



EconoLogistics

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FINAL ECONOMIC ANALYSIS OF THE WAREHAM RE-ZONING PLAN PROPOSED BY THE NOTOS GROUP

*Frederic B. Jennings Jr., Ph.D.
30 March 2021*

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TABLE OF CONTENTS

<i>1. Introduction</i>	<i>2</i>
<i>2. Frederic B. Jennings Jr., Ph.D.: Professional Experience and Qualifications</i>	<i>2</i>
<i>3. Executive Summary of Findings and Opinions</i>	<i>2</i>
<i>4. Statement of Historical and Current Facts, Issues and Concerns</i>	<i>4</i>
4.a. The Wareham Economic Development Strategy (WEDS) – March 2019	5
4.b. Three FXM Reports Conducted for the NOTOS Group – Nov/Dec 2020	5
4.c. Letter from Jeffery A. Tocchio on Revisions to Proposed HREOD – 8 Feb 2021	8
4.d. A Local Letter Supporting the HREOD Re-Zoning Proposal – 26 Feb 2021	9
4.e. “The Story Behind the Hospitality District Letter sent to All Voters – 9 Mar 2021	10
4.f. Opposition to this Re-Zoning Proposal from “Environmental Advocates”	10
4.g. “Red Brook Conservation Land Removed from NOTOS Proposal” – 17 Mar 2021	12
<i>5. A Critique of the FXM Analysis</i>	<i>13</i>
<i>6. A Look at Wareham Plans, Standards, Goals and Guidelines</i>	<i>16</i>
6.a. The 2017-2024 Wareham Open Space and Recreation Plan – May 2018	16
6.b. Wareham Zoning By-Laws – October 2018	22
6.c. Town of Wareham Master Plan – 27 January 2020	22
6.d. Town of Wareham Multi-Hazard Mitigation Plan – November 2020	24
<i>7. The “Official Position” of Wareham on Environmental Resource Protection</i>	<i>26</i>
<i>8. The “Economic Arguments” for this Re-Zoning Proposal (Restated)</i>	<i>26</i>
<i>9. The Importance of Credibility in Honoring Town Standards and Guidelines</i>	<i>26</i>
<i>10. Summary and Conclusions</i>	<i>27</i>
<i>LIST OF EXHIBITS</i>	<i>28</i>

1. Introduction

EconoLogistics was retained in early March 2021 to consider, examine and evaluate the various issues and documents of relevance to a recent re-zoning proposal by the NOTOS Group to establish a “Hospitality, Recreation and Entertainment Overlay District” (HREOD) on around 700 acres of ecologically sensitive land located in northeastern Wareham, MA.

The economic evaluation presented and reported below was based on a review of documents listed at the end of this report in **Exhibit One**. **EconoLogistics** has made every attempt to evaluate and process this information accurately and consistently using generally-accepted economic practices. If additional relevant information becomes available, this report may be revised.

2. Frederic B. Jennings Jr., Ph.D.: Professional Experience and Qualifications

My qualifications are as follows: I have a B.A. in economics (*magna cum laude*) from Harvard College (1968) and an M.A. (1980) and Ph.D. (1985) in economics from Stanford University. I have taught microeconomics and other courses at the graduate and undergraduate levels (including business ethics) in economics departments at Tufts University (1979-83) and at Bentley College (1985-87), and I have had over 30 years of experience as a consultant in economic litigation at Charles River Associates (1973-74 and 1988-91), Arthur Andersen (1991-92) and in my own consulting practice, **EconoLogistics**, founded in 1992. In summary, I have about 35 years of work experience as a professional economist in various capacities (cf. my Curriculum Vita for further information on my experience and qualifications, attached hereto as **Exhibit Two**). I have also published many academic papers on various economic subjects under the auspices of the *Center for Ecological Economic and Ethical Education (CEEEE)* located in Ipswich, MA, which I founded in 1998, and have written extensively about the economics of fisheries conservation and climate change. prepared numerous reports and economic studies for private clients and diverse industry trade associations for **EconoLogistics** since its founding in 1992, and have frequently testified as an economic damages expert in court, a context that demands an exacting and rigorous care in one’s economic analysis and conclusions. Everything you do is closely scrutinized, so you learn to choose assumptions most detrimental to your case, both as a matter of consulting ethics and to assure conservative findings.

3. Executive Summary of Findings and Opinions

EconoLogistics was retained in March 2021 to examine and evaluate the NOTOS Group re-zoning proposal of ecologically sensitive land in northeastern Wareham, MA. The author’s professional qualifications are reviewed, and then followed by a lengthy description of “Facts, Issues and Concerns.” The re-zoning plan proposed by the NOTOS Group has been motivated in part by a claim that current zoning arrangements, combined with the effects of COVID-19, will unduly burden Wareham municipal budgets. A set of studies by FXM Associates has raised concerns for Wareham’s fiscal resilience, suggesting this re-zoning proposal as a solution. The present report examines this argument and its purported economic justification.

Four reports reviewed were prepared by FXM Associates: “Wareham Economic Development Strategy” (March 2019); “Assessment of Municipal Revenues and Costs of Potential New Residential Development in Wareham: Executive Summary Report” (two versions, 16 November and 7 December 2020); and “Potential Market Driven Economic and Fiscal Impacts to the Town

of Wareham of the COVID-19 Pandemic” (December 2020). The last three of these four reports were prepared under contract for the NOTOS Group, the developer proposing this re-zoning plan. Among other things, these reports suggest that the current R-130 zoning – on the land designated by this re-zoning plan – threatens the fiscal stability of the Wareham municipal budget.

FXM Associates projected the prospective financial losses to Wareham without the re-zoning using an invalid series of economic arguments. **First**, the number of new homes is overstated; 90 homes cannot be placed on a 275-acre parcel zoned for 3-acre lots and still leave room for roads and other facilities. **Second**, taking the *average value of existing homes* as a benchmark for the taxable value of *new homes* understates their tax revenue impacts. **Third**, the FXM analysis also exaggerated *people per household* to overstate their cost effects. **Fourth**, the scaling up of *average cost per student* to determine the cost impact of new enrollments is only valid were there *no fixed costs* in education! **Fifth**, *excess capacity* (from falling enrollments in Wareham’s schools) has inflated the average cost per student (due to significant fixed costs and COVID-19), which has further biased these cost effects upward. **Sixth**, the FXM measure of non-school costs, by scaling average residential use costs for municipal services upward, suffers from the same mistake of assuming *no fixed costs* in the provision of town services, so biases these costs upward as well.

Assuming no fixed costs in education or municipal services inflates their estimated cost effects. FXM also understates the tax revenue impact of new homes. Consequently, the case for re-zoning this land rests upon **an exaggeration of costs and an understatement of tax revenues** associated with the residential use of this land.

Several other documents were also reviewed that were intended to guide decisions in Wareham on environmental protection and business development proposals. Each is briefly described below.

The 2017-2024 Wareham Open Space and Recreation Plan began with a Statement of Purpose: “The need to protect open space, ...[to] safeguard watershed areas, and protect river corridors, ponds, and coastlines is widely recognized by Wareham’s residents.” The plan adds that: “protecting our natural water resources is very important to the residents... The Plymouth-Carver ... Aquifer ... is quite vulnerable to contamination” and “groundwater contaminants can quickly travel long distances, and affect a large area. ... Sound land management policies are essential to produce development that minimizes adverse impacts on natural systems.” The plan reviews state-level restrictions on protected lands such as *Outstanding Resource Waters* and *Coldwater Fisheries Resources* like Red Brook, and addresses other wetlands conservation issues of sedimentation, road runoff, nitrogen loading and sewage disposal, calling for “a collaborative effort of Wareham’s Town Administrator, Board of Selectmen, Town Planner, the Conservation Commission, the Community Preservation Committee, the Open Space Committee, the Commonwealth of Massachusetts, local, regional, and state conservation organizations, and Wareham’s residents” to protect open space. The Wareham town leadership endorsed this Open Space Plan with a unified and enthusiastic voice.

The Wareham Zoning By-Laws, identified in the Open Space Plan as the town’s main source of environmental protection, explain that a “Groundwater Protection Overlay District” – which “includes all areas within the delineated MA DEP Zone II Wellhead Protection Area” – prohibits an array of uses including “wastewater treatment facilities.” This Wellhead Protection Area seems to lie within the proposed HREOD zone that allows “wastewater treatment facilities.”

The Town of Wareham Master Plan thanks these entities for their support: the Planning Board; Board of Selectmen; Town Administration; SRPEDD; and many others. The primary goals of this

Master Plan include: land use, open space and recreation; natural and cultural resources; etc., and the plan calls for “collaboration” and “public participation.” Among its most important goals is “permanently protected open spaces” and the protection of “watersheds, wetlands, salt marshes, rivers, bays, and ponds ... for current and future use...” “Open Space Goal 1” is to “Implement the 2017-2024 Wareham Open Space and Recreation Plan” and Goal 2 is to “prioritize land conservation” with the help of the “Open Space Committee, Planning Department, Conservation Commission.” The Master Plan also endorses two “Natural and Cultural Resources Goals ... to increase climate resilience in Wareham” and to “Protect Wareham’s Water Resources” by reducing “nitrogen pollution” along with “fertilizer and pesticide use near flowing water.”

The Town of Wareham Multi-Hazard Mitigation Plan warns: “Wareham’s natural environment and natural resources are important to the Town’s identity and quality of life” because “large stretches of open space, forested land, and upland ... support the economy...” The plan expresses concern about wildfires, drought and extreme temperatures, and about runoff and nutrient pollution that risk eutrophication which “affects the whole ecosystem” and can disrupt “residential water supplies.” This plan stresses the importance of following “Town Plans and Policies” on “land use, economic development ... open space... natural and cultural resources [and] ... climate resilience.”

This re-zoning proposal appears to conflict with the town’s ‘official position’ on environmental conservation in its land use priorities. The Wareham community has established a detailed set of standards and guidelines for its economic development decisions. The claim that Wareham’s finances are at risk under current residential zoning arrangements lacks any credible or substantive justification. There is no oncoming or imminent fiscal crisis that this re-zoning proposal will solve.

4. Statement of Historical and Current Facts, Issues and Concerns

A recent proposal put forth by the NOTOS Group provides for the re-zoning of approximately 700 acres of forest land with a “Hospitality, Recreational and Entertainment Overlay District” (HREOD). The proposal was endorsed by the Town of Wareham Board of Selectmen. Because of a substantive revision to the proposed HREOD, the proposal must come before the Planning Board for review again. That review is scheduled for April 5, 2021, five days before the proposal on the most recent warrant article will be presented to Town Meeting for a vote on April 10, 2021.

The basic argument in support of this economic development project is founded upon a claim – buttressed through several economic analyses produced by FXM Associates in Mattapoisett, MA – that the current 3-acre residential zoning of a 275-acre parcel that the NOTOS Group has targeted for its development plans, if used for that purpose, will lead to net financial losses for the Town of Wareham of approximately \$800,000 per year. An additional economic analysis by FXM Associates has also estimated that the COVID-19 pandemic will cause a cumulative loss of financial solvency for the town of between \$927,000 and \$1,450,000 over the next five years, with possibly additional annual losses to Wareham of \$800,000 each year from state revenue shortfalls.

This series of studies by FXM Associates began with a Wareham Economic Development Strategy (WEDS) presented to the Town of Wareham and the Wareham Redevelopment Authority (WRA), all of which have led to an urgent sense of concern in the neighborhood and among community leaders about the future financial solvency and fiscal resilience of the Wareham municipal budget. The effect of all these FXM studies and reports has been to promote the NOTOS Group’s proposal for economic development in the northeastern part of Wareham, provoking the opposition of many environmental organizations to this plan.

4.a. The Wareham Economic Development Strategy (WEDS) – March 2019

The Town of Wareham along with the Wareham Redevelopment Authority (WRA) contracted with FXM Associates to conduct a study of their prospects for economic growth and development. FXM Associates subsequently presented a report in March 2019 called the ***Wareham Economic Development Strategy (WEDS)*** aimed “to expand the tax base and employment opportunities” in the Town of Wareham for the short and intermediate term. This report proposed a foundation for further development plans. The aim of this report was...

...to provide data and analyses that can not only inform Town officials but also assist current and prospective private businesses and developers in better understanding market opportunities for expanded commercial and residential development. Recent prior planning efforts related to economic development addressed critical infrastructure, zoning, land parcelization and ownership, and building-specific rehabilitation issues, but did not assess market conditions, trends, and opportunities. The market assessments were, therefore, the primary focus of FXM’s work and are reflected in the report.

This report’s Summary Observations and Findings showed that population and housing in Wareham were growing at 5-7%/year, and both educational and income levels in Wareham were lower than in surrounding towns. The lower value of housing implied lower property tax revenues. But there was good 2006-2016 job growth in Wareham, and the lower average wages than in surrounding towns would tend to attract new business. A significant potential for commercial development in the town implied that the expected demand for housing will likely exceed its currently available supply in Wareham, where tax rates are lower as well.

Among the Strategic Priorities for the Wareham Redevelopment Authority (WRA), this report listed urban renewal for downtown and in Onset, business development in Wareham Industrial Parks, and the beautification of commercial strips along Routes 6 and 28. An important potential growth area for Wareham was seen to be in office-using industries; the report said: “A notable industry with growth potential in Wareham is Arts, Entertainment and Recreation.” (p. 28) That declaration set the stage for the NOTOS Group’s re-zoning proposal, which Wareham Week, the local newspaper characterized on 17 March 2021 in the following way:

The Notos Group proposed building a horse racing track and casino on a parcel of land on Glen Charlie Road back in 2019 — a proposal that seems to have been dropped, although the company has undisclosed plans in-the-works for the new district, if it is approved. A previous version of the proposal was set to encompass about one quarter of the town’s landmass, including the roughly 275-acre property on which the Notos Group had hoped to build its “racino.” The district was then cut down to about 963 acres, and has yet again been reduced to an unspecified number of acres. ... The district would allow a variety of uses including hotels, conference centers, multiple family dwellings, hospitals and riding stables. All projects would have to include an “indoor and/or outdoor commercial recreation facility or place of amusement and residential uses.” ... Currently, the land is zoned only for single-family homes on several acre lots.

4.b. Three FXM Reports Conducted Under Contract for the NOTOS Group – Nov/Dec 2020

The First FXM “Technical Memorandum” dated 16 November 2020: FXM Associates, the same group that produced the Wareham Economic Development Strategy (WEDS) in March of 2019, was retained by the NOTOS Group to promote this development plan with three reports. The first one is dated 16 November 2020, and it made the following argument about how the 275-acre parcel, currently used as a gravel pit, is zoned for single-family homes with minimal lot sizes of 3 acres. The report claims that there could be built on that parcel, under current zoning laws, a

total of 90 single-family homes. The average value of existing homes in Wareham is \$349,900, each with a 2020 Fiscal Year property tax rate of \$10.98 per thousand dollars in value, so these 90 new homes should generate \$345,771 in annual property tax revenue and another \$589,610 in other municipal revenue, based on an average projected number of 4.5 residents per household.

These revenue increases are then compared with the municipal service costs of schooling and other expenses for the town which are respectively calculated at \$1,313,290 and \$421,800 per year, based on per capita cost (per student and household member) in the Town of Wareham. This means that the net annual burden on the Wareham fiscal budget will suffer an estimated loss of \$800,000 per year if this 275-acre parcel is developed for residential purposes as the current zoning permits.¹ Their calculation of schooling costs, based on 4.5 people per household, assumed 0.93 school-aged children per household multiplied by 90 households (which equals 83.7 students) at an average per pupil cost of \$16,892 in FY 2020 to get – according to their Table 1 – a total schooling cost per year of \$1,313,290.² Their calculation of non-school municipal service costs, stated in Table 1 as \$421,800, is apparently “based on Town of Wareham, FY 2020 budget estimates divided by the 2020 total population estimates based on the latest US Census estimates (2019) of 22,745 persons.”

They also note, curiously, that: “There is an average of 0.27 school aged children and 2.41 persons per household town-wide in 2020.” Their reasons for offering this information were not revealed; their own loss calculation of \$800,000 was based on 0.93 school-aged children and 4.5 persons per household. The report also bristles with various qualifications, caveats and disclaimers, such as the following italicized statement:

It should be noted that these assumptions are for a hypothetical development and do not reflect any actual proposed project. Target market values, number of bedrooms per unit and household types would be expected to reflect detailed market studies which have not been done to date.

On their calculation of school costs, they say that: “This estimate was made after consulting a variety of sources, as it is notoriously difficult to predict how many children a given development will house, and even estimates based on empirical data can vary widely.” They explain in this way how their estimate was derived:

The portion of the Wareham Town budget allocated to school costs (including state aid for education) was divided by the total number of public school students in the town to derive a per-pupil cost of \$16,692 in FY 2020. Then per-pupil costs were multiplied by the number of students estimated to live in the Wareham potential development options in order to estimate total school costs attributable to the development.

They add a “NOTE” to suggest their calculation of losses to Wareham was actually conservative, because it did not include several other sources of possible loss:

NOTE: FXM did not analyze potential marginal costs that new residents might impose on town infrastructure or services because of capacity or service limits, thus requiring the municipality to invest in additional physical infrastructure such as school, police, or fire buildings or vehicles, water and sewer, roadways, personnel, and so forth. This level of analysis is beyond the scope of the current study which is considering only hypothetical development options as specified by the client.

The final line of this “NOTE” defines that their focus on “only hypothetical development options” was “specified by the client” (namely, the NOTOS Group).

¹ The actual figure that they derive is \$799,709, which is rounded up to \$800,000 in the 16 Nov 2020 FXM Report.

² The actual figure that I get from this calculation, however, is \$1,413,860.40. I cannot explain this discrepancy.

The Second FXM “Technical Memorandum” dated 7 December 2020:

This second FXM Report presented the exact same information as the previous one, so I will not repeat what was explained above. I don’t know why there are two reports dated differently, except for one important change between the two nearly identical memoranda. The first version included a peculiar remark contradicting their own assumptions (noted above) that said: “There is an average of 0.27 school aged children and 2.41 persons per household town-wide in 2020.” This curious statement was removed from the follow-up version.

The Third FXM “Technical Memorandum” on COVID-19 Impacts dated December 2020:

This report was also prepared for the NOTOS Group, and it begins with an array of qualifications and disclaimers suggesting how uncertain all of its calculations and findings are under “Caveats”:

*At the time of writing, the COVID-19 pandemic is in its ninth month since the first lockdown. The fluctuating levels of infections and deaths make it extremely difficult to draw more than broad conclusions about its economic impacts... The development and distribution of vaccines will help mitigate some of these impacts, but much remains unknown about the timing and extent of the rollout. There is still uncertainty too about how and whether Massachusetts budgets can help fill municipal gaps and support local needs, or worse, whether state budget shortfalls will be passed onto local municipalities. **With no real precedents, too many variables, and too much uncertainty** over the duration of the virus and the attendant restrictions on businesses and governments, employees and consumers, **forecasting the pandemic’s effects on local economies and finances is not a straightforward process.** ... The analyses conducted for this report must be interpreted within a range of possibilities of both scope and time. [emphasis added]*

The purpose of this report, therefore, is stated as follows: “to estimate the impact of the pandemic on Town finances, using current fiscal data such as tax rates and valuations. *This report does NOT assess municipal finance and budget trends and projections but rather examines market forces expected to influence town revenues. It does not necessarily represent the views of Wareham Town officials.*” [original emphasis] Then they state their “Summary Findings” while repeating several more caveats thus:

***With so much uncertainty** inherent to any forecasts of economic and fiscal variables that will affect employment, business sales, and fiscal revenues in Wareham, **we approach the assessment of potential impacts with extreme caution.** ... There is also uncertainty on the full impact of vaccinations on personal and business behavior and whether and to what extent they can restore the mostly positive economic and real estate market trends preceding the pandemic. **Clearly there are potential longer-term changes ... that could disrupt projections**... These will in turn affect real estate market conditions... **With these caveats in mind,** and further recognizing that we have not analyzed historical budget trends in Wareham nor assessed current capacity and service limitations, **FXM estimates that over the next five years, based on projected real estate market conditions and trends in employment and income, cumulative revenue losses to the Town of Wareham may range from about \$930,000 to \$1,500,000**... As noted, this analysis does not consider state funding, which comprises about 24% of total town receipts. ... 2020 revenues to Massachusetts are about 5% less than projected. **If state funding to Wareham were to be reduced by that percentage of current funding, in calendar 2020 the shortfall would have been over \$800,000. That amount is greater than the total losses in any given year estimated in this analysis.** It also does not consider the likely demand for additional social services to assist individuals and families coping with mental health as well as economic stresses brought about by the pandemic. [emphasis added]*

These numerous caveats suggest two things: first, that the FXM Associates findings are most likely conservative, and second, that the analysis contained in this report is not to be relied upon for any substantive purpose. Furthermore, calculating the results on a cumulative basis makes them

seem much larger than they would appear, were they reported on an annual basis (which is the usual practice). The report continues to review various aspects of these fiscal effects of COVID-19 on Wareham's economy. "The COVID-19 pandemic continues to do serious economic damage." (p. 3) Households may be unable to make mortgage payments, and job growth will be slow. (p. 5) Household spending has decreased. (pp. 6-8). Job loss leads to severe mental health impacts, especially among lower-income people. (p. 10) Inflation will increase, adding to Wareham misfortunes. (p. 11)

The report particularly emphasizes that: "Transportation, Hospitality, and Entertainment and Recreation services suffered staggering losses in economic activity across all levels of geography starting in March 2020. ... But they will return." (p. 12) "The sectors most affected by the economic slump attributable to the virus are Retail Trade, Office-Using industries, and Leisure and Hospitality, which covers Accommodation and Food Services and Arts, Entertainment, and Recreation. Trends in these industries were traced in FXM's earlier Economic Development Strategy for the Town of Wareham, completed in 2019 but based on 2017 data..." (p. 16) "...An assessment of potential revenue losses to the Town of Wareham based on projected real estate market conditions and trends in employment and income ... does not consider state funding, which comprises about 24% of total town receipts." It should be noted, in this regard, that current plans in Massachusetts for state subsidies for 2021 economic losses due to COVID-19 to towns include \$2,243,920 as of 12 March 2021 for the Town of Wareham, which amount far exceeds the FXM Associates estimate of 2021 COVID-19 losses as between \$364,000 and \$644,000 for that year.

The FXM Associates' forecasts stand on changes compared to a 2019-2020 baseline, with: 2021 = -8%; 2022 = -5%; 2023 = -2%; 2024 = 0%; and 2025 = +0.10%. ***Based on these forecasts, Wareham losses in employment and income in 2021 will "range from \$280,000 to \$562,000" with a "cumulative impact over the next five (5) years ... estimated to range from (\$927,000) to (\$1,450,000) as shown in Table 1..."*** (p. 29) [emphasis added] The substance of this projection is based on a 2019-20 baseline scaled down by a declining percentage as indicated above, the basis of which forecasts is not explained anywhere in this report, a lengthy and ponderous document chock full of numbers and graphs to present an appearance of substance while not providing any justification at all for the central projections used in the analysis: these declining percentage shortfalls from 2019-20 "employment and income" levels, the revenue impact of which are then presented in cumulative form through 2025 to exaggerate their apparent impact. There is no consideration in this analysis, for example, that pent-up demand during the pandemic shutdown may yield a boom in spending at the end of this slow-growth year; or of any other positive factors.

4.c. Letter from Jeffery A. Tocchio on Revisions to Proposed HREOD dated 8 February 2021

A letter from the Hingham, MA lawyer representing the NOTOS Group went to Ken Buckland, Director of Planning and Community Development for the Town of Wareham that presented a "revised version of the proposed Hospitality, Recreation and Entertainment Overlay District" or HREOD. The attached proposal started off with a statement of its "Intent and Purpose":

Intent and Purpose: *To encourage mixed-use development within the town that will allow and promote economic development opportunities that create sustainable employment opportunities and increase the net tax base of the Town by diversifying and expanding development opportunities within appropriate land areas, that by virtue of their location, infrastructure or transportation access make highly suitable locations for a mixed-use zoning district, while preserving the health and safety of its residents, and to provide protection for the Town's natural resources from environmentally undesirable or adverse*

impact by encouraging innovative and efficient planning for mixed-use developments. The purpose of the Hospitality, Recreation and Entertainment Overlay District (“HREOD”) is to provide for a mixture of retail, hospitality, recreational, entertainment, commercial and other compatible uses on large tracts of land in order to foster greater opportunity for the construction of quality developments by providing flexible guidelines which allow the integration of a variety of land uses and densities in one development, provided that such land usage will protect the health, safety and welfare of the public.

This letter claims the permit for the HREOD will provide: “A hydrogeological groundwater study ... that demonstrates that there will be no adverse nitrogen impacts to the surrounding groundwater and surface water resources,” which statement curiously has detailed the conclusion of that study before it has been conducted. The letter also claims that the Planning Board, during the approval process, “shall consider the following: ... 3. Conservation and preservation of the natural environment; ... 9. Impacts on water resources, including wetlands, streams, water bodies, groundwater and floodplains...” although such would regularly be required in any event for all specific proposals during the permitting process. Furthermore: “Prior to the granting of a HREOD Special Permit, the Applicant shall perform a Mass Balance Analysis of the proposed nitrogen and water uses within the boundaries of the development demonstrating that there will be no adverse nitrogen impact to the surrounding groundwater and surface water resources...”, which once again states the conclusion in advance of the actual execution of this proposed analysis.

The letter goes on to a lengthy list of the “Permitted Uses” in such a district, once approved, that includes the following: hotel, motel, conference center, etc.; indoor and/or outdoor recreational facilities; health or athletic facilities; restaurant or entertainment uses; food and beverage services, facilities and activities; retail and service uses; commercial and office uses; hospital, medical or veterinary facilities; multiple family dwellings; public or private educational uses; facilities for municipal use, wireless communications, parking, public or private transportation, and wastewater treatment; riding stables; agricultural uses; dormitories; a childcare center; or any other activities defined as “accessory” to those listed above.

4.d. A Local Letter Supporting the HREOD Re-Zoning Proposal dated 26 Feb 2021

A letter went out to all Wareham residents signed by four members of the Wareham Board of Selectmen plus seven other town residents supporting this re-zoning proposal. In the context of announcing a “Special Town Meeting” on Saturday, April 10th, they said this:

These are challenging times for everyone. It has never been more important for us to pull together as a community and look out for each other and the best interests of our town. ... In the coming months and years, we anticipate a highly competitive environment for jobs and new economic development as communities struggle to deal with a growing tax burden.

- ***25% of Wareham’s revenue is from state aid.***
- ***We had to budget for a 10% reduction in state aid this year and we have to anticipate additional cuts next year.***
- ***FXM Associates estimates that Wareham will lose \$930,000 to \$1,500,000 in revenue over the next five years due to COVID even before state aid is considered.***

There will be new opportunities for smart development, but they will be highly competitive. Cities and towns in our region will be fighting even harder to bring tax-generating and job-creating projects to their communities. Wareham has a real chance to take advantage of some of these opportunities if we are united and prepared.

The letter continues thus, after announcing this Special Town Meeting and its location and date:

*Currently, there is a 275-acre parcel off of Glen Charlie Road in the R-130 zone to allow for large-scale residential development. These uses tend to add to the municipal tax burden, generating more in costs than tax revenue. In fact, an analysis by FXM Associates found that the development of 90 single family homes on this property, which would be allowed under its current zoning, would generate an annual loss of \$800,000 in net municipal revenue. ...Wareham has a unique opportunity to compete for any projects that become available if we are prepared and united. With several pending town projects on the horizon ... we will need to find a way to address budget issues without increasing the burden on Wareham families. **This is Wareham's time.** Communities in our area will benefit from these competitive economic development opportunities and we believe it can and should be us. Please join us in support of this zoning change at Town Meeting on April 10th.*

This letter reveals the persuasive impact of the FXM Associates' analysis on town officials and residents in favor of this re-zoning proposal by the NOTOS Group. Enough confusion about this matter was created to prompt an explanatory article in *Wareham Week*, the local newspaper.

4.e. “The Story Behind the Hospitality District Letter sent to All Voters” dated 9 March 2021

This article explained that the above-mentioned “letter was mailed by the NOTOS Group” (despite there having been no indication of that in the letter itself), purportedly to “clear up rumors and misconceptions about the zoning change.” It also elaborated on the impetus for that letter as the previously-described FXM Associates’ “Technical Memoranda” analyses:

The letter makes an economic argument in favor of the zoning change, based in part on a study conducted by FXM Associates in Mattapoisett predicting significant losses to town coffers over the next five years due to the ongoing impacts of the pandemic. The group estimates that the town may lose out on between \$900,000 and \$1,500,000 over the next five years. However, the report, which is preceded by a lengthy “caveats” section, is careful to note that it is “extremely difficult” to make these predictions. “With no real precedents, too many variables, and too much uncertainty over the duration of the virus and the attendant restrictions on businesses and governments, employees and consumers, forecasting the pandemic’s effects on local economies and finances is not a straightforward process,” the report reads. The letter also argues that commercial uses for the land would be more profitable for the town than residential uses, as new homes mean more people using town services like schools. If 90 single-family homes were built on the land rather than a commercial development, FXM Associates estimated that would mean an annual loss of \$800,000 for the town. There is no current proposal to build single-family homes on the site.

The letter was signed by four Selectmen: Peter Teitelbaum, Judith Whiteside, Alan Slavin and Patrick Tropeano. The members individually decided to sign on and were contacted outside of board business. A number of business owners also signed the letter: John Salerno, owner of Glen Cove Hotel and Marc Anthony’s La Pizzeria; John Cornish, owner of Atlantic Boats and Stonebridge Marina; Mark St. Jean, owner of Stone Path Malt; John Churchill, owner of the Fan Club and JC Engineering; and Todd Mello, owner of A Slice of Heaven. Jared Chadwick and Damon Solomon, the president and director of the Wareham Tigers, respectively, also signed the letter. The Notos spokesperson said the business owners who signed the letter “are all interested in positioning Wareham for economic growth in a highly challenging and competitive landscape.” The zoning proposal has also been subject to intense criticism, particularly from environmental advocates.

4.f. Opposition to this Re-Zoning Proposal from “Environmental Advocates”

There have been several letters and opinion pieces written in opposition to this re-zoning plan proposed by the NOTOS Group. Five pieces of writing of this kind have been brought to my attention; I will list and discuss them based on the sequence of dates on these submissions.

Letter from the Trustees of Reservations dated 8 February 2021:³ The Trustees letter was sent to the Wareham Board of Selectmen with Attn: Peter Teitelbaum, Esq., as Chair, and it stated that:

The Trustees is alarmed about the impacts this proposed zoning change would have on critical natural resources throughout the region as well as the local community. In addition to Mass Wildlife's Red Brook Wildlife Management Area the proposed district would threaten habitat on The Trustees' Theodore Lyman Reserve property and would impact quality of life for our neighbors... The Lyman Reserve, together with the Wildlife Management Area, protects the entire length of Red Brook... Red Brook is one of the few coastal streams in Massachusetts that supports anadromous fish (which make their way to the sea to grow and return as adults to spawn) and is home to one of the last remaining native sea-run Brook Trout fisheries in the Eastern US.

Considerable effort and expense by The Trustees, MassWildlife, A.D. Makepeace and other partners has been made to restore and protect the sensitive fish and wildlife habitat offered by Red Brook. Since the removal of several dams, the native Brook Trout population has rebounded... This fishery is so unique and important that the state designated this river as catch and release only. The lands proposed for this zoning change represent some the last undeveloped Pine Barrens habitat in the region. These barrens have global significance... The area is designated as Priority Habitat, Core Habitat or Critical Natural Landscape by the state. Proposed zoning changes ... will threaten the habitat value and integrity of the barrens...

The proposed zoning change will lead to dense developments that threaten the water quality and quantity that support these ecosystems, especially during warmer months when ground water maintains the water flow and lower temperatures are needed for the fisheries' survival. Allowing dense development in this area would negatively impact groundwater resources through nutrient enrichment from runoff and wastewater disposal. In addition to concerns about nitrogen, groundwater could be negatively impacted by dissolved oxygen depletion, other dissolved nutrients and chemical constituents and emerging contaminants of concern. Climate change impacts including warmer temperatures and drought already threaten the globally rare pine barrens as well as Red Brook and its regionally important status – future development could exacerbate problems for the community's water supplies resulting from increased water withdrawals, wastewater, and stormwater runoff.

The impacts of a zoning change and associated development on these sensitive and already-threatened natural resources could be permanent and would likely result in an irreversible collapse of the region's unique and sensitive ecosystems and would detrimentally impact quality of life for the local community. As such, The Trustees opposes Wareham's proposed Hospitality, Recreation and Entertainment District and associated developments.

Katherine Harrelson Opinion Piece in Wareham Week on 9 February 2021: She argued that the “majestic parcel” currently being considered for re-zoning is more valuable as is than it would be for “horse racing.” She added that developing this land goes “against Massachusetts’ own plan to combat climate change” and that it sits on top of not only “the EPA-designated sole-source Plymouth-Carver aquifer” but also “an approved wellhead protection area.” She explained that “the parcel is also surrounded by mapped, protected natural resources” and “open space,” that leaving it alone “helps mitigate climate change” according to “the Massachusetts *Integrated State Hazard Mitigation and Climate Adaptation Plan*.”

Don Jepson Opinion Piece in Wareham Week on 4 March 2021: Jepson argued that the zoning change “puts the cart before the horse” by proposing a plan without any specific commitments on how that land will actually be used, especially in the context of an economic claim that not voting

³ The date as printed on the letter is “February 8, 2020” but based on the content I believe that 2021 was intended...

for this proposal will lead to a significant loss in tax revenue for Wareham. “To suggest that voters should rezone the area and then learn later what developments might be considered seems to be putting the cart before the horse. ... The fact that Notos Group is pushing this rezoning to benefit the town of Wareham, without any specific plan..., is difficult to accept.”

Press Release from Southeastern MA Chapter of Trout Unlimited dated 6 March 2021: This Press Release was titled “ZONING CHANGE THREATENS TO DESTROY SALTER BROOK TROUT POPULATION” and quotes the Chapter President thus:

“Red Brook is one of only a handful of tidal streams in Massachusetts that support Salter Brookies” said Matt Hoagland, President of the Southeast Chapter of Trout Unlimited. “It’s a gem, and only here because of collaborative efforts by Wareham residents, local non-profits and government agencies. It is an inspiring story of diverse partners and communities coming together to restore a vibrant resource that was born when the glaciers that shaped Wareham’s landscape began retreating,” Mr. Hoagland continued. “Salter Brook Trout, along with other migratory fish such as eels and river herring that move back and forth between fresh and salt water, depend on clean flowing water all year around. The system simply cannot withstand further water removals than currently exist nor can it handle additional loads of pollution. Both can be expected once the first domino (this zoning change) falls.”

The Southeast MA Chapter of Trout Unlimited, along with the MA/RI TU Council and the National Trout Unlimited, Inc. have spent 30 years working to restore Red Brook, improve and enhance its habitat working with the Massachusetts Division of Fisheries and Wildlife and The Trustees of Reservations. Close to \$4 million and tens of thousands of volunteer hours have been spent to date on the entire restoration project. The restoration of Red Brook has garnered national recognition and awards for its successful restoration of Red Brook’s Sea Run Brook Trout. While there are still viable Salter Brook Trout populations in Maine, development and deteriorated water quality have extirpated Salter Brook Trout populations over much of their former U.S. range between Long Island and Southeast Massachusetts. Trout Unlimited in Massachusetts has 4000 volunteer members. Nationwide, TU has 300,000 members and supporters.

Katherine Harrelson Opinion on “Rezoning Goes Against Master Plan” on 8 March 2021: Harrelson made the argument that: “The rezoning proposal is just a bad idea, and the residents of Wareham know it.” Her reasons were that: “The January 2020 Master Plan and November 2020 Multi-Hazard Mitigation Plan say the space should be preserved just the way it is.” She went on:

According to the Master Plan’s Future Land Use Map, almost all of the acreage in the proposed Hospitality, Recreation, and Entertainment District should be utilized as “permanently protected open space, water resources and habitat, or agriculture.” According to the plan, “natural resources are essential to the future of Wareham and to the quality of life of its residents,” and “future conservation efforts can focus on expanding these sites and creating linked networks of open spaces throughout town.” ... According to the Multi-Hazard Mitigation Plan, “Wareham’s natural environment and natural resources are important to the Town’s identity and quality of life.”

She urged people not to “let the Notos Group steal away Wareham’s own vision for the future. Vote NO on Article 1 at the Special Town Meeting, Saturday, April 10.”

4.g. “Red Brook Conservation Land Removed from Notos Proposal” on 17 March 2021

An article appeared on St. Patrick’s Day indicating that the already-protected Red Brook Conservation Land acquired by Massachusetts Fish & Wildlife had been withdrawn from the tract of acreage proposed for this zoning change. Interestingly, as the article pointed out: “The selectmen said the Red Brook Conservation Area land was protected and couldn’t have been developed, regardless of whether or not the district is rezoned.”

5. A Critique of the FXM Analysis

Much of the case for this development proposal promulgated by the NOTOS Group is based on projected losses to Wareham promoted by FXM Associates in the four reports already outlined and reviewed above. Consequently a close study of the FXM analysis is warranted due to its significant role in this process. I will focus on the housing argument used to project a shortfall in net revenues to Wareham if the 275-acre property at issue is developed for residential use, as currently zoned. Because of its impact on – and relevance to – the arguments over this plan, the FXM analysis should be reviewed on its projection of Wareham’s prospects.

A Review of the FXM Analysis of Residential Housing Effects: Recall what the argument was, that the residential use of this 275-acre parcel – currently zoned for 3-acre residential lots – could therefore support the construction of about 90 single-family households. FXM Associates argue, also, that based on average home values in Wareham, the worth of those 90 new homes will likely be \$349,900 each, for a total increase in Wareham’s tax base of \$31,491,000, according to their specific calculations. Each of those new homes was then projected to hold 4.5 people on average, with 0.93 of those residents being school-age students. The average educational cost per student in Wareham was then estimated to be \$16,692, which implied that the total additional schooling costs of these 90 new homes would sum to $0.93 \times 90 = 83.7$ new students times the average cost for each of \$16,692, for a total enrollment cost per year of \$1,397,120.40 (although FXM reports this number as \$1,313,290).⁴ Non-school costs per resident are also estimated, based on the average per capita costs in Wareham for all other municipal services than education, and added to the potential burden on the town of these 90 new residences.

FXM Associates then calculate the property tax revenues from these 90 new homes – each valued as stated above – at \$10.98 per thousand, to find the annual property taxes on each home as \$3,842, which multiplied by 90 yields annual property tax revenues from this prospective residential development of \$345,771. Then they add to that the average non-school municipal revenues per resident in the Town of Wareham to calculate the total “Other Revenue from Residences” at \$589,610 per year. Based on such calculations of potential municipal revenues (from property taxes and other sources) from 90 new homes with 405 new residents therein, and subtracting from those revenues the costs associated with these new homes that Wareham would likely have to bear, FXM Associates concludes that a full use of this 275-acre parcel for residential purposes would cause Wareham to incur a net annual loss of approximately \$800,000 per year.

Consequently, they argue that using this parcel for residential purposes will exacerbate the financial shortfalls suffered by Wareham residential taxpayers, and that the obvious solution to this worrisome prospect is for the town to adopt the NOTOS Group proposal for re-zoning this large area of land as a “Hospitality, Recreational and Entertainment Overlay District” to allow all these “opportunities” for fruitful and timely economic development. Thus will the Town of Wareham mitigate and avoid these impending crises in its fiscal stability as depicted in the FXM Associates’ economic analyses.

There are number of problems with the economic analyses performed by FXM Associates.

First, FXM Associates starts with **90 new homes** on this 275-acre parcel zoned for three-acre lots, which sounds totally reasonable on its surface. However, I am assured by those who know

⁴ I’ve no explanation for the discrepancy, or which figure should be deemed “correct” (though they differ by little).

much more of these matters than I, that there is no way that a plot of land this size could actually accommodate that many new homes once the acreage required for roadways and other necessary installations is taken into account. If that is correct, then the number of new homes that could be built on this parcel has been unduly exaggerated by FXM Associates.

Second, let's consider the presumed *taxable value of these 90 new homes*. Wareham is not a wealthy town; that was clearly established in the WEDS study by FXM Associates produced in March 2019, and also underlined by both the Urban Land Institute (ULI) Technical Assistance Panel (TAP) Report in February 2020 and the Onset Village Slum and Blight Inventory in November 2018. Taking the *average value of existing homes* in Wareham as the proper benchmark for measuring the estimated value of *new homes on 3-acre lots in a nice woody residential area* is effectively setting their value at the lowest possible level in order to minimize the potential property tax revenues associated with that parcel of land when used for residential development. I was also informed of two recent comparable sales of new single-family homes on Glen Charlie Road, directly adjacent to the 275-acre parcel being considered, with assessed values of **\$526,400 and \$605,800, which are 50% and 73% higher** than the valuation used by FXM Associates in their analysis. So the FXM Associates study has significantly underestimated the value – and therewith the property tax revenue base – stemming from these new homes.

Third, consider the FXM Associates' assumption that there are going to be **4.5 people per household** in this new development. Here they did not use the average number of people per household during that time in Wareham, which was reported in the 2020 Wareham Master Plan (p. 66) to be falling from 2.57 in 1990 through 2.44 in 2000 to an average of **2.38 people per Wareham household in 2020**. Furthermore, only **25%** of Wareham households had any school-aged children under 18 years, down significantly from 32% in 1990, according to the 2020 Wareham Master Plan (p. 66). So once again the data selected by FXM Associates to project the associated educational costs that would burden the Town of Wareham from all of the 90 new homes that allegedly could be built on this 275-acre parcel appears to be vastly overstated. In the first of the two FXM "Technical Memoranda" on Wareham housing, they even admit that their numbers are wrong: "There is an average of 0.27 school-aged children and 2.41 persons per household town-wide in 2020." This revealing comment was removed from the second version of these two nearly identical reports...

Fourth, perhaps the most egregious error of all in the FXM calculation of schooling costs is their use of the *average educational costs per student* in Wareham as a basis for estimating the additional burden on the Wareham public school system. Scaling up the total costs for new students based on their average costs – and therefore assuming that total costs will rise in a linear manner in accord with and in proportion to any increase in student numbers – would only make sense as a projection if there were **no fixed costs anywhere in the educational system!!!** Only if all costs vary directly with and in exact proportion to the number of students enrolled in the system would this method be legitimate. If there are **any fixed costs at all** in this system – and thus if all of these costs are not variable with respect to enrollments – then new students simply reduce the average cost per student by some amount dependent on how much of those schooling costs are fixed costs for plant and equipment, maintenance, faculty, administration, etc. The point is that only a very small portion of the total educational costs will vary in direct proportion to the number of students served. This means that the cost impact of new students would only amount to a small fraction of what was estimated by FXM Associates, because most of the costs of a public school system are relatively fixed, or more responsive to other factors than student numbers.

Fifth, there is another issue relevant to this question of how much the educational budget will vary with additional students. If there is *excess capacity in the system*, namely, if student numbers have been declining over time, then these significant fixed costs will drive up the average burden per student to a much higher level than would be the case with more students. According to p. 47 of the Wareham Master Plan, the number of students in Wareham schools has decreased by “over 860 students” between 2007 and 2017, which was a 32% decline from 3,596 to 2,461 student enrollments. Since that time, one can be sure that COVID-19 has led to an even greater increase in both excess capacity and therewith a much higher rise in the average cost per enrolled student in this system. Consequently, FXM Associates’ decision to use average cost per student even further exaggerates their estimated cost effects on Wareham’s budget.

Sixth, the FXM Associates’ calculation of municipal non-school costs is equally flawed, for a similar reason, because they have taken an average cost per resident and scaled it up by the additional 405 residents in these 90 new homes (at 4.5 residents per household, which is also wildly overstated, given a 2020 town-wide average of 2.38 members per Wareham household, and despite FXM’s own – perhaps unintended and later removed – admission that the real average is 2.41).⁵ This proportional scaling up of estimated municipal service costs by the average costs per resident when new residents are introduced assumes that there are *no fixed costs* in the provision of town services and functions, which is without justification on any credible grounds. Again, it is likely that most of the costs incurred by the town for its various services are either fixed or at least not directly or proportionally responsive to the numbers of people living there or using those services. Indeed, this is the very justification for those services being provided as ‘public goods’!

So assuming that, in effect, there are no fixed costs in the educational system or in the provision of municipal services, most especially in the presence of excess capacity due to declining student or residential populations, is simply an illegitimate means to inflate the schooling and service cost numbers by a considerable amount. I made no effort to re-estimate these figures with more realistic and accurate data, but it would not surprise me at all if the implications of proper figures used in such a revised analysis of residential and municipal cost effects were to show Wareham performing quite well with the residential use of this particular parcel of land. The FXM Associates’ estimate of schooling and town service costs is dramatically overstated.

As noted above, the FXM Associates’ estimate of the property tax revenues stemming from the new homes situated on this property is also seriously understated due to their unjustified use of town-wide average home values for existing real estate to estimate the likely worth of new homes in a lovely wooded area with three-acre lots outside of downtown zones. This method of valuation ignores the much lower values of older and more deteriorated housing located elsewhere in town. So with the FXM Associates’ estimation of costs overstated and town revenues biased downward, their conclusion is no surprise. Their study was designed in such a way to make it come out with results that meet their client’s financial interests.

But first, I should offer just a few comments on their “Technical Memorandum” on the alleged impact of COVID-19 on Wareham’s prospective financial situation. This report is much lengthier, and is chock full of numbers, graphs, and discussions of various issues and concerns that are most likely derived from their prior report on the Wareham Economic Development Strategy (WEDS). My point here is that almost none of this information has any bearing at all on the findings or even the purpose of their report on the financial impact of the COVID-19 pandemic on Wareham’s

⁵ They also assume 0.93 students per household while admitting the real figure is only 0.27 pupils per home; also the Wareham Master Plan says only 25% of households have students, which number has declined from 32% in 1990.

financial status. Indeed, their conclusions are in large part derived from mere assertion, that the 2019-2020 employment and income data will fall off in 2021 by 8%, in 2022 by 5%, 2023 by 2%, 2024 by 0%, and then recover by merely 0.10% from the level pertaining to what was achieved five years before in 2025. These projected percentage adjustments appear to rest on assertion.

There is no obvious attempt to justify these numbers, or to suggest why there might not instead be an enormous surge in economic activity after the pandemic closedowns subside due to pent-up demand or other sociological factors. I made no attempt to analyze their detailed estimates in this report of real estate revenue losses; given the manner in which this subject was approached in the housing report. The analyses by FXM Associates – in my professional opinion – shed no useful light on Wareham’s prospective financial status or development options.

6. A Look at Wareham Plans, Standards, Goals and Guidelines

In this section of my report, I examine several documents that were intended to outline the future directions of Wareham decisions on land use and environmental protection. In 2018, there were two planning documents issued: the **2017-2024 Wareham Open Space and Recreation Plan** (May 2018) and the **Wareham Zoning By-Laws** (October 2018). Then, on 27 January 2020, the Town of Wareham issued a town **Master Plan**, which was followed in November 2020 by a **Town of Wareham Multi-Hazard Mitigation Plan**. All four of these documents were designed and intended to guide the Town of Wareham in its important decisions about land use and other matters by laying out its priorities and resources in need of protection.

6.a. The 2017-2024 Wareham Open Space and Recreation Plan dated May 2018

This open space plan began with a Statement of Purpose:

*This 2017 update to Wareham’s Open Space and Recreation Plan provides a foundation to guide future land use policies and actions. **The need to protect open space ... safeguard watershed areas, and protect river corridors, ponds, and coastlines is widely recognized by Wareham’s residents. ... Protected open space is an integral component of maintaining Wareham’s character; it provides recreational opportunities, safeguards natural resources, and improves the overall quality of life for all residents. Open space acquisition should be continued and, to the extent practical, targeted to encourage efficacious groundwater recharge, stream flow maintenance, and habitat protection. Open space preserves the scenic quality and visual character of the town.*** (p. 1) [emphasis added]

The plan went on to say this: “The Town should pursue every opportunity to acquire open space... It is suspected that **many residents are not aware of the tenuous nature of existing open space.** Public education in this area is important.” (p. 2) It might be seen as ironic that Wareham, today, is facing a vote by town residents over a re-zoning proposal that threatens such land use priorities, supported by many town leaders including four members of the Board of Selectmen.

In the course of developing this Open Space Plan, a survey of town residents was conducted and the ensuing report described the results of this survey and what the residents said:

*When asked to choose priorities for the Wareham Open Space and Recreation Plan, survey respondents identified their most important goal as **the desire to preserve coastal areas, wetlands, and land along rivers and ponds,** closely followed by the need to **conserve open space for wildlife habitat and scenic areas.** Preserving open space for **water supply** protection and sustaining the scenic quality and visual character of the town tied for third... [emphasis added]*

The report summarizes these findings thus: “It is clear from the survey response that **protecting our natural water resources is very important to the residents of Wareham.**” (pp. 3-4) Much later in this report, these survey conclusions are restated to reinforce their importance. (pp. 84-85)

The Open Space Plan then turns to the key importance and sensitivity of the Plymouth-Carver aquifer underlying this area: “**The Plymouth-Carver Sole Source Aquifer** is Wareham’s primary source of drinking water. The Aquifer, located in eight towns in southeastern Massachusetts, exhibits regional groundwater flow patterns. **It is quite vulnerable to contamination.**” (pp. 5-6) So protecting a critical source of drinking water for an entire region, not to mention that the aquifer feeds and maintains several local rivers, is of the utmost importance. The report describes the role of this bountiful source of fresh, clean water thus:

The Plymouth-Carver Sole Source Aquifer is a 199 square-mile aquifer... The Aquifer is the primary source of the public and private water supply for the communities located upon it and is one of the largest designated aquifers in New England. The unconsolidated stratified glacial deposits that form the aquifer were deposited during the last retreat of glacial ice about 15,000 years ago. These deposits are saturated with water fed by direct infiltration of precipitation (the aquifer recharge). ... The coarse nature of the deposits results in very low surface runoff and high infiltration rates. ... The Plymouth-Carver Aquifer is quite vulnerable to contamination. Because of its highly permeable and transmissive character, and large size granular materials, groundwater contaminants can quickly travel long distances and affect a large area. ... Activities occurring in the upland areas can have direct impact on groundwater quality in the rest of the Aquifer. ... Both the Wareham Fire District and the Onset Fire District use the Aquifer as their source of water. The well fields for both districts are on protected land.⁶ Wareham’s zoning helps to protect the groundwater resources. Diligence must be exercised to ensure that the water quality of the Aquifer does not degrade. Development creates impervious surface (e.g. roads and parking lots) that increase runoff and prevents groundwater recharge. The Plymouth-Carver Aquifer exhibits regional groundwater flow patterns. Awareness and protection of this vulnerable resource is the responsibility of all the towns that share it... (p. 28) [emphasis added]

The report reiterates such concerns subsequently, emphasizing how sandy soils facilitate such high infiltration rates to make this aquifer extremely vulnerable to contamination from surface water discharges. “Because of its highly permeable and transmissive character, and large size granular materials, **groundwater contaminants can quickly travel long distances, and affect a large area.** ... Activities occurring in the upland areas can have direct impact on groundwater quality in the rest of the Aquifer. The present quality of the water from the Aquifer is characterized as good to excellent.” (p. 84) As the report makes clear: “Development in Wareham is primarily regulated under the provisions of the **Zoning By-Law**” (p. 15), the town’s main source of protection.

Wareham’s Open Space and Recreation Plan delineates the critical importance of such land use restrictions even for Wareham’s *economic development* and well-being. The view that economic concerns and environmental conservation priorities inevitably conflict is dismissed in this report with the declaration that they are both aligned together in crucial respects:

Wareham ... has a wealth of natural resources. The natural environment is important not only for ecological purposes but also serves a role in the economy... Future growth must be balanced with resource protection to ensure the community continues to be an attractive place to live. As development pressures intensify, so does the potential for destruction or damage to the environment.

⁶ These well fields are located within the proposed HREOD, according to the local maps further discussed below.

Sound land management policies are essential to produce development that minimizes adverse impacts on natural systems. (p. 24) [emphasis added]

In the specific context of this new re-zoning proposal, these warnings should be attended; these resources comprise an essential aspect of Wareham's quality of life.

The report then describes the nature of Wareham's geological land surfaces, and why they make the underlying aquifer so vulnerable to contamination, and why its protection matters so much:

*Wareham is on the Coastal Lowlands of Buzzards Bay. Land surfaces are predominantly covered by glacial outwash, a reminder of the time when it was covered by glaciers. ... Wareham is predominantly flat with **well-drained soils**... About 23 percent of Wareham's total land area is made up of wetlands or cranberry bogs. **These areas contain hydric soils. A hydric soil is one of the indicators for a regulated wetland and have constraints for building and other activities. Glacial till and fluvial deposits are the two dominant types of glacial deposits that occur in Wareham. Till is unsorted, unstratified material that consists of a heterogeneous mixture of clay to boulder size particles. Soils developed in glacial till have a high percentage of surface and subsurface gravel to boulder size rock fragments. The upland soils are capped with a mantle of sand to silty soil textures. The melting ice from retreating glaciers provided huge amounts of water, which left outwash deposits of stratified sand and gravel sediments hundreds of feet thick. **These outwash deposits are important aquifer recharge areas ... and commercially important sources of sand and gravel.***** (pp. 24-25)

It is worthy of note that an important part of the 275-acre land parcel at issue in this re-zoning vote is a large sand and gravel pit, in an area of particular vulnerability to aquifer contamination and so in need of vigilant protection.

Wareham's "vegetation is varied" (p. 26) according to this report, which describes the uniquely irreplaceable ecological importance of Wareham's special forest resources: "A 1,483-acre **Pitch Pine-Scrub Oak Community** in northeast Wareham is part of almost 17,000 acres designated by NHESP⁷ as a Natural Community. This Pitch Pine-Scrub Oak Community, that straddles the Wareham/Plymouth line, is globally significant and the largest of its kind remaining in the northeast. ... Pitch Pine-Scrub Oak Communities provide habitat for many species." (pp. 29-30)

The importance of protecting such areas is stressed in this report, as well as in all of the diverse state regulations designed to assure their safeguarding: "**BioMap2 Core Habitat** identifies specific areas necessary to promote the long-term persistence of *Species of Conservation Concern* (those listed under the Massachusetts Endangered Species Act as well as additional species identified in the State Wildlife Action Plan), exemplary natural communities, and intact ecosystems. NHESP Core Habitat consists of six components identified as Priority Natural Communities, Forest Core, Vernal Pool Core, Wetlands, Aquatic Core, and Species of Conservation Concern." (p. 32) According to this planning document's **MAP 19 NHESP BIOMAP2** (p. 51), almost the entire area proposed for this HREOD is identified as "**Core Habitat**" or "**Critical Natural Landscape**" and thus is subject to special protection under Massachusetts state law.

The report then goes on to address the importance of Wareham's wetland areas: "Wareham has over 2,000 acres of **wetlands**. ... Wetlands are an important resource and efforts must be continued to protect them." (p. 26) This planning document returns to this subject to reemphasize its supreme importance to the quality of life for residents of this town: "A large area of Wareham is classified as **wetlands**. ... The freshwater wetlands ... include shrub swamps, shallow and deep marshes,

⁷ Massachusetts Fish & Wildlife's NHESP is its Natural Heritage Endangered Species Program.

and seasonally flooded flats.” (p. 30) Their means of protection has long been to redefine them in conservation categories that prevent their diversion to other less ecologically-valuable uses:

Outstanding Resource Waters (ORW) are designated under the Massachusetts Surface Water Quality Standards of 2007. “Certain waters shall be designated for protection under this provision. Waters that constitute an outstanding resource as determined by their outstanding socioeconomic, recreational, ecological and/or aesthetic value may be designated as ORWs. The quality of these waters shall be protected and maintained.” (Source: 314 CMR) Outstanding Resource Waters in Wareham include ... two Coldwater Fisheries Resources (CFR)... CFRs are important habitat for a number of cold water species, including trout. Cold water species are typically more sensitive than other species to alterations to stream flow, water quality, and temperature ... Identification of CFRs is based on fish samples collected annually. Red Brook and Patterson Brook are identified as CFRs.” (p. 26) [emphasis added]

Interestingly – and as a convenient matter of timing coincidence – I recently received a draft letter written by an attorney friend on precisely this issue. He described the regulatory environment surrounding ORW and CFR classification thus:

A water withdrawal permit application must address twelve (12) distinct subjects, including a detailed evaluation of the potential effects of the withdrawal on water quality, wetland resources, fish and wildlife. (310 CMR §36.21(1)(2)). Furthermore, if the proposed source of withdrawal is groundwater and is located within a sub-basin where a Cold Water Fish Resource (“CFR”) is located, impacts on that resource are required to be minimized. (310. CMR §36.21(3)). Because withdrawals under a permit application would likely impact the streamflow of [Red]⁸ Brook, a designated CFR, a number additional regulatory requirements come into play. Specifically 310 CMR § 36.22 (Coldwater Fish Resource, Minimization and Mitigation Planning Requirements) addresses the depletion of groundwater in a CFR-designated area. The purpose of this regulation is best expressed in the DEP’s November 7, 2014 Water Management Act Permit Guidance Document at page 27, as follows:

“Coldwater Fish Resources (CFRs) are critical resources that require special consideration within the WMA permitting process. There has been a significant loss in CFR habitat over time, partially because these temperature-dependent habitats are strongly influenced by groundwater and particularly vulnerable to impacts from groundwater withdrawals.”

Accordingly, in order to prevent the further depletion of CFR habitat, the regulations require that the permit applicant consult with the DEP and EOEEA Agencies and submit options for the shifting of withdrawals to other withdrawal points to minimize CFR impacts, or a “Coldwater Fish Resource Optimization Plan”. 310 CMR 36.22(4). In certain cases a minimization plan is required, depending upon the projected extent of groundwater depletion. 310 CMR 36.22(5). [emphasis added]

This letter went on to describe the more general restrictions established for the protection of ORWs or Outstanding Resource Waters, which classification applies to Red Brook:

Aside from the state’s mandated water withdrawal permitting process... the [Red] Brook watershed qualifies as Class A “Outstanding Resource Water” (“ORW”) under the standards established in 314 CMR §4.05(3)(a). The presence of a self-sustaining population of native brook trout ... supports this conclusion. As such, the watershed is eligible for certain protections under 314 CMR 4.00 (Massachusetts Surface Water Quality Standards) which has as its purpose to secure for the state the benefits of the federal Clean Water Act (33 U.S.C. §1251 et seq.) as follows:

The objective of 33 U.S.C. §1251 et seq. is the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. To achieve the foregoing requirements the Department has adopted the Massachusetts Surface Water

⁸ Another brook was named as the focus of this particular letter draft, in a situation disturbingly similar to this one...

Quality Standards which designate the most sensitive uses for which the various waters of the Commonwealth shall be enhanced, maintained and protected; which prescribe the minimum water quality criteria required to sustain the designated uses; and which contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges.(314 CMR §4.01(4)).

*Waters having an ORW designation are afforded the protection of the “Antidegradation Provisions” of 314 CMR §4.04 from unauthorized discharges. While limited degradation may be allowed, authorization from the DEP must be obtained after proper impacts analysis (314 CMR §4.04(5))¹, provided: “**In all cases existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected**”. (314 CMR §4.04(1)). In the case of the [NOTOS Group] Project, discharges to the [Red] Brook headwaters may occur during construction. In addition, and more significantly, the long term effect of discharges from contaminated surface water runoff, water treatment facilities and/or waste treatment need to be considered. [emphasis added]*

So there are special limits and restrictions on the use of vulnerable wetlands and environmental resources, imposed by the Commonwealth of Massachusetts, that must be adhered to in any plan for economic or business development proposed in such areas, including any re-zoning decisions.

CFR fisheries are also described in several different parts of this important report, as areas in need of special and diligent attention, conservation and protection. The anadromous species in these waters are of particular importance to their ecological health and maintenance:

*“Each spring alewives (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad, and rainbow smelt migrate from the coastal water through the major river systems and several smaller brooks in Wareham to reach fresh water ponds to spawn. Alewives return between March and April to spawn and herring return from late April to late May. **These anadromous fish return annually to the Weweantic River, Agawam River, Wankinco River, Gibbs Brook, and Red Brook. ... Anadromous fish generally ... return to spawn in the same location where they were hatched. These fish are important links in both marine and freshwater food webs and they are important ... to humans.**” (pp. 30-31) [emphasis added]*

Later, the report returns to this subject to reiterate how important anadromous fisheries are to our own economic well-being and to the ecological health of the region, and how they need vigilant protection against “uncontrolled development along river corridors” for all sorts of valid reasons.

*“The Weweantic River, Agawam River, **Red Brook**, and the Wankinco River are all anadromous fish runs. **These rivers and their riparian areas are critical for wildlife...** **The protection of river systems is a high priority for open space and recreation planning in Wareham.** Uncontrolled development along river corridors could adversely affect an already declining anadromous fish population and further restrict public access to Wareham’s river systems.” (p. 84) [emphasis added]*

Other related wetlands issues especially applicable to riverine habitats are also discussed in this Open Space Plan, including perennial problems of sedimentation, road runoff, nitrogen loading and sewage disposal:

***Sedimentation** of wetlands, streams, and rivers can cause poor water circulation, which may lead to a degradation of wildlife habitat. It has been a common practice to channel stormwater into nearby waterways. This **road runoff** is a significant contributor to sedimentation in streams and rivers. ... **Nitrogen loading** from activities in the towns upstream from Wareham directly contributes to water quality degradation in Wareham’s major river and estuarine systems. ... **Sewage disposal** is also a difficult issue.” (pp. 37-38) [emphasis added]*

This document, Wareham’s **2017-2024 Open Space and Recreational Plan**, reiterates the case for protecting valuable and irreplaceable environmental resources – and therewith the quality of

residential life in the town – from inadvisable land development projects on ecologically sensitive parcels of land. The overall case is summarized thus:

The value of open space is shown in many ways. Open space protection leads to financial benefits, recreational opportunities, preserves natural resources, and safeguards public health. It provides visual respite, ecological benefits, and has a positive effect on physical and mental health. Open space is critical for maintaining recharge of the Plymouth-Carver Sole Source Aquifer – Wareham’s only source of drinking water. Open space supports the continued existence of rare species and critical habitats. ... Open space is sound fiscal policy for a municipality. ... Open space can reduce financial burdens on the town... Maintaining land as open space is an integral component of preserving the overall quality of life for Wareham’s residents. Protected open space ensures that the Town’s rural character will be maintained. Open space acquisition should be continued and, to the extent practical, targeted to encourage efficacious groundwater recharge, stream flow maintenance, and habitat protection. ... Protected open space is land that is set aside, in perpetuity, for the benefit of all. (p. 55) [emphasis added]

Open space and its long-term protection is important not only for the environment, but to preserve the quality of life for Wareham residents along with their financial viability. There is no conflict here between the protection of ecological health and the fostering of a strong economic foundation for development, as long as it includes a proper respect for natural resources of all kinds.

This report concludes with a restatement of its “*Goals and Objectives*” and puts forth a *Seven Year Action Plan* to protect Wareham’s character. The first and top priority goal listed in this section of the plan, along with the first objective thereunder, is characterized in this way: “**GOAL: Protect land of high natural, environmental, scenic, and recreational value**” with the first set of “**Objectives**” stated as these: “**Protect land with high environmental value including but not limited to significant wetlands, waterways, estuarine environments, watersheds, land important for wildlife habitat, land that supports rare plants and animals, and land and water that are important fish habitat.**” (p. 88) The report presents a detailed set of declarations in what it calls its *Seven Year Action Plan* that includes the following priorities:

Protecting open space through land acquisition, conservation restriction, or other means is a collaborative effort of Wareham’s Town Administrator, Board of Selectmen, Town Planner, the Conservation Commission, the Community Preservation Committee, the Open Space Committee, the Commonwealth of Massachusetts, local, regional, and state conservation organizations, and Wareham’s residents. ... Open space acquisition should continue and, to the extent practical, target efficacious groundwater recharge, stream flow maintenance, and habitat protection. (p. 89)

I have devoted time and space to the *Wareham 2017-2024 Open Space and Recreation Plan* because it is so full of interesting and relevant conservation information, and because of its roster of signatories and others who enthusiastically endorsed and supported this planning process, including many Wareham leaders and officials:

- *The Town of Wareham Board of Selectmen (signed by Peter W. Teitelbaum, Esq., Chairman);*
- *The Southeastern Regional Planning & Economic Development District (SRPEDD) (signed by William S. Napolitano, Environmental Program Director);*
- *The Town of Wareham Planning Board (signed by George Barrett, Chairman);*
- *The Town of Wareham Zoning Board of Appeals (signed by Nazih Elkallassi, Chairman);*
- *The Town of Wareham Conservation Commission (signed by Sandra Slavin, Vice Chairman)*
- *The Town of Wareham Open Space Committee (signed by all six members plus the clerk)*
- *The Buzzards Bay National Estuary Program (signed by Sarah B. Williams, Regional Planner)*
- *The Wareham Land Trust (signed by Kevin P. Bartsch, President)*

6.b. Wareham Zoning By-Laws dated October 2018

The Wareham Zoning By-Laws specify the governing rules for the zoning process in Wareham; among many other provisions, they offer some detail on the need for environmental safeguards:

Section 211.1 defines the “**Residential Districts**” specified under these by-laws, including “Residence 130 (R-130): The R-130 district is intended to preserve and protect groundwater and surface water resources and to promote agricultural uses. Residential development is permitted with standards and densities that are consistent with these objectives.” So this zoning category is specifically designed for the protection of groundwater resources such as the underlying aquifer.

Section 212.3 of the By-Laws defines a “**Groundwater Protection Overlay District**” thus: “The purpose of this district is to protect the public health from the contamination of existing and potential public and private groundwater resources for present and future use.”

Section 223 states that this GPOD “includes all areas within the delineated Massachusetts Department of Environmental Protection (DEP) Zone II Wellhead Protection Area.”⁹

Section 441 adds that: “The regulations in this By-Law are not intended to supersede or limit the protections contained in state or federal groundwater protection programs, but to supplement protections contained in other statutes and regulations.”

In **Section 444**, under the heading of “PROHIBITED USES” the By-Laws state that: “Within the District the following uses are presumed to be detrimental to groundwater and surface water and are prohibited:

444.1 Facilities that generate, treat, store or dispose of hazardous waste...;

444.2 Disposal of solid wastes...;

444.3 Disposal of leachable wastes;

444.4 Storage of sludge or seepage...;

444.7 Open storage of road salt or other de-icing chemicals;

444.8 Disposal of snow which contains de-icing chemicals;

444.9 Industrial uses which discharge processed wastewater on site; ...

444.15 On-site disposal of wastewater...;

444.16 Wastewater treatment facilities...”¹⁰

6.c. Town of Wareham Master Plan dated 27 January 2020

In the opening “Acknowledgements” section of this Wareham Master Plan, one finds these appreciative words along with a list of the names of community leaders who supported this effort:

***ACKNOWLEDGEMENTS:** This Wareham Master Plan Vision document would not have been possible without the support, input, and local knowledge provided by Wareham’s citizens, professional staff, and leadership. The Town would like to acknowledge the following for their role in preparing this Vision.*

***PLANNING BOARD:** George Barrett; Michael A. Baptiste, Sr.; John P. Cronan; Emmanuel Daskalakis; Marc Bianco; Michael King; Richard Swenson*

***PLANNING BOARD STAFF:** Ken Buckland, AICP; Sonia Raposo; Jasmin Campos*

⁹ It is my understanding that this designated “Wellhead Protection Area” lies within the land proposed for re-zoning as an HREOD by the NOTOS Group.

¹⁰ I would note that item #17 of the prospectively “Permitted Uses” for the HREOD in the Jeffrey Tocchio letter dated 8 February 2021 about the NOTOS Group re-zoning proposal specifies “wastewater treatment facilities...”

BOARD OF SELECTMEN: Peter Teitelbaum; Alan Slavin; Patrick Tropeano; Anthony Scarsciotti; Jim Munise; Mary Mackey Bruce

TOWN ADMINISTRATION: Derek Sullivan; Susan Green; Patricia Neal

THE MASTER PLAN WAS PREPARED BY THE FOLLOWING AGENCY AND INDIVIDUALS: Southeastern Regional Planning and Economic Development District (SRPEDD); Eric Arbeene, AICP; Sara Brown; Jed Cornock, AICP; Katie Goodrum, AICP; Kevin Ham; Grant King, AICP, Project Manager; Bill Napolitano; Don Sullivan

The “INTRODUCTION” to this Wareham Master Plan declares its primary goals in this manner, but then they append an additional goal to give this document further relevance to the community. The purposes of this planning process, as stated here, are these:

To guide Wareham as it addresses core issues. To identify main strengths and opportunities. To harness Wareham’s diversity and achieve consensus. And to identify issues that require leadership, teamwork, and service.

The various elements in this Master Plan would therefore “focus on specific themes:

*Vision, **Land Use**, Economic Development, Housing, Services & Facilities, Transportation & Circulation, **Open Space & Recreation**, **Natural & Cultural Resources**, and Implementation. Think of these as the main subjects that a plan covers. Covering them ensures that the plan is ‘comprehensive,’ that it addresses Wareham’s diverse needs. [emphasis added]*

But then they append an additional aspect to this plan:

*Wareham is creating an additional element called **Stewardship & Service**. This extra chapter is unique to Wareham and is **all about collaboration**. Its purpose is to encourage and guide participation by all local Boards and Commissions, agencies, volunteers, business and property-owners, and the community as a whole. It is a signal to all of you that the Master Plan is yours. It will directly address your needs and respond to your goals. And its success depends on your ongoing contribution of time, ideas, and actions. [emphasis added]*

This “INTRODUCTION” ends with an appeal to the community about the value of good, accurate information and participation in the planning process in order to foster a sense of ‘ownership’ in the resulting product and a strong commitment to seeing that these plans are faithfully carried out:

Good data means that the plan will be grounded in reality, but your aspirations and creativity are just as important. This comes from ongoing public input at workshops, online, and through in-person meetings. Without this essential participation by Wareham’s residents and businessowners, the plan would not reflect an understanding of the town as a community and as a place. Again, as you read this document and the future Master Plan, please keep in mind that these two parts – data and public input – are equally important. Good data grounds us in reality. Aspirations and creativity make the plan come alive and give it Vision.

Then the Wareham Master Plan moves on to more specific and substantive matters. One of the topics that is addressed is “**Open Space & Recreation**” (p. 15), with a statement of primary goals:

- ***Encourage the creation of permanently protected open spaces**, preferably in contiguous parcels (1998 MP, 2011 HMP, 2006 CPP) [1998 Master Plan; 2011 Hazard Mitigation Plan; 2006 Community Preservation Plan]*
- ***To protect watersheds, wetlands, salt marshes, rivers, bays, and ponds**, to improve recreational access to natural water resources, and to provide habitat for plants, wildlife, fish, and marine life (2010 OSRP). [2010 Open Space and Recreation Plan]*

- Enhance the public's opportunities to enjoy **open space** and recreational facilities (2010 OSRP). [2010 Open Space and Recreation Plan]
- Improve recreational facilities (2010 OSRP, 2006 CPP). [2010 Open Space and Recreation Plan; 2006 Community Preservation Plan]
- **Recognize the need to preserve, protect, and enhance the natural resources for current and future use** for residents and visitors (2011 HMP). [2011 Hazard Mitigation Plan]

Under the heading of “**OPEN SPACES**” one finds the following goals and comments thereon that define different categories of land use or restriction for conservation purposes (pp. 20-24):

Permanently Protected Open Space: *The areas mapped here are already preserved with permanent conservation restrictions. They are composed of wildlife habitats, parks, farms, and forests. These sites should remain protected for “passive uses” that protect natural resources, drinking water resources, and recreational opportunities for Wareham. Master Plan Goal: Future conservation efforts can focus on expanding these sites and creating linked networks of open spaces...*

Water Resources and Habitats: *Similar to “Permanently Protected Open Space” areas, these natural resources are essential to the future of Wareham and to the quality of life of its residents. They are, for the most part, undeveloped. Master Plan Goal: While these locations are already covered by the Zone II and Buttermilk Bay Water Resource Protection Overlay Districts, Wareham could focus future land preservation efforts here.*

The Master Plan returns to this issue of “**OPEN SPACE**” (pp. 76-78) to specify the following **GOALS**: “**Open Space Goal 1: Implement the 2017-2024 Wareham Open Space and Recreation Plan (OSRP).**” and “**Open Space Goal 2: Prioritize land conservation that builds on existing open space networks, considers ‘green infrastructure,’ protects water and habitat resources, and is highly visible to the public**” under which is stated that: “Description: The 2017-2024 OSRP includes an inventory of land with conservation value and interest.” Furthermore, **those responsible for implementing this plan are clearly identified: “Responsible Parties: Open Space Committee, Planning Department, Conservation Commission.”** Then the plan goes on to state: “*Strategy 2: Create a specialized Open Space Acquisition Subcommittee that actively pursues land purchases and donations*” with the following “Description: A very important component of implementing the 2017-2024 OSRP is actually acquiring more land that is protected in perpetuity” in which the same “Responsible Parties” are identified as above. [emphasis added]

The document then addresses the topic of “**NATURE AND CULTURAL RESOURCES**” (pp. 86-91) where the following appears: “**Natural and Cultural Resources Goal 1: Coordinate and strategically implement several ongoing efforts to increase climate resilience in Wareham.**” The report adds this: “**Natural and Cultural Resources Goal 3: Protect Wareham’s Water Resources**” with two strategies: “*Strategy 1: Consider methods to reduce septic-related nitrogen pollution in Wareham’s rivers, bays, and harbors*” and “*Strategy 2: Evaluate the need for regulated fertilizer and pesticide use near flowing water.*”

This Wareham Master Plan is important; it is supposed to define decision priorities for the community going forward, with the full participation and ‘ownership’ of residents. The Plan ends with a statement (p. 92) that it “should be updated and changed only after careful and deliberate consideration.” And thus the plan concludes, with the support of town members and leadership.

6.d. Town of Wareham Multi-Hazard Mitigation Plan dated November 2020

This Multi-Hazard Mitigation Plan was prepared by the Woods Hole Group in Bourne, MA for the Town of Wareham. This disaster planning effort was motivated in part by the 2018 Wareham

Master Plan Vision that preceded the 2020 Wareham Master Plan reviewed above. The Woods Hole Group portrays this Master Plan Vision in the following way:

The Wareham Master Plan Vision was created in 2018 to compile general mission statements, goals and recommendations that will ultimately be used to guide the development of a future Master Plan. The Master Plan Vision also includes a Future Land Use Map that depicts general patterns for the way Wareham should develop and conserve land in the future. The Master Plan Vision document covers land use, economic development, services and facilities, stewardship and service, transportation, housing, open space and recreation, and natural and cultural resources.

On p. 2-5 of this report is found a copy of the “Town of Wareham Future Land Use Vision Map” that identifies much of the area proposed for re-zoning as “**Permanently Protected Open Space**” or “**Water Resources and Habitats.**”

The report gives in **Section 2.4** a description of Wareham’s “**NATURAL ENVIRONMENT**” in the following way that conveys its integral importance to the town’s very character:

Wareham’s natural environment and natural resources are important to the Town’s identity and quality of life. In fact, one of the most important factors in why people move to and visit Wareham is its natural environment and coastal features. The Town has a varied landscape, with large stretches of open space, forested land, and upland, as well as coastal salt marshes, sandy beaches and protected harbors. These natural resources support the economy through tourism and recreation, in addition to a variety of other ecosystem services, such as clean air and water. The natural environment also increases resiliency and reduces hazard impacts, through flood attenuation as wetland areas absorb flood waters, through stormwater management as rainwater drains through the soil, and through erosion control as vegetation secures soil along coastal banks and dunes.

The triple hazards of wildfires, drought and extreme temperatures are addressed in this report as potential threats to the well-being of Wareham residents. On pp. 3-30 to 3-31, the report states that “the Wareham area is susceptible to **wildfires**” such that: “Extensive areas of forests and other natural areas can be burned. Wildfires can strip slopes of vegetation, increasing the potential for runoff and erosion.” Then on p. 3-35 they explain how: “The entire Town of Wareham is equally vulnerable to **drought**” yielding problems including these: “Loss of fish habitat as streams, rivers, and ponds dry up. Lack of food and drinking water for wildlife. Wildlife may be forced to migrate to find adequate resources. Wildfires may become more common.” There is also a danger of **extreme temperatures**, as discussed on p. 3-41: “Extreme heat can reduce water levels in natural ponds and reservoirs, as well as increase surface water temperatures to dangerous levels. Both can have an adverse impact on fish and wildlife.”

In a subsequent section of this report, the dangers of runoff from impervious surfaces along with nutrient discharge, all of which can yield eutrophication in rivers and ponds, are addressed in the following terms. In **Section 3.13** on pp. 3-58 to 3-59, for example, the report discusses “**WATER QUALITY CONCERNS (ALGAL BLOOMS, RED TIDES)**” and warns of how “Nutrient pollution ... can fuel the growth of algae” leading to a “process ... called eutrophication ... [which] affects the whole ecosystem ... and can lead to fish kills ... and disruption to residential water supplies.” The report explains that “freshwater ponds and lakes are some of the most likely areas to be adversely affected. Wareham also has a number of major rivers” that can be affected by eutrophication. The report returns on p. 5-13 to “**Water Quality Issues**” because: “Water quality monitoring is necessary to evaluate the effect of anthropogenic eutrophication on fish/shellfish populations and residential water supply. Including public outreach in monitoring efforts will educate the public on both the importance of water quality and how to maintain it.”

In **Section 5.2**, on pp. 5-2 to 5-3, the report discusses “**Town Plans and Policies**” including the **Wareham Master Plan** which covers “topics such as land use, economic development, services and facilities, stewardship and service, transportation, housing, open space and recreation, and natural and cultural resources ... and incorporates goals for increasing climate resilience, and evaluating and reducing flood risk throughout the Town.” They then address “**Existing Mitigation Measures**” which include “**Flood Plain District Zoning**,” which “is intended to protect the public health and safety through the regulation of land use” and the “**Wetlands Protection Bylaw**” whose “purpose ... is to protect the wetlands, water resources and adjoining land areas.”

7. The ‘Official Position’ of the Town of Wareham on Environmental Resource Protection

The purpose of the lengthy exegesis above of all these Wareham municipal planning documents is simply to lay out the town’s ‘official position’ on the protection of both its own natural resources and of the ecological health of land and underground water resources across the entire region. The fragile life-forms residing in our forests and streams demand our attentive valuation and stewardship. Protecting such species is why these stipulations have been codified into our rules, standards and laws. The Town of Wareham has approved and endorsed a use of valuable lands set aside for ecological preservation. Wareham’s voluminous planning documents show the worth of this ecologically sensitive land. The town and its residents have spent many years studiously reviewing and deciding to protect their remaining open space from environmental loss, as shown throughout these studies.

8. The “Economic Arguments” for this Re-Zoning Proposal (Restated)

What is the reason for re-zoning this land away from protection of groundwater resources, given Wareham’s statements strongly endorsed by municipal leaders? The worry is over Wareham’s financial standing and the protection of its taxable revenue base. But this development proposal is not the rescue for Wareham that has been claimed. The fear that Wareham will be in financial jeopardy without this re-zoning plan is economically unjustified. There is no incipient crisis that this zoning change will resolve.

9. The Importance of Maintaining Credibility in Honoring Town Standards and Guidelines

In my economic research, I have devoted many years of thought to organizational functionality. A way to make communities strong is through reliable leadership. When social systems start to collapse, the first thing to go is *trust*. Wareham has put a lot of energy into its various plans, which bind its sense of community. The Wareham Master Plan made the point well:

*Wareham is creating an additional element called **Stewardship & Service**. This extra chapter is unique to Wareham and is **all about collaboration**. Its purpose is to encourage and guide participation by all local Boards and Commissions, agencies, volunteers, business and property-owners, and the community as a whole. It is a signal to all of you that the Master Plan is yours. It will directly address your needs and respond to your goals. And its success depends on your ongoing contribution of time, ideas, and actions.* [emphasis added]

This document also remarked on the importance of realism in decisions, and then extended this thought to community:

Good data means that the plan will be grounded in reality, but your aspirations and creativity are just as important. This comes from ongoing public input at workshops, online, and through in-person meetings. Without this essential participation by Wareham's residents and businessowners, the plan would not reflect an understanding of the town as a community and as a place.

These are issues that matter. They maintain community. This is why I have devoted the effort to this report. Protecting sensitive environmental resources is a top priority, as stated throughout the Wareham planning documents. The R-130 zoning category is meant to protect these resources.

10. Summary and Conclusions

EconoLogistics was retained to evaluate the NOTOS Group re-zoning proposal of ecologically sensitive land in northeastern Wareham, MA. After reviewing my professional qualifications, this report delineated some facts, issues and concerns with the case at hand. This re-zoning proposal is motivated by a claim that current zoning and COVID-19 will unduly burden Wareham municipal budgets, with this plan posed as a solution.

FXM Associates projected the prospective financial losses to Wareham with a deeply-flawed analysis. **First**, the number of new homes is overstated. **Second**, taking the *average value of existing homes* as a benchmark for valuing *new homes* understates their revenue impact. **Third**, exaggerating the number of *people per household* overstates municipal cost effects. **Fourth**, their use of *average cost per student* overstates the cost of new students with any *fixed costs* in the system. **Fifth**, *excess capacity* (from declining student enrollment) inflates average cost per student (due to fixed cost and COVID-19), further biasing cost effects upward. **Sixth**, their measure of non-school costs, based on a residential average, is biased upward as well.

Assuming no fixed costs in education or town services inflates their cost effects. FXM's tax revenue effects are also understated. To exaggerate costs and minimize revenues yields a biased result that supports the NOTOS Group goals. The FXM Associates' analyses shed no credible light on Wareham's development options. Their results are in no way conservative.

Four documents were reviewed, all meant to guide decisions in Wareham on environmental protection: *The 2017-2024 Wareham Open Space and Recreation Plan*; *The Wareham Zoning By-Laws*; *The Town of Wareham Master Plan*; and *The Town of Wareham Multi-Hazard Mitigation Plan*. Every one of those planning documents describes a commitment town leaders have made to conservation as a top priority issue. Wareham's position on the environment is the sort of long-term thinking needed on land use issues. These standards and guidelines should be followed.

The claims, opinions and conclusions in this economic analysis are valid to a reasonable degree of economic certainty, based on my many years of experience as a professional economist.

Signed:



Date: 30 March 2021

Frederic B. Jennings, Jr., Ph.D.

CONTACT INFORMATION: EconoLogistics, P.O. Box 946, Ipswich, MA 01938-0946
Email: econologistics@yahoo.com; Phone: 978-356-2188 (messages); 617-605-3150 (cell)

LIST OF EXHIBITS

EXHIBIT ONE: LIST OF SOURCES RELIED UPON IN THIS STUDY

EXHIBIT TWO: FREDERIC B. JENNINGS JR.: CURRICULUM VITA

EXHIBIT ONE: LIST OF SOURCES RELIED UPON IN THIS STUDY

GENERAL SOURCES:

Environmental Protection Agency (EPA), Map titled “Waterbody Assessment and TDML Status, Wareham, MA,” 2008

Joan Pierce, Mass. Dept. of Fish and Game, “Proposed Hospitality, Recreation and Entertainment Zone Change: (Revised),” 22 January 2021

The Trustees of Reservations, Letter “Re: Proposed Zoning Change to create a Wareham Hospitality, Recreation and Entertainment District,” 8 February 2021 (says 2020)

Peter Teitelbaum et al., “Dear Wareham Resident” Letter, 26 February 2021

Southeast Massachusetts Chapter of Trout Unlimited (SEMATU), “PRESS RELEASE: ZONING CHANGE THREATENS TO DESTROY SALTER BROOK TROUT POPULATION,” 6 March 2021

NOTOS GROUP AND FXM ASSOCIATES COMMUNICATIONS:

FXM Associates, “Wareham Economic Development Strategy,” March 2019

FXM Associates, “Technical Memorandum: Assessment of Municipal Revenues and Costs of Potential New Residential Development in Wareham: Executive Summary Report” prepared for the NOTOS Group LLC, 16 November 2020

FXM Associates, “Technical Memorandum: Assessment of Municipal Revenues and Costs of Potential New Residential Development in Wareham: Executive Summary Report” prepared for the NOTOS Group LLC, 7 December 2020

FXM Associates, “Potential Market Driven Economic and Fiscal Impacts to the Town of Wareham of the COVID-19 Pandemic: Technical Memorandum” prepared for the NOTOS Group, December 2020

Letter from Jeffery A. Tocchio “Re: Responsive Revisions to Proposed Hospitality, Recreation and Entertainment Overlay District,” 14 January 2021

Letter from Jeffery A. Tocchio “Re: Additional Responsive Revisions to Proposed Hospitality, Recreation and Entertainment Overlay District,” 8 February 2021

FXM Associates, “FXM In The News” (from their website)

WAREHAM WEEK ARTICLES:

Cyrus Moulton, “Century Bog protected by State”, 29 January 2010

Katharine Harrelson, “Opinion: Majestic parcel offers residents something more valuable than horse racing,” 9 February 2021

Don Jepson, “Opinion: Proposed zoning change puts the cart before the horse,” 4 March 2021

Chloe Shelford, editor, “Trustees of Reservations, Trout Unlimited oppose zoning change,” 7 March 2021

Katharine Harrelson, “Opinion: Rezoning Goes Against Wareham's Master Plan,” 8 March 2021

Chloe Shelford, editor, “The story behind the Hospitality District letter sent to all voters,” 9 March 2021

Madison Czopek, reporter, “Red Brook conservation land removed from Notos Group zoning proposal,” 17 March 2021

WAREHAM TOWN PLANNING DOCUMENTS:

Town of Wareham, “Town of Wareham Zoning Map,” 14 May 2007

Town of Wareham, “2017-2024 Open Space and Recreation Plan,” 29 May 2018

J.M. Goldson Community Preservation and Planning, Report on “Onset Village Slum and Blight Inventory,” prepared for the Town of Wareham Department of Planning and Community Development, Community and Economic Development Authority, and Wareham Redevelopment Authority, November 2018

Town of Wareham, “Wareham Zoning By-Laws,” revised November 2018

Town of Wareham, “Wareham Master Plan,” 27 January 2020

Urban Land Institute (ULI), “Technical Assistance Panel (TAP) Report: Wareham Village,” 4 February 2020

Woods Hole Group, “Wareham Multi-Hazard Mitigation Plan” prepared for the Town of Wareham, November 2020

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EDUCATION

STANFORD UNIVERSITY	Ph.D. (1985), M.A. (1980)	Economics
DISSERTATION:	<u>Public Policy, Planning Horizons and Organizational Breakdown: A Post-Mortem on British Canals and Their Failure</u>	
HARVARD COLLEGE	B.A., <i>magna cum laude</i> (1968)	Economics
HONORS THESIS:	<u>Competition Theory and the Welfare Optimum: A Methodological Analysis</u>	

PROFESSIONAL EXPERIENCE

EDUCATION AND TEACHING:

1985-87	Assistant Professor of Economics	BENTLEY COLLEGE , Waltham, MA
	♦ <i>taught courses in introductory and intermediate microeconomics and macroeconomics</i>	
	♦ <i>team taught in an interdisciplinary business ethics course called "Values and Choices"</i>	
1979-83	Instructor of Economics	TUFTS UNIVERSITY , Medford, MA
	♦ <i>taught courses in introductory, intermediate and graduate microeconomics</i>	
	♦ <i>developed and taught a course in "The Roots of Modern (20th Century) Economics"</i>	
1976-78	Educational Consultant	STANFORD CTR. FOR TEACHING & LEARNING
	♦ <i>videotaped classes and counselled professors and graduate students on pedagogical approaches and techniques</i>	
	♦ <i>developed programs to support the training of future educational counsellors for the organization</i>	
1975-78	Teaching Fellow in Economics	STANFORD UNIVERSITY , Palo Alto, CA
	♦ <i>developed and taught a workshop in teaching techniques and problem-solving approaches</i>	
	♦ <i>teaching assistant in economic principles and comparative economic systems courses</i>	

CONSULTING, EMPLOYMENT AND ACADEMIC RESEARCH:

1995-present	President and Founder	CTR FOR ECOL ECON & ETH EDCN , Ipswich, MA
	♦ <i>focusing on academic publication and conference presentations, fisheries conservation and management issues</i>	
1995-present	Owner	PEAK DAWN ANGLERS
	♦ <i>specialized guide for motorless saltwater fly fishing with ultalight tackle in Ipswich estuary through low tide</i>	
1992-present	President and Founder	ECONOLOGISTICS
	♦ <i>specializing in economic litigation work and expert testimony on damage assessment, economic losses, etc.</i>	
1991-92	Sr. Mgr., Office of Fedl Tax Svcs	ARTHUR ANDERSEN & CO. , Washington, DC
	♦ <i>analyzed transfer pricing policies of multinational firms in auto, tool, apparel and software industries</i>	
	♦ <i>developed proposals for internal systems improvements and a practice development marketing plan</i>	
1988-91	Economic and Business Consultant	CHARLES RIVER ASSOCIATES, Inc. , Boston, MA
	♦ <i>prepared documentation and testimony for FTC antitrust hearings on merger proposals and other issues</i>	
	♦ <i>prepared documentation and testimony for antitrust cases in various industries (appliances, paper, etc.)</i>	
	♦ <i>analyzed tax implications of transfer pricing policies between multinational firms and subsidiaries</i>	
	♦ <i>evaluated demand forecasts and researched pricing by electric utilities in major bond fraud case</i>	
	♦ <i>prepared documentation and testimony on US Census data collection and processing schedules</i>	
1988	Economic and Business Consultant	MAC RESEARCH GROUP, Inc. , Cambridge, MA
	♦ <i>prepared testimony in tax matter on technical obsolescence of plants in auto industry</i>	
1976-77	Research Assistant	STANFORD ECONOMICS DEPT. , Palo Alto, CA
	♦ <i>gathered and processed statistical data for various projects and studies in economic history</i>	
	♦ <i>verified statistical and mathematical analyses in the preparation of manuscripts for publication</i>	

- 1976-77 Summer Research Fellow **INST. FOR HUMANE STUDIES**, Menlo Park, CA
- ♦ *analyzed construction costs data for British canal system as part of Ph.D. dissertation research proposal*
 - ♦ *developed a general systems (monopolistic competition) model of transportation network pricing decisions*
- 1973-74 Research Assistant **CHARLES RIVER ASSOCIATES**, Cambridge, MA
- ♦ *conducted detailed statistical and theoretical analyses of antitrust issues in broadcast industry*
 - ♦ *prepared studies relating to the regulation and profitability of vehicular transportation alternatives*
- 1969-72 Independent Research Fellow **INST. FOR HUMANE STUDIES**, Menlo Park, CA
- ♦ *pursued a self-designed study program in economics, philosophy, psychology, social and natural sciences*
- 1968-69 Junior Medicare Accountant **MASS. BLUE CROSS-BLUE SHIELD**, Boston, MA
- ♦ *worked with professional accountants to coordinate and verify hospital medicare audit procedures*

ADMINISTRATIVE LEADERSHIP:

- 2017-present Member of Core Planning Group **BIODIVERSITY FOR A LIVABLE CLIMATE**
- 2019-present Staff – Ecological Economist **BIODIVERSITY FOR A LIVABLE CLIMATE**
- 2016-2020 Secretary; Vice Chair **MA/RI COUNCIL OF TROUT UNLIMITED**
- 2015-2019 Secretary/Director, Northeast Council **INTERNATL. FEDERATION OF FLY FISHERS**
- 2006-present Member, Board of Directors **GREATER BOSTON TROUT UNLIMITED**
- 2013-2014 Chapter Vice President **GREATER BOSTON TROUT UNLIMITED**
- 2015 Chapter President **GREATER BOSTON TROUT UNLIMITED**
- 2016 Chapter Secretary **GREATER BOSTON TROUT UNLIMITED**
- 2012-present Member, Board of Directors **NOR'EAST CHAPTER TROUT UNLIMITED**
- 2014-2017 Chapter President **NOR'EAST CHAPTER TROUT UNLIMITED**
- ♦ *initiated and developed numerous projects to promote cold-water fisheries conservation in regional area*
- 2003-present MA State Co-Chair **MA CHAPTER OF STRIPERS FOREVER**
- ♦ *developed and pursued initiatives to achieve gamefish status for striped bass in MA and along the Atlantic Coast*
 - ♦ *framed and promoted several legislative initiatives on gamefish, health and the economics of striped bass fishery*
 - ♦ *analyzed the economic value of recreational and commercial fisheries for wild striped bass and other species*
- 1986-87 Founder/Organizer **THE BENTLEY PARTICIPANTS**
- ♦ *organized a three-semester series of formal discussions on topics such as: personal differences, human rights, education, death, injustice, creativity, arms race, personal and organizational growth*
- 1978-79 Resident Associate **STANFORD OFFICE OF RESIDENTIAL EDUCN.**
- ♦ *managed a high-rise apartment building housing 250 graduate students on the Stanford campus*
 - ♦ *initiated, wrote, edited, and published a biweekly graduate newsletter for building residents*
 - ♦ *organized a year-long series of educational, social, and recreational activities for residents*
- 1977-79 Founder and First President **STANFORD GRADUATE STUDENT ASSN.**
- ♦ *created a university-wide graduate student organization with a fully-staffed committee structure*
 - ♦ *worked to encourage graduate student involvement with and to increase graduate financial aid from Stanford*
- 1977-78 Chair of Special Commission **A.S.S.U. ELECTION REVIEW BOARD**
- ♦ *resolved a constitutional crisis over student senate elections during the fall quarter of 1977-78*
 - ♦ *designed and secured the Board's unanimous support for a new system of student representation*
 - ♦ *prepared, authored, and published a 212-page report on our deliberations and recommendations*
- 1976-77 Student Body Co-President **ASSOCIATED STUDENTS OF STANFORD UNIV.**
- ♦ *participated in a successful effort to establish an official university-wide course evaluation system*
 - ♦ *initiated a successful proposal for a budgeted program for teaching improvement at Stanford*
 - ♦ *drafted and developed a successful proposal for a much-needed Graduate Student Association at Stanford*
- 1974-76 Chairperson and Representative **STANFORD GRADUATE STUDENT COUNCIL**
- ♦ *served as economics department representative for two years; chairperson during the second of those years*
 - ♦ *conducted and coordinated detailed studies of graduate aid and teacher training proposals at Stanford*
 - ♦ *prepared and published a detailed analysis of various means of increasing graduate financial aid at Stanford*

SELECTED PUBLICATIONS, PREPARATIONS, AND PRESENTATIONS

Many of the following papers can be found on this site: <https://independent.academia.edu/FredericJennings>. Also see https://www.researchgate.net/profile/Frederic_Jennings.

Many other economic reports and prepared testimony performed for private clients by *EconoLogistics* since 1992 are not available here, although some might be made available in response to a direct request...

“LABOR RATE: Facts, Fiction and the Future (An Economist’s Perspective) – Parts 3-6,” *New England Automotive Report*, January, February, March and April, 2021.

“The Joust and The Potlatch as Social Alternatives,” *Resilience Magazine*, 11 March 2021:

https://www.resilience.org/stories/2021-03-11/the-joust-and-the-potlatch-as-social-alternatives/?utm_source=rss&utm_medium=rss&utm_campaign=the-joust-and-the-potlatch-as-social-alternatives&mc_cid=752a342bbc&mc_eid=b8aa15c89a

“A Horizontal Look at Social Entropy,” *Resilience Magazine*, 16 December 2020:

https://www.resilience.org/stories/2020-12-16/a-horizontal-look-at-social-entropy/?utm_source=rss&utm_medium=rss&utm_campaign=a-horizontal-look-at-social-entropy&mc_cid=ef79a4001f&mc_eid=b8aa15c89a

“Scarcity and/or Abundance? The Horizontal Nature of Social Relations,” *Resilience Magazine*, 2 December 2020:

<https://www.resilience.org/stories/2020-12-02/scarcity-or-abundance-the-horizontal-nature-of-social-relations/>

“Authenticity,” *Resilience Magazine*, 18 November 2020: https://www.resilience.org/stories/2020-11-18/authenticity/?utm_source=rss&utm_medium=rss&utm_campaign=authenticity&mc_cid=9f37f2e006&mc_eid=b8aa15c89a

https://www.resilience.org/stories/2020-11-18/authenticity/?utm_source=rss&utm_medium=rss&utm_campaign=authenticity&mc_cid=9f37f2e006&mc_eid=b8aa15c89a

“What Might We Learn from COVID-19?”, *Resilience Magazine*, 14 April 2020:

<https://www.resilience.org/stories/2020-04-14/what-might-we-learn-from-covid-19/>

“Economic Essays (Part Two): Toward a Realistic Concept of Choice,” *Journal of Philosophical Economics*, Vol. XIII, Issue 2, Spring-Autumn 2020, pp. 1-57: www.jpe.ro/pdf.php?id=8789

“Economic Essays (Part One): Toward a Realistic Concept of Choice,” *Journal of Philosophical Economics*, Vol. XIII, Issue 1, Autumn 2019, pp. 65-105: www.jpe.ro/pdf.php?id=8546

“Collision Labor Rates and the ‘Arm’s Length’ Standard,” *New England Automotive Report*, June 2019

“The Role of Economics in Ecosystemic Conservation,” presented at the 2017 Annual Conference of Biodiversity for a Livable Climate on “Climate Reckoning: Paths to an Earth Restored,” Harvard University, 18 November 2017:

<https://www.youtube.com/watch?v=2IQIGNZgK88&feature=youtu.be>

THE ECONOMICS OF HORIZON EFFECTS: Why Economics Falls Short of Human Needs, and How to Refocus It onto What Matters, Lambert Academic Publishing, Saarbrücken, Germany, 2017

THE HUMAN ECOLOGY OF HORIZON EFFECTS: The Social, Ethical and Ecological Impact of Competition and Myopic Cultures, Lambert Academic Publishing, Saarbrücken, Germany, 2017

NATURE’S SONG, INHUMAN SOCIETY: A FLY CAST TO THE WILD – Fishing for Truth in Economics, unpublished draft manuscript, 2016 (currently being considered for publication).

“Planning Horizons as an Ordinal Entropic Measure of Organization,” *The Journal of Philosophical Economics*, Vol. X, No. 1, Autumn 2016, pp. 58-80.

“A Report on the Economic Value and Impact of the MA Wild Striped Bass Fishery” issued in August 2016 by CEEEE, to be expanded into a series of similar statewide reports on the Atlantic coastal wild striped bass fishery.

“Competitive Failure Due to Horizon Effects: Four Case Studies,” forthcoming (in two parts) in the *Forum for Social Economics*.

“The Microeconomics of Time,” written for and submitted to a special issue on “Time in Economics,” *Oeconomia*, edited by John Davis et al., forthcoming.

“Atoms, Bits and Wits: A New Economics for the 21st Century – Part II,” *Forum for Social Economics*, Vol. XLV, No. 1, January 2016, pp. 88-109.

“The Case for Increasing Returns II: The Methods of Planning Horizons,” *The Journal of Philosophical Economics: Reflections on Economic and Social Issues*, Vol. IX, Issue 2, Spring 2016, pp. 2-39 (forthcoming).

“Abundance and Scarcity,” in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 1, 2015, Sage Publications, Thousand Oaks, CA, pp. 5-8.

“Benevolence,” in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 1, 2015, Sage Publications, Thousand Oaks, CA, pp. 189-91.

“Economic Rationality,” in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 2, 2015, Sage Publications, Thousand Oaks, CA, pp. 604-7.

- "Inside Job," in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 1, 2015, Sage Publications, Thousand Oaks, CA, pp. 937-39.
- "Lemons, Market for," in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 3, 2015, Sage Publications, Thousand Oaks, CA, pp. 1025-26.
- "Libertarianism," in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 3, 2015, Sage Publications, Thousand Oaks, CA, pp. 1032-34.
- "Regulatory Capture," in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 3, 2015, Sage Publications, Thousand Oaks, CA, pp. 1376-78.
- "Willingness to Pay," in Frederick F. Wherry and Juliet Schor, eds., *The Sage Encyclopedia of Economics and Society*, Vol. 4, 2015, Sage Publications, Thousand Oaks, CA, pp. 1699-1701.
- "Atoms, Bits and Wits: A New Economics for the 21st Century – Part I," *Forum for Social Economics*, Vol. XLIV, No. 3, December 2015, pp. 213-33.
- "The Case for Increasing Returns I: 'The Hicksian Getaway' and 'The Hirshleifer Rescue'," *The Journal of Philosophical Economics: Reflections on Economic and Social Issues*, Vol. IX, Issue 1, Autumn 2015, pp. 5-51.
- "The Methods of Planning Horizons, Increasing Returns and Complementarity," presented at the 2015 World Congress of the Association for Social Economics (ASE), St. Catherine's, Ontario, Canada, June 2015.
- "The Cultural and Health Implications of Economic Complementarity," *Journal of Economic Issues*, June 2015.
- "The Culture of Complementarity," presented at the 2014 Association for Institutional Thought (AFIT) conference, Albuquerque, NM, April 2014; accepted for the International Initiative for Promoting Political Economy (IIPPE), Fifth Annual Conference, Naples, Italy, September 2014 and for the European Association for Evolutionary Political Economy (EAEPE) Conference, Corsica, Italy, November 2014; presented at the 2015 Allied Social Sciences Associations (ASSA) Meetings for the Association for Evolutionary Economics (AFEE), Boston, MA, January 2015.
- "Atoms, Bits and Wits: A New Economics for the 21st Century," presented at the 2013 Association for Institutional Thought (AFIT) conference, Denver, CO, April 2013; published in the *Forum for Social Economics* in two parts (see above).
- "Addressing Sustainability: Integrating Macro Goals and Micro Techniques with Meso Analysis," presented at the 2013 Association for Institutional Thought (AFIT) conference, Denver, CO, April 2013.
- "A Theory of Planning Horizons (2): The Foundation for an Ethical Economics," *Journal of Philosophical Economics*, Vol. VI, Issue 1, Autumn 2012, pp. 2-31.
- "Planning Horizons as Social Conscience: The Foundation for an Ethical Economics," presented at the Association for Social Economics (ASE) 2012 World Congress, University of Glasgow, Glasgow, Scotland, June 2012.
- "Planning Horizons, Conscience and the Ethics of Externalities: Organizational Theory and the Emergence of Social Responsibility," presented at the American Social Science Associations (ASSA) Conference in an Association for Social Economics (ASE) session, Chicago, IL, January 2012, at the 2012 Annual Conference of the International Network for Economic Research (INFER), Coimbra, Portugal, May 2012, and at the Association for Social Economics (ASE) 2012 World Congress, University of Glasgow, Glasgow, Scotland, June 2012.
- "Social Costs and the Horizontal Approach to Ecological Economics" in Paolo Ramazzotti, Pietro Frigato, Wolfram Elsner, eds., *Social Costs Today: Institutional Analyses of the Present Crises*, Routledge Frontiers of Political Economy, New York, 2012, pp. 57-72.
- "Estimating the Cost of Monopsony Power Abuse Imposed by a Single U.S. Auto Insurer upon a Large Individual Auto Body Repair Shop," presented at the 2012 Annual Conference of the International Network for Economic Research (INFER), Coimbra, Portugal, May 2012.
- "A Theory of Planning Horizons (1): Market Design in a Post-Neoclassical World," *Journal of Philosophical Economics*, Vol. V, Issue 2, Spring 2012, pp. 5-37.
- "Toward a Horizontal Theory of Justice: Efficiency, Equity, Rights and Capabilities in a Free Market Economy," *Forum for Social Economics*, Vol. 39, No. 1, January 2010, pp. 77-87.
- "The Design of Free-Market Economies in a Post-Neoclassical World" presented at the School of Oriental and Asian Studies Conference on Law and Economics, September 2007; also presented at: the 2009 Annual Conference of the International Network for Economic Research (INFER), University of Stirling, Scotland, September 2009; the 2010 Allied Social Sciences Associations (ASSA) Meetings for the Association for Evolutionary Economics (AFEE), Atlanta, GA, January 2010; the Association for Institutional Thought (AFIT) Conference, Salt Lake City, UT, April 2011; the International Consortium of Associations for Pluralism in Economics (ICAPE), Amherst, MA, November 2011.
- "Atoms, Bits and Wits: The Elements of Economics" presented at the 2010 Conference of the Association for Institutional Thought (AFIT), Reno, NV, April 2010; also presented at the International Initiative for Promoting Political

- Economy (IIPPE), Second Annual Conference, Istanbul, Turkey, May 2011 and at the Association for Heterodox Economics (AHE) Conference, Nottingham, U.K., July 2011.
- “The Economic Cultures of Fear and Love,” presented at the World Congress of the Association for Social Economics, Montreal, Canada, June/July 2010; also presented at the Association for Heterodox Economics Conference, Nottingham, U.K., July 2011
- “Six Choice Metaphors and their Social Implications,” *Journal of Philosophical Economics*, Vol. II, Issue 2, Spring, 2009
- “A New Economics of Complementarity, Increasing Returns and Planning Horizons” in Wolfram Elsner and Hardy Hanappi (eds.), *Varieties of Capitalism and New Institutional Deals: Regulation, Welfare and the New Economy*, Edward Elgar, Cheltenham, England, 2008
- Regional Economic Policy in Europe: New Challenges for Theory, Empirics and Normative Interventions*, Ulrike Stierle-von Schutz, Michael H. Stierle, Frederic B. Jennings Jr. and Adrian T.H. Kuah (eds.), Edward Elgar, Cheltenham, England, 2008
- “A Horizontal Theory of Pricing in the New Information Economy” in Christian Richter (ed.), *Bounded Rationality in Economics and Finance*, LIT Verlag, Berlin, 2008
- “A Cognitive View of Scale and Growth” in Robert L. Chapman (ed.), *Creating Sustainability Within Our Midst: Challenges for the 21st Century*, Pace University Press, New York, NY, 2008
- “Horizon Effects, Sustainability, Education and Ethics: Toward an Economics of Foresight” in Christian Richter (ed.), *Bounded Rationality in Economics and Finance*, LIT Verlag, Berlin, 2008
- “‘The Hicksian Getaway’ and ‘The Hirshleifer Rescue’: Increasing Returns from Clapham to Kaldor” presented at the European Association for Evolutionary Political Economy (EAEPE) Annual Conference, Rome, Italy, November 2008; also presented at: the Association for Institutional Thought (AFIT) Meetings at the Western Social Science Association (WSSA) Annual Conference, Albuquerque, New Mexico, April 2009; the European Society for the History of Economic Thought (ESHET) Annual Conference, Istanbul, Turkey, May 2011; International Initiative for Promoting Political Economy (IIPPE), Second Annual Conference, Istanbul, Turkey, May 2011
- “Six Choice Metaphors and their Economic Implications” first presented at the Association for Institutional Thought (AFIT) Meetings at the Western Social Science Association (WSSA) Annual Conference, Denver, Colorado, April 2008; also at the International Network for Economic Research (INFER) Annual Conference, Evora, Portugal, September 2008
- “Does Competition Advance or Retard Economic Development? – An Institutional View” presented at the European Association for Evolutionary Political Economy (EAEPE) Conference, Porto, Portugal, November 2007; also presented at: a Conference on “Theory and Evidence of Growth, Trade and Economic Development, with Special Reference to Latin America” at the Instituto Polytechnica Nazionale (IPN), Mexico City, Mexico, September 2008; International Initiative for Promoting Political Economy (IIPPE), Second Annual Conference, Istanbul, Turkey, May 2011
- “The Economics of Conscience and the Ethics of Externalities” presented at the International Network for Economic Research (INFER) Annual Conference, Cork, Ireland, October 2007; published in Christian Richter, Antonio Caleiro, and Carlos and Isabel Vieira, eds., *Challenges for Economic Policy Design: Lessons from the Financial Crisis*, Lambert Academic Publishing, Saarbrücken, Germany, 2009
- “The Economics of Love” presented at the International Network for Economic Research (INFER) Annual Conference, Cork, Ireland, October 2007; published in Christian Richter, Antonio Caleiro, and Carlos and Isabel Vieira, eds., *Challenges for Economic Policy Design: Lessons from the Financial Crisis*, Lambert Academic Publishing, Saarbrücken, Germany, 2009
- “Competition or Collaboration? – The Interrelations of Firms and Agents in Regional Economic Development” presented at the International Network for Economic Research (INFER) Workshop on Regional Economic Development, University of Wooster, Wooster, Ohio, July 2007
- “Complexity and Complementarity: A Horizontal Economics of Conscience” presented at the International Conference on Complex Systems hosted by the New England Complex System Institute in Quincy, MA, October 2007
- “Toward an Ethical Economics of Planning Horizons and Complementarity” presented at the Association for Social Economics (ASE) Congress in Amsterdam, The Netherlands, June 2007; published in John B. Davis, ed., *Global Social Economy: Development, Work and Policy*, Routledge (Springer), New York, 2009
- “Hammers, Nails and New Constructions – Orthodoxy or Pluralism?: An Institutional View” first presented at the Conference of the International Consortium of Associations for Pluralism in Economics (ICAPE), University of Utah, Salt Lake City, UT, June 2007; also presented at the Association for Institutional Thought (AFIT) Meetings at the Western Social Science Association (WSSA) Annual Conference, Denver, Colorado, April 2008
- “Horizon Effects and the British Canals: An Institutional View” in Frank Fichert, Justus Haucap, Kai Rommel (eds.), *Competition Policy in Network Industries*, LIT Verlag, Berlin, 2007

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- "A Horizontal Challenge to Orthodox Theory: Competition and Cooperation in Transportation Networks" in Michael Pickhardt and Jordi Sarda Pons (eds.), *Perspectives on Competition in Transportation*, LIT Verlag, Berlin, 2006
- "Time, Knowledge and Pricing: Toward a Horizontal Theory of Choice" presented at the International Network for Economic Research (INFER) Annual Conference, London, England, October 2005
- "Planning Horizons as an Ordinal Entropic Measure of Organization" presented at the Conference on Complex Systems, Liverpool, England, September 2005; also presented at the International Network for Economic Research (INFER) Annual Conference, Evora, Portugal, September 2008 and at the United States Society for Ecological Economics (USSEE) Conference, Washington, DC, June 2009
- "The Privatization of Ocean Fisheries: A Paradigmatic Systems View" presented at the United States Society for Ecological Economics (USSEE) Conference, Olympia, WA, July 2005; and the Association for Institutional Thought (AFIT) Conference, Salt Lake City, UT, April 2011
- "How Efficiency/Equity Tradeoffs Resolve Through Horizon Effects," *Journal of Economic Issues*, June 2005
- "A Horizontal View of Competition in Transportation Networks" presented at the International Network for Economic Research (INFER) Workshop on Competition and Networks, Reus, Spain, October 2004
- "Interdependence, Horizon Effects and Ecological Economics," in Raimund Bleischwitz and Oliver Budzinski, eds., *Environmental Economics: Institutions, Competition and Rationality*, VWF (Verlag für Wissenschaft und Forschung), Berlin and Wuppertal Institute, Wuppertal, Germany, September 2004
- "Economic Analysis in a Complexly Interdependent Ecology" presented at the International Society for Ecological Economics (ISEE) in Montreal, Canada, July 2004
- "The Joust and the Potlatch as Social Alternatives" presented at the Association for Social Economics (ASE) Congress in Albertville, France, June 2004; also presented at the 2010 Association for Institutional Thought (AFIT) Conference, Reno, NV, April 2010
- "Horizon Effects, Sustainability, Education and Ethics" prepared for the Australia – New Zealand Society for Ecological Economics Meetings in Auckland, New Zealand, December 2003
- "The Ecological Economics of Horizon Effects" presented at the Canadian Society for Ecological Economics (CSEE) Meetings in Jasper Park, Canada, November 2003
- "Ecology, Economics and Values," *Environmental Health*, June 2003
- "Four Choice Metaphors for Economic Systems Analysis," presented at the New England Complex Systems Institute's (NECSI) International Conference on Complex Systems, Manchester, NH, June 2000
- "The Answer to Steering: Educate Consumers!" *Beyond Parts & Equipment*, June 2000
- "Imitation Sheetmetal: An Economist Views MA Hearings" and "Practical Ways to Manage Imitation Parts Problems," *Beyond Parts & Equipment*, May 2000
- "A Flyfishing Ecology" (essay), *Sea Winds*, Spring 2000
- "The Privatization of Ocean Fisheries: An Institutional View" presented at the 2000 Allied Social Sciences Associations (ASSA) Meetings for the Association for Evolutionary Economics (AFEE), January 2000
- "Scaring the Fish": *A Critique of the NRC's Justification for Individual Transferable Quotas (ITQs) and a 'Systems Analysis' of Their Likely Effects*, a joint CEEEEE/Greenpeace publication, November 1999
- "Four Choice Metaphors and their Pricing and Growth Implications" presented at the Atlantic Economic Society (AES) Meetings, New York, January 1995
- "Autoglass/DRP Networks: 'Efficiency' or 'Market Power'?" published in *Hammer & Dolly, Beyond Parts & Equipment*, and *NAGC Update*, 1994
- "The Proposed New Transfer Pricing Rules: New Wine in an Old Bottle?" *Tax Notes*, 2/10/92, w/ G. Carlson et al.: I drafted the "arm's length" and "intangibles" sections and helped pull the whole thing together
- "The 'Hicksian Getaway' and the 'Hirshleifer Rescue': The Debate on Increasing Returns (1922-1972)," a paper in process presented before the Kress Society, Harvard University, February 1991
- "Time, Knowledge and Pricing: Toward a Horizontal Theory of Choice," prepared for the Atlantic Economic Society (AES) Conference, Boston MA, August 1986; revised for the Western Economic Association (WEA) Conference, Seattle WA, June 1991; revised for the International Network for Economic Research (INFER) Annual Conference 2005, London, UK, 8 October 2005
- "Public Policy, Planning Horizons and Organizational Failure: A Post-Mortem on British Canals" (Summary of Dissertation, November 1984); revised for the Western Economic Association (WEA) Conference, Seattle, WA, June 1991; revised for the International Network for Economic Research (INFER) Competition Workshop on "Competition Policy in Network Industries", London, UK, 30 October 2005

Public Policy, Planning Horizons and Organizational Breakdown: A Post-Mortem on British Canals and Their Failure, Ph.D. Dissertation, Stanford University, 1985

"Academy, Society and Personal Growth: Some Thoughts on Our Modern Malaise -- For My Students," *Tufts Meridian*, April 1983; *Bentley Vanguard*, November 1986

"Whither Our Education?" -- A Lament," *Tufts Meridian*, October 1983; *Bentley Vanguard*, April 1986

Democracy in Disarray: The Failures of Stanford's Student Government -- A Call for Structural Change, ASSU Publication, May 1978

"The 'Rand-Polanyi Synthesis' and its Methodological Relevance to Economic Theory," presented at the University of Delaware at Newark's Symposium on Scientific Methodology, November 1977

A Report on Graduate Financial Aid in the School of Humanities and Sciences, jointly published by the ASSU and the Dean of Graduate Studies, Stanford University, November 1976

Competition Theory and the Welfare Optimum: A Methodological Analysis, undergraduate honors thesis, Harvard Economics Department, March 1968

"Value, Exchange and Profit: The Bedrock of Economic Science," *The Freeman*, September 1966; reprinted in two other journals and at least one anthology

PROFESSIONAL INTERESTS

Industrial Organization
Public Policy and Regulation
Transport and Communications

Public Finance and Taxation
Economics of Fisheries Management
Social/Environmental Economics

Productivity/Economic Growth
Technology and Systems Theory
Economic/Industrial History



Fred Jennings