Lake Auburn Watershed Protection Commission

www.lakeauburnwater.org

Wednesday, November 9, 2022 at 3:30pm – 5:30pm AVCOG, 125 Manley Road, Auburn, Maine

AGENDA

1. Minutes
    a. 09/14/2022 – Regular Meeting

2. Consent Agenda
    a. Financial Report
    b. 2023 Meeting Schedule
    c. Water Quality & Watershed Report
    d. Education and Outreach Report

3. Draft 2023 Budget- Tracy Roy

4. Public Comment

5. Staff Report
    a. Mike Broadbent – As deemed necessary by Mr. Broadbent
    b. Erica Kidd – As deemed necessary by Mrs. Kidd

6. Old Business
    a. Water quality testing overview – Erica Kidd
    b. LAWPC-held properties and acquisition prioritization- Erica Kidd

7. New Business
    a. Assign or hire a clerk- Chair Cyr
    b. CDM Smith final draft of peer review of Gracelawn studies – Erica Kidd
    c. CEI draft peer review of FB Environmental study- Erica Kidd
    d. Adoption of modified Robert's Rules- Chair Cyr

8. Adjournment

FUTURE REGULAR MEETING SCHEDULE:

December 7, 2022 (if needed for budget adoption)
February 8, 2023
April 12, 2023
June 14, 2023
September 13, 2023
November 8, 2023

Minutes 9-14-22

Lake Auburn Watershed Protection Commission

Regular Meeting Minutes

Wednesday, September 14, 2022

Location: Androscoggin Valley Council of Governments (AVCOG), Auburn, Maine

Time: Meeting began at 3:32 PM

Recording: The meeting was recorded.

Commissioners Present: Evan Cyr, Alan Holbrook, Mary Ann Brenchick, Amy Landry, Dan Bilodeau, Rick LaChapelle, Glen Holmes and Camille Parrish

Commissioners Absent: Dan Dube

Others Present: Michael Broadbent Commission Secretary, Erica Kidd Watershed Manager, Carolyn Houtz Education and Outreach Coordinator, Heather Hunter Commission Treasurer

Agenda Item 1: Appointment of Tracy Roy as Treasurer

Heather Hunter made a recommendation to the Commissioners to appoint Tracy Roy as Commission Treasurer. Tracy was recently hired as Lewiston's Finance Director and has extensive experience with municipal government.

Vote 1 On a motion by Commissioner Holmes and seconded by Commissioner LaChapelle to appoint Tracy Roy to the position of Treasurer.

Passed 8-0

Vote 2 On a motion by Commissioner Holmes and seconded by Commissioner LaChapelle to authorize Michael Broadbent to provide the necessary cooperate vote to get Treasurer Roy access to the appropriate Commission accounts.

Passed 8-0

Agenda Item 2: Minutes

Vote 3 On a motion by Commissioner LaChapelle and seconded by Commissioner Parrish to approve the Minutes from the June 8, 2022 Commission meeting.

Passed 6-0-2 Commissioners Cyr and Holbrook abstained from the vote.

Agenda Item 3: Consent Agenda

Vote 4 On a motion of Commissioner Holmes and seconded by commissioner Bilodeau to accept the consent agenda.

Passed 8-0

Agenda Item 4: Public Comment

Jim Wellehan spoke on the importance of the proposed peer review prepared by CEI. Jim feels that this is an important study for a very fair rate.

Bonnie Lounsbury from West Auburn Road asked what the procedure is for posting meeting agendas. Bonnie had reached out to a commissioner to get a copy as the agenda was not posted in advance on the website. Bonnie also urged the Commissioner to conduct a peer review of the FB Environmental study as presented by CEI.

Agenda Item 5: Staff Report

Mike Broadbent updated the Commissioners on the status of the Route-4 project. MDOT is re-constructing Route 4 in the area of the Lake Auburn Boat Launch. The project is progressing and AWD staff has relocated the gates to the boat launch. However, the new traffic pattern in the launch requires the addition of a couple of traffic bollards to protect the gates. Mike anticipated that this coupled with inflation since the time the work was estimated will drive the re-location cost up by about $2,000.

Erica Kidd reported that a petition was received and reviewed by the Auburn City Council in regards to the re-zoning of the Gracelawn pit area. City Council repealed their decision to remove a section of land out of the watershed

Commissioners asked about the phosphorus data on the lake and asked that the data be included with the meeting packets.

Agenda Item 6: Old Business

A. **Peer review update on the Gracelawn Property**
   Erica gave an overview of the draft CDM Smith report. CDM reviewed the watershed boundary recommendations made by FB Environmental. CDM reviewed all of the same data that was provided to FB environmental. They broke a roughly 150-acre area into quadrants and gave recommendations based on the available data for each. Some of the quadrants they agreed do not currently flow towards the lake under the current conditions. One section had ground water models that showed flow towards the lake and a third section would require further data collection to determine the ground water flow.

The Commissioners agreed that CDM Smith should be asked to delineate a map showing what they recommend remain in the watershed, along with areas of uncertainty based on the available data.

B. Lake Study Recommendations

Erica went over Section 5, key findings of the 2021 FB Environmental report #1-10. Erica concluded that items 1-3 are recommendations that are best addressed by the City of Auburn. #4 recommends collaboration with all stakeholders to control development and encourage phosphorus control in the upper Watershed. #5 recommended a gap analysis of all water quality data. Erica felt that this would be better addressed through the AWD, LWD and other partners who actively monitor the lake. The Commissioners would like to be part of the data review. The Commissioners would also like to solidify a formal policy for selecting stakeholders. The Commissioners agreed to have Erica work on drafting a plan to address this item and bring it forward at the next commission meeting.

Vote 5 On a motion by Commissioner Holmes and seconded by Commissioner LaChapelle to ask staff to put together a proposal to cover item 5, 2021 FB Environmental Report Key findings.

Motion was withdrawn by Commissioner Holmes.

#5 also included a recommendation to create a full-time data management position. This will be looked at with the annual budget review. They also encouraged collaboration with Bates College. #6 and #7 were not relevant to the Commission. #8, suggested coordination with youth groups, and the City of Auburn acquiring permanent recreational trail easements to LAWPC properties. Creating trail easements was discussed and it was urged to workshop this to better understand the pros and cons of permanent easements. #9, The Commissioners feel they're currently working towards satisfying this recommendation. The Commission is currently developing a management plan, once that is complete, they discussed re-visiting this recommendation. #10, the Commissioners asked staff to provide a property map to review before they take action on this Item. There was some debate of the benefits of having Commission land put into permanent conservation.

Agenda Item 7: New Business

A. CEI proposal to review FB Environmental studies

Erica gave an overview of a proposal from CEI consultants to review the recent work completed by FB Environmental. This proposal was originally drafted for the Auburn Water District, however the District thought that this review would be more appropriate if

conducted by the Commission. The not to exceed price for the review work is $6,000. There was discussion on weather an RFP is needed for this type of work, there was also discussion on the need for the review. The Commissioners would like the proposal to be addressed to the Commission. A member of the public, Steven Beale, was allowed to speak on this topic, and he encouraged the Commissioners to proceed with the work given the importance.

Vote 6 On a motion by Commissioner Landry and seconded by Commissioner Brenchick to have the CEI proposal re-addressed and to proceed with the work.

Passed 4-3-1

B. Draft Resolution for consideration by LAWPC

Vote 7 On a motion by Commissioner Holmes and seconded by Commissioner Bilodeau to table the discussion on a resolution.

Failed 3-4-1

Commissioner Brenchick gave an overview of the resolve as it was presented. The intent of the resolve is to pause any changes until a peer review can be conducted

Vote 8 On a motion by Commissioner LaChapelle and seconded by Commissioner Brenchick to adopt the resolve with the agreed upon changes and to have Commissioner LaChapelle sign the resolve as the Commission Vice Chair.

Passed 5-2-1

Vote 9 On a motion by Commissioner LaChapelle and seconded by Commissioner Brenchick to adjourn the meeting.

Passed 7-0

A true record, attest;

Michael Broadbent
LAWPC Secretary

Financial Report

Lake Auburn Watershed Commission
Statement of Revenues & Expenditures
As of 10/11/22

	Original Operating Budget	Final Operating Budget	Operating Account	Balance	Sinking Fund	YTD Combined	12/31/21 Combined
Revenues:							
Contributions - AWD	58,250.00	58,250.00	48,541.70	9,708.30	16,666.70	65,208.40	75,000.00
Contributions - LWD	58,250.00	58,250.00	58,250.00	-	20,000.00	78,250.00	75,000.00
Timber Harvesting	14,000.00	14,000.00	28,562.96	(14,562.96)		28,562.96	93,763.92
Gain on Sale of Assets				-		-	25,830.46
Water Withdrawal Revenue			386.70	(386.70)		386.70	4,421.45
Intergovernmental	2,000.00	2,000.00	2,250.00	(250.00)		2,250.00	2,200.00
Interest	35.00	35.00	26.84	8.16	564.27	591.11	1,302.57
Total Revenues	**132,535.00**	**132,535.00**	**138,018.20**	**(5,483.20)**	**37,230.97**	**175,249.17**	**277,518.40**
Expenditures:							
Auburn Water Department	6,000.00	6,000.00	4,575.60	1,424.40		4,575.60	5,191.00
Lewiston Water Division	6,000.00	6,000.00	5,042.35	957.65		5,042.35	8,991.17
Executive Administration	750.00	750.00	511.54	238.46		511.54	
Forestry	4,500.00	4,500.00	7,050.19	(2,550.19)		7,050.19	10,064.59
Outside Services	3,325.00	3,325.00	350.00	2,975.00		350.00	3,435.00
Sanitary Facilities	3,760.00	3,760.00	1,980.00	1,780.00		1,980.00	2,680.00
Source Protection	63,250.00	63,250.00	28,495.90	34,754.10	18,283.00	46,778.90	41,198.99
Repairs to Property & Equipment	6,000.00	6,000.00	3,125.58	2,874.42		3,125.58	3,252.94
Public Education	1,775.00	1,775.00	-	1,775.00		-	2,371.28
Public Ed. - Labor	27,620.00	27,620.00	18,682.17	8,937.83		18,682.17	11,902.33
Public Ed. - Supplies	800.00	800.00	-	800.00		-	2,035.79
Public Ed. - Events	2,000.00	2,000.00	261.81	1,738.19		261.81	189.49
Public Ed. - Outside Services	500.00	500.00	-	500.00		-	-
Public Ed. - Public Relations	1,500.00	1,500.00	1,852.88	(352.88)		1,852.88	498.52
Public Ed. - Miscellaneous	1,500.00	1,500.00	392.68	1,107.32		392.68	1,183.83
Liability & D&O Insurance	11,650.00	11,650.00	9,845.40	1,804.60		9,845.40	12,075.47
Legal	4,000.00	4,000.00	9,427.50	(5,427.50)		9,427.50	6,454.50
Audit/Financial Services	6,695.00	6,695.00	5,845.63	849.37		5,845.63	6,595.26
Property Taxes	4,625.00	4,625.00	3,994.73	630.27		3,994.73	4,515.20
Operational Supplies	1,000.00	1,000.00	621.99	378.01		621.99	1,999.73
Depreciation/Amortization Expense			3,796.94	(3,796.94)		3,796.94	36,844.10
Miscellaneous	950.00	950.00	609.67	340.33		609.67	2,175.49
Total Expenditures	**158,200.00**	**158,200.00**	**106,462.56**	**51,737.44**	**18,283.00**	**124,745.56**	**163,654.68**
Excess Revenues Over Expenditures	(25,665.00)	(25,665.00)	31,555.64		18,947.97	50,503.61	113,863.72
Retained Earnings/Fund Balance, 1/1			2,218,418.12		3,443,929.61	5,662,347.73	5,548,484.01
Retained Earnings/Fund Balance, 12/31			**2,249,973.76**		**3,462,877.58**	**5,712,851.34**	**5,662,347.73**

FUTURE REGULAR MEETING SCHEDULE:

February 8, 2023

April 12, 2023

June 14, 2023

September 13, 2023

November 8, 2023

December 6, 2023 (if needed for budget adoption)

Water Quality, Watershed, and Education & Outreach Reports

Water Quality Report

1. Average turbidity:
    a. September was 1.22 NTU in 2022, and 0.76 in 2021. 30 days over 1 NTU in 2022.
    b. October was 1.12 NTU in 2022, and 1.02 in 2021. 31 days over 1 NTU in 2022.
2. Please see attached turbidity and temperature graphs for reference.
3. September fecal datasheets are attached.
4. Tributary and lake phosphorus datasheets are attached.
5. Secchi disk (water clarity) readings are attached.
6. Dissolved oxygen data attached. Please note to fit this sheet on one page, the surface-22m columns were hidden; oxygen depletion is not currently an issue to that depth.

Watershed Report

1. The MaineDOT Route 4 and boat launch reconstruction project is completed.
2. Culvert replacements and drainage improvements were completed on the Whitman Spring Road this fall. LWD did the work. Grading will occur in the spring.
3. The annual watershed inspection that is required per the Maine Drinking Water Program occurred on 10/5/22, with the annual report provided by Erica to the DWP on 10/7/22. This is a requirement of the waivers for filtration issued to AWD and LWD.
4. CDM Smith provided a final draft of the review of the Gracelawn studies; included in this packet.
5. CEI provided a draft peer review of the FB Environmental study; included in this packet.
6. Staff have discussed moving the intake pipe in the lake to a deeper location in hopes of avoiding water quality issues. Staff also talked with a water quality expert about a potential alum dosing station at a major tributary that contributes significant phosphorus loading to the lake. Staff plan to implement a proposal from 2021 for work on the Blanchard Pond tributary in 2023.
7. Demolition of the 79 Point of Pine property will likely occur in November, and will include removal of all structures and the septic system.

Lake Auburn Watershed Protection Commission
Education and Outreach Updates 11.09.2022

Past events:

Trail Day and Donuts 9/17 - Volunteers enjoyed donuts and coffee while helping clear the walking path of the Townsend Brook Trail. We cleared the path from the Auburn Tot Lot, between the 1st and 2nd outdoor classrooms, and touched up the path to the 1st classroom.

AVEC field trips 9/29, 10/27 - The Androscoggin Valley Education Collaborative Program has a course focus of Stewardship this school year, and will be working with LAWPC for the duration of the year. Students will be learning about our ecosystem, drinking water, human interaction, and stewardship. They will also help develop interpretive signs for the Townsend Brook Trail. During the first field trip students rotated through 4 different stations to learn about environmental science. The stations were: water quality testing, macro-invertebrate ID as water quality indicators, tree ID, and nature exploration. Their most recent field trip focused on tree diversity. Students identified trees in 4 different plots and used their observations to calculate tree diversity with the Shannon-Wiener Index.

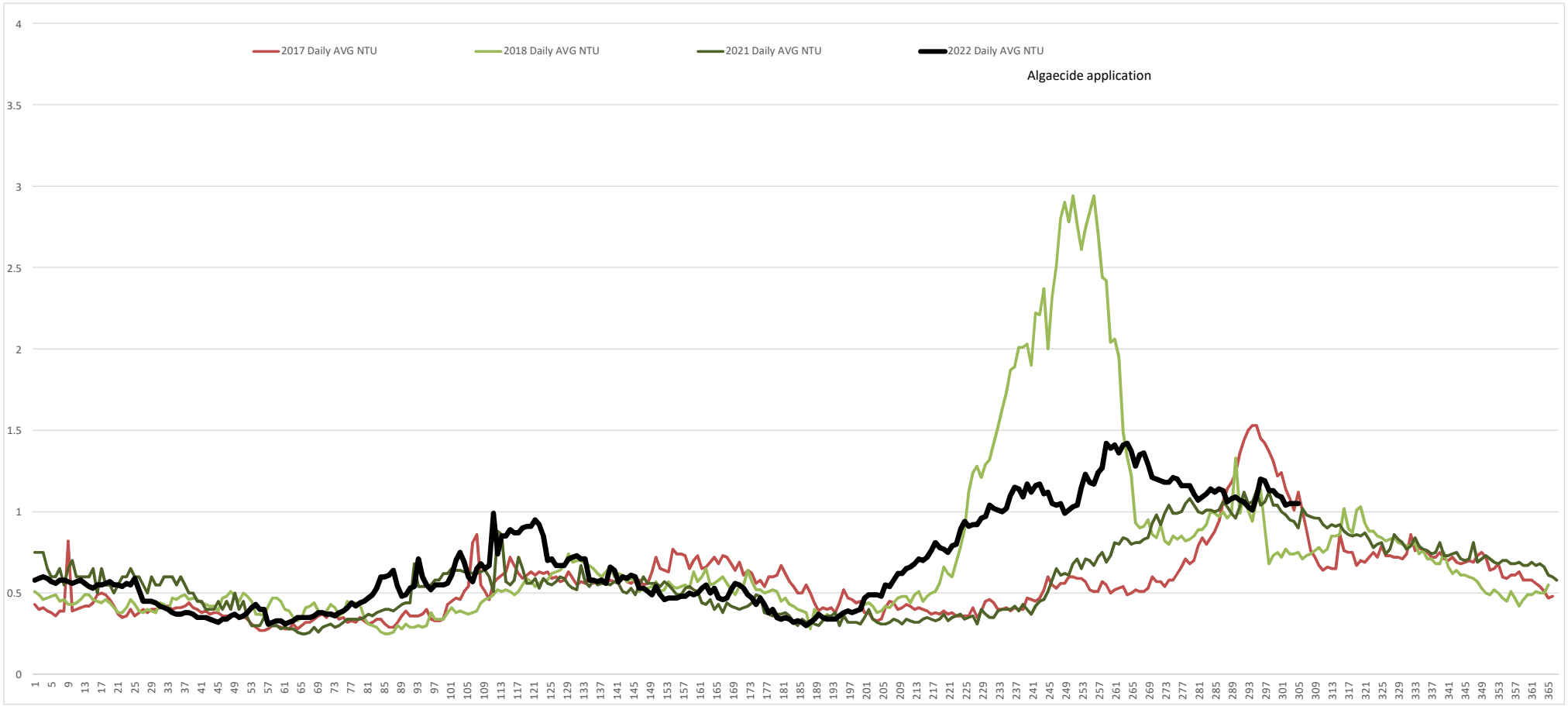
Conservation Easement Monitoring with ALT 10/13 - Androscoggin Land Trust monitors some of LAWPC's properties. They are annually monitored by walking though the property and along the boundaries. The purpose of monitoring is to check for boundary encroachments, lookout for improper land use like litter or unauthorized trails, and monitor for environmental changes like invasive species or erosion.

St. Mary's Commit to Get Fit 10/16 - Tabling at the St. Mary's commit to Get Fit 5K and Harvest walk to promote our free walking trails and to increase community awareness that city water from Lewiston and Auburn comes from Lake Auburn.

ArtVan: Book Reading and Waterways 10/19 - Partnered with the Lewiston Public Library and ArtVan for a children's program connecting books, art, drinking water, and advocacy. First there was a reading of We Are Water Protectors by Carole Lindstrom, then a discussion about the interdependence of humans and clean water, last the artists created images that represented our waterways in the past, present, and future.

Other Updates:

Celebrating 50 Years of the Clean Water Act (9/29) and Imagine a Day Without Water (10/20) were recognized to increase awareness and appreciation of clean drinking water. The 2023 Lake Auburn Watershed Calendar has been completed and we are awaiting the proof.


2017 Daily AVG NTU
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2022 Daily AVG NTU
Algaecide application
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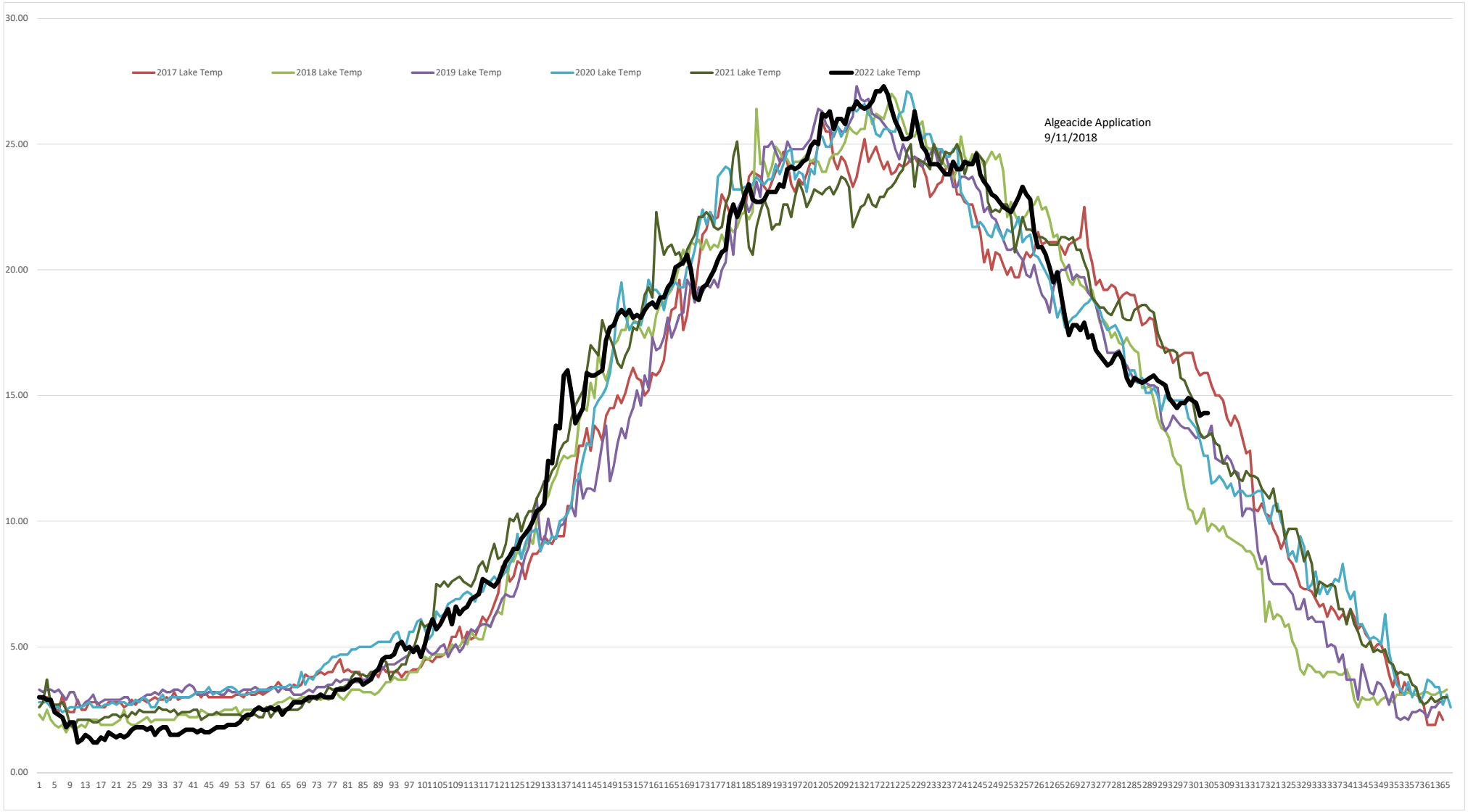
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Lake Phosphorus Results

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
4/26/2022	12-4M	CORE	4	17	3
4/26/2022	12-4M			11	<1
4/26/2022	30-9M	CORE	9	21	<1
4/26/2022	30-9M			7	<1
4/26/2022	29-9M	CORE	9	8	1
4/26/2022	29-9M			8	1
4/26/2022	32-10M	CORE	9	8	1
4/26/2022	32-17M			8	<1
4/26/2022	31-10M	CORE	9	9	<1
4/26/2022	31-27M			8	1
4/26/2022	8-10M	CORE	9	8	1
4/26/2022	8-33M			9	1
5/3/2022	12-4M	CORE	4	8	<1
5/3/2022	12-4M			10	<1
5/3/2022	30-9M	CORE	9	8	1
5/3/2022	30-9M			8	1
5/3/2022	29-9M	CORE	9	8	1
5/3/2022	29-9M			7	1
5/3/2022	32-10M	CORE	10	8	<1
5/3/2022	32-17M			8	<1
5/3/2022	31-10M	CORE	10	8	<1
5/3/2022	31-27M			8	<1
5/3/2022	8-10M	CORE	10	8	<1
5/3/2022	8-33M			8	<1
5/11/2022	12-4M	CORE	4	13	2
5/11/2022	12-4M			7	<1
5/11/2022	30-9M	CORE	9	10	1
5/11/2022	30-9M			10	<1
5/11/2022	29-9M	CORE	9	11	1
5/11/2022	29-9M			11	<1
5/11/2022	32-10M	CORE	10	8	<1
5/11/2022	32-17M			9	<1
5/11/2022	31-10M	CORE	10	8	<1
5/11/2022	31-27M			8	<1
5/11/2022	8-10M	CORE	10	8	<1
5/11/2022	8-33M			7	<1
5/19/2022	12-4M	CORE	4	13	1
5/19/2022	12-4M			11	<1
5/19/2022	30-9M	CORE	9	10	<1
5/19/2022	30-9M			10	<1
5/19/2022	29-9M	CORE	9	10	<1
5/19/2022	29-9M			9	<1

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
5/19/2022	32-10M	CORE	9	10	<1
5/19/2022	32-17M			9	<1
5/19/2022	31-10M	CORE	9	9	<1
5/19/2022	31-27M			10	<1
5/19/2022	8-10M	CORE	9	10	<1
5/19/2022	8-33M			8	<1
5/24/2022	12-4M	CORE	4	8	<1
5/24/2022	12-4M			8	<1
5/24/2022	30-9M	CORE	9	10	<1
5/24/2022	30-9M			10	<1
5/24/2022	29-9M	CORE	9	7	<1
5/24/2022	29-9M			9	<1
5/24/2022	32-10M	CORE	10	8	<1
5/24/2022	32-17M			9	<1
5/24/2022	31-10M	CORE	10	8	<1
5/24/2022	31-27M			9	<1
5/24/2022	8-10M	CORE	10	8	<1
5/24/2022	8-33M			9	<1
6/1/2022	12-4M	CORE	4	9	<1
6/1/2022	12-4M			9	<1
6/1/2022	30-9M	CORE	6	7	<1
6/1/2022	30-9M			10	<1
6/1/2022	29-9M	CORE	6	7	<1
6/1/2022	29-9M			9	<1
6/1/2022	32-10M	CORE	6	6	<1
6/1/2022	32-17M			12	1
6/1/2022	31-10M	CORE	6	6	<1
6/1/2022	31-27M			11	1
6/1/2022	8-10M	CORE	6	6	<1
6/1/2022	8-33M			10	1
6/7/2022	12-4M	CORE	4	8	<1
6/7/2022	12-4M			7	<1
6/7/2022	30-9M	CORE	7	7	<1
6/7/2022	30-9M			7	<1
6/7/2022	29-9M	CORE	7	9	<1
6/7/2022	29-9M			12	<1
6/7/2022	32-10M	CORE	7	7	<1
6/7/2022	32-17M			10	1
6/7/2022	31-10M	CORE	7	7	<1
6/7/2022	31-27M			11	2
6/7/2022	8-10M	CORE	7	7	<1
6/7/2022	8-33M			10	2

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
6/14/2022	12-4M	CORE	4	19	4
6/14/2022	12-4M			7	<1
6/14/2022	30-9M	CORE	7	10	<1
6/14/2022	30-9M			7	<1
6/14/2022	29-9M	CORE	7	7	<1
6/14/2022	29-9M			8	<1
6/14/2022	32-10M	CORE	7	8	<1
6/14/2022	32-17M			12	2
6/15/2022	31-10M	CORE	7	7	<1
6/15/2022	31-27M			11	3
6/15/2022	8-10M	CORE	7	7	<1
6/15/2022	8-33M			14	3
6/23/2022	12-4M	CORE	4	17	1
6/23/2022	12-4M			6	<1
6/23/2022	30-8M	CORE	8	11	<1
6/23/2022	30-9M			7	<1
6/23/2022	29-8M	CORE	8	8	<1
6/23/2022	29-9M			6	<1
6/23/2022	32-8M	CORE	8	6	<1
6/23/2022	32-17M			9	1
6/23/2022	31-8M	CORE	8	7	<1
6/23/2022	31-27M			10	4
6/23/2022	8-8M	CORE	8	11	<1
6/23/2022	8-33M			11	6
6/29/2022	12-4M	CORE	4	6	<1
6/29/2022	12-4M			10	<1
6/29/2022	30-9M	CORE	8	6	<1
6/29/2022	30-9M			7	<1
6/29/2022	29-9M	CORE	8	7	<1
6/29/2022	29-9M			9	<1
6/29/2022	32-10M	CORE	8	5	<1
6/29/2022	32-17M			8	1
6/29/2022	8-10M	CORE	8	5	<1
6/29/2022	8-33M			10	4
7/5/2022	12-4M	CORE	4	8	<1
7/5/2022	12-4M			5	<1
7/5/2022	30-9M	CORE	8	7	<1
7/5/2022	30-9M			7	<1
7/5/2022	29-9M	CORE	8	6	<1
7/5/2022	29-9M			7	<1
7/5/2022	32-10M	CORE	8	6	<1

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
7/5/2022	32-17M			9	1
7/5/2022	31-10M	CORE	8	6	<1
7/5/2022	31-27M			11	4
7/5/2022	8-10M	CORE	8	11	<1
7/5/2022	8-33M			12	4
7/13/2022	12-4M	CORE	4	9	<1
7/13/2022	12-4M			9	<1
7/13/2022	30-9M	CORE	4	12	2
7/13/2022	30-9M	CORE	8	8	<1
7/13/2022	30-9M			7	<1
7/13/2022	29-9M	CORE	8	7	<1
7/13/2022	29-9M			7	<1
7/13/2022	32-10M	CORE	8	7	<1
7/13/2022	32-17M			11	1
7/13/2022	31-10M	CORE	8	6	<1
7/13/2022	31-27M			11	4
7/13/2022	8-10M	CORE	4	7	<1
7/13/2022	8-10M	CORE	8	6	<1
7/13/2022	8-33M			11	4
7/20/2022	12-4M	CORE	4	7	<1
7/20/2022	12-4M			7	<1
7/20/2022	30-9M	CORE	9	9	<1
7/20/2022	30-9M			9	<1
7/20/2022	29-9M	CORE	9	6	<1
7/20/2022	29-9M			6	<1
7/20/2022	32-10M	CORE	9	6	<1
7/20/2022	32-17M			9	1
7/20/2022	31-10M	CORE	9	7	1
7/20/2022	31-27M			12	3
7/20/2022	8-10M	CORE	9	9	<1
7/20/2022	8-33M			14	5
7/27/2022	12-4M	CORE	4		1
7/27/2022	12-4M			6	<1
7/27/2022	30-9M	CORE	9	8	1
7/27/2022	30-9M			8	1
7/27/2022	29-9M	CORE	9	8	<1
7/27/2022	29-9M			10	<1
7/27/2022	32-10M	CORE	9	7	2
7/27/2022	32-17M			9	2
7/27/2022	31-10M	CORE	9	9	1
7/27/2022	31-27M			13	5
7/27/2022	8-10M	CORE	9	7	1

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
7/27/2022	8-33M			12	4
7/27/2022	8-9M		9	8	<1
8/3/2022	12-4M	CORE	4		
8/3/2022	12-4M				
8/3/2022	30-9M	CORE	9		
8/3/2022	30-9M				
8/3/2022	29-9M	CORE	9		
8/3/2022	29-9M				
8/3/2022	32-10M	CORE	9		
8/3/2022	32-17M				
8/3/2022	31-10M	CORE	9		
8/3/2022	31-27M				
8/3/2022	8-10M	CORE	9		
8/3/2022	8-33M				
8/9/2022	12-4M	CORE	4	8	<1
8/9/2022	12-4M			6	<1
8/9/2022	30-9M	CORE	9	7	<1
8/9/2022	30-9M			8	<1
8/9/2022	29-9M	CORE	9	10	<1
8/9/2022	29-9M			9	<1
8/9/2022	32-10M	CORE	9	7	<1
8/9/2022	32-17M			10	1
8/9/2022	31-10M	CORE	9	7	<1
8/9/2022	31-27M			14	6
8/9/2022	8-10M	CORE	9	6	<1
8/9/2022	8-33M			14	7
8/16/2022	12-4M	CORE	4	10	<1
8/16/2022	12-4M			9	<1
8/16/2022	30-9M	CORE	9	8	<1
8/16/2022	30-9M			11	<1
8/16/2022	29-9M	CORE	9	12	<1
8/16/2022	29-9M			10	<1
8/16/2022	32-10M	CORE	9	9	<1
8/16/2022	32-17M			13	3
8/16/2022	31-10M	CORE	9	11	<1
8/16/2022	31-27M			17	7
8/16/2022	8-10M	CORE	9	10	<1
8/16/2022	8-33M			16	7
8/23/2022	12-4M	CORE	4	11	1
8/23/2022	12-4M			10	1
8/23/2022	30-9M	CORE	9	11	<1

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
8/23/2022	30-9M			9	<1
8/23/2022	29-9M	CORE	9	11	1
8/23/2022	29-9M			12	<1
8/23/2022	32-10M	CORE	9	9	<1
8/23/2022	32-17M			14	2
8/23/2022	31-10M	CORE	9	10	<1
8/23/2022	31-27M			18	8
8/23/2022	8-10M	CORE	9	10	<1
8/23/2022	8-33M			18	9
8/30/2022	12-4M	CORE	4	12	<1
8/30/2022	12-4M			10	<1
8/30/2022	30-9M	CORE	9	15	<1
8/30/2022	30-9M			13	<1
8/30/2022	29-9M	CORE	9	54	<1
8/30/2022	29-9M			12	<1
8/30/2022	32-10M	CORE	9	41	<1
8/30/2022	32-17M			15	1
8/30/2022	31-10M	CORE	9	12	<1
8/30/2022	31-27M			20	8
8/30/2022	8-10M	CORE	9	13	<1
8/30/2022	8-33M			25	9
9/7/2022	12-4M	CORE	4	12	<1
9/7/2022	12-4M			11	<1
9/7/2022	30-9M	CORE	9	13	<1
9/7/2022	30-9M			12	<1
9/7/2022	29-9M	CORE	9	12	1
9/7/2022	29-9M			11	<1
9/7/2022	32-10M	CORE	10	11	1
9/7/2022	32-17M			11	1
9/7/2022	31-10M	CORE	10	11	<1
9/7/2022	31-27M			21	9
9/7/2022	8-10M	CORE	10	11	1
9/7/2022	8-33M			23	10
9/14/2022	12-4M	CORE	4	12	1
9/14/2022	12-4M			10	<1
9/14/2022	30-9M	CORE	9	12	<1
9/14/2022	30-9M			13	<1
9/14/2022	29-9M	CORE	9	14	1
9/14/2022	29-9M			14	<1
9/14/2022	32-10M	CORE	10	11	<1
9/14/2022	32-17M			10	<1
9/14/2022	31-10M	CORE	10	12	<1

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
9/14/2022	31-27M			18	9
9/14/2022	8-10M	CORE	10	10	<1
9/14/2022	8-33M			21	11
9/21/2022	12-4M	CORE	4	13	<1
9/21/2022	12-4M			13	<1
9/21/2022	30-9M	CORE	9	13	<1
9/21/2022	30-9M			13	<1
9/21/2022	29-9M	CORE	9	13	<1
9/21/2022	29-9M			13	<1
9/21/2022	32-10M	CORE	10	12	1
9/21/2022	32-17M			9	1
9/21/2022	31-10M	CORE	10	12	1
9/21/2022	31-27M			20	9
9/21/2022	8-10M	CORE	10	12	<1
9/21/2022	8-33M			23	10
9/28/2022	12-4M	CORE	4		
9/28/2022	12-4M				
9/28/2022	30-9M	CORE	9		
9/28/2022	30-9M				
9/28/2022	29-9M	CORE	9		
9/28/2022	29-9M				
9/28/2022	32-10M	CORE	10		
9/28/2022	32-17M				
9/28/2022	31-10M	CORE	10		
9/28/2022	31-27M				
9/28/2022	8-10M	CORE	10		
9/28/2022	8-33M				
10/5/2022	12-4M	CORE	4		
10/5/2022	12-4M				
10/5/2022	30-9M	CORE	9		
10/5/2022	30-9M				
10/5/2022	29-9M	CORE	9		
10/5/2022	29-9M				
10/5/2022	32-10M	CORE	10		
10/5/2022	32-17M				
10/5/2022	31-10M	CORE	10		
10/5/2022	31-27M				
10/5/2022	8-10M	CORE	10		
10/5/2022	8-33M				
10/12/2022	12-4M	CORE	4		
10/12/2022	12-4M				

Date	Location Site #	CORE	Depth M	Total P ug/L	Ortho P mg/L
10/12/2022	30-9M	CORE	9		
10/12/2022	30-9M				
10/12/2022	29-9M	CORE	9		
10/12/2022	29-9M				
10/12/2022	32-10M	CORE	10		
10/12/2022	32-17M				
10/12/2022	31-10M	CORE	10		
10/12/2022	31-27M				
10/12/2022	8-10M	CORE	10		
10/12/2022	8-33M				
10/20/2022	12-4M	CORE	4		
10/20/2022	12-4M				
10/20/2022	30-9M	CORE	9		
10/20/2022	30-9M				
10/20/2022	29-9M	CORE	9		
10/20/2022	29-9M				
10/20/2022	32-10M	CORE	10		
10/20/2022	32-17M				
10/20/2022	31-10M	CORE	10		
10/20/2022	31-27M				
10/20/2022	8-10M	CORE	10		
10/20/2022	8-33M				
10/27/2022	12-4M	CORE	4		
10/27/2022	12-4M				
10/27/2022	30-9M	CORE	9		
10/27/2022	30-9M				
10/27/2022	29-9M	CORE	9		
10/27/2022	29-9M				
10/27/2022	32-10M	CORE	10		
10/27/2022	32-17M				
10/27/2022	31-10M	CORE	10		
10/27/2022	31-27M				
10/27/2022	8-10M	CORE	10		
10/27/2022	8-33M				

Tributary Phosphorus Results

Date	Location Site #	Total P ug/L	Ortho P mg/L	Comments
3/16/2022	598 W. AUBURN	22		
3/16/2022	375 W. AUBURN	13		
3/24/2022	25	24	4	
3/24/2022	2	14	3	
3/24/2022	23	16	3	
3/24/2022	3	4	2	
3/24/2022	4	6	2	
3/24/2022	13	7	2	
3/24/2022	27	8	3	
3/24/2022	18	9	2	
3/24/2022	17	8	2	
3/24/2022	26	12	4	
3/24/2022	R-2	35	4	
3/24/2022	640 W. AUBURN	8	2	
3/24/2022	598 W. AUBURN	25	2	
3/24/2022	375 W. AUBURN	12	4	
3/24/2022	S-27	10	3	
4/13/2022	25	25	3	
4/13/2022	2	14	2	
4/13/2022	23	15	3	
4/13/2022	3	5	2	
4/13/2022	4	8	2	
4/13/2022	13	8	1	
4/13/2022	5A	5	3	
4/13/2022	16	8	1	
4/13/2022	27	8	3	
4/13/2022	18	10	2	
4/13/2022	17	8	2	
4/13/2022	26	13	4	
4/13/2022	B-1	95	3	
4/13/2022	R-2	36	2	
4/13/2022	640 W. AUBURN	10	3	results between 640/327 w auburn
4/13/2022	598 W. AUBURN	11	2	
4/13/2022	375 W. AUBURN	14	4	
4/13/2022	S-27	11	3	
4/20/2022	25	29	4	
4/20/2022	2	14	2	
4/20/2022	23	18	3	
4/20/2022	3	6	2	
4/20/2022	4	8	2	

Date	Location Site #	Total P ug/L	Ortho P mg/L	Comments
4/20/2022	13	7	1	
4/20/2022	16	7	1	
4/20/2022	27	8	2	
4/20/2022	18	12	2	
4/20/2022	5A	23	14	
4/20/2022	17	9	2	
4/20/2022	TBR	9	2	
4/20/2022	26	16	3	
4/20/2022	B-1	100	3	
4/20/2022	R-2	40	3	
4/28/2022	25	33	4	
4/28/2022	2	14	2	
4/28/2022	23	14	3	
4/28/2022	3	9	2	
4/28/2022	4	8	2	
4/28/2022	13	7	1	
4/28/2022	16	7	1	
4/28/2022	27	7	2	
4/28/2022	18	10	1	
4/28/2022	5A	12	8	
4/28/2022	17	9	2	
4/28/2022	TBR	10	2	
4/28/2022	26	13	3	
4/28/2022	B-1	110	2	
4/28/2022	R-2	34	3	
5/12/2022	25	17	3	
5/12/2022	2	14	1	
5/12/2022	23	16	4	
5/12/2022	3	5	3	
5/12/2022	4	8	2	
5/12/2022	13	10	1	
5/12/2022	16	9	1	
5/12/2022	27	7	2	
5/12/2022	18	11	2	
5/12/2022	17	8	2	
5/12/2022	TBR	12	3	
5/12/2022	26	13	3	
5/12/2022	R-2	19	2	
6/10/2022	25	47		
6/10/2022	2	28		

Date	Location Site #	Total P ug/L	Ortho P mg/L	Comments	
6/10/2022	23	67			
6/10/2022	3	12			
6/10/2022	4	19			
6/10/2022	13	13			
6/10/2022	16	14			
6/10/2022	27	13			
6/10/2022	18	21			
6/10/2022	5A	9			
6/10/2022	17	10			
6/10/2022	TBR	27			
6/10/2022	26	30			
6/10/2022	R-2	46			
6/28/2022	2	23	2		
6/28/2022	3	17	6		
6/28/2022	13	18	1		
6/28/2022	27	12	4		
6/28/2022	18	15	2		
6/28/2022	17	11	1		
6/28/2022	TBR	30	5		
6/28/2022	26	39	3		
7/26/2022	26	25	4		
					ACTUAL #
7/29/2022	25	89			72
7/29/2022	2	17			0
7/29/2022	3	22			6
7/29/2022	13	17			5
7/29/2022	16	11			2
7/29/2022	18	13			3
7/29/2022	17	11			20
7/29/2022	TBR	27			11
7/29/2022	26	24			5
7/29/2022	R-2	87			150
8/18/2022	25	110	7		2ML FECAL
8/18/2022	2	17	2		
8/18/2022	3	37	6		
8/18/2022	4	51	9		
8/18/2022	13	16	10		
8/18/2022	27	32	<1		
8/18/2022	18	17	5		
8/18/2022	17	11	2		
8/18/2022	TBR	30	1		

Date	Location Site #	Total P ug/L	Ortho P mg/L	Comments	
8/18/2022	26	32	6		
8/18/2022	R-2	90	2		
9/6/2022	25	53	3		2ML FECAL*50 FOR NUMBER
9/6/2022	2	18	1		
9/6/2022	3	19	5		
9/6/2022	4	28	5		
9/6/2022	13	13	<1		
9/6/2022	16	12	1		
9/6/2022	27	12	2		
9/6/2022	18	17	1		
9/6/2022	17	9	1		
9/6/2022	TBR	23	4		
9/6/2022	26	24	2		
9/6/2022	R-2	58	2		
9/20/2022	25	78	6		2ML FECAL*50 FOR NUMBER
9/20/2022	2	55	4		
9/20/2022	23	56	6		
9/20/2022	3	30	4		
9/20/2022	4	31	4		
9/20/2022	13	13	1		
9/20/2022	16	9	<1		
9/20/2022	27	31	3		
9/20/2022	18	19	1		
9/20/2022	5A	27	9		
9/20/2022	17	7	1		
9/20/2022	TBR	36	6		
9/20/2022	26	36	2		
9/20/2022	B-1	170	4		
9/20/2022	R-2	79	7		
9/20/2022	RT-4-1	29	1		
9/23/2022	25				
9/23/2022	2				
9/23/2022	23				
9/23/2022	3				
9/23/2022	4				
9/23/2022	13				
9/23/2022	16				
9/23/2022	27				
9/23/2022	18				
9/23/2022	17				

Date	Location Site #	Total P ug/L	Ortho P mg/L	Comments
9/23/2022	TBR			
9/23/2022	26			
9/23/2022	R-2			
10/18/2022	25			
10/18/2022	2			
10/18/2022	3			
10/18/2022	4			
10/18/2022	13			
10/18/2022	16			
10/18/2022	27			
10/18/2022	18			
10/18/2022	17			
10/18/2022	TBR			
10/18/2022	26			
10/18/2022	R-2			

LAKE AUBURN WATERSHED SAMPLING LOCATIONS

BUCKFIELD

HEBRON

TURNER

MINOT

AUBURN

LEWISTON

MUD POND

LITTLE WILSON POND

LAKE AUBURN

N

W E

S

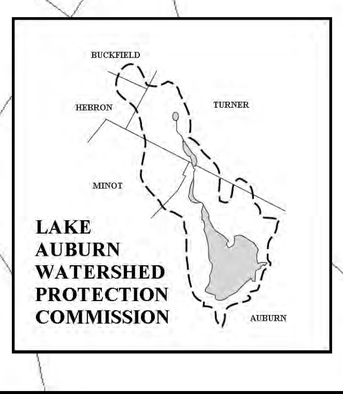
LEGEND

- SAMPLE POINTS
- WATERSHED LINE
- SUB-WATERSHED LINE
- TOWN LINE

0 1,600 3,200

1 inch = 1600 feet

28 18 17 27 16 13 B4 29 4 3 23 2 26 B-1 R-2 25 30 32 31 B0 12 B1 8 B3 B2



LAKE AUBURN WATERSHED PROTECTION COMMISSION

Dissolved Oxygen (mg/L)												
DATE	SURFACE	23M	24M	25M	26M	27M	28M	29M	30M	31M	32M	33M
4/26/2022	12.5	12.3	12.3	12.3	12.3	12.2	12.1	12.1	12.1	12.1	12.1	12.1
5/3/2022	12.6	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.3	12.3	12.3
5/11/2022	12.1	12	12	12	12	11.9	11.9	11.9	11.9	11.9	11.8	11.8
5/19/2022	10.8	11.7	11.7	11.7	11.7	11.6	11.6	11.6	11.5	11.5	11.4	11.4
5/24/2022	10.7	11.5	11.3	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.1
6/1/2022	10.4	10.7	10.7	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.5	10.5
6/7/2022	10.4	10.5	10.4	10.4	10.4	10.4	10.3	10.2	10.2	10.2	10.1	10.1
6/15/2022	10	10	10	9.9	9.9	9.9	9.8	9.8	9.7	9.7	9.6	9.6
6/23/2022	10.1	9.6	9.5	9.5	9.4	9.3	9.3	9.3	9.2	9.2	9.2	9.1
6/29/2022	9.8	9.3	9.2	9.2	9.2	9.1	9.1	9	8.9	8.8	8.8	8.8
7/5/2022	9.7	8.8	8.8	8.8	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
7/13/2022	9.4	8.6	8.6	8.6	8.5	8.4	8.3	8.2	8.2	8.2	8	8
7/20/2022	9.6	8.1	8	8	8	8	7.9	7.7	7.6	7.5	7.2	7.1
7/27/2022	9.7	7.6	7.5	7.5	7.4	7.4	7.4	7.3	7.3	7.2	7.1	6.8
8/3/2022	8.7	6.5	6.5	6.4	6.1	6	6	6	6	6	5.9	5.6
8/9/2022	8.5	5.8	5.8	5.8	5.7	5.7	5.6	5.6	5.5	5.3	5.2	5.1
8/16/2022	8.7	5.5	5.5	5.5	5.5	5.5	5.3	5.3	5.3	5	4.5	4.4
8/23/2022	8.9	5.5	5.1	5	5	5	4.9	4.8	4.7	4.6	4.2	3.8
8/30/2022	8.6	4.6	4.6	4.6	4.5	4.3	4.3	4.1	4	3.8	3.7	3.7
9/7/2022	8.8	4.2	4	4	3.8	3.7	3.6	3.5	3.5	3.3	3.2	3
9/14/2022	9.3	4.1	3.9	3.8	3.6	3.5	3.3	3.1	2.8	2.2	2	1.8
9/21/2022	8.5	3.4	3.2	3.1	3.1	3	2.9	2.7	2.4	2.1	1.9	1.8
9/28/2022	9	3.1	3	2.8	2.7	2.5	2.2	2	1.8	1.7	1.6	1.5
10/5/2022	9	3.2	3	2.8	2.6	2.4	2	1.8	1.7	1.6	1.4	1.2
10/12/2022	9.1	2.5	2.5	2.3	2.1	1.8	1.6	1.5	1.3	1.3	1.2	1
10/20/2022	8.8	2	1.8	1.7	1.6	1.4	1.3	1.1	0.8	0.8	0.6	0.2

DATE	Secchi (m)
4/26/2022	4.7
5/3/2022	4.9
5/11/2022	6.5
5/19/2022	
5/24/2022	8.6
6/1/2022	9.7
6/7/2022	10.3
6/15/2022	9.7
6/23/2022	9.8
6/29/2022	11.5
7/5/2022	11.8
7/13/2022	12
7/20/2022	10
7/27/2022	7.4
8/3/2022	5.9
8/9/2022	5.4
8/16/2022	4.65
8/23/2022	4.1
8/30/2022	3.95
9/7/2022	3.75
9/14/2022	3.3
9/21/2022	2.9
9/28/2022	3.1
10/5/2022	3.4
10/12/2022	3.55
10/20/2022	3.4

Sep-22

INLINE

Collected			Temp	Turbidity		Ph	Amount	FECAL	QUANTITRAY		Fecal
DATE	TIME	BY	*C	1720E	TU5200	230 A	Sample	BACTERIA CFU	TOTAL	E.COLI	Confirmation
9/1	02:45	DAF	24.60	1.05	1.05	8.55	100	0			
9/2	03:00	DAF	23.80	1.20	1.20	8.23	100	1			P/P
9/3	06:40	LRB	23.50	0.95	1.15	8.12	100	0			
9/4	06:40	LRB	23.30	1.00	1.10	7.88	100	1			P/P
9/5	06:45	DAF	23.00	1.00	1.00	8.11	100	0			
9/6	03:10	DAF	22.90	1.00	1.00	8.01	100	2			P/P,P/P
9/7	03:05	DAF	22.70	1.00	1.05	7.99	100	0			
9/8	03:00	DAF	22.50	1.00	1.00	8.37	100	1			p/p
9/9	03:00	DAF	22.40	1.05	1.10	8.49	100	0			
9/10	05:20	DAF	22.30	1.20	1.10	8.29	100	0			
9/11	05:20	DAF	22.60	1.15	1.15	8.64	100	0			
9/12	03:20	DAF	22.90	1.15	1.20	8.59	100	0	>2419.6	<1	
9/13	03:30	DAF	23.30	1.15	1.20	8.68	100	0			
9/14	03:20	DAF	23.00	1.30	1.30	8.59	100	0			
9/15	03:30	DAF	22.80	1.35	1.30	8.50	100	6			P/P,P/P,P/P,P/P,P/P
9/16	04:00	DAF	21.50	1.25	1.15	8.11	100	0			
9/17	05:20	DAF	20.90	1.35	1.30	7.80	100	4			
9/18	05:45	DAF	20.90	1.30	1.20	7.78	100	0			
9/19	03:15	DAF	20.60	1.40	1.30	7.71	100	1	>2419.6	1.0	
9/20	03:05	DAF	20.10	1.35	1.30	7.58	100	0			
9/21	03:10	DAF	19.50	1.40	1.35	7.55	100	18			
9/22	03:05	DAF	19.90	1.30	1.35	7.51	100	6			
9/23	03:10	DAF	19.00	1.30	1.35	7.38	100	11			
9/24	05:40	DAF	18.10	1.35	1.45	7.34	100	2			
9/25	06:05	DAF	17.40	1.30	1.25	7.35	100	4			
9/26	03:05	DAF	17.80	1.20	1.25	7.42	100	1	686.6	2.0	
9/27	03:15	DAF	17.80	1.20	1.20	7.47	100	0			
9/28	03:15	DAF	17.60	1.20	1.30	7.38	100	0			
9/29	03:20	DAF	17.90	1.15	1.20	7.35	100	0			
9/30	04:00	DAF	17.30	1.20	1.20	7.40	100	0			
			21.1	1.19	1.20	7.94		58.00			

2023 Draft Budget

Lake Auburn Watershed Commission
Proposed Budget
For the Fiscal Year 2023

	2019 Actual	2020 Actual	2021 Actual	Approved 2022 Budget	Estimated 2022 Actual	2023 Budget	Percentage Change
Expenditures:							
Auburn Water District	5,398.28	6,755.35	5,191.00	6,000.00	5,575.00	6,000.00	0.00%
Lewiston Water Division	6,710.25	4,281.50	8,991.17	6,000.00	6,000.00	6,000.00	0.00%
Executive Administration	1,432.72	62.49	-	750.00	-	550.00	-26.67%
Source Protection Management	(6,244.30)	111,806.99	41,198.99	63,250.00	30,495.00	63,150.00	-0.16%
Forestry	8,189.63	4,895.00	10,064.59	4,500.00	7,050.00	3,500.00	-22.22%
Outside Services	3,325.00	3,325.00	3,435.00	3,325.00	3,325.00	3,325.00	0.00%
Sanitary Facilities	3,339.10	3,680.00	2,680.00	3,760.00	3,095.00	3,760.00	0.00%
Repairs to Property & Equipment	3,726.79	2,454.77	3,252.94	6,000.00	4,625.58	3,800.00	-36.67%
Public Education General	1,566.48	17.00	2,371.28	1,775.00	1,775.00	1,775.00	0.00%
Public Ed. - Labor	19,358.22	11,975.44	11,902.33	27,620.00	24,682.00	30,515.00	10.48%
Public Ed. - Supplies	2,385.14	838.98	2,035.79	800.00	155.00	1,400.00	75.00%
Public Ed. - Events	1,036.96	-	189.49	2,000.00	461.00	2,000.00	0.00%
Public Ed. - Outside Services	(11.05)	838.69	-	500.00	-	2,400.00	380.00%
Public Ed. - Public Relations	2,475.58	1,079.49	498.52	1,500.00	1,853.00	2,800.00	86.67%
Public Ed. - Misc.	1,600.71	661.93	1,183.83	1,500.00	713.00	250.00	-83.33%
Insurances	11,605.00	11,446.08	12,075.47	11,650.00	11,645.00	12,000.00	3.00%
Legal	7,938.00	127.50	6,454.50	4,000.00	12,000.00	10,500.00	162.50%
Audit/Financial Services	6,291.25	6,441.26	6,595.26	6,695.00	7,190.00	7,395.00	10.46%
Property Taxes	4,616.50	4,710.32	4,515.20	4,625.00	3,995.00	4,165.00	-9.95%
Operational Supplies	460.34	2,201.62	1,999.73	1,000.00	625.00	1,000.00	0.00%
Miscellaneous	757.95	864.76	435.49	950.00	685.00	850.00	-10.53%
Total Operating Expenditures	85,958.55	178,464.17	125,070.58	158,200.00	125,944.58	167,135.00	5.65%
Capital Expenditures:							
Forestry Management Plan						20,000.00	
Pontoon Boat & Accessories - Funded over 2 years				25,000.00		25,000.00	
Total Capital Expenditures	-	-	-	25,000.00	-	45,000.00	
Total Expenditures	**85,958.55**	**178,464.17**	**125,070.58**	**183,200.00**	**125,944.58**	**212,135.00**	15.79%
Revenues:							
Contributions - AWD	48,550.00	40,000.00	52,500.00	58,250.00	58,250.00	60,000.00	3.00%
Contributions - LWD	48,550.00	40,000.00	52,500.00	58,250.00	58,250.00	60,000.00	3.00%
Fund Balance Carryforward		94,807.97		50,665.00		88,100.00	73.89%
Gain on Sale of Assets			4,576.64				
Sale of Timber/Assets	53,647.30	-	93,763.92	14,000.00	28,563.00	2,000.00	
Intergovernmental	2,000.00	2,000.00	2,200.00	2,000.00	2,250.00	2,000.00	0.00%
Interest	2,853.42	1,656.20	344.82	35.00	35.00	35.00	0.00%
Total Revenues	**155,600.72**	**178,464.17**	**205,885.38**	**183,200.00**	**147,348.00**	**212,135.00**	**15.79%**
Surplus	**69,642.17**	**0.00**	**80,814.80**	**0.00**	**21,403.42**	**0.00**	
Total contributions from each entity:							
Operations	48,550.00	40,000.00	52,500.00	58,250.00	58,250.00	60,000.00	
Source Water Protection Sinking Fund	20,000.00	25,000.00	22,500.00	20,000.00	20,000.00	25,000.00	
	68,550.00	**65,000.00**	**75,000.00**	**78,250.00**	**78,250.00**	**85,000.00**	
						8.63%	
Water Withdrawal Revenue	1,528.21	7,282.68	4,421.45	4,000.00	387.00	-	
Accumulate Accumulative Balance	2,901.81	10,184.49	14,605.94	18,605.94	14,992.94	**14,992.94**	

Lake Auburn Watershed Commission
Proposed Budget - Detail
For the Fiscal Year 2023

Budget Line Item	Amount Requested	Explanation for the Request
Auburn Water District	6,000	Routine maintenance, groundwork, trash pickup, erosion & drainage work, and maintenance
Lewiston Water Division	6,000	Routine maintenance, groundwork, trash pickup and maintenance
Executive Administration	550	Clerk's time for property/septic reviews, project contracts, polices, background research, and legal communications with the attorney
Source Protection Management	63,150	Lake patrol $18,000; boat inspections $5,150; septic evaluations $2,000; and special projects identified $38,000 Tighe Bond recommendations - Blanchard Pond
Outside Services	3,325	ALT conservation easement monitoring
Forestry	3,500	Forestry management contractual services, property line marking and blazing invasive species
Sanitary Facilities	3,760	G A Downing facilities $470/month x 8
Repairs to Property & Equipment	3,800	Repairs to property & equipment $1,800; signs $500; and boat maintenance $1,500
Public Education	1,775	Contributions to partnership organizations: LSM $1,500 & Little Wilson Pond testing $275
Public Ed. - Labor	30,515	Community Outreach Coordinator and Educator's salary ($22 x 24 hours) and benefits
Public Ed. - Supplies	1,400	Supplies and materials to support the Community Outreach Program, plus laptop
Public Ed. - Events	2,000	Public education events for the community
Public Ed. - Outside Services	2,400	Contractual labor for technology and website - $200/month
Public Ed. - Public Relations	2,800	Public education mailings, Constant Contact account, new watershed calendar $1,500
Public Ed. - Miscellaneous	250	Misc. program costs, mileage, dues, training, etc.
Liability & D & O Insurance	12,000	$10,400 for general liability coverage; theft & dishonesty coverage $500; and $1,100 for D & O insurance coverage
Legal	10,500	Routine legal consultations about ordinances, contracts, etc.
Audit/Financial Services	7,395	Annual audit $4,700 and annual bookkeeping fee $2,695
Property Taxes	4,165	Town of Minot $2,200; City of Auburn $690; and Town of Turner $1,275
Operational Supplies	1,000	Buoys $700 and boat safety equipment $300
Miscellaneous	850	Central Maine Power for the boat launch $350; routine offices supplies, reports, and postage $250; and Misc. $250
Total	**167,135**	

Lake Auburn Watershed Commission
Contribution History by Entity
10-year Trend & 5-year Projection

Year	Operating Contribution	Sinking Fund Contribution	Total Contribution
2014	87,500	125,000	212,500
2015	87,385	70,000	157,385
2016	78,125	60,000	138,125
2017	77,000	30,000	107,000
2018	75,000	25,000	100,000
2019	48,550	20,000	68,550
2020	40,000	25,000	65,000
2021	52,500	22,500	75,000
2022	58,250	20,000	78,250
2023	60,000	25,000	85,000
2024*	61,800	25,000	86,800
2025*	63,654	25,000	88,654
2026*	65,564	25,000	90,564
2027*	67,531	25,000	92,531
2028*	69,556	25,000	94,556

* Estimated operations assume a 3% annual increase

Water Quality Testing Overview

Tributaries

Done every other week approximately from ice-out to ice-in, plus try to catch rain events

15 routine sampling sites

More if Spring Road included (28)

# of sites sampled each time depends on flow

Collect: pH, temp, dissolved oxygen, turbidity, color, conductivity, total dissolved solids, total coliform, E. coli, fecal coliform, total nitrogen & ammonia, nitrate/nitrite, total nitrogen, total phosphorus, orthophosphorus, flow

Lake

Done every week from ice-out to ice-in

6 sampling sites

Collect at every meter at each site: temp, conductivity, total dissolved solids, chlorophyll A, blue-green algae, dissolved oxygen, pH

Collect with a core sample above the thermocline at each site: total nitrogen & ammonia, nitrate/nitrite, total nitrogen, total phosphorus, orthophosphorus

Collect with a grab sample at the bottom at each site: total nitrogen & ammonia, nitrate/nitrite, total nitrogen, total phosphorus, orthophosphorus

Raw Water

Two online turbidity meters read every hour of the day

LAKE AUBURN WATERSHED SAMPLING LOCATIONS

BUCKFIELD

HEBRON

TURNER

MINOT

AUBURN

LEWISTON

MUD POND

LITTLE WILSON POND

LAKE AUBURN

N

W E

S

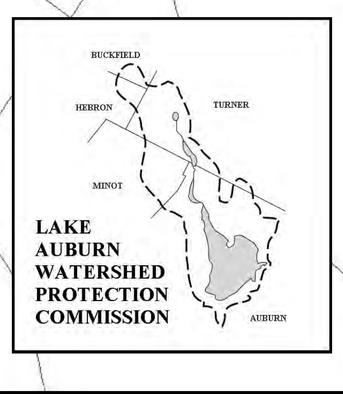
LEGEND

- SAMPLE POINTS
- WATERSHED LINE
- SUB-WATERSHED LINE
- TOWN LINE

0 1,600 3,200

1 inch = 1600 feet

28 18 17 27 16 13 B4 29 4 3 23 2 26 B-1 R-2 25 30 32 31 B0 12 B1 8 B3 B2



LAKE AUBURN WATERSHED PROTECTION COMMISSION

LAWPC Properties and Prioritization

LAKE AUBURN WATERSHED

BUCKFIELD

HEBRON

TURNER

MINOT

N

W E

S

WATERSHED LINE

(SUB WATERSHED LINE)

RESTRICTED ZONE

CONSERVATION EASEMENTS

AWD LAND

COMMISSION LAND

LIFE ESTATES

LAKE AUBURN Watershed Protection Commission

Date: 10/31/2022 1 in = 1500 ft

DETAIL A
SCALE: 1in = 400ft

HALF OWNED BY THE COMMISSION

LAKE AUBURN

DETAIL A

RESTRICTED ZONE

Date: 10/31/2022

DRAFT

Lake Auburn Watershed Protection Commission
Land Acquisition Prioritization

Category 1
Land with frontage on Lake Auburn
Land with frontage on Outlet of Townsend Brook
Land with frontage on "the Basin" or stream between Basin & Lake
Land with frontage on Townsend Brook
Land with frontage on any significant tributary feeding into Lake Auburn
Land with frontage on any significant tributary feeding into The Basin

Category 2
Land within 250 feet of Lake Auburn shoreline
Land within 250 feet of The Basin

Category 3
Large Land Parcels undeveloped that have minimal levels of protection via Zoning
Parcel on with current use may pose a threat to water supply
Tax Acquired Property within watershed

CDM Smith Final Draft of Peer Review of Gracelawn Studies

Memorandum

To: *Erica Kidd, Watershed Manager*

From: *Robert H. Fitzgerald, PE, Water Resources Engineer*
Anne E. Malenfant, PE, PMP, Project Manager

Date: *June 24, 2022 (Draft)*
October 5, 2022 (Revised)

Subject: *Watershed Delineation Rezoning Review – Gravel Pit Parcel*
Lake Auburn Watershed Protection Commission

Executive Summary

As part of an environmental and regulatory analysis of Lake Auburn water supply protection (FB Environmental, 2021), a revised delineation of the watershed near the southeast shore of Lake Auburn was presented which reduced the watershed area by 148 acres. This revised watershed delineation in part reflects topography (i.e., surface drainage) and in part was based on estimates of groundwater flow directions presented in previous hydrogeologic studies.

The Lake Auburn Watershed Protection Commission requested CDM Smith to provide an independent review of the past studies that were the basis of this revised delineation, including the geologic, water level and water quality data and analyses presented in these reports. CDM Smith's observations and assessments pertinent to watershed delineation are presented in the following memorandum.

Based on CDM Smith's review, the groundwater data support the revised watershed delineation in some areas, and in other areas the data are insufficient to confirm a precise delineation. **Figure ES-1** presents a summary of the review, including the revised delineation (red dashed line), the area of uncertainty (blue dashed line) and direction of groundwater flow (blue arrows), and can be summarized as follows:

- The solid blue line to the west is a delineation that reflects surface topography and is consistent with the FB Environmental revised delineation except for a small area to the north near MW-1 and MW-4. To the south of this line, data from 14 groundwater monitoring wells indicate flow in the surficial sand and gravel away from the lake and, significantly, groundwater levels that are below lake level, precluding discharge to the lake.
- Near the center of **Figure ES-1** are three triangles indicating the location and elevation of bedrock outcrops. In this area of high bedrock (so called "bedrock knob"), the water table is

in bedrock and is above lake level based on surrounding well data. However, in the reviewed reports there is no well data to indicate bedrock flow direction in this area. Hence, **Figure ES-1** indicates a band of uncertainty in the area of the outcrops and nearby topographic high elevations.

- To the east of the bedrock knob, water level data from wells MW-1, MW-10, MW-301 and MW-206 indicate a water table in the sand and gravel above lake level with a generally northeastward flow direction. Groundwater within the band of uncertainty in this area could possibly discharge to Lake Auburn or to a stream farther to the east that is tributary to the Androscoggin River.

- The northern limit of the uncertainty band in **Figure ES-1** is approximately consistent with a surface drainage divide indicated by topography. To the south of the uncertainty band, water level data (and also water quality data) indicate that the water table is in the surficial sand and gravel with a flow direction away from the lake. This includes data from wells MW/PZ-203, P-1, MW-205, MW-102/P-2 and MW-101/P-3.

To determine the limit of the watershed in this "area of uncertainty", the following steps would be recommended:

- Create a 3-D geometric visualization model and associated geographic information system (GIS). The scope of effort would include:

  - Incorporation and integration all of the relevant geologic, well construction, water level and water quality data included in the reports that were reviewed.

  - Additional data including topography, land parcels and other geographic features.

  - Research to identify if there are other hydrogeologic data available not included in the reports reviewed for this memo. These might include additional seismic survey results and boring logs.

- Based on the visualization model, the need for and focus of additional field data collection and/or groundwater flow modeling can be assessed. While it is likely that additional field exploration, including installation of new monitoring wells, will be required to more precisely delineate the watershed, preliminary visualization and modeling analysis can make this investigation more efficient.

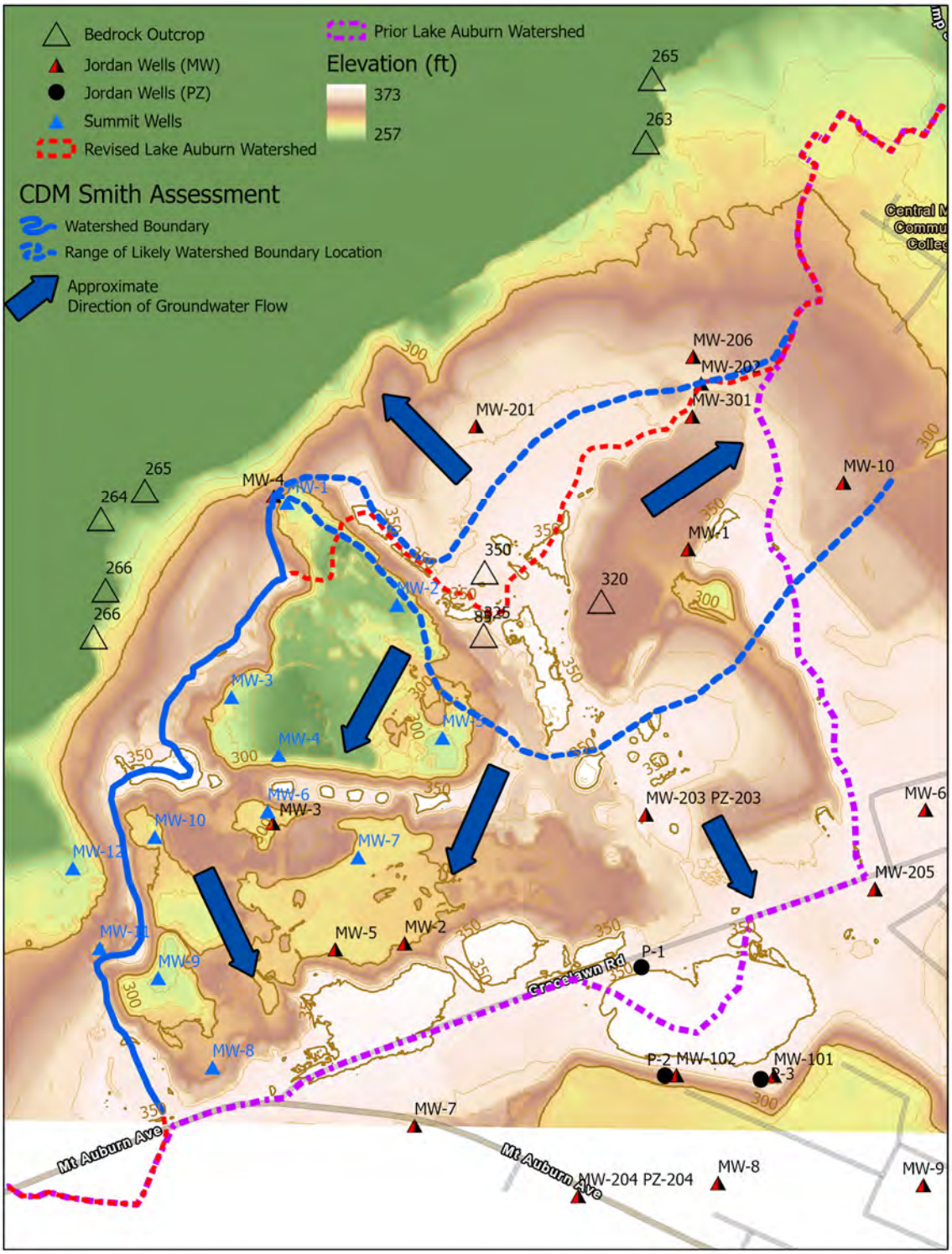


Figure ES-1: Summary of Estimated Watershed Boundary Review

Technical Analysis

Study Area Introduction

Lake Auburn in Auburn, Maine provides public drinking water supply to Auburn and Lewiston, Maine. As part of the report "A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine" (FB Environmental, 2021), a revision to the watershed delineation near the southeast shore of the lake was presented. This revision was based in part on previous hydrogeologic studies:

- E.C. Jordan Co., Hydrogeologic Investigation, Gracelawn Landfill/Lake Auburn, June 1990. (E.C. Jordan, 1990)
- Woodard and Curran Environmental Services, Supplemental Hydrogeological Study, Auburn Brush Dump, City of Auburn, ME, August 1995. (Woodard and Curran, 1995)
- Summit Environmental Consultants Inc., Ground Water Assessment, Gracelawn Road Gravel Pit, Auburn, ME, September 2007. (Summit, 2007)

The watershed delineation was moved northward, closer to the lake, removing approximately 148 acres from the estimated watershed. **Figure 1** shows the previous and revised delineations as presented by FB Environmental. **Figure 2** shows an approximation of these delineations sketched onto an aerial photo. The area between the old and proposed new delineations includes a number of sand and gravel borrow areas on the west side and former City of Auburn landfill and dump areas to the southeast

The recently proposed City of Auburn land use zoning change for this parcel is generally consistent with the revised watershed delineation, as shown in **Figure 3**. The area within the newly delineated watershed is generally shown to be in a "Resource Protection" zone, while much of the area just outside of the revised delineation is shown to be in a "General Business" zone.

This memo presents a review of the data presented in the hydrogeologic reports listed above that formed part of the basis for the new watershed delineation, plus a Maine DEP (MEDEP, 2019) memo related to the Gracelawn Landfill near the southern boundary of the study area.

- State of Maine Department of Environmental Protection, June 3 2019 Memorandum, Site: Gracelawn Landfill, Auburn, Subject Document: 2018 Annual Monitoring Report, Gracelawn Landfill, Auburn, ME prepared by CES Inc.

Study Area Topography

Topography and surface water drainage were not addressed in the reports reviewed for this memorandum. However, it is evident in **Figure 4** that topography was a significant factor in developing the revised watershed delineation. That is, the revised delineation in large part follows local topographic high points. Apparent exceptions are circled in **Figure 4**. The delineation does not follow the topographic high to the north near Summit well MW-1 and Jordan well MW-4, and

does not extend south to the apparent topographic high between the bedrock outcrops labeled 325 and 320 (indicating surface elevation).

Study Area Geology

Sand and Gravel Overburden

According to E.C. Jordan (1990), the overburden soils are primarily ice-contact deposits, which "consist largely of stratified water-laid, medium to fine sands. Widespread coarser deposits of sand, gravel, cobbles, and boulders are present at the surface (topset beds) across much of the site but only locally with depth." The sand and gravel deposits are noted to be 50 to 150 feet thick where borrow pits have been excavated.

Glacial Till

According to Jordan, a layer of till underlies the sand and gravel and overlies the bedrock. The till is described as "a very dense, heterogeneous, unstratified mixture of silt, clay, sand, gravel, cobbles, and boulders." As such, the till, where it exists, could act as a semi-confining layer inhibiting groundwater flow.

The presence of till is explicitly recorded in logs of borings that were continued into bedrock as rock cores. Till is not explicitly identified in boring logs of wells completed in the overburden. The till layer is noted by Jordan to be relatively thin, with a maximum observed thickness of 7.5 feet.

Bedrock

The overburden and till are underlain by bedrock. The bedrock is visually identified in rock cores as coarse-grained gneiss. A few areas where the bedrock is present at the ground surface (outcrops) have been observed near the center of the study area and at/near the lake shoreline.

The bedrock is considered to be water bearing; a few of the groundwater monitoring wells were completed in the bedrock. No estimate of the permeability or transmissivity (i.e. quantity of groundwater flow the bedrock can support) is provided.

Bedrock Surface Geometry

Groundwater flow in the sand and gravel overburden is influenced in part by the geometry of the bedrock (plus till layer) that underlie the sand and gravel overburden and define the limits of the overburden aquifer.

Figures 5 and **6** show bedrock surface contours as presented by E.C. Jordan (1990) and Woodard and Curran (1995), respectively. In **Figure 6**, bedrock surface contours are shown only for the northeast part of the study area (orange circle). Seismic survey lines in that area are also shown. The contours in both figures were developed based on seismic surveys, boring logs and surveyed elevations of outcrops. Though it is not stated how the thin till layer might affect the seismic data and refusal in borings, the delineated bedrock surface should be reasonably representative of the bottom of the sand and gravel overburden aquifer, except at the identified outcrops areas where the overburden aquifer does not exist.

Noteworthy features of the delineated bedrock surface geometry include the following:

Knob

- Near the center of the study area is an area of high bedrock, labeled "bedrock knob" in **Figure 5**. The area includes outcrops, indicated by triangles in the original figure, circled in red in **Figure 5**. Outcrop surface elevations of 350, 325 and 320 feet mean sea level (MSL) are shown. The reported bedrock surface at MW-201, just north of the outcrops, is also greater than 300 feet.

- The bedrock surface appears to decline most steeply from the "knob" area to the north and northwest towards the lake, and to the southwest.

West/Southwest

- A large area with bedrock elevation less than 250 feet MSL is indicated for the west/southwest portion of the study area by E.C. Jordan (1990).

- This is consistent with well data presented in the Summit (2007) report for this area. While top of bedrock/till, or refusal is not explicitly stated in the logs, the bottom elevations of all but two of the twelve Summit overburden monitoring wells are below 253 feet MSL.

- The eastern-most Summit wells, MW-2 and MW-5, have bottom elevations greater than 260 feet MSL, indicating where bedrock starts to rise towards the "knob". (The Summit report refers to a seismic survey performed, but no data from the survey are provided.)

- Bedrock outcrops at the shoreline with surface elevations 264-266 feet MSL shown in **Figure 3** indicate a rise of the bedrock surface near the shore. The relatively elevated bedrock here might significantly limit the hydraulic connection between the overburden aquifer and the lake, which has a water surface elevation of approximately 260 feet MSL.

South/Southeast

- The bedrock surface decline to the south and southeast of the knob is less steep. The bedrock surface at MW-203, approximately 900 feet to the south-southeast, is 283 feet MSL. At MW-6, approximately 1,500 feet southeast, the bedrock surface indicated by refusal is 277 feet MSL.

East/Northeast

- **Figure 6** shows bedrock surface elevation contours for this area presented by Woodard and Curran (1995). These are based on boring logs and the seismic survey. The contours indicate the bedrock surface is lower than 250 (and as low as 235) feet MSL at MW-202, MW-206 and MW-301, approximately 900 feet east of the knob, indicating a significant decline.

- The contours indicate a subsequent rise in the bedrock surface to elevations greater than 260 feet MSL farther to the northeast.

- Note that the contouring shown in **Figure 6** does not account for the higher bedrock surface estimated at MW-1, approximately 500 feet south of MW-301, to be 275 feet MSL.
- The green circle at the eastern edge of **Figure 6** highlights locations where the topographic contours indicate areas where the ground surface is less than 260 feet. The area is highlighted in **Figure 6** because subsequent figures in this report do not extend that far to the east.

Groundwater Flow

The following observations about likely groundwater flow features in the study area are made based on data presented in the reports reviewed for this memo. The observations are made in the context of estimating the Lake Auburn watershed area, noting that precise new delineations have not been made as part of this review task.

The discussion below is organized by subareas that share similar groundwater flow characteristics that are distinct from the other subareas. The subareas are defined and illustrated by the locations of representative monitoring wells or bedrock outcrops.

A. Lake Auburn

- The lake water level is controlled by a dam. Based on 1940-2012 data, the lake level averages approximately 259.9 feet MSL, with a range from approximately 257 to 262 feet MSL.
- Groundwater level probes installed 2 to 4 feet into the lake bottom sediments just offshore (**Figure 7**) indicated upward head gradients, i.e., groundwater flow into the lake, at 10 of the 12 working probes. (DP-10 was damaged.)
- A slight downward gradient was observed at DP-13 adjacent to the wetlands near the northwestern extent of the study area. DP-2, near the northeastern extent of the study area also indicated a downward gradient.
- The observation of bedrock outcrops near the shoreline suggests that the bedrock aquifer could be a source of groundwater discharging into the lake.
- While the measured gradients in the probes were substantial, up to 1 foot head difference, the rate of groundwater flow into the lake at the probe locations depends on the degree of flow resistance provided by the bottom sediments. No hydraulic conductivity estimates were included in the reports.

B. North Central (Knob Area)

- Three identified bedrock outcrops near the top of the bedrock "knob" are circled in **Figure 8**. Also circled is well MW-201, approximately 600 feet north of the outcrops. The water table is in the bedrock at MW-201. Hence, most or all groundwater flow in this subarea is within the bedrock.

- The measured water level in MW-201 is greater than 305 feet MSL, and is thus more than 40 feet above the lake water level.
- The groundwater level could be even higher near the outcrops, where the surface elevation is higher than at MW-201 and the bedrock aquifer is directly recharged.
- While there is insufficient data to reliably determine bedrock groundwater flow direction in this subarea, it is very possible that this flow is to the lake. This includes the outcrop area, some of which appears to be outside of the revised watershed delineation.

C. West-Southwest

- Measured groundwater levels are below lake level (250.0 to 255.2 feet on 5/24/1990) in E.C. Jordan overburden monitoring wells MW-2 – MW-5.
- Summit overburden monitoring wells in the same area, MW-1, MW-3, MW-4, MW-6 – MW-12, also had water levels below lake level (250.6 to 258.0 feet MSL on 5/15/2006 to 8/9/2007)
- Hence, overburden groundwater flow in the area represented by these 14 wells (indicated by solid green circles in **Figure 9**) does not discharge to the lake based on these data. A mild southerly gradient away from the lake is indicated for both sets of wells.
- These data consistent with the revised watershed delineation in this subarea, except that Jordan well MW-4 and Summit well MW-1, which are part of the group with water levels below lake level, are within the revised watershed.
- Data for the easternmost Summit wells, MW-2 and MW-5 (dashed green circles in **Figure 9**), indicate that both the bedrock surface and groundwater levels exceed the lake water level (maximum reported groundwater level 271 at MW-5).
- The ground surface and bedrock surface rise steeply to the knob east and northeast of MW-2 and MW-5. Hence, these wells are likely close to the northeastern limit of the area where groundwater flow is predominantly in the overburden and is reliably away from the lake. At both wells, the measured water level is near the bottom of the well, assumed to be at or near the bedrock or till surface.
- The lake sediment probe data suggests that lake water does not contribute significantly to overburden groundwater flow in this subarea. This is consistent with high bedrock observed near the lake shore that could limit the hydraulic connection between the lake and the overburden aquifer.
- No data are available to indicate whether bedrock flow in this subarea could discharge to the lake, thus causing the observed upward gradients in the lake sediments. However, even If the bedrock aquifer does discharge to the lake in this area, the bedrock aquifer could not in that case be recharged in this subarea where overburden heads are below lake level.

D. Southeast

- Southerly flow away from the Lake is indicated in the vicinity of the Gracelawn Landfill by groundwater levels measured at piezometers P-1, to the north, and P-2 and P-3 to the south of the landfill. The piezometer locations are circled in **Figure 10**.
- Southerly flow at the Gracelawn Landfill is also indicated by water quality sampling and analysis at wells MW-101 and MW-102, co-located with the piezometers south of the landfill. Elevated specific conductance (among other parameters) was reported for MW-101 and MW-10 by E.C. Jordan (1990) and for MW-101 by ME DEP (2019).
- To the north of the Graceland landfill approximately 600 feet, the water level at PZ-203 (289 to 293) is much higher than the water levels at the nearest wells to the south, southwest and southeast. It is likely, therefore, that groundwater flow from this location (dashed green circle in **Figure 10**) has a southerly component away from the lake, which is nearly one-half mile to the north.
- However, it is difficult to estimate the actual groundwater flow directions in this vicinity because it is significantly influenced by the high bedrock and till here. The measured water table at PZ/MW-203 is very near the top of till elevation, sometimes just above and sometimes just below.

E. Northeast

- Monitoring wells MW-1, MW-10, MW-202, MW-206 and MW-301 (indicated by orange circles in **Figure 11**) are located east of the area of highest bedrock associated with the "knob".
- A northward component to overburden groundwater flow is indicated by water levels measured by Woodard & Curran (1995) at MW-1 (278.7), MW-301 (275.5) and MW-206 (274.4). Synoptic data including these wells and MW-202 are not available.
- Approximately 600 feet farther east, the water level measured at MW-10 (272.7) indicates that there is also an eastern component to the groundwater flow.
- Woodard and Curran (1995) states, based on water quality data (not presented), that "it is possible that impacted groundwater from the north end of the brush dump and old burn area is flowing toward MW-10." This is consistent with both northward and eastward components to groundwater flow in this area.
- Lake Auburn (water level 260) and a stream channel east of MW-10, where ground surface is less than 260, are both possible points of discharge for groundwater in this area. The stream channel is tributary to the Androscoggin River.

- There is insufficient data to delineate a dividing line between flow to the lake and flow to the creek. One unknown is the influence (if any) on groundwater flow of the bedrock surface which rises to the east and north of MW-206 and MW-301.

Summary and Conclusions

As part of an environmental and regulatory analysis of Lake Auburn water supply protection (FB Environmental, 2021), a revised watershed delineation of the watershed near the southeast shore of the lake was presented which reduced the watershed area by 148 acres (**Figure 1**).

Lake Auburn is an unfiltered water supply source for the cities of Auburn and Lewiston, Maine. Hence, changes to the watershed delineation could be relevant to future land use and land use regulation and possible impacts on water quality.

The watershed revision was based in part on estimates of groundwater flow directions presented in previous hydrogeologic studies. CDM Smith reviewed the geologic, water level and water quality data and analyses presented in these reports. CDM Smith's observations and assessments pertinent to watershed delineation are presented in this memorandum.

The observations are organized in terms of subareas that share similar groundwater flow characteristics that are distinct from the other subareas.

Bedrock High (North Central)

Near the center of the area where the watershed delineation has been revised (study area), the bedrock surface rises, creating what is called a bedrock "knob". Groundwater flow here occurs only in bedrock. The bedrock groundwater level well MW-201 in this subarea is more than 40 feet above the lake surface water level and the groundwater level could be higher still near the bedrock outcrops farther to the south. Well MW-201 and the outcrops are circled in red in **Figure 12**.

There are insufficient data to reliably determine bedrock aquifer flow directions, but it would be reasonable to extend the revised watershed farther south in this area, to at least include the observed outcrop areas where the bedrock aquifer would be directly recharged as well as the nearby topographic high.

West-Southwest

To the west and southwest of the bedrock knob is a subarea represented by 14 monitoring wells (solid green circles in **Figure 12**) where the overburden groundwater level measurements are consistently below the lake surface water level. Groundwater in the area represented by these wells does not discharge to the lake. This is consistent with the revised watershed delineation, except that two of the wells in this group are north of the revised watershed delineation as shown in **Figure 12**.

Summit Environmental well MW-2 and MW-5 (Dashed green circles in **Figure 12**) are likely near the limit of the west-southwest subarea where groundwater flow is predictably away from the lake. Just to the northeast of these wells the ground surface and bedrock surface rise steeply towards the knob area.

Gracelawn Landfill (Southeast)

The previous watershed delineation apparently included the Gracelawn Landfill near it's southeastern limit. Groundwater level and water quality data at wells circled in blue in **Figure 12** indicate that groundwater flow in this vicinity is southward, away from the lake. This is consistent with the revised watershed delineation.

Northeast

Groundwater in the area indicated by the orange circled wells east of the knob in **Figure 12** likely flows in part to Lake Auburn and in part to a small stream just east of the study area that is ultimately tributary to the Androscoggin River. Data in the review documents, are not sufficient to precisely locate the divide between groundwater flow to the lake and to the river, and thereby establish a precise watershed boundary.

Further Study

If a more precise delineation of the watershed is required in any area, the next step would be to create a 3-D geometric visualization model and associated geographic information system (GIS) incorporating and integrating all of the relevant geologic, well construction, water level and water quality data included in the reports that were reviewed. Additional data including topography, land parcels and other geographic features should also be included. Research to identify if there are other hydrogeologic data available not included in the reports reviewed for this memo that should be included in the visualization model. These might include additional seismic survey results and boring logs.

Subsequently, the need for and focus of additional field data collection and/or groundwater flow modeling can be assessed. Groundwater flow model development would be significantly expedited by previous completion the 3-D geologic visualization model.

Attachment

Technical Memorandum Figures

Figures

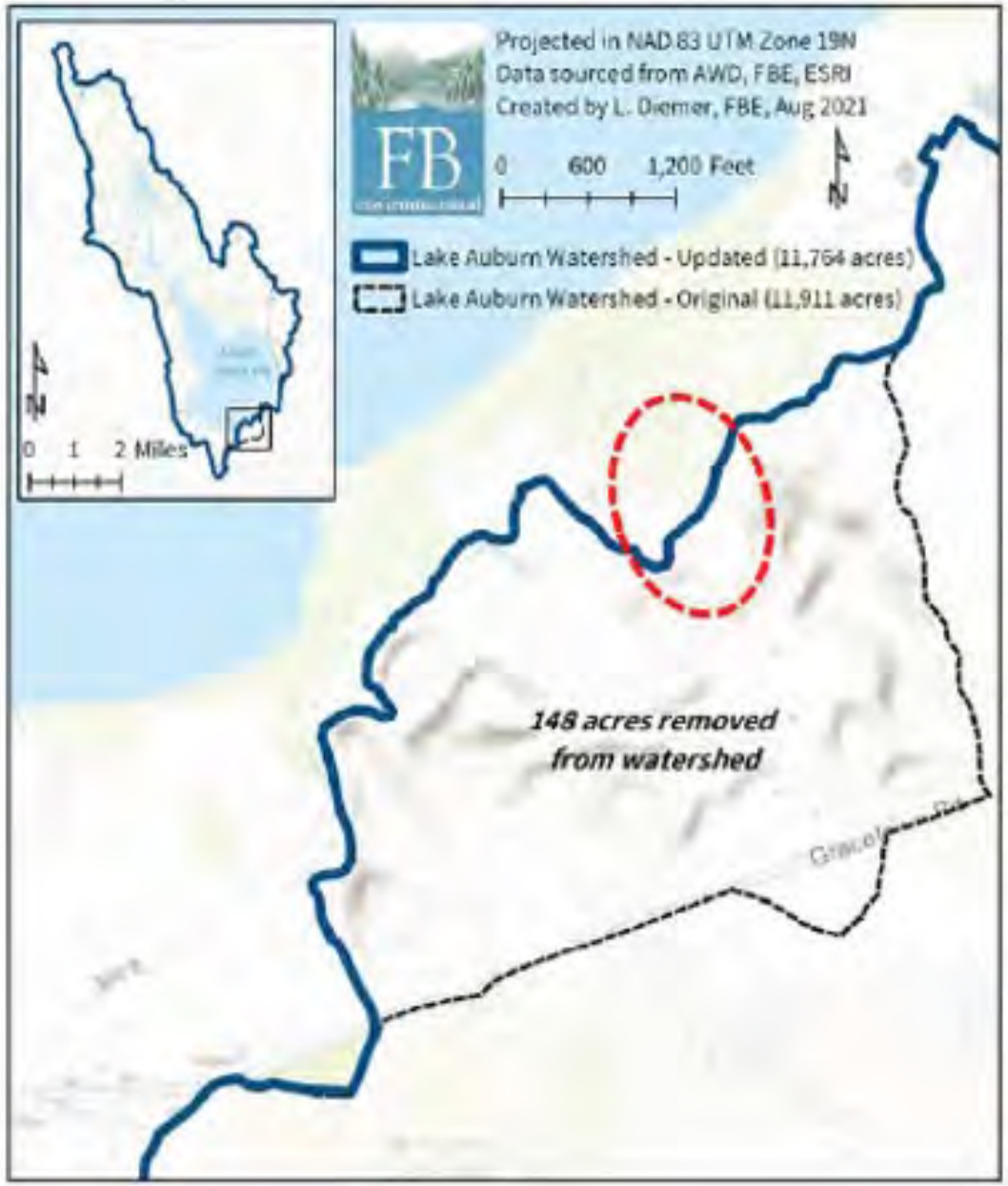


Figure 1 Previous (black dashed) and revised (blue) watershed delineation per FP Environmental (2021)

Figure 2 Google Earth aerial photo of study area

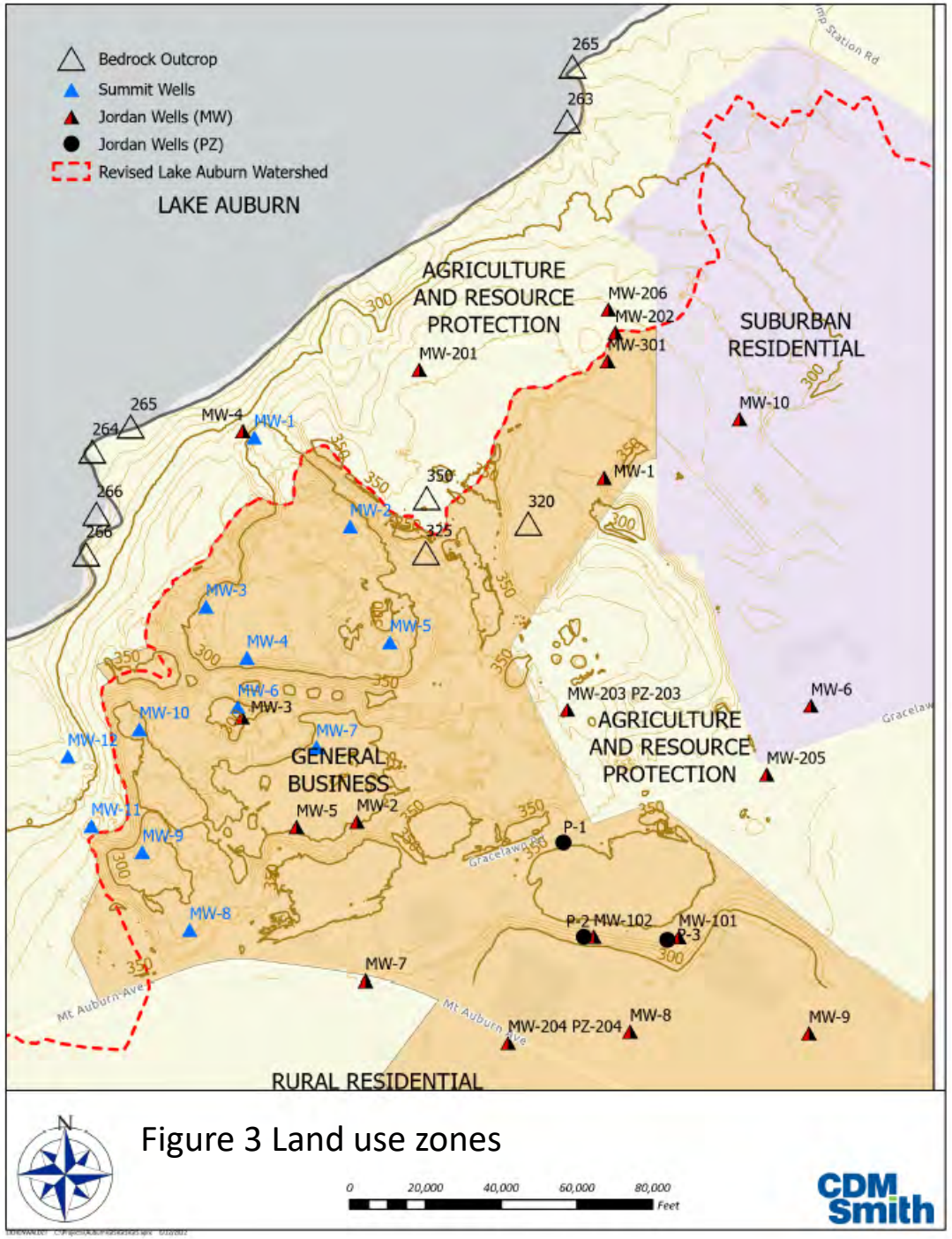


Figure 3 Land use zones

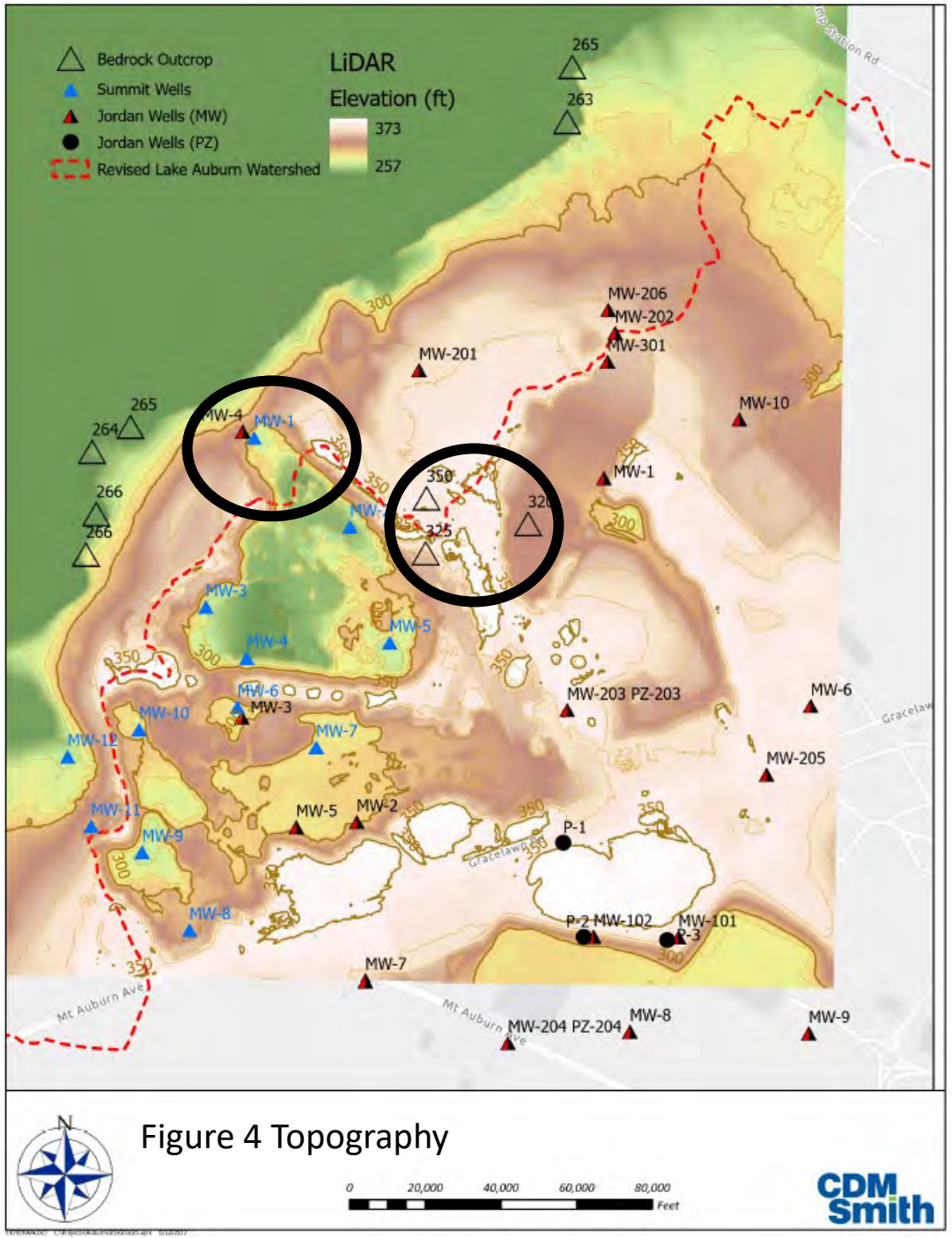


Figure 4 Topography

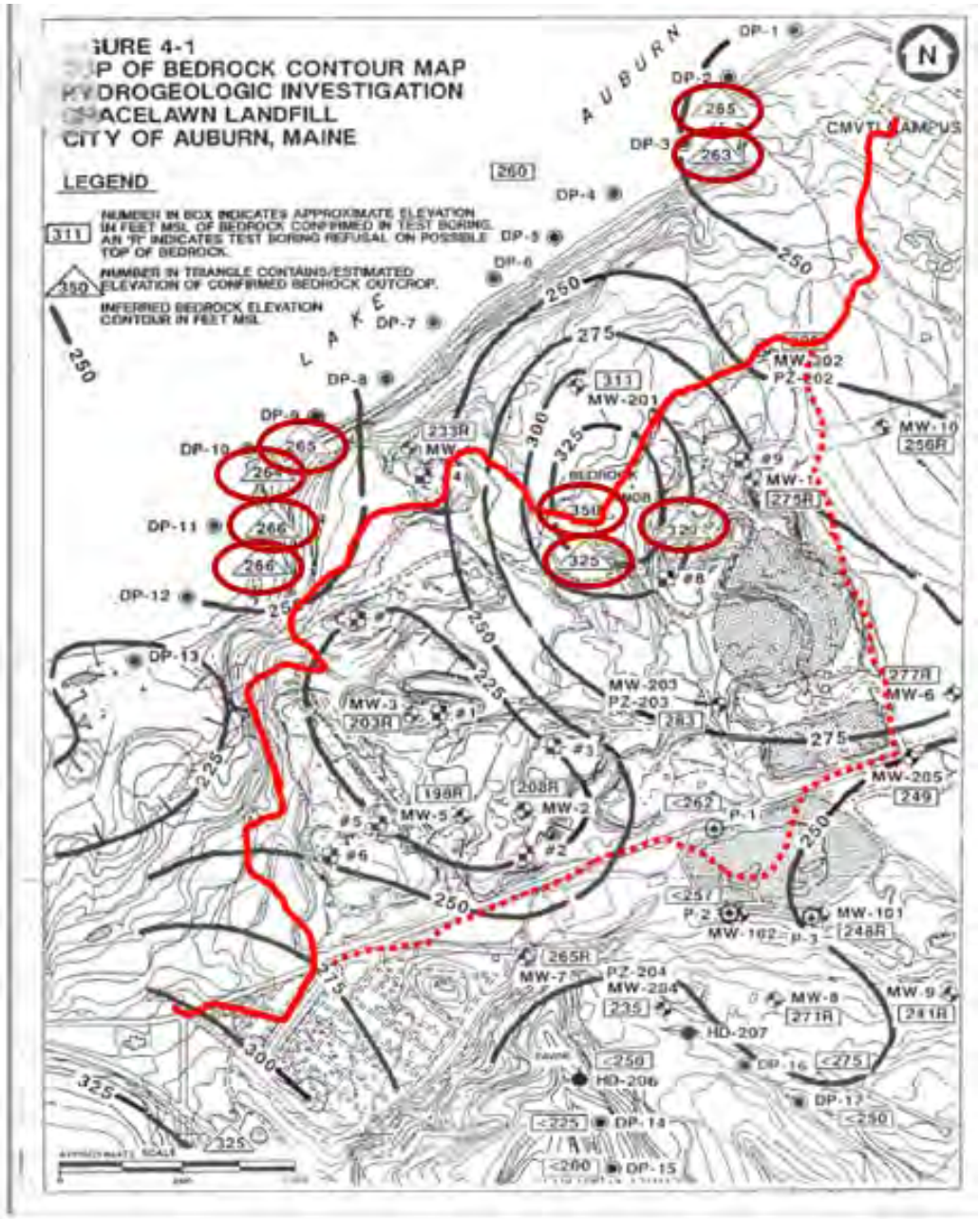


Figure 5 Bedrock surface contour map from E.C. Jordan (1990)

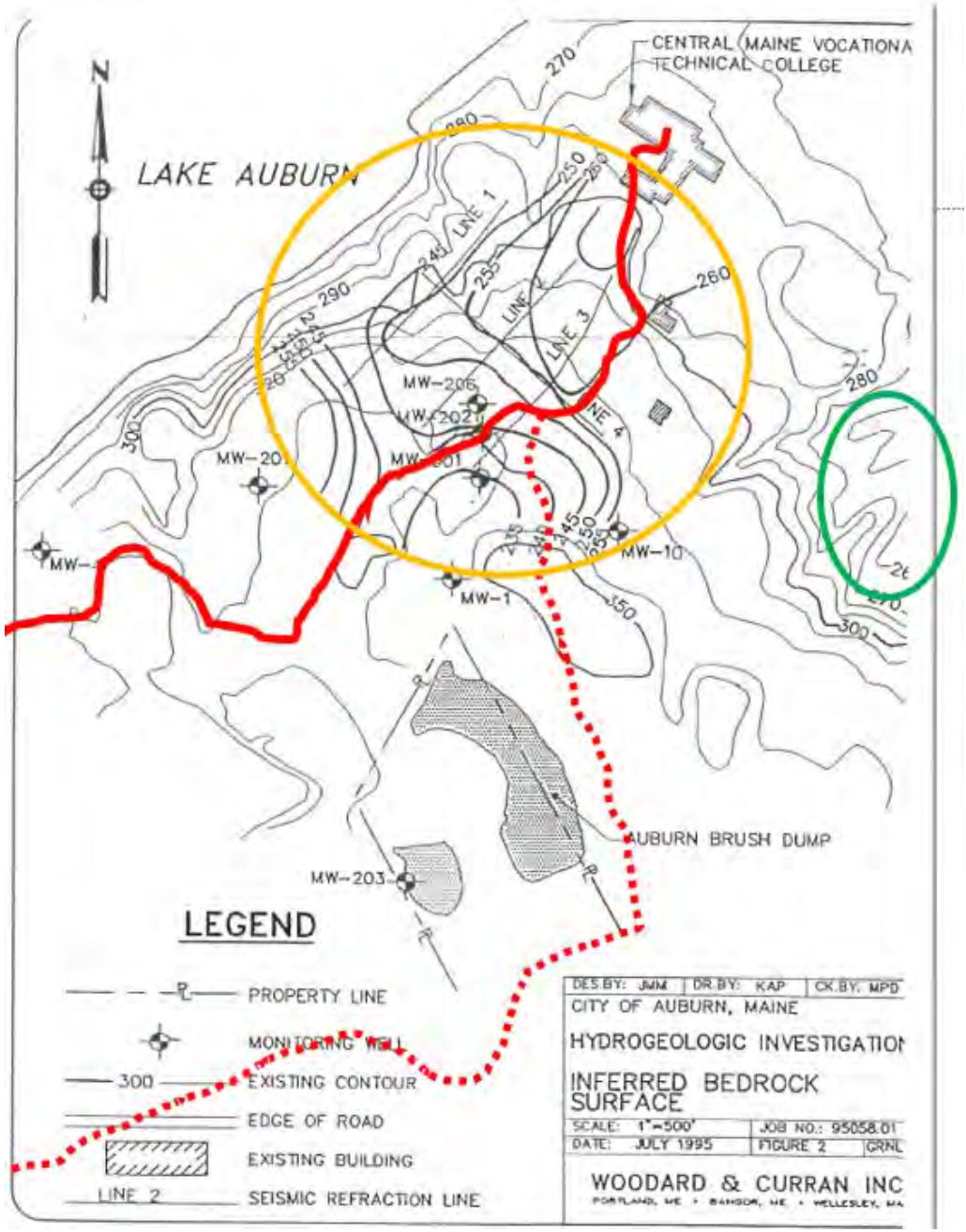


Figure 6 Bedrock surface contours from Woodward & Curran (1995)

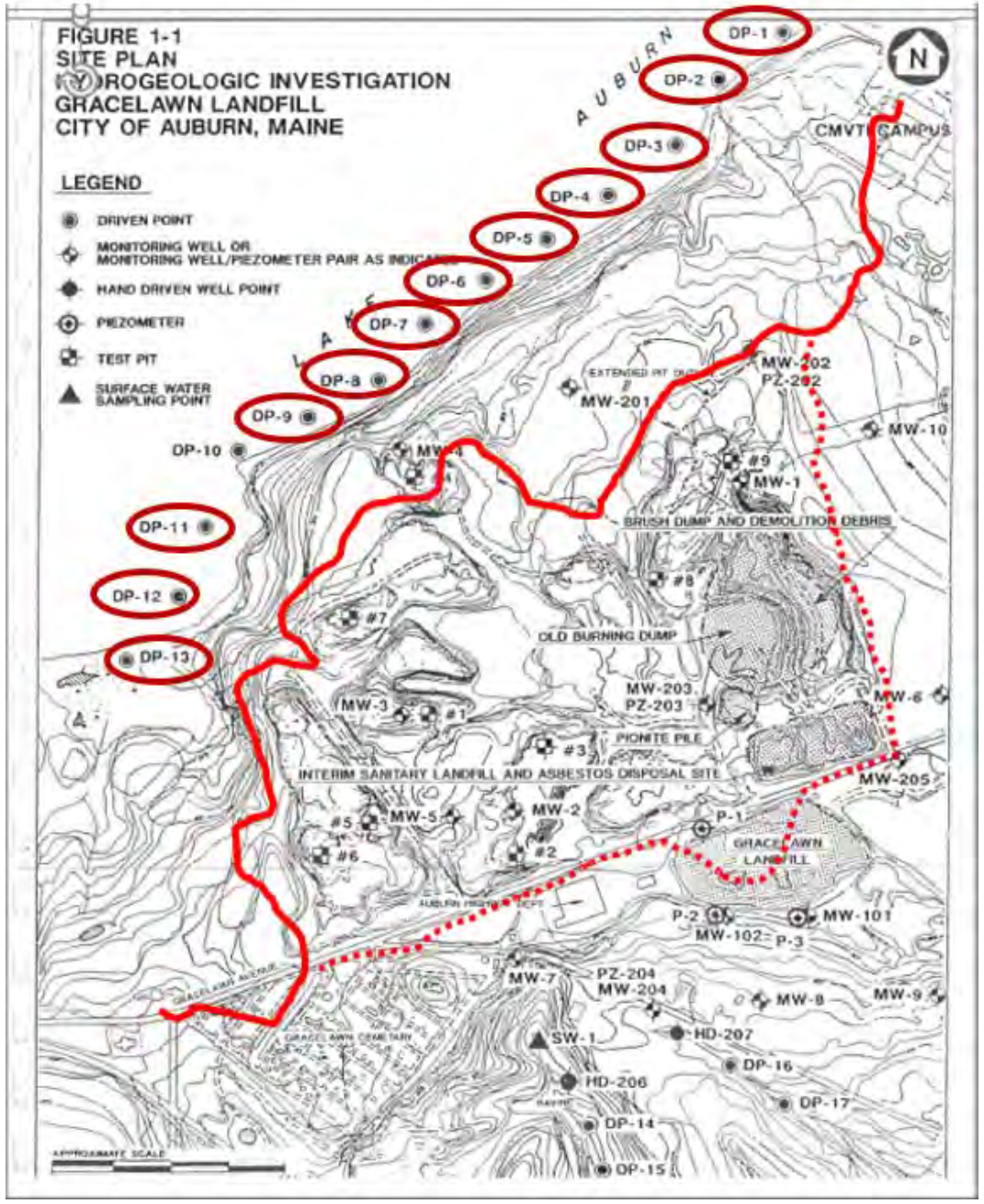


Figure 7 Subarea A: Lake Agawam sediment probes

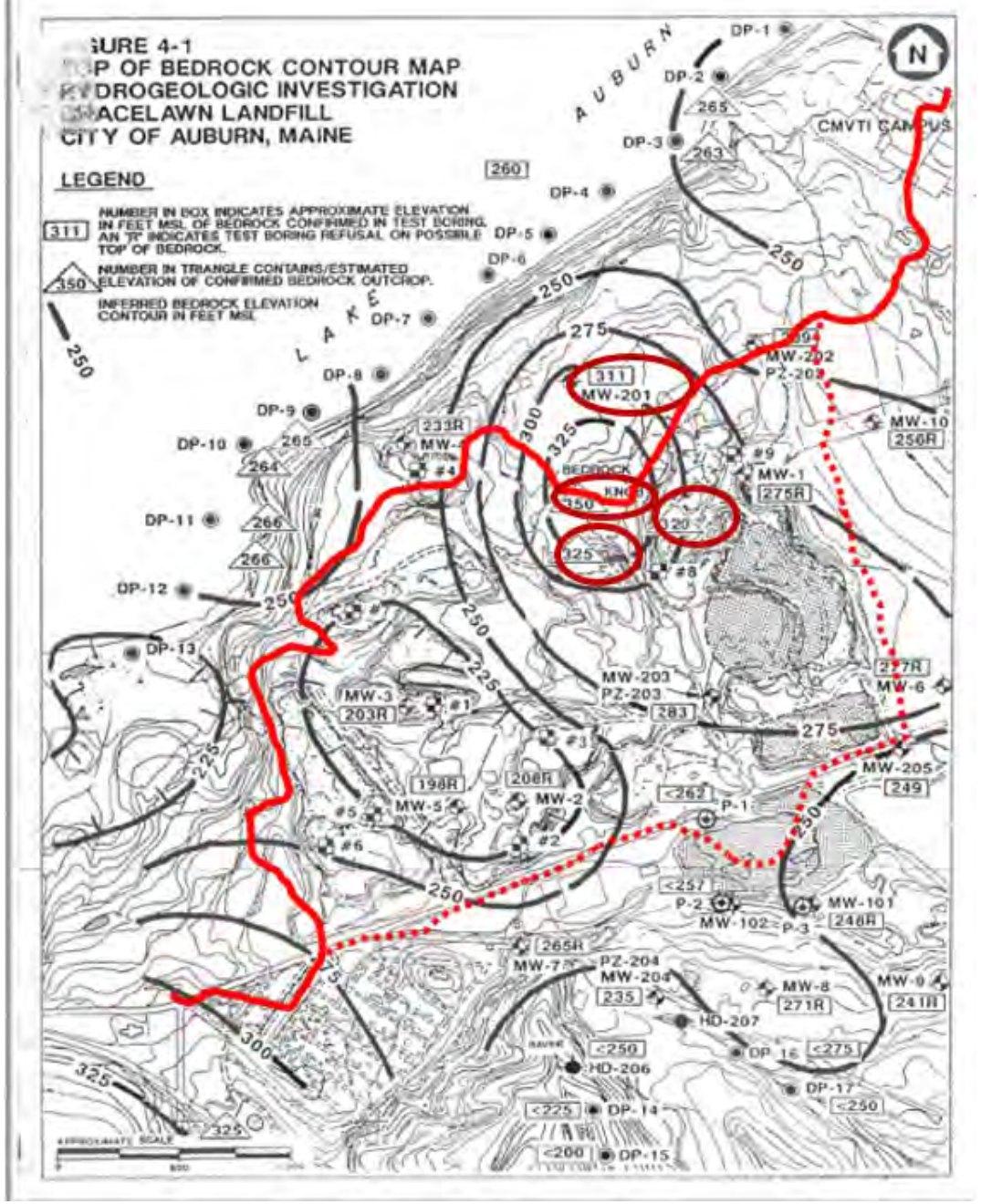


Figure 8 Subarea B: Monitoring well MW-201 and bedrock "knob" outcrops

Figure 9 Subarea C: West monitoring wells

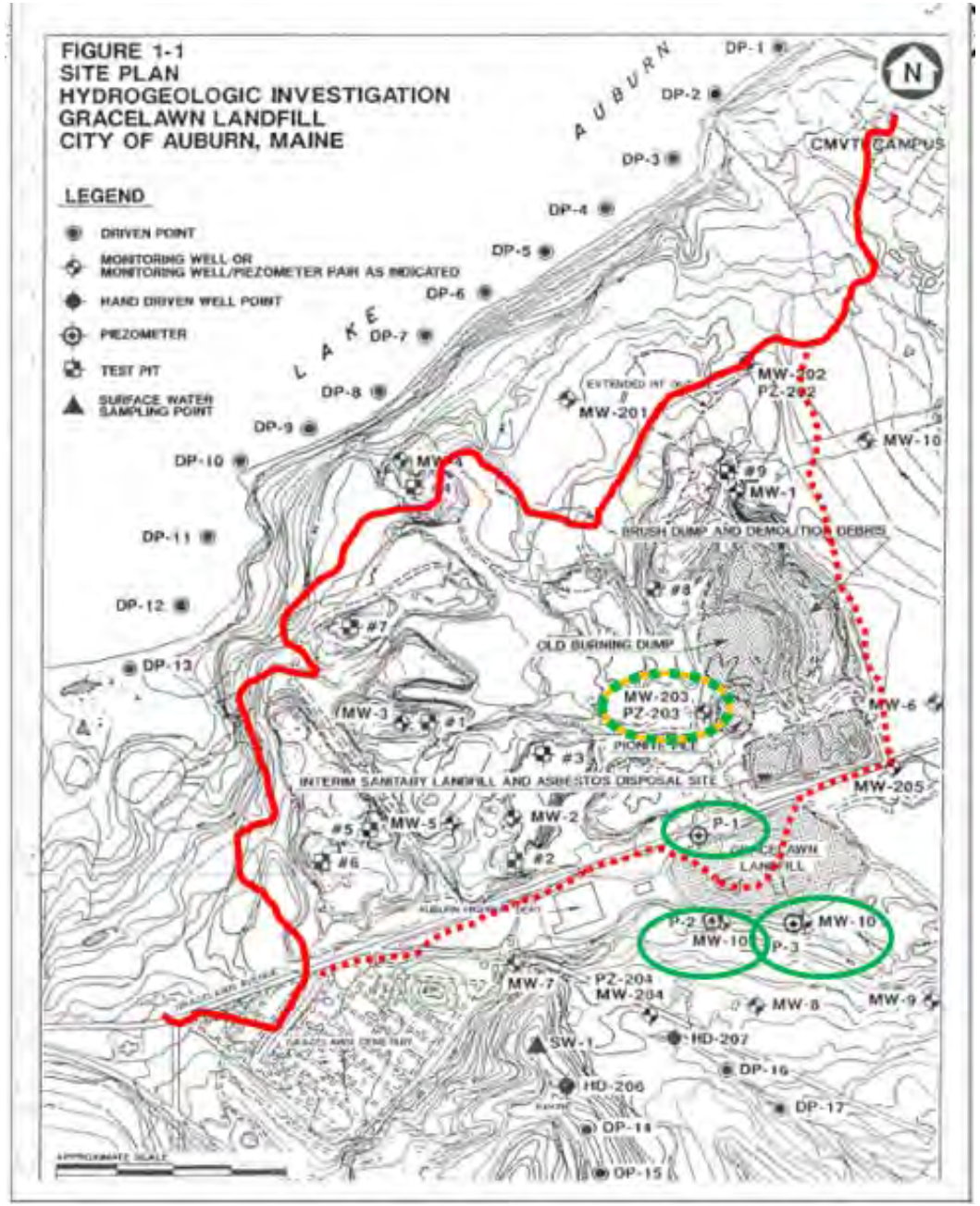


Figure 10 Subarea D: Gracelawn Landfill monitoring wells and MW/PZ-203

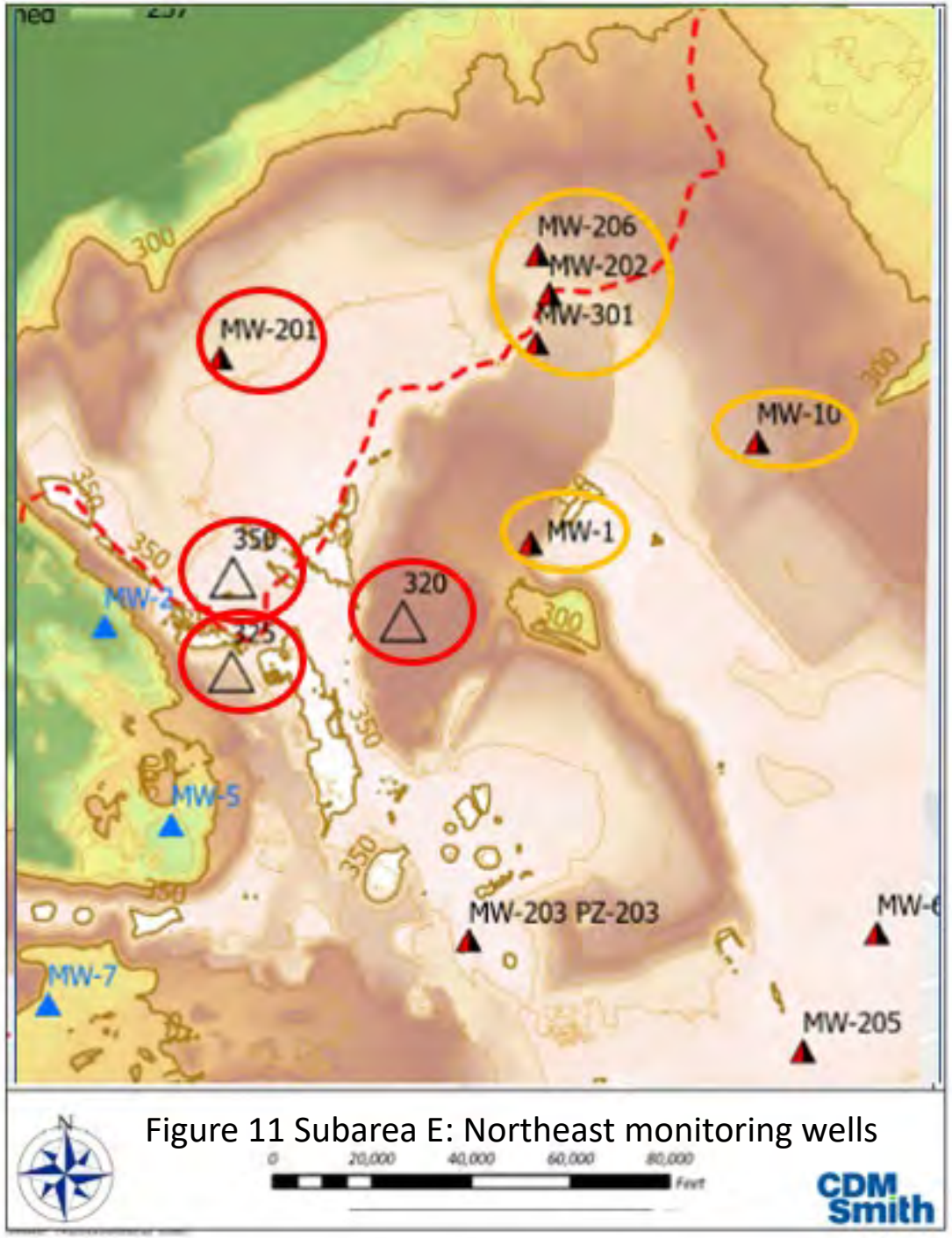


Figure 11 Subarea E: Northeast monitoring wells

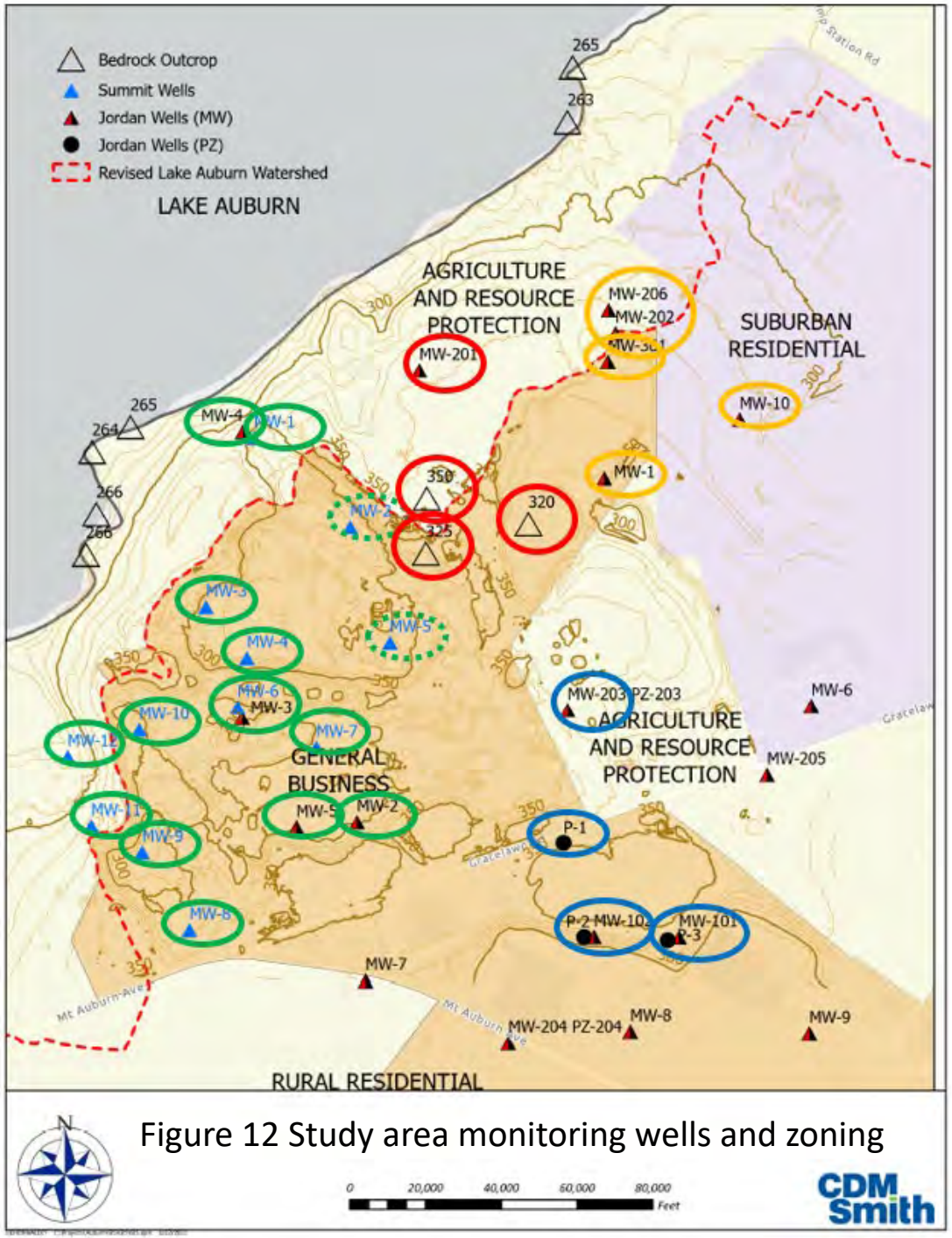


Figure 12 Study area monitoring wells and zoning

CEI Draft Peer Review of FB Environmental Study

MEMORANDUM

TO:	Erica Kidd, Watershed Manager, Lake Auburn Watershed Protection Commission, Maine
FROM:	Rebecca Balke and Eileen Pannetier, Comprehensive Environmental Inc.
SUBJECT:	**Peer Review of FB Environmental Associates *A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine* dated October 2021 and the supplemental Lake Auburn Model Technical Memorandum dated August 1, 2022**
JOB NUMBER:	222-5
DATE:	**October 17, 2022**

The Lake Auburn Watershed Protection Commission requested CEI to perform a peer review of a recent study and technical memorandum prepared by FB Environmental Associates (FBE) that evaluated local regulatory scenarios and their impact on the water quality of Lake Auburn. The purpose of the review is to evaluate the conclusions drawn as they pertain to development and water quality impacts on Lake Auburn.

The following documents were reviewed by CEI as part of this evaluation:

- A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine prepared by FB Environmental Associates, Horsely Witten Group and the University of Maine, dated October 2021.
- Lake Auburn Model Technical Memorandum addressed to Eric Cousens, City of Auburn, prepared by Laura Diemer, FB Environmental Associates, dated August 1, 2022.
- Memo addressed to Eric Cousens, John Blaise prepared by Sid Hazelton, P.E., Superintendent of AWD, dated August 8, 2022.
- Lake Auburn Watershed Management Plan prepared by CEI, dated April 19, 2010.
- Lake Auburn Diagnostic Watershed Study prepared by CEI, dated March 13, 2013.

CEI performed a peer review of the FBE study and subsequent technical memorandum to evaluate the assumptions used to estimate buildout conditions and associated loads under various buildout scenarios and the conclusions drawn from these assumptions as they pertain to the protection of Lake Auburn. This was a qualitative analysis of the information provided and did not involve any modeling.

CEI Review and Findings

In considering the following findings, CEI would like to reiterate that FBE's 2021 study concluded that Lake Auburn is nearing its assimilative capacity for nutrient load (even with the partial alum treatment) and cannot bear additional nutrient loads without diminishing water quality and its associated benefits. FBE found no net environmental economic, or social benefit supporting expansion of development in the Lake Auburn watershed. FBE also concluded that even if reduced

development through conservation or other means is achieved in the headwater towns, any additional development in Auburn has an outsized negative impact since its drainage area goes directly to the lake. CEI agrees with these findings.

Proposed Zoning Changes[i]

The Auburn Office of Planning & Permitting prefaced that the approval of the proposed septic requirements must coincide with the adoption of the zoning change that reduces the housing density as this would offset the increase in buildable lots in the watershed allowed with relaxed septic requirements. It also argued that the existing septic requirements encourage people interested in building a home within the watershed boundary to sell easements to their suitable soil site, clustering wastewater disposal systems in a relatively small area where very little wastewater treatment occurs and that it would be better to allow septic systems to be installed on finer textured soils, even if the seasonal groundwater table is shallower than 36 inches.

CEI does not understand what the purpose of the revised septic change is. It is presented as a way to improve treatment of new septic systems by preventing clustering and allowing them to take advantage of the finer textured surface soils. The increased buildable area from the septic systems is then proposed to be offset with changes in zoning density in the RR district, and assuming no new development will occur in the AG district. This was shown to result in less potential development than would occur under the existing zoning regulations. CEI has the following comments and recommendations regarding the proposed zoning changes:

1. It was difficult to compare the various buildout scenarios and their impacts on the lake, as some of the buildout assumptions changed from the 2021 to 2022 study, yet the phosphorus load analysis was not updated to reflect these changes and true differences in loads. The change in phosphorus load and impact on the lake should consistently reflect final assumptions for comparison. All buildout analysis should be updated to show phosphorus loads using consistent assumptions.
2. The final analysis ignores potential development in the AG district, including the increased buildable area from the revised septic regulations. It is unlikely that no additional development will occur in the AG district, even given the existing restrictions on development and the suggestion of changes to prevent new agriculture in the watershed. There is nothing preventing future development from occurring in this district and relaxing the septic system requirements increases the potential buildable area in this district.
3. Relaxing the septic system regulations opens the door for future development in the AG district. If the desired outcome of the proposed 2022 ordinance changes is a reduction in potential developable sites and better treatment of septic systems, there are other ways to achieve the same goal without relaxing the septic requirements and without creating potential new buildable areas. CEI recommends that the following alternatives be evaluated:
    a. Maintain the existing depth restrictions, but allow for amendment of sandy soils to provide better treatment. This prevents expansion of buildable areas while

improving the treatment capabilities of septic systems in sandy soils. Why introduce new buildable areas at all if the focus is to reduce development;

b. Allow only one septic system per lot to avoid clustering;
c. Prohibit development within the 300-foot buffer of waters considering septic systems closest to the lake pose the greatest risk of passing contaminants such as nutrients, pathogens, and viruses. This removes some of the uncertainty of the models in the most critical areas of the watershed;
d. Continue with zoning to reduce the density of development (e.g., RR to LDCR).

Gracelawn Road Area Boundary Change

CEI did not review the referenced hydrogeologic studies as part of this evaluation. The only information provided was in the October 2021 FBE study, which includes Figure 3-1 showing the mapped groundwater contours taken from one of the hydrogeologic studies. The map does appear to support that groundwater in the area is artificially mounded as a result of the gravel pit and landfill, with the majority flowing away from the lake. However, CEI cautions the City from discounting this area from the watershed entirely, particularly under a future development scenario. Depending on how the sand and gravel pit is restored and developed, the mounding could be eliminated with the groundwater flows returning to their more natural regional flow pattern where the area could contribute to Lake Auburn. This requires a more detailed evaluation of potential development scenarios and their impact on both localized groundwater and surface water runoff.

[i] Following is a summary of proposed zoning changes to modify the septic system requirements and decrease zoning density:

a. Relaxing septic system requirements to allow for septic systems where there is less than 12 inches to the limiting factor (e.g., seasonal groundwater table, bedrock, or other impervious layer) and with at least 24 inches of suitable natural soil or fill material below the bottom of the disposal field to result in a 36-inch separation between the bottom of the disposal field and the limiting factor.
b. Defining sandy or gravelly soil as sand or gravel outwash or stratified drift as shown on table 4D (profiles 5 or 6 and some 11) of the State of Maine Subsurface Wastewater Disposal Rules 10-144 Chapter 241 and prohibiting installation of septic system in these soils within 400 feet to the normal high-water mark (vs. 300-feet).
c. Rezoning the Rural Residential (RR) district to Low Density County Residential (LDCR) district, increasing the lot size from 1 to 3 acres and decreasing the potential number of homes that can be developed.
d. While not a proposed ordinance change, FBE made adjustments in its assumptions for the Agriculture and Resource Protection (AG) zone in its August 1, 2022 memorandum to assume no new development would occur in the AG zone due to the existing restrictive standards. The October 11, 2022 memorandum from the City of Auburn Office of Planning & Permitting regarding the Public Hearing and map amendments from RR to LDCR also mentioned that "Modifying the Agriculture and Resource Protection Zone within the Lake Auburn Watershed Overlay District to prevent new agriculture would protect forested area and prevent additional phosphorus loading."

MEMORANDUM

TO:	File
FROM:	Rebecca Balke and Eileen Pannetier, Comprehensive Environmental Inc.
SUBJECT:	**Peer Review of FB Environmental Associates – Background Information**
JOB NUMBER:	222-5
DATE:	**October 17, 2022**

The Lake Auburn Watershed Protection Commission requested CEI to perform a peer review of a recent study and technical memorandum prepared by FB Environmental Associates (FBE) that evaluated local regulatory scenarios and their impact on the water quality of Lake Auburn. The purpose of the review is to evaluate the conclusions drawn as they pertain to development and water quality impacts on Lake Auburn.

The following documents were reviewed by CEI as part of this evaluation:

- A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine prepared by FB Environmental Associates, Horsely Witten Group and the University of Maine, dated October 2021.
- Lake Auburn Model Technical Memorandum addressed to Eric Cousens, City of Auburn, prepared by Laura Diemer, FB Environmental Associates, dated August 1, 2022.
- Memo addressed to Eric Cousens, John Blaise prepared by Sid Hazelton, P.E., Superintendent of AWD, dated August 8, 2022.
- Lake Auburn Watershed Management Plan prepared by CEI, dated April 19, 2010.
- Lake Auburn Diagnostic Watershed Study prepared by CEI, dated March 13, 2013.

Background

Lake Auburn is the sole public water supply for over 39,000 consumers residing in Auburn, Lewiston, and a portion of Poland. Due to its long history of excellent water quality, Lake Auburn's water supply has been granted a 'Filtration Avoidance' waiver by the US Environmental Protection Agency (EPA) for nearly 30 years, bypassing certain treatment requirements under federal drinking water law and saving the need for a costly filtration plant, estimated at a capital cost of $35-$45 million.

Lake Auburn has been faced with declining water quality over the last 10 years, reaching a tipping point circa 2010 where key environmental thresholds were reached or passed. Specifically, levels of phosphorus, a key nutrient for the growth of aquatic algae, rose above 10 parts per billion and elevated the risk of algae blooms. This was addressed through the application of alum in 2019 to reduce high internal phosphorus loads from the bottom sediments in the lake that had accumulated over the last several decades from discharges from the watershed. This provides some time to address phosphorus inputs from the watershed through watershed management efforts.

Based on this history, FBE was commissioned by the City of Auburn, Maine to provide a comprehensive analysis of the regulatory, environmental, and economic benefits and costs for scenarios that will maximize long-term public water supply protection of Lake Auburn, to guide future management decisions. Key findings from this study, completed in October 2021, included:

- Lake Auburn is nearing its assimilative capacity for nutrient load (even with the partial alum treatment) and cannot handle much more additional nutrient load without diminishing water quality and its associated benefits. FBE found no net environmental economic, or social benefit supporting expansion of development in the Lake Auburn watershed.
- More development cannot be allowed in the Auburn portion of the watershed even with low impact development (LID) requirements implemented in Auburn. Even if reduced development through conservation or other means is achieved in the headwater towns, any additional development in Auburn has an outsized negative impact since its drainage area goes directly to the lake.
- It was recommended to revise the septic system requirements of the Lake Auburn Watershed Overlay District Ordinance to incorporate the Maine Subsurface Wastewater Disposal Rules, including provisions that allow for mounded leach fields and other State-approved alternative designs where there is not a native, in-situ, 36-inch vertical separation between the bottom of the organic horizon and the bedrock, water table, or other restrictive layer. FBE recognized that this would allow more areas to be developed with the potential for over 100 new homes in the watershed over existing ordinances, however, stated that restrictions on developable land are better left to base and resource protection zoning than to septic design standards.
- Update the Lake Auburn Watershed Overlay District Ordinance to reflect the revised watershed boundary, reducing the existing watershed boundary by 148 acres in the Gracelawn Road area. This was based on groundwater flow studies around the sand and gravel operations and groundwater monitoring data around the former City of Auburn landfill which groundwater to flow away from Lake Auburn.

At the conclusion of the study, the City of Auburn requested FBE to evaluate proposed ordinance changes, in the City of Auburn only, for their potential effects on land use and development in the Lake Auburn watershed and associated impacts to lake water quality. FBE presented its analysis and findings in the Lake Auburn Model Technical Memorandum addressed to Eric Cousens, City of Auburn, dated August 1, 2022. A summary of the proposed ordinance changes evaluated, included:

- an increased agricultural buffer strip from 50 feet to 100 feet – this does not change the number of building lots, rather reduces phosphorus inputs by converting existing tilled agricultural land to open space, thus reducing phosphorus loads;
- allowing septic systems in soils with a minimum of 12” of soil over a restrictive layer vs. 36” and vs. no restrictions;
- prohibiting the siting of septic systems within 400 feet of the high-water line where soils are profiled as gravel outwash or stratified drift as shown in Table 4D (profiles 5, 6, and

some of 11) of Chapter 24 – this showed the entire 400-foot buffer as restricted from development, reducing the number of buildable lots by 23 from the "Business as Usual" model (baseline buildout analysis considering under existing ordinances). FBE stated that this new model run likely underestimated new building potential as physical field application of the Table 4D rules would likely be less restrictive but there is no way of knowing the extent of the difference without field evaluations by a Licensed Site Evaluator. For comparison purposes, they removed the 23 homes predicted under the "Baseline as Usual" buildout scenario to estimate the reduction in buildings between the two scenarios.

- Rural Residential (RR) was rezoned to Low Density County Residential (LDCR), increasing the lot size from 1 to 3 acres.
- while not a zoning change, FBE also made adjustments to the buildout assumptions that they claimed more accurately apply existing ordinances. Specifically, the model updated assumed no development in the Agriculture and Resource Protection (AG) zone due to the restrictive standards existing for development in this zone. This removed 928 acres of buildable area and 74 projected buildings compared to the "Business as Usual" buildout scenario included in the October 2021 study.
- reducing the threshold where a phosphorus control plan (PCP) is required from 575 square feet to 200 square feet, essentially capturing accessory dwelling units, as primary households were already required to prepare a PCP. FBE considered its LID buildout assumptions to be nearly equivalent to requiring a PCP, which was supported by the load estimates associated with PCP restrictions vs. LID restrictions (e.g., and the numbers do support this (e.g., the load estimated with the application of LID was similar to the load allowed under the ordinance and PCP requirements).

Based on this analysis, FBE concluded that the ordinance changes directly reduced the total buildable area by 27 acres and the number of projected new buildings by 58 (after adjusting for the "Business as Usual" scenario to also remove development in the AG), indicating that the expansion of buildable area with the lifting of the septic system siting restriction (changing from 36" to 12") was effectively offset by the reduction of buildable area with the rezoning of RR to LDCR (changing from 1-acre to 3-acre minimum lot size).

FBE also noted a phosphorus load reduction of 6 kg/yr compared to the "Business as Usual + LID" scenario included in the October 2021 study, however, did identify that there were limitations to directly comparing the results of the "Business as Usual" scenario to the 2022 model update. FBE did not remodel the "Business as Usual + LID" scenario presented in the October 2021 report to show the phosphorus reduction associated with no future development in the AG zone, thus the load reduction is expected to be less than 6 kg/yr.

MEMORANDUM

CEI Peer Review Evaluation

CEI performed a peer review of the FBE study and subsequent technical memorandum to evaluate the assumptions used to estimate buildout conditions and associated loads under various buildout scenarios and the conclusions drawn from these assumptions as they pertain to the protection of Lake Auburn. This was a qualitative analysis and did not involve any modeling.

Gracelawn Road Area Boundary Change

FBE recommended that 148 acres of the watershed in the Gracelawn Road area be removed from the watershed. This was based on hydrogeologic studies of the sand and gravel operations and former City of Auburn landfill along Gracelawn Road, which showed groundwater to flow away from Lake Auburn. CEI did not review the referenced hydrogeologic studies as part of this evaluation, only the information provided in the October 2021 FBE study, which includes Figure 3-1 showing the mapped groundwater contours taken from one of the hydrogeologic studies. The map does appear to support that groundwater in the area is mounded, with the majority flowing away from the lake. However, CEI cautions the City from discounting this area from the watershed entirely, particularly under a future development scenario. Depending on how the sand and gravel pit is restored and developed, the area could contribute to Lake Auburn. This requires a more detailed evaluation of potential development scenarios and their impact on localized groundwater and surface water runoff.

Buildout Assumptions

The FBE buildout analysis included in the October 2021 study assumes a worst-case buildout scenario based on the allowable development for the zone. The method used to estimate potential development by FBE is as follows:

1) FBE identified and subtracted land unavailable for development due to physical constraints, including environmental restrictions (e.g., steep slopes, existing buildings, wetlands, resource protection zones, hydric soils, and conserved land), zoning restrictions (e.g., shoreland zoning, street ROWs, minimum lot sizes, and building setbacks), and practical design considerations (e.g., lot layout inefficiencies). FBE applied an efficiency factor of 66% for all zones based on prior experience.
2) The remaining buildable land was subdivided to the smallest units allowed under current zoning and a point representing a building was placed in each unit.
3) LAWPC-owned lands were considered to be protected from development indefinitely (in the "Business as Usual" and "Max Development – LAWPC Lands Remain Protected" buildout scenarios).
4) County level soil data was used to restrict development from areas with less than 36 inches to groundwater or some restrictive layer where septic systems are not allowed, as well as from areas within sandy soils within 300 feet of the Lake Auburn shoreline.
5) Lakes and ponds were given a 100-foot setback.
6) Other waterbodies, streams and wetlands were given a 75-foot setback.

CEI is in agreement with the buildout assumptions applied in the October 2021 evaluation. However, in the updated modeling analysis presented in the August 1, 2022 memo, FBE assumed no additional buildings would be allowed in the AG zone under existing and proposed ordinance changes due to restrictions to development in this zone. CEI assumed this was due to the agricultural income requirements to develop in this zone combined with the observed declining agricultural trends in the watershed.

To better understand each of the buildout scenarios and the impact on future development, CEI created a summary table (Table 1 at the end of this memorandum) of existing and projected increases in buildings under three key buildout scenarios, including:

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1. "Business as Usual" – this buildout reflects the potential number of additional homes under the existing zoning regulations and assumed future development will occur in the AG zone based on current zoning densities.
2. "Max Development – LAWPC Lands Remain Protected" – this buildout removes the development restrictions associated with septic systems on land with less than 36 inches to groundwater and on land with sandy soils within 300 feet of the shoreline. It also included rezoning of 51 parcels (59 buildable acres) from AG and RR to General Business (GB) and Neighborhood Business (NB).
3. "2022 Ordinance Changes Baseline Buildout" – this buildout incorporates the proposed 2022 ordinance changes outlined under the Background section above and assumes no new development will occur in the AG zone.

Although agricultural land use has been declining in the watershed, it is unlikely that no additional development will occur in the AG zone. CEI believes that FBE's original assumptions of 74 homes under existing zoning regulations and 101 homes with relaxed septic regulations is more realistic than no new development. Even if no new agriculture is proposed in the AG zone in the future, as has been suggested, it seems to reason that some development would still be allowed, and therefore should not be discounted in any future development scenario. Without language specifically prohibiting further development in the AG zone, there is always a possibility for more buildings.

To allow for a more representative comparison between scenarios, adjustments were made to remove the village rezoning impacts from the "Max Development – LAWPC Lands Remain Protected" scenario so that this scenario represented existing zoning ordinances with relaxed septic system requirements. Further adjustments were made to include the same assumptions for future development of the AG zone in all three cases, including no development in the AG zone as assumed in FBE's 2022 model update and some development in the AG zone as assumed in FBE's October 2021 buildout scenarios. These are presented in Tables 2 and 3 (at the end of this memorandum) respectively.

Under the assumption that no development would occur in the AG zone, the "2022 Ordinance Changes Baseline Buildout" showed a reduction of 57 buildings from the "Business as Usual" scenario. Under the assumption that development would occur in the AG zone, a reduction of 30 buildings was demonstrated. In both cases, the proposed 2022 zoning changes showed that rezoning the RR to LDCR would offset the buildable land created through relaxation of the septic requirements, but less so when development in the AG occurs.

LID Assumptions

CEI reviewed the LID assumptions used by FBE to reduce phosphorus loads from the residential development that does occur in the watershed. We found these assumptions to be in line with the reductions that would be achieved with a phosphorus control plan under the Phosphorus Control Ordinance. CEI used similar phosphorus load reductions in its 2010 buildout analysis.

While the phosphorus control requirements do limit the amount of area that can be developed, this only needs to be demonstrated at the time of development and it is not uncommon for homeowners to disturb additional areas over the years. This would require continued monitoring and enforcement in any scenario.

Relaxing Septic Restrictions

In its October 2021 study, FBE recommended that the City of Auburn update the septic system regulations contained in the Lake Auburn Watershed Overlay District Ordinance to align with the State Plumbing Code requirements with an increase in depth to groundwater, bedrock or other restrictive layers of 36 inches, rather than the shallower depths allowed by the less protective tiers in the State code. FBE noted that the State code was last updated in 2015 to require a depth of between 12-24 inches of native soil below the leach field. Prior to this update, the requirement was as little as 9 inches in many cases. FBE also noted that the Maine requirements are less stringent than other New England states. The recommendation was presented as a simple approach to revising the language to maintain both the greater depth to groundwater requirements but also allows for alternative onsite septic disposal approaches that can improve phosphorus control from septic systems. It would also allow projects in the watershed to use innovative and alternative designs in place of a traditional septic system leach field, including drip irrigation and proprietary devices. FBE recognized that such a change could increase development potential by over 100 homes in Auburn and suggested that changes to zoning densities be used to control the amount of development. FBE then modeled proposed 2022 ordinance changes to demonstrate that density changes could offset the increase in buildable areas presented with an update to the septic regulations.

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This is not the first-time modification of the septic ordinance has come up. CEI performed a Lake Auburn Watershed Septic System Analysis in October 2009 to evaluate whether the septic design criteria should be modified consistent with the state's less stringent criteria. The key findings of the evaluation were:

1) Other New England States require 3+ feet of vertical separation and at least 2 feet is needed – the soils beneath a leach field serve to filter pollutants from the wastewater. The greater the vertical distance through the soil, the greater the treatment. Most studies reveal a minimum of 24" vertical separation for adequate pollutant removal, regardless of soil type.
2) The Lake Auburn watershed has coarse soils – The geology of the Lake Auburn watershed is characterized by coarse soils and some gravel, unlike the lodgement (basal) tills found in much of Maine. These coarse materials do not filter pollutants as well as finer materials and may require greater vertical separation distances to treat.
3) Phosphorus, an important pollutant of Lake Auburn, can get to the lake if septic systems are too close – Some studies have found long-term migration of phosphorus in the groundwater zone, with phosphorus above background levels detected up to 250 feet away from the septic system. Nitrate travels rapidly away from septic systems.
4) More lenient septic requirements increases phosphorus loads to Lake Auburn – Both failing and non-failing septic systems can contribute phosphorus and other pollutants to the Lake. Allowing for more lenient septic design requirements within the watershed will allow for the placement of septic systems where they are not currently allowed. This also results in an increase in impervious area in the watershed and increased phosphorus loadings from stormwater runoff.
5) Changes to the Lake Auburn Watershed Overlay District (LAO) ordinance may put the filtration waiver at risk – The LAO and other watershed control programs in place at the time the filtration waiver was granted were key factors in granting the waiver and changes to these programs, particularly changes that allow for more growth and net loadings to the Lake, could put the District at risk for losing that waiver.

FBE confirmed that Maine state septic requirements continue to be less stringent than other states, despite the recent change to require 12-24" of native soil rather than 9". The State made the requirements more stringent for a reason and its not unreasonable to consider this could be tightened further in the future as well.

FBE also mentioned the watershed's sand and gravel aquifer and concern that the existing ordinance has led to the preferential siting of some septic systems on deep formations of sand and gravel aquifer that are not appropriate for septic systems without the importation of suitable reactive soils that the recommended ordinance revisions would allow. CEI agrees that coarse sand and gravels do not filter as well as fine materials and amendment of these soils may be appropriate, but does not have to be tied to a relaxation of the existing depth restrictions.

Phosphorus loads still remain a concern, both from septic systems located close to the lake and from the associated development of the site. While the increase in buildable areas associated with a relaxed septic regulation can be offset with other zoning regulations to control density, the City should be aware that alternative septic designs, such as mounded systems do require more consideration and care during installation and to ensure they are maintained to continue functioning properly and to prevent breakouts. This is something that will not show up in the models, but can present an increased risk to the lake. Additionally, considering that systems closest to the lake pose the greatest risk of passing contaminants such as nutrient, pathogens, and viruses, consideration should be given to prohibiting systems within a certain distance to surface waters in the watershed, such as the 300-foot buffer. This removes some of the uncertainty of the models in the most critical areas of the watershed.

Finally, an extremely important consideration is the filtration waiver and whether loosening existing restrictions could jeopardize that waiver. Other means of protecting the watershed that do not loosen existing restrictions should be considered.

Summary and Conclusions

The following summarizes the key findings from this evaluation:

1. FBE stated that Lake Auburn is nearing its assimilative capacity for nutrient load (even with the partial alum treatment) and cannot handle much more additional nutrient load without diminishing water quality and its associated benefits. FBE found no net environmental economic, or social benefit supporting expansion of development in the Lake Auburn watershed. CEI agrees with this conclusion.
2. FBE stated in its 2021 study that more development cannot be allowed in the Auburn portion of the watershed even with low impact development (LID) requirements implemented in Auburn. Even if reduced development through conservation or other means is achieved in the headwater towns, any additional development in Auburn has an outsized negative impact since its drainage area goes directly to the lake. CEI agrees with this assessment.
3. CEI cautions the City from discounting the 148-acre Gracelawn Road area from the watershed entirely, particularly under a future development scenario. Depending on how the sand and gravel pit is restored and developed, the mounding could be eliminated with the groundwater flows returning to their more natural regional flow pattern where the area could contribute to Lake Auburn. This requires a more detailed evaluation of potential development scenarios and their impact on localized groundwater and surface water runoff.
4. CEI agrees with the buildout assumptions used by FBE in its October 2021 study, however, in its 2022 model update, FBE assumed that no additional development would occur in the AG zone. Although agricultural land use has been declining in the watershed, it is unlikely that no additional development will occur in the AG zone. Unless development is strictly prohibited in the zoning ordinance, some development should be expected and included in each of the buildout scenarios, similar to FBE's October 2021 study.

5. Modeling of the proposed 2022 zoning changes showed that rezoning the RR to LDCR would offset the buildable land created through relaxation of the septic requirements. However, the number of potential buildings is likely underestimated in the 400-foot setback from water bodies considered in the updated model. Considering systems closest to the lake pose the greatest risk of passing contaminants such as nutrient, pathogens, and viruses, consideration should be given to prohibiting systems within a certain distance to surface waters in the watershed. This removes some of the uncertainty of the models in the most critical areas of the watershed.
6. While the additional buildable land associated with a relaxed septic regulation can be offset with revised zoning densities, it does raise other concerns:
    a. The filtration waiver was based on protection measures in place when the waiver was granted. Why risk jeopardizing the waiver by loosening these restrictions?
    b. Relaxing the septic system regulations opens the door for future development in the AG district. If the desired outcome of the proposed 2022 ordinance changes is a reduction in potential developable sites and better treatment of septic systems, there are other ways to achieve the same goal without relaxing the septic requirements and without creating potential new buildable areas. CEI recommends that the following alternatives be evaluated:
        i. Maintain the existing depth restrictions, but allow for amendment of sandy soils to provide better treatment. This prevents expansion of buildable areas while improving the treatment capabilities of septic systems in sandy soils. Why introduce new buildable areas at all if the focus is to reduce development;
        ii. Allow only one septic system per lot to avoid clustering;
        iii. Prohibit development within the 300-foot buffer of waters considering septic systems closest to the lake pose the greatest risk of passing contaminants such as nutrients, pathogens, and viruses. This removes some of the uncertainty of the models in the most critical areas of the watershed;
        iv. Continue with zoning to reduce the density of development (e.g., RR to LDCR).

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Table 1. Existing and Potential New Buildings for Various Buildout Scenarios in Auburn, Maine as Presented in FBE Reports

Development Scenario:	**Existing**	**Business as Usual**	**Max Development – LAWPC Lands Remain Protected**	**2022 Ordinance Changes Baseline Buildout[1]**
Assumptions:		Existing ordinances.	Removed septic restrictions. Includes rezoning 51 parcels from AG and RR to NB and GB.	Proposed 2022 ordinance changes. No future development in AG.
Agriculture and Resource Protection (AG)	77	74	101	0
General Business (GB)	2	0	44	0
Low Density Country Residential (LDCR)	47	16	24	79
New Business (NB)	0	0	130	
Rural Residential (RR)	218	143	279	0
Suburban Residential (SR)	75	6	9	6
Total	419	239	587	85

[1]FBE updated its buildout assumptions for the AG zone in its 2022 modeling update. These updates assumed no new development would occur in the AG zone due to the restrictive zoning. Updates were not made to the "Business as Usual" scenario to reflect this, but were discussed as limitation for comparing the phosphorus loads between the two scenarios.

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Table 2. Existing and Potential New Buildings for Various Buildout Scenarios in Auburn, Maine Adjusted for Comparison – No Development in AG[1]

Development Scenario:	Existing	Business as Usual	Max Development – LAWPC Lands Remain Protected	2022 Ordinance Changes Baseline Buildout
Assumptions:		Existing ordinances. Adjusted to remove buildings from AG for comparison with 2022.	Removed septic restrictions. Adjusted to remove buildings from AG, GB and NB for comparison with 2022.	Proposed 2022 ordinance changes. No future development in AG.
Agriculture and Resource Protection (AG)	77	~~(74)~~ 0	~~(101)~~ 0	0
General Business (GB)	2	0	~~(44)~~ 0	0
Low Density Country Residential (LDCR)	47	16	24	79
New Business (NB)	0	0	~~(130)~~ 0	
Rural Residential (RR)	218	143	279	0
Suburban Residential (SR)	75	6	9	6
Additional Adjustments[2]	--	-23	-23	--
Total[3]	419	~~(239)~~ 142	~~(587)~~ 289	85

[1]To allow for a more representative comparison between buildout scenarios where no development is assumed to occur in the AG zone, development in AG was removed from all buildout scenarios and the proposed village district rezoning in "Max Development – LAWPC Lands Remain Protected" to convert 59 acres of AG and RR zones to GB and NB zones was removed. Doing so illustrates the projected increase in development from existing conditions, to buildout conditions under existing zoning, to buildout conditions under existing zoning with relaxed septic system requirements, to buildout conditions under the 2022 proposed zoning. Values removed are shown in gray strikeout with those added shown in bold black font.

[2]There were 23 projected new buildings identified within the 300-foot buffer under the "Business as Usual" and "Max Development – LAWPC Lands Remain Protected" that the 2022 ordinance changes conservatively excluded due to the limitations of using the Table 4D soil profiles. These were removed from the two 2021 buildout scenarios.

[3]**Assuming no further development in the AG zone, the 2022 ordinance changes directly reduced the total buildable area by 27 acres and the number of projected new buildings by 57 in comparison to the "Business as Usual" scenario** (142-85=57). The results show that the rezoning of RR to LDCR offsets the additional building lots allowed from removing the septic restrictions.

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Table 3. Existing and Potential New Buildings for Various Buildout Scenarios in Auburn, Maine Adjusted for Comparison – Includes Development in AG[1]

Development Scenario:	**Existing**	**Business as Usual**	**Max Development – LAWPC Lands Remain Protected**	**2022 Ordinance Changes Baseline Buildout**
Assumptions:		Existing ordinances.	Removed septic restrictions. Adjusted to remove buildings from GB and NB for comparison with 2022.	Proposed 2022 ordinance changes. No future development in GR. Adjusted to add buildings to AG.
Agriculture and Resource Protection (AG)	77	74	101	~~(0)~~ 101
General Business (GB)	2	0	~~(44)~~ 0	0
Low Density Country Residential (LDCR)	47	16	24	79
New Business (NB)	0	0	~~(130)~~ 0	
Rural Residential (RR)	218	143	279	0
Suburban Residential (SR)	75	6	9	6
Additional Adjustment[2]	--	-23	-23	--
Total[3]	419	~~(239)~~ 216	~~(587)~~ 390	(85) 186

[1]To allow for a more representative comparison between buildout scenarios where development is assumed to occur in the AG zone, potential development in the AG zone was added to the "2022 Ordinance Changes Baseline Buildout". For simplicity purposes, it was assumed to be the same as that predicted for the "Max Development – LAWPC Lands Remain Protected" scenario that also considered the removal of septic restrictions. The proposed village district rezoning in "Max Development – LAWPC Lands Remain Protected" to convert 59 acres of AG and RR zones to GB and NB zones was also removed. Doing so illustrates the projected increase in development from existing conditions, to buildout conditions under existing zoning, to buildout conditions under existing zoning with relaxed septic system requirements, to buildout conditions under the 2022 proposed zoning. Values removed are shown in gray strikeout with those added shown in bold black font.

[2]There were 23 projected new buildings identified within the 300-foot buffer under the "Business as Usual" and "Max Development – LAWPC Lands Remain Protected" that the 2022 ordinance changes conservatively excluded due to the limitations of using the Table 4D soil profiles. These were removed from the two 2021 buildout scenarios.

[3]FBE's October 2021 study predicted an additional 174 buildings in Auburn if the septic restrictions are relaxed (390-216=174). This matches closely with the 176 additional buildings estimated in the 2010 CEI buildout with relaxed septic system requirements (Scenario 2). **Assuming further development in the AG zone can occur, the 2022 ordinance changes directly reduced the total number of projected new buildings by 30 in comparison to the "Business as Usual" scenario** (216-186=30). The results show that the rezoning of RR to LDCR offsets the additional building lots allowed from removing the septic restrictions, but to a lesser degree when development in the AG zone is considered.

AWD Questions 8/8/2022 Memo & City of Auburn Responses 8/18/22 email

1. Question: In accordance with the report, adopting the proposed new septic ordinance would result in 74 new homes being built in the "Ag Zone" portion of the watershed, however, this number was not included in the total buildout analysis because of the assumption that people would not build due to the requirement to have 50% of household income from farming (as currently required in the City-wide Ag Zone). In a letter to the Auburn Planning Board dated July 12, 2022, Deputy Director of Planning and Permitting John Blais presented the possibility of modifying the Agriculture and Resource Protection Zone within the Lake Auburn Watershed Overlay District to prevent new agriculture. If the City were to adopt that standard, coupled with the adoption of the revised septic standard, we believe the "74 new home" buildout would occur rather quickly. Even without modifying the income standard, we believe more homes will be built in the AG Zone by modifying the septic standard. How would that change the Consultants conclusions?

   City Response: The household income requirement is 30% for agricultural uses. In the information provided to Planning Board on July 12, 2022, the suggested language was to eliminate any agriculture uses in the AG zone in the watershed essentially creating a more focused resource protection zone. The number one highest potential for non-point source pollution is certain agricultural activities like dairy farms. We used China lake watershed as an example. The elimination of agricultural uses would in no way allow the 74 new homes to be built in this area.

   CEI Evaluation: The 74 new homes presented in the "Business as Usual" buildout scenario was based on current septic restrictions and existing zoning. This increased to 101 new buildings in the AG zone with relaxation of the septic standards (e.g., removed development restrictions on land with less than 36 inches to groundwater and on land with sandy soils within 300 feet of the shoreline, while retaining Shoreland Zoning Overlay District with setbacks), or 27 additional buildings and septic systems in the AG zone. In the updated modeling analysis presented in the August 1, 2022 memo, FBE assumed no additional buildings would be allowed in the AG under existing and proposed ordinance changes due to restrictions associated with development (assumed to be the agricultural income requirements mentioned by AWD and declining agricultural trends observed by FBE).

   Following summarizes FBE's buildout analysis in its October 2021 study as it relates to additional buildings.

Number of Additional Buildings for Various Buildout Scenarios in Auburn, Maine

	Existing	Business as Usual	Max Development – LAWPC Lands Remain Protected	2022 Ordinance Changes Baseline Buildout
		Existing Ordinances	51 parcels in Auburn rezoned: 1) Parcels along Oak Hill Rd & Andrew Dr rezoned AG to NB, no min lot size & sewer; 2) Parcels southwest of Townsend Brook Rd rezoned AG to NB (except parcel 391-001 remained AG due to its size and breadth), no min lot size & sewer; 3) Parcels along N.Auburn Rd from Holbrook Rd to Skillings Corner Rd rezoned RR to GB, min lot size of 0.23 acres & no sewer connection. Removed development restrictions on land with less than 36 inches to groundwater and on land with sandy soils within 300' of the shoreline, while retaining Shoreland Zoning Overlay District with setbacks.	2022 Ordinance Changes Also assumed no development in AR due to restrictions, which they said should apply to all scenarios.
AG	77	74	101	0
GB	2	0	44	0
LDCR	47	16	24	79
NB	0	0	130	
RR	218	143	279	0
SR	75	6	9	6
Shoreland	0	0	0	
	419	239	587 413 (if we subtract GB & NB, which were not proposed in the 2022 ordinance changes - if these are left as AG and RR (59 acres), they could potentially result in another 10 homes on top of the 413)	85

Ignoring the rezoning of 51 parcels from AG or RR to GB and NB included in FBE's "Max Development Not Allowing Building on LAWPC Lands", relaxation of the of the septic standards to remove the 36" depth to groundwater restriction and land with sandy soils within 300' of the shoreline allows an approximate additional 174 buildings and septic systems to be built from the "Business as Usual" scenario, including 27 in the AG zone, 8 in the LDCR zone, 136 in the RR zone and 3 in the SR zone. This is in line with the 176 additional buildings and septic systems estimated in the 2010 CEI buildout with relaxed septic system requirements (Scenario 2).

The August 1, 2022 FBE memorandum analyzed a new set of proposed zoning regulations, including:

1) an increased agricultural buffer strip from 50 feet to 100 feet – this does not change the number of building lots, rather reduces phosphorus inputs by converting existing tilled agricultural land to open space;
2) allowing septic systems in soils with a minimum of 12" of soil over a restrictive layer vs. 36" or no restriction – this would reduce the number of buildings and septic systems from FBE's "Max Development Not Allowing Building on LAWPC Lands" slightly, however, was not quantified independently from the other proposed zoning changes;
3) prohibiting the siting of septic systems within 400 feet of the high-water line where soils are profiled as gravel outwash or stratified drift as shown in Table 4D (profiles 5, 6, and some of 11) of Chapter 24 – this showed the entire 400-foot buffer as restricted from development, reducing the number of buildable lots by 23 from the "Business as Usual" model. FBE stated that this new model run likely underestimated new building potential as physical field application of the Table 4D rules would likely be less restrictive but there is no way of knowing the extent of the difference without field evaluations by a Licensed Site Evaluator.
4) RR was rezoned to LDCR, increasing the lot size from 1 to 3 acres.
5) while not a zoning change, FBE also removed new development in the AG zone due to the restrictive standards existing for development. This removed 74 building lots from the "Business as Usual" buildout scenario and 101 from the "Max Development – LAWPC Lands Remain Protected".
6) reducing the threshold where a phosphorus control plan (PCP) is required from 575 sf to 200 sf, essentially capturing accessory dwelling units, as primary households were already required to prepare a PCP. FBE considered its LID scenario to be nearly equivalent to requiring a PCP, and the numbers do support this (e.g., the load estimated with the application of LID was similar to the load allowed under the ordinance and PCP requirements).

Although agricultural land use has been declining in the watershed, it is unlikely that no additional development will occur in the AG zone. CEI believes that FBE's original assumptions of 74 homes under existing conditions and 101 homes with relaxed septic regulations is more realistic than no new development. Even if no new agriculture is proposed in the AG zone in the future, as has been suggested, it seems to reason that some development would still be allowed, and therefore should not be discounted in any future development scenario.

2. Question: The report concludes that adoption of the proposed new septic standards will result in the construction of 85 additional homes in the watershed within the newly developed Low Density Country Residential Zone, which will replace the existing Rural Residential Zone. A summary chart concluded that an overall reduction in phosphorus load will occur over current conditions due to ordinance changes and low impact development standards. This chart seems suspect; common sense would tell you there will be more pollution and runoff from a developed lot than one that is forested or in a natural state. It would help if the consultant could explain how this overall reduction is possible.

City Response: There is a potential **net reduction of 80 new homes** as compared to what could be built now with the current standards. To make this clearer, the number of lots developable now is 159 house lots. With the introduction of the new ordinances, both the septic system changes and the RR to LCDR there would be 79 house lots available for development. This is less than what is estimated under current ordinances. I cannot understand how the narrative that we keep hearing says we are allowing more development in the watershed. **The proposed changes result in less development. Less development results in less runoff and phosphorus. Less development and LID**

standards is even better for the lake than less development alone. Retaining the housing restrictions of the AG zone is critical to the protection of the lake and that is not proposed to change.

CEI Evaluation: FBE estimated that 239 buildings could be constructed under the existing ordinances, including the 74 in the AG zone, which they later concluded would not be constructed due to the restrictions for development in this zone. For the purposes of comparing apples to apples, assuming no new construction in the AG zone results in 165 new buildings in the "Business as Usual" scenario compared to 85 buildings in the buildout scenario that considers the proposed 2022 ordinance changes. This shows a potential reduction of 80 new homes if the proposed ordinances are implemented. The reduction occurs through the proposed rezoning of RR to LDCR, which reduces the potential new homes from 159 to 79 (a reduction of 80 homes). This reduction in homes results in a reduction of phosphorus load.

If we assume that building can occur in the AG zone in the future, as originally included in FBE's buildout analysis, and adjustments are made to remove the 23 buildings that were conservatively excluded from within the 300 foot buffer (FBE used Table 4D to better define stratified drift soils that could not be developed in the 400 ft buffer and it resulted in no development allowed in this buffer, so FBE removed the 23 buildings it included in the Baseline to allow for a better comparison as they felt Table 4D may be too conservative and some development may still occur based on site specific soil testing), the "Business as Usual" scenario predicts a total of 216 new homes in the Auburn portion of the watershed, the "Max Development Not Allowing Building on LAWPC Lands" scenario (e.g., relaxed septic restrictions and ignoring rezoning of the 59 acres to create three village districts from AG and RR to GB and NB) predicts 390 new homes in the Auburn portion of the watershed and the "2022 Ordinance Changes Baseline Buildout" predicts 186 new homes (e.g., if 101 buildings in the AG district are added back in). This reveals a potential reduction of 30 new homes with the proposed 2022 ordinances from existing ordinance conditions (e.g., 216 – 186 = 30).

Question: We believe the adoption of low impact development standards, and the new phosphorus standards for new construction is a good thing; but to be effective it would require continual monitoring, maintenance, and enforcement. These ordinance changes are a City initiative. How will the City ensure that engineered controls continue to provide treatment? Who would be responsible for oversight of this? Unfortunately, in our experience, once the building permit is issued, people are not particularly good at providing long-term maintenance, and we (as well as you),have specific examples of how it has played out in reality. Monitoring 85 new homes (159 including the Ag Zone) would overburden current staff resources. Once constructed, there would be no turning back, and all this development could be a burden on the Lake forever. Other than education and after-the-fact enforcement, how would we prevent 159 new homeowners from overfertilizing their lawns, misusing pesticides, flushing medications; all things that could accelerate the decline in water quality? As the old saying goes, "People equals pollution", plain and simple; what is the plan?

City Response: In addition, we reviewed the updated phosphorus ordinance regarding implementing Low Impact Development techniques. The model included a disturbed area of 1-1.7 acre per house lot. Whereas the ordinance does not suggest a disturbed area greater than .5 acres. As we reviewed recent phosphorus plans for house lot development impacts the developments averaging closer to¼ acre of developed area. (we can provide recent examples if desired}. The model is built conservatively assuming more developed area per site than reality. The City also has limited depth residential strips that discourage new roads from being constructed which is another

reason why our average developed area is less than the average assumed in the conservative modeling.

The City does not intend to abandon code enforcement. We do hope the LAWPC and the water district takes a more active role in enforcement and NPS reduction. The cost of enforcement can be shared by the two cities with additional LAWPC help instead of born by Auburn alone. Particularly with the updating the watershed based plan. The City hopes to have an active role in that public process. In addition, the city is currently participating at a high level-of after the fact permitting by proposing the ordinance change that addresses an antiqued septic system design standards that inserts the disposal field one foot below the surface essentially missing the most critical soils for attenuation of phosphorus and nitrogen uptake. As mentioned by a licensed site evaluator and state soil scientist David Rocque.

CEI Evaluation: FBE's incorporation of LID and associated phosphorus reduction is similar to what is required for phosphorus control under the phosphorus control ordinance. While the phosphorus control requirements do limit the amount of area that can be developed, this only needs to be demonstrated at the time of development and it is not uncommon for homeowners to disturb additional areas over the years. This would require continued monitoring and enforcement in any scenario.

3. Question: In a 4/20/22 letter to you, Amy Lachance, Director of the Maine CDC Drinking Water program stated "The City should be aware that the filtration waiver may be threatened if water quality sampling indicates that standards have been exceeded, or if the conditions under which the filtration waiver was originally granted are no longer in place". Prior to moving forward, the City should find out in no uncertain terms from our regulators if the passage of these ordinances alone could cause us to lose our filtration waiver.

   City Response: CDC DWP Letter - Please refer to number 3 [LID response] above. In addition to allowing less development if the changes are adopted, LID standards and increased protection of tributary streams and the lake are included in the proposed ordinance changes. You have chosen language that meets the false narrative that we are allowing for more development in the watershed. What I draw from that letter is that we are doing what Amy suggests that "these actions would better support water quality in Lake Auburn and help to maintain the filtration waivers granted to AWD and LWD."

   CEI Evaluation: While some of the proposed ordinance changes are more restrictive and protective, others are not, specifically relaxing the septic system requirements. While mounded systems can and do provide adequate treatment when constructed and maintained properly, they do require more consideration and care by the homeowner to ensure they are maintained and functioning properly. This requires consideration as it can increase the potential for more septic issues and contamination from septic systems. Alternative zoning scenarios that do not relax septic requirements should be evaluated.

AWD Questions 8/23/2022 Memo

In addition to consideration of the 8/8/2022 memo and City responses, we have additional questions:

1. Table 4 projects an original baseline buildout within the RR Zone of 159 homes. The map in Figure 3 is labeled as showing the existing and projected buildings in the baseline buildout analysis. Our GIS Technician enlarged the map and counted 74 projected new buildings on the map, not 159. Is this Figure mis-labeled? If so, do you have a map that shows 159 new homes in the baseline build-out?

CEI Evaluation: Figure 3 shows the existing and projected buildings for the buildout scenario that incorporated the proposed 2022 zoning changes (79 buildings projected in the RR (note RR was rezoned as LDCR in this scenario)). Figure 2-5 in the October 2021 study shows the existing and projected buildout for the "Business as Usual" scenario where 159 homes were projected.

2. We believe 159 new homes within the current RR zone baseline buildout is grossly overestimated. From our observance, there have been very few new homes built in the RR zone within the past two decades. This could probably be confirmed through City records. We know the new requirements call for a 3-acre parcel in order to build (good), but current zoning requirements simply do not seem to allow for that many more homes to be built. How did you arrive at the 159 number?

   CEI Evaluation: The FBE buildout analysis assumes a worst-case buildout scenario based on the allowable development for the zone, which may not match the past rate of development or larger development densities. The method used to estimate potential development by FBE is as follows (p. 13 and Table 2-3 of 2021 FBE report):

   1) subtracted land unavailable for development due to physical constraints, including environmental restrictions (e.g., steep slopes, existing buildings, wetlands, resource protection zones, hydric soils, and conserved land), zoning restrictions (e.g., shoreland zoning, street ROWs, minimum lot sizes, and building setbacks), and practical design considerations (e.g., lot layout inefficiencies). FBE applied an efficiency factor of 66% for all zones based on prior experience.
   2) remaining buildable land is subdivided to the smallest units allowed under current zoning and places a point representing a building in each unit.
   3) LAWPC-owned lands were considered to be protected from development indefinitely.
   4) County level soil data was used to restrict development from areas with less than 36 inches to groundwater or some restrictive layer where septic systems are not allowed, as well as from areas within sandy soils within 300 feet of the Lake Auburn shoreline.
   5) Lakes and ponds were given a 100-foot setback.
   6) Other waterbodies, streams and wetlands were given a 75-foot setback .

3. If the proposed new septic ordinance is passed, and the zone changes from RR to LDCR, the report states there will be 79 new homes built in that zone. Do you have a map (similar to Figure 3) that shows where these new houses will go?

   CEI Evaluation: Figure 3 is the map showing where these new homes will be built (you counted 74 on this map, some may be very close together such that they overlap and are hard distinguish).

4. The City is putting forward for consideration the elimination of Ag use in the Ag Zone creating a more focused Resource Protection Zone. How will the Ag Zone be protected from more homes and future development? Our Ag Zone questions in the 8/8 memo are very important, and we don't think the City adequately addressed our questions. We firmly believe that changing the septic standards will be one large step towards allowing more homes to be built in the Ag Zone within the watershed overlay, but this possibility was discounted in your report. If the revised septic ordinance passes, it is not a stretch to believe the City would pursue the relaxation of other restrictions such as the income standard or acreage requirements. To us, the septic ordinance revision is a foot in the door to build more houses in the watershed. We would appreciate your comments on this.

CEI Evaluation: CEI agrees that it is unlikely that no new development will occur in the AG zone given the size of this zone in the watershed. Relaxation of the septic requirements allows for an additional 27 homes over what would be allowed under the "Business as Usual" scenario. This number could be even greater if the zoning were ever to change in the future to allow higher density development. We agree that the relaxation of any standards can set precedence for further relaxation of standards in the future. Boards change and so do their agendas.

5. As outlined in the 8/8 memo, how do you create a process for monitoring the new development? How large of a team would be needed and what is your estimate of effort required?

   CEI Evaluation: As outlined, similar levels of development are likely to occur under existing regulations as the proposed 2022 zoning ordinance changes. Any buildout scenario should involve monitoring.

6. If any of your modeling assumptions change, it could have a profound effect on the outcomes and conclusions, bringing our comment on the Drinking Water Programs potential actions back into focus. Could you comment on this?

   CEI Evaluation: The change in potential AG development from the October 2021 to August 2022 FBE evaluation is a perfect example of this. FBE went from predicting 101 homes in the AG zone under building with relaxed septic system to no homes. This helped make the proposed ordinance changes more attractive as demonstrated above, but may misrepresent the real implications on the watershed. There isn't anything in the existing or proposed ordinance to prohibit development in the AG, rather an assumption was made that the restrictions made it unlikely.