
May 2025	100,899	3.1	6.0	294.6	55.9	26.4	6.5
Jun 2025	101,292	3.1	6.3	267.1	58.0	25.1	6.6
Jul 2025	95,107	3.3	6.8	244.6	57.5	25.3	7.1
Aug 2025	104,752	3.0	7.9	230.6	60.4	24.2	8.0
Sep 2025	108,169	2.9	7.2	249.5	57.1	25.5	7.6
Oct 2025	110,060	2.9	7.1	270.2	55.5	26.4	7.7
Nov 2025	96,752	3.2	6.3	254.7	49.1	29.8	7.8
Average	96,067	3.3	6.2	262.5	52.4	28.1	7.1



appendix C

Wastewater Sampling Results

26-112-4176REPORT DATE
Apr 22, 2026
RECEIVED DATE
Apr 17, 2026SEND TO
67861**PAGE 1/1**ISSUE DATE
Apr 22, 2026

**EMBRIS GROUP
LUCAS BILLESBACH
963 N 13Th St
Fort Calhoun NE 68023-2077**

REPORT OF ANALYSIS

For: (67861) EMBRIS GROUP
Sulfate Sulfide Alka pH

Sample 5501604-1 taken at force main discharge
Sample 5501604-2 taken at lift station influent pipe

Analysis	Level Found		Reporting		Analyst- Date	Verified- Date
	As Received	Units	Limit	Method		
Sample ID: 5501604-1	Lab Number: 70788956	Date Sampled: 2026-04-16 1242				
Sulfate	2.6	mg/L	1.5	EPA 300.0	jsp9-2026/04/17	jdb5-2026/04/21
Sulfide	1.1	mg/L	1.0	SM 4500 S2- F(2021)	Gas9-2026/04/22	mgn8-2026/04/22
Alkalinity to pH 4.5 (endpoint)	467	mg CaCO3/L	20	SM 2320 B-(2021)	Ppj2-2026/04/22	mgn8-2026/04/22
pH	7.55	S.U.	0.10	SM 4500-H+ B-(2021)	dsn7-2026/04/20	jdb5-2026/04/21
Sample ID: 5501604-2	Lab Number: 70788957	Date Sampled: 2026-04-16 1325				
Sulfate	218	mg/L	7.5	EPA 300.0	jsp9-2026/04/17	jdb5-2026/04/21
Sulfide	< 1.0	mg/L	1.0	SM 4500 S2- F(2021)	Gas9-2026/04/22	mgn8-2026/04/22
Alkalinity to pH 4.5 (endpoint)	< 400	mg CaCO3/L	20	SM 2320 B-(2021)	Ppj2-2026/04/22	mgn8-2026/04/22
pH	7.15	S.U.	0.10	SM 4500-H+ B-(2021)	dsn7-2026/04/20	jdb5-2026/04/21

All results are reported on an AS RECEIVED basis, ppm = parts per million, ppm = mg/L

For questions please contact:

Calvin J Sterkel-Colombo
Account Manager
ccolombo@midwestlabs.com (402)829-9858

The result(s) issued on this report only reflect the analysis of the sample(s) submitted.

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**EMBRIS GROUP
LUCAS BILLESBACH
963 N 13Th St
Fort Calhoun NE 68023-2077**

REPORT OF ANALYSIS

For: (67861) EMBRIS GROUP
BOD

Sample 5502009-1 taken at force main discharge
Sample 5502009-2 taken at lift station influent pipe

Analysis	Level Found		Reporting		Analyst- Date	Verified- Date
	As Received	Units	Limit	Method		
Sample ID: 5502009-1	Lab Number: 70788954	Date Sampled: 2026-04-16 1230				
Biochemical oxygen demand	141	mg/L	91.1	SM 5210 B-(2016)	jsp9-2026/04/22	mgn8-2026/04/22
Sample ID: 5502009-2	Lab Number: 70788955	Date Sampled: 2026-04-16 1325				
Biochemical oxygen demand	358	mg/L	27.3	SM 5210 B-(2016)	jsp9-2026/04/22	mgn8-2026/04/22

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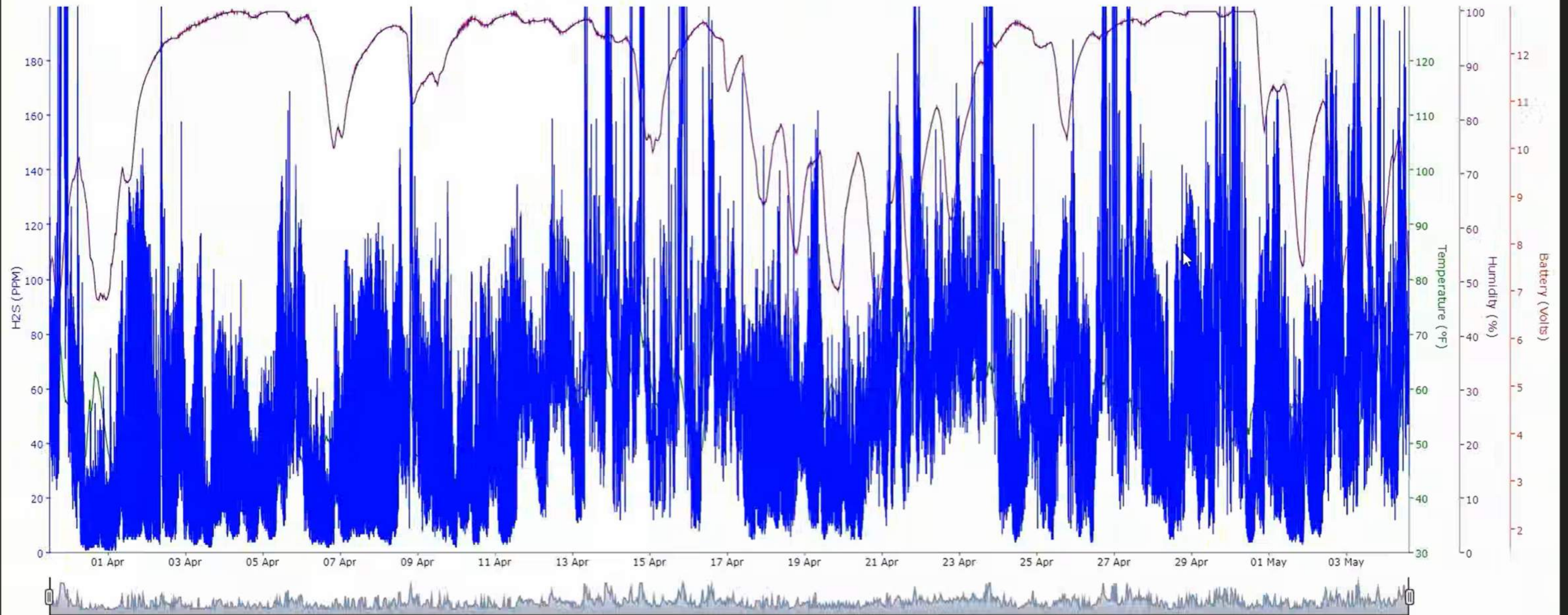
appendix D

H₂S Monitoring Results

Edit

Fort Calhoun.jpg

H2S-230507170:[LOTT Centrate]



Average: 57.06 PPM; Minimum: 0 PPM; Maximum: 220 PPM [3/30/2026, 11:47:42 AM --- 5/4/2026, 3:14:42 PM]

appendix E

Vendor Technical Information

ODOR CONTROL POINT:
Fort Calhoun NE
Nitrate Limit (mg/L):
5.0
Sulfide Limit (mg/L):
1.0
Influent BOD (mg/L):
250.0
Temp (°C):
23.9
Initial Sulfate (mg/L):
50.0
Influent Sulfide (mg/L):
2.0

FORCE MAIN PHYSICAL DATA

Item	Feed Site	Average Daily Flow (GPD)	Force main Length (ft)	Force main Diameter (in)	Average Retention Time (hrs)	Average Sulfide Prevented (lbs/day)	Average Sulfide Prevented (mg/L)
1	Fort Calhoun discharge manhole	96,000	52,800	12.0	77.5	13.4	16.7

BIOXIDE FEEDRATE ANALYSIS

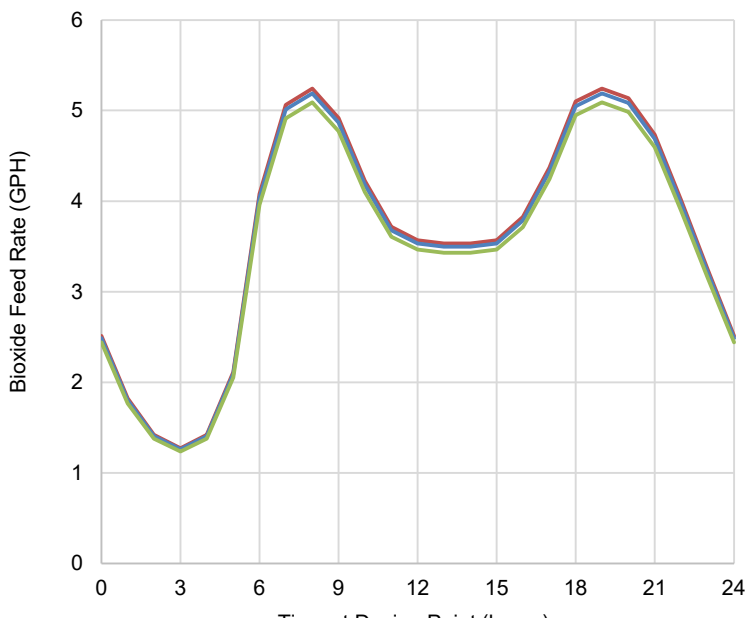
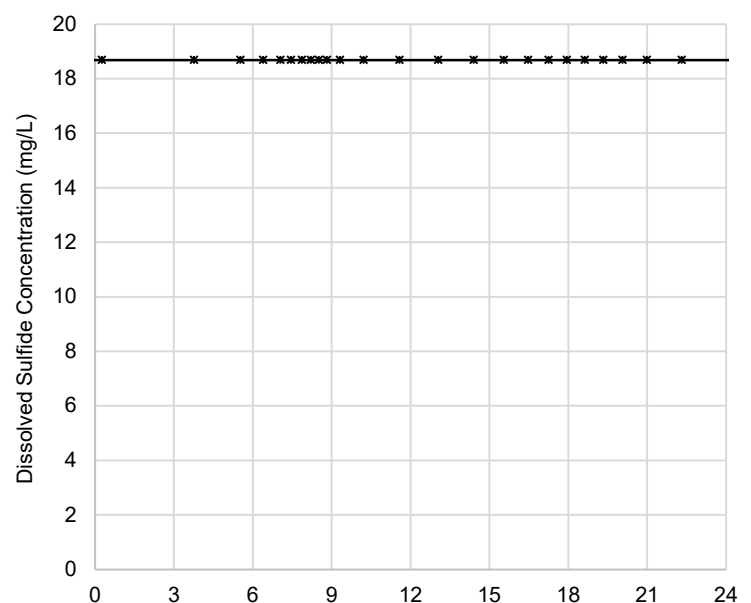
Item	Feed Site	Average Daily Flow (GPD)	Influent Sulfide Removed (lbs/day)	Influent Sulfide Removal Dose (GPD)	Optimal Prevention Dose (GPD)	Nitrate Limit Over Dose (GPD)	Sulfide Limit Under Dose (GPD)
1	Fort Calhoun discharge manhole	96,000	1.6	1.1	85.7	0.9	-1.7

SUMMARY

Item	Feed Site	Average Daily Flow (GPD)	Average Sulfide at Discharge (mg/L)	BOD Removal from Optimal Dose (%)	Total Optimal Dose (GPD)	Total Over Dose (GPD)	Total Under Dose (GPD)
1	Fort Calhoun discharge manhole	96,000	18.7	100.0%	86.8	87.7	85.1

NITROGEN / AMMONIUM RELEASE FROM TOTAL OPTIMAL DOSE

Item	Feed Site	Average Daily Flow (GPD)	Total Optimal Dose (GPD)	Nitrogen Released (lbs/day)	Nitrogen Released (cu.ft. / day)	Ammonium Released (lbs/day)	Ammonium at Discharge (mg/L)
1	Fort Calhoun discharge manhole	96,000	86.8	88.6	1245.3	8.4	10.5

BIOXIDE Feed Rate Estimates

Potential Sulfide at Outlet


BIOXIDE® BIOCHEMICAL SOLUTION - THE NATURAL CHOICE FOR ODOR AND CORROSION CONTROL

BIOXIDE® solution is a unique, proven product because it achieves sewage odor control naturally, rather than chemically. This process eliminates the odor, prevents corrosion and overcomes safety concerns associated with atmospheric hydrogen sulfide.

BIOXIDE solution controls hydrogen sulfide odors and corrosion biologically. Introduction of nitrate oxygen via addition of BIOXIDE solution into a waste stream creates an environment in which certain naturally occurring bacteria thrive. These bacteria utilize the dissolved hydrogen sulfide which is present as a part of their metabolism, thereby cost effectively removing any dissolved hydrogen sulfide from the wastewater. As a result, BIOXIDE solution both removes dissolved hydrogen sulfide and prevents its formation.

In addition to hydrogen sulfide, BIOXIDE also combats most other odors commonly found in wastewater treatment systems. BIOXIDE solution has proven effective treatment in many types of wastewater facilities, in widely varying flows, and in any kind of weather.

TYPICAL PHYSICAL PROPERTIES

Nitrate Oxygen Content	3.5 lb/gal
Appearance	Clear and colorless to slightly tan
Odor	Odorless
Solubility in Water	Complete
Specific Gravity	1.42 - 1.48 at 68°F
Density	11.8 - 12.4 lb/gal at 68°F
Freezing Point	-30°F
pH	4 - 8

Typical properties are listed for information only, and are not to be considered as specification requirements. These items are not analyzed on a routine basis.

Typical Applications

- Force mains/Pressure mains
- Gravity interceptors
- Lift Stations
- Biosolids processing
- Ponds and lagoons

Proper dosage (as determined by Evoqua Water Technologies) of BIOXIDE treatment solution to a sludge or a wastewater stream, provides for a population of beneficial bacteria which oxidize dissolved hydrogen sulfide and other reduced sulfur compounds as part of their metabolism. By treating the hydrogen sulfide both in flow and solids of the wastewater stream, the process prevents release of hydrogen sulfide into the air, reducing odors and corrosion.

Typical Feed Requirements

Treatment is typically applied in a collection system upstream of the odorous control point. From a carefully selected point(s), the benefits will spread throughout the collection system to the influent of the treatment plant. The process has been documented to reduce dissolved hydrogen sulfide from over 50 mg/l to < 0.1 mg/l in numerous wastewater collection force mains, wet wells and gravity interceptors. Similar results have been achieved with BIOXIDE treatment in sludge lagoons and storage tanks. Due to the biochemical nature of this process, complete sulfide removal is extremely cost effective in applications where extended detention times produce septic conditions.

For additional treatment information, including dosage specific to your application, please contact your Evoqua Water Technologies representative.

Storage and Handling

Bioxide solution contains no substances that are listed on the Extremely Hazardous Substances (EHS) under Section 302 of EPCRA or on the Extremely Hazardous Substances (EHS) Release Notification under Section 304 of the EPCRA. Bioxide Solution is not listed as a CERCLA hazardous substance. The active ingredient is nitrate oxygen which is a stable compound found in nature. This compound is selected as the active ingredient for BIOXIDE solution because it specifically interacts with naturally occurring bacteria to remove and prevent dissolved sulfide, resulting in an effective, safe and cost efficient product.

Can be stored outdoors in ambient conditions. Follow all local, state and federal regulations for storage. Do not dump on the ground or release into any body of water. All disposal methods must be in compliance with all Federal, State, Local and Provincial laws, and regulations. Regulations may vary in different locations.

See Safety Data Sheet for additional safety and handling information before storing or handling BIOXIDE solution.

Packaging

BIOXIDE solution is normally shipped in 3,800 gallon bulk tanker loads. Mini bulk deliveries (<2,000 gallons) are available in many parts of the country. For further information, please contact your Evoqua Water Technologies representative. For reorders and customer service, call 1.800.345.3982.



210 Sixth Avenue, Suite 3300, Pittsburgh, PA 15222

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MS-BIOXIDE-DS-0921



Link2Site® System Site Details Interface

LINK2SITE® REMOTE MONITORING SYSTEM

The Link2Site® Remote Monitoring System is a 3G cellular-internet based monitoring and control solution designed to accommodate Evoqua Full Service Odor Control service centers, customers, and sites. Link2Site monitoring utilizes the cellular networks national coverage to provide a reliable, secure, low-cost monitoring and control system. In addition to acting as a remote monitoring platform, the Link2Site system can generate email and text alarm notifications to immediately alert users of non-compliant conditions at the application and control points.

The Link2Site system interfaces with remote telemetry devices including tank level indicators, hydrogen sulfide monitors, and remote dosing equipment to provide a superior level of visibility and control of end user odor and corrosion control programs. The Link2Site user interface is password protected and accessible on any web enabled device, allowing application site data to be securely accessed anywhere at anytime.

Features and Benefits

- Password protected, easy-to-use graphic interface
- Site specific user data archive
- Accessible on any web enabled device
- Two-way communication with remote devices
- Remote chemical dose rate adjustment
- Remote tank volume inventory
- Remote hydrogen sulfide concentration monitoring
- Immediate notification of alarm conditions

Site Data	
Site Name:	
Site Type:	VersaDose
Status:	Active
System Information:	
Customer:	
Service Center:	Wilmington
Product:	Hydrogen Peroxide 50%
Inventory Information:	
Inventory (Gals):	2383
Capacity (Gals):	6650
To Fill (Gals):	4267
Inventory %:	35%
Estimated Usage Information:	
24-Hr Adj. Dose Totalizer:	308 Gallons
24-Hr Tank Drop:	304 Gallons
Delta Dose Setpoint:	10 %
Actual Delta Dose:	1 %
Days worth of storage:	7.1 Days
Control Scheme:	
Control Mode:	Curve Dosing
Delivery Information:	
Last Fill Date:	7/5/2017
Last Fill Amount:	3457 Gallons
BOL Fill Date:	na
BOL Fill Amount:	na
Hydrogen Sulfide (H₂S) Monitor:	
Status:	OFF
Daily Raw Feed Rates (gallons/day):	
Saturday:	293
Sunday:	293
Monday:	293
Tuesday:	293
Wednesday:	293
Thursday:	293
Friday:	293
Week Total:	2058
Daily Adjusted Feed Rates (gallons/day):	
Saturday:	257
Sunday:	249
Monday:	250
Tuesday:	266
Wednesday:	285
Thursday:	309
Friday:	277
Week Total:	1897
Chemical Pump Status:	
Pump 1 Status:	Auto
Pump 2 Status:	Off

Hydrogen Sulfide Monitoring

The Vaporlink® Hydrogen Sulfide Monitor was designed to communicate directly with the Link2Site platform, allowing the user to access H₂S data from any location with an internet connection. The Vaporlink monitor is equipped with a programmable monitoring interval from once per second to once per hour. The data transmitted to the Link2Site® system is stored indefinitely and can be accessed for any date range. The Vaporlink monitor can be programmed with high level, average, and low level alarm setpoints.

Tank Level Monitoring

The Link2Site system boasts a robust chemical inventory monitoring function, allowing for the use of ultrasonic or pressure sensing level indicators in both vertical and horizontal tanks. The function works by receiving an SMS tank level signal from the chemical storage location. The data is then stored in the system database where it can be viewed graphically or downloaded for any date range.

In addition to monitoring storage tank volume, the Link2Site system compares the tank inventory to the targeted daily feed rate, monitoring for deviations and indicating a delta dose condition or a tank fill.

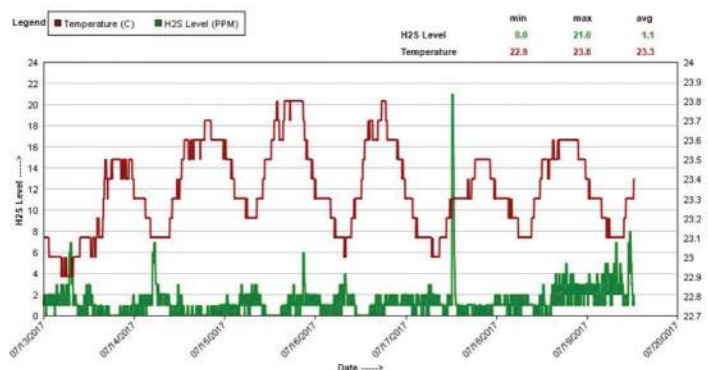
Alarms available from the tank monitoring function include: Tank high Level, Tank Low Level, Tank Empty, and Delta Dose.

Automated Dose Control

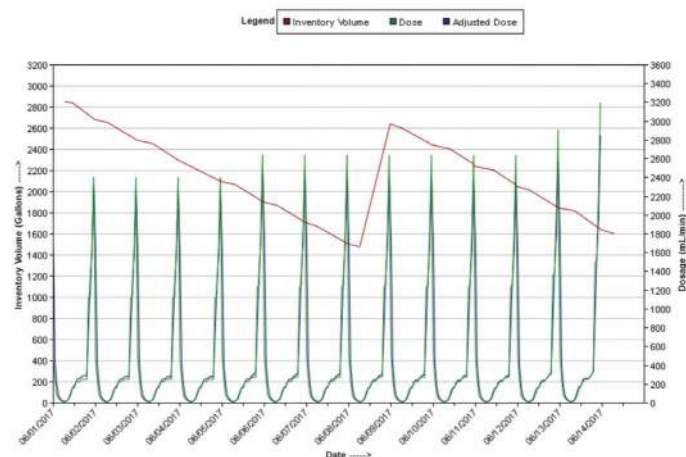
Evoqua brand Versadose® and Versadose LT Automated Dosing Controllers are fully configurable through the Link2Site system user interface. This allows users to monitor the status of chemical feed equipment, make adjustments to the 168 point dose curve, manipulate daily/global adjustment factors, and view or download historical data including tank inventory, sewage flow, chemical dose, and hydrogen sulfide concentration.

Alarms associated with Versadose controllers include, but are not limited to: Chemical Pump Overcapacity, VFD Fault, Dose Adjust, Leak Detect, Pump Lockout, etc.

Atmospheric H₂S and Temperature Data



Inventory Volume and Dose Rate



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www.evoqua.com

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MS-LINK2SITE-DS-0717

Odor Reduction Corrosion Abatement (ORCA): A Water One® Services Solution



GENERAL INFORMATION

Evoqua's innovative Odor Reduction Corrosion Abatement (ORCA) solution provides superior odor control efficiency and corrosion protection through our state-of-the-art digitally enabled technology and proactive service. This ensures consistent and precise chemical dosing with enhanced service and system automation to handle changing levels of hydrogen sulfide in real-time. The ORCA solution also optimizes dosing levels, protecting critical water infrastructure.

Evoqua's full-service ORCA program supports your treatment objectives with 24/7 remote monitoring and control through our secure web portal. Your digitally connected water systems are monitored daily by our team of experts for enhanced service and site monitoring. This provides more frequent system checks while offering additional flexibility with the remote adjustment of chemical dose rates. Remote service also reduces risk through enhanced troubleshooting and system control by quickly identifying conditions contributing to over/under dosing including pump miscalibrations and system clogs. This ensures optimal performance, so your water system will be continuously protected.

HOW TO GET STARTED

Contact your local sales representative. We'll walk through how Evoqua will provide initial upfront discovery and investigation by conducting liquid and atmospheric testing. An Evoqua representative will provide a timeline and next steps that meet your water treatment needs.

ORCA SOLUTION SPECIFICATIONS

Dimensions	29.5" x 26" x 58" (L x W x H)
Power Requirements	120v, 60 Hz, Single Phase
Capacity: ORCA 60	
Instantaneous	1,800 ml/min (684 gpd)
Average Daily	900 ml/min (342 gpd)
Discharge Pressure	100 psi
Capacity: ORCA 120	
Instantaneous	3,900 ml/min (1,482 gpd)
Average Daily	1,800 ml/min (684 gpd)
Discharge Pressure	60 psi

FEATURES & BENEFITS

- Accurate, reliable, and automated chemical dosing
- 24/7 remote monitoring and control by Evoqua's team of water experts
- Real-time visibility and automatic dosing adjustments for rain events, temperature changes and more
- Link2Site® platform provides continuous visualization of H2S levels, tank inventory/volume and dose rates
- Automated system alarms and alerts for proactive system maintenance
- User-friendly interface with Wi-Fi connectivity
- FCC and UL standards certification

The Evoqua Digital Advantage

Evoqua improves upon traditional approaches to water system management by leveraging decades of experience in water system design, an unmatched local service network and digital remote monitoring technology to deliver the quality and quantity of water you need—when you need it.

You can count on us to be there when needed with customer support centers nationwide and 24/7 automated dispatch service. Our professional service technicians, engineers and customer service representatives are highly trained and experienced to help with all your water system needs.

Our Water One® services solution is supported by an in-house digital operations team consisting of water experts, program engineers and data scientists to ensure optimal performance. When purchased with Evoqua's award-winning Water One service offering, we use remote monitoring and data intelligence to provide proactive, predictive services to maintain all your water needs. In addition, we back this up with access to monthly data reports that illustrate your water quality is controlled and consistent.

With the Water One services solution, you can rest assured that your water system is operating at peak performance.



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VaporLink® 2.0 Hydrogen Sulfide Monitor for Wastewater Treatment Systems

DESCRIPTION

The VaporLink® 2.0 hydrogen sulfide monitor combines effective hydrogen sulfide analysis with a remote, customer interface for improved recording and responsiveness to changes in site conditions. The VaporLink 2.0 monitor is equipped with a cellular modem that communicates the logged data to Evoqua's Link2Site® website. Remote personnel have convenient access to site specific data from any location with an internet connection. This improves the ability to make necessary adjustments to chemical dosing and alarm setpoints—quickly and efficiently.

The hydrogen sulfide concentration, the variability of the concentration and the time of the monitoring event determine the VaporLink 2.0 monitor's operating parameters. The robust, moisture-resistant hydrogen sulfide logger is available in two detection ranges, (0-100 ppm, 0-1000ppm). For general purposes, a 0-100 ppm unit is recommended. For most collection lines, a 300 second recording interval is sufficient to detect slow changing hydrogen sulfide levels. In applications where concentration levels change more rapidly, a 60 second recording interval is preferred to assure the accuracy of collected data from the site.

Logged data can be transmitted to the Link2Site interface hourly, once every four hours or once a day. The VaporLink 2.0 monitor can also send instantaneous alarms when the hydrogen sulfide concentration exceeds the high level or average alarm setpoint or, when the gas concentration is less than the low level alarm setpoint. The system also includes an alarm to replace the VaporLink 2.0 monitor and a low battery alarm.

The Evoqua Vaporlink 2.0 minimizes service interruptions and reduces personnel exposure through it's patented, six sensor design. The system will automatically isolate and place on service a new sensor on predetermined intervals, ensuring continuous and effective compliance monitoring for up to one year.



FEATURES & BENEFITS

- Site security and controller access via user passwords (when used with Link2Site program)
- Immediate alarm notification (SMS, email, phone call or all of these)
- Reports (daily, monthly, yearly) on hydrogen sulfide data log
- Widest range of alarm setpoints; unmatched by any other logger
- Sensor lifetime alarm

APPLICATIONS

- Wet wells
- Forced main discharges
- Gravity collection systems
- Headwork facilities
- Chemical scrubber inlet
- Biofilter inlet and discharge

LINK2SITE® WEB MONITORING AND CONTROL

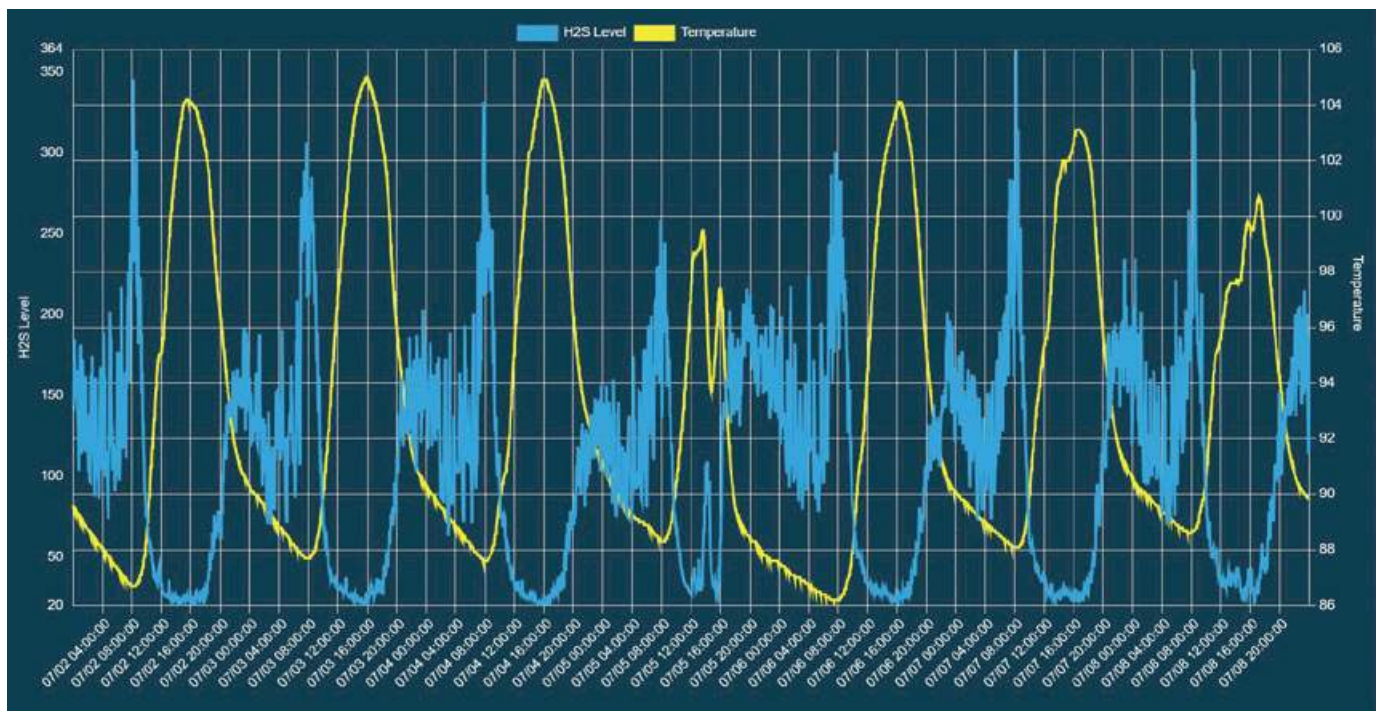
Evoqua's Link2Site platform provides operators with remote access to hydrogen sulfide data for real-time monitoring and responsiveness to changing site conditions. The Link2Site web platform interfaces with Evoqua's VaporLink® 2.0 Hydrogen Sulfide Monitor and ORCA dosing controller for comprehensive performance monitoring and dosing control.

Operators can connect to the system from any location to program dosing rates, manage inventory, set system alarms, and view and download trending graphs and charts to analyze system performance. The result is a more efficient use of chemicals, reduced labor requirements, and better odor and corrosion control.

THE EVOQUA ADVANTAGE

Evoqua provides full-service programs for odor and corrosion control. We perform a complete site investigation to determine the current H₂S profile, dosing needs, and feed rate per time of day. Once the system is set up, our technicians monitor performance for optimal efficiency. Our suite of odor and corrosion control solutions includes: air scrubber based treatment, nitrate solutions, pH shift solutions, oxidizer-treatment, iron salt treatment, and Water One® service programs with 24/7 remote monitoring and proactive service.

LINK2SITE SYSTEM OVERVIEW: ATMOSPHERIC H₂S AND TEMPERATURE DATA



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MS-VAPORLINK-DS-0723



Capabilities Overview

PREPARED FOR EMBRIS FOR FORT CALHOUN H₂S CONTROL

3.20.2026

USP Technologies Overview

About USP Technologies, LLC

For over 25 years USP Technologies has been an industry-leading “solutions provider” for treatment of wastewater, water & solids in the municipal & industrial markets

- Unmatched applications & engineering expertise with hydrogen peroxide and a range of other wastewater treatment chemistries
- Full Service Supply Scope =
 - Treatment Chemistry*
 - Best –In-Class Bulk Equipment Systems*
 - Engineering & Applications Services*

Zero Capital Programs

- Largest N.A. supplier of H₂O₂ for wastewater/water applications

Part of the Veralto Water Platform



ChemTreat Business Group

Veralto



Fort Calhoun's Forcemain: H₂S Production Model Results

Model Results: Pomeroy-Parkhurst

Client **Fort Calhoun, NE**

Sulfide Generation Model -- Force Mains

Sulfide generation		Segment:	15C	20C	25C
Within the segment		mg / L	101.7	146.6	211.4
Within the segment		lbs per day	81.47	117.47	169.39
		kg per day	37.03	53.40	77.00
Input Params					
T	Temperature, deg-C		15	20	25
BOD	BOD-20, mg/L		300	300	300
mgd	Flow, mgd		0.096	0.096	0.096
D	Pipe diameter, in		12	12	12
L	Pipe length, ft		52,800	52,800	52,800
S1	Sulfide conc at time t1, mg/L		0.1	0.1	0.1
Calculated					
EBOD	Effective BOD = BOD * 1.076(T-20), mg/L		208	300	433
PV	Pipe volume, gals		310,860	310,860	310,860
t	Flow time within the segment (t2-t1), hr		77.72	77.72	77.72
d	Pipe diameter, m		0.36	0.36	0.36
v	Velocity, fps		0.2	0.2	0.2
Intermittent pumping		Pump rate			
		Run time			
		lpm			
		% of day			

Results Interpretation

Client Fort Calhoun, NE

Sulfide Generation Model -- Force Mains

- Extremely long retention time
 - Pipe volume: 310,860 gallons
 - Flow time within pipe: 78 hours
- If sulfate is not a limiting factor**, then you could have over 100 lbs/day of H₂S generated
 - If SO₄ is 78 mg/L, then H₂S would be capped at ~28 mg/L
 - 22 lbs/day H₂S more likely?
- Flow is definitely deficient in oxygen and septic, likely with a drop in pH

		Segment:	15C	20C	25C
Sulfide generation					
	Within the segment	mg / L	101.7	146.6	211.4
	Within the segment	lbs per day	81.47	117.47	169.39
		kg per day	37.03	53.40	77.00
Input Params					
T	Temperature, deg-C		15	20	25
BOD	BOD-20, mg/L		300	300	300
mgd	Flow, mgd		0.096	0.096	0.096
D	Pipe diameter, in		12	12	12
L	Pipe length, ft		52,800	52,800	52,800
S1	Sulfide conc at time t1, mg/L		0.1	0.1	0.1
Calculated					
EBOD	Effective BOD = BOD * 1.076(T-20), mg/L		208	300	433
PV	Pipe volume, gals		310,860	310,860	310,860
t	Flow time within the segment (t2-t1), hr		77.72	77.72	77.72
d	Pipe diameter, m		0.36	0.36	0.36
v	Velocity, fps		0.2	0.2	0.2
Intermittent pumping		Pump rate	lpm		
		Run time	% of day		

Municipal Wastewater Applications: Odor & Corrosion in Collection Systems

USP Technologies Toolbox

USP Technologies has a robust toolbox of technologies:

- SulFeLox™
- Hydrogen Peroxide
- Nitrates
- Iron Salts
- PRI-Tech®
- Chlorite Oxidant Blend (USP-OC31™)
- Biofilm Removal
- Peracetic Acid (PAA)
- Alkalies

That we use strategically to Solve Your Problems!

*Because
One Size
Does Not
Fit All !*



Iron Salts

Control

Ferrous salts precipitate sulfide

Mechanism(s)

Ferric salts oxidize & precipitate sulfide

Advantages

- Extensive history / commonly used
- Effective for long duration control
- Assists in phosphate / struvite control
- Not affected by oxygen uptake rates

Disadvantages

- Contributes to solids loading
- Can deplete alkalinity & add salinity
- Corrosive
- Ineffective below pH 6



SulFeLox™

Control Mechanism(s)

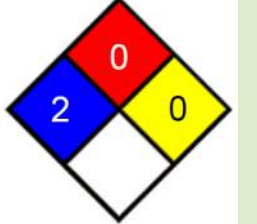
SulFeLox™ bind & precipitate sulfide

Advantages

- Low hazard iron alternative
- Ideal for hazard sensitive dose sites
- Equal performance to Ferrous Chloride (FeCl_2)
- Field trials show superior performance to Calcium Nitrate

Disadvantages

- Contributes to solids loading
- Does not destroy sulfide
- Overdosing may leave deposits on pipes/equipment
- Ineffective below pH 6

SulFeLox™	Calcium Nitrate
	



Nitrates

Control

Reduces septicity

Mechanisms

Promotes bio-oxidation of sulfide & organic odors

Advantages

- Simple feed systems
- Benchmark for non-hazardous odor control

Disadvantages

- Reaction time requires several hours
- Consumes Volatile Fatty Acids & rbCOD
- May stimulate biogrowth / floating solids
- Can contribute to nitrogen load at plant
- Costly



Hydrogen Peroxide

Control

H_2O_2 oxidizes sulfide

Mechanism(s)

Adds dissolved oxygen

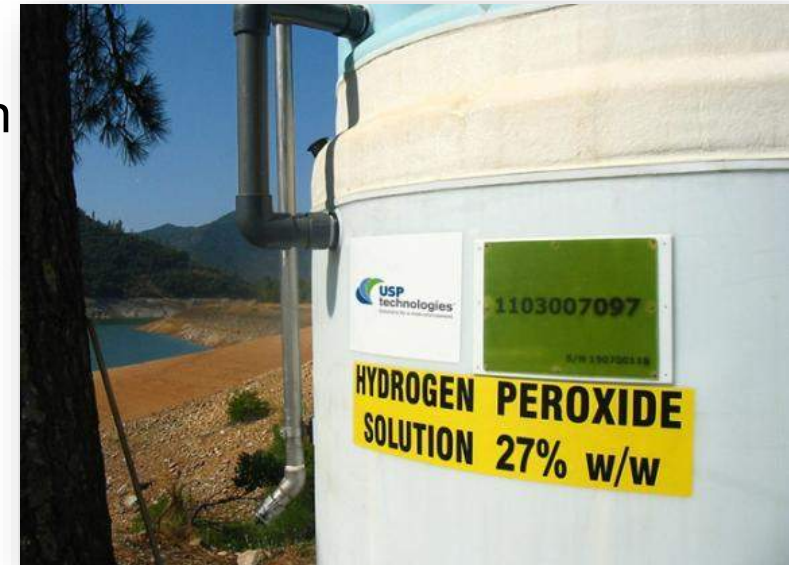
Regenerates iron (oxidizes FeS)

Advantages

- Relatively short reaction time (5-20 min) w/o catalyst
- Adds D.O. which prevents septicity & promotes bio-oxidation
- Efficient and cost effective H_2S oxidant
- No troublesome by-products
- Selective for sulfide oxidation
- Simple feed systems

Disadvantages

- Limited durational control, <3 hours



Alkalinity ($\text{Mg}(\text{OH})_2$, $\text{Ca}(\text{OH})_2$, Carbonate)

Control

Controls sulfide through preventing off-gassing

Mechanism(s)

Suppresses biofilm activity

Advantages

- Provides alkalinity
- May prevent solubilization (at high pH)
- Biofilm suppression
- Delivers alkalinity to treatment plant

Disadvantages

- Drives aqueous sulfide downstream
- Impact air demand and settleability in the WWTP
- Increased potential for scale



Biofilm Removal

**Control
Mechanism(s)**

Controls sulfide through preventing off-gassing
Suppresses biofilm activity

Advantages

- Biofilm is chemically removed
- Durational impact (1 – 2 weeks)
- Can be as simple as dumping in chemicals every week or two
- Oftentimes lowest cost

Disadvantages

- May impact WWTP negatively
- Increased potential for scale
- Labor intensive
- Uneven regrowth requires monitoring



Next Steps



Sampling Needed

Liquid phase measurements needed at:

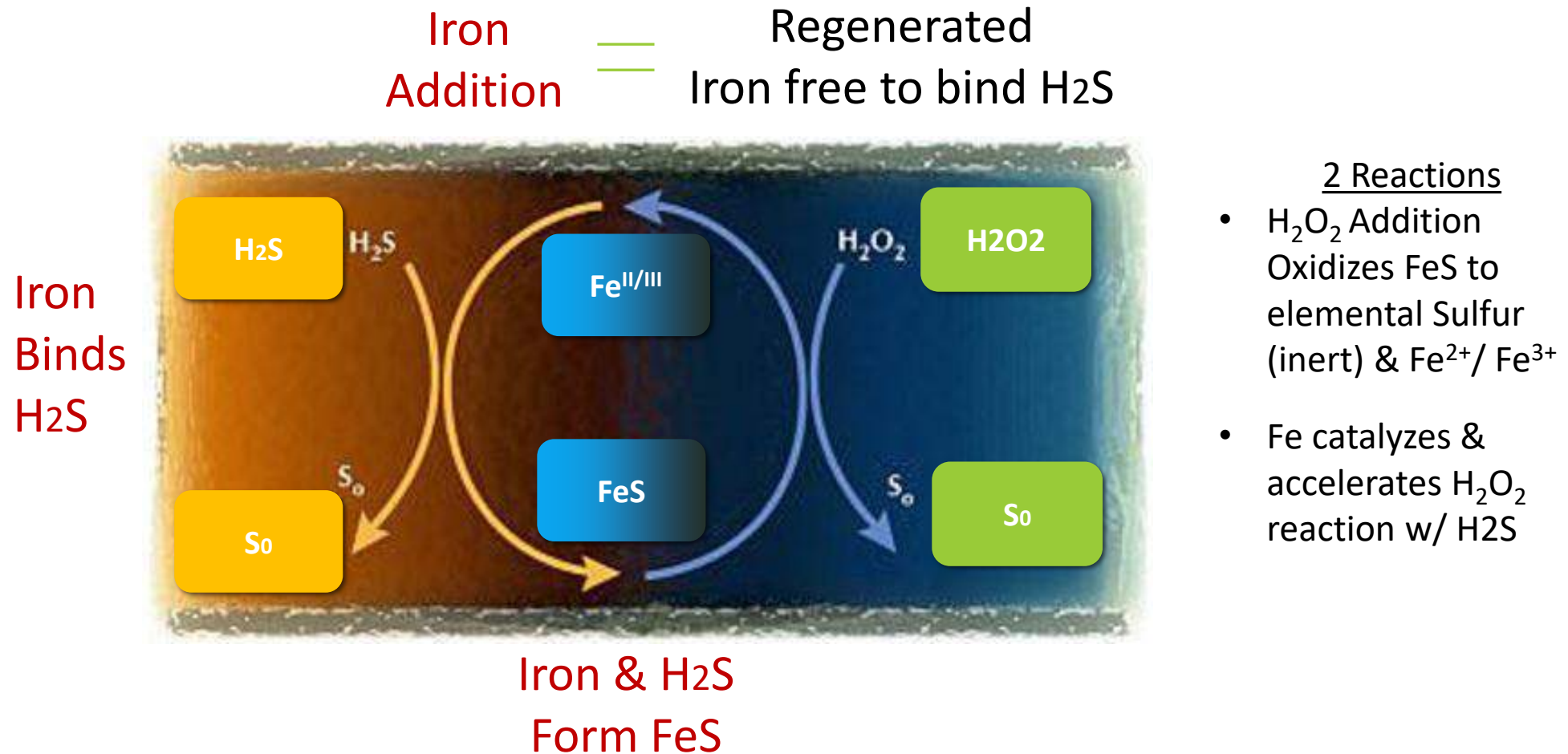
- Pump station & force main outfall
 - pH
 - Sulfate
 - Sulfide
 - Temperature

This will allow us to better estimate chemical demand and on-going treatment costs

Questions?



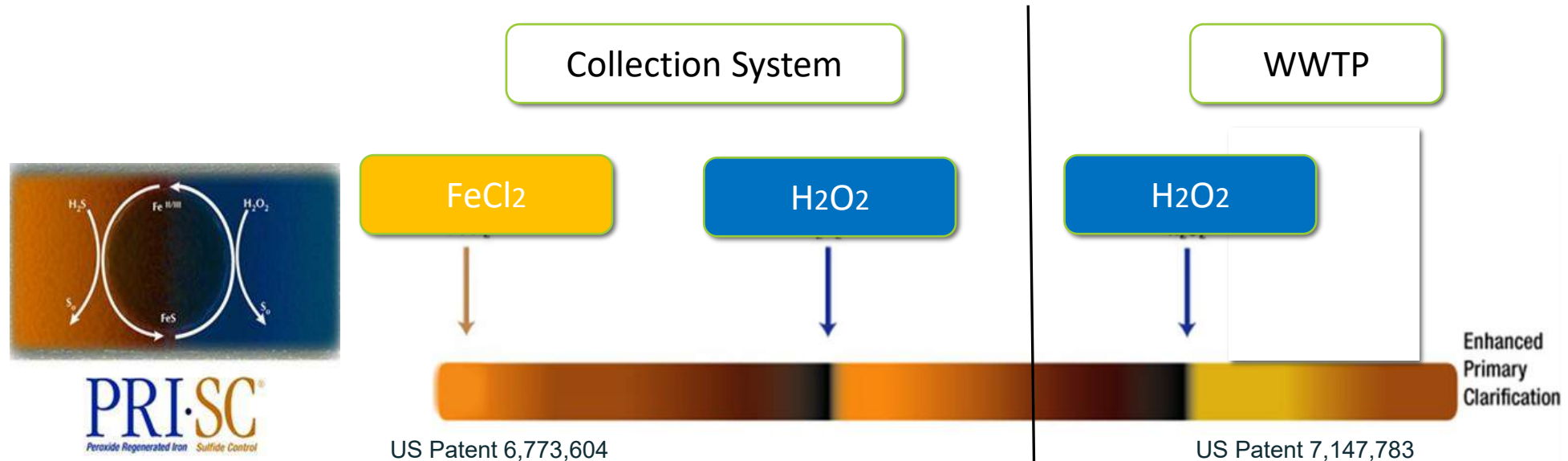
Peroxide Regenerated Iron (PRI)



PRI-Tech™ in Practice

To get the most out of your iron use...

USE..... RE-USE..... and RE-USE again with PRI-TECH



Iron is selective to binding with sulfide –
can be overfed upstream & will carry through until sulfides appear

Sodium Chlorite (USP-OC31)

Control

Sodium chlorite oxidizes sulfide

Mechanism(s)

Oxidizes sulfide & organic odors (excl. amines)

Advantages

- Simple feed system
- Very fast reaction (< 1 min)
- No troublesome by-products
- Efficient reaction with sulfide
- Effective for organic odors

Disadvantages

- Higher cost (relative to H_2O_2)
- Limited durational control, < 3 hours



How are we different?

We take a holistic view of Wastewater Treatment Operations.

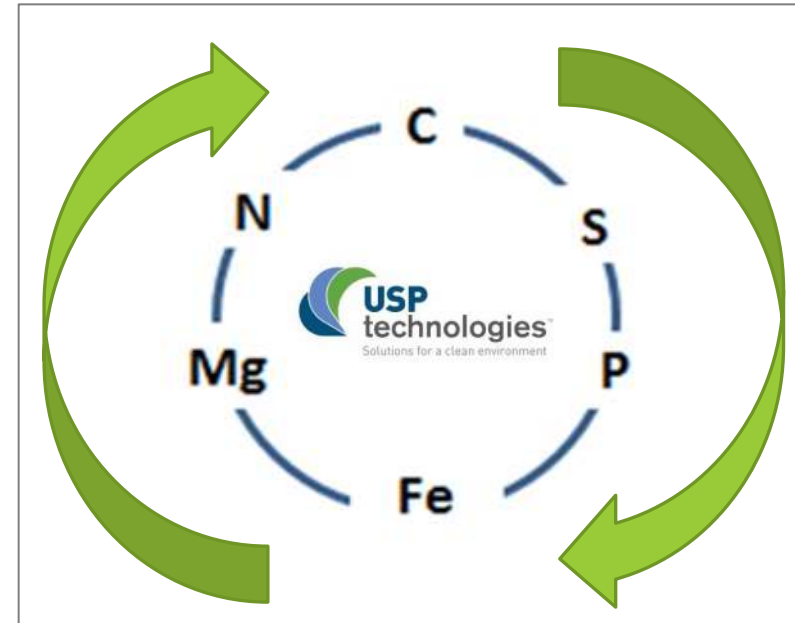
What looks like THIS to most folks...

Linear

- Odor control
- Solids separation
- Biotreatment
- Nutrient removal
- Disinfection
- Solids processing

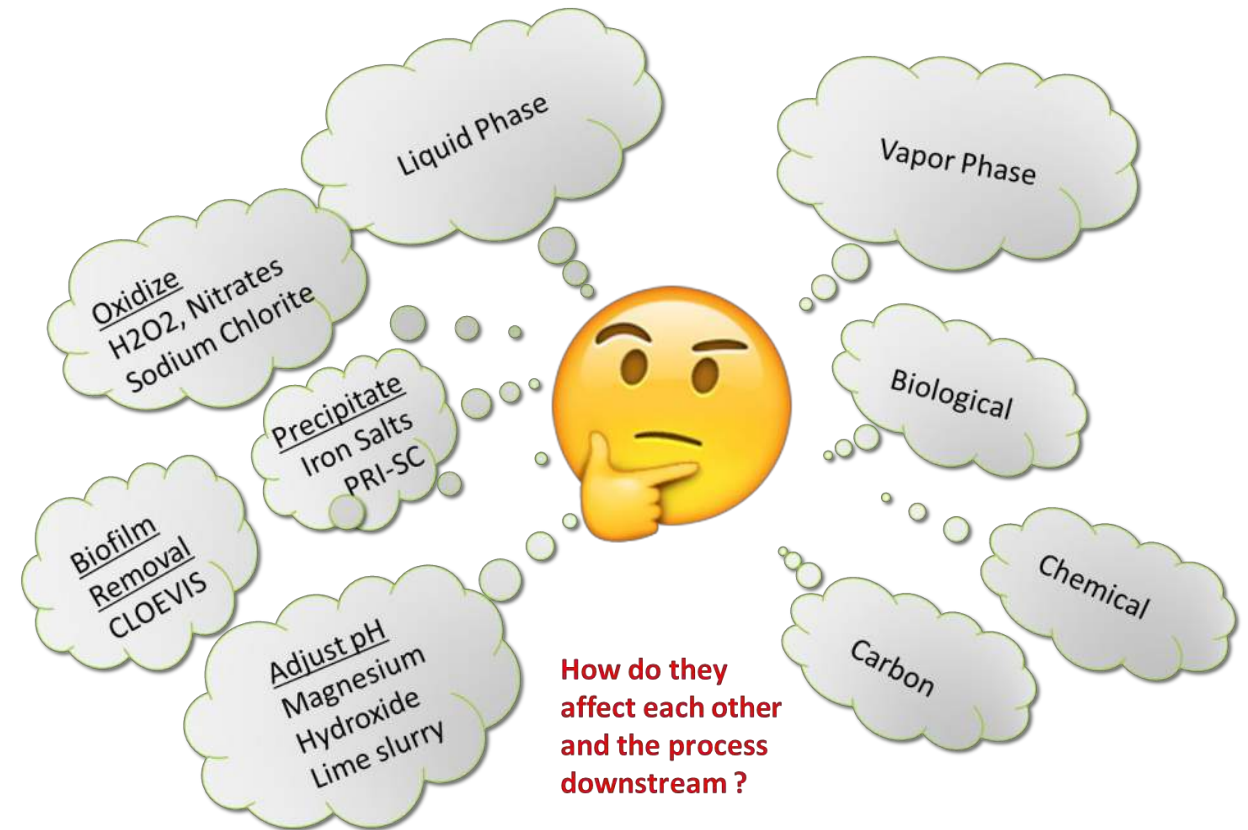
Looks like THIS to us ...

Interconnected



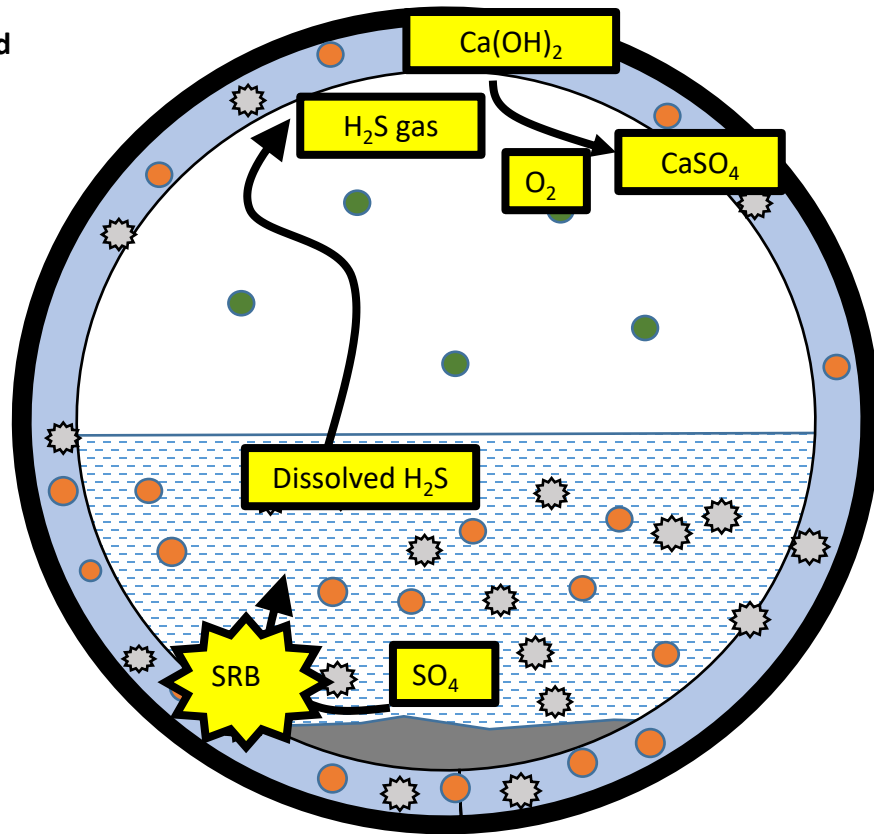
USP Muniverse™ Technologies

Odor Control Problems...



Odor Control Solutions!

Sulfide and
Corrosion



**Remove
Sulfides**

H₂O₂
Nitrates
USP-OC31™

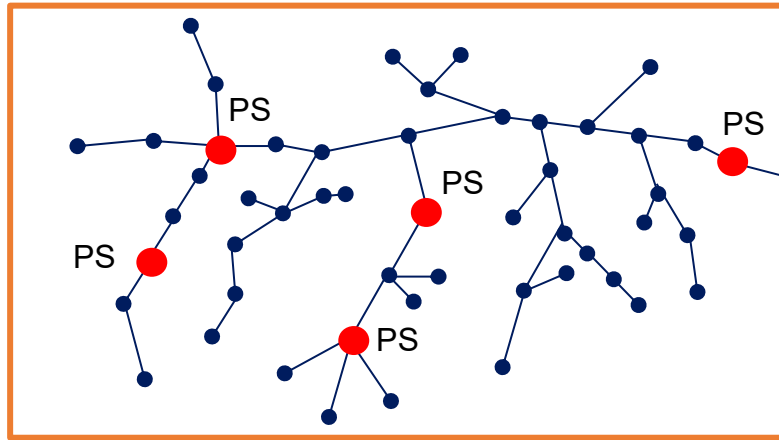
**Prevent
H₂S Formation**

H₂O₂
Nitrates

**Prevent
H₂S Release**

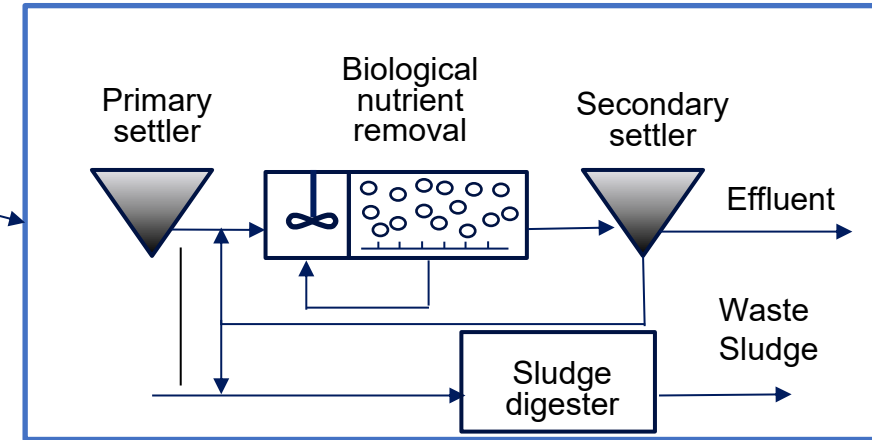
Iron Salts
PRI-SC®
PRI-TECH®
Alkali

The New Collection System Reality



Collection and Conveyance

Physical transportation of
sewage



Biochemical Treatment

Sewer is a bioreactor:

- Plug-flow + biofilm reactor
- Bacteria
- Food and energy
- Aerobic/Anoxic/Anaerobic

Water Quality Impact

Choice of Odor Control in the collection system determines the water quality delivered to the plant:

Nitrates

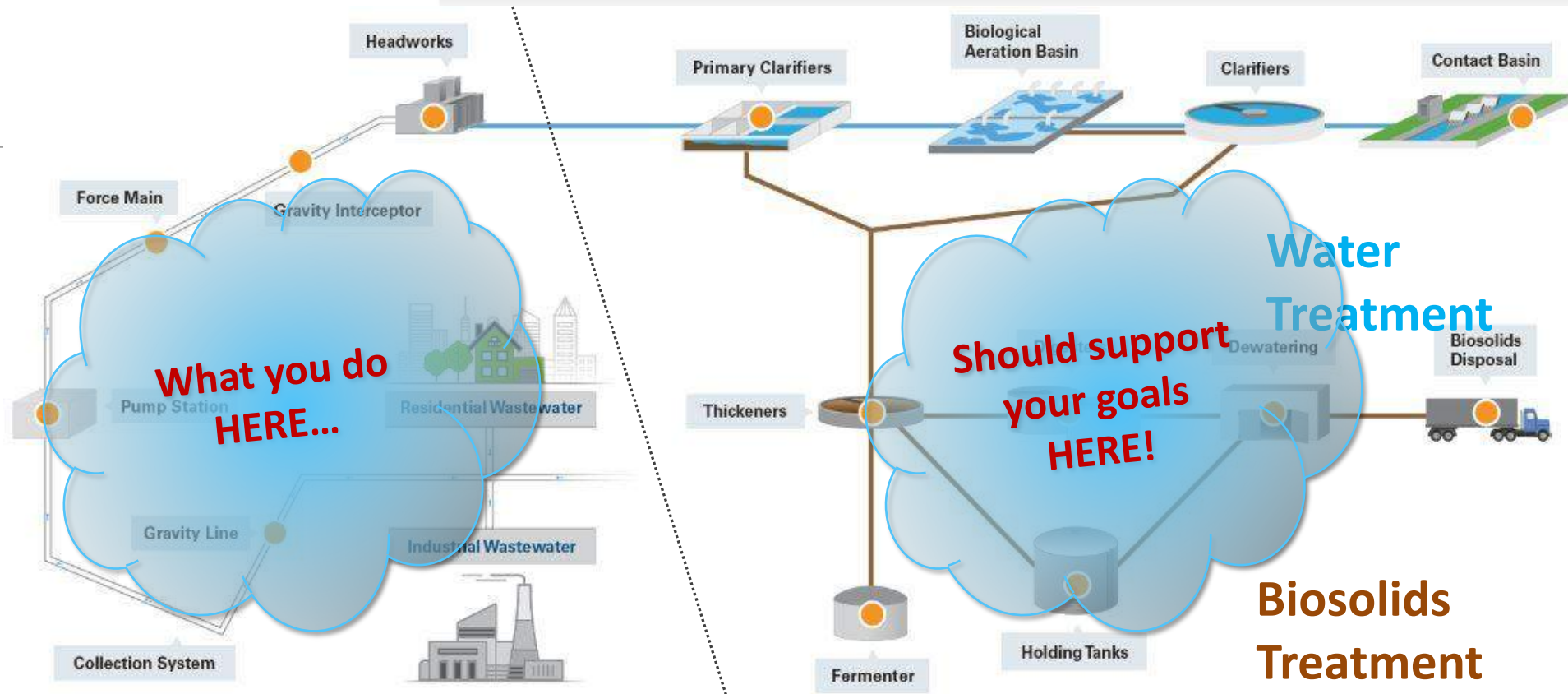
ORP ↑
Soluble BOD ↓
VFAs ↓
Sulfides ↓
N-Load ↑

Mag

pH ↑
Sulfides in
Solution ↑
Struvite ↑

Iron

ORP ↓
VFAs ↑
Sulfides ↓
“Regenerable”



Collection System

WWTP

Everything is connected !

FLOW DIAGRAM

Solids Flow ———

Water Flow ———

Municipal Wastewater Applications: In-Plant Highlighted Technologies

Municipal Applications Expertise

USP Technologies offers solutions for:

Odor & Corrosion Control

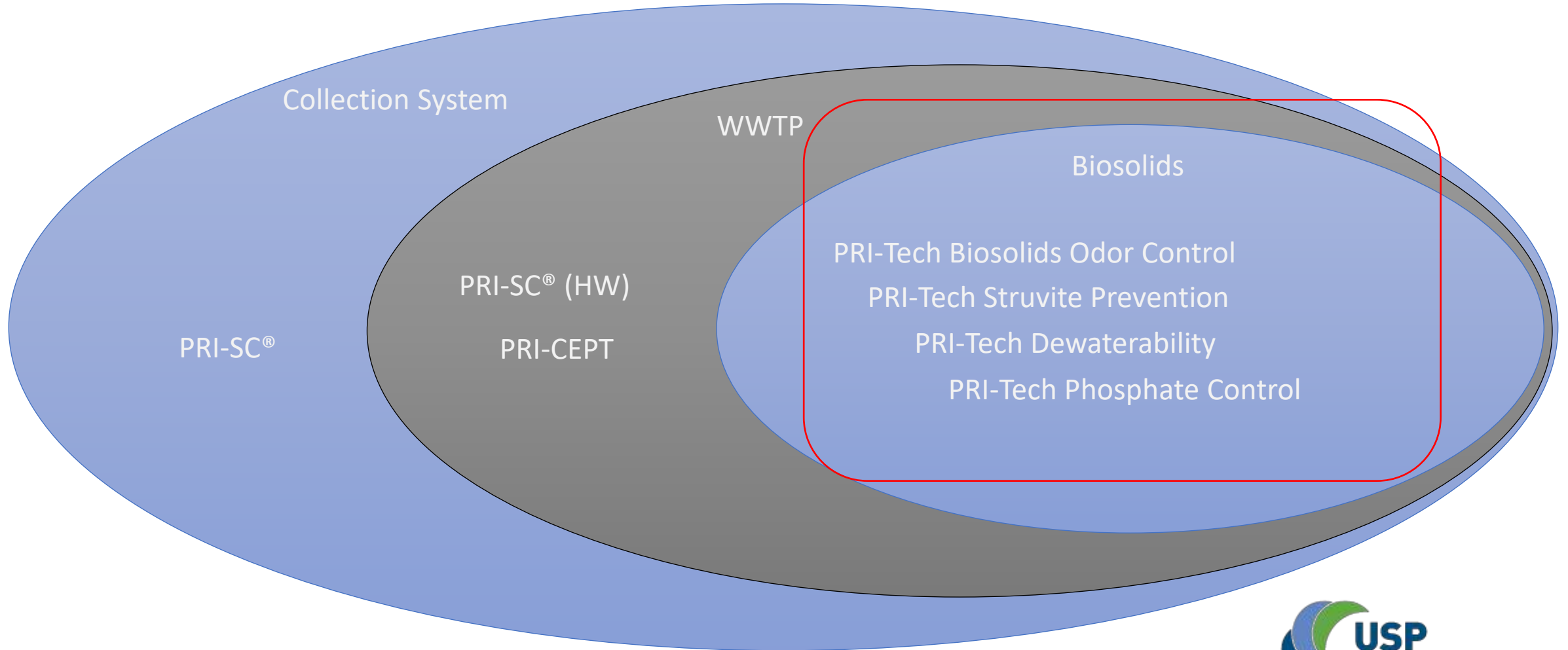
- Collection Systems
- Headworks
- Primary Clarifier
- Thickeners
- Biosolids Odor Control

Process Enhancements

**Starts in Collection System*

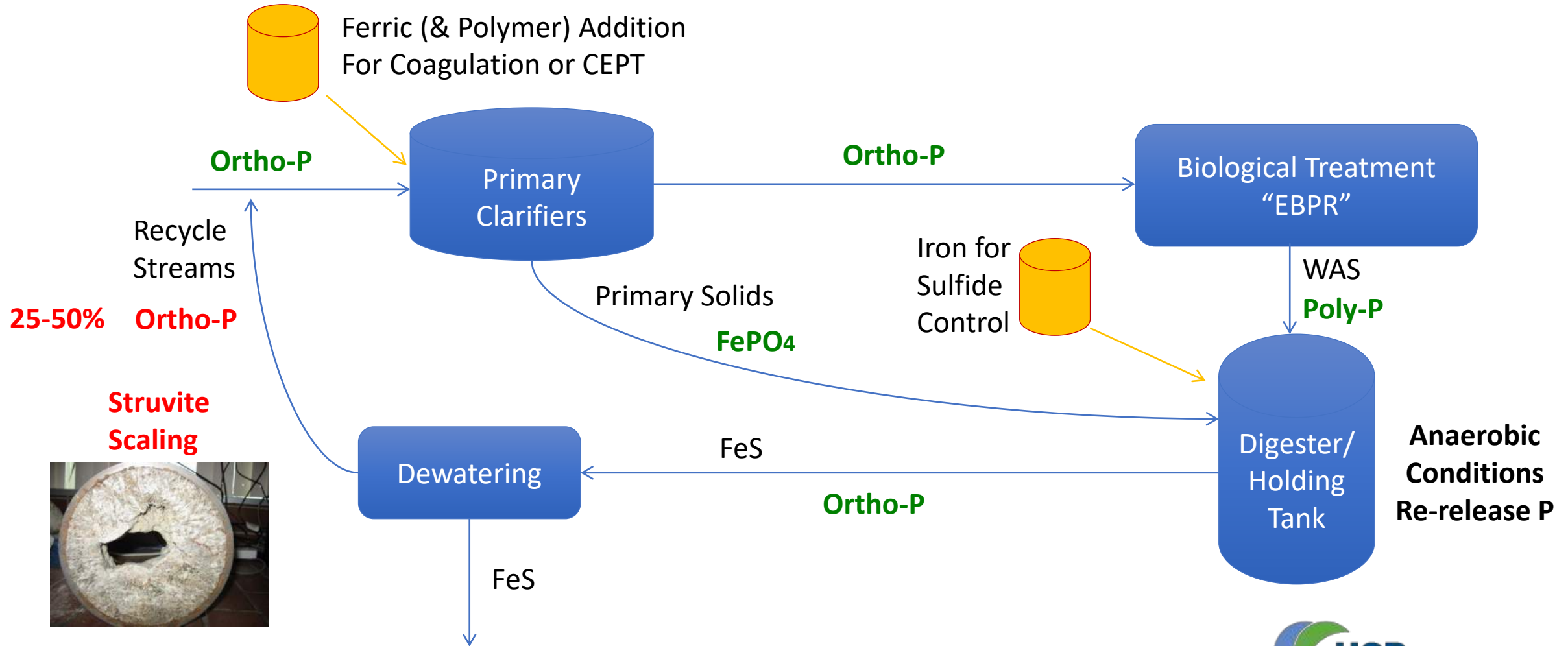
- P- Removal
- Struvite Control
- Enhanced Settling
- Dewatering
- Biogas improvement
- Supplemental D.O.
- Disinfection

What is PRI-TECH®?





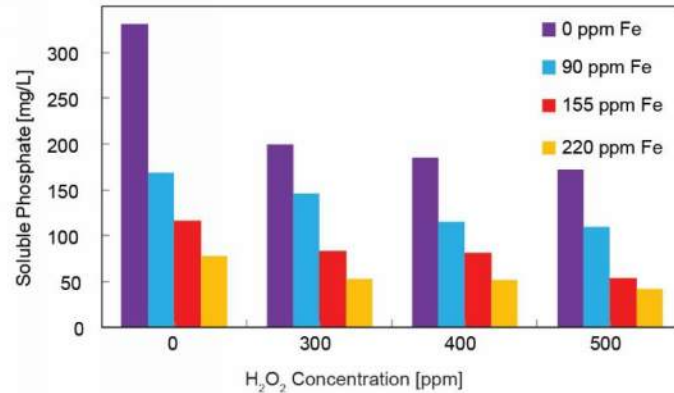
Phosphorus Movement Through the Plant



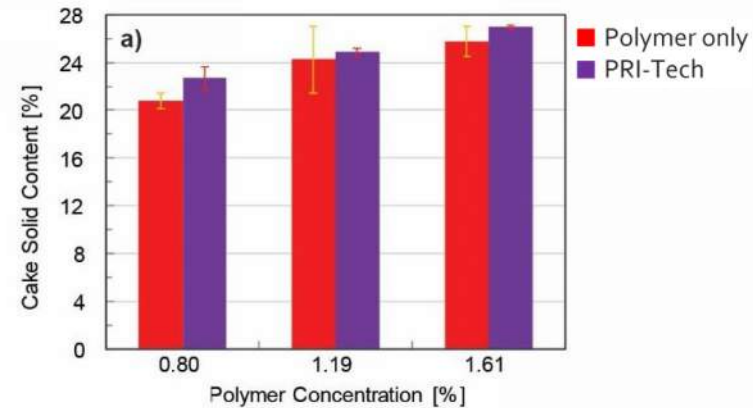


PRI-TECH® Chemistry – Fate of PO_4^{-3}

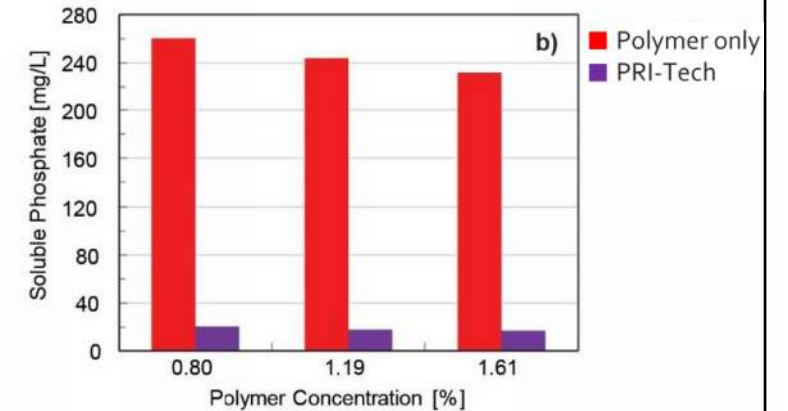
Optimized Fe/H₂O₂ Dosing



Improved Cake Solids



Polymer Impact



- Optimizing for phosphate removal may require a combination of ferric and peroxide dosing (PRI-Tech®)
- 85% removal in this study

- Polymer was optimized and cake solids were improved by ~1-2% with the addition of PRI-Tech®

After study, execution at scale of PRI-Tech confirms >5% improvement in cake solids possible

- Relative to PRI-Tech®, additional polymer does not significantly impact phosphorus removal

Industrial Wastewater Applications



Industrial Chemical & Program Offerings

Hydrogen Peroxide

- *Technical & Standard Grades*
- *EPA Registered (Antimicrobial)*
- *Food Grade*

Iron Salts

- *Ferric & Ferrous Salts*

Fenton's Reagent

- *Iron Catalyzed H_2O_2*

Peracetic Acid

Nitrates

USP OC-31

- *Chlorite Based Oxidant*

Permanganate

Rapid Response/ Mobile Systems

- *"Emergency" supply of chemicals, equipment & field support*
- *Temporary projects – Oil & Gas, Remediation*

Large Pond Treatment – Peroxidon™

- *Floating Manifolded Chemical Distribution System*



Industrial Applications Technology

Hydrogen Sulfide (H₂S)

- *Odor, Corrosion, Operator Safety*
- *Wastewater, Produced Water, Large Lagoons, Sludge Dewatering*

Fenton's Reagent

- *Fe Catalyzed H₂O₂*

Cooling Tower Cleanings

Supplemental Dissolved O₂

Enhanced Filter Backwashing

Refinery Spent Caustic Oxidation

Cyanide

Refinery Selenium Treatment

DAF Enhancement

High Strength WW

- *Reduce toxicity or inhibition of WWTP Biomass*
- *Spent caustic, Impounded or "off spec" WW*

Effluent Disinfection (PAA)

Organic Oxidation

- *Phenols/ Benzene/ Formaldehyde/ Glycols*

NO_x Emissions Control

- *Nitric acid/ nitrogen fertilizer*
- *Stainless/ Titanium metal finishing*

PAA for Wastewater Disinfection

- Peracetic Acid (PAA) is growing in use as an alternative to conventional chlor/dechlor disinfection
 - Also a low-capital alternative to UV or to supplement UV for wet weather/high TSS conditions
- USP (and sister company Trojan Technologies) possess expertise with PAA, other peracids
 - Advanced dose control (ADC), CFD modeling, kinetics
- PAA benefits:
 - Biodegradable components, no chlorinated compounds or harmful disinfection by-products
 - Disinfection performance not impacted by variability in nitrite or ammonia concentrations
 - In most applications, it does not require quenching of PAA residual (no bisulfite)
 - Broader manufacturing & distribution networks are reducing overall cost in use

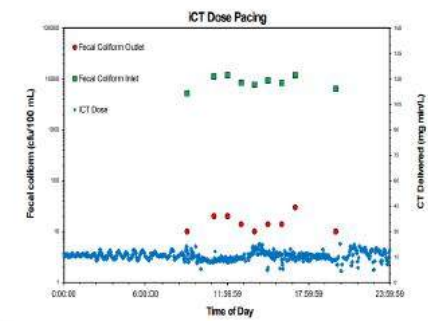
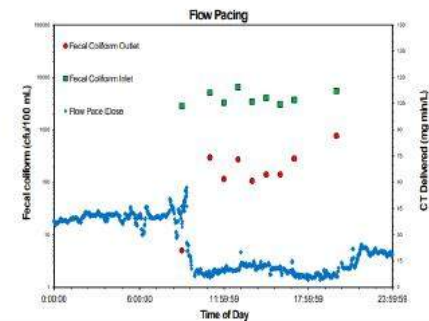
OaSys iCT™

Improving disinfection + saving money: Is this possible?

OaSys iCT™ is a novel control approach that optimizes disinfection performance by calculating the optimal chemical dosage that accounts for sources of treatment variability in real time



When chemical disinfection is used, inherent variability in plant processes (e.g. flow events, plant upsets) can result in inadequate public health protection and risk of permit violation. To avoid these disruptions, WRRFs regularly overdose disinfectant, resulting in excessive cost for disinfectant and quenching chemicals and increasing sensitivity to chemical market conditions (supply disruptions, price increases). To date, the available control technologies account for wastewater flow, but do not take into account the variation of wastewater quality, which results in inconsistent disinfection performance and increases risk of disinfection byproduct formation. OaSys iCT™ intrinsically incorporates all of these sources of variability, providing an improved chemical dosing strategy that optimizes performance and reduces risk of overdosing and permit violations



Features



Multi-Variable Disinfection Algorithm
with Automatic Flow Adjustment



Dose Control and Monitoring
With USP's ACS 2.0



Data Collection and Reporting
Through USP Vista™

RESOLUTION 2026-12

The following resolution was introduced by _____, who moved its adoption,
seconded by _____,

"WHEREAS, the City Street Superintendent has prepared a One Year and Six Year Plan for
Street Improvement Program for the City of Fort Calhoun, and

WHEREAS, a public meeting was held on the 19th day of October 2026, to present this plan and
there were no objections to said plan;

THEREFORE, BE IT RESOLVED BY THE Mayor and City Council of Fort Calhoun, Nebraska, that
the plans and data as furnished are hereby in all things accepted and adopted."

Upon roll call vote as follows:

BE IT FURTHER RESOLVED THAT A CERTIFIED COPY OF SAID PLAN BE FILED WITH THE
BOARD OF PUBLIC ROADS CLASSIFICATIONS AND STANDARDS, STATE OF NEBRASKA.

ADOPTED THIS 19th DAY OF OCTOBER 2026.

Mayor _____

ATTEST: _____
City Clerk