CHARLES TOWN UTILITY BOARD
AGENDA

WEDNESDAY, JUNE 23, 2021

Regular Meeting | **661 South George Street, Charles Town, WV 25414** | **4:00 PM**

CALL TO ORDER

1. **APPROVAL OF MINUTES**
   a. Approval of June 11, 2021 Regular Meeting Minutes
   UB Minutes June 9, 2021.pdf

2. **PUBLIC COMMENT**
   This portion of the agenda is designed for members of the general public to share thoughts on items of interest in the community. By law, Board members may ask clarifying questions or discuss procedural matters but are not permitted to discuss the policy merits of any issue unless it is scheduled for discussion.

   Until such time as Governor Justice revokes Executive Order 09-20 or any subsequent executive order that is primarily intended to address the public health emergency and spread of COVID-19 by restricting public gatherings and invoking physical distancing, public access to the meeting room will be restricted. Members of the public may still submit written comments to kstolipher@ctubwv.com that will be read aloud. Up to 20 minutes of time will be allotted for reading public comments.

   The public is invited to attend this meeting via webcast (www.ctubwv.com - Board Meetings - Meeting Agendas and Minutes 2021). The public may also attend the meeting by accessing the following zoom link:
   https://zoom.us/j/94001595034?pwd=RlRTRTEvVEJvOXEvdlFTd0hmMFR6UT09
   or by calling 1-301-715-8592 and entering the Meeting ID 940 0159 5034 and Passcode 512384.

3. **BOARD TRAINING**
   a. Steptoe & Johnson PLLC - Ethics

4. **UNFINISHED BUSINESS**

5. **NEW BUSINESS**
   a. Gannett Fleming - Overview of Class Cost of Service Study
   Charles Town 6-23-2021.pdf
   b. Dewberry Task Order

TO 03 Water Capital Improvements.pdf

c. RK&K Forrest Avenue and Fairfax Crossing Report
Forrest Avenue and Fairfax Crossing Report 06-16-2021.pdf
Forrest Avenue and Fairfax Crossing Report 06-16-2021 Supplemental Docs.pdf

d. RK&K Task Order 12 Change Order No. 2 - Forrest Avenue and Fairfax Crossing
Task 12 Subtask 2 Fairfax Crossing and Forrest.pdf

e. Resolution 2021-04 Route 9 Project Escrow Account Interest Reimbursement
Resolution 2021-04 Route 9 Project Escrow Account Interest Reimbursement.pdf

f. WV PSC Case 21-0260-S-P Shenandoah Junction Public Sewer Review - Possible Executive Session Under: WV State Code Section §6-9A-4(b)(9) - To consider matters involving or affecting the purchase, sale or lease of property, advance construction planning, the investment of public funds or other matters involving commercial competition, which if made public, might adversely affect the financial or other interest of the state or any political subdivision and involving contract matters.

6. **MANAGER REPORTS**
   a. Utility Manager Report
   b. Chairman Report

7. **APPROVAL OF BILLS**
   a. June 23, 2021
   Board Report 6.23.21.pdf

8. **INFORMATION ONLY - NEXT MEETING - JULY 14, 2021 AT 4:00 P.M.**
   a. RK&K Manhole Evaluation Report
   Manhole Evaluation Report 06-08-2021.pdf

ADJOURNMENT

June 9, 2021

The Charles Town Utility Board held a virtual meeting on June 9, 2021 at 4:00 p.m. Members of the Board present were Daryl Hennessy, Pete Kubic, Duke Pierson, Tommy Stocks and Jacquelyn Milliron. Also present were Kristen Stolipher, April Shultz, Hoy Shingleton and Commissioner Caleb Hudson. The Chairman called for changes or corrections to the May 26, 2021 regular meeting minutes. Jacquelyn suggested several changes. The Board approved the minutes as amended. The Board received no public comment.

The Chairman next opened the floor for discussion on the Route 9 Sewer Project Resolution No. 15 – Final Contractor Pay Application No. 014, Hatch Invoices and CTUB Reimbursement. Kristen noted this is for the final pay application for contracts from Snyder Environmental, Hatch and CTUB reimbursements. Motion by Duke, second by Tommy, with discussion from Jacquelyn, the Board approved the Route 9 Sewer Project Resolution No. 15. The Board next discussed Route 9 Sewer Project Resolution No. 16. Kristen mentioned this resolution is for the final pay back to Rockwool. Motion by Pete, seconded by Tommy, the Board approved Resolution No. 16

Next discussed was the Request to Assign AMEA for the Route 9 Sewer Project. John Stump presented an overview on the request from Rockwool for written consent from CTUB to the assignment of Rockwool's rights to receive payments for the Connection Fee, as defined in the AMEA, to the West Virginia Economic Development Authority (WVEDA). Further, the WVEDA has requested CTUB's consent to the Collateral Assignment of the Payment Rights by the WVEDA to the West Virginia Water Development Authority acting on behalf of the West Virginia Infrastructure and Jobs Development Council as the lender to the WVEDA. Jacquelyn had several questions. John noted no terms have been changed in the AMEA, but simply who receives the payment. Motion made by Duke, seconded by Tommy, the Board approved the Resolution to assign the AMEA for the Route 9 Sewer Project.

The Chairman next opened the floor for discussion on the Request to Assign AMEA for Huntfield. Kristen explained the request is to assign the conditions and terms of the Water Services Agreement dated September 12, 2002 between CTUB and Huntfield. The project has recently been purchased by DR Acquisitions, who would be assuming all existing and future commitments of the agreement. Motion by Pete, seconded by Duke, with discussion from Jacquelyn, the Board approved the request to assign the AMEA for Huntfield.

Next, the Board discussed Thrasher Task Order 4 – Specification Review and Pump Station Specifications. Kristen requested the Board consider hiring Thrasher to review CTUB's specifications, but as an initial task, to assist in developing new design standards and details for the sewer pump stations as Task Order 4 for $17,000.00. Kristen also provided Task Order 3, which includes the review of the existing water and sewer design specifications for $9,700.00. Thrasher was chosen through the 5G process in the past to assist staff with various preliminary tasks. Doug Smith from Thrasher was present to review the proposal. Motion by Duke, seconded by Tommy, with discussions from the Board to approve Task Order 4 with Thrasher. Motion by Jacquelyn, seconded by Duke, to amend the original motion to insert "do not exceed" language into the document. The Board approved Task Order 4 as amended.

The Utility Manager Report was next addressed. Kristen briefed the Board on this month's sewer and water efforts. She noted that staff had a lunch the week prior to recognize Chris Hutzler, Water Chief Operator, as he was awarded the AWWA West Virginia Section Perkins Boynton Award for large systems. Other water updates included the lead and copper sampling, an EPA assessment and a free chlorine conversion. For sewer updates, the Centrisys Pilot study has been scheduled, various

pump stations are being decommissioned, and discussions were held with Arcadia for Harvest Hills and Norborne Glebe. Jacquelyn had several questions on the report. Under the Chairman Report, the Chairman provided an update on the Capacity Improvement Fee Analysis Schedule. Jacquelyn provided comments. She was more concerned with the EDU chart in the tariff rather than the CIF amount. The Chairman also provided that City Council adopted a resolution last Friday to reconvene meetings in public moving forward as a result of the recent Governor mandates. Limited public will be allowed to attend depending on the size of the room, as well as continuing virtual means for public comment.

The Board next discussed the Approval of Bills. Motion by Tommy, second by Duke, with discussion from Jacquelyn, the Board approved the payment of bills. The meeting was adjourned at 5:34 p.m. The June 23rd regular meeting will be held beginning at 4:00 p.m.

_____ _____

Chairman Secretary

CHARLES TOWN UTILITY BOARD

Cost of Service and Rate Study

Connie Heppenstall
Senior Project Manager

June 23, 2021



Gannett Fleming

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Charles Town Utility Board – Rate Study

Agenda

- Results of the Cost of Service Study
- Projected Rate Design:
  - Consolidate Rates over an 8-year period
  - Option A – Maintain current rate design
  - Option B – Revised Rate Design

Gannett Fleming

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Charles Town Utility Board – Rate Study

Results of the Cost of Service Study:

Comparison of Cost of Service With Revenues Under Present Rates for the Year Ending June, 30 2022

Customer Classification	Cost of Service		Revenues, Present Rates	
	Amount	Percent	Amount	Percent
(1)	(2)	(3)	(4)	(5)
Residential	$ 4,286,378	72.2%	$ 4,294,116	72.4%
Non-Residential	1,646,713	27.8%	1,638,975	27.6%
Total Sales	5,933,091	100.0%	5,933,090	100.0%
Other Revenues	218,000		218,000	
Total	$ 6,151,091		$ 6,151,090	

Gannett Fleming

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Charles Town Utility Board – Rate Study

Projected Rate Design – Option A:

- Consolidate Rates, accomplished in 2028/2029 Fiscal Year
- 2,000 gallon Minimum
- Maintain current rate design

Gannett Fleming

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CHARLES TOWN UTILITY BOARD
OPTION A
COMPARISON OF PRESENT AND PROPOSED RATES

Charles Town and Ranson

	2021/2022 Rates	2022/2023 Rates	2023/2024 Rates	2024/2025 Rates	2025/2026 Rates	2026/2027 Rates	2027/2028 Rates	2028/2029 Rates
Minimum Charge - All Meter Sizes	$ 29.58	$ 29.86	$ 30.16	$ 30.46	$ 30.76	$ 31.06	$ 31.38	$ 31.66
Consumption Charges (per 1000 gallons)								
First 2,000 gallons	-	-	-	-	-	-	-	-
Next 8,000 gallons	$ 10.640	$ 10.749	$ 10.858	$ 10.967	$ 11.076	$ 11.185	$ 11.294	$ 11.400
Over 10,000 gallons	$ 9.670	$ 9.769	$ 9.868	$ 9.967	$ 10.066	$ 10.165	$ 10.264	$ 10.361

Jefferson County

Minimum Charge - All Meter Sizes	$ 30.72	$ 30.85	$ 30.98	$ 31.11	$ 31.24	$ 31.37	$ 31.50	$ 31.66
Consumption Charges (per 1000 gallons)								
First 2,000 gallons	-	-	-	-	-	-	-	-
Next 8,000 gallons	$ 14.290	$ 13.877	$ 13.464	$ 13.051	$ 12.638	$ 12.225	$ 11.812	$ 11.400
Over 10,000 gallons	$ 13.980	$ 13.463	$ 12.946	$ 12.429	$ 11.912	$ 11.395	$ 10.878	$ 10.361
Flat Rate	$ 49.30	$ 48.89	$ 48.48	$ 48.08	$ 47.67	$ 47.26	$ 46.86	$ 46.48

CHARLES TOWN UTILITY BOARD
OPTION A
COMPARISON OF PRESENT AND PROPOSED RATES

Average Bills	2021/2022 Rates	2022/2023 Rates	2023/2024 Rates	2024/2025 Rates	2025/2026 Rates	2026/2027 Rates	2027/2028 Rates	2028/2029 Rates	Cumulative Change
Charles Town and Ranson:									
Residential at 3,300 gallons	$ 43.41	$ 43.83	$ 44.28	$ 44.72	$ 45.16	$ 45.60	$ 46.06	$ 46.48	$ 46.48
$ Increase		$ 0.42	$ 0.44	$ 0.44	$ 0.44	$ 0.44	$ 0.46	$ 0.42	$ 3.07
Percentage Change		0.97%	1.01%	1.00%	0.99%	0.98%	1.01%	0.91%	7.07%
Non-Residential at 8,450 gallons	$ 98.21	$ 99.19	$ 100.19	$ 101.20	$ 102.20	$ 103.20	$ 104.23	$ 105.19	$ 105.19
$ Increase		$ 0.98	$ 1.00	$ 1.00	$ 1.00	$ 1.00	$ 1.02	$ 0.96	$ 6.98
Percentage Change		1.00%	1.01%	1.00%	0.99%	0.98%	0.99%	0.92%	7.11%
Race Course at 940,000 Monthly	$ 9,107.80	$ 9,201.02	$ 9,294.26	$ 9,387.51	$ 9,480.75	$ 9,573.99	$ 9,667.25	$ 9,758.59	$ 9,758.59
$ Increase		$ 93.22	$ 93.24	$ 93.24	$ 93.24	$ 93.24	$ 93.26	$ 91.34	$ 650.79
Percentage Change		1.02%	1.01%	1.00%	0.99%	0.98%	0.97%	0.94%	7.15%
Jefferson County:									
Residential at 3,300 gallons	$ 49.30	$ 48.89	$ 48.48	$ 48.08	$ 47.67	$ 47.26	$ 46.86	$ 46.48	$ 46.48
$ Increase		$ (0.41)	$ (0.41)	$ (0.41)	$ (0.41)	$ (0.41)	$ (0.41)	$ (0.38)	$ (2.82)
Percentage Change		-0.83%	-0.83%	-0.84%	-0.85%	-0.85%	-0.86%	-0.80%	-5.71%
Non-Residential at 8,450 gallons	$ 122.89	$ 120.36	$ 117.82	$ 115.29	$ 112.76	$ 110.22	$ 107.69	$ 105.19	$ 105.19
$ Increase		$ (2.53)	$ (2.53)	$ (2.53)	$ (2.53)	$ (2.53)	$ (2.53)	$ (2.50)	$ (17.70)
Percentage Change		-2.06%	-2.11%	-2.15%	-2.20%	-2.25%	-2.30%	-2.32%	-14.40%

CHARLES TOWN UTILITY BOARD

COMPARISON OF BILLS UNDER PRESENT AND PROPOSED RATES
CITY - MONTHLY
OPTION A

CONSUMPTION GALLONS		BILLS UNDER 2021/2022 RATES	BILLS UNDER 2028/2029 RATES	INCREASE AMOUNT	INCREASE PERCENT
(1)		(2)	(3)	(4)	(5)
0		$ 29.58	$ 31.66	$ 2.08	7.03%
1,000		29.58	31.66	2.08	7.03%
2,000		29.58	31.66	2.08	7.03%
3,000		40.22	43.06	2.84	7.06%
3,300	*	43.41	46.48	3.07	7.07%
4,000		50.86	54.46	3.60	7.08%
5,000		61.50	65.86	4.36	7.09%
6,000		72.14	77.26	5.12	7.10%
7,000		82.78	88.66	5.88	7.10%
8,000		93.42	100.06	6.64	7.11%
8,450	**	98.21	105.19	6.98	7.11%
9,000		104.06	111.46	7.40	7.11%
10,000		114.70	122.86	8.16	7.11%
11,000		124.37	133.22	8.85	7.12%
12,000		134.04	143.58	9.54	7.12%
13,000		143.71	153.94	10.23	7.12%
14,000		153.38	164.30	10.92	7.12%
15,000		163.05	174.67	11.62	7.12%
20,000		211.40	226.47	15.07	7.13%
30,000		308.10	330.08	21.98	7.13%
40,000		404.80	433.69	28.89	7.14%
50,000		501.50	537.30	35.80	7.14%
60,000		598.20	640.91	42.71	7.14%
70,000		694.90	744.52	49.62	7.14%
100,000		985.00	1,055.35	70.35	7.14%
200,000		1,952.00	2,091.45	139.45	7.14%
300,000		2,919.00	3,127.55	208.55	7.14%
400,000		3,886.00	4,163.65	277.65	7.14%
500,000		4,853.00	5,199.75	346.75	7.15%

* Average Residential Bill.
** Average Non-Residential Bill.

CHARLES TOWN UTILITY BOARD

COMPARISON OF BILLS UNDER PRESENT AND PROPOSED RATES
COUNTY - MONTHLY
OPTION A

CONSUMPTION GALLONS		BILLS UNDER 2021/2022 RATES	BILLS UNDER 2028/2029 RATES	INCREASE AMOUNT	INCREASE PERCENT
(1)		(2)	(3)	(4)	(5)
0		$ 30.72	$ 31.66	$ 0.94	3.06%
1,000		30.72	31.66	0.94	3.06%
2,000		30.72	31.66	0.94	3.06%
3,000		45.01	43.06	(1.95)	-4.33%
3,300	*	49.30	46.48	(2.82)	-5.71%
4,000		59.30	54.46	(4.84)	-8.16%
5,000		73.59	65.86	(7.73)	-10.50%
6,000		87.88	77.26	(10.62)	-12.08%
7,000		102.17	88.66	(13.51)	-13.22%
8,000		116.46	100.06	(16.40)	-14.08%
8,450	**	122.89	105.19	(17.70)	-14.40%
9,000		130.75	111.46	(19.29)	-14.75%
10,000		145.04	122.86	(22.18)	-15.29%
11,000		159.02	133.22	(25.80)	-16.22%
12,000		173.00	143.58	(29.42)	-17.00%
13,000		186.98	153.94	(33.04)	-17.67%
14,000		200.96	164.30	(36.66)	-18.24%
15,000		214.94	174.67	(40.28)	-18.74%
20,000		284.84	226.47	(58.37)	-20.49%
30,000		424.64	330.08	(94.56)	-22.27%
40,000		564.44	433.69	(130.75)	-23.16%
50,000		704.24	537.30	(166.94)	-23.70%
60,000		844.04	640.91	(203.13)	-24.07%
100,000		1,403.24	1,055.35	(347.89)	-24.79%

* Average Residential Bill.
** Average Non-Residential Bill.

Charles Town Utility Board – Rate Study

Projected Rate Design – Option B:

- Consolidate Rates, accomplished in 2028/2029 Fiscal Year
- 1,000 gallon Minimum
- Lower cost for low users; 29% of bills in Charles Town are under 2,000 gallons per month

Gannett Fleming

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CHARLES TOWN UTILITY BOARD
OPTION B
COMPARISON OF PRESENT AND PROPOSED RATES

Charles Town and Ranson

	2020/2021 Rates	2021/2022 Rates	2022/2023 Rates	2023/2024 Rates	2024/2025 Rates	2025/2026 Rates	2026/2027 Rates	2027/2028 Rates	2028/2029 Rates
Minimum Charge - All Meter Sizes	$ 28.14	$ 29.58	$ 23.30	$ 22.80	$ 22.35	$ 21.85	$ 21.50	$ 21.00	$ 20.55
Consumption Charges (per 1000 gallons)									
First 2,000 gallons/1000 gallons		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Next 8,000 gallons/9,000 gallons	$ 10.120	$ 10.640	$ 10.861	$ 11.082	$ 11.303	$ 11.524	$ 11.745	$ 11.966	$ 12.185
Over 10,000 gallons	$ 9.200	$ 9.670	$ 9.871	$ 10.072	$ 10.273	$ 10.473	$ 10.674	$ 10.875	$ 11.074

Jefferson County

Minimum Charge - All Meter Sizes	$ 33.22	$ 30.72	$ 16.25	$ 17.00	$ 17.75	$ 18.50	$ 19.00	$ 19.80	$ 20.55
Consumption Charges (per 1000 gallons)									
First 2,000 gallons/1000 gallons		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Next 8,000 gallons/9,000 gallons	$ 16.610	$ 14.290	$ 13.989	$ 13.688	$ 13.387	$ 13.086	$ 12.785	$ 12.484	$ 12.185
Over 10,000 gallons	$ 16.610	$ 13.980	$ 12.714	$ 12.440	$ 12.167	$ 11.893	$ 11.620	$ 11.346	$ 11.074
Flat Rate	$ 58.14	$ 49.30	$ 48.42	$ 48.48	$ 48.54	$ 48.60	$ 48.41	$ 48.51	$ 48.58

CHARLES TOWN UTILITY BOARD
OPTION B
COMPARISON OF PRESENT AND PROPOSED RATES

Average Bills	2021/2022 Rates	2022/2023 Rates	2023/2024 Rates	2024/2025 Rates	2025/2026 Rates	2026/2027 Rates	2027/2028 Rates	2028/2029 Rates	Cumulative Change
Charles Town and Ranson:									
Residential at 3,300 gallons	$ 43.41	$ 48.28	$ 48.29	$ 48.35	$ 48.36	$ 48.51	$ 48.52	$ 48.58	$ 48.58
$ Increase		$ 4.87	$ 0.01	$ 0.06	$ 0.01	$ 0.16	$ 0.01	$ 0.05	$ 5.16
Percentage Change		11.21%	0.02%	0.12%	0.02%	0.33%	0.02%	0.11%	11.89%
Non-Residential at 8,450 gallons	$ 98.21	$ 104.21	$ 105.36	$ 106.56	$ 107.70	$ 109.00	$ 110.15	$ 111.33	$ 111.33
$ Increase		$ 6.01	$ 1.15	$ 1.20	$ 1.15	$ 1.30	$ 1.15	$ 1.18	$ 13.12
Percentage Change		6.12%	1.10%	1.14%	1.08%	1.20%	1.05%	1.07%	13.36%
Race Course at 940,000 Monthly	$ 9,107.80	$ 9,300.99	$ 9,489.22	$ 9,677.60	$ 9,865.83	$ 10,054.30	$ 10,242.54	$ 10,429.13	$ 10,429.13
$ Increase		$ 193.19	$ 188.23	$ 188.38	$ 188.23	$ 188.48	$ 188.23	$ 186.59	$ 1,321.33
Percentage Change		2.12%	2.02%	1.99%	1.95%	1.91%	1.87%	1.82%	14.51%
Jefferson County:									
Residential at 3,300 gallons	$ 49.30	$ 48.42	$ 48.48	$ 48.54	$ 48.60	$ 48.41	$ 48.51	$ 48.58	$ 48.58
$ Increase		$ (0.87)	$ 0.06	$ 0.06	$ 0.06	$ (0.19)	$ 0.11	$ 0.06	$ (0.72)
Percentage Change		-1.77%	0.12%	0.12%	0.12%	-0.40%	0.22%	0.13%	-1.46%
Non-Residential at 8,450 gallons	$ 122.89	$ 120.47	$ 118.98	$ 117.48	$ 115.99	$ 114.25	$ 112.81	$ 111.33	$ 111.33
$ Increase		$ (2.42)	$ (1.49)	$ (1.49)	$ (1.49)	$ (1.74)	$ (1.44)	$ (1.48)	$ (11.56)
Percentage Change		-1.97%	-1.24%	-1.25%	-1.27%	-1.50%	-1.26%	-1.31%	-9.41%

CHARLES TOWN UTILITY BOARD

COMPARISON OF BILLS UNDER PRESENT AND PROPOSED RATES
CITY - MONTHLY
OPTION B

CONSUMPTION GALLONS		BILLS UNDER 2021/2022 RATES	BILLS UNDER 2028/2029 RATES	INCREASE AMOUNT	INCREASE PERCENT
(1)		(2)	(3)	(4)	(5)
0		$ 29.58	$ 20.55	$ (9.03)	-30.53%
1,000		29.58	20.55	(9.03)	-30.53%
2,000		29.58	32.74	3.16	10.67%
3,000		40.22	44.92	4.70	11.69%
3,300	*	43.41	48.58	5.16	11.89%
4,000		50.86	57.11	6.25	12.28%
5,000		61.50	69.29	7.79	12.67%
6,000		72.14	81.48	9.34	12.94%
7,000		82.78	93.66	10.88	13.14%
8,000		93.42	105.85	12.43	13.30%
8,450	**	98.21	111.33	13.12	13.36%
9,000		104.06	118.03	13.97	13.42%
10,000		114.70	130.22	15.52	13.53%
11,000		124.37	141.29	16.92	13.60%
12,000		134.04	152.36	18.32	13.67%
13,000		143.71	163.44	19.73	13.73%
14,000		153.38	174.51	21.13	13.78%
15,000		163.05	185.59	22.54	13.82%
20,000		211.40	240.96	29.56	13.98%
30,000		308.10	351.70	43.60	14.15%
40,000		404.80	462.44	57.64	14.24%
50,000		501.50	573.18	71.68	14.29%
60,000		598.20	683.92	85.72	14.33%
70,000		694.90	794.66	99.76	14.36%
100,000		985.00	1,126.88	141.88	14.40%
200,000		1,952.00	2,234.29	282.29	14.46%
300,000		2,919.00	3,341.70	422.70	14.48%
400,000		3,886.00	4,449.11	563.11	14.49%
500,000		4,853.00	5,556.52	703.52	14.50%

* Average Residential Bill.
** Average Non-Residential Bill.

CHARLES TOWN UTILITY BOARD

COMPARISON OF BILLS UNDER PRESENT AND PROPOSED RATES
COUNTY - MONTHLY
OPTION B

CONSUMPTION GALLONS		BILLS UNDER 2021/2022 RATES	BILLS UNDER 2028/2029 RATES	INCREASE AMOUNT	INCREASE PERCENT
(1)		(2)	(3)	(4)	(5)
0		$ 30.72	$ 20.55	$ (10.17)	-33.11%
1,000		30.72	20.55	(10.17)	-33.11%
2,000		30.72	32.74	2.02	6.56%
3,000		45.01	44.92	(0.09)	-0.20%
3,300	*	49.30	48.58	(0.72)	-1.46%
4,000		59.30	57.11	(2.19)	-3.70%
5,000		73.59	69.29	(4.30)	-5.84%
6,000		87.88	81.48	(6.40)	-7.29%
7,000		102.17	93.66	(8.51)	-8.33%
8,000		116.46	105.85	(10.62)	-9.11%
8,450	**	122.89	111.33	(11.56)	-9.41%
9,000		130.75	118.03	(12.72)	-9.73%
10,000		145.04	130.22	(14.83)	-10.22%
11,000		159.02	141.29	(17.73)	-11.15%
12,000		173.00	152.36	(20.64)	-11.93%
13,000		186.98	163.44	(23.54)	-12.59%
14,000		200.96	174.51	(26.45)	-13.16%
15,000		214.94	185.59	(29.35)	-13.66%
20,000		284.84	240.96	(43.88)	-15.41%
30,000		424.64	351.70	(72.94)	-17.18%
40,000		564.44	462.44	(102.00)	-18.07%
50,000		704.24	573.18	(131.06)	-18.61%
60,000		844.04	683.92	(160.12)	-18.97%
100,000		1,403.24	1,126.88	(276.36)	-19.69%

* Average Residential Bill.
** Average Non-Residential Bill.

Questions?

RETURN TO: DEWBERRY ENGINEERS INC.
8401 Arlington Boulevard
Fairfax, VA 22031
703.560.6366 phone | 703.468.2212 fax

CLIENT: CHARLES TOWN UTILITY BOARD
832 South George Street
Charles Town, WV 25414
304.724.7080 phone

PROJECT INFORMATION

Name: Future Demand Projections and Water Systems Capital Improvements Planning

Dewberry PM: M. Kazmierczak
Dewberry BU: 1651
Task Order Number: 03
Task Order Date: June 17, 2021

A. Method of Payment and Contract Amount

The projected hours and estimated fee for this project are summarized in Attachment "A" and shall not exceed fee of $39,500 without written permission from CTUB. Payment will be in accordance with the agreed hourly rate schedule on a monthly basis and based upon actual expenditures for the project.

B. Terms and Conditions

The standard terms and conditions for this Task Order are pursuant to the Engineering Services Agreement (dated September 26, 2018) for Dewberry's Services performed under this Agreement.

C. Description of Services

Services covered by this Task Order will be performed in accordance with the Attachments referenced above. This Task Order supersedes all prior agreements and understandings and may only be changed by written amendment executed by both parties. Dewberry will not be required to render services until this Agreement is signed, returned and the applicable retainer, if appropriate, is paid in full. Dewberry is an equal opportunity employer and, as such, complies with Section 202 of Executive Order 11246 as amended.

Authorized Signatures:

CTUB Charles Town Utility Board		ENGINEER Dewberry Engineers Inc.
	Authorized Signature	
Daryl Hennessy	Print Name	Martin A. Kazmierczak, PE, PMP
Chairman	Title	Principal Engineer
	Date	6-17-2021

PHASE 1 – REPORT PHASE

Task 1A – Team Chartering Meeting

A Team Chartering Meeting will be held with CTUB staff to discuss project goals, level of service (LOS) criteria, objectives, requirements, schedule, and other coordination issues. A meeting agenda will be provided prior to the meeting and, following the meeting, a summary shall be prepared to highlight all key issues and decisions discussed. As part of this meeting, LOS criteria will be discussed, which may include the following:

- Hydraulic criteria
- Fire flow requirements
- Minimum and maximum pressures
- Minimum and maximum velocity in pipe
- Minimum and maximum headloss gradient
- Reliability requirements

Task 1B – Demand Projection and Allocation

This task will include working with the CTUB and Jefferson County (County) Planning staff to approximate population increases over the planning period, determine anticipated demands, and allocate the future demands to the model in order to simulate one (1) scenario for 2040, at the end of the planning period. It is assumed that the projections will span the entire planning horizon in order to estimate the anticipated demands at the end of the planning period. The task will include the following:

1. Preparation of a preliminary demand projection methodology to be used for review and discussion with the CTUB and County needed to supplement demand projections developed during previous tasks.
2. Workshop with the CTUB and County to identify areas of potential future development and supplement the previous demand projections.
3. Calculation of anticipated demands at each planning time step.
4. Workshop with the CTUB to review and adjust preliminary demands.
5. Revision of future demands based on CTUB and County comments.

Task 1C – Water Distribution Systems Evaluation

This task will include the evaluation of CTUB's distribution system to determine if it can meet current and future water needs based on projected demands. The existing water model, which

was developed in Bentley WaterCAD modeling software, will used for the hydraulic limitations analysis. The scope will include the following:

1. Develop steady-state and extended period scenarios for one (1) time step during the planning period for the purpose of analyzing the existing water infrastructure's capacity to supply the anticipated demand in the future based on the projected water demands.
2. Allocate water demands and analyze system capacity.
3. Identification hydraulic limitations and upgrades to address those limitations.
4. Confirm water supply allocation is adequate through the planning period.
5. Identify phased capital improvements and inspection and high-level preventative maintenance schedules with Class 5 cost estimate for large vertical assets including the water treatment plant, three (3) booster stations, and seven (7) storage tanks.
6. Attend two (2) meetings to discuss progress and results.

Task 1D – Summary Report
The aforementioned tasks will be summarized in a water systems capital improvements plan report which will include:

- Water model description
- A graphic depiction of the water system
- An inventory of major water distribution system components (tanks, pumps, valves, etc.)
- Overview of current operating and future operating philosophy
- Water model results
- Demand projections for 2040
- Locations of hydraulic restrictions
- Improvements to address hydraulic restrictions
- Suggested phased capital improvements program including major preventative maintenance work

Dewberry will prepare a draft report and conduct a review with the CTUB. CTUB's comments will be addressed by Dewberry in a final report. PDF format will be used for the draft report. Three (3) hard-copies and a PDF will be provided for the final report along with the associated Water-CAD and GIS files.

PROJECT SCHEDULE AND DELIVERABLES

The Demand Projections and Future Improvements Analysis will be completed within three (3) months of Notice to Proceed. Project delivery is predicated upon no unforeseen delays or circumstances and assumes timely review as scheduled for the CTUB and regulatory agencies. The schedule is based on the assumption that all field data, record drawings, and operational data will be provided within 3 weeks of initiation of this Task Order.

CONDITIONS

The scope and fee are conditioned on the following:

1. Condition assessments are excluded from this proposal: however, allocations for site visits to selected faciltiies have been included on the same day as the Team Chartering Meeting to aid the team in developing an inventory inspection and high-level preventative maintenance plan.
2. Water-age and water quality evaluations are not included, but may be added as an amendment to this Task Order at the request of the CTUB.
3. Design of utility infrastructure is not included. Separate task order(s) are envisioned for such infrastructure.
4. Any required hydrant tests will be performed by CTUB.
5. Safe yield assessments of source waters are not included.
6. Dewberry may rely upon accuracy of water demand information, the record drawings, and other information provided by the CTUB.
7. Due to the unique nature of this assignment, Dewberry's professional liability shall be limited to the fees paid to it by the CTUB for this Task Order.

159 Plaza Drive | Keyser, WV 26726 | P 304.788.3370 | F 304.788.3577 | www.rkk.com

June 15, 2021

Ms. Kristen Stolipher, Utility Manager
Charles Town Utility Board
661 S. George Street
Charles Town, WV 25414

Re: Charles Town Utility Board
Forrest Avenue and Fairfax Crossing
Top Level Budget

Ms. Stolipher,

At the request of the Board, RK&K reviewed the available information on the existing sewer collection system and the proposed development and prepared a "top level" budget for providing sewer service to the existing Fairfax Crossing Subdivision, the proposed Lakeland Place at Fairfax Crossing Subdivision, and the Forrest Street Pump Station service area via a single pump station.

HATCH previously evaluated the downstream gravity capacity of the Lakeland Place Subdivision and ultimately recommended relocating the Forrest Avenue Pump Station to the location of the proposed Lakeland Place Pump Station. HATCH also recommended that the Lakeland Place Pump Station be designed for less than the full build out of the sewershed to reduce the initial cost. Therefore, the Lakeland Place Pump Station would serve:

- 96 townhouses – Phase IIIB Lakeland Place at Fairfax Crossing
- 36 residential lots – Currently served by Forrest Avenue Pump Station
- Church of Christ – Currently served by Forrest Avenue Pump Station
- 70 townhouses - redevelopment of platted lots around the Fairfax Boulevard "peanut". This redevelopment was noted as likely in discussions with the City of Ranson and if this occurs the CTUB could prorate their connection contribution cost based on those lots., thereby saving long-term O&M costs, but at an extremely high initial cost for the CTUB (much of the flow within this gravity sewer is attributed to future and current users).
- 15 residential lots – Currently served by the 11th Avenue Pump Station. RK&K looked at the feasibility of decommissioning the 11th Avenue Pump Station and redirecting flow to the new Lakeland Place Pump Station.

Enclosed with this letter is a drawing of the proposed option for combining all flows into a single pump station. A breakdown of construction costs and a pro rata share of construction costs for the chosen alternative is identified in the following section.

SEWER SERVICE

Two (2) options were evaluated for conveying sewage from the 11th Avenue Pump Station to a proposed Lakeland Place Pump Station, and seven (7) options were evaluated for conveying sewage from the Forrest Avenue Pump Station to a proposed Lakeland Place Pump Station. The composition of properties and unit counts are based off of the HATCH Report dated March 9, 2020. A brief description of the chosen alternatives is below:

11th Avenue Pump Station Chosen Option

This option consists of the construction of 735 LF of 8" gravity sewer, 5 manholes, demolition of the existing 11th Avenue PS; and converting the existing pump station into a sanitary manhole. This option utilizes the alley between E. 10th Ave. and E. 11th Ave. and ties into the proposed manhole at the location of the existing Forrest Ave. Pump Station.

Overall, the construction cost for 11th Avenue Option 1 is $210,000, as shown below.

CONCEPTUAL LEVEL COST ESTIMATE
June 9, 2021

No.	Description	Quantity	Unit	Unit Price	Total Price
	11th STREET PS PURPLE LINE (CTUB)				
1	Mobilization	1	LS	$ 8,000	$ 8,000
2	Erosion & Sediment Control	1	LS	$ 8,000	$ 8,000
3	8" SDR 35 PVC Gravity Sewer	735	LF	$ 125	$ 91,875
4	4 ft. Dia. Manholes (up to 6')	5	EA	$ 7,500	$ 37,500
5	MH Extensions	3	EA	$ 500	$ 1,500
6	Frame & Cover (Highway)	5	EA	$ 500	$ 2,500
7	System Tie-in Connection	1	EA	$ 2,000	$ 2,000
8	Test Pit Excavation and Refill	3	EA	$ 1,000	$ 3,000
9	Asphalt Trench Patch (Base)	2	TON	$ 150	$ 225
10	Asphalt Overlay	3	TON	$ 120	$ 300
11	Aggregate for Backfill	7	CY	$ 50	$ 350
12	11th St. PS Demolition	1	LS	$ 12,000	$ 12,000
				Construction Subtotal	**$ 167,300**
	Contingency	20%		$	33,500
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**200,800**
	Easements and Acquisition (0 Easements, $5/LF)			**$**	**-**
				Say	**$ 210,000**

Forrest Avenue Pump Station Chosen Option

This option consists of the construction of 685 LF of gravity sewer, 3 manholes, demolition of the existing Forrest Avenue PS, and 830 LF of force main. This option also includes the construction of the Lakeland Place Pump Station at the low point of the developer's property in the proposed dog park. This alignment utilizes the property lines and will require 125 LF of easement from a homeowner and 242 LF of easement from the GLP capital tract property. This leaves the GLP capital tract property open for future development.

The benefit of this Option is that it removes the existing Forrest Ave. Pump Station from the front yards and combines the existing Forrest Ave. Pump Station and the proposed Lakeland Place Pump Station into a single pump station. The new force main will run along Mare Street and will tie into an existing manhole in the development.

Overall, the construction cost for Forrest Avenue Option 1 linework is $200,000. The construction cost for the Lakeland Place Pump Station is $480,000 as shown in the tables below:

CONCEPTUAL LEVEL COST ESTIMATE					
June 11, 2021					
No.	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Price**
	FORREST AVE BLUE LINE				
1	Mobilization	1	LS	$ 8,000	$ 8,000
2	Erosion & Sediment Control	1	LS	$ 8,000	$ 8,000
3	8" SDR 35 PVC Gravity Sewer (D<8')	310	LF	$ 110	$ 34,100
4	8" SDR 35 PVC Gravity Sewer (8'<D<12')	108	LF	$ 125	$ 13,500
5	8" SDR 35 PVC Gravity Sewer (D>12')	267	LF	$ 175	$ 46,725
6	4 ft. Dia. Manholes (up to 6')	3	EA	$ 7,500	$ 22,500
7	MH Extensions	10	EA	$ 500	$ 5,000
8	Frame & Cover (Highway)	3	EA	$ 500	$ 1,500
9	System Tie-in Connection	1	EA	$ 2,000	$ 2,000
10	Test Pit Excavation and Refill	3	EA	$ 1,000	$ 3,000
11	Forrest Ave. PS Demolition	1	LS	$ 12,000	$ 12,000
				Construction Subtotal	**$ 156,400**
	Contingency	20%		$	31,300
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**187,700**
	Easements and Acquisition (2 Easements, $5/LF)			**$**	**1,850**
				Say	**$ 190,000**

CONCEPTUAL LEVEL COST ESTIMATE					
June 11, 2021					
No.	**Description**	**Quantity**	**Unit**	**Unit Price**	**Total Price**
	LAKELAND PLACE PUMP STATION				
1	Pump Station	1	LS	$ 358,355	$ 358,355
2	4" PVC Force Main	830	LF	$ 45	$ 37,350
				Construction Subtotal	**$ 395,800**
	Contingency	20%		$	79,200
	TOTAL ESTIMATED CONSTRUCTION COST			**$**	**475,000**
	Easements and Acquisition (1 Easement)				
				Say	**$ 480,000**

TIMING / RECOMMENDATION

It is recommended that 11th Avenue Pump Station Chosen Option and Forrest Avenue Pump Station Chosen Option are constructed. Construction of 11th Avenue Pump Station chosen option will eliminate the 11th Avenue Pump Station, whereby lowering O&M costs to the sewer system. The Forrest Avenue Pump Station Chosen Option will combine the Forrest Avenue Pump Station and the proposed Lakeland Place Pump Station into a single pump station.

The total cost for the combined Lakeland Place pump station and force main is $480,000. Below is a summary of the pro rata share of the construction costs for the proposed combined pump station and force main.

Property	EDU	% Total	Responsibility	Pro Rata Cost
Residential Lots – Phase IIIB	96	44%	Developer	$211,200
Residential Lots – Existing Forrest Ave PS	38	17%	CTUB	$81,600
Residential Lots – Existing 11th Ave PS	15	7%	CTUB	$33,600
Church of Christ	1	1%	CTUB	$4,800
Residential Lots - Redeveloped	70	31%	Future Developer (CTUB now)	$148,800

The cost for demolition of the 11th Avenue Pump Station and the linework from the existing 11th Avenue and Forrest Street Pump Stations to the combined pump station will be the responsibility of the CTUB. Below is a summary of the total pro rata share of construction costs for the overall project.

CTUB: $210,000 + $190,000 + $81,600 + $ $33,600 + $4,800 + $148,800 = $668,800

Developer: $211,200

CAPACITY ANALYSIS

Construction of a combined Lakeland Place pump station that discharges into the existing Flowing Springs Pump Station will relieve the Old Ranson sewer of flow. The proposed combined pump station will immediately serve a total of 147 EDUs and will ultimately serve a total of 217 EDUs.

The Flowing Springs Pumps and the Evitt's Run Gravity Sewer are being upgraded as part of the 2021 Charles Town Sewer Project and therefore, will be designed to handle the flow from the Lakeland Place Pump Station. It is recommended that the Flowing Springs Pump Station and Evitt's Run Gravity Sewer are upgraded prior to connection of the proposed combined Lakeland Place Pump Station.

Any future development not planned for in the area served by the combined pump station will need to be evaluated prior to construction. Future development may require replacement of the pumps with larger pumps or modifications to the pump station to handle the additional capacity. The construction of a 4" force main from the proposed pump station will allow for larger pumps in the future as the maximum flow in a 4" force main is 313 GPM.

During the Board's review, should you have any questions or require additional information, please do not hesitate to contact me at 304.788.3370 or rdodge@rkk.com.

Very truly yours,
RUMMEL, KLEPPER & KAHL, LLP

Rhiannon A. Dodge, EIT
Associate Engineer

John W. Cole, PE
Manager, Municipal Engineering

Enc.
Forrest Ave and Fairfax Crossing Chosen Alternative Display
Fairfax Crossing Chosen Alternative Profile
HATCH TO 07 Fairfax Crossing Evaluation
Proposed Developer PS Units



\\AD.RKK.COM\VS\CLOUD\PROJECTS\2019\19339_CTUBONCALL\19339.012_FORREST AVE AND FAIRFAX CROSSING\ACAD\DRAWINGS\FORREST AVE_FAIRFAX CROSSING_OPTIONS.DWG

RK&K

P: 304.788.3370
159 Plaza Drive | Keyser, WV 26726
Engineers | Construction Managers | Planners | Scientists
www.rkk.com
Responsive People | Creative Solutions

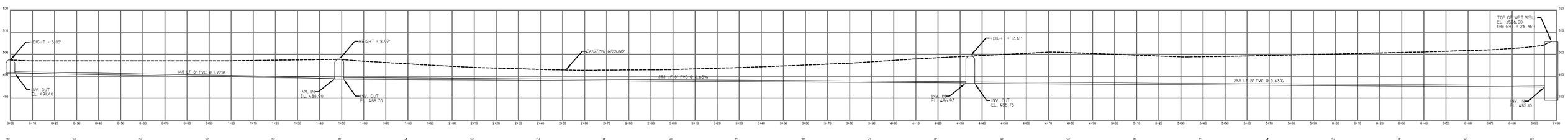
PROJECT NO.	19339.012-001
DATE	06/15/2021
DESIGNED	RAD
DRAWN	RAS
CHECKED	JWC

REVISIONS

CHARLES TOWN UTILITY BOARD
661 S. GEORGE ST.
CHARLES TOWN, WV 25414

FORREST AVENUE & FAIRFAX CROSSING PUMP STATION RELOCATION

DRAWING NO.....
OF..... 28



PROPOSED RELOCATED PUMP STATION OPTION

March 9, 2020

H/359787/100-700

Ms. Kristen M. Stolipher, Assistant Utility Manager
Charles Town Utility Board
661 South George Street, Suite 101
Charles Town, WV 25414

Subject: Evaluation Findings
Task Order #7 – Fairfax Crossing Evaluation
Engineering Services for Water/Wastewater Systems Upgrades Projects

Dear Kristen,

This task order's scope includes evaluating the impact of the next phase of the Lakeland Place at Fairfax Crossing development (459 townhouses), including whether an upgrade in downstream gravity trunk sewer capacity is required. The downstream capacity analysis to Flowing Springs Pump Station will assume the replacement of the small pump station at Forrest and 11th Avenues. The undeveloped industrial land between Fairfax Crossing and the existing Norfolk-Southern Railroad will be reviewed for possible future inclusion into the gravity trunk sewer. These parcels are shown on the attached Task Order #7 Exhibit and are purple, Zone I - Industrial.

This task order's scope also includes review and comment of the Sanitary Sewer Trunkline, Forrest Avenue to Rt. 9 plan set prepared by Allegheny Surveys, Inc. and approved by WV Dept. of Health 5/7/2015. It is noted that this trunk sewer eliminates the Forrest and 11th Avenues pump station by serving that area with gravity sewer. It also connects the (assumed) next phase of Lakeland Place at Fairfax Crossing, thereby eliminating the pump station shown on the attached Task Order #7 Exhibit.

Lack of Design and As-built Sewer System Plans

The sewer system design plans for all phases of Lakeland Place at Fairfax Crossing, as well as the 12-inch sewer to the 15-inch Trunk Sewer were never provided to the City of Ranson due to bankruptcy of the original developer. Further, the City was never provided all the as-built plans for the sewers constructed by the Ranson Builders Consortium, LLC. These include the sewers within The Boulevard, and The Market Place at Potomac Towne Center, and Shenandoah Springs subdivision. It is noted there are Record Plans for the 15-inch Trunk Sewer to Flowing Springs Pump Station (FSPS) and the FSPS.

It is recommended that CTUB's conditional acceptance of the Lakeland Place at Fairfax Crossing, Phase IIIB also include as-built survey of all sewers that feed to the 15-inch Truck Sewer from this development.

Downstream Capacity Analysis

Hatch reviewed the sewershed that includes the Phase IIIB, Lakeland Place at Fairfax Crossing, the lots served by the Forrest Avenue Pump Station, including those platted lots in the vicinity of the Fairfax Avenue Circle, and the industrial lots east of the Norfolk-Southern Railroad (refer to the attached Sewershed Exhibit and the Sewer Capacity Calculations).

Currently, Lakeland Place at Fairfax Crossing is connected to the 15-inch trunk sewer on the east side of Route 9 via a 12-inch sewer at MH-20. It is understood that originally the Phase IIIB sewer system planned to include a proposed pump station (refer to the TO#7 Exhibit) that would discharge to the existing gravity sewers and flow through the 12- and 15-inch sewers to Flow Springs Pump Station.

An alternate gravity sewer was designed by Allegheny Surveys, Inc. that eliminates this Lakeland Place pump station (see Review of Sanitary Sewer Trunkline Plans below). Considering this alternative and the possibility that other properties east of the Norfolk-Southern Railroad could flow by gravity to this same gravity system, we looked at existing topography and developed the attached Sewershed Exhibit. This shows that conservatively four out of five Industrial properties could flow into this alternate gravity sewer. Further, the GLP Capital tract (triangular shape) southeast of Lakeland Place would also naturally flow to the alternate gravity sewer. It is noted that the fifth Industrial property is currently vacant, and it likely drains southerly and connect to the existing sewers within the City of Ranson.

Compiling these properties and converting their acreage into Equivalent Dwelling Units (EDUs) results in a combined flow at the 12-inch junction with the 15-inch Trunk Sewer of 1644 EDUs (refer to Sewer Capacity Calculations attached). The existing sewer system information is not available under or east of Route 9 as noted above. Hatch used a design set of plans for the 15-inch Trunk Sewer, which included the 12-inch segments east of Route 9 that serves Lakeland Place. These same 12-inch pipe segments would serve the 1644 EDUs noted above and identified in the Sewer Capacity Calculations. Based on the analysis we reached these conclusions:

- The 12-inch sewer (east of route 9) has adequate capacity for the proposed Lakeland Place at Fairfax Crossing and other proposed development in its sewershed.
    - The projected peak flows (current plus future) for this sewershed are 688 gpm as shown within the attached Sewer Capacity Calculations, and
    - The 12-inch sewer currently serving Lakeland Place at Fairfax Crossing has a limiting/critical sewer segment between MH-20C and MH-20D with a peak capacity of 1018 gpm, but, again, the capacity of the segments upstream of MH-20D (under Route 9 and to Lakeland Place) is unknown.
- The 15-inch sewer has adequate capacity for its current and future sewershed development.
    - The current and future peak flows for this sewershed are 229 gpm and 936 gpm, respectively, as shown within the attached Sewer Capacity Calculations, and
    - The 15-inch sewer between the connection of the 12-inch sewer at MH-20 and Flowing Springs Pump Station has a limiting/critical sewer segment between MH-21 and MH-22 with a peak capacity of 1830 gpm.

Review of Sanitary Sewer Trunkline Plans

Hatch reviewed the Sanitary Sewer Trunkline, Forrest Avenue to Rt. 9 plan set prepared by Allegheny Surveys, Inc. and approved by WV Dept. of Health on 5/7/2015. Generally, this trunk sewer eliminates the small pump station serving the Forrest Avenue area and would serve what appears as the next phase of Lakeland Place at Fairfax Crossing. Following are general comments:

1. This trunk sewer provides a gravity solution for the next phase of Lakeland Place at Fairfax Crossing rather than a pump station. Refer to the Recommendations Moving Forward section below.
2. The minimum slope for a 12” sewer is 0.22% compared to the 0.50% shown. Many places this trunk sewer is deep and revising the slope could save several feet of excavation.
3. The lower segment under Route 9 passes under the highway bridge between its foundations and the 12-inch force main from Flowing Springs Pump Station adjacent to the CSX Railroad. This segment is greater than 20 feet deep, making it a constructability issue. It may be more economical than a 250-foot long bore and jack operation under Route 9, but that option should be provided during bidding if this alignment is pursued.
4. An alternate alignment starting at MH-8E could be continuing the 12-inch sewer to the existing 12-inch sewer under Route 9 (approximately 450 feet north of the bridge). As noted above the sewer system plans for the sewer under Route 9 and within Lakeland Place at Fairfax Crossing were never provided to the City of Ranson due to bankruptcy of the original developer. We believe it may be possible to connect to the existing 12-inch sewer west of Route 9 (assume 10-foot deep sewer at

Route 9 and 12-inch sewer run at minimum 0.22% slope), but that connection must be field verified.

5. MH-8M and MH-8N are only 15 feet apart and 22 feet deep and are necessary to "turn the corner" without an acute angle of sewage flow. It is recommended that an easement or right-of-way is explored east of the rear yards over the GLP Capital Tract to prevent the need for this sewer alignment (two deep manholes within 15 feet). The segment of sewer between MH-8P and MN-8M is "bucking grade", so the easement/right-of-way across this land toward MH-8L (the connection to Fairfax Crossing could help reduce the depth of the sewer.
6. An alternate alignment to installing the sewer in the alley across the rear yards is to place the sewer within the right-of-way of Forrest Avenue and pass it adjacent to the "corner" lots at 12th Avenue (easement required). This alignment is not necessarily more economical due to the surface restoration required along Forrest Avenue, but would eliminate the two manholes 15 feet apart and 22 feet deep.
7. The City of Ranson is currently planning to construct a 48-inch storm sewer within the same alley behind the houses as this sewer segment MH-8N to MH-8P, so an easement as discussed in #5 above is likely mandatory unless the alternate alignment discussed in #6 above is pursued.

<u>Recommendations Moving Forward</u>

While a gravity sewer option to serve this sewershed is possible, its cost will be prohibitive for the CTUB at this time. Only a small portion (81 out of 459 townhouses) of the new Phase IIIB of Lakeland Place at Fairfax Crossing will flow to the Proposed Lakeland Place Pump Station. Therefore, the majority of the cost will be borne by the CTUB.

Alternatively, relocating Forrest Avenue Pump Station to the location of the Proposed Lakeland Place Pump Station would serve the CTUB well.

- Relocation would result in one pump station rather than two.
- The Lakeland Place Pump Station could be designed for less than the full build-out of the sewershed to reduce the initial costs. No interest in redevelopment was noted by the City of Ranson for the four industrial properties (Ameristore, Ameritech Tire & Auto, Thompson Gas and Potomac Metals) or the Lloyd Tract, so the initial design for the relocated pump station could be limited to:
    - 81 townhouses – Phase IIIB Lakeland Place at Fairfax Crossing
    - 38 residential lots – currently served by the Forrest Avenue Pump Station
    - Church of Christ – currently served by the Forrest Avenue Pump Station
    - 70 townhouses – redevelopment of platted lots around the Fairfax Boulevard "peanut". This redevelopment was noted as likely in discussions with the City of Ranson and if this occurs the CTUB could prorate their connection contribution cost based on those lots., thereby saving long-term O&M costs, but at an extremely high initial cost for the CTUB (much of the flow within this gravity sewer is attributed to future and current users).
    - The pro-rata share for the above scenario is shown on the Opinion of Probable Construction Cost attached and summarized below:

Property	EDU	Responsibility	Cost
Residential Lots - Phase IIIB	81	Developer	$ 456,158
Residential Lots (existing)	38	CTUB	$ 214,000
Church of Christ	1	CTUB	$ 5,632
Residential Lots (redeveloped)	70	Future Developer	$ 394,211

Ultimately, a gravity sewer will likely serve the Commercial Use (76 acres between Lakeland Place and Route 9) when it is developed. A determination can be made at that time if elimination of the Lakeland Place Pump Station discussed above would be warranted.

Should you have any questions concerning the evaluation findings above, please contact me at 240-751-7002 or Richard.Travers@hatch.com.

Respectfully,



HATCH
Rick Travers, PE
Senior Project Manager

Lakeland Place Concept Plan
Task Order #7 Exhibit
Sewershed Exhibit
Sewer Capacity Calculations (4 pages)
Fairfax Crossing Phase IIIB Sewersheds

cc: Scott Yearley, Hatch

PIEDMONT DESIGN GROUP
PB 25 Pg 116
WV COORD SYS
NORTH ZONE (NAD 83)

#6
0.17 Ac.
Interim Park - To be Relocated Upon Development of Adjacent Lloyd's Landing Property

#5
0.28 Ac.
Splash Pad

#2
Park Area
0.39 Ac.
Junior High Basketball 44.25 x 75.0'

#3
Park Area (green)
0.21 Ac.

#4
PARK
Active Trekking & Dog Park (open space)
0.73 Ac.

#1
Fairfax Crossing Park
0.32 Ac. (exist)

T3
Existing Single Family Detached (front load)

T4
Existing Single Family Detached (rear load)

T5

Existing Single Family Detached (rear load)

Existing Single Family Detached (front load)

Existing Garage Townhouses (front load)

Existing Townhouses (front load)

N. FAIRFAX BLVD 100' R/W

15th AVENUE 66' R/W

17th AVENUE - 17th AVENUE 66' R/W

20' ALLEY

60' R/W

STALLION STREET

Prop. Alley #2

Block perimeter =1,970'
Block perimeter =2,118'
Block perimeter =2,419'
Block perimeter =2,457'
Block perimeter =2,443'

802'
840'
872'
1,009'
1,000'
988'
1,001'
1,001'

571'

22 Rear Load
23 Rear Load
9 Rear Load
62 Rear Load
52 Rear Load
26 Rear Load
47 Rear Load
28 Rear Load
37 Rear Load
24 Front Load
54 Front Load
54 Front Load
(300' NEW) 500' TOTAL

A
B
C

PARK AREA TABULATION (Civic Space)

#	Acres	Type
1(ex.)	0.32	Green
2	0.39	Green
3	0.21	Square
4	0.73	Open Space
5	0.27	Green
6	0.17	Green

TOTALS 2.09 Ac.
Total Tract Area = 41.80 Ac.
Percentage = 5.00% Prov'd (5% req'd)

UNIT TABULATION (Includes T-5 Units)

	Front Load	Rear Load	Totals
East of F'fax Blvd.	132	59	191
West of F'fax Blvd.	-0-	268	268
TOTALS	132	327	459
Percentages	(29%)	(71%)	
Stacked Flats (26' wide)	-0-	40	40
18' Wide Units	-0-	172	172
20' Wide Units	132	115	247
TOTALS	132	327	459

UNIT TYPE LEGEND

A Front Load - 20' Units — 132 TOTAL UNITS
B Rear Load - 20' Units — 115 TOTAL UNITS
C Rear Load - 18' Units — 172 TOTAL UNITS
D Stacked Flat Rear Load - 26' Units — 40 TOTAL UNITS

459 TOTAL UNITS

Existing Facility
2 tot lots
2 picnic tables
gazebo

SKETCH PLAN-9

Lakeland Place at Fairfax Crossing
Phase IIIB
City of Ranson
Jefferson County, WV

02/27/19
MICHAEL T. WILEY, PE, PROF LS DATE
WEST VIRGINIA P.E. #: 11216, EXPIRATION DATE: 12/31/18
FOR PIEDMONT DESIGN GROUP, LLC
WEST VIRGINIA C.O.A.#: 15-5804, EXPIRATION DATE: 12/31/18

SEAL

PIEDMONT DESIGN GROUP
5283 CORPORATE DRIVE
SUITE 300 FREDERICK, MD 21703
301-695-6614

SCALE 1" = 80'
DESIGNED BY: PSA | CHECKED BY: MTW | APPROVED BY:
SHEET 1
DATE Feb. 27, 2019

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Plotted: May 28, 2019 at 5:18pm
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80 0 80 160 240
Scale 1" = 80'

1 in =500 feet

#1 - Ffx Crossing

#2 - Lloyd Trust

#3 - Potomac TC -
Phase IIIB Lakeland
Place at Fairfax Crossing

15" Trunk Sewer

MH-20

12" Sewer

MH-20C

MH-20D

12" Sewer serving
Lakeland Place

Flowing Springs
Pump Station

Critical/ Limiting
Sewer Segments

Commercial
Use - 76 acres

Proposed Lakeland
Place Pump Station

GLP Capital tract

Thompson Gas

Glendwell & Joann
Lloyd tract

Ameristore

Ameritech Tire & Auto

Potomac Metals

Forrest Avenue
Pump Station

RANSON

TASK ORDER #7 EXHIBIT

Base mapping produced by City of Ranson

Existing Pump Station	Parcel Boundary - Approximate	T3 - Sub-Urban
Private Pump Station	RR - Rural Reserve	T4 - General Neighborhood
Proposed Pump Station	R-6 - R-6 Residential	T4O - General Neighborhood Open
Existing Gravity Main	R-7 - R-7 Residential	T5L - Town Center Limited
Existing Force Main	HC - Highway Commercial	T5 - Town Center
Proposed Gravity Main	RC - Racetrack Commercial	SD - Special District
Proposed Force Main	I - Industrial	CS - Civic Space
Existing Stormwater	SCNC - Smart Code New Community	MUX - Mixed Use - Retired
Proposed Stromwater	T1 - Natural	NCX - Neighborhood Center Mix - Retired
Railroad	T2 - Rural	UCX - Urban Commercial - Retired

15" Trunk Sewer

MH-20C

MH-20

MH-20D

Alternate Sewer Alignment

MH-8E

MH-8M & MH-8N

Forrest Ave. PS

OVERALL PLAN

CITY OF RANSON
FORREST AVENUE TO ROUTE 9
SANITARY SEWER TRUNKLINE PLAN & PROFILE
Ranson Corporation
Jefferson County, West Virginia

ALLEGHENY SURVEYS, INC.
401 S. Fairfax Blvd., Suite 3
Ranson, WV 25438
www.alleghenysurveys.com
Ranson, WV Office
Phone: (304) 724-5008
Fax: (304) 724-5010

DRAWING NO.	2
PROJECT NO.	167-43-R-14
PREPARED	LDM
DRAWN BY	LDM
PARTY CHIEF: MM	
RESEARCH: RKB	
SURVEYED: RKB	
FIELD CREW: MM/A.J.	

Plan Number	
Drawn By	LDM
Designed By	LDM
Checked By	LDM
Date	APRIL 2015
Scale	1" = 150'
Sheet	2 of 8
File Number	167-43-R-14

NO.	DATE	DESCRIPTION	BY
1	5/1/2015	Revisions per 5.1.14 DEP comments	LDM

LISA D. McCAULEY
REGISTERED
NO. 11740
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
ENGINEERS SEAL & SIGNATURE

Plotted: May 01, 2015 at 1:54pm
G:\Projects\2014 Proposals and Projects\16714 City of Ranson Sewer 167-43-R-14\CAD\DELIVERABLES\2-OVERALL.dwg

CHARLES TOWN UTILITY BOARD

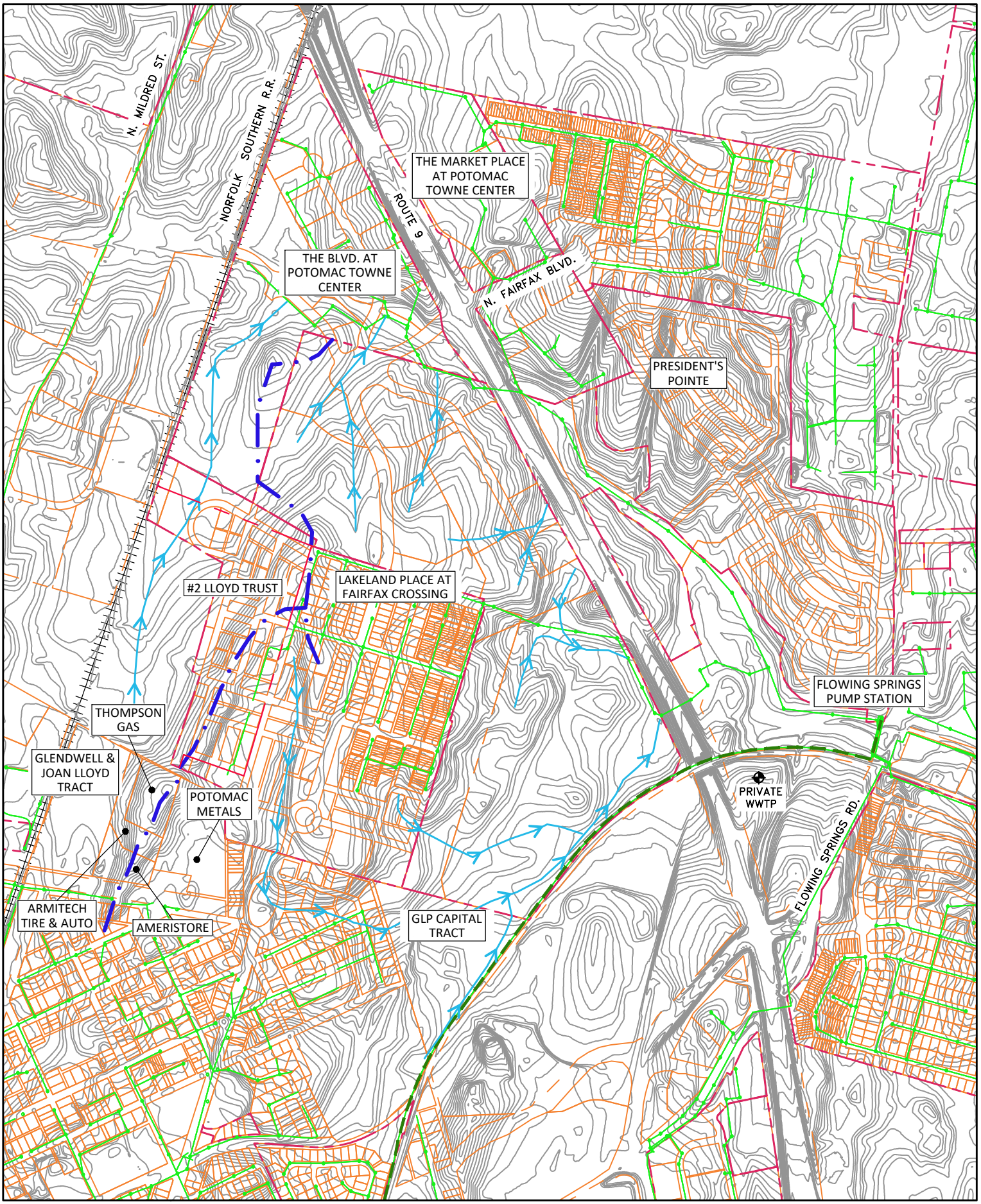
TO #7 Fairfax Crossing Evaluation 12/5/2019

Opinion of Probable Construction Cost Travers

Relocated Forrest Avenue Pump Station

Item	Quantity	Unit	Unit Price	Total
General Conditions & Mobilization (~5% of subtotal)	1	LS	$ 42,000.00	$ 42,000
Site Survey/Layout	1	LS	$ 5,000.00	$ 5,000
Sediment Control	1	LS	$ 7,500.00	$ 7,500
Clearing, Grubbing & Stripping Top Soil	1	LS	$ 2,000.00	$ 2,000
Gravity Sewer - 12" (0'-8' deep)*	544	LF	$ 175.00	$ 95,200
Gravity Sewer - 12" (>8' deep)*	200	LF	$ 350.00	$ 70,000
Manholes (up to 8' deep)*	4	EA	$ 2,500.00	$ 10,000
Manholes (>8' deep)*	80	VF	$ 100.00	$ 7,950
Lakeland Place Pump Station	1	LS	$ 650,000.00	$ 650,000
Site Landscaping (at PS and side yard)	1	LS	$ 5,000.00	$ 5,000
Demolition of Existing PS (by CTUB staff)	0	LS	$ 12,000.00	$ -
			SUBTOTAL	$ 894,650
			Contingency (20%)	$ 178,930
			TOTAL	$ 1,073,580
			SAY	**$ 1,070,000**

Property	EDUs	% Total	Responsibility	Pro Rata Cost
Lakeland Place at Fairfax Crossing				
Residential Lots - Phase IIIB *	81	43%	FFX Crossing IIIB	$ 456,158
Forrest Avenue Pump Station				
Residential Lots (existing)	38	20%	CTUB	$ 214,000
Church of Christ	1	1%	CTUB	$ 5,632
Residential Lots (redeveloped)	70	37%	Fut. Developer	$ 394,211
Total EDUs =	**190**			$ 1,070,000
			TOTAL CTUB =	**$ 219,632**
			FFX Crossing IIIB =	**$ 456,158**
			Future Developer(s) =	**$ 394,211**
CURRENT CTUB includes Future Developer(s) =				**$ 613,842**



SEWERSHED EXHIBIT

CHARLES TOWN UTILITY BOARD
TO #7 Fairfax Crossing Evaluation
Sewer Capacity Calculations

12/19/2019
Travers

HATCH

Sewershed Flows, 12-inch Sewer under Route 9 to 15-inch Trunk Sewer within stream valley flowing to Flowing Springs Pump Station

Property No.		Use	Acres	Avg. Daily Flows* (gpd)	EDUs	Percent Total EDUs		
--	Lakeland Place at Fairfax Crossing							
1	Residential Lots	current	--	49,680	276	17%		
2	** Commercial (west of Route 9)	future	76	76,000	422	26%		76 acres, Potomac TC tract
3	Residential Lots - Phase IIIB	future	41.8	82,620	459	28%		11.0 units/acre per Sketch Plan-9, dated 2/27/2019
4	Other Residential (per LDP)	future	21	34,020	189	11%	(Note 2)	only part of Lloyd tract assumed flowing toward Lakeland Place; 9.0 units/acre are assumed through discussion with Ranson
--	Forrest Avenue Pump Station							
5	Residential Lots	current	--	6,840	38	2%		served by Forrest Ave. Pump Station
6	Church of Christ	current	--	180	1	0%		at 2 gal/member = 90 members
7	Residential Lots	future	--	12,600	70	4%	(Note 5)	assumes townhouse redevelopment adjacent to Lakeland Place
8	Potomac Metals***	future	11.1	5,550	31	2%		current use is recycling center
9	Thompson Gas***	future	3.8	1,900	11	1%	(Note 3)	current use is Thompson Gas
10	Ameritch Tire & Auto***	future	3.1	1,550	9	1%	(Note 3)	current use is tire and auto services
11	Ameristore***	future	3.1	1,550	9	1%	(Note 3)	current use is self storage
12	GLP Capital (triangular tract)****	future	19.6	23,220	129	8%		Jeff. Co. zoning: residential/light industrial/commercial
		Total Flow (gpd) =		*295,710*				
				Total EDUs =	**1644**		(Note 4)	
							peak factor =	3.32
					682		GPM (peak)	682 gpm < 876 gpm (critical segment TBD)
								capacity OK assume 12" at 0.40% slope

EDU - Equivalent Dwelling Unit AMLEA - *Alternate Mainline Extension Agreement*

Note 1 - the original AMLEA for Lakeland Place, date 12/14/2004 computed 131,880 gpd design flow (203 single family, 208 townhouses, 72 apartments, 35 apratments/mixed-use commercial, and 15.99 acres of mixed-use commercial.

Note 2 - It is unclear if, or how much of, Property #4 will drain toward Lakeland Place, but it is added as a possibility.

Note 3 - Properties #9-11 were conservatively added to the sewershed as they are located on the drainage divide. If redevloped with adjacent Lloyd property, the sewage flows will most likely be directed toward the existing system through the City of Ranson.

Note 4 - The computed flows and the resultant EDUs are 2.2 times the original 131,880 gpd design flow outlined in the Lakeland Place AMLEA, dated 12/4/2004 between the City of Ranson and Fairfax Crossing. It is noted that Properties #4 and #5-12 are outside of the original Lakeland Place AMLEA. The computed flow of these tracts/lots equal 87,410 gpd or 66% of the original design flow. Without these properties, the computed flows are 1.6 times the original 131,880 gpd design flow outlined in the Lakeland Place AMLEA.

Note 5 - 70 townhouses assumes a slightly lower density of 7 units/acre on ~10 acres due to topography and the adjacent larger residential lots.

* Each residential lot = 1 EDU; 180 gpd = 1 EDU; which accounts for I&I within the system
** Commercial use planned at 1000 gpd/acre for Commercial use per Lakeland Place AMLEA, dated 12/4/2004
*** Sewage flows based on site acreage = 500 gpd/acre for Industrial Use, WV Design Loading (Table 64-47-B) (using flows > existing use for planning purposes)
**** Density assumed similar to earlier phases of Lakeland Place (249 units on 42 acres = 6.6 units/acre)

typical capacity of gravity sewers

dia.	slope (%)	capacity (GPM)	Equivalent EDU*	Notes
8	0.40	297	719	
10	0.40	538	1305	
12	0.40	876	2124	AMLEA referenced in Note 1 above, indicated that the 12" sewers would be designed at a minimum slope of 0.40%, but as-built drawings are not available, so field survey of the system is necessary to verify system slopes.
	* using peaking factor =	3.30		

City of Ranson Route 9 Infrastructure Project

COMPUTATION OF CAPACITIES OF GRAVITY SEWERS

Ranson 7,000' Sewer (Note 1)

u/s mh	d/s mh	dia.	u/s inv	d/s inv	LF (Note 6)	slope %	capacity (GPM) (Note 2)	
Sewers through The Boulvard at Potomac Towne Center								
11D	11C	10	487.84	487.05	291	0.27	442	(Notes 3, 4)
11C	11B	10	486.95	485.05	380	0.50	602	(Note 3)
11B	11A	10	483.10	477.90	72	7.22	2,288	(Note 5)
Serving The Boulvard at Potomac Towne Center (under Route 9)								
11A	11-2	12	475.91	472.69	87	3.70	2,665	
11-2	11	12	472.59	469.76	296	0.96	1,357	
Trunk Sewer in stream valley to Flowing Springs PS								
11	11-1	15	469.76	469.46	179	0.17	1,036	(Note 8)
11-1	12	15	469.27	468.00	224	0.57	1,898	
12	13	15	467.97	466.19	254	0.70	2,103	
13	14	15	466.19	464.04	245	0.88	2,358	
14	15	15	463.94	460.54	396	0.86	2,331	
15	16	15	460.52	456.17	396	1.10	2,636	
16	17	15	456.06	454.72	380	0.35	1,487	
17	18	15	454.67	453.33	345	0.39	1,570	
18	19	15	453.28	449.40	337	1.15	2,696	
19	20	15	449.34	446.97	337	0.70	2,103	
20	21	15	446.97	445.01	358	0.55	1,864	
21	22	15	444.99	442.86	399	0.53	1,830	(Note 9)
22	FSPS	15	442.82	438.49	399	1.09	2,624	
Serving Lakeland Place at Fairfax Crossing								
20D1	20D	12	452.98	452.97	20	0.05	310	(Note 7)
20D	20C	12	452.87	452.17	129	0.54	1,018	(Note 7)
20C	20B	12	452.07	451.25	147	0.56	1,037	
20B	20A	12	451.21	447.97	287	1.13	1,473	
20A	20	12	447.96	446.97	158	0.63	1,100	

Note 1: MHs and LFs are based on design info, and differ slightly but not significantly from those shown on Figures 9 and 10 which are based on Ranson GIS info.

Note 2: Capacities are computed using a Manning "N" factor of 0.015.

Note 3: This pipe was reportedly designed and constructed as 8" diameter at 0.50%, but was reportedly upsized to 10" diameter.

Note 4: Computed slope of 0.27% is probably closer to 0.50%. It is computed using an as-built invert for MH 11D and a design invert for MH 11C.

Note 5: This pipe was reportedly designed and constructed as 8" diameter at 7.22%, but was reportedly upsized to 10" diameter.

Note 6: MHs and LFs are based on design info, and differ slightly but not significantly from those shown on Figures 9 and 11 which are based on Ranson GIS info.

Note 7: no as-built information is available upstream of MH-20D. Assume that the MH-20D to MH-20C is the critical segment serving Lakeland Place at Fairfax Crossing.

Note 8: Limiting/critical segment for 15" trunk sewer downstream of The Boulevard, and the Market Place at Potomac Towne Center.

Note 9: Limiting/critical segment for 15" trunk sewer downstream of Lakeland Place.

City of Ranson Route 9 Infrastructure Project

GROWTH - TRIBUTARY TO RANSON 7,000' GRAVITY SEWER (Version 2.0, Note 5)

Development	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Rt. 9 corridor flow into u/s end of 10"														
Blackford Village	0	0	0	0	0	0	0	0	0	0	0	0	0	
BOE site (fmr. Lloyd Property)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bridgeforth Property	0	0	0	0	0	0	0	0	0	0	0	0	0	
Burr Business Park (Note 1)	0	0	0	0	27,000	0	6,264	0	6,264	0	6,264	0	6,264	
Clay Hill Farm - North	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clay Hill Farm - South	0	0	0	0	0	0	0	0	0	0	0	0	0	
Day-Care Center	0	0	0	0	833	0	0	0	0	0	0	0	0	
Harvest Hills	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jefferson Orchard - East	0	0	0	0	16,500	0	16,500	0	16,500	0	16,500	0	16,500	GPD (avg)
Jefferson Orchard - North	0	0	0	0	0	0	0	0	7,500	0	7,500	0	7,500	
Jetts Farm flow (less W. Burr)	0	0	0	0	0	0	45,000	0	0	0	0	0	0	
Locust Knoll	0	0	0	0	0	0	12,924	0	12,924	0	12,924	0	12,924	
Locust Knoll - West	0	0	0	0	0	0	0	0	0	0	0	0	0	
Miller Property	0	0	0	0	0	0	0	0	0	0	0	0	0	
North Ranson Development	0	0	0	0	0	0	0	0	0	0	0	0	0	
ROXUL	0	0	40,000	0	0	0	0	0	40,000	0	0	0	0	
Shenandoah Junction	0	0	0	0	0	0	28,800	0	0	0	0	0	0	
Tackley Mill	0	0	0	0	0	0	0	0	0	0	21,600	0	21,600	
			69		77		267		411		524		636	GPM (peak)
			cum. 2017-2019		cum. 2020-2021		cum. 2020-2023		cum. 2020-2025		cum. 2020-2027		cum. 2020-2029	
Feeder flow into 10"														
Boulevard at PTC, MH-11 (Note 2)	6,627	675	12,150	2,700	2,700	2,700	2,700	3,375	3,375	3,375	3,375	0	0	GPD (avg)
			34		9		19		30		42		42	GPM (peak)
			cum. 2017-2019		cum. 2020-2021		cum. 2020-2023		cum. 2020-2025		cum. 2020-2027		cum. 2020-2029	
Feeder flow into 15"														
Lakeland Place at Fairfax Crossing, MH-20 (Note 3)	56,267	0	0	0	0	1,350	1,350	1,350	1,350	1,350	1,350	2,250	2,250	
Marketplace at PTC, MH-11 (Note 4)	15,925	270	270	162	162	162	162	0	0	0	0	0	0	GPD (avg)
President's Pointe, MH-__		0	0	0	0	0	0	0	0	0	675	1,080	1,080	
			126		1		6		11		16		28	GPM (peak)
			cum. 2017-2019		cum. 2020-2021		cum. 2020-2023		cum. 2020-2025		cum. 2020-2027		cum. 2020-2029	
All Sewershed Contributions			229		316		521		682		812		936	GPM (peak)
YEAR			2019		2021		2023		2025		2027		2029	
	438	5	291	16	262	23	632	26	488	26	390	19	378	EDU
	438	443	734	750	1012	1036	1668	1694	2182	2208	2598	2617	2995	cum. EDU

7,000' Gravity Sewer is shown in blue on Figure 9 of the Route 9 Sewer Design Report; figure 9 attached for reference

Note 1: 27,000 GPD = 150 EDU x 180 GPD/EDU. 150 EDU is the estimated interception in Options #3, #5 & #6 (existing Burr tenants constitute 167 EDU per Jefferson County Development Authority letter dated 7/15/2016).

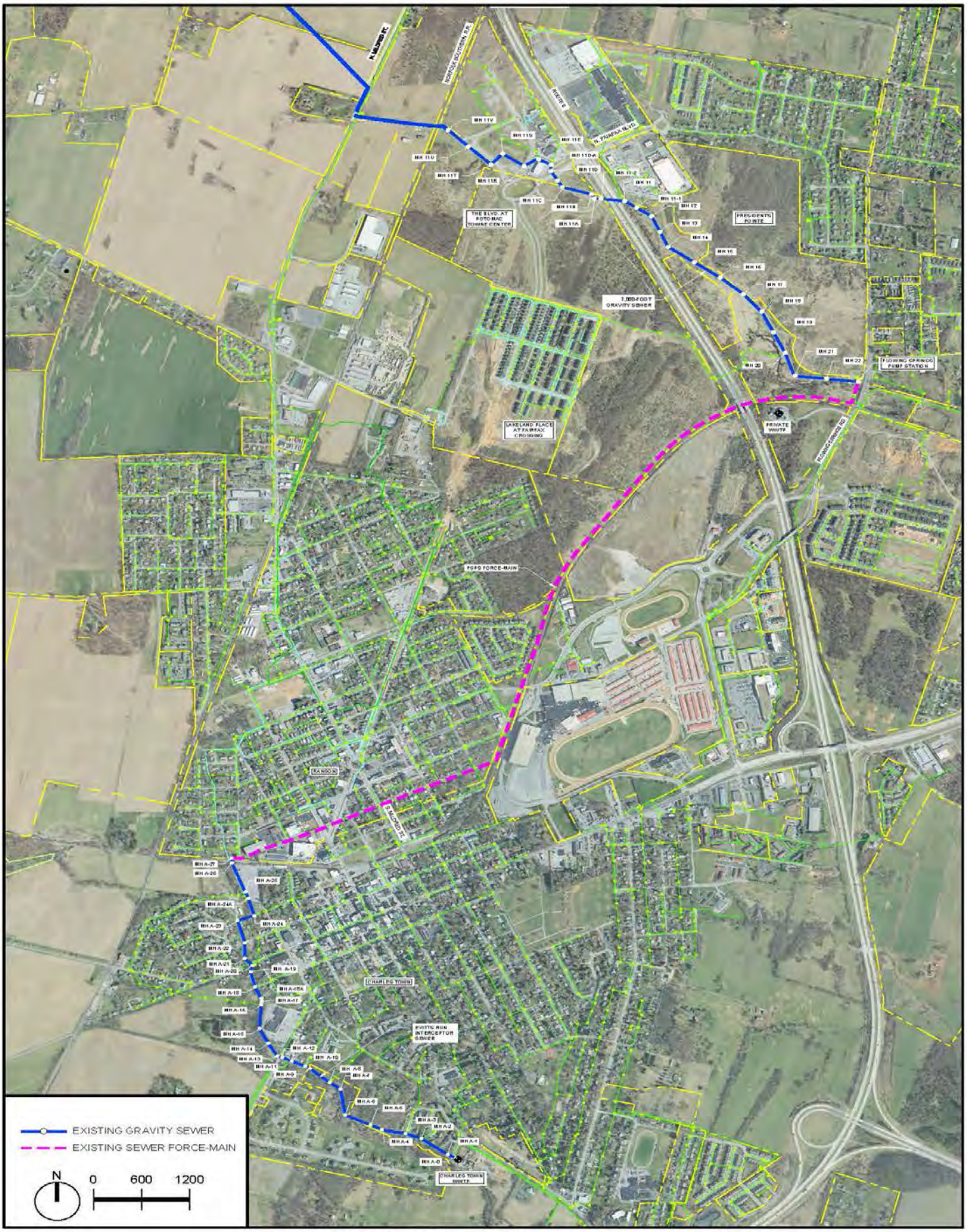
Note 2: 6,627 GPD = (198,810 GAL/MO) / (30 DAY/MO). 198,810 GAL/MO is for 12/1/2016-11/30/2017 per Jefferson Utilities, Inc.

Note 3: 56,267 GPD = 81,552 GPD - 15,925 GPD - 9,360 GPD. 81,552 GPD is per Ranson metering data for 1/1/2017-10/31/2017; 15,925 GPD is per Note 4 below; 9,360 GPD is per Note 2 on next page.

Note 4: 15,925 GPD = (477,756 GAL/MO) / (30 DAY/MO). 477,756 GAL/MO is for 12/1/2016-11/30/2017 per Jefferson Utilities, Inc.

Note 5: Version 2.0, prepared 7/12/2018, is an update of this "GROWTH" table from the "Route 9 Corridor Sewershed Study" dated 1/22/2018. Version 2.0 is for the use of Charles Town Utility Board as a planning tool.

Note 6 - Peaking factor (average to peak) = 2.5; Sewer Capacity Calculations use a computed peaking factor



ROUTE 9 INFRASTRUCTURE PROJECT

FIGURE 9
EXISTING DOWNSTREAM SYSTEM

N. FAIRFAX BLVD
100' R/W

PARK

Alley 3-TEE

NORTH FAIRFAX BOULEVARD
100' R/W

355' - 8" SS

296' - 8" SS

94' - 8" SS

15th AVENUE
66' R/W

20' ALLEY

ALLEY # 2 SQ

16th AVE.

ALLEY #2

17th AVENUE
50' R/W

STALLION ST.
60' R/W

STALLION STREET

STEED ST.
60' R/W

STEED STREET

MARE ST.
50' R/W

MARE ST

400' of 8 inch PVC

274' of 8 inch PVC

139' of 8 inch PVC

1,764' of 8 inch PVC

Pump Station

96 Units flowing directly to Pump Station

Plotted: Dec 14, 2020 at 4:22pm
\\Intel_i5\c\Dwg\Fairfax3\PA\FC-UTIL-PROF_PA_2.dwg

REVISIONS

5283 Corporate Drive, Suite 300
Frederick, MD 21703
(301) 695-5814

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Units trib. to Pump Sta.
Fairfax Crossing
Ranson, WV

SEAL

SCALE: AS SHOWN

DESIGN: PSA	CHECK:	APPROVED

SHEET
SSPS

DATE: December 14, 2020

CHARLES TOWN UTILITY BOARD
WATER/SEWER SYSTEMS UPGRADE PROJECTS

RUMMEL, KLEPPER & KAHL, LLP

TASK NO. 12
SCOPE OF WORK CHANGE NO. 01

PROFESSIONAL ENGINEERING & SURVEYING SERVICES

LAKELAND PLACE PUMP STATION DESIGN

June 16, 2021

Being a part of Agreement Between
Charles Town Utility Board and Rummel, Klepper & Kahl, LLP
dated November 13, 2019

This Scope of Work Change No. 01 to Task No. 12 dated June 16, 2021 to the Agreement between Charles Town Utility Board (CTUB) and Rummel, Klepper, and Kahl, LLP (RK&K) dated November 13, 2019 is to provide professional engineering and surveying services for assisting with the decommissioning of the 11th Avenue and Forrest Street Pump Stations and construction of the Lakeland Place Pump Station and force main in concurrence with RK&K's Forrest Avenue / Fairfax Crossing Top Level Budget dated June 15, 2021.

Scope of Services

The following summarizes RK&K's services as part of this Task:

1. RK&K will perform a field survey to locate existing rights-of-way and property lines, utilities, topographic features, and other relevant features.
2. RK&K will perform geotechnical investigation for the proposed pump station site. Road access and power for the pump station are assumed to be provided by the developer from proposed 16th Avenue.
3. RK&K will prepare preliminary plans for the decommissioning of the 11th Avenue and Forrest Street Pump Stations and conveyance of sewage to the new Lakeland Place Pump Station.
4. RK&K will prepare preliminary plans for design of the Lakeland Place Pump Station and force main.
5. RK&K will coordinate with the developer for pump station location and tie-in to the developer's proposed gravity system.
6. RK&K will submit the preliminary design to the CTUB Staff for review, approval, and authorization to proceed to final design plans.
7. RK&K will prepare the plans, specifications, and contract documents in accordance with CTUB sewer design standards.
8. RK&K will perform courthouse research (online) along with preparing the necessary easement plat(s) and description(s) for the easement across the GDP capital tract property, the easement across the homeowner's property, the force main easement, and the pump station site easement.

9. RK&K will contact environmental review agencies and other stakeholders, if needed, to obtain clearances for construction of project.

    a. Permitting for Culture and History, DNR, USFWS, and ACOE is excluded from this scope of work.

10. RK&K will submit the final design to the CTUB Staff for review and approval.
11. RK&K will revise the final design, incorporating review comments, and prepare the necessary bidding related documents.
12. Bidding and Construction Engineering Services

    a. RK&K will submit a scope of work change to this task order for bidding and construction phase services once the overall project has been defined.

Schedule

Subject to weather, permitting and CTUB review time, RK&K anticipates three months to perform the field survey, study, preparation of drawing, etc. from issuance of notice to proceed. Impacts to the schedule may occur outside of RK&K's and CTUB's ability to control (i.e., regulatory and permitting approvals).

Estimated Person-Hours per Phase by Category, Engineer's Consultant Costs and Other Direct Costs

A labor derivation is attached as Page 4 which includes RK&K's estimated person-hours by category and other direct costs anticipated to complete the work for this project.

RK&K intends to utilize the services of a geotechnical subconsultant to perform the drilling for the geotechnical investigation of the proposed pump station site. The attached labor derivation includes a budgetary amount for this effort. RK&K will only invoice actual cost plus allowable markup.

Materials and Resources Required of CTUB

- CTUB will be responsible for providing available mapping to facilitate RK&K's design.
- CTUB will be responsible for providing available information regarding future developments that would be served by the pump station.
- CTUB will be responsible for paying any permitting fees and regulatory agency costs.
- CTUB will be responsible for any and all construction related materials and equipment.

Estimated Not-To-Exceed Fee

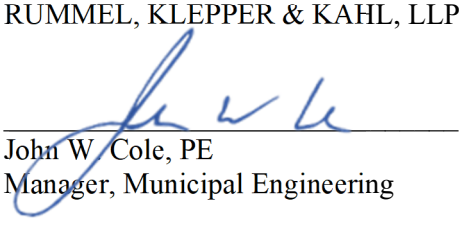
RK&K will provide the scope of services described above at an amount equal to Engineer's Direct Labor Costs times a factor of 2.7 for the services of Engineer's personnel engaged on the Project, plus Reimbursable Expenses. RK&K's current certified payrates for personnel to be assigned to this project is included as Exhibit B to Original Agreement dated November 13, 2019.

The total estimated Not-to-Exceed fee to perform the work is $81,300.00 as shown on RK&K's enclosed labor derivation.

Authorization

This Scope of Work Change No. 01, Lakeland Place Pump Station Design to Task No. 12, Fairfax Crossing / Forrest Avenue, dated June 16, 2021 and being a part of the Agreement between Charles Town Utility Board and Rummel, Klepper & Kahl, LLP for Engineering Services for Water/Sewer Systems Upgrade Projects dated November 13, 2019, is approved by the following duly authorized officials:

Engineer: RUMMEL, KLEPPER & KAHL, LLP



06/16/2021

John W. Cole, PE
Manager, Municipal Engineering

Date

Owner: Charles Town Utility Board

Daryl Hennessy
Chairman

Date

RUMMEL, KLEPPER KAHL, LLP
LABOR DERIVATION
CHARLES TOWN UTILITY BOARD
TASK 12
SCOPE OF WORK CHANGE 01
LAKELAND PLACE PUMP STATION DESIGN

June 16, 2021

Scope of Services	Manager	Associate Engineer	Senior Designer	CADD	Surveyor	Senior Survey Technician	Survey Party Chief	Survey Technician	Electrical	Misc. Expense	Task Total Hours
Technical Assistance											
Meeting	4	12	12							$ 200.00	**28**
Survey/Mapping		8	8	4			48	48			**116**
Easement					4	60	24	24			**112**
Design											
Title Page		0.5		2							**3**
General Notes	1	2		6							**9**
Quanties / R-W Easements		1		4							**5**
Sheet Index		1		4							**5**
Pump Station Electrical		1							80		**81**
Pump Station	1	16	100	16							**133**
Geotech Investigation - Sub-contract	1	4		4			4	4		$ 9,000.00	**17**
11th Ave PS Demo (1 sheet)	1	2		12							**15**
Forrest Ave PS Demo (1 sheet)	1	2		12							**15**
Force Main (1 sheet)	1	1		16							**18**
Coordination with Developer		8		4							**12**
Erosion & Sediment Control		1		16							**17**
Traffic Control	1	1		8							**10**
Details		1	24	8							**33**
Technical Specifications	8	16	24								**48**
Permitting / Regulatory Review											
Ranson	1	4		4							**9**
DEP	1	4		4							**9**
Health	1	4		8							**13**
Bidding Assistance	8	24	20							$ 200.00	**52**
Total Hours	**30**	**114**	**188**	**132**	**4**	**60**	**76**	**76**	**80**		**760**
Total Fee	**$ 6,900.00**	**$ 12,031.00**	**$ 19,740.00**	**$ 11,880.00**	**$ 480.00**	**$ 4,200.00**	**$ 5,092.00**	**$ 3,952.00**	**$ 7,600.00**	**$ 9,400.00**	**$ 81,275.00**

$ 81,300.00

Charles Town
Utility Board
661 S. George Street, Suite 101 Charles Town, WV 25414
Phone: (304) 725-2316 ♦ Fax: (304) 725-7150 ♦ Web: www.ctubwv.com

UTILITY BOARD

CHAIRMAN
Daryl Hennessy

VICE CHAIRMAN
Pete Kubic

TREASURER
Thomas Stocks

INTERIM SECRETARY
Ashley Stottlemyer

City of Ranson
Mayor
Duke Pierson

Jacquelyn Milliron

UTILITY MANAGER
Kristen Stolipher

CHARLES TOWN UTILITY BOARD
ROUTE 9 SEWER ESCROW ACCOUNT INTEREST REIMBURSEMENT

RESOLUTION 2021-04

RESOLUTION OF THE CITY OF CHARLES TOWN UTILITY BOARD APPROVING REIMBURSEMENT FROM THE ROUTE 9 ESCROW ACCOUNT RELATING TO THE ESCROW AGREEMENT FOR THE ROUTE 9 SEWER PROJECT AND AUTHORIZING PAYMENT THEREOF,

WHEREAS, the Charles Town Utility Board (CTUB) has paid all invoices in accordance and incorporated herein by reference relation to the project funded by ROXUL USA, Inc., dba ROCKWOOL under an Alternate Mainline Extension Agreement (WV PSC Case No. 191025-S-PC, approved November 22, 2019) and the Escrow Agreement dated October 11, 2019.

WHEREAS, the Escrow Agreement, dated October 19, 2019, between CTUB and Roxul USA, Inc. dba Rockwool ("Rockwool"), provides that the Developer will deposit, a "Connection Fee" to held by CTUB in a non-interest bearing account (the, Escrow Account") and such monies shall be used solely to pay or reimburse, as appropriate, costs of design, acquisition, construction, and equipping of the Route 9 Sewer Line Extension.

NOW, THEREFORE, BE IT RESOLVED that the City of Charles Town Utility Board hereby approve the payment to Rockwool for the interest accrued in the Route 9 Escrow Account per the Escrow Agreement, dated October 19, 2021 as summarized below, is hereby authorized and directed.

Vendor	Route 9 Sewer Escrow Account
Rockwool	$48,337.07
Total	**$48,337.07**

ADOPTED BY the City of Charles Town Utility Board, at the meeting held on the 23rd day of June 2021.

By: _____
Daryl Hennessy, Chairman

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT	AMOUNT

========== FUND TOTALS ==========	
50 WATER FUND	68,617.07
60 SEWER FUND	145,523.94
GRAND TOTAL:	214,141.01

TOTAL PAGES: 5

APPROVED BY: _____

APPROVED BY: _____

This Packet: $ 214,141.01

JP & RF Burns Partnership, May Loads, check dated 6/09/2021: 10,024.00

Hatch Invoice# 90785630, check dated 6/09/2021: 4,930.08

Encova Premium, check dated 7/01/2021: 9,277.00

Total: $ 238,372.09

Note:

Highlighted invoice to be reimbursed by the Route 9 Sewer Project Escrow Account;

Highlighted invoice to be reimbursed for the R&R Project;

Highlighted invoice to be reimbursed from Huntfield CIF Account

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT		AMOUNT
	BURR OFFICE PARK RAIL	SEWER FUND	SEWER		4,920.00
	SHN#2	SEWER FUND	SEWER		5,600.00
				TOTAL:	12,060.00
GERALD TAYLOR CO., INC.	SUPERVAC / TRANSPORT	WATER FUND	WATER		234.07
	PUMP / HAUL	WATER FUND	WATER		953.95
	SUPERVAC / DISPOSE	SEWER FUND	SEWER		2,200.08
				TOTAL:	3,388.10
THE CI THORNBURG CO, INC.	SINGLE PORT TRANSCEIVER	WATER FUND	WATER		7,319.54
	5/8" SRII TRPL 100G PL/BT	WATER FUND	WATER		2,967.75
	CHLORINE	WATER FUND	WATER		903.00
	PRESSURE TRANSMITTER	WATER FUND	WATER		336.25
				TOTAL:	11,526.54
TIAA COMMERCIAL FINANCE, INC	COPIER	SEWER FUND	NON-DEPARTMENTAL		2,725.73
	COPIER	SEWER FUND	SEWER		688.96
				TOTAL:	3,414.69
TRENCHTECH, INC	SHORE-RENT BUILD A BOX	SEWER FUND	SEWER		1,234.00
	2'X4' BUILD A BOX PANEL	SEWER FUND	SEWER		350.00
				TOTAL:	1,584.00
MICHIGAN DEPARTMENT OF TREASURY	UNCLAIMED PROPERTY RY 2021	WATER FUND	NON-DEPARTMENTAL		23.00
				TOTAL:	23.00
TEXAS COMPTROLLER OF PUBLIC ACCOUNTS	UNCLAIMED PROPERTY RY 2021	WATER FUND	NON-DEPARTMENTAL		325.83
				TOTAL:	325.83
USA BLUEBOOK	FLUKE 376FC TRUE RMS AC/DC	WATER FUND	WATER		498.89
	#12 STRANDED THHN WIRE 500	WATER FUND	WATER		158.95
	INTELLICAL PH ELECTRODE	SEWER FUND	SEWER		620.66
	LONGOFIL ADAPTER& HOLDER	SEWER FUND	SEWER		846.51
	LONGOFIL ADAPTER& HOLDER	SEWER FUND	SEWER		1,641.51
				TOTAL:	3,766.52
VALLEY CREDIT SERVICE, INC.	MAY COLLECTIONS	WATER FUND	WATER		12.50
	MAY COLLECTIONS	SEWER FUND	SEWER		12.50
	PSD MAY COLLECTIONS	SEWER FUND	SEWER		81.25
				TOTAL:	106.25
WEST VIRGINIA TRACTOR COMPANY	JOYSTICK DUAL AXIS	SEWER FUND	SEWER		341.08
				TOTAL:	341.08

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT		AMOUNT
JEFFERSON CO MAGISTRATE COURT	B.FRENCH 507000270 CVL CMP	SEWER FUND	SEWER		60.00
	B.FRENCH 507000270 FEE TO	SEWER FUND	SEWER		25.00
	B.FRENCH 507000265 CVL CMP	SEWER FUND	SEWER		60.00
	B.FRENCH 507000265 FEE TO	SEWER FUND	SEWER		25.00
	B.FRENCH 507000250 CVL CMP	SEWER FUND	SEWER		60.00
	B.FRENCH 507000250 FEE TO	SEWER FUND	SEWER		25.00
				TOTAL:	255.00
DONALD MICKEY	MOWING SUMMIT PT&PLAYGROUN	SEWER FUND	SEWER		250.00
				TOTAL:	250.00
MICRO-TECH DESIGNS, INC.	CT WWTP: SCADA ENGRNG HRS	SEWER FUND	SEWER		2,146.00
				TOTAL:	2,146.00
MISS UTILITY OF WV, INC.	MESSAGE FEES: MAY	WATER FUND	WATER		179.20
				TOTAL:	179.20
LOGICAL CONCEPTS, INC	PARK PS: SVC 6/2021 - 6/20	SEWER FUND	SEWER		1,080.00
				TOTAL:	1,080.00
PACE ANALYTICAL SERVICES, LLC	OVERPYMNT 6/09/21	SEWER FUND	SEWER		176.22-
	TESTING: CT WEEKLY	SEWER FUND	SEWER		173.19
	TESTING: CT WEEKLY	SEWER FUND	SEWER		173.19
	TESTING: CT WEEKLY	SEWER FUND	SEWER		173.19
				TOTAL:	343.35
POLY COATING SOLUTIONS LLC	MANHOLE LINING	SEWER FUND	SEWER		9,648.00
	MANHOLE LINING	SEWER FUND	SEWER		1,776.00
	MANHOLE LINING	SEWER FUND	SEWER		1,776.00
	MANHOLE LINING	SEWER FUND	SEWER		800.00
				TOTAL:	14,000.00
PRECISION PUMP & VALVE SERVICE, INC.	HUNFIELD PS: NEW PUMPS	SEWER FUND	NON-DEPARTMENTAL		39,792.00
				TOTAL:	39,792.00
RED VALVE COMPANY, INC	TUSCAWILLA: VALVE-PISTA GR	SEWER FUND	SEWER		723.34
				TOTAL:	723.34
ROSS H BARE	HUNTFIELD PS PARTS UPGRD	SEWER FUND	SEWER		9,862.87
	WWTP SVC CLL RPLC PHS MNTR	SEWER FUND	SEWER		500.00
	RACETRACK PS UPGRD	SEWER FUND	SEWER		4,872.63
				TOTAL:	15,235.50
SHENANDOAH SALES & SERVICE, INC.	2015 FORD STATE INSPECTION	WATER FUND	WATER		14.00
	1998 4700 DUMP TRUCK SVC C	WATER FUND	WATER		192.00
	SERVICE AT TUSCAWILLA	SEWER FUND	SEWER		280.72
	2011 FORD F150 ABS ISSUE	SEWER FUND	SEWER		560.46
				TOTAL:	1,047.18
SNYDER ENVIRONMENTAL SERVICES, INC	GRADER RENTAL 5/4 - 5/24/2	WATER FUND	WATER		3,885.00
				TOTAL:	3,885.00
DAVID STAUBS	MILEAGE & GAS: 6/07 - 6/11	SEWER FUND	SEWER		290.00
				TOTAL:	290.00
STH, INC.	SHN2 PS: V-SERIES CUTTER K	SEWER FUND	SEWER		1,540.00

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT		AMOUNT
	RACE TRACK: PM SERVICE	SEWER FUND	SEWER		169.25
	WOODLAWN MHP: FULL PM SVC	SEWER FUND	SEWER		145.50
	ORCHARD HILLS: FULL PM SVC	SEWER FUND	SEWER		194.76
				TOTAL:	2,478.76
DENNIS SALES & SERVICE, INC	SERVICE @ WTP	WATER FUND	WATER		1,172.40
				TOTAL:	1,172.40
WV DEPT OF HEALTH & HUMAN SERVICES	FLOURIDE TEST	WATER FUND	WATER		15.00
	BACTERIOLOGICAL TESTING	WATER FUND	WATER		120.00
				TOTAL:	135.00
FASTENAL	T-ROD 18-8 5/8 - 11x6'	SEWER FUND	SEWER		98.66
				TOTAL:	98.66
FRONTIER COMMUNICATIONS	304-876-2120-111514-4	WATER FUND	WATER		95.21
	304-876-9970-121914-4	WATER FUND	WATER		95.21
				TOTAL:	190.42
GUTTMAN ENERGY	W/E 6/06/21	WATER FUND	WATER		193.95
	W/E 6/13/21	WATER FUND	WATER		366.30
	W/E 6/20/21	WATER FUND	WATER		782.02
	W/E 6/06/21	SEWER FUND	SEWER		838.01
	W/E 6/13/21	SEWER FUND	SEWER		601.36
	W/E 6/20/21	SEWER FUND	SEWER		847.85
				TOTAL:	3,629.49
GWIN DOBSON & FOREMAN INC	WTP NPDES LINE SRVY	WATER FUND	NON-DEPARTMENTAL		1,800.00
	WTP HYDROGEOLOCICAL STUDY	WATER FUND	NON-DEPARTMENTAL		24,595.00
	WWTP UPGRADE	SEWER FUND	NON-DEPARTMENTAL		11,414.13
	WW RETAINER SVCS	SEWER FUND	SEWER		1,099.00
				TOTAL:	38,908.13
GRANICUS	YRLY RNWL JUNE 2021-2022	WATER FUND	WATER		4,046.08
	YRLY RNWL JUNE 2021-2022	SEWER FUND	SEWER		4,046.07
				TOTAL:	8,092.15
HACH COMPANY	ASSY, PACK, CHEMKEY, 25 PI	WATER FUND	WATER		196.31
	AMMONIA TNT, KTO: PH BUFFE	SEWER FUND	SEWER		475.54
	NITRATE, TNT	SEWER FUND	SEWER		149.55
				TOTAL:	821.40
JEFFERSON PUBLISHING COMPANY	6/02 AD: WA POLUTN CNTRL P	WATER FUND	WATER		130.78
				TOTAL:	130.78
JEFFERSON UTILITIES, INC	12-0820-00	SEWER FUND	SEWER		45.12
	12-0820-00	SEWER FUND	SEWER		135.36
				TOTAL:	180.48
JOHNNY BLUE, INC	CONSTRUCTION W/SANITIZER	SEWER FUND	SEWER		24.75
				TOTAL:	24.75
JAMES SHERMAN NEWCOMB	HUNTFIELD PS: FBRCT PNLBX	SEWER FUND	SEWER		1,052.74
	DIAMOND PLATE,ANGLE FOR CO	SEWER FUND	SEWER		462.62
				TOTAL:	1,515.36

VENDOR SORT KEY	DESCRIPTION	FUND	DEPARTMENT		AMOUNT
NEAL O NILSEN	OFFICE 365 BASIC - 26 USER	WATER FUND	WATER		78.00
	OFFICE 365 BASIC - 26 USER	WATER FUND	WATER		78.00
	OFFICE 365 BASIC - 26 USER	WATER FUND	WATER		78.00
	OFFICE 365 BASIC - 26 USER	WATER FUND	WATER		78.00
	OFFICE 365 BASIC - 26 USER	SEWER FUND	SEWER		78.00
	OFFICE 365 BASIC - 26 USER	SEWER FUND	SEWER		78.00
	OFFICE 365 BASIC - 26 USER	SEWER FUND	SEWER		78.00
	OFFICE 365 BASIC - 26 USER	SEWER FUND	SEWER		78.00
				TOTAL:	624.00
CHARLES TOWN SEWER	MAY FUNDING	SEWER FUND	NON-DEPARTMENTAL		13,038.18
				TOTAL:	13,038.18
CHARLES TOWN UTILITY BOARD	SECURITY DEP XFR 2/16-6/15	WATER FUND	NON-DEPARTMENTAL		3,444.19
	SECURITY DEP XFR 2/16-6/15	SEWER FUND	NON-DEPARTMENTAL		5,292.63
				TOTAL:	8,736.82
CHARLES TOWN WATER	MAY FUNDING	WATER FUND	NON-DEPARTMENTAL		8,903.87
				TOTAL:	8,903.87
CITY ELECTRIC SUPPLY CO	RACE TRACK SUPPLIES	SEWER FUND	SEWER		290.67
				TOTAL:	290.67
CLIFFS CLEANING SERVICE	MAY CLEANING	WATER FUND	WATER		125.00
	MAY CLEANING	WATER FUND	WATER		365.00
	MAY CLEANING	SEWER FUND	SEWER		200.00
	MAY CLEANING	SEWER FUND	SEWER		100.00
	MAY CLEANING	SEWER FUND	SEWER		365.00
				TOTAL:	1,155.00
COMPRESSED AIR SERVICES, INC.	COMPRESSOR SERVICE LABOR	WATER FUND	WATER		589.00
				TOTAL:	589.00
COMSTOCK PLUMBING, LLC	BLOCKAGE CLEARED @CITY TAP	SEWER FUND	SEWER		313.00
				TOTAL:	313.00
CORE & MAIN	CHK VLVS: FORREST PS& EXTR	SEWER FUND	SEWER		902.30
	PVC SDR35 SWR PIPE	SEWER FUND	SEWER		2,768.92
				TOTAL:	3,671.22
COYNE CHEMICAL	AMMNMSLFT 40%,HYDRFLSLCACD	WATER FUND	WATER		2,278.75
				TOTAL:	2,278.75
C. R. SEMLER, INC.	PRECST CNCRTE DOGHOUSE MAN	SEWER FUND	SEWER		1,280.00
				TOTAL:	1,280.00
CRYSTAL SPRINGS	MONTHLY SVC@ 661 S GEORGE	WATER FUND	WATER		60.07
	MONTHLY SVC@ 661 S GEORGE	SEWER FUND	SEWER		60.07
				TOTAL:	120.14
CUMMINS, INC	HUNTFIELD BOOSTER:TSB'S CN	WATER FUND	WATER		927.00
	DEERFIELD PS: PM SERVICE	SEWER FUND	SEWER		258.00
	JEFFERSON HIGH: PM SERVICE	SEWER FUND	SEWER		227.50
	JETTS FARM: PM SERVICE	SEWER FUND	SEWER		204.75
	JOB CORPS: PM SERVICE	SEWER FUND	SEWER		194.75
	MOOSE LODGE: PM SERVICE	SEWER FUND	SEWER		157.25

CHARLES TOWN UTILITY BOARD

MANHOLE INSPECTION REPORT

JUNE 8, 2021

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APPENDIX B – MANHOLE INSPECTION STATUS
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APPENDIX E – RECOMMENDATION COST ESTIMATE

INTRODUCTION

The Charles Town Utility Board (CTUB) sewer system consists of three (3) separate sewer systems (City of Charles Town, City of Ranson, and Jefferson County Public Service District) that were combined into a single sewer utility owned and operated by CTUB. Within the overall sewer system there are 45 individual sewer pumping stations.

Following the submission of the December 11, 2020 Manhole Evaluation Report, CTUB Staff agreed with the recommendations from the 2020 Report to continue the manhole evaluations based on the hydrogen sulfide issues discovered downstream of the five (5) pumping stations evaluated within the two known problem areas. The two areas in question included the "bottleneck" along the Evitt's Run Interceptor near the Flowing Springs Pump Station discharge and the Brownville Lane area. RK&K inspected 65 sanitary sewer manholes in these known problem areas and discovered severe manhole deterioration in 32 of the manholes, which resulted in RK&K's recommendation within the previous report.

Inspection of these areas confirmed that several of the manholes were in need of immediate rehabilitation. Because these manholes were downstream of pump stations, and at the request of CTUB, RK&K inspected 1-5 manholes downstream of every pump station in CTUB's system. Many of these areas also experienced hydrogen sulfide issues, specifically the areas downstream of the Burr East Pump Station, Jefferson High School Pump Station, Jett's Farm Pump Station, Lloyd's Flat Pump Station, Race Track Pump Station, Wendy's Pump Station, County Green Pump Station, Belvedere Height's Pump Station, Greenfield Pump Station, and Mountaineer Court Pump Station.

The concrete deterioration shown in the sanitary sewer manholes can be attributed to hydrogen sulfide which is common in sewers with flat slopes, low wastewater velocities, and long detention times, especially in force mains and their discharges. Over time, hydrogen sulfide eats away at the walls of manholes, which leads to corrosion, leaks, groundwater intrusion, exposed rebar, and weakened structural strength.

In addition to concrete deterioration from hydrogen sulfide, inflow and infiltration (I&I) can also become an issue in sewer systems. I&I is the result of excess storm water and groundwater entering the sanitary sewer system. Without proper remediation of I&I, costs to pump the excess water as well as treatment costs increase. At the request of CTUB, RK&K also inspected manholes in Ranson for inflow and infiltration. A total of 244 manholes in CTUB's system were inspected. In addition to the 244 manholes inspected, seven manholes were located, but were unable to be accessed, and 91 manholes were unable to be located. A map showing the inspection status of the manholes in CTUB's system is included at the end of this report.

FINDINGS

Overall Rating

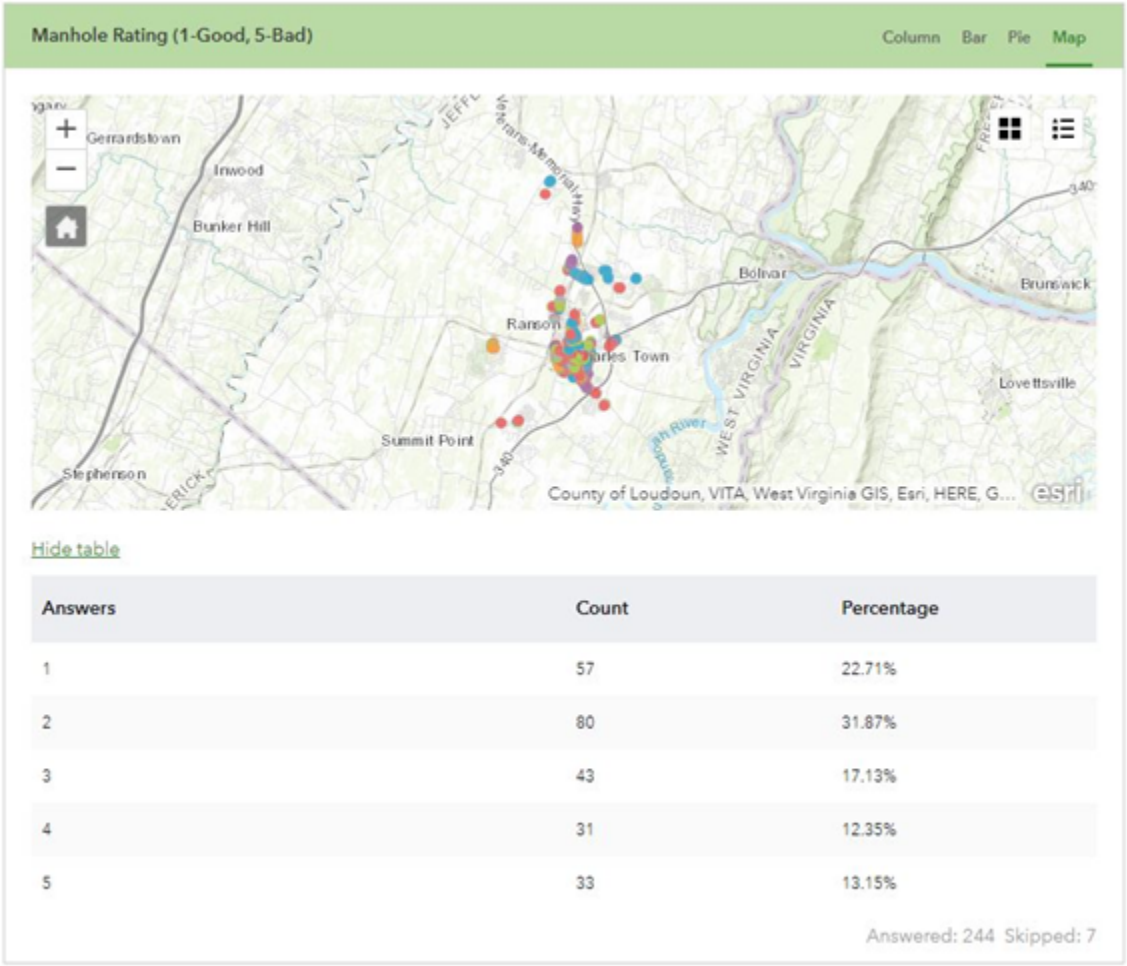
During the inspection process, manholes were rated on a 1 to 5 scale: 1 being good condition and 5 being poor condition. Ratings were assigned on the significance of the defects, extent of damage, amount of wall loss due to deterioration, or amount of inflow or infiltration detected. Ratings and definitions are listed below:

5 – Most significant defect grade
4 – Significant defect grade
3 – Moderate defect grade
2 – Minor to moderate defect grade
1 – Minor or no defect grade

Of the 244 manholes inspected:

- 33 were rated as 5
- 31 were rated as 4
- 43 were rated as 3
- 80 were rated as 2
- 57 were rated as 1

Manholes with a rating of 5 and 4 require immediate attention, and manholes with a rating of 3 will soon require attention. Generally, manholes rated 5 & 4 (poor condition) were closer to the discharge of the various force mains. Longer force mains and pump stations with longer detention times resulted in worse downstream conditions than shorter force mains. A map of the manholes and their respective ratings is shown in **Figure 1** and in **Appendix A** at the end of this report.



Answers	Count	Percentage
1	57	22.71%
2	80	31.87%
3	43	17.13%
4	31	12.35%
5	33	13.15%

Answered: 244 Skipped: 7

Figure 1 – Manhole Rating from GIS

Inflow and Infiltration

During inspections, any indications of inflow or infiltration were noted. However, due to the high amount of concrete deterioration in most of the manholes downstream of pump stations, it was difficult to note any specific instances of inflow or infiltration. In the manholes where the concrete is very soft, it is assumed that water is able to enter through the manhole walls. In addition, hydrogen sulfide has rusted the frame and cover of these manholes, allowing water to enter the manhole.

Many of the manholes inspected in Old Charles Town were brick manholes, which can be susceptible to inflow and infiltration because of their age. Overall, the manholes inspected in Old Charles Town did not show much indication of inflow and infiltration and were generally in good condition.

Overall, there were 76 manholes found with evidence of I&I out of the 244 manholes inspected, as shown in **Figure 2**. Recommendations to fix the manholes with inflow and infiltration are included in the back of this report. These recommendations primarily consisted of lining with epoxy, lining with cement, replacing riser, and replacing frame and cover.

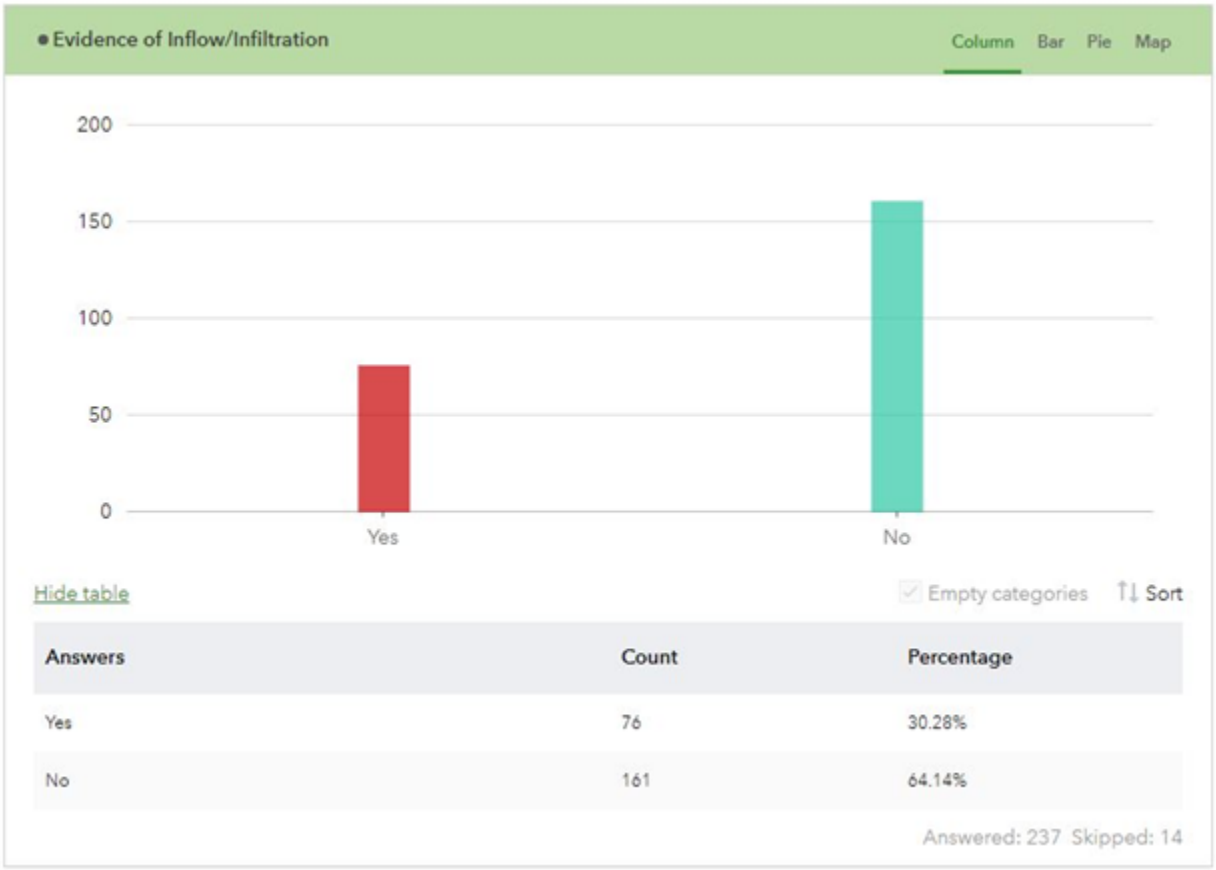


Figure 2 – Evidence of I&I from GIS

Miscellaneous Issues

Many manholes throughout the Old Charles Town System area were buried under asphalt and in yards, needing risers to bring them up to grade to allow access. Buried manholes on Brownsville Lane were uncovered by CTUB Staff and were inspected because they were downstream of a force main discharge. Ninety-one additional manholes throughout the rest of the Old Charles Town System were unable to be located. These manholes were marked yellow on the map in **Appendix B** and shown as not found. It is recommended that Charles Town Operators locate, inspect, and raise the manholes to the grade of the pavement.

Manholes throughout the Old Charles Town System have bolted frame and covers with six hexagon shaped bolts. Discussions with Charles Town Operators and Staff have indicated that maintaining these manholes is more difficult because access is harder and standard risers cannot be used with these frames. It is recommended that these frames and covers are replaced with standard frames and covers.



Figure 2 Six-Bolt Covers and Buried Manholes (typ.)

Hydrogen Sulfide Issues

During inspections, concrete deterioration from hydrogen sulfide was the most commonly observed issue, as shown in the photos on the following pages in **Figure 4A** and **Figure 4B**. Photos on the following two pages correspond with the maps in **Appendix C**. More severe hydrogen sulfide conditions were seen closer to force main discharges, with conditions improved downstream, as shown in **Appendix C** at the end of this report. Force mains from the Burr East Pump Station, Jefferson High School Pump Station, Jett's Farm Pump Station, Lloyd's Flat Pump Station, Race Track Pump Station, Wendy's Pump Station, County Green Pump Station, Belvedere Height's Pump Station, Greenfield Pump Station, and Mountaineer Court Pump Station displayed the worst issues from hydrogen sulfide.

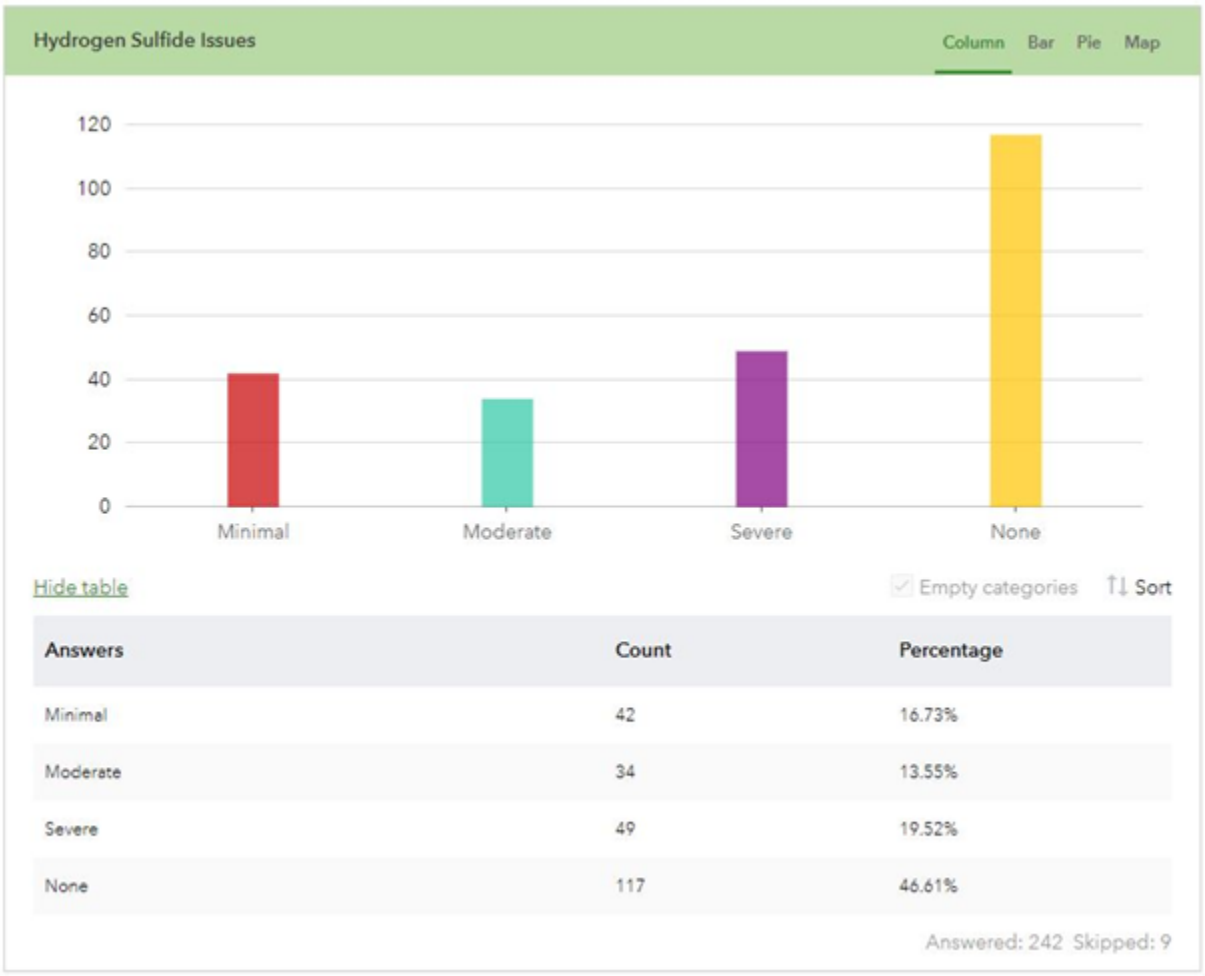


Figure 3 - Hydrogen Sulfide Issues from GIS



Figure 4A - Concrete Deterioration from Hydrogen Sulfide



Figure 4B - Concrete Deterioration from Hydrogen Sulfide

RECOMMENDATIONS

Manhole Rehabilitation

RK&K's recommendations for rehabilitation and maintenance include epoxy coating, cement coating/repairs, standard manhole cover/frame installation, manhole replacement, repair bench/invert, reset existing frame and cover, flush/jet main, install riser, and install drop connection.

Various manholes inspected were noted as already being lined. Most of these manholes were lined by PolyCoating Solutions with products specified in **Appendix D** to this report, and the lining is withstanding the hydrogen sulfide. One of these manholes is MH R-251 which was lined by Ranson using unknown products. This lining is not withstanding the hydrogen sulfide. Because of this, RK&K recommends that CTUB continues to utilize PolyCoating Solutions for the manhole lining. Cost estimates for lining are based on utilization and application of these products by PolyCoating Solutions.

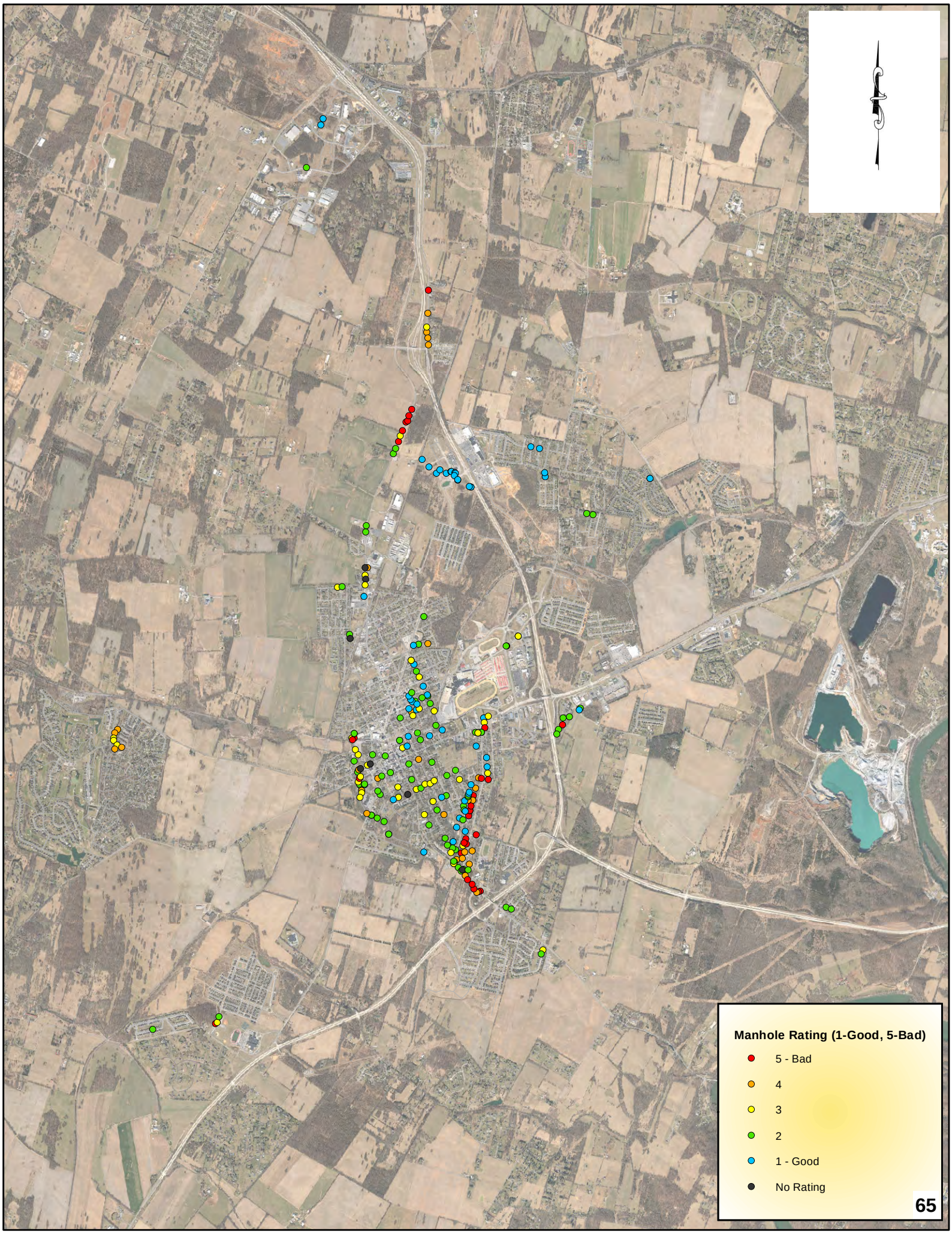
Projects currently under design will involve some of the manholes being rehabilitated or abandoned. These manholes have been noted on the cost estimate because rehabilitation will occur with the project and does not need to happen at this time.

Cost estimates for the rehabilitation efforts are included in **Appendix E** and are summarized in the table below. Cost estimates have been broken into levels based on severity. Note that bypass pumping will be required for manhole lining, and bypass pumping cost is not included in the cost estimates.

	Cost
Level 5 Manholes (33)	$94,540
Level 4 Manholes (31)	$91,500
Level 3 Manholes (43)	$87,750
Level 2 Manholes (80)	$80,650
Level 1 Manholes (57)	$2,240
Total	$356,680

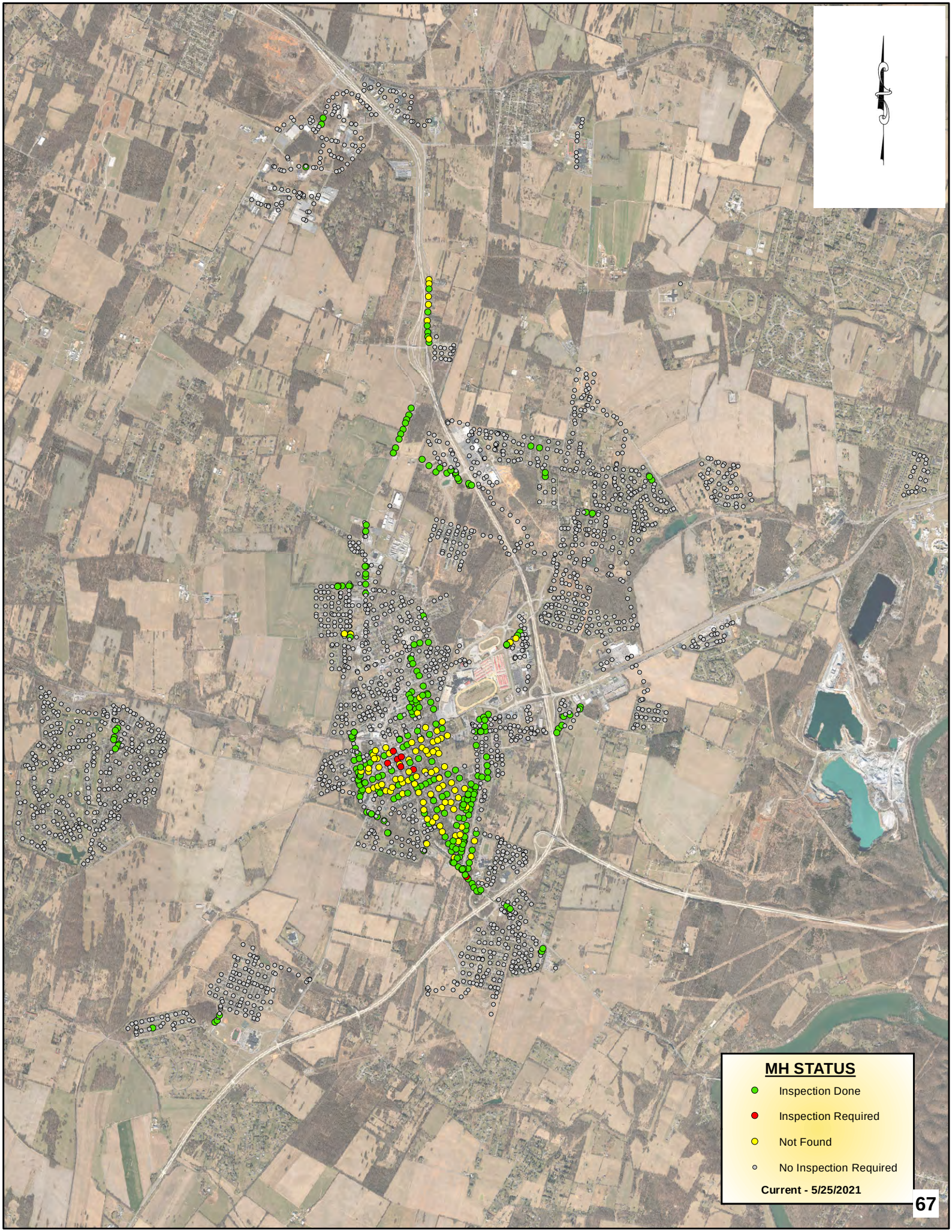
APPENDIX A

MANHOLE RATINGS


Manhole Rating (1-Good, 5-Bad)
5 - Bad
4
3
2
1 - Good
No Rating
65

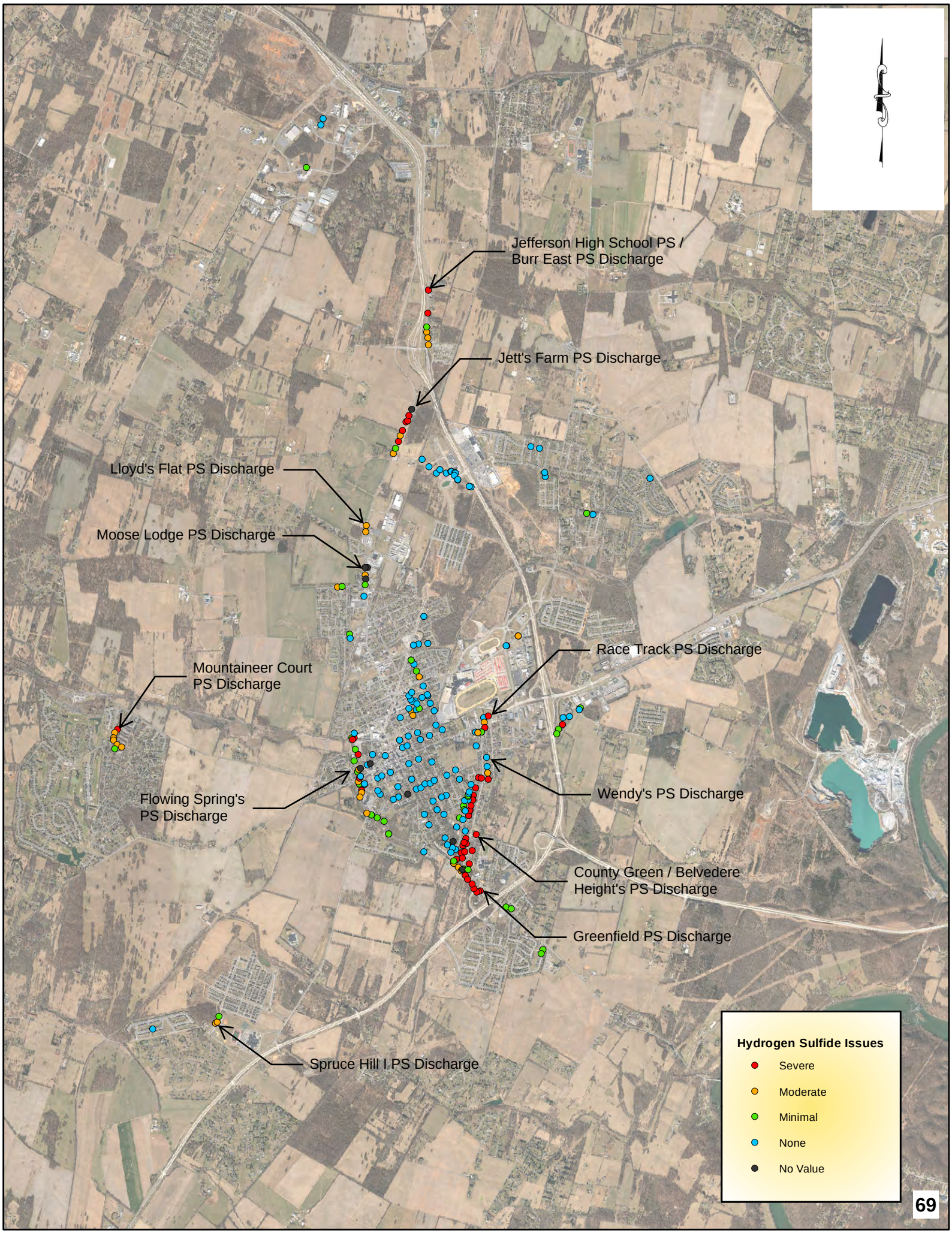
APPENDIX B

MANHOLE INSPECTION STATUS


MH STATUS
Inspection Done
Inspection Required
Not Found
No Inspection Required
Current - 5/25/2021

APPENDIX C

HYDROGEN SULFIDE ISSUES


Jefferson High School PS /
Burr East PS Discharge
Jett's Farm PS Discharge
Lloyd's Flat PS Discharge
Moose Lodge PS Discharge
Race Track PS Discharge
Mountaineer Court
PS Discharge
Flowing Spring's
PS Discharge
Wendy's PS Discharge
County Green / Belvedere
Height's PS Discharge
Greenfield PS Discharge
Spruce Hill I PS Discharge
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No Value


Clem's Addition
MH 24C
Jefferson High School PS / Burr East PS Discharge
Woodland Park
600 ft
610 ft
561 ft
609 ft
Jett's Farm PS Discharge
MH 41
MH 43
Orchard Lodge Ln
West Virginia Way
Marcus Field
Boulevard At Potomac Towne Center
Briar Run Estates
Presidents Pointe Park
538 ft
Lloyd's Flat PS Discharge
Wescott Dr
Oak Farm
Old Leetown Pike
115
N Fairfax Blvd
Lakeland Place At Fairfax Crossing
Moose Lodge PS Discharge
Robelei
American Heritage East
579 ft
16th Ave
574 ft
Foal St
West Edgewood
Esri Community Maps Contributors, Jefferso
VITA, Esri, HERE, Garmin, SafeGraph, INCR
Stayman Dr
E Park Ave
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
70


Race Track PS Discharge
Wendy's PS Discharge
MH CT-336
MH CT-300
MH CT-301
County Green / Belvedere Heights PS Discharge
MH CT-312
MH CT-307
MH CT-325
MH CT-310
Greenfield PS Discharge
MH CT-406
MH CT-401
MH CT-405
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
Esri Community Maps Contributors, County Office, VITA, Esri, HERE, Garmin, SafeGraph,
Edge Hill Cemetery
Willow Spring Farm
Magnolia Springs
Jefferson Memorial Park
Jefferson Heights
Belvedere Heights
County Green
Green Meadows
The Village At Samuel Station
Hillside
Berryville Pike
Jefferson Ave
E Washington St
Hollywood Dr
E 4th Ave
E 1st Ave
E Liberty St
E Avis St
E Academy St
S Church St
S Seminary St
S Samuel St
S George St
Mason St
Forrest Ave
Shutter St
High St
Evitts Run
Cattail Run
504 ft
560 ft
340
9


Flowing Spring's
PS Discharge
MH R-251
MH CT-43
Ranson Civic Center
Charles Town Skate Park
Evitts Run Park
Evitts Run
CSX
115
Valley Pl
Bell Pl
N George St
526 ft
525 ft
N Lawrence St
W North St
Jefferson County Museum
Charles Town
N Charles St
N Water St
Higgs Blvd
N West St
W Liberty St
CVS/pharmacy
W Washington St
S George St
Center St
W Congress St
51
S Charles St
W Avis St
508 ft
518 ft
W Academy St
340
Save-A-Lot
Augustine Ave
Weirick Row
Mordington Ave
506 ft
Creamery Pl
Esri Community Maps Contributors, County
Office, VITA, West Virginia GIS, Building
SafeGraph, INCREMENT P, METI/NASA, U
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No


Mountaineer Court PS Discharge
Middleway Pike
Tuscawilla Dr
Westhall Dr
Beekman Pl
Bradford Ct
Tall Oak Dr
Berkeley Ct
Berkeley Dr
Standish Ct
Tuscawilla Dr
Tall Oak Dr
Fenway Dr
Packett Dr
Webhannet Dr
Hydrogen Sulfide Issues
Severe
Moderate
Minimal
None
No
Esri Community Maps Contributors,
Jefferson County GIS Office, VITA, West Virgi
HERE, Garmin, SafeGraph, INCREMENT P

APPENDIX D
POLYCOATING SOLUTIONS SPECIFICATIONS

PARSONPOXY FS1

DESCRIPTION: PARSONPOXY FS1 is a 100% solids epoxy coating that sets up in approximately 45 minutes for fast repair of manhole inverts.

PHYSICAL PROPERTIES:

Slant Shear Strength ASTM C882	100% concrete failure
Compressive Strength ASTM D695	19,500 psi
Tensile Strength ASTM D638	8,000 psi
Shore D Hardness ASTM D2240	88

SURFACE PREPARATION: Plug or bypass incoming line. Use a minimum 3500 psi waterblast to remove all grease, loose material, existing coatings etc. from application surface. Stop all hydrostatic leaks using PARSON QUICK PLUG or SEAL-TITE. Remove any standing water with air blast or towels prior to application. Surface must be as dry as possible.

MIXING: Premix Parts A and B separately for approximately 3 minutes. Combine 3 Parts A and 1 Part B into a clean container and mix for approximately 1-2 minutes with mechanical mixer until a uniform color is achieved. Only mix amount that be applied in 10 minutes.

SAFETY: Wear protective clothing and eyewear.

APPLICATION: Apply PARSONPOXY FS1 using a brush to a thickness of 100 mils. Application time should not exceed 10 minutes.

SET TIME: Approximately 45 minutes @ 75°F. Time may decrease as temperatures rise and visa versa. Carefully remove pipe plugs as not to disturb or damage coating.

STORAGE: Store PARSONPOXY FS1 in dry environment between 65°F and 85°F. Shelf life is 2 years from date of manufacturing, in unopened containers.

PACKAGING: PARSONPOXY FS1 is available in 1 gallon kits.

COVERAGE: One kit will cover approximately 4 – 48" inverts with 6" pipe when applied at 100 mils thick.

ADVANTAGES:

- Non-toxic – 100% solids
- Chemically resistant
- No primer required
- Easy application
- Return manholes to service quickly

PARSON ENVIRONMENTAL

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Wernersville, PA 19565

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www.parsonenvironmental.com

Chemline ARC-F

Aromatic Polyurea Coating

USGBC LEED, EQ Credit 4:
Low-emitting VOC Compliant Materials

Description

Chemline ARC-F is a fast-set, spray applied, two component polyurea that is 100% solids and contains Zero VOCs. It is highlighted by:

- √ Excellent corrosion protection and chemical resistance
- √ Excellent impact resistance even in sub-freezing weather
- √ High abrasion resistance for harsh environments
- √ Seamless monolithic waterproof membrane that is tough and durable
- √ Odorless, non-toxic vapors

Application Recommendations

Chemline ARC-F adheres extremely well to properly prepared metal, wood, concrete, fiber glass, and other various metal surfaces.

Chemline ARC-F must be applied through a two component, high pressure proportioning unit. Material and hoses should be heated to 150°F, with pressure at a minimum of 2200 psi.

Application Properties

Property	Value
Gel time	5 seconds
Tack free time	20 seconds

Physical Properties

Property	Value
Hardness, D-2240	D 50
Tensile strength, D-412	3200 psi
100% Modulus, D-412	1500 psi
200% Modulus, D-412	1800 psi
300% Modulus, D-412	2350 psi
Tear strength, DIE-C, D-624	480 pli
Ultimate elongation, D-412	360 %
Abrasion Resistance (CS17 wheels, 1000g, 1000 cycles), D-4060	20 mg loss

*Values obtained in laboratory setting for comparison purposes only and should not be considered specifications.

Mixing Instructions: Agitate resin blend (B) component thoroughly with a drum mixer before use to disperse pigment and assure homogeneity. Do not thin. Do not agitate in air and moisture.

Consult a Technical Representative regarding specific metal/steel surface preparation and priming requirements. For concrete applications, we recommend **Chemprime 3558** or **Chemprime CP**.

Packaging, Storage & Shelf Life

Chemline ARC-F is available in 5 gallon pails, 55 gallon drums, and 275 gallon totes. It should be stored in sealed containers at 60-90°F. Shelf life is 12 months in factory sealed containers.

Safety

Chemline ARC-F is for industrial use only. Avoid contact with eyes and skin. Do not inhale or ingest. When spraying, wear a respirator or fresh air hood. Spraying indoors requires forced ventilation. Be sure to read SDS in its entirety prior to use.

Revised 07/2018

Chemline, Inc. • 5151 Natural Bridge Ave. • St. Louis, MO 63115 • Phone: (314) 664 - 2230
• 19500 S. Alameda St. • Los Angeles, CA 90221 • Phone: (310) 764 - 0820

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Chemline ARC-F

Aromatic Polyurea Coating

USGBC LEED, EQ Credit 4:
Low-emitting VOC Compliant Materials

Surface Preparation

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion. Minimum recommended surface preparation:

Steel: Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (3 mils / 75 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs, as required.

Concrete & Masonry: SSPC-SP13/NACE 6 or ICRI No. 310.2R-2013, CSP 3-5. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with recommended repair material.

Moisture content: Use calcium chloride test: 3 lb./24 hr./1,000 ft^2. Concrete shall be 5% maximum as per ASTM F2170 & ASTM F2420. Substrate and air temperature must be 5°F above dew point and rising before material application.

Check for soluble salts on surfaces to be coated. If amount of soluble salts exceeds recommended limits, treat accordingly. Repeat process until acceptable limits are reached. Maximum amounts of soluble salts (micrograms per square centimeter): Chlorides - 3 immersion, 7 non-immersion. Nitrates - 5 immersion, 10 non-immersion. Sulfates - 10 immersion, 20 non-immersion.

If required, holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

Revised 07/2018

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180 River House Lane
Boyce, VA 22620
540-277-7316
www.polycoatingsolutions.com

5 Year Limited Warranty

Poly Coating Solutions, LLC, certified applicator/installer, warranty the installation of the Chemline ARC-F Polyurea/Parson MH Liner composite system against failure for a period of 5 years. Warranty covers failures resulting from groundwater infiltration, substrate deterioration and protective liner de-lamination. Warranty does not cover failures due to an Act of God or Mechanical/Chemical means. Poly Coating Solutions, LLC will perform a complete replacement of composite system if failure is recognized within 5 years of initial installation date. Written notice must be provided. An inspection must be allowed to determine root cause of failure and to create resolution plan.

Poly Coating Solutions, LLC makes no warranties express or implied other than those specifically stated in this 5 year warranty.

Any liability for incidental damages is expressly disclaimed. Liability is limited to the initial purchase price paid.

PARSON
MH LINER

DESCRIPTION: PARSON MH LINER is a high strength, fiber-reinforced, Portland Cement based, microsilica enhanced Mortar for use in rehabilitating manholes, lift station wet wells and other wastewater structures.

PHYSICAL PROPERTIES:

Compressive Strength ASTM C109	1 day > 4,000 psi 28 days > 9,000 psi	Bond ASTM C882	> 2,000 psi
Flexural Strength ASTM C293/C78	28 days > 1,600 psi	Shrinkage ASTM C596	28 days 0.0% at 90% RH
Tensile Strength ASTM C496	28 days >800 psi	Freeze/Thaw ASTM C666	300 cycles, No damage
Applied Density	125 pcf	Sulfide Resistance ASTM C267	No weight loss after 90 days in 20,000 ppm aqueous sulfuric acid solution
Permeability AASHTO T277	< 300 coulombs		

SURFACE PREPARATION: Thoroughly clean and remove any loose or foreign materials including paints, dirt, oil, grease, surface coatings, laitance and any other bond-inhibiting material from surface to be coated, using minimum 3500 psi waterblast. Stop all active leaks. (Please refer to our Manhole Rehabilitation Specifications for product selections.) Surface should be Saturated Surface Dry (SSD) just prior to material application. Any standing water must be removed.

MIXING: Using a slow-speed mortar mixer or large mechanical jiffy mixer, add approximately 3/4 gallon of clean, potable water per 50 lb. bag of PARSON MH LINER. Add water to mixer and then add powder. Mix thoroughly for approximately 3 minutes until a uniform consistency has been obtained.

APPLICATION: Using low pressure spray equipment or trowel, apply mixed product on vertical, horizontal and overhead surfaces to a minimum thickness of 1/4" and up to 3". Trowel or brush to a smooth finish as soon as possible, but within two hours. If additional material is required, apply up to 2" of product within 4–6 hours, then trowel or brush to a smooth finish as soon as possible, but within two hours. Ambient temperature should be minimum 40° F and remain above 32°F for 12 hours after application. Do not apply to frozen surfaces.

COVERAGE: Approximately 1 vertical foot per 50 lb. bag at 1/2 inch thick.

PACKAGING: Available in 50 lb. multiwall paper bags with moisture barrier.

STORAGE: Keep product dry and above 50°F. Shelf life should be 2 years for unopened bags when stored accordingly.

PRECAUTIONS: Use protective eye wear, cover exposed skin and use breathing protection. See SDS for specific instructions



ADVANTAGES:

- Cost–effective alternative to replacement
- Stops infiltration and exfiltration
- Restores structural integrity
- Provides low to moderate corrosion protection
- High Strengths and Low Permeability
- Excellent Bond to damp surfaces
- Apply up to 3" in a single coat
- Spincast, Spray Gun or trowel application

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APPENDIX E

RECOMMENDATION COST ESTIMATE

Replace Existing Manhole	MH ID	Depth (feet)	Cost	
	CT-336	5.8	$ 4,000	
	CT-364	6.33	$ 4,450	
	CT-405	6.9	$ 4,450	
	R-251	6.4	-	evitts run
		Replace Existing Manhole Subtotal	$ 12,900	
Apply Interior Coating (Epoxy)	MH ID	Depth (feet)	Cost	
	37	6	-	abandoned with Jett's project
	38	4.25	-	abandoned with Jett's project
	39	4	-	abandoned with Jett's project
	40	4.5	-	abandoned with Jett's project
	41	4.4	-	abandoned with Jett's project
	43	5.8	-	abandoned with Jett's project
	24C	8.2	$ 3,900	
	CT-294	13.4	$ 6,370	
	CT-298	7.3	-	lined following first report
	CT-300	4.9	-	lined following first report
	CT-301	4.5	-	lined following first report
	CT-302	6.3	-	lined following first report
	CT-303	6	$ 2,850	
	CT-305	7	$ 3,330	
	CT-306	4.6	$ 2,190	
	CT-307	6.2	$ 2,950	
	CT-310	5.1	$ 2,430	
	CT-327	6.6	$ 3,140	
	CT-336	5.8	$ 2,760	
	CT-362	9.9	$ 4,710	
	CT-364	6.33	$ 3,010	
	CT-401	7.9	$ 3,760	
	CT-402	13	$ 6,180	
	CT-404	11.5	$ 5,470	
	CT-405	6.9	$ 3,280	
	CT-406	7.7	$ 3,660	
	CT-423	11.2	-	evitts run
	CT-43	9.4	-	evitts run
	CT-463	9.8	$ 4,660	
	HF-1	8.2	$ 3,900	
	JC-9	9.9	$ 4,710	
	R-251	6.4	-	evitts run
	R-259	10.5	-	evitts run
	26	4.9	$ 2,330	
	24F	5.6	$ 2,660	
	26B	3.6	$ 1,710	
	CT-232	6.9	$ 3,280	
	CT-272	11.8	$ 5,610	
	CT-293	12.8	$ 6,080	
	CT-297	11	$ 5,230	
	CT-299	6.7	$ 3,190	
	CT-309	5.5	$ 2,620	
	CT-311	4.9	$ 2,330	
	CT-312	4.8	$ 2,280	
	CT-313	5	$ 2,380	
	CT-323	4.9	$ 2,330	
	CT-325	5	$ 2,380	
	CT-359	12.4	$ 5,890	
	CT-39	8.1	-	evitts run
	CT-403	15.7	$ 7,460	
	CT-408	4.4	$ 2,090	
	CT-48	5.8	-	evitts run
	CT-57	5.8	-	evitts run
	CT-94	8.75	$ 4,160	
	R-108	4.25	$ 2,020	
	R-3	4.6	-	included in moose lodge project
	R-303	10.45	$ 4,970	
	TW-43	6	$ 2,850	
	TW-48	2.5	$ 1,190	
	TW-53	6	$ 2,850	
	TW-67	7.6	$ 3,610	
	WL-1A	4	$ 1,900	
	25	4.3	$ 2,050	
	42	4.2	-	abandoned with Jett's project
	CT-144	5.1	$ 2,430	
	CT-194	9.1	$ 4,330	
	CT-2	7.1	$ 3,380	

	CT-224	4.3	$ 2,050	
	CT-225	3.9	$ 1,860	
	CT-279	13.6	$ 6,460	
	CT-3	7.1	$ 3,380	
	CT-308	4.2	$ 2,000	
	CT-316	5.75	$ 2,740	
	CT-337	9.9	$ 4,710	
	CT-363	9.3	$ 4,420	
	CT-365	3.3	$ 1,570	
	CT-41	9.2	-	evitts run
	CT-45	7.3	-	evitts run
	CT-49	7.6	-	evitts run
	CT-50	4.4	-	evitts run
	CT-59A	5.7	-	evitts run
	CT-77	7.9	$ 3,760	
	CT-81	6.9	$ 3,280	
	HF-2	6	$ 2,850	
	JC-14	4.8	$ 2,280	
	OH-6	6.2	$ 2,950	
	R-158	6.3	$ 3,000	
	R-209	5.42	$ 2,580	
	R-294	3.6	$ 1,710	
	R-301	5.9	$ 2,810	
	R-4	5.8	$ 2,760	
	R-7	4.6	$ 2,190	
	TW-49	3.9	$ 1,860	
	TW-50	2.7	$ 1,290	
	TW-51	6	$ 2,850	
	44	4.75	-	abandoned with Jett's project
	45	7	-	abandoned with Jett's project
	BI-74	13.6	$ 6,460	
	CT-107	4.8	$ 2,280	
	CT-110	6.15	$ 2,930	
	CT-143A	3.8	$ 1,810	
	CT-153	6.55	$ 3,120	
	CT-219	4.3	$ 2,050	
	CT-235	7	$ 3,330	
	CT-236	5.5	$ 2,620	
	CT-271	7.7	$ 3,660	
	CT-314	7.1	$ 3,380	
	CT-318	3.8	$ 1,810	
	CT-319	2.8	$ 1,330	
	CT-322	3.5	$ 1,670	
	CT-42	4.5	-	evitts run
	CT-46	6.2	-	evitts run
	CT-462	10.5	$ 4,990	
	CT-465	4.9	$ 2,330	
	CT-59A	6.8	$ 3,230	
	CT-64	6.9	-	evitts run
	CT-65	6.25	-	evitts run
	CT-67	7.5	-	evitts run
	CT-93	8.5	$ 4,040	
	DF1	7.3	$ 3,470	
	GF-6	3.6	$ 1,710	
	R-206	7.4	$ 3,520	
	R-33	7.2	$ 3,420	
	WS2	11.8	$ 5,610	
		Apply Interior Coating (Epoxy) Subtotal	$ 302,980	
Apply Interior Coating (Cement)	MH ID		Cost	
	CT-221	*6*	$ 100	
	CT-114	4.8	$ 100	
	CT-167	5.3	$ 100	
	CT-250	10.35	$ 100	
	CT-282	13	$ 100	
	CT-317	5.9	$ 100	
	JC-13	5.1	$ 100	
	R-208	6.25	$ 100	
	R-306	8.05	$ 100	
	SH-16	7.2	$ 100	
		Apply Interior Coating (Cement) Subtotal	$ 1,000	
Install New Standard Frame and Cover	MH ID		Cost	
	37		-	abandoned with Jett's project
	38		-	abandoned with Jett's project

	39		-	abandoned with Jett's project
	40		-	abandoned with Jett's project
	41		-	abandoned with Jett's project
	43		-	abandoned with Jett's project
	24C		$ 310	
	CT-294		$ 310	
	CT-300		$ 310	
	CT-301		$ 310	
	CT-302		$ 310	
	CT-303		$ 310	
	CT-305		$ 310	
	CT-306		$ 310	
	CT-307		$ 310	
	CT-310		$ 310	
	CT-327		$ 310	
	CT-336		$ 310	
	CT-364		$ 310	
	CT-402		$ 310	
	CT-404		$ 310	
	CT-405		$ 310	
	CT-406		$ 310	
	JC-9		$ 310	
	26		$ 310	
	24F		$ 310	
	26B		$ 310	
	CT-232		$ 310	
	CT-293		$ 310	
	CT-297		$ 310	
	CT-299		$ 310	
	CT-309		$ 310	
	CT-311		$ 310	
	CT-312		$ 310	
	CT-313		$ 310	
	CT-323		$ 310	
	CT-325		$ 310	
	CT-359		$ 310	
	CT-403		$ 310	
	CT-408		$ 310	
	R-108		$ 310	
	R-3		-	included in moose lodge project
	TW-43		$ 310	
	TW-48		$ 310	
	TW-53		$ 310	
	25		$ 310	
	42		-	abandoned with Jett's project
	CT-185		$ 310	
	CT-2		$ 310	
	CT-224		$ 310	
	CT-279		$ 310	
	CT-3		$ 310	
	CT-308		$ 310	
	CT-337		$ 310	
	CT-363		$ 310	
	CT-365		$ 310	
	CT-50		-	evitts run
	CT-59A		-	evitts run
	CT-80		$ 310	
	JC-14		$ 310	
	OH-6		$ 310	
	R-107		$ 310	
	R-209		$ 310	
	R-252		-	evitts run
	R-4		$ 310	
	R-7		$ 310	
	TW-49		$ 310	
	TW-50		$ 310	
	TW-51		$ 310	
	45		-	abandoned with Jett's project
	CT-103		$ 310	
	CT-204		$ 310	
	CT-219		$ 310	
	CT-258		$ 310	
	CT-281		$ 310	
	CT-282		$ 310	
	CT-322		$ 310	

	CT-98		$ 310	
	GF-5		$ 310	
	GF-6		$ 310	
	JC-13		$ 310	
	OH-8		$ 310	
	R-2		$ 310	
	R-208		$ 310	
	R-33		$ 310	
	R-36		$ 310	
	R-6		$ 310	
	R-98		$ 310	
	CT-285		$ 310	
	CT-364A		$ 310	
	R-207		$ 310	
	R-23		$ 310	
		Install New Standard Frame and Cover Subtotal	$ 24,800	
Repair Bench and/or Invert	MH ID		Cost	
	CT-303		$ 500	
	CT-404		$ 500	
	CT-423		-	evitts run
	CT-143		$ 500	
	CT-272		$ 500	
	CT-48		-	evitts run
	CT-144		$ 500	
	CT-225		$ 500	
	CT-3		$ 500	
	CT-107		$ 500	
	CT-318		$ 500	
	CT-466		$ 500	
	CT-47		-	evitts run
	JC-10		$ 500	
	R-208		$ 500	
	FC-31		$ 500	
	FC-36		$ 500	
		Repair Bench and/or Invert Subtotal	$ 7,000	
Reset Existing Frame and Cover	MH ID		Cost	
	CT-57		$ -	evitts run
	R-295		$ -	
	CT-241		$ -	
	FC-56		$ -	
	R-290		$ -	
		Reset Existing Frame and Cover Subtotal	$ -	
Flush/Jet Main	MH ID		Cost	
	CT-364		$ -	
	CT-402		$ -	
	CT-404		$ -	
	JC-9		$ -	
	CT-143		$ -	
	CT-408		$ -	
	TW-53		$ -	
	WL-1A		$ -	
	CT-144		$ -	
	CT-229		$ -	
	CT-279		$ -	
	JC-14		$ -	
	R-294		$ -	
	R-301		$ -	
	CT-466		$ -	
	JC-10		$ -	
	JC-13		$ -	
	R-107		$ -	
	R-208		$ -	
	R-249		$ -	
	R-286		$ -	
		Flush/Jet Main Subtotal	$ -	
Install Drop Connection	MH ID		Cost	
	CT-327		$ 100	
	CT-401		$ 100	
	CT-463		$ 100	
	CT-94		$ 100	
	R-303		$ 100	

	CT-81		$ 100	
	CT-200		$ 100	
	CT-230		$ 100	
	CT-240		$ 100	
	CT-271A		$ 100	
	R-286		$ 100	
		Install Drop Connection Subtotal	$ 1,100	
Install Riser/Repair Riser	MH ID	Height (in.)	Cost	
	37	21.5	-	abandoned with Jett's project
	38	18	-	abandoned with Jett's project
	39	13	-	abandoned with Jett's project
	40	12	-	abandoned with Jett's project
	41	16	-	abandoned with Jett's project
	CT-300	5	$ 300	
	CT-301	9.5	$ 300	
	CT-302	8.5	$ 300	
	CT-303	7.5	$ 300	
	CT-401		$ 300	
	26B	8	$ 300	
	CT-359	7	$ 300	
	CT-279	4	$ 300	
	CT-112		$ 300	
	CT-114		$ 300	
	CT-163		$ 300	
	CT-167	7	$ 300	
	CT-267		$ 300	
	R-7	8	$ 300	
	45B	12	-	included in Moose Lodge project
	44	6	-	abandoned with Jett's project
	45	12	-	abandoned with Jett's project
	CT-156		$ 300	
	CT-198		$ 300	
	CT-236	8	$ 300	
	CT-321	2	$ 300	
	CT-97	8.7	$ 300	
	R-2	6	$ 300	
	R-288		$ 300	
	R-298		$ 300	
	R-6	2	$ 300	
		Install Riser Subtotal	$ 6,900	
		TOTAL COST	**$ 356,680**	
		LEVEL 5 COST	**$ 94,540**	
		LEVEL 4 COST	**$ 91,500**	
		LEVEL 3 COST	**$ 87,750**	
		LEVEL 2 COST	**$ 80,650**	
		LEVEL 1 COST	**$ 2,240**	
		***Bypass Pumping Cost Not Included**		