City Council Workshop & Meeting
January 4, 2021
Agenda

This City Council workshop and meeting will be conducted in Council Chambers. The meeting will be broadcast as usual on Great Falls TV (cable channel 11) and on the City of Auburn YouTube channel.

Members of the public may watch in the Community Room, across from Council Chambers. If you attend and wish to offer public comment during the meeting, you may do so by speaking at the podium that will be located in the Community Room. Space is limited and members of the public are encouraged to "attend" via Zoom if possible.

Those who will be "attending" the meeting via Zoom and would like to participate in the public comment/public hearing portions of this city council meeting, please register in advance:
https://us02web.zoom.us/webinar/register/WN_pcKdommMS5CWeybG4pcDHA

After registering, you will receive a confirmation email containing information about joining the webinar.

We will continue taking public comment in writing for those who are not comfortable attending a public meeting at this time, please send your remarks via email to: **comments@auburnmaine.gov**. Your comments will be included in the meeting minutes.

5:30 P.M. City Council Workshop

A. Executive session – Economic development, pursuant to 1 M.R.S.A. Sec. 405 (6)(C).
B. Tax Growth Package – Brian Wood (15 minutes)
C. Ordinance Review Process – Phil Crowell (30 minutes)
D. FY22 Budget Goals/FY21 CIP Update – Phil Crowell, Brian Wood, and Jill Eastman (30 minutes)

If more time is needed, the workshop will continue after the meeting.

7:00 P.M. City Council Meeting - Roll call votes will begin with Councilor Walker

Pledge of Allegiance

I. Consent Items – None

II. Minutes

- December 21, 2020 Regular Council Meeting

III. Communications, Presentations and Recognitions

- Women's Suffrage Mural – Rebecca Swanson Conrad

- Council Communications (about and to the community)

IV. Open Session – *Members of the public are invited to speak to the Council about any issue directly related to City business or any item that does not appear on the agenda.*

V. Unfinished Business - None

VI. New Business

1. **Order 01-01042021**
   Approving the Packgen TIF District #26. Public hearing.

   The City Council may enter Executive Session (Economic development matter), pursuant to 1 M.R.S.A. Sec. 405 (6)(C).

2. **Order 02-01042021**
   Setting the date for the second council meeting in January to be held on Tuesday, January 19, 2021.

3. **Order 03-01042021**
   Authorizing staff to enter into an agreement with FB Environmental Associates for the evaluation of ordinances applicable to the protection of the Lake Auburn Watershed.

VII. Open Session - *members of the public are invited to speak to the Council about any issue directly related to City business or any item that does not appear on the agenda*

VIII. Reports (from sub-committees to Council)

a. Mayor's Report
b. City Councilors' Reports
c. City Manager Report

IX. Executive Session – Labor contract negotiations, pursuant to 1 M.R.S.A. Sec. 405 (6)(D).

X. Adjournment

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021

Subject: Executive Session

Information: Economic development matter, pursuant to 1 M.R.S.A. Section 405(6) (C).

Executive Session: On occasion, the City Council discusses matters which are required or allowed by State law to be considered in executive session. Executive sessions are not open to the public. The matters that are discussed in executive session are required to be kept confidential until they become a matter of public discussion. In order to go into executive session, a Councilor must make a motion in public. The motion must be recorded, and 3/5 of the members of the Council must vote to go into executive session. An executive session is not required to be scheduled in advance as an agenda item, although when it is known at the time that the agenda is finalized, it will be listed on the agenda. The only topics which may be discussed in executive session are those that fall within one of the categories set forth in Title 1 M.R.S.A. Section 405(6). Those applicable to municipal government are:

A. Discussion or consideration of the employment, appointment, assignment, duties, promotion, demotion, compensation, evaluation, disciplining, resignation or dismissal of an individual or group of public officials, appointees or employees of the body or agency or the investigation or hearing of charges or complaints against a person or persons subject to the following conditions:
(1) An executive session may be held only if public discussion could be reasonably expected to cause damage to the individual's reputation or the individual's right to privacy would be violated;
(2) Any person charged or investigated must be permitted to be present at an executive session if that person so desires;
(3) Any person charged or investigated may request in writing that the investigation or hearing of charges or complaints against that person be conducted in open session. A request, if made to the agency, must be honored; and
(4) Any person bringing charges, complaints or allegations of misconduct against the individual under discussion must be permitted to be present. This paragraph does not apply to discussion of a budget or budget proposal;

B. Discussion or consideration by a school board of suspension or expulsion of a public school student or a student at a private school, the cost of whose education is paid from public funds, as long as:
(1) The student and legal counsel and, if the student is a minor, the student's parents or legal guardians are permitted to be present at an executive session if the student, parents or guardians so desire;

C. Discussion or consideration of the condition, acquisition or the use of real or personal property permanently attached to real property or interests therein or disposition of publicly held property or economic development only if premature disclosures of the information would prejudice the competitive or bargaining position of the body or agency;

D. Discussion of labor contracts and proposals and meetings between a public agency and its negotiators. The parties must be named before the body or agency may go into executive session. Negotiations between the representatives of a public employer and public employees may be open to the public if both parties agree to conduct negotiations in open sessions;

E. Consultations between a body or agency and its attorney concerning the legal rights and duties of the body or agency, pending or contemplated litigation, settlement offers and matters where the duties of the public body's or agency's counsel to the attorney's client pursuant to the code of professional responsibility clearly conflict with this subchapter or where premature general public knowledge would clearly place the State, municipality or other public agency or person at a substantial disadvantage;

F. Discussions of information contained in records made, maintained or received by a body or agency when access by the general public to those records is prohibited by statute;

G. Discussion or approval of the content of examinations administered by a body or agency for licensing, permitting or employment purposes; consultation between a body or agency and any entity that provides examination services to that body or agency regarding the content of an examination; and review of examinations with the person examined; and

H. Consultations between municipal officers and a code enforcement officer representing the municipality pursuant to Title 30-A, section 4452, subsection 1, paragraph C in the prosecution of an enforcement matter pending in District Court when the consultation relates to that pending enforcement matter.

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021

Author: Brian Wood, Assistant City Manager

Subject: Tax Growth Package

Information: In an effort to continue to incentivize growth, attract development and create equity tax incentives can be one means to move those efforts forward. This package of tax incentives focuses three areas:

1. first time home buyers purchasing new builds
2. Seniors
3. Veterans

Each of these area's has varying fiscal impacts and each area has a decidedly different impact on the City of Auburn, however these three areas do impact a significant portion of the Auburn community.

City Budgetary Impacts: TBD

Staff Recommended Action: N/A

Previous Meetings and History: N/A

City Manager Comments:

I concur with the recommendation. Signature: Phillip Crowell J.

Attachments:

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021

Author: Sue Clements-Dallaire, City Clerk

Subject: Ordinance Review Process

Information: The Auburn Charter sec. 2.8 states "the city council shall provide for the review of the city's charter and ordinances in their entirety at least once every 15 years". Council recently completed the review of the City Charter and will now begin to review the City Ordinances.

City Budgetary Impacts: None

Staff Recommended Action:

Previous Meetings and History: Charter review discussions were held on October 5, October 26, November 9, November 30.

City Manager Comments:

I concur with the recommendation. Signature: Phillip Crowell Jr.

Attachments:

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021

Author: Sue Clements-Dallaire, City Clerk

Subject: FY22 Budget Goals and FY21 CIP Update

Information: General discussion on FY22 Budget Goals and staff will provide Council with an update on the FY21 CIP.

City Budgetary Impacts: N/A

Staff Recommended Action: General discussion and update.

Previous Meetings and History: N/A

City Manager Comments:

I concur with the recommendation. Signature: 

Attachments: N/A

Mayor Levesque called the meeting to order at 7:04 P.M. in the Council Chambers of Auburn Hall and led the assembly in the salute to the flag. All Councilors were present.

I. Consent Items

1. Order 131-12212020*
Confirming Chief Moen's appointment of Civilian Process Servers for the Auburn Police Department and Constable Process Servers without firearm/arrest powers (Private) within the City of Auburn with term expirations of December 31, 2021.

2. Order 132-12212020*
Appointing Bryan Batchelder as the Local Sealer of Weights and Measures with a term expiration of December 31, 2021.

3. Order 133-12212020*
Confirming the appointment of Dana Staples as the Comprehensive Plan Ad hoc Committee Chair.

4. Order 134-12212020*
Approving the waiver of foreclosure for ABDC (Auburn Business Development Corporation).

Motion was made by Councilor MacLeod and seconded by Councilor Walker for passage of the four consent items.

Passage 7-0.

II. Minutes

November 30, 2020 Special Council Meeting
Motion was made by Councilor MacLeod and seconded by Councilor Walker to approve the minutes of the November 30, 2020 Special Council meeting. Passage 7-0.

December 7, 2020 Regular Council Meeting
Motion was made by Councilor MacLeod and seconded by Councilor Walker to approve the minutes of the December 7, 2020 Regular Council meeting. Passage 7-0.

III. Communications, Presentations and Recognitions

- Safe Voices – Elise Johanson presented
- City staff and community volunteers for the Grab and Go Feeding Program were recognized and presented with the Spirit of America Award
- Proclamation – The Mayor proclaimed December 21, 2020 as Extra Mile Day in Auburn
- Presentation of City Logos and slogans – Liz Allen and Phil Crowell
- Mayor Levesque provided a communication from Dr. Salim Furth, Mercatus Center
- Mayor Levesque provided a communication from Richard Trafton
- Council Communications (about and to the community)

Mayor Levesque – wanted to give the Council a heads up that there will be an order presented at the January 4th Council meeting to schedule the 2nd regular meeting of the month for Tuesday, January 19th.
Councilor Lasagna – encouraged everyone to take a ride around the City to check out the holiday lights.
Councilor Gerry – wanted to wish everyone a happy holiday adding that we've all been through a lot.
Councilor Walker – wanted to let everyone know that Mike Small (Small's Greenhouse located on Summer Street in Auburn) donated some beautiful poinsettias for Councilors and staff to take home. He also reminded everyone about the special holiday meal being put on by the Age Friendly Community noting that there is only one more day to call it in orders.

IV. **Open Session -** Larry Pelletier, Second Street, addressed the sidewalks in New Auburn.

V. **Unfinished Business**

1. **Ordinance 08-11022020**
Adopting the proposed amendments to Chapter 14, Article XVIII – Adult Use and Medical Marijuana Businesses, Section 14-656, Section 14-658 and Section 14-659 of the Ordinances of the City of Auburn. Public hearing and second reading.

Motion was made by Councilor MacLeod and seconded by Councilor Walker for passage.

Public hearing – no one from the public spoke.

Passage 7-0. A roll call vote was taken.

2. **Ordinance 09-11022020**
Adopting the proposed amendments to Chapter 60, Article IX – Home Occupation Regulations, Section 60-738 of the Ordinances of the City. Public hearing and second reading.

Motion was made by Councilor MacLeod and seconded by Councilor Lasagna for passage.

Public hearing – no one from the public spoke.

Passage 6-1 (Councilor Gerry opposed). A roll call vote taken.

3. **Ordinance 11-12072020**
Adopting a zoning map change to expand the T-4.2 Traditional Downtown Neighborhood to the Downtown Enterprise District. Public hearing and second reading.

Motion was made by Councilor MacLeod and seconded by Councilor Milks for passage.

Public hearing-no one from the public spoke.

Passage 7-0. A roll call vote was taken.

4. **Ordinance 12-12072020**
Adopting a zoning map change to expand T-4.1 Traditional Main Street Neighborhood. Public hearing and second reading.

Motion was made by Councilor MacLeod and seconded by Councilor Boss for passage.

Public hearing-no one from the public spoke.

Passage 7-0. A roll call vote was taken.

VI. New Business

1. **Order 135-12212020**
Approving the Liquor License for Chipotle located on Center Street in Auburn. Public hearing.

Motion was made by Councilor Walker and seconded by Councilor MacLeod for passage.

Public hearing – no one from the public spoke.

Passage 6-0 (Councilor Walker was not in the room during the vote).

2. **Order 136-12212020**
Approving the CDBG-CV amendment to the PY2019 Annual Action Plan.

Motion was made by Councilor MacLeod and seconded by Councilor Gerry for passage.

Public comment – no one from the public spoke.

Passage 7-0. A roll call vote was taken.

3. **Order 137-12212020**
Approving the Tax Increment Financing District 25 (Futureguard, 101 Merrow Road).

Motion was made by Councilor Macleod and seconded by Councilor Carrier for passage.

The public hearing began at 8:08 PM. No one from the public spoke and the public hearing ended at 8:09 PM.

Passage 7-0. A roll call vote was taken.

4. **Order 138-12212020**
Authorizing the waiver of all building permit fees for the new Edward Little High School.

Motion was made by Councilor MacLeod and seconded by Councilor Carrier for passage.

Public comment – no one from the public spoke.

Passage 5-2 (Councilors Walker and Gerry opposed). A roll call vote was taken.

5. **Order 139-12212020**
Conducting all City Council meetings remotely until further notice.

Motion was made by Councilor Macleod and seconded by Councilor Boss for passage.

Public comment-no one from the public spoke.

Motion was made by Councilor Gerry and seconded by Councilor Carrier to table this item indefinitely.

Passage 4-3 (Councilors Boss, Lasagna, and MacLeod were opposed). A roll call vote taken.

VII. Open Session – Larry Pelletier, Second Street commented on sidewalk issues in New Auburn.

VIII. Reports (from sub-committees to Council)

Mayor Levesque – Provided an update on the work of the Comp Plan review committee.
Councilor Boss – Provided an update on the Auburn Public Library, the Ag Committee, and asked for an update on the Ad hoc Committee on Boards & Committees.
Councilor Lasagna – Requested an update from the Citizen's Advisory Committee during committee reports, and also questioned the Point of Order question that was brought up earlier in the meeting.
Councilor MacLeod – Provided an update on the LATC survey and the School Building Committee meeting that was held last Tuesday.
Councilor Gerry – Provided information on the Age Friendly Committee's upcoming take-out lunch.
Councilor Milks – Reported that the budgets were approved for both the Water and Sewer Districts. He also provided an update on the Citizen's Advisory Committee.
Councilor Walker – Reported on the recent 911 meeting, and he noted that the Waste to Energy meeting is scheduled for tomorrow morning.
Councilor Carrier – Provided updates on the School Committee meeting and Airport Board.
Manager Crowell – Provided an update on a marijuana business license that was originally denied. It was scheduled to come before the Council for an appeal, however due to an error on a criminal background report that was provided, we are no longer denying the license for that reason. He thanked Mamie Ney, Library Director and the Library Board for continuing with the Auburn Adventures Program.

Jill Eastman, Finance Director – November Final Monthly Report

Motion was made by Councilor Carrier and seconded by Councilor Milks to accept and place on file the November 2020 final monthly report. Passage 7-0.

9. Executive Session

- Personnel matter, pursuant to 1 M.R.S.A. Sec. 405 (6)(A).

Motion was made by Councilor Carrier and seconded by Councilor Walker.
Passage 7-0, time 8:58 PM.

Council was declared out of executive session at 9:25 PM.

- Personnel matter, pursuant to 1 M.R.S.A. Sec. 405 (6)(A).

  Motion was made by Councilor Milks and seconded by Councilor MacLeod. Passage 7-0, time 9:25 PM.

  Council was declared out of executive session at 9:45 PM.

X. Adjournment

Motion was made by Councilor MacLeod and seconded by Councilor Milks to adjourn. Unanimously approved, adjourned at 9:45 PM.

A TRUE COPY ATTEST Susan Clements-Dallaire

Susan Clements-Dallaire, City Clerk

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021 **Order:** 01-01042021

Author: Eric Cousens, Director of Planning and Permitting

Subject: Packgen TIF District #26 Public hearing

Information: The Council and ECD Staff have discussed the proposed purchase of the Auburn Enterprise Center subdivision and the new Packgen Manufacturing Facility numerous times recently. A portion of the subdivision and some land outside of the subdivision on Logistics Drive is already in a TIF District that pays debt service towards the $3,000,000 borrowed to help construct the new road and infrastructure. The proposed TIF will capture 100% of new value created on lots 1&2 only. We projected the creation of $4,000,000 in new taxable valuation from the current proposed project with 40% proposed for a credit enhancement agreement and 60% for City purposes.

After posting the draft TIF for a Public Hearing, the developer received estimates for site construction that exceed the planned budget and would like some time to refine plans and potentially move proposed buildings to lots within the subdivision that are not part of the proposed draft TIF District #26. It is preferrable at this time that the Council accept any public input and then enter executive session to discuss the details of potential changes to the site that might negatively impact the developer if discussed publicly.

Any substantive changes identified in the future will require a new Public Hearing before action by the Council.

City Budgetary Impacts: None at this time.

Staff Recommended Action: Discuss proposed TIF, hold a Public Hearing and enter Executive Session for additional details.

Previous Meetings and History: Executive Sessions.

City Manager Comments:

I concur with the recommendation. Signature: Phillip Crowell Jr.

Attachments:

ECONOMIC DEVELOPMENT
AUBURN, MAINE

An Application for a Municipal Development and Tax Increment Financing District Development Program

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PACKGEN OMNIBUS MUNICIPAL DEVELOPMENT AND TAX INCREMENT FINANCING DISTRICT DEVELOPMENT PROGRAM (District #26)

Presented to:

City of Auburn, City Council

DATED: January 4, 2021

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EXHIBITS:

I. Introduction

A. The Packgen Project and the TIF District

Packgen (the "Developer"), an Auburn based specialty packaging manufacturer, is looking to construct a new facility at Cascade Drive in Auburn, Maine to accommodate recent and forecasted future substantial growth. The Developer is purchasing the subdivision at Cascade Drive and developing lots 1 and 2. The District will be comprised of the following parcels: Map 130/Lot 001-001 and Map 130/Lot 001-002.

The Developer plans an initial investment of $10,000,000 to add a 70,000+/- square foot structure, parking and site improvements, as well as an investment in personal property, on Map 130/Lot 001-001 and Map 130/Lot 001-002, shown on Exhibit A-1 (the "Project"). The Project is expected to add 25 jobs. Additionally, the Developer is considering the future development of at least two other lots in the subdivision that are not located in the proposed district.

A development hurdle has been identified with the developer. Site construction and permitting costs to develop a new manufacturing facility are more expensive than the project can support. A Credit enhancement agreement is proposed that that would help mitigate these expenses and make the project feasible.

The City of Auburn has identified this growth as an opportunity to capture Tax Increment Financing (TIF) district to make needed infrastructure improvements in the area and repay the debt incurred to construct the subdivision road, infrastructure needed to serve the Development and wetland mitigation monitoring. The City will use captured funds to pay debt incurred during the construction of the public road (Cascades Drive). The City would also use TIF Revenues (as defined below) to fund a new public safety facility, as allowed by a recent TIF Statute amendment in 2019. The municipal projects are described below in Table 1.

B. Designation of the TIF District

The City hereby designates the **Packgen Omnibus Municipal Development and Tax Increment Financing District** (#26) (the "District" or "TIF District"). The District is shown on Exhibits A-1 and A-2 and consists of 11.3 acres identified on City Tax Maps as Map 130/Lot 001-001 and Map 130/Lot 001-002. The District will exist for a total of twenty-five (25) years beginning with the City's July 1, 2020-June 30, 2020 Fiscal Year, upon approval from the Maine Department of Economic and Community Development ("DECD"), and ending on October 31, 2045.

The District is a so-called "omnibus" district, which means that the City will be permitted in the future to enter into additional credit enhancement agreements relating to this District as it sees fit for up to the full term of the District for up to 100% of the captured assessed value, so long as the City holds a public hearing prior to the approval of any such credit enhancement agreement. Pursuant to this Development Program, the City is authorizing a credit enhancement agreement with the Developer, and by designating

[1] The property is currently two parcels but may be combined to a single parcel for the Development.

the District as an "omnibus" district, the City reserves the right to enter into additional credit enhancement agreements in the future.

II. Development Program Narrative

A. The Development Program

This Development Program is structured and proposed pursuant to Chapter 206 of Title 30-A of the Maine Revised Statutes, as amended (the "TIF Statute"). The City's designation of the District combined with the adoption of this development program (the "Development Program") create a single municipal TIF district in order to capture the value of the real property improvements made in the District, and enable the use TIF Revenues (as defined below) to ensure the economic viability of the Initial Project slated for construction and as incentive for the development of the Future Projects. The Development Program will run for the same twenty-five (25) years beginning with the City's July 1, 2020 – June 30, 2021 Fiscal Year, upon approval from DECD, and ending on October 31, 2045.

Under this Development Program, the City will capture 100% of the increased assessed value of real property in the District over the original assessed value of the District and retain the tax revenues generated by the captured assessed real property value (the "TIF Revenues") for designated economic development purposes. In the Assessor's Certificate attached as Exhibit C hereto, the City's Assessor has certified the original assessed property value of the District. The calculation of TIF Revenues is more specifically described below in Section IV – Financial Plan.

By adopting this Development Program, the City will be creating a TIF district that will (1) contribute to the success of the District with developer-funded property improvements of the District; and (2) shelter the new municipal real property value from impacting the overall State valuation for the City of Auburn, thereby minimizing decreases in the City's State school subsidy and State revenue sharing, and potential increases in the City's county tax assessments.

Further, approval of this Development Program and the designation of the District will have a neutral impact on the existing tax base, because only the increased assessed real property value over the original assessed property value within the District will be captured. In addition, at the end of the term of this Development Program, the City will emerge with a substantial amount of new real property value to add to its municipal tax base.

In designating the District and adopting this Development Program, the City can accomplish the following goals:

- Maintain the existing tax revenues;
- Enjoy enhanced future tax revenues generated by improvements within the District;
- Enable the investment of TIF Revenues (defined below) in high priority City projects;
- Create long-term, stable employment opportunities for area residents; and
- Improve the overall economy of the City, the region, and the State of Maine.

The City's designation of the TIF District and pursuit of this Development Program constitute a good and valid public purpose pursuant to Chapter 206 of Title 30-A because it represents a substantial necessary City infrastructure improvement and contributing to property taxes. In addition, by creating the District,

the City will "shelter" the increase in municipal valuation that the Project will bring about. This tax shift benefit will mitigate the adverse effect that the District's increased assessed property value would have on the City's share of state aid to education, municipal revenue sharing and its county tax assessment. An estimate of the tax shift benefit is shown as Exhibit D-2 attached hereto**.**

B. The Project Costs

1. Municipal Project Costs

The City plans to invest in municipal infrastructure. The City plans to use its portion of the TIF Revenues to undertake projects that will enhance the exposure and viability of the City as a vibrant place to locate a business, to visit, and to work. The City's Project Costs will cover capital or municipal debt to fund the items listed in Table 1 below.

TABLE 1

City of Auburn's Project Costs

Note: The TIF Revenues from this District are not intended to fully fund each of the projects listed below. The total project cost estimates for the projects listed below may well exceed the projected TIF Revenues from this District.

Project	Cost Estimate	Statutory Citation
1. Public Safety Facility: Costs related to the construction or operation of a public safety facility in the City, the need for which is related to general economic development within the City, not to exceed 15% of the captured assessed value of the development district.	$26,000,000	30-A M.R.S. § 5225 (1)(C)(9); (1)(B)(1)
2. Road and Intersection Improvements: Design, construction and engineering costs related to road construction and intersection improvements on Cascades Drive and Lewiston Junction Road, located within the District or directly related to or made necessary by the District.	$4,600,000	30-A M.R.S. § 5225 (1)(A)(1); (1)(B)(1)
3. Capital Improvements: Costs of the construction of or the expansion of utility infrastructure, including but not limited to sewer and water, located within the District or directly related to or made necessary by the District.	$1,000,000	30-A M.R.S. § 5225 (1)(A)(1); (1)(B)(1)
4. Professional Services Costs: Professional service costs related to the District including, but not limited to, licensing, architectural, planning, engineering and legal expenses.	$400,000	30-A M.R.S. § 5225(1)(A)(4)

5. Economic Development Programs: Costs of the City's economic development programs, including, but not limited to, marketing costs, monitoring and compliance with wetland mitigation requirements, prorated portions of staff salaries devoted to supporting and administering TIF programming, and other related operating expenses for the City's Economic Development Department. *	$20,000	30-A M.R.S. § 5225(1)(C)(1)
TOTAL	**$27,795,000**	

*Similar project contained within Auburn Memory Care TIF, Downtown Omnibus TIF and Futureguard Omnibus TIF.

2. Developer's Use of TIF Revenues

With the designation of this District, the City authorizes a twenty-year credit enhancement agreement (the "CEA") with the Developer under which the Developer will receive 40% of the TIF Revenues per year of the District being developed into the Project, identified on the District map at Exhibit A. The purpose of the CEA is to reimburse the Developer for the cost of the site development, wetland impact permitting, stormwater treatment and construction costs required by the Project. The City will retain the remaining 60% of TIF Revenues related to this portion of the Developer's property to be used for the municipal projects described in Table 1. Once the CEA expires, 100% of TIF Revenues related to this portion of the Developer's property will be retained by the City for the duration of the District to be used to fund municipal projects.

C. Operational Components

1. Public Facilities

See Table 1 for a description of public facilities.

2. Commercial Improvements Financed Through Development Program

The City will enter into the CEA with the Developer, to support the commercial improvements in the District.

3. Relocation of Displaced Persons

Not applicable.

4. Transportation Improvements

See Table 1 for a description of any transportation improvements.

5. Environmental Controls

The improvements made under this Development Program will meet or exceed all federal, state and local environmental laws, regulations and ordinances and will comply with all applicable land use requirements for the City.

6. Plan of Operation

During the term of the District, the City Council or its designee will be responsible for all administrative matters within the purview of the City concerning the implementation and operation of the District.

D. Improvements to the Public Infrastructure

Please see Table 1 for a list of public infrastructure improvements contemplated by the District.

III. Physical Description

This Article III addresses the conditions for approval contained in 30-A M.R.S.A. § 5223(3). The proposed 11.3-acre District is shown in Exhibit A-1 and Exhibit A-2. The statutory threshold limits addressing the conditions for approval mandated by 30-A M.R.S.A. § 5223(3) are set forth in Exhibit B.

IV. Financial Plan

The Original Assessed Value of the property in the District was $272,900 as of March 31, 2020 (April 1, 2019) as shown in the Assessor's Certificates at Exhibit C.[2] In the event of a revaluation of taxable property within the City, the Captured Assessed Value of this District may be adjusted in proportion to the change in taxable assessed property valued within the District in the year of the revaluation.

Under this Development Program, the City will capture 100% of the taxes paid on increased assessed value in the District. As discussed in detail in Section II(B)(2), the City will enter into the CEA with the Developer, which provide that certain percentages of the TIF Revenues be reimbursed to the Developer and certain percentages of TIF Revenues are retained by the City to be used to fund the municipal projects described in Table 1.

A Development Program Fund shall be established by the City consisting of a Project Cost Account and a Sinking Fund. Upon each payment of property taxes for property located inside the District, the City will deposit into a development program fund (the "Packgen Development Program Fund" or "Development Program Fund") 50% of the property tax payments on increased assessed value of District property, also referred to as TIF Revenues. The Development Program Fund is pledged to and charged with the payment of the project costs in the manner provided in 30-A M.R.S.A. § 5227(3). The Development Program Fund Project Cost Account shall consist of and be separated into at least two separate subaccounts: the Developer Project Cost Subaccount (the "Developer Project Cost Subaccount") and the City Project Cost Subaccount (the "City Project Cost Subaccount"). The Developer Project Cost Subaccount will be pledged to and charged with the payment of amounts due to the Developer under the CEA entered into by the City and the Developer.

Upon receipt of each payment of property tax from the Developer on District property, the City shall deposit into the Developer Project Cost Subaccount 15% of the TIF Revenues generated on that portion of the Developer's property upon which the Initial Project is located, until (a) the total cumulative amount of TIF Revenues so deposited during the term of the District reaches the Cap, or (b) the expiration of the term of the CEA, whichever occurs first, at which point no further deposits shall be made into the Developer Project Cost Subaccount. The amounts in the Developer Project Cost Subaccount shall be used

[2] As stated above, as of March 31, 2020, the property within the District was comprised of two parcels, Map 130/Lot 001-001 and Map 130/Lot 001-002. The property within the District will likely be developed as a single merged parcel matching the District Boundaries.

and applied solely to fund the payments to the Developer under the CEA. The City shall deposit in the City Project Cost Subaccount the balance of the TIF Revenues related that portion of the Developer's property upon which the Project is located.

All funds deposited into the City Project Cost Subaccount will be used to pay or costs of the public facilities debt, improvements, and programs described in Table 1 hereof. All funds deposited into the Developer Project Cost Subaccounts will be used to make payments pursuant to the CEA.

A. Financial Data

Estimates of the increased assessed property values of the District and the anticipated TIF Revenues generated by the District are shown in Exhibit D-1. The current and future developers owning or leasing properties located within the District will pay for and/or finance improvements located in the District through private sources.

The statutory requirements and thresholds for approval required by Section 5223(3) of Title 30-A in the TIF Statute are set forth in Exhibit B.

B. Tax Shifts

In accordance with the TIF Statute, the table set forth in Exhibit D-2 identifies the tax shift benefits that the City estimates will result during the term of the District.

C. Public Indebtedness

The City reserves the right to issue municipal bonds in order to pay for capital improvements to pay for capital improvements in the Development Program. Any municipal bond issued for such project would require the City approval process as normally required for municipal indebtedness.

D. Certification of Original Assessed Value

The Original Assessed Value of the District was $272,900 as of March 31, 2020 (April 1, 2019). This assessed value is wholly attributable to taxable real property value. Certification by the City's Tax Assessor of the original assessed value of the District is set forth in Exhibit C.

V. Municipal Approvals

A. Notice of Public Hearing

Attached as Exhibit E hereto is a copy of the Notice of Public Hearing regarding the designation of the District and the adoption of the Development Program for the District, published in a newspaper of general circulation in the City, on a date at least ten (10) days prior to the public hearing. The public hearing on the Development Program was held on January 4, 2021, in accordance with the requirements of 30-A M.R.S.A. § 5226(1).

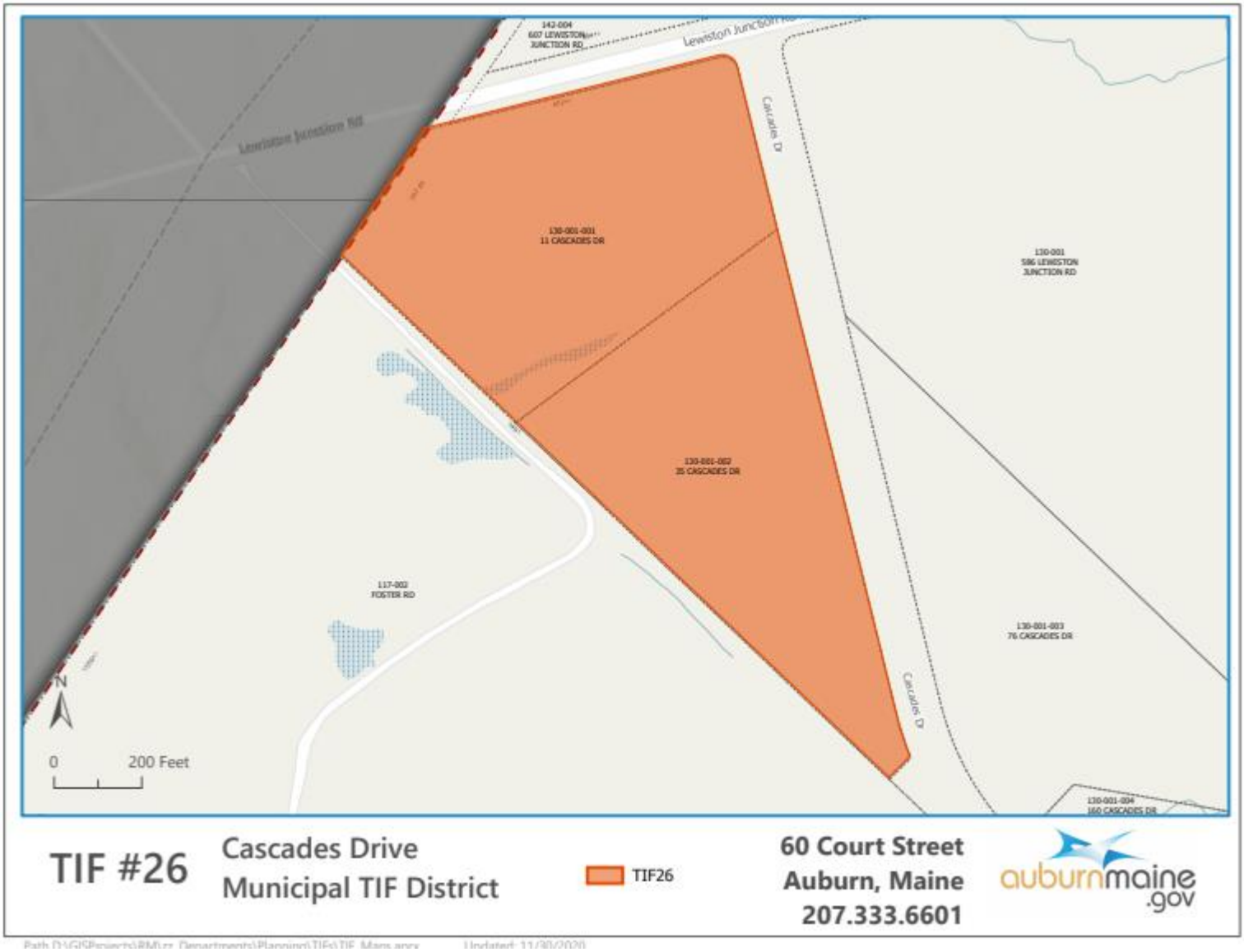
B. Minutes of Public Hearing

The Auburn City Clerk has provided an attested copy of the minutes of the January 4, 2021 public hearing before the Auburn City Council, a copy of which is contained in Exhibit F. This exhibit also provides a record of the vote of the Council on the designation of the District and the adoption of the Development Program.

C. Order and Authorizing Vote

A copy of the City Council Order posted for the Public Hearing and approved by the Auburn City Council is provided in Exhibit G, attested by the City Clerk.

Exhibit A-1



TIF #26

Cascades Drive Municipal TIF District

TIF26

60 Court Street
Auburn, Maine
207.333.6601

auburnmaine.gov

Path: D:\GIS\Projects\BMLs_Departments\Planning\TIFs\TIF_Maps.aprx Updated: 11/30/2020

Exhibit A-2

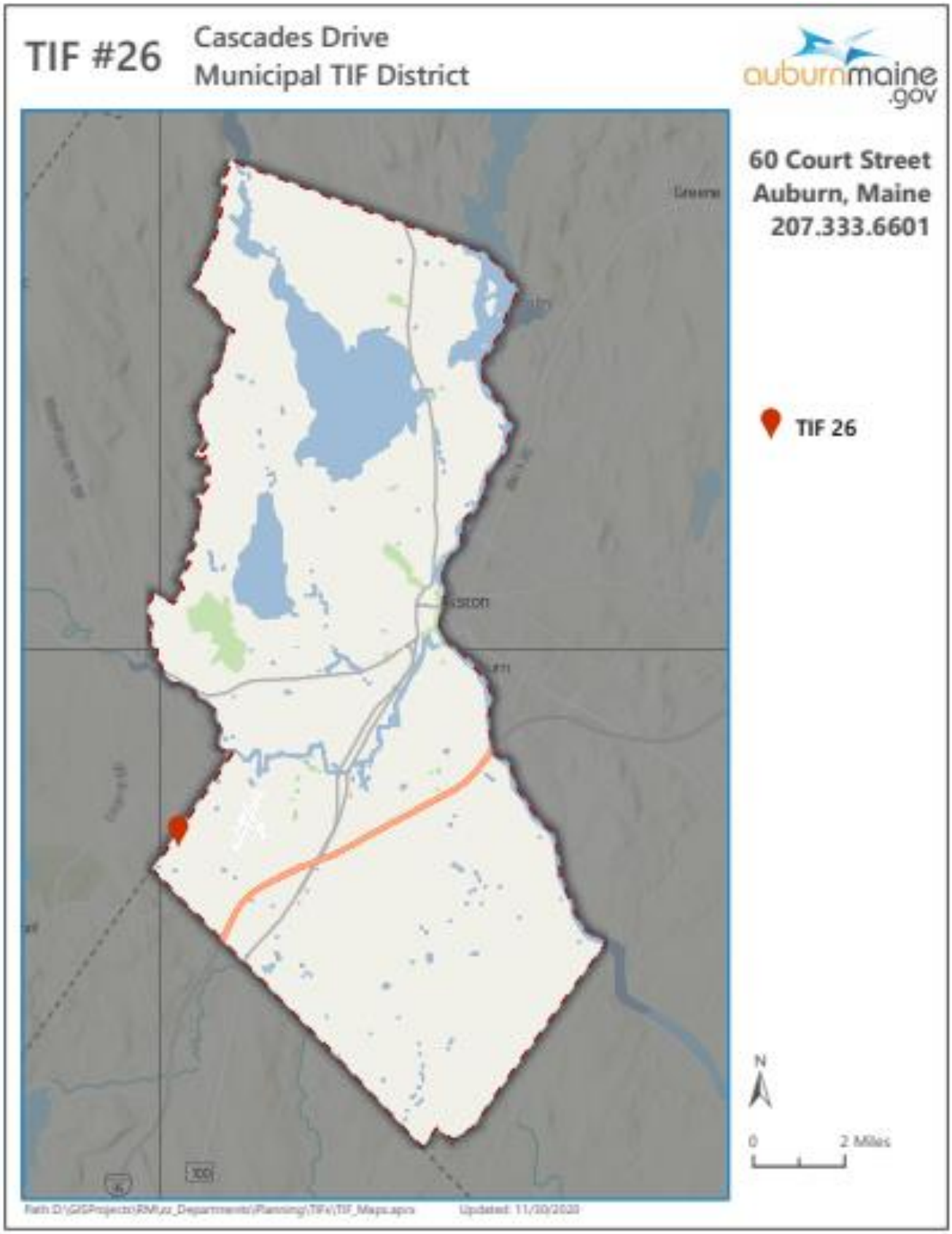

TIF #26
Cascades Drive
Municipal TIF District
auburnmaine.gov
60 Court Street
Auburn, Maine
207.333.6601
TIF 26
N
0
2 Miles

EXHIBIT B

STATUTORY REQUIREMENTS AND THRESHOLDS

Packgen Omnibus Municipal TIF District (#26)

SECTION A. | Acreage Caps			
1.	Total **municipal** acreage;	41,430	
2.	Acreage of **proposed** Municipal TIF District;	11.3	
3.	**Downtown-designation**[1] acres in proposed Municipal TIF District;	0	
4.	**Transit-Oriented Development**[2] acres in proposed Municipal TIF District;	0	
5.	**Total acreage [=A2-A3-A4]** of proposed Municipal TIF District counted toward 2% limit;	11.3	
6.	**Percentage [=A5÷A1]** of total acreage in proposed Municipal TIF District (CANNOT EXCEED 2%).	.027%	
7.	**Total acreage** of all existing/proposed Municipal TIF districts in municipality **including** Municipal Affordable Housing Development districts:[3] #13 Retail Development/29.67 acres #19 Hartt Transportation Industrial Park/43 acres #9 Mall Area/57.74 acres #14 Mall Revitalization/38.91 #18 Norway Savings Bank Arena/8.53 acres #21 477 Minot Ave/3.83 #22 Hampshire Street/1.01 #23 Memory Care/8.61 #24 Gracelawn/2.92 #25 FutureGuard/27.2 #26 Packgen/11.3 #10 Downtown Omnibus/264.18 acres #15 Mall Area Hotel/1.5 acres #6 Proctor & Gamble (Tambrands II)/84 acres #12 Auburn Industrial Park/144 acres #16 Webster School AHTIF/1.4 acres #20 62 Spring Street/.81	Existing	717.31
		Proposed	11.3
		Total:	728.61
30-A § 5223 (3) EXEMPTIONS [4]			
8.	Acreage of an existing/proposed **Downtown** Municipal TIF district;	264.18	
9.	Acreage of all existing/proposed **Transit-Oriented Development** Municipal TIF districts:	0	
10.	Acreage of all existing/proposed **Community Wind Power** Municipal TIF districts:	0	
11.	Acreage in all existing/proposed Municipal TIF districts **common to**[5] Pine Tree Development Zones per 30-A § 5250-I (14)(A) **excluding** any such acreage also factored in Exemptions 8-10 above:	0	
12.	**Total acreage [=A7-A8-A9-A10-A11]** of all existing/proposed Municipal TIF districts counted toward 5% limit;	464.43	
13.	**Percentage of total acreage [=A12÷A1]** of all existing/proposed Municipal TIF districts (CANNOT EXCEED 5%).	1.12%	

14. **Real property** in proposed Municipal TIF District that is:	ACRES	% **[=Acres÷A2]**
a. A blighted area;	0	0
b. In need of rehabilitation, redevelopment or conservation;	0	0
c. Suitable for commercial or arts district uses.	11.3	100%
TOTAL (except for § 5223 (3) exemptions a., b. OR c. must be at least 25%)		100%

[1] Before final designation, the Commissioner will seek advice from MDOACF and MDOT per 30-A § 5226(2).
[2] For Transit-Oriented Development (TOD) definitions see 30-A § 5222 sub-§§ 19-24.
[3] For AH-TIF acreage requirement see 30-A § 5247(3)(B). Alternatively, Section B. must exclude AH-TIF valuation.

STATUTORY REQUIREMENTS AND THRESHOLDS

Packgen Omnibus Municipal TIF District (#26)

[4] Downtown/TOD overlap nets single acreage/valuation caps exemption.
[5] PTDZ districts approved through December 31, 2008.

EXHIBIT B

STATUTORY REQUIREMENTS AND THRESHOLDS

Packgen Omnibus Municipal TIF District (#26)

SECTION B. | Valuation Cap		
1. **Total TAXABLE** municipal valuation—use most recent April 1;	$1,956,632,371	
2. **Taxable Original Assessed Value (OAV)** of proposed Municipal TIF District as of March 31 preceding municipal designation—same as April 1 prior to such March 31;	$272,900	
3. **Taxable OAV of all** existing/proposed Municipal TIF districts in municipality **excluding** Municipal Affordable Housing Development districts: #10 Downtown Omnibus/$83,168,800 #13 Retail Development/$5,425,400 #15 Mall Area Hotel/$4,900 #18 Norway Savings Bank Arena/$1,564,100 #6 Proctor & Gamble (Tambrands II)/$520,900 #9 Mall Area/$5,956,300 #12 Auburn Industrial Park/$334,200 #14 Auburn Mall/$11,328,400 #19 Hartt Transportation Center/$1,278,600 #20 62 Spring Street/$474,300 #23 Auburn Memory Care/$327,100 #24 Gracelawn/$262,600 #25 FutureGuard/$3,838,700 #26 Packgen/$272,900	Existing Proposed Total:	$114,484,300 $272,900 $114,757,200
30-A § 5223 (3) EXEMPTIONS		
4. **Taxable OAV** of an existing/proposed **Downtown** Municipal TIF district;	$83,168,800	
5. **Taxable OAV** of all existing/proposed **Transit-Oriented Development** Municipal TIF districts:	0	
6. **Taxable OAV** of all existing/proposed **Community Wind Power** Municipal TIF districts:	0	
7. **Taxable OAV** of all existing/proposed **Single Taxpayer/High Valuation**[6] Municipal TIF districts:	0	
8. **Taxable OAV** in all existing/proposed Municipal TIF districts **common to** Pine Tree Development Zones per 30-A §5250-I (14)(A) **excluding** any such OAV also factored in Exemptions 4-7 above:	0	
9. **Total taxable OAV [=B3-B4-B5-B6-B7-B8]** of all existing/proposed Municipal TIF districts counted toward 5% limit;	$31,588,400	
10. **Percentage of total taxable OAV [=B9÷B1]** of all existing/proposed Municipal TIF districts (CANNOT EXCEED 5%).	1.6%	

COMPLETED BY	
NAME:	Eric J. Cousens, Interim Director of Economic and Community Development, City of Auburn
DATE:	December 10, 2020

[6] For this exemption see 30-A §5223(3)(C) sub-§§ 1-4.

City of Auburn, Maine
Office of the Assessor
www.auburnmaine.gov | 60 Court Street
Auburn, Maine 04210
207.333.6601

ASSESSORS CERTIFICATE OF ORIGINAL ASSESSED VALUE

PACKGEN TAX INCREMENT FINANCING DISTRICT, (TIF # 26)

CITY OF AUBURN, MAINE

The undersigned Assessor for the City of Auburn, Maine does hereby certify that:

Tax map 130 lot 001-001 (11 Cascades Drive) showing the boundaries of a portion of the boundaries of Packgen, TIF #26 is an accurate depiction of a *portion* of the proposed District. The original assessed value of the taxable real property was One Hundred Forty Two Thousand Dollars ($142,000) as of March 31, 2020.

IN WITNESS THEREOF, this certificate has been executed as of this 17th day of August, 2020.

ASSESSOR, CITY OF AUBURN, MAINE

Karen V. Scammon, CMA-3

Original Assessed Value for Individual Tax Map Lot

Tax Map and Lot Number	Acreage	Original Assessed Value as of March 31, 2020 (April 1, 2019)
Map 130, Lot 001-001	5.8	$142,000

City of Auburn, Maine
Office of the Assessor
www.auburnmaine.gov | 60 Court Street
Auburn, Maine 04210
207.333.6601

ASSESSORS CERTIFICATE OF ORIGINAL ASSESSED VALUE

PACKGEN TAX INCREMENT FINANCING DISTRICT, (TIF # 26)

CITY OF AUBURN, MAINE

The undersigned Assessor for the City of Auburn, Maine does hereby certify that:

Tax map 130 lot 001-002 (35 Cascades Drive) showing the boundaries of a portion of the boundaries of Packgen, TIF #26 is an accurate depiction of a *portion* of the proposed District. The original assessed value of the taxable real property was One Hundred Thirty Thousand Nine Hundred Dollars ($130,900) as of March 31, 2020.

IN WITNESS THEREOF, this certificate has been executed as of this 17th day of August, 2020.

ASSESSOR, CITY OF AUBURN, MAINE

Karen V. Scammon, CMA-3

Original Assessed Value for Individual Tax Map Lot

Tax Map and Lot Number	Acreage	Original Assessed Value as of March 31, 2020 (April 1, 2019)
Map 130, Lot 001-002	5.5	$130,900

Exhibit D-1 | Captured Assessed Value & TIF Revenue Projections

PACKGEN OMNIBUS TIF DISTRICT #26

Fiscal Year	TIF Year	Projected Mill Rate Tax Yr 2020 $23.75	Percent Captured in TIF	Increased Assessed Value	Captured Assessed Value	Total Projected TIF Revenue	TIF Revenue to Developer	TIF Revenue to City	Taxes to City General Fund	Increased Assessed Value Other Parcels	Captured Assessed Value Other Parcels	TIF Revenue to City Other Parcels	Taxes to City General Fund Other Parcels	Total District Captured Assessed Value
2020-2021	1	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2021-2022	2	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2022-2023	3	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2023-2024	4	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2024-2025	5	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2025-2026	6	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2026-2027	7	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2027-2028	8	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2028-2029	9	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2029-2030	10	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2020-2031	11	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2031-2032	12	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2032-2033	13	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2033-2034	14	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2034-2035	15	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2035-2036	16	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2036-2037	17	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2037-2038	18	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2038-2039	19	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2033-2035	20	23.75	100%	$4,000,000	$4,000,000	$95,000	$38,000	$57,000	$0	$0	$0	$0	$0	$4,000,000
2034-2036	21	23.75	100%	$4,000,000	$4,000,000	$95,000	$0	$95,000	$0	$0	$0	$0	$0	$4,000,000
2035-2037	22	23.75	100%	$4,000,000	$4,000,000	$95,000	$0	$95,000	$0	$0	$0	$0	$0	$4,000,000
2036-2038	23	23.75	100%	$4,000,000	$4,000,000	$95,000	$0	$95,000	$0	$0	$0	$0	$0	$4,000,000
2037-2039	24	23.75	100%	$4,000,000	$4,000,000	$95,000	$0	$95,000	$0	$0	$0	$0	$0	$4,000,000
2038-2040	25	23.75	100%	$4,000,000	$4,000,000	$95,000	$0	$95,000	$0	$0	$0	$0	$0	$4,000,000
					25-Year Total:	**$2,375,000**	**$760,000**	**$1,615,000**	**$0**					
					25-Year Average:	**$95,000**	**$30,400**	**$64,600**	**$0**					

Assumptions:

1. Assumes the initial project is complete for Year 1 of the District with an estimated assessed value of $4 million.
2. Assumes a 25-year district term and 100% assessment ratio.
3. Projections include projected mil rates based on 2020 actual mil rate, held constant for remainder of District term.
4. Assumes 100% of the increased assessed value is captured in the District and available for municipal project costs for 25 years (and a portion to the CEA relating to the project for a period of 20 years).
5. Assumes 40% of TIF revenues each year for Developer for 20 years.
6. Projections are much less likely to be accurate farther into the future and are for demonstrative purposes only.

Exhibit D-2 | Tax Shift Benefits

PACKGEN OMNIBUS TIF DISTRICT #26

Fiscal Year	TIF Year	State Aid to Education Benefit	County Tax Benefit	State Revenue Sharing Benefit	Total Tax Shift Benefits
2020-2021	1	-	-	-	$0
2021-2022	2	-	-	-	$0
2022-2023	3	-	$4,890	$2,945	$7,835
2023-2024	4	$10,798	$7,628	$4,593	$21,695
2024-2025	5	$21,595	$9,780	$5,889	$37,260
2025-2026	6	$32,720	$9,780	$5,889	$43,389
2026-2027	7	$32,720	$9,780	$5,889	$43,389
2027-2028	8	$32,720	$9,780	$5,889	$43,389
2028-2029	9	$32,720	$9,780	$5,889	$43,389
2029-2030	10	$32,720	$9,780	$5,889	$43,389
2020-2031	11	$32,720	$9,780	$5,889	$43,389
2031-2032	12	$32,720	$9,780	$5,889	$43,389
2032-2033	13	$32,720	$9,780	$5,889	$43,389
2033-2034	14	$32,720	$9,780	$5,889	$43,389
2034-2035	15	$32,720	$9,780	$5,889	$43,389
2035-2036	16	$32,720	$9,780	$5,889	$43,389
2036-2037	17	$32,720	$9,780	$5,889	$43,389
2037-2038	18	$32,720	$9,780	$5,889	$43,389
2038-2039	19	$32,720	$9,780	$5,889	$43,389
2033-2035	20	$32,720	$9,780	$5,889	$43,389
2034-2036	21	$32,720	$9,780	$5,889	$43,389
2035-2037	22	$32,720	$9,780	$5,889	$43,389
2036-2038	23	$32,720	$9,780	$5,889	$43,389
2037-2039	24	$32,720	$9,780	$5,889	$43,389
2038-2040	25	$32,720	$9,780	$5,889	$43,389
2040-2041		$32,720	$9,780	$5,889	$43,389
2041-2042		$32,720	$9,780	$5,889	$43,389
2042-2043		$32,720	-	-	$37,260
	Totals:	**$784,953**	**$237,458**	**$142,985**	**$1,101,997**
	Averages:	**$31,398**	**$9,498**	**$5,719**	**$44,080**

Assumptions:

1. Data sources include the 2020 mil rate reported and predicted by the City of Auburn, Androscoggin County's FY 2016-2020 Tax Commitment, the State Treasurer's Office Municipal Revenue Sharing projections for FY 2020 07/01/20 - 06/30/21 Published 08/03/20, the Maine Department of Education 11/16/20 2020-2021 ED 279 form for Auburn Public Schools.
2. Tax shift losses are comprised of declining subsidies in revenue sharing and increasing obligations to pay county taxes. Tax shift losses occur a couple of years following the year in which the new assessed value is first recognized in the assessment. No tax shift losses occur when a TIF captures all of the new value.
3. These projections assume that the formulas and general inputs for state subsidies and county taxes do not change over time and they assume that all other values in other communities are static relative to one another except for the new value assessed. The projections are less likely to be accurate farther into the future.
4. Assumes the assessment ratio in the City is 100% when new property value arrives, such that the market value of new property is used for assessment purposes.
5. The projections above assume that no tax increment financing district is put in place, thus the mil rate is reduced by as a result of the full new value in the City. This analysis factors in tax shift impacts resulting from the project's new assessed value into future commitments and mil rate calculations to arrive at projected

CITY OF AUBURN
NOTICE OF PUBLIC HEARING

Notice is hereby given that the City of Auburn City Council will hold a public hearing on **January 4, 2021** at **7:00 p.m.** for the purposes of receiving public comments on the designation of the ***Packgen Omnibus Municipal Development and Tax Increment Financing District*** as well as the adoption of the development program for the district to encompass approximately 11.3 acres located at 11 and 35 Cascades Dive Parcel IDs 130-001-001 and 130-001-002. The City plans to enter into a credit enhancement agreement with the owner of the property within the District related to development of a new manufacturing and distribution facility.

The public hearing is proposed pursuant to the provisions of Chapter 206 of Title 30-A of the Maine Revised Statutes, as amended. All interested persons are invited to attend the public hearing and will be given an opportunity to be heard at the hearing.

This public hearing will be conducted remotely using "Zoom." The meeting will be broadcast as usual on Great Falls TV (cable channel 1302) and on the City of Auburn YouTube channel. Information, materials and the active meeting access links are available under the January 4, 2021 TIF link at: https://www.auburnmaine.gov/pages/government/city-council-agendas .

If you wish to offer public comment during the meeting, you can "attend" the meeting via Zoom and speak during the public comment session. To participate in this way, please register in advance by using the following link under the January 4, 2021 TIF link at: https://www.auburnmaine.gov/pages/government/city-council-agendas .

After registering, you will receive a confirmation email containing information about joining the meeting. If you wish to speak, simply click "Raise Hand" in the webinar controls. You can also use the Alt+Y keyboard shortcut (Mac: Option+Y) to raise or lower your hand. You will be notified when it is your turn to speak. Be sure to "Unmute" yourself and speak clearly. All participants will be able to hear you.

If you prefer to submit public comment in writing, please send your remarks via email to: **comments@auburnmaine.gov**. Your comments will be included in the meeting minutes.

EXHIBIT F – Public Hearing Minutes Placeholder

CITY OF AUBURN, MAINE
COUNCIL ORDER

WHEREAS, the City of Auburn (the "City") is authorized pursuant to Chapter 206 of Title 30-A of the Maine Revised Statutes, as amended, to designate specific areas within the City as Packgen Omnibus Municipal Development District (the "District") and to adopt a development program for the District (the "Development Program"); and

WHEREAS, there is a need for development in the City and for the creation of good new jobs in the City; and

WHEREAS, implementation of the Development Program will help to improve and broaden the tax base in the City and improve the economy of the City and the State of Maine; and

WHEREAS, there is a need to encourage the expansion, improvement and continuation of commercial development in the City through the establishment of the District in accordance with Chapter 206 of Title 30-A; and

WHEREAS, the City Council has held a public hearing on January 4, 2021, upon at least ten (10) days prior notice published in a newspaper of general circulation within the City, on the question of establishing the District in accordance with the requirements of 30-A M.R.S.A. § 5226; and

WHEREAS, the City desires to designate the District as a Municipal Development and Tax Increment Financing District, and to adopt a Development Program for the District; and

WHEREAS, it is expected that approval will be sought and obtained from the Maine Department of Economic and Community Development (the "Department"), approving the designation of the District and the adoption of the Development Program for the District;

NOW THEREFORE BE IT ORDERED AS FOLLOWS:

Section 1. The City Council hereby finds and determines that:

a. At least twenty-five percent (25%), by area, of the real property within the District, as hereinafter designated, is suitable for commercial uses; and

b. The total area of the District does not exceed two percent (2%) of the total acreage of the City, and the total area of all existing and proposed development districts within the City (including the District) does not exceed five percent (5%) of the total acreage of the City; and

c. The original assessed value of all existing and proposed tax increment financing districts (including the District) does not exceed five percent (5%) of the total value of equalized taxable property within the City as of April 1, 2018; and

d. The District and pursuit of the Development Program will make a contribution to the economic growth and well-being of the City of Auburn and the surrounding region, and will contribute to the betterment of the health, welfare and safety of the inhabitants of

the City of Auburn, including a broadened and improved tax base and economic stimulus, and therefore constitutes a good and valid public purpose. The City has considered all evidence, if any, presented to it with regard to any adverse economic effect on or detriment to any existing business and has found and determined that such adverse economic effect on or detriment to any existing business, if any, is outweighed by the contribution expected to be made through the District and Development Program.

Section 2. 30-A of the Maine Revised Statutes, as amended, the City hereby designates a Municipal Development and Tax Increment Financing District and to promote the completion of the project, designated and described more particularly set forth in the Development Program presented to the City Council and such Development Program is hereby incorporated by reference into this vote as the Development Program for the District.

Section 3. Pursuant to the provisions of 30-A M.R.S.A. §5227, the percentage of the increased assessed value to be retained as captured assessed value in the District is set forth in the Development Program.

Section 4. The City Manager be, and hereby is, authorized, empowered and directed to submit the proposed designation of the District and the proposed Development Program for the District to the Department for review and approval pursuant to the requirements of 30-A M.R.S.A. §5226(2).

Section 5. The foregoing designation of the District and the adoption of the Development Program for the District shall become final and shall take full force upon receipt by the City of approval and designation of the District and adoption of the Development Program by the Department.

Section 6. The City Manager be and hereby is authorized and empowered, at his discretion, from time to time, to make such revisions to the Development Program for the District and the City Manager deems reasonably necessary or convenient, including revisions to the scope or description of the public improvements, facilities and programs to be financed with a portion of the tax increment revenues generated by the District, in order to facilitate the process for review and approval of the District by the Department, or for any other reason so long as such revisions are not inconsistent with these resolutions or the basic structure and intent of the Development Program.

Section 7. The City Manager, in the name and on behalf of the City, is hereby authorized and directed to enter into a credit enhancement agreement between the City and the developer of the project to be located in the District, consistent with the description of such agreement in the Development Program.

Section 8. This Order shall take effect immediately upon adoption.

Approved January 4, 2021, by the City Council of the City of Auburn, at a meeting duly convened and conducted at Auburn, Maine.

ORDER 01-01042021

City Council Order

IN CITY COUNCIL

ORDERED, That the Auburn City Council hereby approves the Packgen TIF District #26.

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021 **Order:** 02-01042021

Author: Sue Clements-Dallaire, City Clerk

Subject: Proposed date change for the second Regular City Council meeting of January 2021

Information: Recommend changing the second Regular City Council meeting date to January 19, 2021. The second meeting falls on a holiday and rather than pushing the meeting out another week, we are recommending that the meeting be held the Tuesday after the holiday (change from January 25, 2021 to January 19, 2021).

City Budgetary Impacts: None.

Staff Recommended Action: Move the second regular meeting of January to Tuesday, January 19, 2021.

Previous Meetings and History: In past years, we have held meetings that would have fallen on a holiday on the Tuesday immediately following that date.

City Manager Comments:

I concur with the recommendation. Signature: Phillip Crowell Jr.

Attachments:

ORDER 02-01042021

City Council Order

IN CITY COUNCIL

ORDERED, that the City Council hereby authorizes changing the second regular meeting of the City Council from Monday, January 25, 2021 to Tuesday, January 19, 2021.

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021 **Order:** 03-01042021

Author: Derek Boulanger

Subject: Lake Auburn Impact Study RFP

Information:
Develop a Request for Proposal (RFP) for a study that will have the following outcomes, as it pertains to impact:

1. Economically
2. Environmentally
3. Regulatory
4. Community

Workgroup Members:

Councilor Belinda Gerry, Councilor Brian Carrier, Trustee Mary Sylvester, Trustee Jason Pawlina;
Staff: City Manager Phil Crowell, AWD Superintendent Sid Hazelton, Facilities Manager/Purchasing Agent, Derek Boulanger

Timeline:

- September 8th – city council appointed representatives along with the AWD Trustees
- September 22nd workgroup holds first meeting – determined meeting dates and decided we would use the 2013 ordinance RFP as our template. Started reviewing the economic outcomes.
- September 28th – workgroup met and completed economic section and began the work on regulatory.
- October 5th – workgroup met and completed the regulatory outcomes and began discussion on the environmental outcomes. It was determined the areas that we would propose for outcomes on community impact were being addressed in the other three categories.
- The original timeline had the workgroup presenting to the council on October 19th. With meeting constraints, the final editing of the RFP was completed by email with the group participating over the last few weeks.
- November 2nd – City Council adopted the draft RFP
- November 13th – RFP is advertised
- December 17th – Proposal due date
- December 29th – Staff meeting to review proposals, all in agreement to recommend the proposal submitted by FB Environmental Associates.
- January 4th, 2021 – recommendation provided to the city council for consideration

City Budgetary Impacts:

Staff proposes to utilize $96,852.92 from Comprehensive Plan implementation funds to complete the Study.

Staff Recommended Action:

Authorize staff to enter into an agreement with FB Environmental Associates for the evaluation of ordinances applicable to the protection of the Lake Auburn Watershed.

Previous Meetings and History:

8/17/2020
9/8/2020
11/2/2020

City Manager Comments:

I concur with the recommendation. Signature: Phillip Crowell Jr.

Attachments:

2020 Lake Auburn Impact Study RFP (Bid# 2021-015)
FB Environmental Associates Proposal Docs.

RESPONSE TO THE REQUEST FOR PROPOSALS

Evaluation of Ordinances Applicable to the Protection of the Lake Auburn Watershed

FOR THE CITY OF AUBURN, ME

BID # 2021-015

FB Environmental Associates, Horsley Witten Group , The University of Maine, and rbouvier consulting

December 17, 2020

Photo Credit: Sun Journal


FB
environmental


HORSLEY WITTEN GROUP
Sustainable Environmental Solutions


1865
THE UNIVERSITY OF
MAINE


rbouvier
consulting

Derek Boulanger
Facilities Manager/Purchasing Agent
City of Auburn, Maine
60 Court Street
Auburn, Maine 04210

December 17, 2020

Dear Mr. Boulanger,

FB Environmental Associates (FBE) is pleased to submit to the City of Auburn the following response to the Request for Proposals for Evaluation of Ordinances Applicable to the Protection of the Lake Auburn Watershed (Bid #2021-015). We have coalesced a strong team of watershed planners, environmental modelers, water resources engineers, and economists from FBE, Horsley Witten Group, rbouvier consulting, and the University of Maine to effectively and efficiently coordinate, execute, and deliver outstanding products for the City of Auburn.

FBE is widely regarded as a regional leader in water resource planning, assessment, monitoring, and restoration with an expert staff of scientists, modelers, and planners. Horsley Witten Group is considered a leading-edge engineering, planning, and environmental consulting firm with a staff of highly skilled planners and engineers. Dr. Adam Daigneault is an Assistant Professor of Forest Policy and Economics at the University of Maine's School of Forest Resources and specializes in developing models to assess socio-economic impacts of environmental and land use policy on natural resource sectors. Rachel Bouvier of rbouvier consulting is an Associate Professor and Chair of Economics at the University of Southern Maine and offers expert services in economic, policy, and statistical analyses for natural resource protection issues and community economic development. We are pleased to showcase that four of the six key staff members for this project have a Ph.D. in a related field. All of the project staff will provide a high level of expertise to the City and its stakeholders.

Being only one of 50 non-filtered public drinking water sources in the United States, Lake Auburn is unique and thus the overall approach and goal of the project are unique as well, with components of the project tapping into our team's strong work experience and expertise in ordinance review and drafting, alternatives analyses, environmental and economic trade-off analyses, and client/stakeholder outreach and engagement. We understand that several other consultants have performed studies in the past related to components of this project; however, our team can serve as an independent, third-party reviewer of all previous studies, with the infrastructure, connections, expertise, and unbiased scientific rigor afforded by our firms and university partner. We are also aware of the political tensions and differing interests among stakeholder groups in the watershed. For past projects, we have proven ourselves as effective communicators and mediators in similarly contentious projects, the stakeholders of which were assuaged through public presentation of robust and sound scientific reason and thus the garnering of public trust in the results, regardless of which public interest they may serve. We pride ourselves in this area of stakeholder engagement and look forward to the opportunity to work with key stakeholder groups in the Lake Auburn watershed.

If selected, I will serve as the Principal-in-Charge and will be responsible for ensuring that all project tasks are completed to the satisfaction of the City of Auburn. Rich Brereton Ph.D., (FBE) will serve as the Project Manager and will ensure that all work is performed on schedule and within scope. Other FBE staff will serve as technical support staff for task completion. Environmental planners and water resources engineers at Horsley Witten Group will provide expert support on most project tasks. Economists at the University of Maine and rbouvier consulting will lead the economic analysis tasks.

We specialize in the area where "science meets civics" and look forward to the opportunity of working with the City of Auburn on this important project. Our highly qualified team will be flexible and creative in our approach and will meet the demands of the project schedule. If you have any questions, please feel free to call me at (207) 221-6699 or email me at info@fbenvironmental.com.

Sincerely Yours,

Forrest Bell

Forrest Bell

Principal and Senior Scientist, FB Environmental Associates, Portland, ME

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> "Our team can serve as an **independent, third-party reviewer**, with the infrastructure, connections, expertise, and **unbiased scientific rigor** afforded by our firms and university partner."

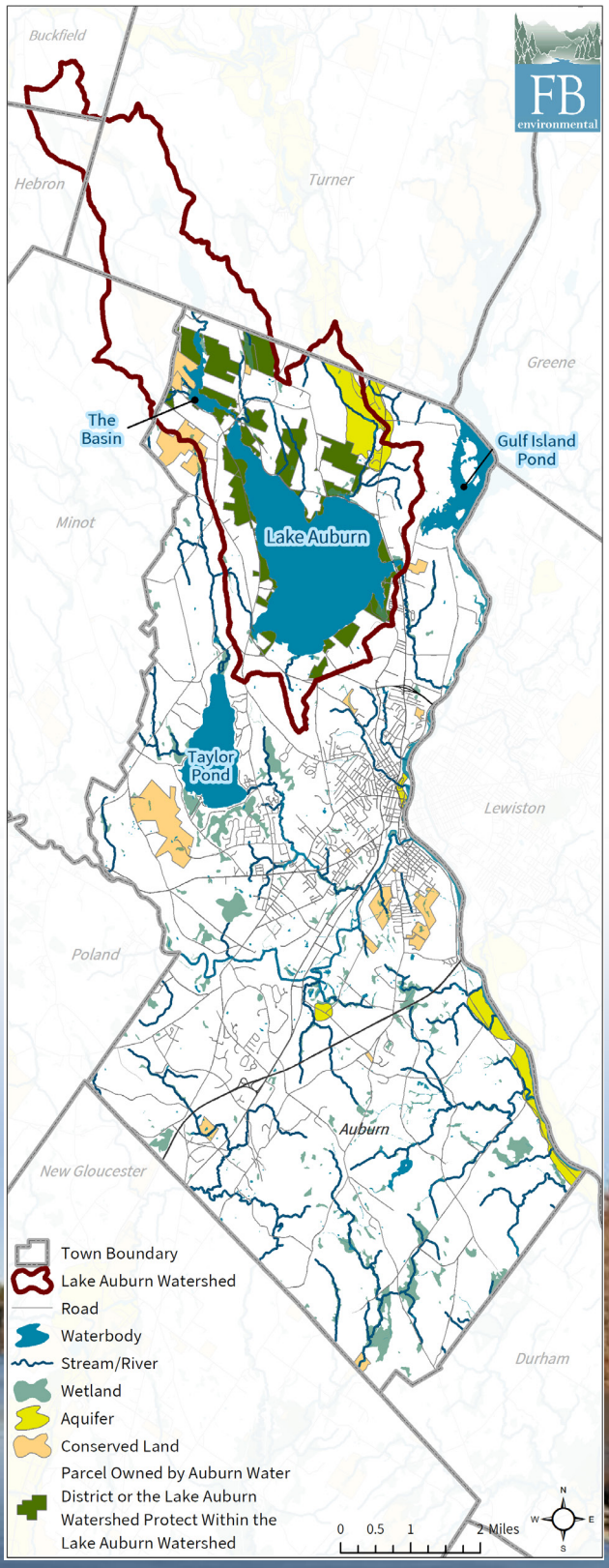


Photo Credit: Fishingnortheast.net

BUSINESS INFORMATION

Primary Firm: FB Environmental Associates LLC.

1. **Length of time our firm has been in business:** We will be celebrating our 20th anniversary in 2021.
2. **Length of time at current location:** 10 years on Exchange St, 16 years in Portland total.
3. **List types and business license number(s):** LLC
4. **Names and titles of all officers of the firm:** Forrest Bell - CEO and Owner
5. **Is your firm a sole proprietorship doing business under a different name?** No
6. **If yes, please indicate sole proprietorship name/name under which you are doing business:** N/A
7. **Please indicate your Federal Tax ID Number:** 26-3505442
8. **Is your firm incorporated?** Yes, LLC
9. **Primary business address:** 97A Exchange Street, Suite 305, Portland, ME 04101

Sub-Consultant: Horsley Witten Group

1. **Length of time your firm has been in business:** 32 years
2. **Length of time at current location:** Sandwhich, MA - 22 years. Exeter, NH - 5 years
3. **Total number of employees:** 60
4. **List types and business license number(s):** N/A
5. **Names and titles of all officers of the firm:** Richard Claytor, President; Mark Nelson, Treasurer; Jane Estey, Clerk
6. **List the names of similar projects you have worked on within the last ten years:**
    - On-Call Engineering and Resource Protection Peer Review Services for Multiple Communities, MA (2010-present)
    - Hazard Mitigation Plan and Municipal Vulnerability Preparedness Planning, Taunton, MA
    - (2020-2021)
    - Designing a Floodwater Management Program in the Assawompset Ponds Complex, MA (2020-2021)
    - Hazard Mitigation Plan Update, Master Plan Update, and Municipal Vulnerability Preparedness Planning, Sudbury, MA (2018-2020)
    - Taunton River Watershed Management Plan & LID Regulatory Code Update (2007-2010)
7. **List the number of past projects partnering with Primary Consultant:** 6

Sub-Consultant: The University of Maine, Orono

1. **Length of time your firm has been in business:** 155 years
2. **Length of time at current location:** 155 years (university); 5 years (Daigneault)
3. **Total number of employees:** 2,500
4. **List types and business license number(s):** Non-profit educational organization
5. **Names and titles of all officers of the firm:** N/A
6. **List the names of similar projects you have worked on within the last ten years.**
    - An Economic Case for the Sebago Watershed Water & Forest Conservation Fund (The Nature Conservancy, 2018-19)

- Modeling Economic Impacts Assessment of Ruamahanga Catchment Water Quality Policy (New Zealand Ministry for the Environment, 2018-19)
- Economic modeling of Kaipara Harbour catchment sediment mitigation study (Auckland Council, 2016-2019)
- Economic assessment of scenarios for the Ruamāhanga Watershed (Greater Wellington Regional Council, 2016-18)
- Economic Costs and Benefits of National Riparian Restoration in New Zealand (Landcare Research, 2016-17)
- Modeling economic impacts of nutrient allocation policies in Canterbury, New Zealand: Hinds and Selwyn Catchments (New Zealand Ministry of Primary Industries, 2012-14).

7. List the number of past projects partnering with Primary Consultant: 0

Sub-Consultant: rbouvier consulting

1. Length of time your firm has been in business: 5.5 years

2. Length of time at current location: Portland, ME - 5.5 years

3. Total number of employees: 1.5

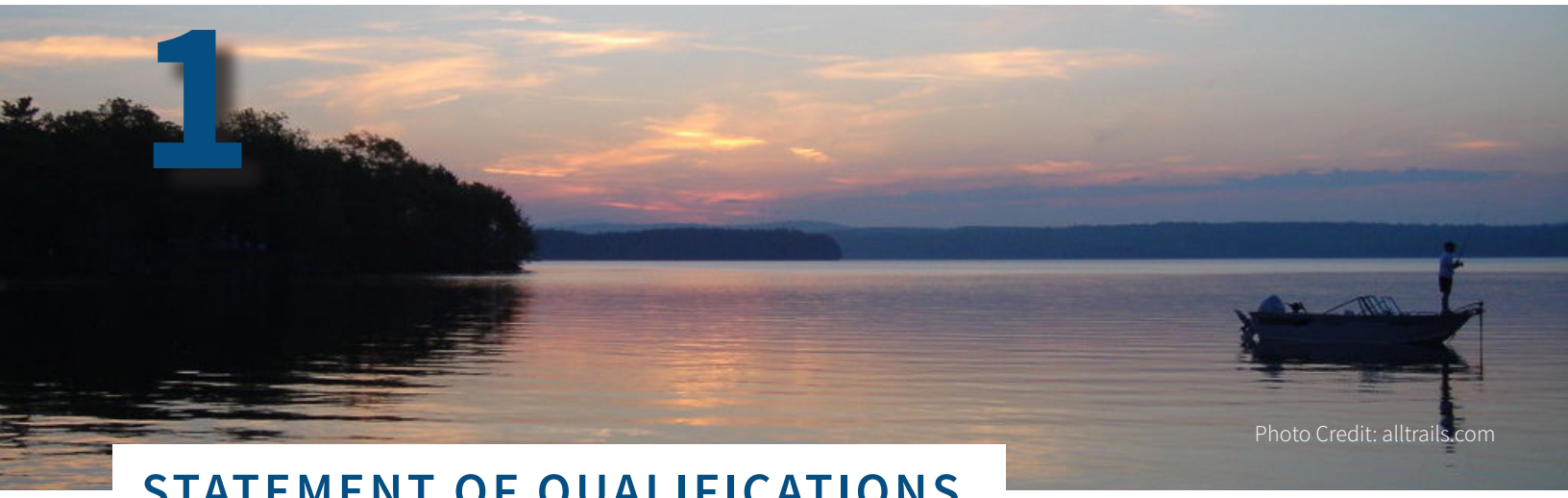
4. List types and business license number(s): LLC

5. Names and titles of all officers of the firm: Rachel Bouvier, Ph.D, President

6: List the names of similar projects you have worked on within the last ten years:

- Southern Maine Planning and Development Commission, Current. Part of a team assessing the economic impact of sea level rise and storm surge on the towns of York, Kennebunk, and Wells.
- New England Interstate Water Pollution Control Council, Current. Assessing the feasibility of point – non-point source water quality trading in the Long Island Sound Study Area.
- Executive Office of Energy and Environmental Affairs, Massachusetts, Current. Developing topical briefings on connections between land conservation and economic outcomes as part of year-long Resilient Lands Initiative.
- State of Maine Land Use Planning Commission, Current. Advising Commission on requiring and reviewing socio-economic assessments for land use changes.
- City of Portland, Maine, 2017-2019. Part of a multi-year, multi-disciplinary team assisting the City of Portland design their Integrated Water Resources Management Plan. Rachel oversees monetizing costs and benefits of the alternative as well as presenting them to the general public.
- Cities of Portland, Maine and South Portland, Maine. 2019-2020. Part of a team assessing the economic value of Portland Harbor to the region.

7. List the number of past projects partnering with Primary Consultant: 1



STATEMENT OF QUALIFICATIONS & EXPERIENCE

PROJECT TEAM

The following section outlines the project team, project hierarchy, and level of participation of each team member. Full staff resumes can be found at the end of this document. All project team members are prepared to work for this project in the timeframe specified (2021).

FB Environmental Associates –Portland, ME and Dover, NH; (207) 221-6699

Email: info@fbenvironmental.com (Forrest Bell)

FB Environmental Associates (FBE) is a consulting firm that specializes in directing environmental planning, assessment, monitoring, mapping, and restoration projects for a diverse array of clients. The firm's thirteen associates have more than 150 years of combined experience working on land and water resource projects in New England. FBE was founded by Forrest Bell in 2001 to help provide state environmental agencies and watershed associations with comprehensive assessments of phosphorus-impaired lakes. Since then, FBE has become a regional leader in stakeholder-driven watershed management and community planning projects for water resources, which include water quality and statistical analyses, nutrient load modeling, land use regulatory reviews, and public outreach and communication. FBE delivers thorough scientific assessments of water resources to public sector clients and assists those clients with comprehensive watershed-wide planning and implementation efforts to protect or restore surface waters.

FBE has worked with municipal officials throughout New England on public policy review and recommendations relating to water quality and land management. Often relied on to bridge the gap between local conservation groups and municipal decision-makers, FBE has conducted municipal ordinance reviews in several Maine and New Hampshire communities. One of the most rewarding aspects of their work is when they see changes in local rules because of their research and recommendations. FBE focuses on the area where "science meets civics" and is passionate about educating decision-makers on the scientific research that requires behavior change and regulatory change.

References have indicated that the firm's greatest asset is the staff's ability to work with great attention to detail to meet the specific needs of project partners and the public. Using sound science and audience-based communication strategies, FBE prides itself on its ability to effectively manage and engage diverse stakeholder interests and mediate controversial topics for a variety of projects and situations. FBE has facilitated dozens of sessions with local stakeholders to address complex and often controversial environmental issues and to solicit input on various components of watershed management and community planning projects. Our associates strive to be thoughtful in soliciting, assessing, and using comments and suggestions from stakeholders during the planning and outreach process. FBE understands the importance of simple and effective communication of important and complex topics to ensure that stakeholders and concerned citizens can fully and equally participate. An example of this at the local level is FBE's facilitation of a unique public meeting involving the planning boards of both Acton, ME and Wakefield, NH. The planning board members were asked to share views on the barriers and advantages of stormwater management. FBE received extensive positive feedback on their facilitation of this meeting, and it has directly led to increased public support of new stormwater management measures, which have now been established.

FBE currently works with a wide range of clients including the US Environmental Protection Agency (US EPA), Maine Department of Environmental Protection (Maine DEP), New Hampshire Department of Environmental Services (NHDES), Maine and New Hampshire municipalities, Piscataqua Regional Estuaries Partnership (PREP), regional planning commissions, lake and watershed associations, and non-profit environmental organizations, including regional land trusts. Specific services include water quality monitoring, modeling and assessment, stormwater management, nutrient management, design and oversight of stormwater controls or best management practices (BMPs), riparian habitat assessments, development of Total Maximum Daily Load (TMDL) reports, ordinance reviews and buildout analyses, and watershed management plans for lakes, rivers, and streams, geographic information system (GIS) mapping and analysis, data compilation and interpretation, wetland delineation, soil characterization, invasive plant management, erosion control, grant writing, and scientific report writing. Our offices are in Portland, ME and Dover, NH, and our website www.fbenvironmental.com describes more about our firm.

Horsley Witten Group, Inc. – Exeter, NH; (603) 658-1660
Email: rclaytor@horsleywitten.com (Rich Claytor, President)

Horsley Witten Group
Sustainable Environmental Solutions

Horsley Witten Group, Inc. (HW) is a leading-edge engineering, planning, and environmental consulting firm providing sustainable design solutions for over 25 years. Over that period, their success in terms of projects and clients can be attributed to a combination of innovation, responsiveness, and client satisfaction. HW's dedicated staff of highly-skilled professionals manages projects in New England and beyond. HW excels as a liaison between decision-makers and the public, translating technical subjects into understandable concepts. Their multidisciplinary-team approach integrates resilience, sustainable civil engineering, and landscape architecture.

HW's award-winning projects address critical environmental challenges including climate change, coastal resiliency, watershed health, and open space and natural resource protection. Their services include site design, green infrastructure, smart growth planning and community design, zoning regulation review, water and natural resources assessment, and emergency preparedness. Their clients include the US EPA, NOAA, and the US Department of Justice, as well as more than 100 New England municipalities, several state agencies, tribal agencies, non-profit organizations, private organizations, and multiple universities and colleges. HW is a New England-based corporation headquartered in Sandwich,

MA with regional offices in Boston, MA, Providence, RI, and Exeter, NH. For more information, visit us at www.horsleywitten.com or facebook.com/HorsleyWittenGroup.

The University of Maine – Orono, ME; (207) 581-2805

Email: adam.daigneault@maine.edu (Adam Daigneault, Ph.D.)

The University of Maine offers premier research facilities to study sustainable forestry, nature-based recreation and tourism, and community development, including the Forest Policy and Economics Lab. The Forest Policy and Economics Lab is a diverse group of faculty, staff, and students focused on researching integrated and applied approaches to helping solve complex natural resource and environmental issues. The lab has conducted research in all seven continents of the globe, investigating topics ranging from estimating global timber supply and carbon stocks under different socioeconomic and policy conditions to understanding how landowners prioritize the management of their farms and forests. The lab is led by Dr. Adam Daigneault, Assistant Professor of Forest Policy and Economics at the University of Maine's School of Forest Resources, faculty fellow at the Senator George J. Mitchell Center for Sustainability Solutions, and affiliated faculty member with the University of Maine's School of Economics and Ecology and Environmental Sciences Program. The lab includes students from the School of Forest Resources, School of Economics, Ecology and Environmental Sciences Program, and School of Food and Agriculture. As such, there is strong emphasis on cross campus collaborations, including with the Mitchell Center for Sustainability Solutions and Center for Research on Sustainable Forests. Lab members are currently working on or have received degrees in Forest Resources, Resource Economics and Policy, Ecology and Environmental Science, Climate Change Mitigation and Adaptation, and Sustainability.

rbouvier consulting. – Portland, ME; (207) 272-8692

Email: rachel@rbouvierconsulting.com (Rachel Bouvier, Ph.D.)

rbouvier consulting, founded in 2015, is a company specializing in economic, policy, and statistical analysis, focusing on environmental and natural resource issues, climate change, and community economic development. We provide economic impact analysis, risk assessment, policy research, and natural resource valuation services to non-profit firms, private companies, and government agencies. Current and past clients include the New England Interstate Water Pollution Control Council, the Massachusetts Executive Office of Energy and Environmental Affairs, the Maine Land Use Planning Commission, the Southern Maine Planning and Development Commission, and the Nature Conservancy, among others. The owner and founder of rbouvier consulting, Rachel Bouvier, is also Associate Professor and Chair of Economics at the University of Southern Maine and member of the Board of Directors at Growsmart Maine.

PROJECT TEAM PROFILES

Brief staff descriptions of key project personnel are presented below. More detailed staff qualifications are provided in the Resume section of this proposal.


A


B


C


D


E


F


G


H

A FORREST BELL, FBE Owner and Principal Scientist; **7% of Project Hours**

Forrest is a regional leader in managing watershed assessment, planning, and restoration projects, having directed more than 550 successful environmental projects, ranging from small (<$5,000) to large (>$1,000,000), over 20 years for a diverse array of clients, including federal and state natural resource agencies, municipalities, and non-profit organizations. FBE managed a $1.6 million contract with USEPA Region 1 under a Blanket Purchase Agreement from 2008-2013. Task orders included detailed assessments of impaired waterbodies in all six New England states (i.e., statewide TMDLs), including technical writing, river and stream mapping, impervious cover analysis, pollutant load modeling, and water quality monitoring. FBE also managed a $900,000 contract with the Maine DEP from 2000-2007, which included TMDL development and phosphorus control action plans for 36 nutrient-impaired Maine lakes. Since founding the company in 2001, Forrest has grown FBE into a successful and reputable consulting business with thirteen highly qualified staff scientists and planners. **Forrest will serve as Principal-In-Charge and will ultimately be responsible for ensuring successful project completion.**

B RICH BRERETON, Ph.D., FBE Project Manager & Land/Water Permitting Division Lead; **25% of Project Hours**

Rich has been with FBE since 2017 and completed his Ph.D. in Earth and Environmental Science from the University of New Hampshire-Durham. He has extensive experience leading scientific and environmental inquiry in the field. At FBE, Rich leads the Land and Water Permitting Division and manages FBE's permitting program for private and public projects. His expertise is in building relationships with stakeholders and collaboratively guiding projects toward good environmental outcomes and regulatory compliance. In addition, as a water resource scientist, he manages multifaceted water resource projects

requiring data collection, management, and analysis, water quality modeling, and GIS mapping and analysis. Prior to joining FBE, Rich gained valuable experience at the UNH Water Quality Analysis Laboratory, the National Science Foundation Critical Zone Observatory Network, the Marine Biological Laboratory, and the Puerto Rico Long-Term Ecological Research program. **Rich will serve as the Project Manager and will be responsible for project oversight and completion.**

C ANTONIA SOHNS, Ph.D., FBE Project Manager & Climate Change Division Lead; **8% of Project Hours**

Antonia joined FBE in 2019 as the Climate Change Division Lead and project manager. She completed her Ph.D. at McGill University in 2019, where her research used qualitative and quantitative methods to examine what factors affect drinking water access in Arctic households. Her fieldwork focused on water security in Alaska. Before her doctoral degree, Antonia was a water and energy analyst/consultant at the World Bank in Washington D.C. and an intern at the White House under President Obama. In her work at the World Bank and at the White House, she worked on large international and national projects that required skills in stakeholder engagement, communicating complex topics to broad audiences, budgeting, and collaboratively working across sectors. She has an MSc. in Water Science, Policy and Management from the University of Oxford, and a B.S. in Earth Systems, Oceans track from Stanford University. Her work and research have focused on natural resources management and community resilience and adaptation. **Antonia will provide expert review of policies and regulations for the project and help direct and facilitate the public outreach effort.**

D LAURA DIEMER, FBE Project Manager & Environmental Monitoring Lead; **13% of Project Hours**

As the FBE Environmental Monitoring Division Lead, Laura oversees FBE's monitoring projects and provides outstanding technical oversight of watershed planning and restoration projects that require water quality analyses, pollutant load modeling, quality assurance/quality control review, statistical analyses, GIS mapping, and public presentations. Laura has been with FBE for eight years and specializes in synthesizing complex water quality information into a form that is clear to a range of clients, including federal and state agencies, lake associations, nonprofit organizations, municipalities, and the public. She received a B.S. in Ecology and Environmental Science from the University of Maine and a M.S. in Soil and Water Resource Management from the University of New Hampshire (UNH). **Laura will lead the environmental modeling task and provide quality control review of technical work products.**

E Richard Claytor, PE., HW President and Professional Engineer; **2% of Project Hours**

Rich Claytor has more than 35 years of practical experience in civil and environmental engineering with specific expertise in water resources planning, design, implementation, research, education, and training (19 years with HW). Rich has extensive experience and expertise in stormwater management design, implementation, program assessment, policy and evaluation. Rich also is experienced in watershed planning, training and education; water resource assessment, research, and permitting; water supply and wastewater design; land use planning, site design and research; storm drainage, erosion/sediment control, and roadway design; and construction administration. **Rich will be responsible for ensuring successful completion of HW's project tasks.**

F Ellie Baker, AICP, HW Senior Project Manager and Senior Environmental Planner; **13% of Project Hours**

Ellie Baker has 25 years of consulting experience working with federal, state, municipal, non-profit, and other private clients in the fields of environmental planning, policy, and science. Ellie has particular

experience in green infrastructure and climate resiliency planning, watershed management, non-point source pollution management, coastal systems, and stormwater management. With a background in watershed management, Ellie has managed and supported multiple watershed management efforts to improve water quality, reduce flooding, restore habitat, and protect property, including efforts in the Taunton River watershed, Mystic River watershed, and Assawompset Ponds Complex in MA. All of these long-term projects have included significant public engagement and technical assistance to staff. Ellie supports communities with bylaw and ordinance revisions to improve water resource protection and management and also assists multiple local boards and commissions with third party technical reviews to evaluate compliance with natural resource protection, water quality, and stormwater requirements. She has an in-depth understanding of municipal decision-making processes related to water resources management and has most recently been working with communities on issues related to resilience planning. **Ellie will provide expert support for tasks related to ordinance review, ordinance language drafting, and public engagement.**

G Adam Daigneault, Ph.D., University of Maine, School of Forest Resources, Assistant Professor of Forest, Conservation, and Recreation Policy; **14% of Project Hours**

Dr Adam Daigneault has been an Assistant Professor of Forest Policy and Economics at the University of Maine's School of Forest Resources for the past five years. He received a PhD in Environmental and Natural Resource Economics from Ohio State University in 2006 and has spent the past decade developing quantitative models to assess the socio-economic impacts of environmental and land use policy on the natural resource sectors. Dr. Daigneault's research has focused on a wide range of issues, including freshwater management, climate change mitigation and adaptation, invasive species control, and valuing ecosystem services. His work typically follows an integrated approach to address complex policy issues that have a direct impact on stakeholders.

Dr. Daigneault has conducted dozens of watershed-level economic analyses over his career, and nearly all of them have focused on identifying potential trade-offs of alternative policy and land use interventions. One of his most recent analyses focused on estimating the benefits and costs of forest conservation on water quality and other ecosystem series in the Sebago Lake Watershed, Maine.

Prior to joining the School of Forest Resources at the University of Maine, Dr. Daigneault was a Senior Economist at Landcare Research, New Zealand's leading institute on terrestrial ecosystems and biodiversity research and an Economist for the U.S. Environmental Protection Agency, where he worked extensively on policy analysis relating to climate change, water quality, and land use change. **Adam will lead the economic analysis in Tasks C-1 and C-2.**

H Rachel Bouvier, Ph.D., rbouvier consulting, Principal/Owner and Economist; **7% of Project Hours**

Rachel is the owner and founder of rbouvier consulting, an economic and sustainability consulting firm that has provided economic impact analyses, risk assessments, social return on investment reports, policy research, and natural resource valuation services to non-profit firms, private companies, municipalities, and government agencies since for the past 5.5 years. Rachel is Chair and Associate Professor of Economics at the University of Southern Maine. She earned her Ph.D. in Economics from the University of Massachusetts at Amherst, where she focused on the relationship between economic development and environmental quality. She also holds a Master's degree in Resource Economics and Community Development from the University of New Hampshire. **Rachel will lead the economic analysis in Task C-3 and provide senior oversight of Task C-1 and C-2.**

LEVEL OF PARTICIPATION

The following flow chart lists the process for project decision making. Forrest Bell will be responsible for all major items, including the submission of deliverables and monthly invoices. He will oversee the overall direction and flow of the project and will troubleshoot any issues that may arise. Forrest is responsible for ensuring that the project manager and team members are completing the work to the satisfaction of the client. Rich Brereton will be the Project Manager for the project tasks and project details and will ensure the successful and timely completion of each deliverable by FBE. The project subcontractors from Horsley Witten Group, the University of Maine, and rbouvier consulting will work collectively with FBE to provide professional expertise for the project.

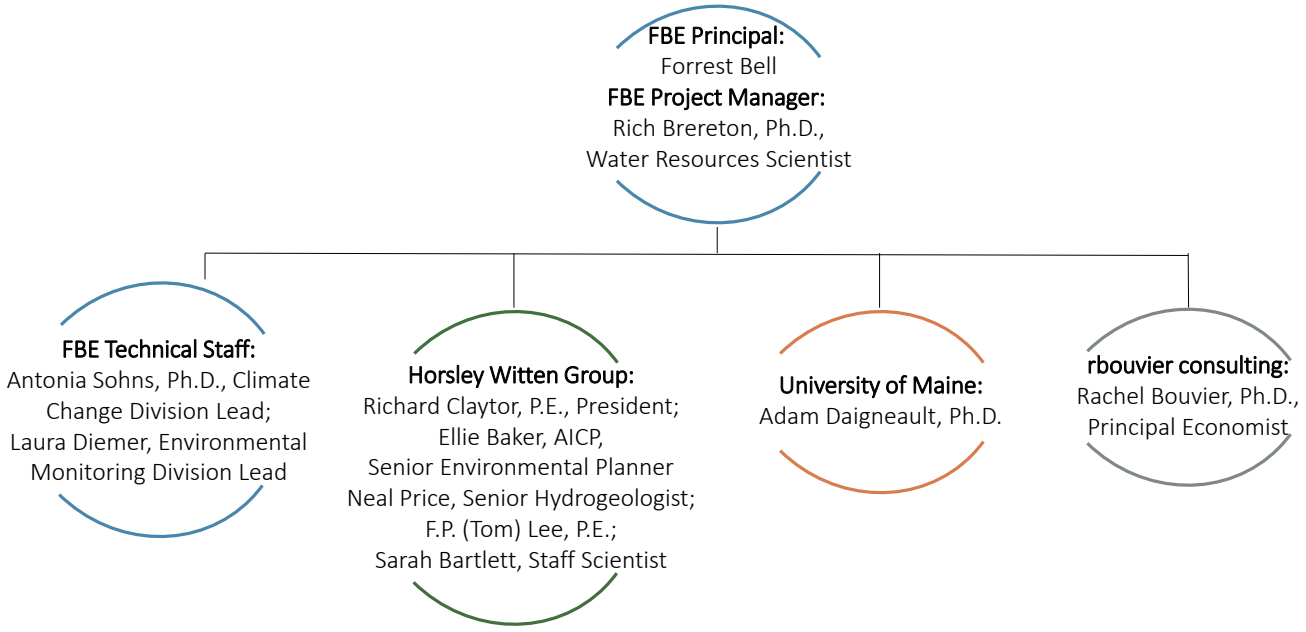


Photo Credit: Bob Orsillo, fineartamerica.com

RECENT AND SIMILAR PROJECTS

Addressing GAO's Recommendations: LISS Performance Reporting and Cost Estimating - 2018

In 2018, FBE partnered with Horsley Witten Group and rbouvier consulting to assist the Long Island Sound Study (LISS), a US EPA National Estuarine Partnership aimed at restoring ecological health in the Long Island Sound, use best practices to improve their progress tracking. Funded by US EPA Region 1, the project was designed to respond to a programmatic review by the US Government Accountability Office (GAO) and implement GAO's recommendations. The team of FBE, Horsley Witten Group, and Rachel Bouvier guided LISS and state and academic partners through a dynamic and collaborative review process. This involved a detailed examination of the ecological indicators proposed by LISS to monitor a range of ecosystems (including but not limited to nitrogen loading, water clarity, sediment quality, riparian buffers) and compared current practices to LISS's national program peers. An economic analysis was completed to estimate implementation costs of ecosystem restoration goals, which included accounting for overlapping goals and uncertainties, as well as developing a cost matrix at a 5-year and 20-year implementation target timeline. This process involved extensive engagement of stakeholders and collaboration across federal and state agencies, municipalities, and academic institutions. The successful conclusion of this project resulted in a full report in 2019 available on LISS's website, entitled Addressing GAO's Recommendations: LISS Performance Reporting and Cost Estimating. Several recommendations set forth by the project team have since been implemented to improve LISS's tracking and reporting on environmental conditions in order to meet their ecosystem restoration and protection goals.

Client Reference: Mark Tedesco, Director, Long Island Sound Office, U.S. EPA; (203) 977-1542; Tedesco.Mark@epa.gov

Boothbay Region Water District: Water Quality Models for Source Water Lakes

FBE assisted the Boothbay Region Water District (BRWD) with developing a water and phosphorus load budget for both Knickerbocker Lake and Adams Pond, both of which are used as primary drinking water sources for the surrounding towns. FBE field-confirmed and edited sub-basin boundaries to the lakes, updated the land cover layer for the watersheds using the most recent available satellite imagery, conducted a buildout analysis, and modeled the lakes' water quality under past, current, and future conditions, as well as under different regulatory scenarios. Areas of each watershed contributing the most phosphorus to the lake helped target restoration efforts and best management practices for the

most effective improvement to water quality. FBE has since been used as an on-call consultant for BRWD work. Recently, FBE performed an analysis that determined the minimum forested land coverage required to meet water quality standards and remain viable drinking water sources. BRWD is now working to secure large parcels of forested land for conservation in both watersheds.

Client Reference: Susan Mello, Natural Resources Program Manager, Boothbay Region Water District; (207) 633-4723 x 111; suem@bbrwd.org

Palmer River Water Quality & Land Use Regulatory Analysis

FBE, in collaboration with Horsley Witten Group, state environmental agencies, and the USEPA Region 1, completed an analysis to better understand the status of water quality in the Palmer River watershed, located in Rehoboth, Seekonk, and Swansea, MA and Barrington and Warren, RI. The analysis included an assessment of water quality status and trends in the context of land cover change and agricultural best management practice (BMP) installation in the watershed. The project (1) developed recommendations for use of an innovative microbial DNA microarray (PhyloChip) method to identify fecal sources in other regional watersheds in the Southeast New England Program (SNEP); (2) analyzed water quality trends in the Palmer River watershed using existing water quality data and PhyloChip results, geospatial information, and summary papers and determined the efficacy of agricultural BMPs; and (3) assessed the impact of changing land use in the Palmer River watershed and provided municipal land use regulation recommendations for reducing the impacts of land development on water quality.

Client Reference: Ian Dombroski, Project Lead, US Environmental Protection Agency; (607) 918-1342; dombroski.ian@epa.gov

Project Examples from Sub-Consultants

Taunton River Watershed Management Plan & LID Regulatory Code Update

Horsley Witten Group collaborated with the Commonwealth of Massachusetts, The Nature Conservancy, and regional planning agencies to develop a long-term vision and strategy for the Taunton River watershed. This plan focuses on protecting ecological resources in support of the hydrologic, environmental, and economic sustainability of the region. Phase I of this Study, completed in 2008, included the development of a GIS-based tool to estimate water budgets for more than 100 sub-basins within the watershed, looking at water withdrawals, wastewater management, impervious cover, and other changes in land use. Habitat and development data were also evaluated within each sub-basin to assist in prioritizing preservation and restoration efforts. In Phase II, Horsley Witten Group developed management recommendations and on-the-ground demonstration projects to illustrate innovative low impact development (LID), green stormwater infrastructure, and wastewater management approaches in the watershed. We also worked with two communities to draft updated regulatory codes to incorporate the LID and green stormwater infrastructure approaches into the permitting requirements for new development and redevelopment. The goal of these bylaw revisions, which also served as an example to others, was to protect the water quality and water quantity in the Taunton River system from further degradation due to development and to promote restoration of impacts. The Taunton River system provides drinking water supply to many of the 44 communities in the watershed.

Client Reference: Alison Bowden, MA Freshwater Program Director, The Nature Conservancy; (617) 532-8300 x. 8360

An Economic Case for the Sebago Watershed Water & Forest Conservation Fund

Dr. Adam Daigneault of the University of Maine School of Forest Resources and the Senator George J. Mitchell Center for Sustainability Solutions and Dr. Aaron Strong of Hamilton College Environmental Studies Program completed an economic feasibility analysis related to scaling up investments in forest conservation that would secure water quality and other ecosystem services in the Sebago Lake watershed over the next 30 to 50 years. The study utilized the latest economic approaches and current land use, ecosystem service, and conservation information to evaluate the benefits and costs of natural water filtration and co-benefits such as carbon sequestration, recreation, habitat, and the provision of fuel and fiber that could be realized from watershed protection. It also provided recommendations on where investments in conservation were most likely to provide the highest returns on investment. The 282,000-acre Sebago Lake watershed provides drinking water to more than 200,000 users in the greater Portland, Maine region. The Portland Water District (PWD) has federal filtration exemption and invests in watershed protection through acquisitions and conservation easements in partnership with local and regional conservation organizations. The Sebago Lake watershed faces the threat of water quality impairment through loss of forest cover, primarily due to anticipated development. The report answered the following questions:

1. At what level of forest area converted to development would the Sebago water supply be at risk of significant decreases in water quality?
2. What are the costs and benefits of protecting enough land to ensure clean water?
3. What is the value to beneficiaries of clean water and the associated co-benefits of land protection in the watershed?
4. Is there a business case for commercial water users to invest in watershed protection to reduce future risk to their water quality?
5. What is the marketing value for commercial water users to invest in watershed protection?
6. Are there investment grade conservation opportunities in the watershed? For example, is there real potential for existing ecosystem service markets (e.g., carbon market) to use any value of co-benefits to help pay for watershed protection?

Client Reference: Spencer Meyer, Senior Conservationist, Highstead Foundation, (207) 852-3171; smeyer@highstead.net

City of Portland Assessment of the Waterfront and Marine Economy

rbouvier consulting worked with AECOM Technical Services to perform an economic analysis of the Portland Harbor and water-related industries, looking at economic impacts to both Portland and South Portland. The full report for Portland can be found here. The basic framework for the study followed the Economics: National Ocean Watch (ENOW) Ocean Economy Framework (NOAA). An input-output analysis was completed using the IMPLAN modeling software to measure the interdependencies between various sectors of the economy. The analysis highlighted the economic importance of the working waterfront in Portland. Interviews and conversations with waterfront users suggested that without this access the cost of doing business in Portland Harbor would increase both monetarily (increased cost of fuel) and in terms of opportunity cost of time, and thus, the health of the marine-related economy could be jeopardized.

Bill Needelman, Waterfront Coordinator, City of Portland; wbn@portlandmaine.gov

3 APPROACH & METHODOLOGY

We understand that the City of Auburn (the City) wishes to evaluate existing ordinances related to water quality protection at Lake Auburn, which serves as a drinking water supply to the cities of Auburn and Lewiston and part of the town of Poland. The analysis will identify watershed protection ordinance deficiencies, develop options for improvements and updates to modernize the City's ordinances to include current best management practices, and consider the overall effect of watershed development density, along with associated stormwater runoff, wastewater disposal, lost economic and recreational opportunity, and water quality implications of alternatives. The outcomes of the evaluation will be used to help the Planning Board and City Council adopt ordinance amendments that meet the needs of the City of Auburn.

We recognize that the City of Auburn, along with the Auburn Water District (AWD) and the Lake Auburn Watershed Protection Commission (LAWPC), have taken numerous progressive actions to protect sensitive natural resources around Lake Auburn. These protection efforts have afforded the AWD and Lewiston Water Division exemption from the EPA Surface Water Treatment Rule's filtration requirements under the Safe Drinking Water Act.

Balancing natural resource protection with development opportunity, the City of Auburn also serves many commercial and industrial businesses that are critical to the local and regional economy. Quantifying the potential lost economic opportunity with added protections in the Lake Auburn watershed will be a key consideration and justification for recommended amendments to existing regulations.

The expertise of our team will be efficiently divided among the tasks. As the lead firm, FBE will rely on support from HW's environmental planners and water resources engineers for Tasks A, B, and D, as well as support from economists at the University of Maine and rbouvier consulting for Task C.

A. Analysis of Regulatory Impacts

Objective: Determine impact of regulations in and around Lake Auburn. What is working and what is not working? Can building restrictions/regulations within the watershed be eased if a filtration plant is built?

1) Review existing ordinances and bylaws for the protection of Lake Auburn and identify strengths, weaknesses, obsolescence, and concerns with existing ordinances and bylaws.

Our team will complete a thorough ordinance review of relevant water quality protections adopted by the City of Auburn for Lake Auburn. At a minimum, we will seek out the following sources for review: Code of Ordinances for the City of Auburn, Maine (June 1, 2020), By-Laws for Protection of Lake Auburn, City of Auburn Comprehensive Plan: 2010

Update, and 2010 Comprehensive Plan Progress Report, Natural Resources (and the reports therein). We will generate a spreadsheet matrix that identifies relevant ordinances and notes specific strengths, weaknesses, obsolescence, and concerns for each. We will also consider the ordinance recommendations included in the 2010 Lake Auburn Watershed Management Plan and any other planning documents that the City wishes us to review. The strength of an ordinance or bylaw can be related to the technical standards implemented, the authority for enforcement, the clarity of the requirements, the process for review and evaluation (or permitting) of activities in the watershed, and the ability to manage both future activities, as well as existing activities.

We will confer with and interview representatives from the City of Auburn economic and community development department, the AWD, and the LAWPC for additional resources and information, with particular attention related to the redundancy or obsolescence when enforcing ordinances, as well as bolstering our clear understanding of the current land use conversion and development pressures in the watershed. Following our initial review of existing ordinances and bylaws, we recommend that detailed input from each representative be gathered via individual calls and individual interviews with our team. We will then convene a virtual panel for group discussion of common issues or topics that came up during the one-on-one interviews. During these discussions, additional stakeholders for interview may be identified and contacted by our team.

2) Review existing studies and reports regarding consideration of filtering drinking water and identify options for updates or improvements.

Our team will compile and review existing studies and reports that consider filtering drinking water from Lake Auburn. We will also interview City staff and prior consultants to obtain more detailed information on the existing studies and reports. Such studies will likely include the Application for Exception to the SDWA Filtration Requirement (1991), the Source Water Assessment Plan – Lake Auburn Watershed (SWAP) (2003), the SDWA Compliance Study (2005), and the UV Concept Design Report (2007), but we will request copies of all studies listed in Section 7 of the RFP (and additional studies since 2013) for relevancy review. We will use this review in conjunction with the ordinance and bylaw review in Task A-1 above to develop options for updates or revisions to watershed regulatory measures that will allow Lake Auburn to continue to meet the filtration avoidance requirements into the future. These options will be described conceptually in a detailed memorandum for discussion with the client prior to the development of specific language revisions. It is these concepts, along with the watershed benefits and environmental impacts, that will be evaluated in the analysis of economic impacts (Task C). We will also use the comparison with best practices used by other communities, described in A-3 below, to inform the list of potential regulatory updates.

3) Determine if the current "multiple barrier approach" to water quality, and its impact to stakeholders, are consistent with best practices used by other protected water sources.

The LAWPC currently follows the "Multiple Barrier Approach to Public Health Protection," which targets four key safeguards or barriers needed to provide safe drinking water. Our team will identify at least three and up to ten other comparable protected drinking water sources (based on size, population served, water quality status, and geographic proximity, among other factors, see Task C-3) and summarize their regulatory best practices for potable water protection. The case studies selected will include both filtered and non-filtered drinking water sources. Similarities and differences among the regulatory best practices for each drinking water source (including Lake Auburn) will be determined in a side-by-side comparability analysis. Impact to stakeholders, including the extent of development restriction and recreational use limitation, as well as the cost to taxpayers for filtration, will be considered and weighed among the case studies (see Task C-3). The analysis will help determine if other comparable protected but filtered drinking water sources have less stringent restrictions to development and recreational use and if other comparable protected and non-filtered drinking water sources have similar levels of restrictions. Lake Auburn is one of only 50 other watersheds in the United States with a filtration waiver.

B. Analysis of Environmental Impacts

Objective: Determine short- and long-term environmental impacts pertaining to past and future watershed and in-lake strategies and make recommendations that will ensure long-term viability of Lake Auburn as a public drinking water supply, future development, and possible recreational activities. Is the current amount of protected land too much, too little, or sufficient to meet water quality goals for an unfiltered public water supply? Do additional recreational opportunities exist that will not impact the overall environmental health of Lake Auburn? Can changes occur to development standards in the Lake Auburn watershed to maintain the unfiltered potable water quality status of the lake?

1) Investigate the magnitude of changes in water quality in Lake Auburn that could result from changes in development standards or enhanced recreational activities.

In consultation with City representatives, our team will select the best model and approach for quantifying estimates of water quality changes resulting from several scenarios of land use change. A good candidate is the InVEST (Integrated

Valuation of Ecosystem Services and Tradeoffs) model, which can estimate the potential changes in multiple water quality parameters (e.g., amounts of phosphorus, nitrogen, and sediment) in Lake Auburn that could result from multiple scenarios, including, but not limited to, the following:

- Minimum amount of protected, forested land in the watershed needed to meet water quality goals for an unfiltered public water supply.
- Incremental and/or complete build-out options with key changes to development standards (based on Task A results) and the point at which the filtration waiver is lost.
- Enhanced recreational activities such as boating, fishing, camping, hiking, and limited bathing.
- Changes to woodlot management plan practices.

InVEST is a suite of open-source software models used to map and value ecosystem goods and services and quantify how changes in ecosystems can lead to changes in the flows of goods and services to people. The unique modular design of InVEST allows for effective balancing of environmental and economic goals and assessment of tradeoffs associated with alternative management options. InVEST uses spatial inputs and thus accounts for the specific location of outputs, which can be useful for targeted protection efforts. For this project, we recommend the Recreation, Sediment Retention, and Water Purification (Nutrient Delivery Ratio) sub-models.

We assume that we will have access to all files associated with CEI's 2010 Generalized Watershed Loading Function – Enhanced (GWLF-E) Version 7.2.3 model with GIS interface for Lake Auburn, as well as the gross build-out evaluation files, as reference for setting up and calibrating the InVEST models. We will rely on the City to provide up-to-date GIS land cover, building, zoning, and parcel files, as well as water extraction/level and water quality records.

Based on a review of comparable studies, our team will assess and quantify (as available) the relative risk of enhanced recreational activities on the spread of invasive species and pathogen contamination from human waste, which are not accounted for specifically in InVEST.

One important factor to consider in the modeling exercise will be climate-driven changes in the timing and magnitude of storm events and warming air temperatures. The 2013 Phase I Diagnostic Study of Lake Auburn showed the significant influence of wetter winter/spring periods and increasingly warmer intake water temperatures on the probability of blooms, regardless of any changes in land use, development standards, or recreational activities. The impact of climate change on water quality in Lake Auburn will be assessed empirically from site-specific historical data and Maine-based mid- and late-century projections from the University of Maine Climate Change Institute and consider the recent study results by Gundersen (2020) in The Origins and Dynamics of Phosphorus in Maine's Lake Auburn Watershed. We will also empirically derive the climate-driven risk of blooms generating cyanotoxins and the likelihood of any changes to taste or odor of source water.

2) Review existing resources and practices pertaining to land conservation, erosion control, and forest management.

Our team will complete a thorough review of existing resources, studies, and reports (starting with at least the ones mentioned in Section 7 of the RFP and since 2013, including the LAWPC's Woodlot Management Plan) that describe practices related to natural resource protection, including land conservation, erosion control, and forest management. In a spreadsheet matrix, we will identify the strengths and weakness of each practice and determine possible opportunities for improvement. The water quality benefit of woodlot management practices will be quantified through InVEST in Task B-1.

3) Review LAWPC land purchase strategy and history of purchases.

Our team will review the LAWPC's land purchase strategy and history of purchases. Significant amounts of land in the watershed have already been put into conservation and have gone through a reforestation process. At present, the LAWPC controls 1,800 (20%) of the watershed and 80% of the direct shoreline along Lake Auburn. The economic cost of these purchases will be considered in Task C. The water quality benefit of individual and collective land purchases for conservation will be quantified through InVEST in Task B-1.

C. Analysis of Economic Impacts

Objective: Determine the financial impacts to the City of Auburn, past and future, to provide a public drinking water supply for the customers of the AWD, with consideration for the impacts of interventions on past, present, and future tax revenues, economic activity (including development and recreational), and rate payers.

1) Quantify the economic costs of added protection for Lake Auburn.

Costs of added protection through ordinances and regulations for Lake Auburn will accrue for a range of sources, including lost property tax revenues and the opportunity cost of unrealized economic activity due to land and water use restrictions. Water users are also impacted by the cost of watershed protection through the rates that they pay. However, it is also uncertain how these costs compare to other alternatives such as constructing a water filtration plant (see Task C-2). To quantify the impacts of added lake protection, we will utilize information gathered in Task B on

the potential expansion of protected land that could occur in the watershed in the future, and then estimate the change in land values, property tax payments, and lost economic activity if that land had the potential to be developed at different levels of impact. These estimates could then be used to quantify the potential opportunity costs of avoided development relative to the cost of constructing a filtration plant. Attention will be paid to quality of life and distributional considerations, in addition to financial opportunities in the area.

2) Quantify the construction, operating, and maintenance costs of various drinking water treatment scenarios, including modern filtration and other technologies to ensure both quality drinking water and long-term lake health, as well as the potential for supplementary or alternate drinking water sources.

At present, the AWD has a filtration waiver and does not need a filtration plant to treat surface water before distributing it to its customers. However, if water quality in the lake was to deteriorate to a level at which the filtration avoidance waiver was no longer obtainable and filtration or other additional treatment became necessary, this would require a significant capital investment, as well as long-term maintenance and operation costs. Prior estimates have been in the $35 million range, which would have impacts on water user fees. Our team will draw on existing studies and literature to develop a short list of potential treatment options for consideration and review that list with the City. We will then develop a planning-level cost estimate for construction, operation, and maintenance of the proposed system, building off the prior estimates that have been developed by and for the City in recent years. We will consider existing water withdrawal needs, as well as trending future needs based on anticipated growth over the typical projected life of the systems. This analysis will serve as a comparison to the costs and benefits of regulatory filtration avoidance measures evaluated in the regulatory impact analysis (Task A). We will quantify the capital and operation and maintenance expenditures required to build and run a plant that would likely have a capacity of 10-20 million gallons per day (MGD). For example, USEPA (2008) published a range of costs for filtration plants with varying capacities, which we will plot out and compare using regression analysis. A similar analysis was recently completed to estimate the costs of putting a 50-150 MGD filtration plant in the Sebago Lake watershed (Figure 1). Up to four additional technologies to ensure both quality drinking water and long-term lake health will be evaluated, based on what is deemed technologically feasible for Lake Auburn.

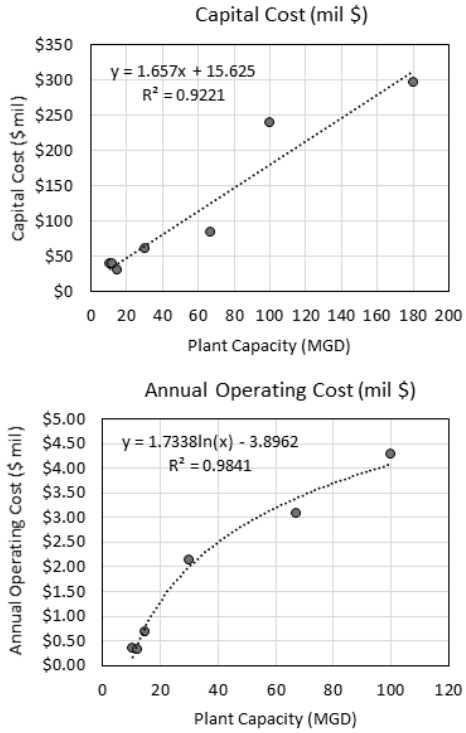


Figure 1. Total capital and annual operating and maintenance costs of a new filtration plant by capacity (MGD), based on EPA (2008) plant data (Source: Daigneault and Strong, 2019).

The change in cost that the AWD would face by needing to construct and maintain various new technologies would likely be passed through to their customers through changes in rate payments. These rates and structure in which water costs are levied are assumed to vary by type of customer (e.g., residential, commercial, industrial). The rate changes will then be used to evaluate the relative cost of each potential intervention compared to rates from the current water management strategy. The analysis will also consider the cost of seeking alternative sources of potable water and using short-term in-lake management controls such as algicides and alum treatments, as well as the potential environmental justice impacts of such changes in rate payments in accordance with current practices.

3) Evaluate where Lake Auburn currently ranks with respect to other filtered drinking water sources, and how that ranking could change with changes in various factors, with consideration for lake size and depth, permissible types of development and recreation, cost to construct and maintain, and other factors.

The economic piece of this sub-task will be combined with Task A-3. We will rely on data from USEPA and state level environmental agencies to quantify and compare surface water quality in Lake Auburn to other filtered lakes and water sources in the US. The analysis will include comparable metrics such as: (1) waterbody location, (2) lake size and max and mean lake depth, (3) total watershed area, (4) watershed

protected land area, (5) watershed land cover distribution, (6) watershed recreational resources and activities, (7) permissible types of development in watershed, (8) water source capacity in MGD, (9) water management company annual expenditures, customer base, and water rates, and (10) lake water quality levels (e.g., nutrients, sediment, etc.).

These metrics will then be used to assess where Lake Auburn ranks relative to comparable but filtered drinking water sources across the US. Rankings will be created for each metric, as well as an index that utilizes multiple indicators. Additional research could utilize regression analysis to evaluate the relative influence of each indicator on key economic metrics such as water rates or annual expenditure per unit of water consumed.

D. Final Report Outcomes

1) Compare identified options in all three categories and make holistic recommendations to the City Council on bundled Improvements.

We will develop a final report that describes the approach and results for Tasks A-C and makes specific ordinance amendment and/or best practice recommendations for the City to adopt or implement. All supporting data and analyses will be provided in spreadsheets, geodatabases, or other relevant formats.

2) Present options to Planning Board.

We will present a summary of recommendations to the City Planning Board at a public meeting of the Planning Board and incorporate any feedback from the Planning Board. In our presentation, we understand the importance of serving as a third-party neutral voice, particularly regarding potentially contentious topics such as this that have generated significant prior consideration and discussion. We will rely on the Planning Board to manage the public participation process at the meeting. We will be prepared to provide a clear and neutral presentation based on our analysis and to answer questions that arise. Based on the final list of approved recommendations, we will draft ordinance revisions for the City Council to review.

3) Present options and Planning Board recommendations to City Council.

We will facilitate a workshop session with the City Council in a public meeting setting to discuss the watershed protection and water treatment options and recommendations, incorporating the Planning Board feedback and including the specific ordinance revisions resulting from that prior feedback. Our team will conduct itself in the same neutral manner at the City Council workshop session and will rely on the City Council to manage the public participation process. We anticipate providing a presentation, with significant time allotted to respond to questions and allow for discussion. Following the public workshop session with the City Council, we will incorporate comments and direction from the City Council and prepare final ordinance revisions for submission to the City Council for adoption. As part of this process, we will work with the City to determine an effective public engagement and outreach plan to solicit public participation and comment. Public engagement is an essential piece that will ensure that the public is involved in this process, trusts the process and the information, and ultimately supports the strategies and revisions that are identified. For purposes of this proposal, our team anticipates employing the following engagement strategies throughout this project:

Project Website. We can develop content for a unique project website. This website can include information announcing the project, tips on how to get involved, and ways to view presentations and data presented at community forums. It will also serve to keep community stakeholders informed and engaged early-on, during and following ordinance development.

Social Media. We can use a Facebook page as another way to engage community members. Whether it is used for project meeting announcements, notifications on the availability of draft materials for public review and comment, or simply to generate community discussions centered on specific topics, it can be a powerful tool to engage the public.

Online Survey. We can use SurveyMonkey to design and implement online surveys to gauge the community's knowledge and/or feedback on important topics relevant to this project. The project team is experienced in standard methods of survey design and execution.

Printed Media/E-blasts. We can develop a media strategy through local networks to publicize the project and direct stakeholders to the website, Facebook page, and presentation events. It can serve as both an educational tool and a mechanism for feedback.

E. Project Management

1) Manage all project components to meet the 4-month project duration schedule (by May 2021).

Our team will complete project management duties to ensure the successful and timely completion of project tasks. Project management duties include coordinating staff and stakeholders on tasks, responding to email correspondence and phone calls from stakeholders, and submitting monthly invoices. Our team will maintain direct communication with City staff to keep them informed of project progress. Within one week of contract signature, the project will be initiated with a team virtual call with City staff to review the scope of work and timeline and determine immediate data needs.

4

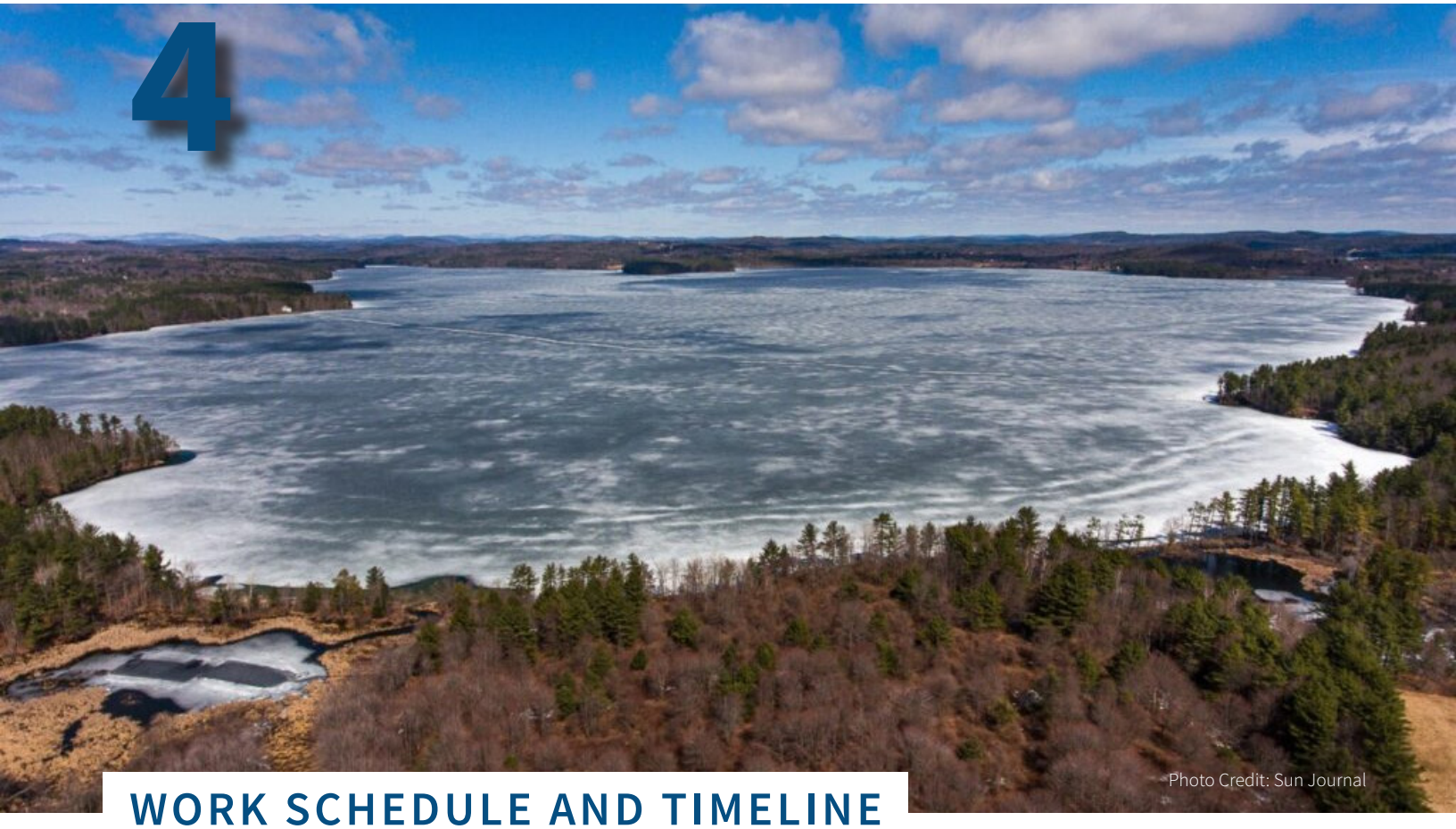


Photo Credit: Sun Journal

WORK SCHEDULE AND TIMELINE

The following table identifies the work schedule and timeline by task for this project, along with milestone dates or events for the 4-month project duration. It is expected that a contract will be secured with the City of Auburn in January 2021, with a conservative official start date of February 1, 2021, extending through to May 31, 2021 **(although we are able to start work at any time after contract execution)**. The City has acknowledged that the completion schedule will be dependent on timely City responses, seasonal data gathering and analyses, and processing information from stakeholder outreach and discussions. We will work as diligently and efficiently as possible to complete the requested scope of work within the allocated timeframe with the City's understanding that several elements (such as event scheduling and public/City feedback) may be out of our team's control and may impede the expeditious project timeline.

Task	Subtask	Deliverable
Task A-1: Ordinance Review	Ordinance Review	Spreadsheet matrix
	Individual Interviews	Call summary document
	Virtual Group Panel	Call summary document
Task A-2: Treatment Alternatives Review (Best Practices)	Reports Review	Spreadsheet matrix
	Individual Interviews	Call summary document
Task A-3: Comparison Matrix (Best Practices)	Comparable Examples Research	Spreadsheet matrix
Task B-1: WQ Impact Model Scenarios	Model/Approach Confirmation	Summary document
	Current Conditions Model Setup	Model files
	Scenario Model Runs	Model files
	Literature Review	Summary document
Task B-2: Land Cons & For Mgmt Review	Reports Review	Spreadsheet matrix
Task B-3: Land Purchase Review	Documents Review	Summary document
Task C-1: Costs of Added Protection	Economic Analysis & Research	Summary document
Task C-2: Treatment Alternatives (Economic Analysis)	Economic Analysis & Research	Summary document
Task C-3: Comparison Matrix (Economic Impacts)	Comparable Examples Research	Spreadsheet matrix
Task D-1: Final Report	Tasks A-C Findings and Recommendations Summary	Final Report with preliminary recommendations for ordinance amendments
Task D-2: Planning Board Pres & Draft Ordinance	*City schedules presentation to Planning Board*	*Scheduled Planning Board Presentation Date*
	Presentation to Planning Board	Presentation files
	Revisions to List of Ordinance Recommendations	Final list of approved recommendations for ordinance amendments
	Ordinance Amendment Language Drafting	Draft ordinance amendment language
Task D-3: City Council Pres & Final Ordinance	*City schedules workshop/public presentation with City Council*	*Scheduled City Council Workshop & Presentation Date*
	Workshop & Public Presentation with City Council	Workshop and presentation files
	Virtual Public Comment Period	Response to public comment summary
	Ordinance Amendment Language Revisions	Revised final ordinance amendment language
Task E-1: Project Mgmt	Project Mgmt	Timely project completion
	Kickoff Call	Call minutes
	City sends needed materials	*Receipt of materials*

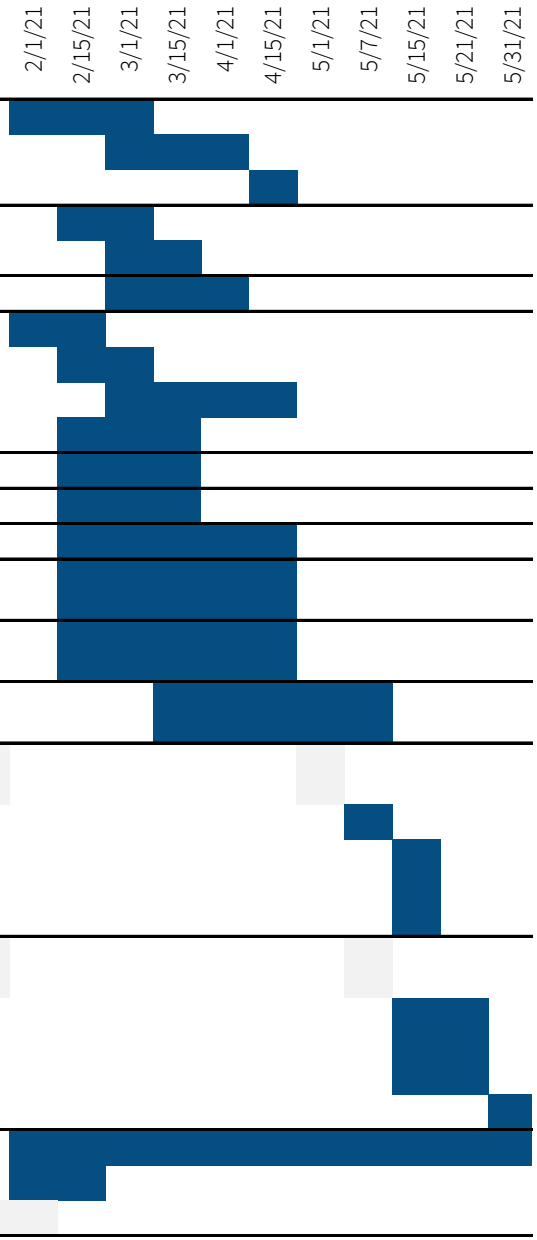


Photo Credit: Lake Auburn Watershed Protection Commission

REFERENCES

Maine Department of Environmental Protection

17 State House Station
28 Tyson Drive
Augusta, ME 04333

Contact: Don Witherill, Director of the Maine DEP Division of Environmental Assessment; (207) 215-9751; Donald.T.Witherill@maine.gov

Projects: Maine Statewide Nonpoint Source TMDL - 2012 ($192,240); numerous past and ongoing projects related to planning and implementation work for surface waters in Maine (2001-present)

United States Environmental Protection Agency

US EPA Region 1
5 Post Office Square, Suite 100 (06-2)
Boston, MA 02109

Contact: Steve Winnett, USEPA Water Quality Standards Section; (617) 918-1687; winnett.steven@epa.gov

Projects: Connecticut Statewide Bacteria TMDL – 2011 ($108,437); Maine Statewide Nonpoint Source TMDL – 2012 ($192,240); Connecticut Statewide Nonpoint Source TMDL – 2012 ($49,323); Addressing GAO's Recommendations: LISS Performance Reporting and Cost Estimating – 2018 ($128,844); Palmer River Water Quality & Land Use Regulatory Analysis - 2019 ($68,283); Connecticut Statewide Lake Nutrient TMDL – ongoing ($103,361); Lake Winnisquam Watershed Based Plan - ongoing ($65,030).

Boothbay Region Water District

184 Adams Pond Rd
Boothbay, ME 04537

Contact: Susan Mello, Natural Resource Program Manager; (207) 633-4723 ext. 111; suem@bbrwd.org

Projects: Peer review of the Maine Coastal Botanical Gardens expansion - 2016 ($2,000); Nutrient load modeling and build-out analysis for Knickerbocker Lake and Adams Pond - 2018 ($19,000); Model updates and shoreline survey of Knickerbocker Lake and Adams Pond - 2018 ($4,960); Estimate of minimum amount of conserved land required to meet acceptable water quality of Knickerbocker Lake and Adams Pond - 2019 ($1,800).

Maine Department of Marine Resources

194 McKnown Point Rd
West Boothbay Harbor, ME 04575

Contact: Erin Summers, Director of the Biological Monitoring and Assessment Division; (207) 350-6076 (cell); erin.l.summers@maine.gov

Project: DMR North Atlantic Right Whale Protection - Fishermen Outreach ($482,529), BREP NOAA Time Tension Line Cutter Testing ($76,978).

Highstead Foundation (Adam Daigneault, Ph.D.)

PO Box 1097
Reeding, CT 06875

Contact: Spencer Meyer, Senior Conservationist; (207) 852-3171; smeyer@highstead.net

Project: An Economic Case for the Sebago Watershed & Forest Conservation Fund - 2018 ($45,000)

PROJECT TEAM RESUMES

FORREST BELL | PRINCIPAL, SENIOR SCIENTIST

Forrest is the founder and owner of FB Environmental Associates, a regional leader in managing environmental assessment and restoration projects. With over 29 years of experience, Forrest has directed more than 500 successful environmental planning, assessment, monitoring, and restoration projects for a diverse array of clients, including federal and state natural resource agencies, municipalities, and non-profit organizations. Forrest is a skilled presenter and facilitator, embracing the challenge of presenting the complexities of land and water resources to New England's communities. Forrest received his BS in Geography from the University of Southern Maine and completed his Master's coursework at the University of New Hampshire in the Natural Resources Management program.

TECHNICAL EXPERTISE

BMP Design & Implementation
Community Development
Conservation & Land Use Planning
Lake, River, & Stream Assessment
Marine Fisheries Management
Natural Resource Evaluations
Watershed Management
Water Quality Monitoring

EDUCATION

M.S. Coursework completed, Natural Resource Administration & Management, University of New Hampshire, Durham (1999-2002)

B.S., Geography & Land Use Planning, University of Southern Maine (1991)

VOLUNTEER BOARDS

Executive Board Member, Piscataqua Regional Estuaries Partnership (2014- present)

Executive Board Member, Saco Headwaters Alliance (2019 – present)

PROFESSIONAL HIGHLIGHTS

- Proven record of success working for clients such as US Environmental Protection Agency, US Army Corps of Engineers, Maine Department of Marine Resources,, New Hampshire Department of Environmental Services, Rhode Island Department of Environmental Management, Piscataqua Regional Estuaries Partnership, Spruce Creek Association, the Casco Bay Estuary Partnership, numerous private companies, and more than 50 municipalities in Maine and New Hampshire.
- Technical training in geomorphic processes, river and stream restoration, water quality monitoring, BMP design, and pollutant load modeling.
- Worked face-to-face with more than 5,000 landowners and fishing and agriculture industry employees to develop conservation strategies for various projects.
- Advises nonprofit organizations, government, municipalities, and professional associations regarding compliance with environmental programs and laws.
- Delivered more than 100 formal presentations at numerous national, state, regional, and local water resource, watershed management, and land management conferences.
- Secured over $10 million in environmental project funds between 1995 and 2019 for several organizations to help improve and protect water resources.

SELECT PROJECTS

Large-Scale Watershed Assessment

Maine Department of Marine Resources (2018-present). Co-PI for a 3-year, $550,000 NOAA-funded study of vertical line strength as it relates to North Atlantic right whale entanglements. Tasks include survey design, implementation, and analysis; rope breaking analysis, and load cell deployment to test breaking strengths at sea. Working collaboratively with the Maine Department of Marine Resources, the Maine Lobstermen's Association, the University of Maine Chen Lab, and the other New England coastal states.

US Environmental Protection Agency Region 1 BPA (2008-2013). Principal scientist and senior project manager for a five-year, 1.6 million-dollar contract focusing on providing detailed assessments of impaired waterbodies in all six New England states. Tasks included directing staff, technical writing, river and stream mapping, impervious cover analysis, pollutant load modeling, and water quality monitoring for multiple parameters. Forrest successfully led eleven individual large-scale projects under this contract.

Select Watershed Management Projects

Saco Headwaters Alliance Technical Assistance (2018- present). Helped local stakeholders develop the Saco Headwaters Alliance which will oversee decades of groundwater and surface water assessment, management, and restoration in conjunction with several conservation organizations, federal and state agencies, and municipalities. Overseeing multiple projects in the Saco River Watershed focusing on water quality management, groundwater protection, floodplain mapping, and climate change resiliency.

FORREST BELL | PRINCIPAL, SENIOR SCIENTIST

Select Watershed Management Projects (continued)

Multiple Watershed Plans, Lake Winnipesaukee Association and New Hampshire Department of Environmental Services (2014-present). Lead contractor for multiple comprehensive watershed management planning projects in the Lake Winnipesaukee watershed in central New Hampshire. Project tasks include field BMP survey, land use modeling, pollutant load modeling, stakeholder participation, community forum facilitation, and technical report writing.

Long Creek Watershed Management District (2011 – 2018). Project manager for the development of the US EPA merit award-winning, Long Creek Watershed Management Plan. Project tasks included developing a detailed stormwater retrofit inventory, including detailed cost estimates, developing a long-term monitoring plan, and leading a large technical advisory committee. FB Environmental also developed the initial Quality Assurance Project Plan and managed the comprehensive water quality monitoring program for several years.

Casco Bay Estuary Partnership, Presumpscot River Drainage Basin (2003-2007). Co-managed a regional watershed management planning and assessment project for the Presumpscot River Watershed. Accomplishments include the authoring of an EPA-funded $740,000 Targeted Watershed Initiative grant proposal and designing a comprehensive monitoring plan for the river, including the establishment of quality assurance guidelines and the installation of continuous monitoring devices.

Land Conservation Planning and Management

Southern Maine Conservation Collaborative and Local Land Trusts (2012-present). Principal-in-Charge for multiple projects for southern Maine land trusts. Efforts include the development of natural resources inventories, conservation planning, easement monitoring, invasive species management, GIS mapping, and wildlife surveys.

Upper Saco Valley Land Trust (2013-2014). Project Manager and Lead Scientist for a regional conservation planning project. Project tasks included interpreting regional co-occurrence modeling, leading presentations to eleven municipalities, modeling future development patterns, hosting a community forum, and engaging communities in land protection efforts.

RECENT PROFESSIONAL PRESENTATIONS

- 2019 Maine Stormwater Conference, Portland, ME: Innovative Restoration Efforts on Dole Brook and Riverside Golf Course
- 2019 Implementing the Merrymeeting River and Merrymeeting Lake Watershed Management Plan, Alton, New Hampshire
- 2018 – Green Mountain Conservation Group: Multiple Public Presentations for the Ossipee Lake Watershed Plan
- 2017 Maine Rural Water Association, Bangor, ME: Bacteria Source Tracking Methods in Maine and New Hampshire
- 2017 Lake Winnipesaukee Association: Multiple Public Presentations for Lake Winnipesaukee Watershed Plan Development
- 2016 New Hampshire Lakes Conference, Meredith, NH: Watershed Plan Development
- 2016 Penobscot River Watershed Conference, Northport, ME: Culvert Assessment for Climate Change Adaptation
- 2015 Maine Lakes Conference, Sebago, ME: Local Climate Change Monitoring and Culvert Assessment
- 2015 International Oyster Symposium, Woods Hole, MA: Using Canine Tracking for Bacteria Impaired Waters
- 2015 New England NPS Conference, Freeport, ME: Restoring Bacteria Impaired Waters in Kittery, Maine and Rye, New Hampshire
- 2015 Maine Beaches Conference, South Portland, ME: Bacteria Source Tracking and Implementation
- 2015 Northern New England Planners Association Annual Meeting, Portland ME: Local Climate Change Monitoring and Adaptation
- 2015 NH Saving Special Places Conference: Climate Change Monitoring and Build-Out Analyses
- 2015 Joint NEAEB/NH Water & Watershed Conference: Innovative Bacteria Source Tracking
- 2015: New England Association of Aquatic Biologists Conference: Restoring New England's Impaired Waters
- 2014 Northeast Region Planners Association Conference, Stowe, VT: Topsham Fair Mall Stream Assessment Project

RICH BRERETON | WATER RESOURCE SCIENTIST/PERMITTING LEAD

Rich has been with FBE since 2017 and completed his Ph.D. in Earth and Environmental Science from the University of New Hampshire-Durham. He has extensive experience leading scientific and environmental inquiry in the field. At FBE Rich leads the Land and Water Permitting Division and manages FBE's permitting program for private and public projects. His expertise is in building relationships with stakeholders and collaboratively guiding projects toward good environmental outcomes and regulatory compliance. In addition, as a water resource scientist, he manages multifaceted water resource projects requiring data collection, management, and analysis, water quality modeling, and GIS mapping and analysis. Prior to joining FBE, Rich gained valuable experience at the UNH Water Quality Analysis Laboratory, the National Science Foundation Critical Zone Observatory Network, the Marine Biological Laboratory, and the Puerto Rico Long-Term Ecological Research program.

TECHNICAL EXPERTISE

Water Resource Permitting
Stream & Riparian Biogeochemistry
Watershed Hydrology
Watershed Management Planning
NPS Pollution Surveys
Water Quality & Flow Monitoring
Groundwater-surface Water Linkages
Statistical Analyses
GIS Spatial Analyses

EDUCATION

Ph.D., Earth & Environmental Science, University of New Hampshire, Durham (2017)

B.A., Colorado College, Colorado Springs, CO (2008)

PROFESSIONAL EXPERIENCE AND SELECT PROJECTS

Water Resource Planning and Regulatory Guidance

Addressing GAO's Recommendations to the Long Island Sound Study (2018-2019). The EPA Long Island Sound Study coordinates ecological restoration and watershed protection efforts across two states and over 100 municipalities, including New York City, and tracks hundreds of ecological, economic, and social variables. The team of FBE, Horsley Witten Group, and Rachel Bouvier guided LISS and state and academic partners through a dynamic and collaborative review process. This involved a detailed examination of the ecological indicators proposed by LISS to monitor a range of ecosystems (including but not limited to nitrogen loading, water clarity, sediment quality, riparian buffers) and compared current practices to LISS's national program peers. An economic analysis was completed to estimate implementation costs of ecosystem restoration goals, which included accounting for overlapping goals and uncertainties as well as developing a cost matrix at a 5-year and 20-year implementation target timeline. This process involved extensive engagement of stakeholders and collaboration across federal and state agencies, municipalities, and academic institutions. The successful conclusion of this project resulted in a full report in 2019 available on LISS's website, entitled Addressing GAO's Recommendations: LISS Performance Reporting and Cost Estimating. Several recommendations set forth by the project team have since been implemented to improve LISS's tracking and reporting on environmental conditions in order to meet their ecosystem restoration and protection goals.

Ossipee Lake Watershed Management Plan, NHDES 319, (2019-present). On behalf of Green Mountain Conservation Group, Rich led design efforts for best management practices (BMPs) to control stormwater on shorefront properties on Ossipee Lake. Funded by the NHDES 319 grant program, this work follows up on Phases I (Lower Bays and Danforth Pond) and II (Lovell River and Ossipee Lake shoreline) of the Ossipee Lake Watershed Management Plan. These projects included data analysis, field survey, pollutant load modeling, and extensive work with stakeholders and several formal presentations to town officials in the watershed. Watershed and shoreline surveys identified many sites that were good candidates for BMP implementation. Phase III products include BMP engineering designs for shorefront stormwater control, as well as documentation of pollutants prevented and shoreland permit applications.

Ogunquit River Watershed Restoration Project, Maine DEP 319, Ogunquit, ME (2018-present). Worked with the Town of Ogunquit, ME and the Ogunquit Conservation Commission to help track sources of fecal indicator bacteria to the fecal-impaired Ogunquit River. Source tracking has included watershed-wide sampling of the Ogunquit River and its tributaries during both wet and dry weather conditions for Enterococci, as well as canine scent detection to identify sites with human waste present. Phase II included installation of BMPs at the Main Beach parking lot and targeted public outreach that included door-to-door education and flyer distribution, mailings, catch basin stenciling, and pet waste signage installation. Rich leads work on the Phase III grant to continue BMP construction and source elimination.

Wetland Protection Ordinance Revisions, Mont Vernon, NH (2018). Conducted ordinance review of existing wetland protection regulations for the Town of Mont Vernon Conservation Commission. Drafted strengthened wetland protection language incorporating sound scientific principles and an approach based on best practices and models from other New Hampshire

communities. Products included an ordinance review, new language for an amended wetland regulation, and maps of existing National Wetland Inventory areas with proposed buffer zones.

Upper Saco Valley Land Trust Ordinance Review (2017-2018). Led an ordinance review funded by a New Hampshire Department of Environmental Services Local Source Water Protection grant, focusing on improving local groundwater protection approaches. Reviewed existing ordinances and other regulations/policies relevant to groundwater protection in eight municipalities, including best management practices (BMPs) programs. Drafted recommendations for improved regulations.

Water Quality Monitoring and Data Analysis

Water Quality Monitor (May 2017-present). Duties consist of water quality monitoring, including coordination and execution of annual sampling, and technical report development for lakes, ponds, streams, tidal estuaries, and beaches in Maine and New Hampshire. Currently conducting continuous and grab sample monitoring for physical and chemical parameters and flow monitoring using USGS guidelines; deployment, maintenance, and calibration of data loggers and sondes (e.g., YSI Exo2, YSI 600 XL/XLM,YSI 600 OMS, YSI 6920, Satlantic SUNA UV Nitrate, Onset HOBO loggers); responsible for data analysis and interpretation, QA/QC review, report writing; certified Maine VLMP volunteer.

Managed the following monitoring projects:

- Salmon Falls River TMDL Monitoring (2018-present)
- Ogunquit River Bacteria Source Tracking (2018-present)
- Sabbathday Lake Annual Water Quality Monitoring (2018-present)

Contributedto the following monitoring projects:

- Kezar Lake Watershed Association Annual Monitoring (2017-present)
- Corinna Closed Municipal Landfill (2017-2018)

Watershed Nutrient Cycling Research

Biotic response to stream nutrients in forested streams of Puerto Rico (2012-2017). Lead author of a synthesis of existing scientific literature from five decades of research on stream ecology and water quality in the USDA Forest Service Luquillo Experimental Forest. Chapter in press in a USDA Forest Service General Technical Report on the response of freshwater biota to nitrogen, phosphorus, and other nutrients in streams.

Nitrogen Uptake in Rainforest Headwater Streams, Puerto Rico (2014-2017). Coordinated and conducted nutrient pulse uptake experiments in rainforest headwater streams to quantify the effects of ammonium and dissolved organic carbon on stream ecosystems. Utilized Onset® Corporation HOBO® data loggers with conductivity sensors to quantify stream flow and characterize breakthrough curves of nutrient pulses. Analyzed grab samples with automated colorimetry and ion chromatography for nutrient and salt concentrations. Quantified nutrient uptake using tracer addition for spiraling curve characterization (TASCC) method. Found that ammonium uptake varied greatly with the amount of groundwater input and geologic setting including bedrock. Conducted as part of dissertation research; a manuscript resulting from the project is in preparation for submission to a peer reviewed journal.

Riparian nitrogen biogeochemistry in a rainforest (2012-2017). Coordinated and conducted groundwater nutrient enrichments in rainforest riparian zones. Designed and installed a field of research minipiezometers (specially-designed wells) to assess ammonium retention in riparian groundwater. Injected nitrogen-rich solution into aquifer, and after incubation period withdrew samples following the push-pull method. Analyzed grab samples with automated colorimetry and ion chromatography for nutrient and salt concentrations. Quantified nutrient retention in several locations in the riparian zone, hillslope, and floodplain. Conducted as part of dissertation research; a manuscript resulting from the project is in preparation for submission to a peer reviewed journal.

PUBLICATIONS

Brereton, R.L. Burgos-Caraballo, S., Lilyestrom, C., McDowell, W.H. In press. Biotic response to stream nutrients in the Luquillo Experimental Forest. US Forest Service Pacific Northwest Research Station General Technical Report.

Wymore, A.S., Brereton, R.L., Ibarra, D.E., Maher, K., McDowell, W.H. 2017. Critical zone structure controls concentration-discharge relationships and solute generation in forested tropical montane watersheds. Water Resources Research, 53, doi:10.1002/2016WR020016.

Morse, N.B., Pelissier, P.A., Cianciola, E.N., Brereton, R.L., Sullivan, M.M., Shonka, N.K., Wheeler, T.B., McDowell, W.H. 2014. Novel ecosystems in the Anthropocene: a revision of the novel ecosystem concept for pragmatic applications. Ecology and Society 19(2).

McDowell, W.H., Brereton, R.L., Scatena, F.N., Shanley, J.B., Brokaw, N.V., Lugo, A.E. 2013. Interactions between lithology and biology drive the long-term response of stream chemistry to major hurricanes in a tropical landscape. Biogeochemistry 116(1-3) 175-186.

ANTONIA SOHNS | PROJECT MANAGER, OUTREACH SPECIALIST

Antonia joined FBE in 2019 as the Climate Change Division Lead and project manager. Her Ph.D. research at McGill University used qualitative and quantitative methods to examine what factors influence drinking water access in Arctic households. Her fieldwork focused on water security in Alaska. Before her doctoral degree, Antonia was a water and energy analyst/consultant at the World Bank in Washington D.C. and an intern at the White House under President Obama. She has an MSc. in Water Science, Policy and Management from the University of Oxford where she studied how energy companies recycle produced water in hydraulic fracturing operations on the Pinedale Anticline in Wyoming, and a B.S. in Earth Systems, Oceans track from Stanford University where she researched cancer clusters along the Mississippi River in Louisiana, and phytoplankton populations aboard the Robert C Seamans in the Pacific Ocean. Her work and research have focused on climate change impacts, community resiliency and adaptation, and stakeholder engagement.

TECHNICAL EXPERTISE

Stakeholder engagement
Facilitation
Project management
Communication
Climate change adaptation strategies
Resilience planning
Vulnerability assessment
Environmental policy
Watershed management
Scientific/Technical Report Writing

EDUCATION

Ph.D., Geography, McGill University (2019)

M.Sc., Water Science, Policy and Management, University of Oxford (2011)

B.S., Earth Systems, Oceans Track, Stanford University (2010)

PROFESSIONAL EXPERIENCE AND SELECT PROJECTS

Stakeholder Engagement & Facilitation

NOAA Recreational Fishery Workshops (July 2019-present). Working with NOAA to facilitate recreational fishery workshops for feedback regarding management measures. The workshops provide an opportunity for stakeholder input on developing potential short- and long-term management approaches for the recreational fishing community.

Maine Department of Marine Resources (DMR) Vertical Line Project (August 2019-present): Working with DMR to develop new regulatory measures for fixed gear fisheries aimed at reducing the rate of serious injuries and mortalities due to entanglements of North Atlantic Right Whales. Co-managing data collection from online and phone surveys and analyzing the functional breaking strengths of rope samples of whole vertical lines donated by fishermen. Engaging with stakeholders to gather data and feedback on continued gear testing. The next phase of the project includes convening a facilitated workshop to discuss gear modifications and protypes being designed to meet regulatory measures.

Project Management

Flood Resilience Checklist (August 2019-present). Working with Wells and Bar Harbor to complete the Maine Flood Resilience Checklist. This process enhances local government and community capacity, shares information between municipal departments, and identifies short and long-term planning needs that require attention. The facilitated process highlights the existing gaps where towns should prioritize planning and resiliency resources and develops adaptation strategies that address those identified needs.

Climate Change Observatory Network on Maine Land Trusts (August 2019-present). Developing a Climate Change Observatory (CCO) network pilot project and CCO App tool to be used across coastal land trusts to observe, measure, and analyze long-term climate change trends, with a focus on sea level rise and coastal erosion. The CCO App will serve as a tool that not only collects important climate observations and data, but also connects people with the local environment and teaches them about climate science.

Natural Resource Management

PhD Candidate, McGill University (September 2016-August 2019). Conducted participatory modeling to identify policy pathways that would improve drinking water access in remote Alaskan households. Worked with policy stakeholders and government officials to develop collaborative strategies to manage water resources, mitigate vulnerability, and increase community resiliency.

Water and Energy Analyst/Consultant, The World Bank (January 2013- July 2016). Helped create and launch the Thirsty Energy Initiative at the World Bank in Washington, D.C. Thirsty Energy incorporates water variables into countries' energy development plans. Provided clients with technical advice on water and energy management frameworks and identified risks of proposed projects. Wrote policy papers and participated in international conferences and workshops to share Thirsty Energy's messages for integrated planning and optimizing resiliency through sound investments and infrastructure.

LAURA DIEMER | PROJECT MANAGER, ENVIRONMENTAL MONITORING LEAD

Laura serves as the Environmental Monitoring Lead for FB Environmental Associates. She manages our water quality monitoring projects and provides technical oversight of watershed management planning projects that require water quality analyses, pollutant load modeling, quality assurance/quality control review, plan development or review, statistical analyses, GIS mapping, and public presentations. She is responsible for both project and staff oversight, including administrative tasks, hiring, training, and supervising staff, and client or public relations. She has experience working with a variety of clients, including federal, state, and municipal governments or agencies, watershed groups, and lake associations. Prior to FBE, she gained valuable research and writing experience through the National Park Service, New England Organics, Wells National Estuarine Research Reserve, and The Nature Conservancy

TECHNICAL EXPERTISE

Lake & Stream Biogeochemistry
Watershed Modeling
Watershed Hydrology
Watershed Management Planning
NPS Pollution Surveys
Water Quality & Flow Monitoring
Geomorphic & Stream Habitat Assessment & Restoration
Statistical Analyses
GIS Analyses

EDUCATION

M.S., Soil & Water Resource Management, University of New Hampshire, Durham (2014)

B.S., Ecology & Environmental Science, University of Maine, Orono (2010)

MEMBERSHIPS

Society for Freshwater Science (SFS), Member (2013–2015)

North American Lakes Management Society (NALMS), Member (2015–Present)

PUBLICATIONS

Diemer et al. (2015). Nutrient uptake along a fire gradient in boreal streams of Central Siberia. Freshwater Science 34(4), 1443-56.

PROFESSIONAL EXPERIENCE AND SELECT PROJECTS

Water Quality Monitoring, Assessment, & Quality Assurance (2011–Present). Provides oversight of water quality monitoring program, including staff and volunteer training, coordination and execution of annual sampling, and technical report development for lakes, ponds, streams, tidal estuaries, and beaches in Maine and New Hampshire; conducts continuous and grab sample monitoring for physical and chemical parameters and flow monitoring using USGS guidelines; experience with deployment, maintenance, and calibration of data loggers and sondes (e.g., YSI Exo2, YSI 600 XL/XLM, YSI 600 OMS, YSI 6920, AquaTROLL, DIVERS, Onset HOBO loggers); responsible for data analysis and interpretation, QA/QC & QAPP compliance review, report writing, and presentations to public; certified Lake Stewards of Maine volunteer; developed numerous state and EPA-approved quality assurance project plans (QAPPs); developed more than 50 water quality assessment reports that apply applicable state water quality criteria to data to determine impairment status and are prepared in an acceptable format for submittal to state agencies for review and approval; recommends management actions based on complex issues (e.g., fecal indicator bacteria source tracking) surrounding results of water quality analysis and works with communities to implement those actions. Select project examples include:

- Sagamore Creek Water Quality Sampling Program (2017-2020)
- Kezar Lake Water Quality & Climate Change Monitoring, Lovell, ME (2011-2020)
- Salmon Falls TMDL Compliance Monitoring, ME/NH (2011-2020)
- Bangor Streams Monitoring, Bangor, ME (2014-2017)
- Coastal Bacteria Source Tracking, ME/NH (2011-2020) – includes Parsons Creek (Rye, NH), Winnicut & Little Rivers (North Hampton, NH), Ogunquit River (Ogunquit, ME), & Spruce Creek (Kittery, ME)
- Lake Water Quality Monitoring Buoys, ME (2016-2020) – innovative, cost-effective design of buoy system with DO/temp loggers deployed at two Maine lakes

Maine NPS TMDL Stream Delisting (2014). Collaborated with the Maine DEP on development of a technical document supporting the delistment of six streams from Maine's 303(d) list of impaired waterbodies. The 2013 NPS TMDL showed these six streams required no nutrient or sediment loading reductions, and thus, exceedance of dissolved oxygen criteria at these streams was likely a result of natural conditions. Carefully documented reasons for delisting for natural conditions based on available reports or studies, land use characteristics, habitat assessments, biomonitoring surveys, and modeling results.

Stormwater Monitoring & IDDE Investigations (2011-Present). Conducts stormwater outfall monitoring and IDDE investigations for municipalities, especially MS4-regulated communities, following federal and state guidelines, such as the 2004 IDDE Guidance Manual published by the Center for Watershed Protection, or permits, such as the 2017 New Hampshire Small MS4 General Permit. Select project examples include: North Hampton MS4 Program Assistance (2020); Salem Outfall Monitoring & IDDE (2015-2018); Portsmouth Outfall Monitoring & IDDE (2017); Farmington Outfall Monitoring (2015).

Watershed Planning (2011–Present). Provides technical oversight of watershed management planning projects that require water quality & statistical analyses, pollutant load modeling (see Environmental Modeling below), watershed and shoreline surveying, rapid geomorphic and habitat assessments, GIS mapping, and public presentations. Expertise in developing US EPA

a-i watershed management plans that include technical information on watershed characteristics, water quality impairment status, modeled pollutant load estimates, field-identified NPS sites, measurable milestones and interim benchmarks, community-prioritized action plan & goal(s), and plan implementation costs. Select project examples include:

- Merrymeeting River & Lake Watershed Management Plan (2018-2019, ongoing)
- Spofford Lake Watershed Management Plan (2017-2018)
- Watershed Plan for the Ossipee Lake Shoreline & Lovell River Watersheds (2015-2017)
- Pleasant Lake Watershed Restoration Plan (2015-2016)
- Moultonborough Bay Inlet Watershed Restoration Plan (2015-2016)
- Watershed Plan for Danforth Ponds and the Lower Bays of Ossipee Lake (2014-2015)
- Capehart Brook Watershed Management Plan (2014-2015)

Environmental Modeling (2011–Present). Uses a variety of simple and complex models to simulate or estimate environmental conditions. Model expertise in STEPL, Region 5, SIMPLE method, MapShed, Virtual Beach, BASINS, and Lake Loading Response Model (LLRM). The LLRM is an Excel-based model that uses environmental data to develop a water and phosphorus loading budget for lakes and their tributaries. Water and phosphorus loads (in the form of mass and concentration) are traced from various sources in the watershed through tributary basins and into the lake. The model requires detailed and accurate information about the waterbody, including the extent and number of sub-basins draining to the lake, the type and area of land covers within those sub-basins, water quality data for the deep spot and tributary outlets, lake volume, septic system loading estimates, and more. Implementing this model requires advanced GIS modeling and understanding of complex lake biogeochemical processes. Select project examples include:

- Palmer River, Rehoboth, MA (2019) - STEPL
- Merrymeeting Lake and River, New Durham/Alton, NH (2018-2019) – LLRM, SIMPLE Method/Region 5
- Spofford Lake, Chesterfield, NH (2017-18) - LLRM
- Knickerbocker Lake & Adams Pond, Boothbay, ME (2017-18) - LLRM
- East Pond, Smithfield/Oakland, ME (2017) - LLRM
- Ossipee Lake, Ossipee/Freedom, NH (2017) - LLRM
- Pleasant Lake, Deerfield/Northwood, NH (2016) - LLRM
- Moultonborough Bay Inlet, Moultonborough, NH (2016) – LLRM
- Capehart Brook Watershed Management Plan (2014-2015) – SIMPLE method
- Spruce Creek Watershed Restoration Project (319 Phase IV) (2015-2016)– STEPL
- Ogunquit River Restoration Project (319 Phase I-II) (2014-2017) – Region 5
- Maine Statewide Nonpoint Source (NPS) TMDL Report (2012-2013) – MapShed
- Willard Beach, South Portland, ME (2011) – Virtual Beach

SELECT PRESENTATIONS

- Guest Lecturer. Watershed Water Quality Management. University of New Hampshire. (2013-2019)
- Diemer, L. Using co-indicators along with traditional source tracking methods to better pinpoint human sources of fecal contamination, a case study from Parsons Creek, Rye, NH. Beaches Conference, Well, ME: July 14, 2017.
- Diemer, L. Alternative and affordable approach to buoy monitoring systems for Maine lakes and insights gained from continuous data collection. First Annual Lake Monitoring Summit, Augusta, ME: March 23, 2017.
- Diemer, L. Creative and effective tools for translating water quality data. 46th Annual Maine Lakes Conference, Unity, ME: June 25, 2016.
- Diemer, L. & Bell, F. Citizen-driven watershed-based plans for lake protection: a how-to. NH Lakes Congress, Meredith, NH: June 3, 2016.
- Diemer, L. & Riley, J. Recent pH trends in the Kezar Lake watershed and potential impacts to coldwater fisheries. New England Association of Environmental Biologists Conference (NEAEB), Rockport, ME: March 25, 2016.

PROFESSIONAL TRAININGS

Field Geology Services. Professional Short Course: Using fluvial geomorphology in watershed assessment and stream restoration. Concord, NH: April 26-28, 2016.

Richard Claytor, Jr.

President
rclaytor@horsleywitten.com

Areas of Expertise

Stormwater Management
Green Infrastructure
Wetland & Natural Resource Area Assessments
Environmental Permitting & Compliance
Watershed Planning & Assessment
Civil Engineering
Environmental Engineering
Surveying
Site Design
Training

Professional Registrations & Affiliations

Professional Engineer: MA & NH
LEED Accredited Professional
Town of Sandwich, Historical Commission
American Society of Civil Engineers

Academic Background

Bachelor of Science, Union College, Civil Engineering, Concentration in Hydrology, Hydraulics, Water Resources, and Geotechnical Engineering

Professional Experience

Horsley Witten Group, Inc., President, 2013- Present; Principal Engineer, 2001 to 2013
Center for Watershed Protection, Principal Engineer, 1994 to 2001
Loiederman Associates, Inc. (now Soltesz, Inc.), Vice President and General Manager, 1985 to 1994
Greenhorne and O'Mara, Inc.(Now Stantec, Inc.), Design Engineer, 1983 to 1985

Horsley Witten Group
Sustainable Environmental Solutions

Rich Claytor has more than 37 years of practical experience in civil and environmental engineering with specific expertise in water resources planning, design, implementation, research, education, and training. Rich has extensive experience and expertise in stormwater management design, implementation, program assessment, policy and evaluation. Rich also is experienced in watershed planning, training and education; water resources assessment, research, and permitting; water supply and wastewater design; land use planning, site design and research; storm drainage, erosion/sediment control, and roadway design; and construction administration.

KEY PROJECTS

Green Infrastructure Solutions for Boston Public Schools and the Boston Water and Sewer Commission (BWSC), Boston, MA: Principal-in Charge for the implementation of green infrastructure (GI) solutions to manage stormwater runoff and engage students at five Boston Public Schools.

EPA, Region 1: Clean Water Act and Safe Drinking Water Act Basic Purchasing Agreement (2018-2023) Program Manager for HW and Principal-in-Charge for specific work assignments, including Palmer River Watershed Plan, Long Island Sound Study GAO Response, and Connecticut Statewide Lake Nutrient TMDL.

Fuller Brook Restoration, Wellesley, MA: Principal-in-Charge for the stream restoration of a 2.2-mile reach of a suburban impaired stream/wetland system using natural channel-based geomorphologic principles.

Massachusetts Department of Ecological Restoration: Principal-in-Charge for master services contracts for the assessment, design, and implementation of ecological restoration for more than two dozen projects in the Commonwealth of Massachusetts, beginning in 2005.

Willard Street, Cambridge MA Sewer Separation: Principal-in Charge for the assessment and design of green infrastructure measures to manage stormwater runoff prior and reduce phosphorus loading for a new discharge pipe to the Charles River in compliance with the Lower Charles TMDL.

Assessment of Climate Change Impacts on Stormwater BMPs in Coastal Massachusetts: Principal-in-charge for this assessment of likely impacts to stormwater management practice performance as a consequence of climate change and resulting sea level rise and changes in precipitation characteristics with funding from the Massachusetts Office of Coastal Zone Management.

Engineering Design and Assessment of Stormwater Management for MassDOT's Impaired Waters Program: Principal-in-charge for several project assignments to evaluate existing drainage/stormwater characteristics and design stormwater retrofit improvements to address runoff from MassDOT rights-of-way that drain impaired waters.

Morrissey Boulevard Redesign to Accommodate a Changing Climate and Provide Coastal Resiliency: Principal-in-Charge for the design of a set of green infrastructure controls and living shoreline along a 2.5 mile segment of Morrissey Boulevard, a scenic parkway in a vulnerable coastal location subject to increasingly frequent inundation from sea level rise.

Richard Claytor, Jr.
President
rclaytor@horsleywitten.com

Horsley Witten Group
Sustainable Environmental Solutions

Maine Mall Retrofit Design and Construction, South Portland, ME: Principal-in-Charge for the identification, design, permitting, and construction administration for the "Greening of the Maine Mall," a key component of the Long Creek Watershed Management District's charge to restore Long Creek to meet water quality standards.

Roger Williams Park Water Quality Improvement Plan and Implementation, Providence, RI: Principal Engineer for planning and design of implementation projects to improve the water quality and biodiversity conditions of the Park's urban ponds.

Comprehensive Evaluation of Alternative Strategies for Combined Sewer Overflow Reduction, New York City: Principal Engineer and part of a team under contract with the New York City Department of Environmental Protection to evaluate and implement a series of pilot green infrastructure stormwater retrofits projects to reduce the contribution of stormwater to combined sewer systems.

Barnstable Municipal Airport Terminal Improvement Project, Hyannis, MA: Principal Engineer for the permitting and design of civil site improvements for a $20 million passenger terminal construction.

2010 Rhode Island Stormwater Design and Installations Manual Update: Principal-in-Charge and co-author for the update to the statewide Rhode Island Stormwater manual to incorporate low impact development practices for all new and redevelopment projects.

Oak Bluffs Streetscape Improvements: Principal-in-Charge for the Oak Bluffs Downtown Streetscape Master Plan to provide a framework for future planning, development, and design of the commercial district of Oak Bluffs on Martha's Vineyard, Massachusetts.

Centennial Brook Flow Restoration Plan, Burlington, VT: Principal-in-Charge for a watershed assessment and plan to develop a flow restoration approach to meet the flow based TMDL for the 1.4 square mile Centennial Brook watershed.

Integrated Water Quality Plan, Burlington, VT: Principal-in-Charge for HW's role in Burlington's integrated water quality plan. Specifically, HW is assisting in the development of stormwater runoff opportunities to identify projects that reduce phosphorus loading to Lake Champlain. Responsibilities also include prioritizing stormwater runoff opportunities as compared to a range of other CSO projects, such as sewer separation and wastewater treatment plant upgrades.

Salmon River Watershed Evaluation of Municipal Policies and Regulations, Eastern Connecticut: Principal-in-Charge of a two-phase project for the Salmon River watershed to evaluate municipal codes and management practices contributing to water resource impacts. Completed technical training, and support for policy revisions to Conservation Subdivision Design, parking regulations, roadway standards, and LID design standards for two Connecticut municipalities.

Upper Charles River Sustainable Stormwater Funding Assessment, Bellingham, Franklin, & Milford, MA: Project Director for the assessment and dissemination of a technical report documenting the feasibility of widespread implementation of stormwater control measures to meet TMDL requirements and the requirements for a sustainable funding source through a Stormwater Utility structure.

Phase II Stormwater Permit and LID Training Clinics for Municipal Officials in New England, EPA Region I: Conducted a series of training clinics and hands-on assistance to New England municipal staff on the requirements of the new Phase II permits, as well as helping municipal officials and decision-makers encourage the use of low impact development/green infrastructure practices.

Massachusetts Statewide Stormwater Training Seminars, Various Locations in Eastern Massachusetts: Prepared technical presentations for more than a dozen one-hour stormwater design, policy, implementation and maintenance topics for a range of stormwater management strategies and presented at more than ten one full-day training sessions.

Ellie Baker, AICP

Sr. Project Manager/
Sr. Environmental Planner
ebaker@horsleywitten.com

Areas of Expertise

Watershed Planning & Assessment
Integrated Water Management
Stormwater Management
Land Use Planning
Environmental Permitting & Compliance
Coastal Resources
Smart Growth/Low Impact Development
Climate Change Adaptation
Low Impact Development
Training

Professional Registrations & Affiliations

AICP
Certified Municipal Vulnerability Preparedness Provider
APA, MA and Northern New England Chapters

Academic Background

Masters of Environmental Management, Coastal and Watershed Systems, Yale University
Bachelor of Arts, Environmental Studies and Spanish, Bowdoin College

Professional Experience

Horsley Witten Group, Inc., Senior Project Manager and Senior Environmental Planner, 2006 to present, 2000 to 2004
The Nature Conservancy in New Hampshire, Coastal and Marine Program Director, February to September, 2016
Weston & Sampson Engineers, Inc., Senior Environmental Scientist, 2004 to 2005
Harvard Institute for International Development, Research Assistant, Central America Project, 1997 to 1998
ICF Incorporated, Analyst, 1995 to 1997

Horsley Witten Group
Sustainable Environmental Solutions

Ellie Baker has more than 20 years of consulting experience working with federal, state, municipal, non-profit and other private clients in the fields of environmental planning, policy and science. Specific topics of technical experience include: watershed management, stormwater management, low-impact development (LID), climate adaptation, site design, non-point source pollution management, land use planning and smart growth, drinking water supply protection, and water quality modeling. Ellie directs Horsley Witten Group (HW)'s office in Exeter, New Hampshire.

KEY PROJECTS

Taunton River Watershed Management Plan, MA: Managed this multi-year state-funded watershed planning project, working with an Active Steering Committee representing various state and regional agencies, Bridgewater State University and TNC. The goal of this project was to evaluate water resource impacts from land development within the more than 35 watershed communities and make recommendations to keep water local and restore natural hydrology and habitats. Also included the design of six LID, alternative wastewater, and habitat restoration demonstration projects to "keep water local" and two code-reform projects to encourage LID design.

Assawompset Ponds Complex Floodplain Management Planning and Project Prioritization (Southeastern Regional Planning and Economic Development District): Provided technical assistance to the project team, consisting of SRPEDD, The Nature Conservancy, MassAudubon, Manomet, and the Assawompset Ponds Committee, to compile and evaluate prior management and restoration recommendations, lead a prioritization process, and develop project concepts, cost estimates, and permitting pathways to facilitate progress toward implementation. This work immediately resulted in an MVP grant application (pending) and the obtainment of an EPA SNEP technical assistance grant for implementation of two of the priority projects, and was recently the focus of a site visit and briefing for the Governor and EEA Secretary in summer 2020.

Upper Nemasket Hydrology and Hydraulics Study, EPA SNEP Program Technical Assistance: Environmental Planner assisting with an H&H study of the Upper Nemasket River, the largest herring run in the state. The project included the collection of historical hydrology and infrastructure survey data and new field data to inform the creation of an H&H model using the USACE HEC-RAS river modeling program. The model will be used to evaluate a variety of potential water resources related projects including multiple dam removals, fish passage, channel restoration, culvert replacement, and wetlands restoration.

Stormwater Program Technical Assistance for Mystic River Watershed Municipalities, EPA Region 1: Provided technical assistance to communities to identify assistance needs and fill those needs in improving stormwater management programs for MS4 compliance, reducing pollutants to the Mystic River system, and facilitating green infrastructure practices. HW was a subcontractor to ERG for EPA Region 1 for this work. Products included a code review of multiple watershed communities, guidance document for an O&M self-certification program to improve long-term practice performance, and a package of small-site stormwater BMP educational cut-sheets.

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Red Brook Watershed Stormwater and Stream Protection Standards and Regulatory Framework, Scarborough, ME: Prepared a set of recommended stormwater management and stream protection standards for the watershed in order to meet environmental and economic growth goals, and drafted a regulatory framework for local implementation to assist the town in obtaining regulatory primacy from the Maine DEP. Provided services as a sub-consultant to AMEC and worked closely with Scarborough Planning, Engineering and Public Works staff, as well as Maine DEP.

Watershed Management Plan for Boynton Inlet Watershed in Southeastern Florida, NOAA Coral Program: Managed the development of a watershed management plan for this highly mechanized and managed water system to set the stage for future funding and implementation. Convened a stakeholder advisory committee of municipal staff, scientific community and state and regional agency representatives to shepherd the project. HW developed a hydrologic model to assess relative pollutant loads and performed rapid field assessment to identify retrofit opportunities. Final deliverable included a library of information, a watershed management plan, pollutant reduction calculations, and prioritized recommended retrofits and conceptual designs.

Municipal Vulnerability Preparedness (MVP) Planning, Multiple Municipalities, MA: Lead Newburyport, Peabody, Newbury and West Newbury individually through the MVP Planning Process, and supported the process in Sudbury and Methuen. Served as project manager and point of contact for each municipal team, as well as workshop coordinator, lead facilitator and primary technical presenter at the workshop, and manager for the development of maps, workshop materials and final reports. These communities have since secured over $1M in MVP Action grant funding.

Site Suitability Analysis for Green Infrastructure to Boost Drought Resilience, MA: Managed the development of a GIS-based methodology to identify suitable sites for green infrastructure practices, with the goal of improving drought resilience in a variety of settings in MA. This work was funded by EPA, to support the 2017/2018 MA Hazard Mitigation and Climate Adaptation Plan development process.

Assessment of Climate Change Impacts on Stormwater BMP Design in MA, MACZM and MADEP: HW performed an assessment of potential impacts of climate change on stormwater BMPs in the MA. Managed HW team in evaluation of specific BMPs installed primarily in the near coastal area of MA against a set of anticipated climate change impacts, and development of example retrofit concepts to illustrate recommended design revisions for these and future BMPs.

Analysis of Nature Based Solutions and Innovative Financing Mechanisms for Nutrient Mitigation, Barnstable, MA (The Nature Conservancy): Provided technical support for the team of The Nature Conservancy and Quantified Ventures to evaluate a variety of nature based solutions (such as cranberry bog restoration, alternative septic systems, fertigation, and phytoremediation) in tandem with an evaluation of innovative financing opportunities to reduce risk and improve results.

Neal M. Price

Senior Hydrogeologist – Associate Principal
nprice@horsleywitten.com

Areas of Expertise

Hydrogeology/ Water Supply Development
Watershed Planning & Assessment
Integrated Water Management
Groundwater Quality
Wastewater Management
Stormwater Management
Wetlands Restoration
Dam Removal
Dredging
Coastal Resources
Environmental Permitting & Compliance

Professional Registrations & Affiliations

American Geophysical Union
National Groundwater Association
American Water Works Association
New England Water Works Association

Academic Background

Master of Science, Geology, University of Massachusetts, Amherst
Bachelor of Arts, Archeology, Oberlin College Archeological Field School, Sheffield University

Professional Experience

Horsley Witten Group, Inc., Senior Hydrogeologist/Senior Project Manager, 1997 to present
MetroWest Water Supply Tunnel Project, 1997
Water Resources Research Center, Univ. of Massachusetts, Research Scientist, 1995 to 1997
Fugro East Inc., Geologist, 1995
21E, Inc., Environmental Scientist, 1993

Horsley Witten Group
Sustainable Environmental Solutions

Neal Price has 25 years of professional experience in the fields of hydrology and hydrogeology. Neal is a Senior Hydrogeologist/ Hydrologist and Associate Principal at HW and is responsible for developing client relations, supervising staff activities, and managing various projects within the firm. The nature and extent of the work he has conducted includes freshwater and saltwater wetlands restoration, groundwater and surface water modeling, watershed and drinking water protection studies, water supply investigations, wastewater disposal feasibility studies, dam removal, nutrient management, contaminant fate and transport studies, stormwater management, dredging assessment, expert witness testimony, as well as development review and permitting.

KEY PROJECTS

Assomopsett Ponds Complex Water Resources Assessment: Technical Lead for a high altitude assessment and prioritization of potential water resources projects in the vicinity of the Assawompsett Ponds and it outlet river, The Nemasket. The Ponds are the largest natural freshwater bodies in Massachusetts and the Nemasket has the largest herring run in the state. This project included frequent meetings between various federal, state, non-profit, and municipal representatives to review 30 years of past water resources-related work, prioritize those that best meet current goals and needs, and plan an implementation strategy. Several of the priority projects have already received funding through competitive grants.

Upper Nemasket River Hydrology and Hydraulics Study: Project Manager for an H&H study of the Upper Nemasket River, the largest herring run in the state. The project included the collection of historical hydrology and infrastructure survey data and new field data to inform the creation of an H&H model using the USACE HEC-RAS river modeling program. The model will be used to evaluate a variety of potential water resources related projects including multiple dam removals, fish passage, channel restoration, culvert replacement, and wetlands restoration.

Ipswich Mills Dam Removal, Ipswich, MA: Managed dam removal feasibility assessment for this historic and highly visible dam in downtown Ipswich. The Project includes site survey, natural resources and habitat assessment, sediment quality/ dredging assessment, hydraulic evaluation, assessment of potential structural impacts to adjacent historic mill buildings supported by timber piles, conceptual dam removal and river restoration site designs, and public outreach.

Taunton River Watershed Study, MA: Principal Investigator for the water budget components of this major basin-scale watershed study in Southeastern, MA. Compiled extensive databases of hydrology, climate, water/wastewater/stormwater infrastructure, geology, land use, and impervious surfaces in a GIS-based water budget model that estimated the water balance status of each of the 108 sub-watersheds within the basin.

Aberjona River/ Davidson Park Restoration, Winchester, MA: Managed this river and park restoration project in a historic park with flooding concerns and sediment quality concerns related to two upstream superfund sites. The Project includes site survey, natural resources and habitat assessment, sediment quality/ dredging assessment, hydraulic evaluation, conceptual river and park site designs, and public outreach.

Neal M. Price
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Horsley Witten Group
Sustainable Environmental Solutions

Groundwater Modeling Assessments of Water Management Alternatives, Southeastern Massachusetts: Served as Project Manager and Lead Modeler for two projects in the so-called Tri-Basin area of Southeastern Massachusetts evaluating water budget impacts from various water management strategies related to the City of Brockton's interbasin transfers of water between various surface water bodies. One project assessed water budget and water quality impacts to Stump Brook and Monponsett Pond; the other project assessed impacts to Silver Lake and the Jones River. Both projects involved the adaption of a USGS regional groundwater model to conduct the water quantity evaluations and then used that water budget information to inform water quality analytical evaluations of the water quality impacts from potential management strategies.

Red Lily Pond Wetlands Restoration, Barnstable, MA: Managed this feasibility assessment and conceptual design of a multi-faceted wetlands restoration that includes freshwater ponds, freshwater stream, and tidal stream. Project includes survey, hydrological monitoring, groundwater and surface water modeling, and design to remove flow restrictions and restore naturalized hydrology, ecology, and fish passage to the extent practical.

Saltwater Wetland Restoration Feasibility and Implementation, Sandwich, Falmouth, Barnstable, Yarmouth, Bourne, Eastham, Harwich, Nantucket, Manchester, and Mattapoisett, MA: Managed over a dozen projects to investigate the feasibility of restoring salt water flow to wetland areas and evaluate design options to provide enhanced flow (culverts, channels, bridges). Many of these projects were designed and permitted and several of them have progressed through construction.

Freshwater Wetland Restoration Feasibility and Implementation, Plymouth, Carver, Winchester, Walpole, Falmouth, Barnstable, and Harwich, MA: Managed over a half dozen freshwater stream restoration projects involving feasibility assessment, design, permitting, and public outreach.

Water Supply Investigations, Plymouth, MA: Conducted groundwater modeling and field investigations to identify, develop, and permit new water supply wells for the Town of Plymouth, the Pinehills, and multiple golf courses.

Coastal Processes and Stormwater Impacts, Savin Hill Cove, Dorchester, MA: Managed this major, long-term project assessing potential impacts to coastal resource areas from stormwater improvements proposed as part of the continuing MWRA cleanup of Boston Harbor. The projects included modeling of stormwater quality and potential sediment erosion and transport characteristics; field monitoring of bathymetry, depositional characteristics, and long term, automated, stormwater water quality sampling of baseline, construction, and post-construction conditions.

Parker River Low-Flow Study, MA: Managed this project assessing the extent of flow impairment, potential causes of flow impairment, and potential mitigation strategies to address the critical low flow conditions in this basin. The project included components of groundwater recharge water budget assessment, statistical analyses of measured historical and current streamflows, and estimates of potential streamflow depletions caused by groundwater withdrawals using the USGS StrmDepl modeling tool.

Groundwater Modeling Support for Remedial Actions, San Francisco, CA: Managed two separate projects conducting groundwater modeling assessments of remedial actions alternatives for different parcels within the Hunter's Point Naval Shipyard. Utilized the USGS MODFLOW groundwater modeling code to create two groundwater models used to evaluate a landfill cap, slurry walls, French drains, pump and treat systems, and constructed wetlands as remedial alternatives.

Eastern Ontario Regional Groundwater Study, Canada: Managed wellhead delineation project wherein six different MODFLOW numerical groundwater models were constructed to delineate Wellhead Protection Areas for 32 public drinking water wells in the greater Ottawa area.

F.P. (Tom) Lee, P.E.

Senior Project Manager
Principal Engineer
fplee@horsleywitten.com

Areas of Expertise

Civil Engineering
Environmental Engineering
Stormwater Management
Wastewater Treatment and Management
Water Treatment and Management
Low Impact Design
Site Design

Professional Registrations & Affiliations

Professional Engineer, MA, RI, CT,WI, ME and Alberta, Canada.
Member, Conservation Commission (2006 to present),
Community Preservation Committee (2009 to present), and Land Acquisition and Preservation Committee (2011 to present).
American Water Works Association
Water Environment Federation
American Society of Civil Engineers
Plymouth County Water Works Association

Academic Background

Master of Science, Environmental Engineering, Purdue University

Bachelor of Science, Civil Engineering, University of Massachusetts

Professional Experience

Horsley Witten Group, Inc., 1999 to Present

City of Edmonton, Alberta, Canada, 1982 to 1999

Howard Needles Tammen & Bergendoff, 1980 to 1981

Horsley Witten Group
Sustainable Environmental Solutions

Tom is the Principal Engineer, specializing in water and wastewater design and management systems, with 40 years of engineering experience. His experience includes water and wastewater master plan studies, engineering designs, permit applications, capital and operating budget preparations, construction oversight, contract administration, and project management. Tom is also experienced with system startups for various water and wastewater projects, including water pumping stations, water treatment plant upgrades, and wastewater treatment systems. Since 2001, Tom has been providing management services to the water, wastewater treatment facilities, and irrigation systems at The Pinehills community in Plymouth, Massachusetts. His management oversight includes: updating the water system hydraulic model; reviewing water, sewer and drainage systems; inspecting water, sewer, and sewage lift stations; updating as-built plan annually; updating water and sewer system specifications; preparing annual capital and operating budget for the water and wastewater treatment facilities; assuring compliance with Drinking water license, Water Management Act permits, and Groundwater Discharge Permit for wastewater; coordinating system operation with contract operators; and various management functions with the water and wastewater treatment facilities. Tom also provides management and design review for the irrigation systems for community area in The Pinehills community. Tom also works on stormwater and site design components of other projects.

KEY PROJECTS

The Pinehills Private Sewer Treatment Facilities Phase III Expansion, Plymouth, MA: Client Representative for Phase III Expansion to increase the plant capacity to 450, 000 GPD from 300,000 GPD including additional influent equalization volume, sequencing batch reactor, air blower piping upgrade, filter upgrade with related building, UV system upgrade, odor scrubber upgrade, instrumentation and SCADA control upgrade, and treated water reuse. Tom permitted this project under current Groundwater Discharge Permit with MassDEP. Tom is working with the Woodard & Curran Operation and Engineering group on this project, which is scheduled to be built in 2017.

Catamumet Harborview Homes Wastewater Treatment Plant, Stormwater and Site Design, Bourne, MA: Lead Designer for the permit, design, and construction services for a subsurface leaching systems to support a 34,000 gpd Moving Bed Biofilm Reactor (MBBR) package wastewater treatment system for a housing development and existing commercial development in Kingman Marina. The project is permitted for a Groundwater Discharge Permit through MassDEP and is currently under construction. Tom also worked on the site and stormwater design. The development is scheduled to be available for sale in 2016.

Wastewater System Evaluation and Design, Algonquin Heights Apartment Complex, Plymouth, MA: Tom manages this project, performed evaluation of existing wastewater system, designs a gravity sewer collection and lift station, and provided the information to the Town of Plymouth DPW for the construction of a Town lift station to service this area including this apartment complex.

EPA Copper Rule for State of Washington, Oregon, Washington: Tom provided the treatment options to reduce the copper concentration in the wastewater treatment effluent to meet the potential effluent target level and related cost estimates.

MCI Wastewater Treatment System Upgrade, Norfolk, MA: Lead Designer for an upgrade to a 0.484 MGD wastewater treatment system, using membrane bioreactor technology, to meet the new Total Phosphorus discharge limit of 0.1

mg/L. Completed permitting through MassDEP, Norfolk Con Comm, and EPA, public bid, and design upgrades that include: a screening process, anaerobic tanks, aeration tanks, a membrane system, an ultraviolet disinfection system, chemical addition, treated water reuse, and reuse of existing clarifiers as part of the overall treatment processes and additional influent liquidation tanks. Tom also oversaw construction administration, weekly meetings, and change orders throughout the Project.

MCI Wastewater Treatment System Upgrade, Plymouth, MA: Lead Designer for a new 31,000 gpd wastewater treatment system using membrane technology. The project includes a trash trap, anaerobic tank, aeration tanks, membrane system, ultraviolet disinfection system, effluent pump station, and subsurface leaching beds. The project included obtaining a GWDP from MassDEP. Tom also oversaw construction administration, weekly meetings, and change orders throughout the Project.

South Sandwich Village Wastewater Treated Effluent Disposal Design, Sandwich, MA: Lead Designer for the permit, and design services for a subsurface leaching systems to support a 500,000 gpd membrane wastewater treatment system for a commercial and housing development. They project did not obtain the Town's approval and terminated during the Groundwater Discharge permit preview process.

The Pinehills Wastewater Treatment Plant Phase II Expansion, Plymouth, MA: Project Manager and Designer for the permit, design and construction services for the expansion of the treatment plant from 150,000 gpd to 300,000 gpd. Tom directed the design and construction of a grit removal system, screened influent pump chamber, sequencing batch reactor, effluent equalization tanks, effluent pump station, subsurface leaching beds and supervisory control and data acquisition system.

Breezy Acres Wastewater and Water Design, Mashpee, MA: Lead Designer for the design, permit, and construction supervision of a 4,400 gpd septic system with connection to the Mashpee High School wastewater treatment plant, and watermain.

Barstow Village Drainage, Wastewater and Water Design, Hanover, MA: Lead Designer for the design, permit and construction supervision of a 9,924 gpd septic system with subsurface leaching fields serving 65 housing units, watermain, and drainage system for the community.

West Barnstable Community Wastewater Treatment Systems, Barnstable, MA: Lead Designer for the design, permit and construction services for two different wastewater treatment plants for two separate locations in the Town of Barnstable. One system was designed using Bioclere system with a design capacity of 1,800 gpd while the second system is designed using Advantex and Presby system with a design capacity of 7,260 gpd.

Canal Bluffs Water and Wastewater System Design, Bourne, MA: Lead Designer for the permit, design, and construction services for a new wastewater treatment system for this affordable housing development, consisting of 137 housing units. Services included permitting, design, public bid support, and construction inspection for 1,600 feet of 8-inch water main and a booster pump station. An advanced wastewater treatment system was designed, using Bioclere and multimedia filtration system, for a flow of 7,644 gpd. An innovative stormwater management system was also designed and implemented. Prepared an interim GWDP from DEP because the final design flow, including future phases, will exceed 10,000 gpd. The project will also be permitted under the "no-net nitrogen increase."

Main Street Village, Mashpee, MA: Lead Designer for the overall site design and wastewater system design that included stormwater, drinking water, and wastewater for thirty-two housing units and two commercial buildings. The project involved all permit applications including a pilot testing permit for the Nitrix system.

The Pinehills Private Sewer Treatment Facilities, Plymouth, MA: Project Manager for the operation and maintenance of the wastewater treatment plant, in cooperation with the contract operators. Tom also prepares capital and operating budgets, forecasts wastewater flow, updates the sewer system specifications, reviews sewer and lift stations design, inspects sewer systems during construction and startup, reviews as-built plan, and other related activities for the wastewater treatment and collection system.

Sarah Bartlett

Staff Scientist
sbartlett@horsleywitten.com

Areas of Expertise
Environmental Science
Data Management
Water Quality Monitoring & Assessment
Site Assessment and Remediation
Water Resource Management

Professional Registrations & Affiliations
OSHA 40 HAZWOPER (includes Confined Space Entry and Rescue)

Academic Background
Bachelor of Arts, Environmental Science, Saint Anselm College

Professional Experience
Horsley Witten Group, Inc., July 2019 to Present

New Hampshire Department of Environmental Services, MtBE Remediation Bureau, Environmentalist II, February 2018-July 2019

New Hampshire Department of Environmental Services, MtBE Remediation Bureau, Environmental Technician III, October 2016 to February 2018

Horsley Witten Group
Sustainable Environmental Solutions

Sarah Bartlett has more than three years of professional experience in the environmental science field. At the Horsley Witten Group, she currently supports a variety of consulting services including data analysis, evaluation and summary of public comments on proposed rulemakings, and developing maps, letters, and reports. Sarah has experience in water quality sampling and analysis as well as ArcGIS. While working for the New Hampshire Department of Environmental Services, she sampled private drinking water wells throughout New Hampshire for the presence of various contaminants including MtBE and PFAS.

KEY PROJECTS

Summary of State and Tribal Co-Regulator Meetings Regarding Proposed Water Quality Certification Rule, EPA: Assisted the EPA's Office of Water in Salt Lake City, Utah and Chicago, Illinois. Support involved background research on the proposed rule, development of technical materials, note-taking, followed by a summary for the meetings, and assistance at the public hearings. The meetings involved a discussion between EPA representatives and state and tribal co-regulators.

Summary and Analysis of Public Comments on Rulemaking Regarding the Waters of the United States, EPA: Assisted the EPA'S Office of Water in compiling, categorizing, and summarizing comments. Assisted with data management and quality control throughout the comment process.

MtBE Remediation Bureau, NH: Conducted private drinking water well sampling throughout NH per NHDES protocol. Sampled for a variety of contaminants including VOCs, PFAS, Perchlorates, and naturally occurring contaminants. Also researched areas of possible contamination using ArcGIS and multiple databases.

Black Brook Water Quality Assessment, Manchester, NH: Assisted the Watershed Assistance Program at NHDES in the assessment of Black Brook stream. The assessment was done in order to evaluate the progress the dam had made since the dam was removed Collected aquatic insects in order to assess the diversity and quantity. Counted pebbles in order to quantify the substrate at different points up the stream.

Surface Water Sampling-PFAS, NH: Assisted the Trend Monitoring Program at NHDES in the first of its kind, statewide initiative to sample rivers and streams throughout New Hampshire for PFAS.

Stream Crossing Assessments, NH: Assisted the Wetlands Bureau at NHDES assessing stream crossing structures (i.e. culverts, bridges, arches, etc.) that carry a road over a river, lake, wetlands or small stream. Evaluated the geomorphic compatibility of the structure, the aquatic organism passage and flood resiliency.

ADAM J. DAIGNEAULT, PhD

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Orono, ME 04469, USA

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Phone: +1 207 581 2805

EDUCATION

The Ohio State University — Columbus, OH

- Ph D., Natural Resource and Environmental Economics — August 2006
  - Dissertation: "Fire, Carbon, Timber, and Trees: Three Essays in Natural Resource Economics"
- M.A., Economics — September 2004
- Certificate of Graduate Interdisciplinary Specialization in Survey Research — September 2004

Denison University — Granville, OH

- B.A., *magna cum laude*, Economics and Environmental Studies — May 2001
  - Honors Thesis: "Cuba, An Ecological Footprint: Analyzing the 'Special Period,' 1989-1999"

PROFESSIONAL EXPERIENCE

2016-present, Assistant Professor, University of Maine School of Forest Resources
2010-2016, Senior Economist and Research Area Leader, Landcare Research New Zealand
2009-2010, Fellow, Deshpande Foundation & The Energy and Resources Institute (TERI)
2008-2009, Economist, U.S. EPA Office of Air and Radiation, Climate Change Division
2006-2008, Post-Doctoral Research Economist, U.S. EPA National Center for Env Economics
2005, Research Economist, USDA Forest Service Pacific Northwest Research Station
2002-2006, Research Assistant, The Ohio State University

HONORS AND AWARDS

NZ Association of Economists Economic Policy Prize, Best Paper	2014
Landcare Research Distinguished Service Award	2013
NZ Assoc. of Ag. and Resource Economists Society, Best Paper	2011
NZ Association of Economists Economic Policy Prize, Runner Up	2011
EPA Gold Medal: Economic Impacts of U.S. Climate Change Legislation	2009
EPA Bronze Medal: Economic Impacts of Increased Biofuels Production	2007
EPA Bronze Medal: Economic Impacts of Phosphate Mining	2007
The Ohio State University Distinguished University Fellowship	2005 - 2006
Ohio Agricultural Research and Development Center Director's Associateship	2003 - 2004
The Ohio State University Distinguished University Fellowship	2002 - 2003
Denison University Heritage Academic Scholarship	1997 - 2001
Park National Bank Scholarship for Excellence in Economics	2000 - 2001
Environmental Studies Program Melon Student Internship Grant	Summer 2000

JOURNAL PUBLICATIONS

Austin, K.G., J. Baker, B. Sohngen, C. Wade, **A. Daigneault**, S. Ohrel, S. Ragnauth, A. Bean. 2020. How much will global forest carbon sequestration cost?. *Nature Communications* 11 5946. https://doi.org/10.1038/s41467-020-19578-z.

Roy, S.G., **A. Daigneault**, J. Zydlewski, A. Truhlar, S. Smith, S. Jain, D. Hart. 2020. Coordinated river infrastructure decisions enhance social-ecological resilience. *Environmental Research Letters* 15 104054. https://doi.org/10.1088/1748-9326/abad58.

Daigneault, A., B. Sohngen, R. Sedjo. 2020. Carbon and Market Effects of US Forest Taxation Policy. *Ecological Economics* 178: 106803.

Zhao, J. **A. Daigneault**, A. Weiskittel. 2020. Forest Landowner Harvest Decisions in a New Era of Conservation Stewardship. *Forest Policy and Economics*. 118: 102251. https://doi.org/10.1016/j.forpol.2020.102251.

Favero, A., **A. Daigneault**, and B. Sohngen. 2020. Forests: Carbon Sequestration, Biomass Energy, or Both? *Science Advances*, 6(13): eaay6792.

Gawith, D., I. Hodge, F. Morgan, and **A. Daigneault**. 2020. Climate change costs more than we think because people adapt less than we assume. *Ecological Economics* 173: 106636.

Fernandez, M. and **A. Daigneault** 2020. A double win: new pathways to reduce greenhouse gas emissions and improve water quality in New Zealand. *Environmental Research Letters* 15 074004. https://doi.org/10.1088/1748-9326/ab8255

Carroll, J. **A. Daigneault.** 2019. Achieving Ambitious Climate Targets: Is it Economical for New Zealand to Invest in Agricultural GHG mitigation? *Environmental Research Letters* 14 124064. https://doi.org/10.1088/1748-9326/ab542a

Daigneault, A. 2019. A Shared Socio-economic Pathway Approach to Assessing the Future of the New Zealand Forest Sector. *Journal of Forest Economics* 34:233-262.

Daigneault. A. C. Johnston, A. Korosuo, J. Baker, N. Forsell, J. Prestemon and R. Abt. 2019. Developing Detailed Shared Socioeconomic Pathway (SSP) Narratives for the Global Forest Sector. *Journal of Forest Economics* 34:7-45.

Ausseil, A., **A. Daigneault**, B. Frame, E. Texiera. 2019. Towards an integrated assessment of climate and socio-economic change impacts and implications in New Zealand. *Environmental Modelling and Software* 119:1-20.

Gunukula, S., **A. Daigneault**, A.A. Boateng, C.A. Mullen, W.J. DeSisto, M.C. Wheeler. 2019. Influence of Upstream, Distributed Biomass-Densifying Technologies on the Economics of Biofuel Production. *Fuel,* 249:326-333.

Brown, P., **A. Daigneault** and J. Dawson. 2019. Age and Decision Making in New Zealand Agriculture. *Journal of Environmental Management.* 231:110-120.

Greenhalgh S., **A. Daigneault**, O. Samarasinghe. 2018. Allocation – The dilemma at the heart of setting water quality limits. *The Journal (official publication of the New Zealand Institute of Primary Industry Management Incorporated)* 22(4): 25-33.

Monge, J. **A. Daigneault**, L. Dowling, D. Harrison, and A. Ausseil. 2018. Implications from payments for forest ecosystem services on land-use decision-making under uncertain climate change: The case of erosion prevention on the East Coast of New Zealand. *Ecosystem Services*, 33(B):199-212.

Frame, B., A. Reisinger, A. Ausseil, **A. Daigneault** and J. Lawrence. 2018. Adapting shared climate policy assumptions for national and local scenarios. *Climate Risk Management*, 21:39-51.

Fernandez M., and **A. Daigneault.** 2018. The Paris Agreement and its Economic Impact on New Zealand. *Climate Change Economics*, 9(03), p.1850005.

Teixeira, E, J. de Ruiter, A. Ausseil, **A. Daigneault**, P. Johnstone, A. Holmes, A. Tait and F. Ewert. 2018. Adapting crop rotations to climate change in regional impact modelling assessments. *Science of the Total Environment* 616:785-795.

Daigneault A., S. Greenhalgh, and O. Samarasinghe. 2018. Economic impacts of multiple agro-environmental policies on regional New Zealand land use. *Environmental and Resource Economics* 69(4): 763-785.

Brown P., **A. Daigneault**, E. Tjernstrom, and W. Zou. 2018. Natural Disasters, Social Protection, and Risk Perceptions. *World Development* 104:310–325

Fernandez M., and **A. Daigneault.** 2017. Erosion Mitigation in the Waikato District, New Zealand: Economic Implications for Agriculture. *Agricultural Economics* 48(3): 341-361.

Daigneault, A., F. Eppink, and W. Lee. 2017. A national riparian restoration programme in New Zealand: is it value for money? *Journal of Environmental Management* 187:166-177.

Daigneault A., S. Greenhalgh, and O. Samarasinghe. 2017. Sharing the Pie: The dilemma of allocating nutrient leaching between sources. *Ecological Economics* 131:449-459.

Brown, P., **A. Daigneault**, and D. Gawith. 2017. Economic Impacts of Climate Change on Flooding in Fiji. *Climate and Development* 9(6): 493-504.

Daigneault, A., B. Sohngen, and S.J. Kim. 2016. Estimating welfare effects from supply shocks with dynamic factor demand models. *Forest Policy and Economics* 73: 41-51.

Fernandez M., and **A. Daigneault**. 2016a. The Paris Agreement and its impact on cattle and food sectors of New Zealand. *New Zealand Journal of Agricultural Research* 59(4), 436-443.

Fernandez M., and **A. Daigneault**. 2016b. Emissions trading and the economic impact of the Paris Agreement on New Zealand. *Compendium: Cuadernos de Economía y Administración* 3(5): 92–104.

Gawith D., **A. Daigneault** and P. Brown. 2016. Does community resilience mitigate loss and damage from climate-related disasters? Evidence based on survey data. *Journal of Environmental Planning and Management* 59(12): 2102-2123.

Daigneault, A, P. Brown, and D. Gawith. 2016. Dredging versus hedging: comparing hard infrastructure to ecosystem-based adaptation to flooding. *Ecological Economics* 122: 25–35.

Stephens, T., S. Greenhalgh, M. Brown, and **A. Daigneault**. 2016. Enhancing the tax system to halt the decline of nature in New Zealand. *Policy Quarterly*. 12(1): 26-34.

Brown, P., and A. **Daigneault.** 2015. Managing the invasive small Indian mongoose in Fiji. *Agricultural and Resource Economics Review* 44(3): 275–290.

Morgan, F., P. Brown, and **A. Daigneault.** 2015. Simulation vs. definition: differing approaches to setting probabilities for agent behaviour. *Land* 4(4): 914–937.

Morgan, F., and **A. Daigneault**. 2015. Estimating Impacts of Climate Change Policy on Land Use: An Agent Based Modelling Approach. *PLOS One*. DOI:10.1371/journal.pone.0127317

Brown, P., and **A. Daigneault**. 2014. Cost–benefit analysis of managing the Papuana uninodis (Coleoptera: Scarabaeidae) Taro Beetle in Fiji. *Journal of Economic Entomology* 107(5): 1866-1877.

Norbury, G., A. Hutcheon, J. Reardon, and **A. Daigneault**. 2014. Pest fencing or pest trapping: a bio-economic analysis of cost-effectiveness. *Austral Ecology* 39(7):795-807.

Brown, P., and **A. Daigneault**. 2014. Cost–benefit analysis of managing the invasive African tulip tree *Spathodea campanulata* in the Pacific. *Environmental Science & Policy* 39: 65-76.

Daigneault, A., S. Greenhalgh, and O. Samarasinghe. 2014, A response to Doole and Marsh (2013) article: methodological limitations in the evaluation of policies to reduce nitrate leaching from New Zealand agriculture. *Australian Journal of Agricultural and Resource Economics* 58: 281–290.

Funk J., C. Field, S. Kerr, and **A. Daigneault.** 2014. Modeling the impact of carbon farming on land use in a New Zealand landscape. *Environmental Science & Policy* 37: 1-10.

Daigneault, A., B. Sohngen, and R. Sedjo. 2012. An economic approach to assess the forest carbon implications of biomass energy. *Environmental Science and Technology* 46(11): 5664–5671.

Greenhalgh, S., **A. Daigneault**, O. Samarasinghe, and R. Sinclair. 2012. Capitalizing on Water and Climate Policies in the New Zealand Agricultural and Forestry Sectors. *The International Journal of Climate Change: Impacts and Responses* 3(2): 15-32.

Baker, J., B. McCarl, B. Murray, S. Rose, R. Alig, D. Adams, G. Latta, R. Beach, and **A. Daigneault**. 2010. Net Farm income and land use under a U.S. greenhouse gas cap and trade. *Policy Issues* P17, April 2010: 1-5.

Daigneault, A., M. Miranda, and B. Sohngen. 2010. Optimal forest rotation with environmental values and endogenous fire risk. *Land Economics* 86(1): 155-172.

Newbold, S. and **A. Daigneault**. 2009. Climate response uncertainty and the expected benefits of greenhouse gas emissions reductions. *Environmental and Resource Economics* 44(3): 351-377.

Daigneault, A., B. Sohngen, and R. Sedjo. 2008. Exchange rates and the competitiveness of the U.S. timber sector in a global economy. *Forest Policy and Economics* 10(3): 108-116.

Kelch, D., F. Lichtkoppler, B. Sohngen, and **A. Daigneault**. 2006. The Value of Steelhead (*Onchorhynchus mykiss)* Angling in Lake Erie Tributaries. *Journal of Great Lakes Research*. 32:424-433.

SELECT REPORTS & OTHER PEER REVIEWED PUBLICATIONS

Daigneault, A., Simons-Legaard, E., Birthisel, S., Carroll, J., Fernandez, I., & Weiskittel, A. 2020 "Maine Forestry and Agriculture Natural Climate Solutions Mitigation Potential." University of Maine Center for Research on Sustainable Forests Interim Report, August 2020. Available here.

Arnold, S., …, **Daigneault, A.**, et al. 2020. "Scientific Assessment of Climate Change and Its Effects in Maine." Maine Climate Council Science and Technology Subcommittee Technical Report. Available here.

Lichko, L.,[#] Crandall, M., Johnson, T., & **Daigneault, A**. 2019."Valuing the Economic Benefits of Conservation Land in Downeast Maine." Technical Report prepared for the Downeast Conservation Network. Available here.

Daigneault, A. & Strong, A. 2019. "An Economic Case for the Sebago Watershed Water & Forest Conservation Fund." University of Maine Mitchell Center for Sustainability Solutions Report prepared for The Nature Conservancy and Highstead Conservation. March 2019. Available here.

Abello, T. **Daigneault, A**. et al. 2018. "Review of the Maine Tree Growth Tax Law: Report to the 128th Legislature Committee on Taxation." Available here.

Buncle, A., Daigneault, A. et al. 2018. "Cost-Benefit Analysis for Natural Resource Management In The Pacifica Guide: Second Edition." Technical Report for the Pacific Cost-Benefit Analysis Partnership. Available here.

Daigneault A., Eppink F., Gawith D., Craig H. 2017. "Estimate of the economic damage from the September 2015 flood in Freetown, Bo, and Pujehun (Sierra Leone)". Landcare Research Contract Report LC2751 for Sierra Leone Environmental Protection Agency. 136p.

Rutledge D.T., Ausseil A-G., Baisden T., Bodeker G., Booker D., Cameron MP., Collins DBG., **Daigneault A.**, Fernandez M., Frame B., Keller E., Kremser S., Kirschbaum MUF., Lewis J., Mullan B., Reisinger A., Sood A., Stuart S., Tait A., Teixeira E., Timar L., Zammit C.. 2017. "Identifying Feedbacks, Understanding Cumulative Impacts and Recognising Limits: A National Integrated Assessment. Synthesis Report RA3. Climate Changes, Impacts and Implications (CCII) for New Zealand to 2100." CCII report for MBIE contract C01X1225. 84pp.

Daigneault A. 2016. "Economic modelling of Hurunui Catchment nitrogen allocation under counter-factual policy assumptions." Landcare Research Contract Report LC2484 prepared for New Zealand (NZ) Ministry for Primary Industries. 20 p.

Daigneault A., Wright W., Samarasinghe O. 2015. "Economic analysis of land use opportunities in Maniapoto rohe." Landcare Research Contract Report LC2415 prepared for Maniapoto Māori Trust Board. 62 p.

Daigneault A, Samarasinghe, O. 2015. "Whangarei Harbour sediment and E.coli study: Catchment economic modelling." Landcare Research Contract Report LC2421 prepared for NZ Ministry for Primary Industries. 97 p.

Awatere S, **Daigneault A.**, Hainsworth S., Fenemor A., Tahi M. 2015. "Land-Use Options for Mākirikiri Aggregated Trust lands under a kaitiakitanga framework." Landcare Research Contract Report LC2135 for NZ Ministry for Primary Industries.

Daigneault A. 2015. "Modelling the economic impact of New Zealand's post-2020 climate change contribution." Landcare Research Contract Report LC2208 prepared for Ministry for Primary Industries and Ministry for the Environment. 41 p.

Daigneault A, Fernandez M. 2015. "Impact of New Zealand's post-2020 Climate Change Contribution: An economic modelling assessment." Landcare Research Contract Report LC2185 prepared for NZ Ministry for the Environment. 80 p.

Daigneault A, Fernandez M, Wright W. 2015. "Economic modelling of New Zealand's INDC for the post-2020 Climate Change Agreement: quality report." Landcare Research Contract Report LC2106 prepared for NZ Ministry for the Environment. 59 p.

Fernandez M, **Daigneault A** 2015. "The climate mitigation, adaptation and trade in dynamic general equilibrium (CliMAT-DGE) model". Landcare Research Contract Report LC2156 prepared for NZ Ministry for the Environment. 59p.

Daigneault, A. Fernandez M. 2014. "MfE GHG emissions reduction policy scenarios." Landcare Research Contract Report LC1966 for the NZ Ministry for the Environment. 167p.

Brown P, **Daigneault A**, Gawith D, Aalbersberg W, Comley J, Fong P, Morgan F. 2014. "Evaluating ecosystem-based adaptation for disaster risk reduction in Fiji." Landcare Research contract report LC1227 for the Climate and Development Knowledge Network. 161p.

Daigneault A, Samarasinghe O, Lilburne L. 2014. "Modelling economic impacts of nutrient allocation policies in Canterbury: Selwyn Catchment." Landcare Research Contract Report LC1491 for the NZ Ministry for the Environment.

Buncle A, **Daigneault A**, Holland P, Fink A, Hook S, Manley M. 2013. **"**Cost-benefit analysis for natural resource management in the Pacific." Suva, Fiji: Secretariat of the Pacific Community. http://www.undp-alm.org/sites/default/files/downloads/cost-benefit_analysis_for_natural_resource_management_in_the_pacific-a_guide.pdf

Daigneault A, Samarasinghe O, Lilburne L 2013. "Modelling economic impacts of nutrient allocation policies in Canterbury: Hinds Catchment." Landcare Research Contract Report LC1490 for the NZ Ministry for the Environment.

Lennox J, **Daigneault A**, Jhunjhnuwala, K, Turner J, Reisinger A. 2013. "Integrated Assessment of Trade-Related Impacts of Global Climate Change Policies." Landcare Research Contract Report, prepared for the NZ Ministry for Primary Industries.107p.

Daigneault A, Brown P, Greenhalgh S, Boudjelas S, Mather J, Nagle W, Aalbersberg B 2013. "Valuing the impact of selected invasive species in the Polynesia-Micronesia hotspot." Landcare Research contract report ; LC1227. Landcare Research New Zealand Ltd. 239 p. http://www.landcareresearch.co.nz/publications/researchpubs/CEPF-valuing-invasives.pdf

Daigneault et al. 2012. "Sustainable Land Management and Climate Change - Catchment Analysis of Climate Change." MPI SLMACC Contract C09X0904. Landcare Research Contract Report, prepared for the NZ Ministry for Primary Industries (MPI).175p.

Daigneault A, McDonald H, Elliott S, Howard-Williams C, Greenhalgh S, Guysev M, Kerr S, Lennox J, Lilburne L, Morgenstern U, Norton N, Quinn J, Rutherford K, Snelder T, Wilcock B. 2012. Evaluation of the impact of different policy options for managing to water quality limits: main report. MPI Technical Paper No: 2012/46. Landcare Research. 127p.

Lennox, J. and **A. Daigneault**. 2011. Quantitative economic analysis of water policies and developments in New Zealand's regions and catchments. In: *Old Problems, New Solutions*. Russel, S. B. Frame, and J. Lennox, eds. Lincoln, NZ: Manaaki Whenua Press. 59-69.

Adams, D., R. Haynes, and **A. Daigneault**. 2006. *Estimated timber harvest by U.S. region and ownership, 1950-2002.* Gen. Tech. Rep. PNW-GTR-659. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, 64 p.

SELECT PRESENTATIONS

2020 Agricultural and Applied Economics Association Annual Meetings, Virtual, August 11-12, 2020. "Glo A forest model inter-comparison project (For-MIP) to assess the future of global forests under climate, policy and technological stressors"

2019 Agricultural and Applied Economics Association Annual Meetings, Atlanta, GA. July 21-23, 2019. "Global forest management and carbon sequestration futures under alternative shared socioeconomic pathways"

2019 Northeastern Agricultural and Resource Economics Association Annual Meetings, Portsmouth, NH. June 11-12, 2019. "The value of ecosystem services and forest conservation in the Sebago Lake watershed"

2019 International Society of Forest Resource Economists Meeting. Columbus, OH. May 14-15, 2019. "An overview of global forest sector pathways in an SSP context"

2018 Society of American Foresters National Convention, Portland, OR. October 3-7, 2018. "The future of global forestry under alternative shared socioeconomic pathways"

2018 Agricultural and Applied Economics Association Annual Meetings, Washington DC. August 5-7, 2018. "Global forest management and carbon sequestration futures under alternative shared socioeconomic pathways"

6th World Congress of Environmental and Resource Economists, Gothenburg, Sweden. June 28, 2018. "How tax reform can affect investments in natural resources and public goods"

Fall 2017 Maine Society of American Foresters Meeting. Portland, ME. October 6, 2017. "State forest property tax policies: a review"

2017 Global Trade Analysis Partnership (GTAP) Conference, West Lafayette, Indiana. June 7-9, 2017. "Shared socio-economic pathway approach to assessing the future of the global forest sector"

2017 IIASA Forest Sector Modelling Conference. Vienna, Austria. March 8, 2017. "An overview of the New Zealand forest & agriculture modelling system"

2016 Agricultural and Applied Economics Association Annual Meetings, Boston, Massachusetts. July 29-31, 2016. "Equally slicing the pie: water quality policy and allocation"

2016 Australian Agricultural and Resource Economics Society Annual Meetings, Canberra, Australia. February 2-5, 2016. "Economic costs and environmental benefits of national riparian restoration for NZ"

2015 Australian Agricultural and Resource Economics Society Annual Meetings, Rotorua, New Zealand. February 10-13, 2015. "Linkage of a spatially explicit agent-based model to a partial equilibrium model of agriculture"

2014 New Zealand Association of Economists Annual Meetings, Auckland. July 2-4, 2014. "Agro-environmental policy impacts on regional land use in New Zealand" *Winner of NZAE New Zealand Policy Paper Prize*

2014 Australian Agricultural and Resource Economics Society Annual Meetings, Port Macquarie, Australia. February 4-7, 2014. "Costs and Benefits of Ecosystem-based Adaptation for Flood Risk Reduction in Fiji"

2014 Australian Agricultural and Resource Economics Society Annual Meetings, Port Macquarie, Australia. February 4-7, 2014. "Agro-environmental policy impacts on regional economics and ecosystem services in New Zealand"

GREENHOUSE 2013 Conference, Adelaide, Australia, October 8-11, 2013. "Estimating the regional economic impacts of climate change and policy responses on agricultural and forestry productivity"

2013 Agricultural and Applied Economics Association Annual Meetings, Washington DC, USA August 4-6, 2013. "Economic and environmental impacts of implementing multiple agro-environmental policies in New Zealand"

2013 Australian Agricultural and Resource Economics Society Annual Meetings, Sydney, Australia. February 5-8, 2013. "Invasive species management in the Pacific using survey data and benefit-cost analysis"

2013 Australian Agricultural and Resource Economics Society Annual Meetings, Sydney, Australia. February 5-8, 2013. "Economic and environmental impacts of nutrient reduction policies and their design at the catchment-level"

2012 EcoSummit for Ecological Sustainability, Columbus, Ohio, USA October 1-5, 2012. "Economic and environmental impacts of implementing multiple agro-environmental policies in New Zealand"

2012 Agricultural and Applied Economics Association Annual Meetings, Seattle, USA August 12-14, 2012. "Modeling forestry in dynamic general equilibrium: a climate change policy analysis"

2012 Agricultural and Applied Economics Association Annual Meetings, Seattle, USA August 12-14, 2012. "Estimating impacts of climate change policy on land use: an agent based modeling approach"

2012 Australian Agricultural and Resource Economics Society Annual Meetings, Fremantle, Australia. February 7-10, 2012. "Role of global forests in climate change mitigation: a focus on the Australia and New Zealand forest sector"

2011 Agricultural and Applied Economics Association Annual Meetings, Pittsburgh, USA. July 24-26, 2011. "Estimating Co-benefits of agricultural climate policy in New Zealand: A catchment-level analysis"

2011 New Zealand Association of Economists Annual Meeting, Wellington, New Zealand. June 29-30, 2011. "Estimating co-benefits of New Zealand agricultural climate policy" *Runner-up of NZAE New Zealand Policy Paper Prize*

2009 National Conference on Forestry Solutions, Shimla, HP, India, November 19-21, 2009. "Role of global forests in climate change mitigation"

2009 International Association of Research Universities Climate Change Congress, Copenhagen, Denmark, March 10-12, 2009. **"**Implications of offset eligibility provisions on GHG mitigation for U.S. forestry and agriculture carbon sinks"

2007 American Agricultural Economics Association Annual Meeting, Portland, OR, July 29-31, 2007. "Optimal forest rotations with environmental values and endogenous fire risk"

2005 American Agricultural Economics Association Annual Meeting, Providence, RI, July 24-27, 2005. "Exchange Rates and the Competitiveness of the U.S. Timber Sector in a Global Economy"

MANUSCRIPTS UNDER REVIEW

Daigneault, A., and A. Favero. Give or take a billion hectares: the influence of shared socioeconomic pathways on global forests. Under review at *Land Use Policy* (revised and resubmitted September 2020).

Ignatiadis, M, **A. Daigneault**, C. Sponarski, and J. Reed[#]. Operationalizing Sense of Place to Evaluate Potential Conflicts in Natural Resource-Dependent Rural Economies. Under review at *Journal of Environmental Policy and Perspetives* (revised and resubmitted September 2020).

Cook-Patton, S.C., T. Gopalakrishna, **A. Daigneault**, S.M. Leavitt, J. Platt, S.M. Scull, O. Amarjargal, P.W. Ellis, B.W. Griscom, J.L. McGuire, S.M. Yeo, J.E. Fargione. Spatial action maps to restore forest cover and mitigate climate in the contiguous United States. *One Earth* (revised and resubmitted September 2020).

Al Abri, I., K. Grogan, **A. Daigneault**. Optimal Forest Management in the Presence of Fire Risk and Fuel Biomass in the Southeastern United States. Under review at *Environmental & Resource Economics* (revised and resubmitted September 2020).

Daigneault, A., A. Strong, S. Meyer. Economic and Ecosystem Benefits of Conserving Forested Watersheds. Under Review at *Ecosystem Services* (revised and resubmitted September 2020).

Dymond, J., **A. Daigneault**, O. Burge, C. Tanner, F. Carswell, S. Greenhalgh, A. Ausseil, N. Mason, B. Clarkson. Searching for balance between pastoral agriculture and nature through ecosystem services. Under review at *New Zealand Journal of Marine and Freshwater Research* (submitted June 2020).

Listo, A, **A. Daigneault,** W. Gray, G. Hunt. Environmental Regulations and Employment in the Pulp and Paper Industry: Evidence from The Cluster Rule. Under review at *Journal of Cleaner Production* (submitted February 2020).

TEACHING EXPERIENCE

2020-21 SFR 444/544, Forest Resource Economics (Fall 2020)
2019-20 SFR 446/546, Forest Resource Policy (Spring 2020)
SFR 611, Quantitative Social Science for Natural Resources (Spring 2020)
SFR 444/544, Forest Resource Economics (Fall 2019)
2018-19 SFR 544, Forest Resource Economics (Spring 2019)
SFR 446/546, Forest Resource Policy (Spring 2019)
SFR 521, Research Methods in Forest Resources (Fall 2018)
2017-18 SFR 521, Research Methods in Forest Resources (Fall 2017)
SFR 444/544, Forest Resource Economics (Fall 2017)
SFR 446/617, Forest Resource Policy (Spring 2018)
2016-17 SFR 521, Research Methods in Forest Resources (Fall 2016)
SFR 446/617, Forest Resource Policy (Spring 2017)
2015-16 Economic Analysis of Invasive Species Management in East Melanesia
2014-15 Economics of Invasive Species Management in Southeast Asia
2013-14 Cost-benefit Analysis of Invasive Species Management in the Caribbean
2012-13 Economic Analysis of Natural Resource Management in the Pacific Islands

RESEARCH GRANT AWARDS

$105,130. (**PI: Adam Daigneault**). "A Resilience Indicators Approach to Ensuring Equitable, Objective, and Continued Investment in Northern Border Communities." 2020-2022. Funded by USDA Forest Service.

$132,174. (**PI: Adam Daigneault**). "An Integrated Approach to Quantifying the GHG Mitigation Potential of Natural Climate Solutions from Maine's Working Lands." 2019-2021. Funded by US Climate Alliance.

$25,000. (**PI: Adam Daigneault**). "Maine's Natural Climate Solutions Initiative." 2019-2021. Funded by Maine Farmland Trust.

$22,981. (**PI: Adam Daigneault**). "A Maine Soil Health Initiative to Enhance Agricultural Sustainability and Mitigate Climate Change." 2019-2020. Funded by Mitchell Center Sustainability Grant.

$35,243. (PI: Anil Raj Kizha, University of Maine). "Identifying opportunities for improving small-diameter tree harvesting strategies, logistics and market diversification." 2019-2021. Funded by the UMaine Cooperative Forestry Research Unit.

$25,000. (**PI: Adam Daigneault**) "Developing Economic and Community Resilience Indicators for the Katahdin Region, Phase 2." 2018-2019. Funded by The Nature Conservancy.

$26,205. (**PI: Adam Daigneault**). "Developing Economic and Community Resilience Indicators for the Katahdin Region." 2017-2018. Funded by Mitchell Center Sustainability Grant.

$499,907. (**UMaine PI: Adam Daigneault**; University of Vermont PI: Meredith Niles). 2018-2021. "Assessing Climate Perceptions and Developing Adaptation Resources for Small, Medium and Beginning Farms." Funded by USDA Agriculture and Food Research Initiative.

$2,998,314. (PI: Sandra De Urioste-Stone, University of Maine). "Enhancing Conservation Science and Practice: An Interdisciplinary Program." 2018-2022. Funded by NSF Research Traineeship (NRT) program.

$150,000. (PI: Sandra De Urioste-Stone, University of Maine). 2018-2020. "Fostering Climate Change Resilience: A Socio-Ecological Forest Systems Approach." Funded by USDA Agriculture and Food Research Initiative.

$179,654. (PI: Anil Raj Kizha, University of Maine). "Small-diameter trees: Evaluating cost and value proposition of harvest from different silvicultural prescriptions". Funded by the USDA Agricultural Research Service.

$115,006. (PI: Sam Roy, University of Maine). "Fishy business: identifying synergies between researchers and stakeholders for improved transportation infrastructure and ecological resilience through coordinated road culvert improvement" Funded by USGS Water Resources Research Institutes Sustainability Research Grant.

$41,908. (**PI: Adam Daigneault**). "Developing Economic and Community Resilience Indicators for the Katahdin Region, Phase 1." 2017-2018. Funded by The Nature Conservancy.

$399,999. (PI: Mehdi Tajvidi, University of Maine). 2017-2020. "Technical and Economic Feasibility Evaluation and Pilot-Scale Production of Composite Panels Made From Low-Cost Cellulose Nanomaterials and Wood Residues." Funded by the USDA Agricultural Research Service.

$400,000. (PI: Steve Shaler, University of Maine). 2017-2020. "Commercialization and Scaling Up of Mass Timber in Maine." Funded by the USDA Agricultural Research Service.

$150,000. (PI: Aaron Weiskettel, University of Maine). 2017-2018. "Benchmarking Maine's Forest Product Sector and Assessing Future Markets." Funded by the USDA NIFA.

$30,882. (**PI: Adam Daigneault**) "An Integrated Approach to Realizing the Value of Maine's Forest Resources." 2017-2018. Funded by the University of Maine Research Reinvestment Fund.

MANUSCRIPTS REVIEWED

Agricultural Systems, Australian Journal of Agricultural and Resource Economics, Carbon Balance and Management, Climate Policy, Climatic Change, Computers and Electronics in Agriculture, Ecological Economics, Ecosystem Services, Energy Policy, Energy Economics, Environmental Economics & Policy Studies, Environment, Development and Sustainability, Environmental & Resource Economics, Environmental Science and Technology, Environmental Science and Policy, Forest Economics and Policy, *Forest Science*, *Forestry: An International Journal of Forest Research, Frontiers in Ecology and the Environment, Global Change Biology, Journal of Agricultural and Resource Economics Review*, *Journal of Forest Economics*, *Land Use Policy, Management Science, Mitigation and Adaptation Strategies for Global Change*, *Management Science, Natural Hazards, Nature Climate Change, Nordic Pulp and Paper Research Journal, PLOS ONE, Resources, Conservation & Recycling, Sustainability,* USDA Forest Service Publications, US Environmental Protection Agency Publications, Economic Report of the President

PROFESSIONAL AFFILIATIONS

American Agricultural Economics Association (AAEA)
Association of Environmental and Resource Economists (AERE)
Society of American Foresters (SAF)
Northeast Agricultural and Resource Economics Association (NAREA)

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Rachel Bouvier, PhD
Principal / Owner
Economist

Rachel is the owner and founder of rbouvier consulting, an economic and sustainability consulting firm providing economic impact analysis, risk assessment, social return on investment reports, policy research, and natural resource valuation services to non-profit firms, private companies, municipalities, and government agencies.

Rachel is Chair and Associate Professor of Economics at the University of Southern Maine. She earned her PhD in Economics from the University of Massachusetts at Amherst, where she focused on the relationship between economic development and environmental quality. She also holds a Master's degree in Resource Economics and Community Development from the University of New Hampshire.

CAREER HIGHLIGHTS

As an economic and sustainability consultant, Rachel has worked with private, non-profit, and government clients including the Massachusetts Executive Office of Energy and Environmental Affairs, Coastal Enterprises, Inc., the City of Portland, Maine, The Nature Conservancy, and the Maine Public Advocate. As a professor, Rachel has taught over 1,000 students in Environmental Economics, Natural Resource Economics, Econometrics, Community Economic Development, Rural and Regional Development, and others.

TECHNICAL EXPERTISE

Rachel is experienced in cost-benefit analysis, non-market valuation, survey design and implementation, statistical analysis, social return on investment calculations, cost-effectiveness evaluation, economic impact assessment, training, facilitation, and public speaking.

EDUCATION

- University of Massachusetts, Amherst; Amherst, MA (Doctor of Philosophy, Economics; 2004).
- University of New Hampshire; Durham, NH (Master of Science, Resource Economics, 1996).
- Smith College, Northampton, MA (Bachelor of Arts, Economics, 1994).

SELECTED PROJECTS

Strategic Planning and Economic Development

- **Southern Maine Planning and Development Commission, Current.** Part of a team assessing the economic impact of sea level rise and storm surge on the towns of York, Kennebunk, and Wells.
- **New England Interstate Water Pollution Control Council, Current.** Assessing the feasibility of point – non-point source water quality trading in the Long Island Sound Study Area.
- **Executive Office of Energy and Environmental Affairs, Massachusetts, Current.** Developing topical briefings on connections between land conservation and economic outcomes as part of year-long Resilient Lands Initiative.
- **State of Maine Land Use Planning Commission, Current.** Advising Commission on requiring and reviewing socio-economic assessments for land use changes.
- **City of Portland, Maine, 2017-2019**. Part of a multi-year, multi-disciplinary team assisting the City of Portland design their Integrated Water Resources Management Plan. Rachel oversees monetizing costs and benefits of the alternative as well as presenting them to the general public.

Cost-Benefit and Cost-Effectiveness Analysis

- **The Nature Conservancy (Maine), 2016**. Performed a cost-effectiveness analysis of "traditional" culverts versus stream simulation culverts, using data from The Nature Conservancy, the Maine Department of Transportation, and several Maine municipalities to. The results are being used to promote the economic, as well as environmental, benefits of installing stream simulation culverts.
- **Reed & Reed General Contractors, 2016**. Demonstrated the economic benefits of installing 100 MW of wind energy in Maine versus importing the same amount of hydroelectric power from elsewhere. Using data from purchase power agreements, in-house engineering data, and the National Renewable Energy Laboratory's JEDI-W model, Results demonstrated that the economic impact of installing indigenous wind energy in Maine far exceeded those of importing hydroelectricity.

Economic Impact Assessment, Needs Assessment, and Market Analysis

- **Cities of Portland, Maine and South Portland, Maine. 2019-2020.** Part of a team assessing the economic value of Portland Harbor to the region.
- **Coastal Enterprises, Inc, 2019.** Developing comprehensive market analysis for innovative method of scallop aquaculture in Maine.
- **Center for Business and Economic Research / Casco Bay Estuary Partnership, 2017.** Contributed a section to a report on the economic importance of Casco Bay, focusing on the potential economic impact of climate change on the area.
- **Friends of Fort Gorges, 2016.** Designed, implemented, and analyzed the first ever visitation survey used by the Friends of Fort Gorges, to document the economic impact of the Fort and advocate for its preservation.
- **Unity Food Hub, 2016.** Designed and implemented a survey ascertaining the financial impact of the Unity Food Hub in Unity, Maine, on its member farmers.

- **Maine Public Advocate, 2015**. Performed the first-ever needs assessment for low-income electricity consumers in Maine, using data from the Census Bureau, the Maine Housing Bureau, the Maine Office of GIS, and several utilities in Maine. Results are being used to design a new, state-wide low-income electricity assistance program that will be easier to implement, more equitable, and will allow more low-income households to obtain assistance with their electricity bills more easily.

- **Planning Decisions, Inc. 2015**. Assisted Planning Decisions, Inc., in several economic development projects, including the economic impact of the Coastal Maine Botanical Gardens in Boothbay, Maine, as well as the structural economic changes in the greater Waterville, ME area affecting Thomas College.

- **Friends of the Presumpscot River, 2015**. Authored a report demonstrating the economic benefits of restoring native fish passage on the Presumpscot River, by documenting both the use and non-use values of restoring an historic alewife run.

ACADEMIC POSITIONS HELD

- Associate Professor of Economics, University of Southern Maine, 2019 – Current.
- Visiting Associate Professor, Economics, Colby College, February – May, 2018.
- Adjunct Associate Professor, Economics, University of Southern Maine, 2016 – 2017.
- Adjunct Associate Professor, Environmental and Resource Economics, University of New Hampshire, 2015 – current.
- Associate Professor, Economics, University of Southern Maine; Adjunct Associate Professor, Environmental Science and Policy, University of Southern Maine, 2005 – 2014.

ACADEMIC PUBLICATIONS

- 2015. The Friends of the Presumpscot River and rbouvier consulting. "The Economic Value of a Restored Fishery on the Presumpscot River." Online at www.presumpscotriver.org.
- 2014. Bouvier, R. "Distribution of Income and Toxic Emissions in Maine, United States: Inequality in Two Dimensions," Ecological Economics, 102(1): 39-47.
- 2014. Bouvier, R. "The Distribution of Environmentally Related Well-Being: A Conceptual Framework," Local Environment [published on-line April 23 at http://www.tandfonline.com/doi/abs/10.1080/13549839.2014.903235?journalCode=cloe20#.VNTV6J3F-T9.
- 2013. Wagner, T.P., Toews, P., & Bouvier, R. "Increasing diversion of household hazardous wastes and materials through mandatory retail take-back," Journal of Environmental Management, 123: 88-97.
- 2011. Bouvier, R. and T. Wagner. "The Influence of Collection Facility Attributes on Household Collection Rates of Electronic Waste: The Case of Televisions and Computer Monitors." Resources, Conservation and Recycling 55(11): 1051– 1059.
- 2010. Bouvier, R. "The Natural Environment as Field-Level Actor: The Environment and the Pulp and Paper Industry in Maine." Journal of Economic Issues 44(3): 717-735.
- 2009. Bouvier, R. "Sulfur Dioxide Emissions and Per Capita Income: A Disaggregation of The Effects of Long Run and Short Run Income Growth." Environment and Development Economics 14(5): 601-619.

- 2009. Bouvier, R. “Determinants of Environmental Performance: Pulp and Paper Mills, Regulations, and Community in Maine.” Economic Development Quarterly 23(2): 111-126.
- 2009. Bouvier, R. “Review of Frontiers in Rural and Resource Economics [book review].” Agricultural and Resource Economics Review 38(1):78-82.
- 2009 Bouvier, R. [with Travis Wagner]. “The Influence of Municipal Facility Operational Characteristics on the Collection of Household Electronic Waste [extended abstract].” Agricultural and Resource Economics Review 38(2): 284.
- 2000. Bouvier, R., Halstead, J., Manalo, A., and Conway, K. “The Effect of Landfills on Rural Residential Property Values: Some Empirical Evidence,” Journal of Regional Analysis and Policy, 30(2): 23-37.
- 1997. Halstead, J., Bouvier, R., Hansen, B. “On the Issue of Functional Form Choice in Hedonic Price Functions: Further Evidence,” by John M. Halstead, Rachel Bouvier, and Bruce E. Hansen. Environmental Management, 21(5): 759-65.

ACADEMIC AND PROFESSIONAL PRESENTATIONS

- “Crafting an Economically Sustainable Waterfront: The Big Picture,” January 2019. The Waterfront Alliance, Portland, Maine.
- “Ecosystem Services and Green Infrastructure: Understanding Valuation, Benefits, and SITES v2 Applications,” October 22, 2018. American Society of Landscape Architects Annual Conference, Philadelphia, PA. With Marla Stelk, Martha Sheils, and Lisa Cowen.
- “Turn and Face the Strange: The Economic Impacts of Climate Change,” June 2018. Energy and Environmental Council of Maine, Hallowell, ME.
- “Beyond the Bottom Line: Calculating the Social Return on Investment,” June 2018. Startup Maine, Portland, ME.
- “Marsh-o-nomics: The economic benefits of salt marsh conservation and restoration,” May 23, 2018. Friends of Scarborough Marsh, Scarborough, ME.
- “The Price of Everything and the Value of Nothing,” June 27, 2017, Association of State Wetland Managers, Windham, ME.
- “Promoting the Value of Sustainability in an Adverse Political Climate,” April 13, 2017, PelotonLabs, Portland, ME.
- “The Price of Everything and the Value of Nothing: What Economists Can (and Can’t) Say About Ecological Restoration,” Workshop given to the Society for Ecological Restoration, October 2016, Durham, NH.
- Moderator, “A Changing Climate: How Municipal Government Can Be Part of the Solution,” Freeport, ME, March 2016.

VOLUNTEER AND PROFESSIONAL AFFILIATIONS

- GrowSmart Maine, Executive Board, 2015 to present.
- Friends of the Presumpscot River, Executive Board, 2011 to 2014.
- Northeast Agricultural and Resource Economics Association, Board of Directors, 2011-2013.
- Environmental & Energy Technology Council of Maine, member.
- Society for Ecological Restoration, member.

CERTIFICATION AND AWARDS

- “Successful Green Small Business,” SCORE, Portland, ME, 2016.
- Institute for Sustainable Infrastructure, Envision Sustainability Professional, 2016.
- University of Southern Maine Faculty Senate Research Awards (2006; 2012).

Cost Proposal

The undersigned, as proposer, certifies that this submittal is made without collusion with any other person, firm, or corporation; and in submitting a response to this request; has examined instructions, specifications, and all terms and conditions of the solicitation. Proposer proposes and agrees to execute and fully perform in accordance with the instructions, specifications, terms and conditions of this request and any resulting agreement.

Not to Exceed Price for the Scope of Work contained herein (fixed price including all reimbursable): $96,852.92

Not to Exceed Price (in words): Ninety-six thousand eight hundred fifty-two dollars and 92 cents

Authorized Signature Forrest Bell Date: 12-16-20

Name of Firm: FB Environmental Associates
Name of Owner: Forrest Bell
Mailing Address: 97A Exchange Street, Suite 305, Portland, ME 04101
Phone: (207) 221-6699
Fax: N/A
Email Address: info@fbenvironmental.com

Total Cost by Task

Submitted to the City of Auburn by FB Environmental Associates, Horsley Witten Group, the University of Maine, and rbouvier consulting.

Task #	Item	Cost
A	Analysis of Regulatory Impacts	$21,346.00
B	Analysis of Environmental Impacts	$20,316.00
C	Analysis of Economic Impacts	$17,800.00
D	Final Report Outcomes	$27,118.00
E	Project Management	$4,530.00
Other Direct Costs (ODCs)		
UMaine Indirect (33%)		$4,700.12
UMaine Salary Employee Fringe (7.9%)		$1,042.80
	TOTAL	**$96,852.92**

Lake Auburn Ordinance Review

Submitted to the City of Auburn by FB Environmental Associates, Horsley Witten Group, the University of Maine, and rbouvier consulting.
The following provides a billing and payment schedule for the proposed project. The project will be billed monthly for time and materials by task.

Staff Member	Task A-1: Ordinance Review	Task A-2: Treatment Alternatives Review (Best Practices)	Task A-3: Comparison Matrix (Best Practices)	Task B-1: WQ Impact Model Scenarios	Task B-2: Land Cons & For Mgmt Review	Task B-3: Land Purchase Review	Task C-1: Costs of Added Protection	Task C-2: Treatment Alternatives (Economic Analysis)	Task C-3: Comparison Matrix (Economic Impacts)	Task D-1: Final Report	Task D-2: Planning Board Pres & Draft Ordinance	Task D-3: City Council Pres & Final Ordinance	Task E-1: Project Mgmt	Subtotal by Staff
Bell, P4					4	4				10	12	12	8	50
Brereton, P3	12		40	16	8	8				60	16	16	12	188
Diemer, P3				80						20			2	102
Sohns, P3	12		12	12	8	8				8				60
FB TASK TOTAL:	*24*	*0*	*52*	*108*	*20*	*20*	*0*	*0*	*0*	*98*	*28*	*28*	*22*	*400*
Claytor, P4		4									4	4		12
Baker, P4	16	8		4	8	4					32	16	12	100
Price, P4		6												6
Lee, P4		6												6
Bartlett, P2	20	50									6			76
HW TASK TOTAL:	*36*	*74*	*0*	*4*	*8*	*4*	*0*	*0*	*0*	*0*	*42*	*20*	*12*	*200*
UMaine (Daigneault)				*20*			*40*	*40*	*10*					*110*
rbouvier consulting							*16*	*16*	*18*					*50*
TOTAL	60	74	52	132	28	24	56	56	28	98	70	48	34	760

Bell, P4	$0.00	$0.00	$0.00	$0.00	$568.00	$568.00	$0.00	$0.00	$0.00	$1,420.00	$1,704.00	$1,704.00	$1,136.00	$7,100.00
Brereton, P3	$1,212.00	$0.00	$4,040.00	$1,616.00	$808.00	$808.00	$0.00	$0.00	$0.00	$6,060.00	$1,616.00	$1,616.00	$1,212.00	$18,988.00
Diemer, P3	$0.00	$0.00	$0.00	$8,080.00	$0.00	$0.00	$0.00	$0.00	$0.00	$2,020.00	$0.00	$0.00	$202.00	$10,302.00
Sohns, P3	$1,212.00	$0.00	$1,212.00	$1,212.00	$808.00	$808.00	$0.00	$0.00	$0.00	$808.00	$0.00	$0.00	$0.00	$6,060.00
FB TASK TOTAL:	*$2,424.00*	*$0.00*	*$5,252.00*	*$10,908.00*	*$2,184.00*	*$2,184.00*	*$0.00*	*$0.00*	*$0.00*	*$10,308.00*	*$3,320.00*	*$3,320.00*	*$2,550.00*	*$42,450.00*
Claytor, P4	$0.00	$840.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$840.00	$840.00	$0.00	$2,520.00
Baker, P4	$2,640.00	$1,320.00	$0.00	$660.00	$1,320.00	$660.00	$0.00	$0.00	$0.00	$0.00	$5,280.00	$2,640.00	$1,980.00	$16,500.00
Price, P4	$0.00	$1,110.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,110.00
Lee, P4	$0.00	$1,110.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,110.00
Bartlett, P2	$1,900.00	$4,750.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$570.00	$0.00	$0.00	$7,220.00
HW TASK TOTAL:	*$4,540.00*	*$9,130.00*	*$0.00*	*$660.00*	*$1,320.00*	*$660.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$6,690.00*	*$3,480.00*	*$1,980.00*	*$28,460.00*
UMaine (Daigneault)	*$0.00*	*$0.00*	*$0.00*	*$2,400.00*	*$0.00*	*$0.00*	*$4,800.00*	*$4,800.00*	*$1,200.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$13,200.00*
rbouvier consulting	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$2,240.00*	*$2,240.00*	*$2,520.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$7,000.00*
TOTAL	$6,964.00	$9,130.00	$5,252.00	$13,968.00	$3,504.00	$2,844.00	$7,040.00	$7,040.00	$3,720.00	$10,308.00	$10,010.00	$6,800.00	$4,530.00	$91,110.00

Labor	Rate/hr	Total Hours	Total Dollars
Bell, P4	$ 142.00	50	$7,100.00
Brereton, P3	$ 101.00	188	$18,988.00
Diemer, P3	$ 101.00	102	$10,302.00
Sohns, P3	$ 101.00	60	$6,060.00
		Subtotal (FBE)	*$42,450.00*
Claytor, P4	$ 210.00	12	$2,520.00
Baker, P4	$ 165.00	100	$16,500.00
Price, P4	$ 185.00	6	$1,110.00
Lee, P4	$ 185.00	6	$1,110.00
Bartlett, P2	$ 95.00	76	$7,220.00
		Subtotal (HW)	*$28,460.00*
UMaine (Daigneault)	$ 120.00	110	$13,200.00
rbouvier consulting	$ 140.00	50	$7,000.00
		TOTAL LABOR	$91,110.00
Other Direct Costs (ODCs)			Total Dollars
UMaine Salary Employee Fringe (7.9%)			$ 1,042.80
UMaine Indirect (33%)			$4,700.12
		TOTAL ODCs	$ 5,742.92
		TOTAL LABOR + ODCs	$ 96,852.92

Note: color coded by lead firm for each task

ORDER 03-01042021

City Council Order

IN CITY COUNCIL

ORDERED, that the City Council hereby authorizes staff to enter into an agreement with FB Environmental Associates for the evaluation of ordinances applicable to the protection of the Lake Auburn Watershed.

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: January 4, 2021

Subject: Executive Session

Information: Labor contract negotiations, pursuant to 1 M.R.S.A. Section 405(6) (D).

Executive Session: On occasion, the City Council discusses matters which are required or allowed by State law to be considered in executive session. Executive sessions are not open to the public. The matters that are discussed in executive session are required to be kept confidential until they become a matter of public discussion. In order to go into executive session, a Councilor must make a motion in public. The motion must be recorded, and 3/5 of the members of the Council must vote to go into executive session. An executive session is not required to be scheduled in advance as an agenda item, although when it is known at the time that the agenda is finalized, it will be listed on the agenda. The only topics which may be discussed in executive session are those that fall within one of the categories set forth in Title 1 M.R.S.A. Section 405(6). Those applicable to municipal government are:

A. Discussion or consideration of the employment, appointment, assignment, duties, promotion, demotion, compensation, evaluation, disciplining, resignation or dismissal of an individual or group of public officials, appointees or employees of the body or agency or the investigation or hearing of charges or complaints against a person or persons subject to the following conditions:
(1) An executive session may be held only if public discussion could be reasonably expected to cause damage to the individual's reputation or the individual's right to privacy would be violated;
(2) Any person charged or investigated must be permitted to be present at an executive session if that person so desires;
(3) Any person charged or investigated may request in writing that the investigation or hearing of charges or complaints against that person be conducted in open session. A request, if made to the agency, must be honored; and
(4) Any person bringing charges, complaints or allegations of misconduct against the individual under discussion must be permitted to be present. This paragraph does not apply to discussion of a budget or budget proposal;

B. Discussion or consideration by a school board of suspension or expulsion of a public school student or a student at a private school, the cost of whose education is paid from public funds, as long as:
(1) The student and legal counsel and, if the student is a minor, the student's parents or legal guardians are permitted to be present at an executive session if the student, parents or guardians so desire;

C. Discussion or consideration of the condition, acquisition or the use of real or personal property permanently attached to real property or interests therein or disposition of publicly held property or economic development only if premature disclosures of the information would prejudice the competitive or bargaining position of the body or agency;

D. Discussion of labor contracts and proposals and meetings between a public agency and its negotiators. The parties must be named before the body or agency may go into executive session. Negotiations between the representatives of a public employer and public employees may be open to the public if both parties agree to conduct negotiations in open sessions;

E. Consultations between a body or agency and its attorney concerning the legal rights and duties of the body or agency, pending or contemplated litigation, settlement offers and matters where the duties of the public body's or agency's counsel to the attorney's client pursuant to the code of professional responsibility clearly conflict with this subchapter or where premature general public knowledge would clearly place the State, municipality or other public agency or person at a substantial disadvantage;

F. Discussions of information contained in records made, maintained or received by a body or agency when access by the general public to those records is prohibited by statute;

G. Discussion or approval of the content of examinations administered by a body or agency for licensing, permitting or employment purposes; consultation between a body or agency and any entity that provides examination services to that body or agency regarding the content of an examination; and review of examinations with the person examined; and

H. Consultations between municipal officers and a code enforcement officer representing the municipality pursuant to Title 30-A, section 4452, subsection 1, paragraph C in the prosecution of an enforcement matter pending in District Court when the consultation relates to that pending enforcement matter.