



Community Land & Water Coalition
A Project of Save the Pine Barrens, Inc.
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February 2, 2024

Via email to:

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Massachusetts Department of Energy Resources
Solar Massachusetts Renewable Target (SMART) Program
100 Cambridge Street, Suite #1020
Boston, MA 02114

Re: SMART Review Comments

Dear DOER:

Thank you for the opportunity to comment on the Department of Energy and Resources's (DOER) Solar Massachusetts Renewable Target (SMART) program and its evaluation of potential SMART program improvement. These comments are submitted by Community Land and Water Coalition (CLWC), an non-profit organization whose mission is to protect, preserve and steward the land and water of Southeastern Massachusetts, including the Plymouth Carver Sole Source Aquifer.

Southeastern Massachusetts is ground zero for the state's solar policy and the SMART program gone wrong. Thousands of acres of forest have been and are being clear-cut in our region for ground mounted solar and Battery Energy Storage Systems (BESS). The precise number of acres can be ascertained in the 2023 Mass Audubon and Harvard Forest Report, *Growing Solar Protecting Nature*. Wetlands have been and are being filled for solar projects, and solar panels and BESS are being installed in Riverfront Areas without the required alternatives analysis or regulatory review. "Dual use" on cranberry bogs is an "experiment," according to the state's own studies and the statements of the UMass Cranberry Station and its researchers. Yet, hundreds of acres of bogs are being covered with solar and BESS most with no viable plan for growing cranberries.

Farmland is being "created" by clearcutting forests and denuding the land to site solar, in order to maximize subsidies. We have previously provided DOER with this evidence. Sites include the A.D. Makepeace "Swan Holt" solar project in Carver.

Underneath these arrays lies the Plymouth Carver Sole Source Aquifer, the only source of drinking water for 200,000 people in Southeastern Massachusetts. Before the subsidized solar arrays are built, the land is strip mined of sand, adding to additional profits made by the landowners and solar developers in conjunction with SMART subsidies, creating a recipe for environmental devastation in Southeastern Massachusetts and threatening the drinking water of hundreds of thousands of people. We hope that you will take our comments below on how to reform the SMART program seriously, and implement the necessary reforms before the onset of an environmental disaster occurs.

1. The SMART program currently provides added incentives for certain project types, including building mounted, canopy mounted, landfill, brownfield, agricultural, floating, community solar, and projects serving low income or public entities, projects with energy storage, and axis tracking. DOER seeks additional feedback on changes or improvements that will advance achievement of the Commonwealth's 2050 GWSA mandates while balancing land use, equity, and economic considerations.

A. What project type incentive changes could improve program outcomes?

b. Should other project types also be prioritized?

Incentives (Adders) under the SMART program must be limited to projects on disturbed land and the built environment - only. There should be no incentives for greenfields, forested land, agriculture land or open space.

The Greenfield subtractor must be eliminated and projects not allowed on greenfields. The subtractor of .05 cents per kWh is meaningless given the other financial incentives. The track record shows it is not a large enough financial disincentive to prevent forested, ecologically important, and agriculturally productive lands from being negatively impacted and destroyed for solar.

Solar and BESS projects on forested land, woodland, wetlands, wetland buffers and agricultural lands should be prohibited from participating in the SMART program. SMART incentives should not be provided for projects with BioMap3 areas designated as Core Habitat or Critical Natural Landscape by BioMap 3. The exception for "good cause," which allows for solar development in forests or agricultural land, should be removed completely.

In Southeastern Massachusetts, we have seen the devastating effects of incentivised solar that has deforested and stripped away at our natural resources. The DOER is engaged in de facto land use planning through the SMART solar program distribution of ratepayer subsidies for large solar and battery storage. This is not an appropriate means or method to ensure that solar is properly sited and our climate goals are met.

The results of DOER's de facto land use planning have been a disaster: our coalition is dealing with hundreds of solar projects that have not been properly sited. Solar developers target rural and environmental justice communities who are surrounded by relatively inexpensive land. We are watching volunteers boards spend thousands of hours annually to address all of the siting issue: concerns of abutters about vegetated buffers that protect water, hydrology, battery storage safety and emergency response, recycling of solar panels, and decommissioning; stormwater runoff is a particular concern because these projects completely denude the land, stripping vegetation and stumps and leaving the land in a condition where nothing can grow again in human time, in many instances. See the attached June 22, 2023 comments to the Joint Committee on Telecommunications, Utilities and Energy prepared by Save the Pine Barrens, Inc. See also the May 22, 2022 comments to the Secretary of Energy and Environmental Affairs prepared by Save the Pine Barrens, Inc..

AGSTU gets 6 cents per kWh vs. building mounted solar gets 2 cents per kwh. 225 CMR 20.07. There should be NO adder for so-called "Dual Use" solar on agricultural land. This adder is wrong on many levels. We have seen the debacle of the dual use SMART incentives writ large in Southeastern Massachusetts. First, the reckless installation of thousands of copper chromated arsenic poles in cranberry bogs to mount solar panels. BESS installed on wetlands with no planning or accountability. Clearing of forested land to create farmland for dual use solar, such as the AD Makepeace Swan Holt-REDP project sited above.

There should be NO adder for "floating solar." As shown in the attached MACC presentation, cranberry growers are excavating for sand and gravel, creating man-made ponds claiming this is agriculture and planning to install floating solar. This is a direct result of SMART incentives. These projects mine in the Sole Source Aquifer, federally designated under the Safe Drinking Water Act, with no accountability. Thus the SMART program is threatening and most likely directly contaminating the Aquifer which serves

Likewise, "canopy" solar on agricultural canals should be entirely eliminated. 225 CMR 20.07 provides 6 cents per kWh vs. building mounted solar at 2 cents per kWh. DOER has allowed canal solar on agricultural canals created by diverted streams, which are Waters of the United States. The pristine biodiversity hotspot at Frogfoot Brook in Plymouth is proposed by Makepeace for canal solar. The DOER subsidies are impacting aquatic life, water temperatures

and biodiversity with little or no ecological or environmental review of these canopy and floating solar projects.

13. Are there any Commonwealth policies (e.g., renewable energy goals, land use priorities, housing policy) that you believe the SMART program inadvertently conflicts with? Please describe any potential modifications to SMART that would alleviate these conflicts.

The SMART program conflicts with every local, state and federal law for the protection of the public, health, safety, welfare and the environment that exists. It conflicts with the Safe Drinking Water Act, the wetlands protection act and more. The SMART program is incentivizing the destruction of the environment while claiming to save it by building clean energy.

The state Massachusetts Environmental Policy Act (MEPA) office has created a de facto and illegal loophole from MEPA for solar projects that destroy the environment by claiming that the SMART program is not “financial assistance” and the SMART statements of qualification are not “permits” within the meaning of MEPA. This allows environmental destruction without even so much a cursory look by MEPA.

The SMART regulations never underwent MEPA review and they should have. The magnitude and extent to the destruction of the environment caused by this state program is enormous and ongoing.

The state’s Clean Energy and Climate Plan, page 94, states that the state will need to reduce financial incentives for forest clearing including those for ground mounted solar in order to meet its climate goals. This is a clear directive to DOER to end all subsidies for solar that impacts forests, wetlands and ecosystems. The so-called GHG analysis done for solar are not scientifically defensive. See, Partnership for Policy Integrity Report, attached.

14. Is there any additional feedback you wish to provide to DOER?

The purpose of the SMART program should be expanded to align with findings of new reports and contextualized to recognize solar as part of multi-pronged approach which should be complementary with protection of carbon sequestration/storage and resilience, protection of environment. For instance, in their 2023 report, *Growing Solar, Protecting Nature*, Mass Audubon and Harvard Forest found that:

Massachusetts’ rooftops and parking lots alone could support up to 30 Gigawatts of solar, and sites with low-impacts to nature and farms could support another 25 Gigawatts.

and that

[Massachusetts’] Current solar development trends would cause the loss of 6.3 million metric tons of CO₂ by 2050— roughly equivalent to the annual CO₂ emissions of the City of Boston;

To combat this loss of carbon sequestration associated with solar development, their policy recommendations suggest that the SMART program:

Eliminate state incentives for solar projects on valuable natural and working lands while increasing incentives for solar on rooftops and developed lands

A copy of the report is included for your reference.

Very truly yours,

Margaret Sheehan

Margaret E. Sheehan
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Attachments:

Undated, *Comments to Secretary Kathleen A. Theoharides, Executive Office of Energy and Environmental Affairs, Re: Expanded Environmental Notification Form, March 15, 2021 and May 11, 2021 Supplement, ADM TMUD Wareham Solar Projects, EEA No. 13940-ADM Tihonet Mixed Use Development, Wareham, Plymouth, Carver, Massachusetts*, prepared by Mary S. Booth, Director, Partnership for Policy Integrity

May 23, 2022, *Comments to Secretary of Energy and Environmental Affairs, Re: EEA 13940: AD Makepeace Tihonet Mixed Use Development (TMUD): Comments on Final Environmental Impact Report (FEIR) dated March 30, 2022*, prepared by Save the Pine Barrens

March 4, 2023, Massachusetts Association of Conservation Commission Presentation on the impacts of ground mounted solar: *“Industrial Ground Mounted Solar: Challenges Municipalities Face While Protecting Wetlands, Rivers, Forests and Farmland*. Meg Sheehan, Esq., CLWC.

June 22, 2023, *Comments to Joint Committee on Telecommunications, Utilities and Energy, Re: CLWC-Save the Pine Barrens, S. 2164: An act to allow municipalities to reasonably regulate solar siting: SUPPORT H. 3230: An act to allow municipalities to reasonably regulate solar siting: SUPPORT*, prepared by Save the Pine Barrens

October, 2023, Michelle Manion, Jonathan R. Thompson, Katie Pickrell, Lucy Lee, Heidi Ricci, Jeff Collins, Joshua Plisinski, Ryan Jones, Gabe Kwok, Drew Powell, & Will Rhatigan (2023), *Growing Solar, Protecting Nature*. Mass Audubon and Harvard Forest.



Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114
Via email to MEPA@mass.gov

Re: Expanded Environmental Notification Form, March 15, 2021 and May 11, 2021 Supplement
ADM TMUD Wareham Solar Projects
EEA No. 13940-ADM Tihonet Mixed Use Development
Wareham, Plymouth, Carver, Massachusetts

Dear Secretary Theoharides,

The Partnership for Policy Integrity (PFPI) submits the following comments on the Expanded Environmental Notification Form (“EENF”) EEA # 13940 to the Massachusetts Environmental Policy (“MEPA”) Unit. PFPI’s work focuses on forests and climate, and our involvement in state policy matters has up to this point largely been confined to biomass energy. However, we are very concerned at how the state’s policy on large-scale solar energy appears to be promoting projects that result in net damage to Massachusetts’ forests, and accordingly are submitting these comments on particular aspects of the Wareham solar projects.

General comments on the state’s solar policy

First, this project, and the others going in, represent not a success of the state’s solar energy policy, but a failure. It is shocking to see that the state’s renewable energy policy is actually incentivizing forest clearing for solar. Climate change mitigation is not just about reducing fossil fuel emissions. Climate modeling is crystal-clear that we need to not only reduce emissions, but actually sequester CO2 that has *already* been emitted. Restoring and expanding forests is the only means under our control to achieve this at scale. Accordingly, anything that undermines forest carbon uptake is actively undermining climate mitigation. The state should not have a policy that pits solar against forests. Policies should offer incentives for preserving and expanding forests, not destroying them.

Satellite imagery from Global Forest Watch shows that forest loss in the vicinity of the project is particularly high. Figure 1 shows forest loss just since 2000¹; it doesn’t even include the large amount of conversion to cranberry bogs and other uses from before 2000. In fact, pulling back, this area appears to have one of the highest rates of forest loss since 2000 in the entire state of Massachusetts.

¹ Data from Global Forest Watch at <https://bit.ly/3ukdyc0>

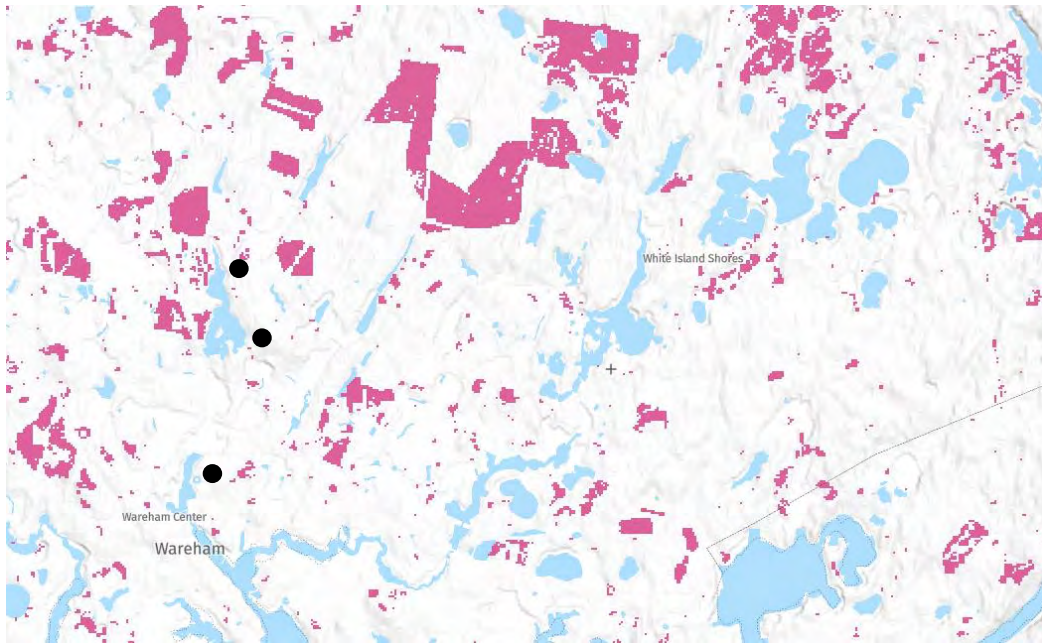


Figure 1. Global Forest Watch overview of forest loss in the area of the project. The three proposed solar fields are marked with black dots.

Regarding this specific project, it is tone-deaf for the EENF to claim (page 11) that *“Furthermore, the Master Plan’s Natural and Cultural Resources Goal 1 is to, ‘Coordinate and strategically implement several ongoing efforts to increase climate resilience in Wareham.’ While the Project will not contribute directly to climate resilience specifically in Wareham, it will advance the Commonwealth’s renewable energy initiatives, which broadly address the issues surrounding climate change.”*

We would argue that any project that causes more forest loss in Wareham is actually undermining the town’s climate resilience.

General comments on the project

These projects are extraordinarily damaging

Using Google Earth to view other solar projects installed in the same area as the proposal makes it evident how damaging these projects are. Removal of forest and land preparation scrapes the soil down to essentially white sand, and even beyond this, further sand mining is occurring. This essentially resets the ecosystem to where it was right after the glaciers retreated. Transpiration from vegetation cools and moistens the air, but the sand pit is a glaring, radiating zone without any ability to affect or modify its microclimate. The subsoil is sterile sand with few available nutrients, meaning nothing much will grow here again in any human timeframe, even after the solar panels are removed. This may be within the owner’s rights – but why is it being subsidized with Massachusetts clean energy subsidies? Approval of the project and receipt of the subsidies should at a minimum be made contingent on the ability to fully restore the site to forest. In few years, these projects are going to be seen as dinosaurs and be viewed with shame for the forest destruction they caused. Assuming a sane climate policy prevails, forest protection and restoration will be prioritized, and solar will be built in places that are already sacrifice zones, such a parking lots, road medians, and perhaps the cranberry bogs of Wareham.



Figure 2. A recent solar and sand mining project in the vicinity of the proposed project (at 41.800214°, -70.703461°)

Comments on the analysis for the proposal

The proposal contains questionable assumptions and analyses in at least two respects – consideration of mitigation for the loss of forests, and consideration of net GHG impacts of the project.

Mitigation of habitat loss

The 2014 certificate on the ENF states, “NHESP indicates that a long term net benefit can be developed through a) permanent protection of appropriate habitat in the vicinity of previously designated conservation areas, and b) providing funding for long-term habitat management to benefit the affected species.”

We wonder if the program would use similar language today. There is no “net” benefit given the accelerating forest loss in the region, as shown in Figure 1.

At page 5 of the March 2021 EENF, it states, “Although portions of the 150 Tihonet Road PV+ES Project lie within identified but unmapped pine barrens habitat, the Proponent is coordinating with NHESP and will undertake appropriate mitigation in the form of conservation lands and habitat funding.”

Even if these minimal set-asides are actually happening, this does not constitute “mitigation” given that the entire pine barrens ecosystem is being obliterated where the solar panels are installed. Setting aside other land for conservation is nice, but there is a net loss of ecosystem that is occurring. There is no “mitigation.”

Other impacts

The loss of vegetation also changes the hydrology of the site. The proponent is developing stormwater retention basins, the planning for which needs to take into account changes in rainfall amount and intensity now underway with climate change. Has this occurred? Does the modeling actually recognize non-stationarity of rainfall?

The ponds already have issues with dissolved oxygen and phosphorous pollution, which is evident with satellite photos that show extensive algae growth. Also, it appears that there is potentially some planting activity planned for the area under the solar panels. We wonder if the project will use herbicides to reduce growth of the meadow? If so, has the potential for water contamination been evaluated, given the sandy soils and the proximity to ponds?

We also note that wetland resources in this rare pine barrens ecosystem are being disturbed. This area of eastern MA has extremely fragile ecosystems. It seems a real failure of state policy, both in terms of MEPA review and in terms of solar incentives, that this project is moving forward and seemingly headed for state approval and even financial support.

GHG analysis

Failure of the state to provide guidance

The 2014 certificate discusses developing a protocol for evaluating GHG impacts, but apparently this has not been done. Why not? There has been plenty of time. There should have been a protocol for the proponents to follow, instead of being left to make it up as they go along. Why is the state so lax on these matters?

Failure to include ecosystem carbon loss

In calculating the GHG “benefit” of the project, the proponent simply ignores the carbon emissions from removing the forest from the site. Why do they assume this is legitimate? It is not, because this is stored carbon. They appear to claim it would only be emitted to the atmosphere if it were burned (page 2 of memo), but in fact even if the trees were converted into long-lived wood products, a significant portion of the wood would be lost right away during processing.

The basic IPCC protocol for assessing emissions impacts of forest clearing treats felling trees as an instantaneous emission of stored carbon, though more refined approaches are possible when data are available. The appropriate protocol to require here appears to be the one for “Other Land”²:

Tier 1

*A Tier 1 method follows the approach in Equation 2.16 in Chapter 2 where the amount of above-ground biomass that is removed is estimated by multiplying the area (e.g., forest area) converted annually to Other Land by the average carbon content of biomass in the land prior to conversion (B_{BEFORE}). In this case, B_{AFTER} in Equation 2.16 is set to zero by default. **The default assumption for the Tier 1 calculation is that all carbon in biomass (less harvested wood products removed from the area) is released to the atmosphere immediately (i.e., in the first year after conversion) through decay processes either on- or off-site.***

Tier 2

² https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_09_Ch9_Other_Land.pdf

A Tier 2 method can be developed and used if country-specific data on carbon stocks before conversion to Other Land (i.e., B_{BEFORE} in Equation 2.16) are obtainable. B_{AFTER} remains at zero. In addition, under Tier 2, carbon losses can be apportioned to specific conversion processes, such as burning or harvesting. This allows for more accurate estimation of non-CO₂ greenhouse gas emissions. A portion of biomass removed is sometimes used as wood products or as fuel wood. Chapter 2, Section 2.4 provides the basic method for estimating non-CO₂ greenhouse gas emissions from biomass burning. Chapter 12 provides guidance for estimation techniques for carbon stored in harvested wood products.

Tier 3

A Tier 3 method requires more detailed data/information than the Tier 2 approach, e.g.,:

- *Geo-referenced disaggregated areas converted annually are used for each land use converted to Other Land;*
- *Carbon densities are based on locally specific information and; and*
- *Biomass stock values are based on inventories and/or the model estimations.*
- *Where data are available, Tier 3 methods may be used to track the dynamic behaviour of carbon stocks and greenhouse gas emissions following conversion. **Where the land remains in a vegetation-free state (due to severe degradation), there will generally be a continuing decline in carbon stocks.** If this is not the case, countries should consider whether the land should be classified under another land use, as indicated in Chapter 3.*

In the case of this project, where stumps and roots will be removed, the loss of biomass carbon is especially notable. The loss of soil carbon is also extreme. According to the data the proponents themselves cite (from EPA), soil carbon can constitute more than 50 - 60% of ecosystem carbon. The total removal of topsoil and the layers of subsoil that are most likely to store soil organic carbon in dissolved forms also needs to be taken into consideration. The state should require the proponents to find data that accurately reflect the aboveground and belowground carbon loss, including from soils, and do the calculation properly.

Failure to include timing of GHG emissions

The proponent draws attention to the future gain of carbon on the site, stating that the calculations are “likely conservative” because they do not include the carbon that will be sequestered in the “meadow” growing beneath the solar panels (to be planted?) and the future carbon sequestration in the forest that will replace the solar panels when the project is decommissioned. These hypothetical impacts are in the future, while the liquidation of site carbon is happening now, just when it is most urgent to reduce emissions. Carbon loss happening in the near term with certainty needs to be valued more highly than future potential carbon gain. Further, it appears that the proponent is actually misrepresenting the developer’s intentions when they say the area will be reforested, because the developer is on video³ as saying that after the “fad” of solar passes, the “junk” will be hauled away and the site will be turned into a housing development.

Sequestration analysis is incorrect

The proponents’ assessment of carbon emissions from the project is confined to estimates of future forest carbon sequestration that will be foregone. They analyze this using two approaches. The first approach uses data they say they obtained from Northeast Survey Consultants, but they do not say what the data are, or how they were obtained, though they do refer to diameter at breast height (DBH)

³ <https://www.youtube.com/watch?v=nh7fnq2y3Sg>

measurements “where applicable.” It is not clear what this means. It is also not clear how the tree volume estimates were made or how they relate to the DBH. The report further makes an error in converting the dry weight to green weight of 72.5%, citing an unpublished online document⁴ with no citations which states, “Taking all species in the table into account, the average tree is 72.5% dry matter and 27.5% moisture.” This is not correct for trees in New England, where moisture content of freshly harvested wood is around 50% and sometimes more.

Given this failure and the proponents’ evident unfamiliarity with protocols for ecosystem carbon assessment, we have no confidence in the approach to calculating increased DBH and volume through time, which uses a “simplified, linear growth rate formula.” They do cite a reference for this approach, but it is not clear if their analysis of forest biomass takes into account the fact that trees with bigger circumference tend to also be taller, meaning their overall volume is greater. In fact, the regression curve that proponents provide for volume/weight (cubic meters) looks very similar to a standard curve of the relationship between diameter and area of a cross-section of a tree (square meters), which if the trunk is circular in cross-section would follow the relationship of “pi-r-squared.” We graphed up that simple relationship (in blue) and overlaid it on the on the proponents’ graph (Figure 3):

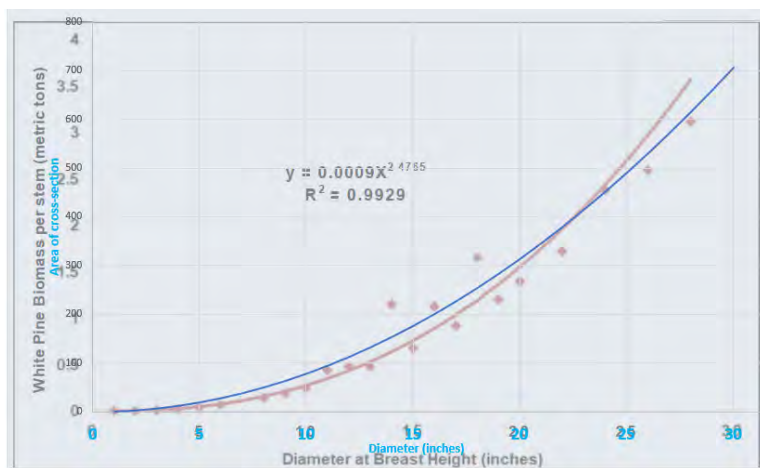


Figure 3. The graph of the relationship between diameter and area (square meters) overlaid on the proponents’ graph of diameter and volume (cubic meters) translated in some unknown way to weight of biomass.

It appears that the proponents’ analysis of biomass per stem does not correctly reflect the overall increase in volume, because it traces a relationship of DBH to stem cross-sectional area, rather than full tree volume. Further, a stem analysis does not really tell much about forest biomass as a whole, unless there is a detailed count of stems per acre, and the analysis includes the volume of stumps and roots. Even with that information, the analysis of carbon *stocks* is incomplete, because it does not include soil carbon. For an analysis of future sequestration (carbon sinks), however, soil carbon may be difficult to quantify.

For a more credible approach, at a minimum the proponents could use the USFS Forest Inventory and Analysis data and tools that the Forest Service makes available for estimating forest carbon stocks and sinks. Additionally, research suggests carbon sequestration by larger, older trees has in some cases been

⁴ https://www.unm.edu/~jbrink/365/Documents/Calculating_tree_carbon.pdf

underestimated, for instance see Stephenson et al 2014⁵ and most recently Leverett et al 2021,⁶ with Figure 1 from that paper reproduced below. While growth patterns from individual trees can not be directly extrapolated to whole stands, the data suggest that the *apparent* “slowing” of growth by older trees is often not reflected in their volume, which continues to increase.

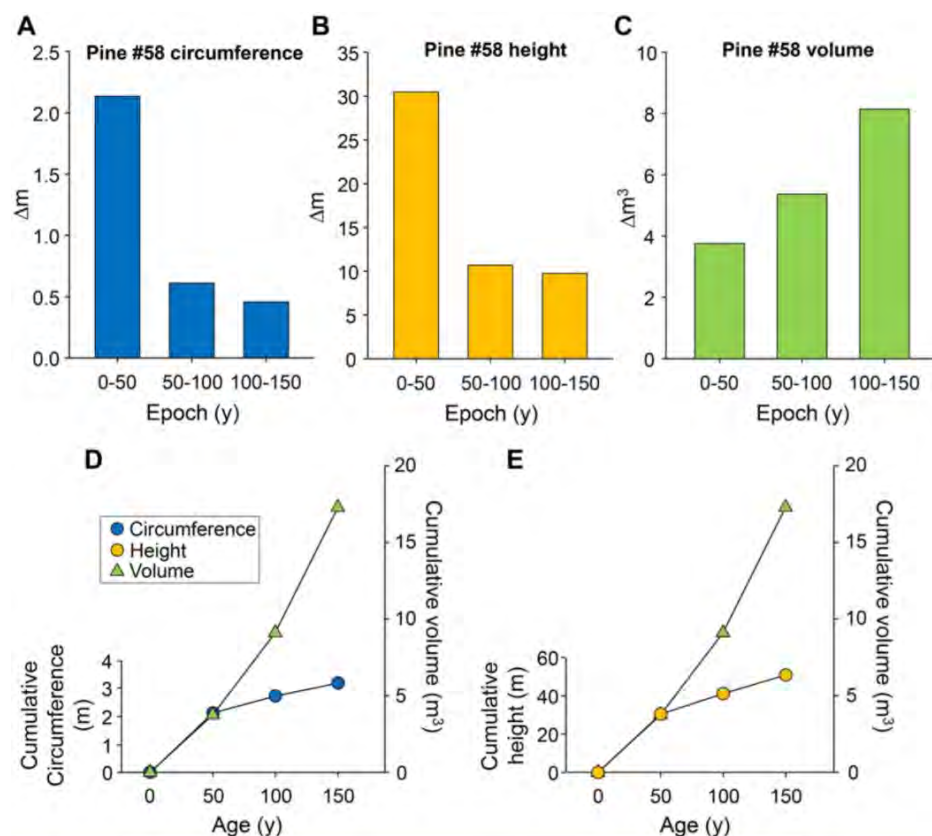


Figure 4, which is Figure 1 from Leverett et al, 2021. *Changes in circumference, height and volume of a stand-grown individual eastern white pine (Pine #58) in three 50-y intervals. Upper panels (A) Change in circumference during 0–50, 50–100, and 100–150 years. (B) Change in height between 0–50, 50–100, and 100–150 years. (C) Change in above-ground tree volume (trunk plus limbs) between 0–50, 50–100, and 100–150 years. Lower panels (D) Cumulative circumference at 50, 100, and 150 years compared to cumulative above-ground volume. (E) Cumulative height at 50, 100, and 150 years compared to cumulative above-ground volume. On each lower panel initial slopes were matched to reflect the rapid change in circumference and height during the first 50-years interval. Note that volume is a proxy for above-ground carbon. Values for circumference, height and volume of Pine #58 were determined by a combination of direct measurement and chronosequence and described in the text and in Supplement.*

⁵ Stephenson, N. L., et al. (2014). "Rate of tree carbon accumulation increases continuously with tree size." *Nature* 507(7490): 90-93. <https://www.nature.com/articles/nature12914#Sec14>. Supplementary information at <https://www.nature.com/articles/nature12914#Sec14>

⁶ Leverett, R. T., et al. (2021). "Older Eastern White Pine Trees and Stands Accumulate Carbon for Many Decades and Maximize Cumulative Carbon." *Frontiers in Forests and Global Change* 4(40). <https://www.frontiersin.org/articles/10.3389/ffgc.2021.620450/full>

The second approach employed by the proponents to estimate foregone sequestration relies on an EPA estimate of forest carbon stocks that includes soil carbon, deadwood, etc. However, the proponents incorrectly apportion sequestration based on stocks, assuming that because living biomass constitutes 31% of the ecosystem carbon, then it must be responsible for the same proportion of active carbon sequestration. If only this were true! If mineral soils added new carbon to stocks at the same rate as living biomass, maybe we wouldn't have a climate crisis (though we'd be up to our eyeballs in soil). In fact among the several problems with this analysis, the proponents have underestimated the amount of ecosystem carbon uptake for which living biomass is responsible, so have underestimated the total ecosystem C sink.

Assumption of fossil fuel displacement is not valid

The entire GHG benefit of the project is based on the assumption that it will displace fossil fuels. The proponents make several statements to this effect. However, for there to be a net reduction in GHG emissions, there does need to be actual, verifiable substitution. Climate warming is a function of the total amount of CO₂ loading, not the GHG intensity of generation. Therefore if solar and other relatively emission-free technology comes online, but the total amount of fossil fuel burning stays the same or increases, there will be no decrease in the amount of CO₂ emitted per year. Yes, it seems likely that fossil fueled electricity generation decreases as solar and wind generation come online and become cheaper, but the other thing that happens is that electricity use increases as consumers become aware that more "green" energy is available, and as electricity becomes cheaper. As electrification increases, for instance of vehicles, overall use will rise, keeping pressure on fossil generators to continue operating. Substitution can only occur if the total amount of electricity generation from fossil sources is capped⁷ - otherwise there is simply additional generation, and no net reduction in emissions. As there is no requirement for fossil generation to be taken offline as new solar generation comes online, there can be no assumption that substitution is occurring – as attractive as this concept appears.

Valuing forests solely as "carbon sinks"

Overall, the very concept embodied in the EENF, that forests are valued in this context solely for their ability to sequester carbon is, frankly, insane. Yes, it is probably possible to calculate a GHG "benefit" to building the solar field and replacing forests, making dubious assumptions as the proponent does. In that case, why not clear all the forests in Wareham? Isn't that the logical outcome of such calculations? Perhaps the state should provide incentives to remove *all* the forest in eastern MA and replace it with solar – then we could claim even more GHG "reductions."

The obvious absurdity of that suggestion indicates that there is some scale at which this policy of allowing forest removal for solar no longer makes sense. To us, it seems obvious that this point has already been reached. Forest loss occurring for any reason is hugely counterproductive for ecosystem values and climate alike; clearing forests for solar, specifically, when there are so many alternative places it could be built, is repugnant.

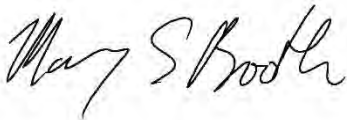
⁷ Leturcq, P. (2020). "GHG displacement factors of harvested wood products: the myth of substitution." Scientific Reports 10(1): 20752. <https://doi.org/10.1038/s41598-020-77527-8>

Decommissioning should include reforestation

The proponent states that funds are set aside for decommissioning. In fact, given the current rapid rate of forest loss in the region now, we suspect that in the future, the highest use of the site will be as forest. Accordingly, the decommissioning cost should include reforestation as a value to society. There is precedent for this – for instance, the landowner has currently been benefitting from Chapter 61, which is a program that reduces taxes because of the public benefit of keeping land in forests. Making approval of these projects and receipt of publicly funded renewable energy subsidies contingent on future mitigation back to the natural state is completely reasonable. At a minimum, state officials should require real mitigation, which returns the land to its natural forested state, as a condition for approval. If this can not be assured, the project should not be approved. Ideally, the state should change its policies and stop approving any so-called “green” energy projects that rely on clearcutting, and in this case obliterating, the natural ecosystem. In the case of this particular project, it seems likely this area will functionally be a waste land, and that forest regeneration will be paltry, if it occurs at all, due to sandy soils that will be rendered even more nutrient-poor with removal of topsoil and sand mining.

Thank you for the opportunity to comment.

Mary S. Booth, PhD
Director, PFPI

A handwritten signature in black ink that reads "Mary S Booth". The signature is written in a cursive, flowing style.

May 23, 2022

Beth Card
Secretary of Energy and Environmental Affairs
Commonwealth of Massachusetts
Boston MA 02108
Submitted via MEPA Public Comments Portal

Re: EEA 13940: AD Makepeace Tihonet Mixed Use Development (TMUD): Comments on Final Environmental Impact Report (FEIR) dated March 30, 2022

Dear Secretary Card:

Save the Pine Barrens, Inc. (STPB) submits these comments on behalf of itself and its members and affiliates including Community Land and Water Coalition on the Final Environmental Impact Report (FEIR) submitted by Beals+Thomas (BT) dated March 30, 2022 for ADM Development Services LLC (ADM). The FEIR purports to form the basis for the MEPA “close out” of the 2007 Special Review Procedure for the ADM Tihonet Mix Use Development of 6,100 acres in Plymouth, Carver and Wareham.

These comments show the inadequacy of the FEIR and MEPA review for the TMUD development and request that the Secretary retain jurisdiction and take the actions requested below. The maps and photographs provided here are only a sampling of what is publicly available to MEPA to see the Damage to the Environment in the TMUD area from ADM’s commercial mining, trucking and dumping covered up with industrial solar energy facilities and cranberry bogs.

This letter also serves as a notice of intent to commence an action or proceeding on behalf of STPB and its members alleging that the FEIR and prior MEPA review fail to comply with G.L. c. 30, Sections 62-62G because they do not describe:

- The “nature and extent” of the Damage to the Environment and its environmental impact,
- The adverse short term and long term environmental consequences that cannot be avoided, and
- Reasonable alternatives to the project and environmental consequences.

This notice is timely and is given within 60 day of issuance of notice of the FEIR under G.L. c. 30, Section 62C. Said notice was given in the April 8, 2022 Environmental Monitor. This notice identifies with particularity the issues to be considered in any such action or proceeding. A copy of this notice is being provided to the Attorney General and project proponent ADM.

The Form for the notice of intent to commence an action or proceeding is submitted as a separate document.

Under G.L. c. 30, Section 62H, the action or proceeding to be commenced will seek, inter alia, a judicial determination that ADM has “knowingly concealed a material fact or knowing submitted false information in a form or report required under sections 62 to 62H.”

Thank you for the opportunity to comment. Please contact us to obtain any further information.

Very truly yours,

Save the Pine Barrens, Inc.

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May 23, 2022
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Introduction

The silent environmental crisis of sand mining and the TMUD

Underlying the thin veneer of ADM's "TMUD" smart growth, open space and "clean energy" solar development is a legacy of unregulated, uncontrolled and environmentally disastrous aggregate mining and processing causing unmitigated and unreviewed Damage to the Environment. This is the state's largest environmental crisis perhaps in its history, other than maybe the Pilgrim Nuclear Power Plant and its spent nuclear fuel.

The impacts of ADM's sand mining are being ignored. ADM is contributing to the "silent environmental crisis" of industrial sand mining happening globally. The United Nations Environment Program in April 2022 [issued a global warning](#) about the massive, unregulated destruction caused by sand mining. And it is happening right here in the TMUD area where ADM is mining its "vast reserves" of "Carver sand" - a global commodity. See, www.readcustomsoils.com (Read is ADM's affiliate in Carver that sells the sand). The world faces a shortage of the type of silica sand ADM is mining. Its removal from the aquifer is harming our drinking water.

MEPA jurisdiction extends to at least 2032 over the entire TMUD area

The SRP cannot legally be closed out as ADM requests. The SRP itself, coupled with irrefutable facts about Damage to the Environment never reviewed, requires MEPA to retain jurisdiction. ADM cannot so easily evade accountability for past and ongoing failures to disclose, assess, provide alternatives to and mitigation for prior and ongoing Damage to the Environment, including the impacts of sand mining.

The SRP jurisdiction extends until at least 2032 according to its terms and covers all work within the TMUD area that is likely to cause Damage to the Environment. The January 29, 2007 *Certificate of the Secretary of Environmental Affairs Establishing a Special Review Procedure* defined the "Project" as "the development of a 6,000 acres in the towns of Wareham, Carver and Plymouth" to occur "over the next 25 years or more" (2032 at least). G.L. c. 30, Section 62 (definition of "project").

MEPA and ADM have consistently defined "the Project" in this way for the last 15 years. See, for example, 9/12/2008 Draft Record of Decision by EEA ("The project is proposed as a phased development over the next 25 years or more...The Phase C development [4,910 acres in the towns of Carver, Plymouth and Wareham] will likely include agricultural, mixed use residential, village scale retail, with remainder to be held as conservation land.")

The TMUD uses have invariably been defined as residential, commercial, light industrial, and open space. MEPA review documents have consistently stated that the types of uses may vary – but MEPA has never said ADM gets an off ramp if it unilaterally decides that it does not want some uses reviewed as it is doing with the FEIR.

ADM is seeking to evade scrutiny of its industrial sand mining operations, destruction of historic resources, removal of vast quantities of sand and gravel that protect the Plymouth Carver Sole Source Aquifer and other Damage to the Environment it has tried to hide, cover up (literally and figuratively), and greenwash under the ruse of “clean” renewable energy generating facilities built on land that is the ancestral Wampaoag homelands, once forested, globally significant for biodiversity and that served the climate resilience needs of the region.

The Aquifer serves as the sole source of drinking water for 7 towns and part of an 8th town. The region is consistently among the fastest growing in the state by population and demand for services such as safe drinking water. Areas around the TMUD are already contaminated with PFAS and ADM’s own landfill located in the heart of the TMUD could be a likely source of contamination. Yet, surrounding the landfill, ADM has stripped off at least 10 million cubic yards of sand and gravel and removed the forests and vegetation that once filtered that groundwater.

The Project area is the unceded ancestral territory of the Wampanoag people who have been excluded from meaningful opportunities for review and comment on work that has destroyed and continues to destroy sites, artifacts and lands with significant historic and cultural value to these people. The significance of the entire TMUD Project was explicitly acknowledged by Massachusetts Historical Commission as recently as 2020: “The archeological reconnaissance survey conducted in 2007 for the overall ADM project indicates that the project impact area is archaeologically sensitive.” 10/30/2020 Letter from MHC to Borrego Solar for ADM Makepeace solar project in TMUD area. ADM has ignored and manipulated the MHC review process and cut the public out. The SRP has failed and continues to fail to provide meaningful opportunity for public input and comment for the Wampanoag people.

Required mitigation for past Damage to the Environment is incomplete, as ADM admits. The state’s Environmental Justice policy is being ignored, and cumulative impacts have not been assessed.

The FEIR continues ADM’s tired refrain that ground mounted solar (preceded by industrial sand mining, logging and often dumping) is a better environmental outcome than residential subdivisions that require wastewater disposal, water usage, and traffic, to quote ADM CEO Jim Kane (Wareham Week 5/20/2022). This is a baseless claim contradicted by the CEO’s own statements. Strip mining and hauling away tens of millions of cubic yards of sand and gravel and denuded forested lands and rendering them sterile removes groundwater protection. The FEIR and Kane fail to mention ADM’s apparent onsite sand washing that extracts unknown volumes of groundwater for industrial processing. Or the unaccounted truck traffic - some 900,000 tractor trailers - needed to haul off the estimated 24 million cubic yards of sand and gravel removed to date – and that is likely an underestimate. Those trucks contained the state’s environmental and cultural heritage - historic resources, unique pine barrens trees, carcasses of globally rare animal species, and soils that took 30,000 years to build up.

The FEIR and MEPA review to date is unsupportable, incomplete and deficient. ADM’s attempt to obtain MEPA’s rubber stamp violates the fundamental precept of MEPA environmental review of transparency, accountability, and public participation in review of the impacts of large development projects. Indeed,

this is one of the largest, if not the largest development project in MEPA history by land acreage, duration and Damage to the Environment. ADM failed to conduct proper scoping for work on the Project, MEPA failed to do site visits, and ADM violated mandates for public participation and involvement.

The record shows that ADM attempted to evade, minimize and hide Damage to the Environment from the beginning of the SRP to the current day, with devastating, avoidable and unmitigated impacts to the environment. ADM's industrial scale aggregate mining operations have been swept under the rug and the impacts on the Plymouth Carver Sole Source Aquifer completely ignored.

Requested Findings

STPB requests that the Secretary find:

- ADM has knowingly concealed material facts and/or knowingly submitted false information in forms and/or reports required under MEPA, G.L. c. 30, Sections 62 to 62H;
- A special investigation by an independent qualified team of experts paid for by ADM is required to assess the nature and extent of the Damage to the Environment by ADM's earth removal operations in the TMUD area, including an audit of the volume of earth removed and the impact on the Plymouth Carver Sole Source Aquifer;
- Site visits and in person consultations with community members knowledgeable about the history, ecology and nature and extent of ADM's Damage to the Environment is required to fully and accurately ascertain the damage and necessary mitigation;
- In person consultations with the Wampanoag Nation and full disclosure of damage to historic resources is required, and a full consultation under the National Historic Preservation Act, Section 106 will be held for the cumulative damage to Native American cultural resources;
- No further work in the TMUD area will occur until there is free, prior and informed consent by the Wampanoag Nation and full compliance with MEPA's Environmental Justice Policy;
- The FEIR and prior MEPA reviews do not adequately assess the nature and extent of Damage to the Environment;
- ADM has undertaken "Expansion" of the Project within the meaning of 301 CMR 11.02, failed to disclose Damage to the Environment from expansion, and must file Environmental Notification Forms (ENF), draft and final EIR for each aspect of the expansion;
- ADM has improperly segmented the Project, withheld information from MEPA, state agencies, local boards and committees, undermined Section 61 findings and undermined consideration of

“positive and negative short-term and long-term potential environmental impacts for all Phases of a Project” and the “cumulative impacts of a Project.” 301 CMR 11.01(d) and 11.02(c);

- ADM has violated the Special Review Procedure, 301 CMR 11.09;
- ADM must file a new ENF and draft EIR containing a “reasonably complete and stand-alone description of the Project and all work in the TMUD area, and its alternatives and assessment of its potential environmental impacts and mitigation measures,” with the “depth and level of description and analysis that reflects “the status of the Project planning and design, the type and size of the Project...the availability of reasonable alternatives and methods to avoid or minimize potential environmental impacts, and the opportunity to assess environmental impacts and to identify appropriate mitigation measures.” 301 CMR 11.07(3) and (6); and
- The FEIR fails to contain Section 61 Findings from Massachusetts Historical Commission (MHC), Massachusetts Division of Fish and Game (DFG), Massachusetts Natural Heritage and Endangered Species Program (NHESP); Massachusetts Department of Environmental Protection (DEP), and possibly others, as required by 310 CMR 11.12(2).

I. MEPA must retain jurisdiction over Project review because work is ongoing, more is planned and the SRP has not expired

In 2006, ADM sought the benefit of a SRP, essentially “MEPA lite”. To get the SRP, ADM claimed benefits to itself, the public and MEPA. The SRP was supposed to “ensure that the cumulative impacts of the Development are documented in a timely manner, while allowing for more detailed review of individual components of the Development in review documents for each proposed phase of the Development.” (Emphasis supplied.)¹ Under the SRP, any and all development work in the TMUD area likely to cause Damage to the Environment is subject to MEPA jurisdiction.

The 2007 SRP Certificate adopted every aspect of ADM’s request, sanctioning MEPA lite through at least 2032 for the entire 6,000 acre “Development.” The Certificate states, “Upon completion of the MEPA review of the final development phase, a Certificate on the Final EIR for the entire 6,000-acre project site (referred to as Phase C in the Request for a SRP) will be issued.” Page 5.

¹ G.L. c. 30, Section 62A provides for a SRP: “in the case of a major and complicated project the secretary of environmental affairs, with the agreement of the agencies and persons who are proposing, providing financial assistance for or issuing permits for a project subject to sections sixty-two to sixty-two H, inclusive, may establish a specific procedure for evaluation and review of the environmental impacts of said project.”

Under the SRP, the Project in its entirety is subject to “Area-Wide Review” under 301 CMR 11.09(4). The purpose of review for an Area Wide project is “to assist a Proponent in establishing a future baseline in relation to which a Project and its alternatives can be described and analyzed and its potential environmental impacts and mitigation measures can be assessed.”

The FEIR provides no measurement of the Damage to the Environment against the benchmarks described in the 2009 TMUD baseline documents. It provides no description of the alternatives other than comparing solar to residential. Mitigation measures are non-existent, incomplete and for work never reviewed, mitigation was never even proposed.

MEPA jurisdiction for the SRP is broad and based on numerous agency permits and state financial assistance. A MEPA 2009 NPC Certificate lists state permits, stating the “project is undergoing environmental review because it requires state Agency Actions and exceeds MEPA review thresholds for a mandatory EIR.” The Certificate further states that because the “project involves financial assistance from the Commonwealth, MEPA jurisdiction is broad and extends to all aspects of the project likely to cause Damage to the Environment.” Now, ADM claims there is no MEPA review for certain types of work in the TMUD area - a position contrary to the Certificate which says any work that causes Damage to the Environment is subject to MEPA review as part of “the Project.”

The FEIR and prior MEPA reviews have never disclosed any Financial Assistance ADM received for development of the TMUD, including any agricultural subsidies. All of ADM’s solar projects approved by DOER are made possible only by DOER’s Financial Assistance. DOER “statements of qualification” for ADM’s SMART solar projects are state permits and Agency Action granted subject to conditions and revocation for violations. Therefore all of the solar projects have obtained Financial Assistance and Agency Action has been taken triggering MEPA review independent of the SRP.

Whether an individual “phase” of the Project requires Agency Action or Financial Assistance, or meets a threshold is, however, irrelevant: ADM consented to MEPA jurisdiction, the Secretary in 2009 found MEPA jurisdiction is broad and extends to any and all any activities within the 6,000+/- acres of the TMUD geographic area that are likely to cause Damage to the Environment. ADM’s self-serving claim in the FEIR that “the SRP was never intended to create jurisdiction where it did not exist” belies and contradicts its own 2006 SRP request for MEPA lite and is contrary to the broad jurisdiction announced by the Secretary in 2009.

II. The FEIR fails to disclose ongoing work, long term plans, and new projects that have commenced

MEPA should not let ADM off the hook by closing out the SRP because the Damage to the Environment from past and ongoing work has never been disclosed to MEPA as required by MEPA and the regulations. See, e.g. 301 CMR 11.07(3) and (6). STPB brought this to MEPA's attention in 2021, by filing two Notices of Project Change under the MEPA regulations requesting that the Secretary determine that ADM knowingly and/or inadvertently concealed material facts and/or submitted false information during MEPA review, and has segmented the Project. 301 CMR 11.10(5). STPB submitted detailed factual information about the nature and extent of undisclosed material facts and/or false information. MEPA denied STPB's NPC requests without any legal or factual grounds.

MEPA itself can easily observe the Damage to the Environment in the TMUD by doing a site visit, but it has refused to make such a visit. MEPA can also observe the Damage to the Environment by accessing MassMapper, the state's own GIS system, or accessing aerial images, photographs and maps on the [YouTube Channel](#) of Save the Pine Barrens showing unaccounted for work causing ongoing Damage to the Environment in the TMUD area. The FEIR is incomplete for all of the reasons cited in STPB's NPC filings, by these images and videos, which are incorporated by reference herein.

A. New work commenced without MEPA filings

Public records disclose ADM's plans for continued, new development in the TMUD area, destroying the credibility of its claims in the FEIR that future development is uncertain. This work is likely to cause Damage to the Environment and subject to MEPA review – another reason why the SRP cannot be closed out.

1. New solar and battery storage projects

It appears, based on best available information (not anything disclosed by ADM) that Eversource has approved the following new solar projects for the TMUD area:

- Wankinko Federal Road Carver Solar, 4.99 MW PV in Carver applied for on August 3, 2021, project ES-21-G35, approved by ISO in 2021.
- Frogfoot Tihonet Road Wareham Solar, 4.5 MW PV facility in Wareham, project ES-21-G68, approved by ISO September 21, 2021.
- Old Orchard Tihonet Road Wareham Solar, 2.25 MW solar PV, project ES-21-G-67 applied for in August, 2021 and approved by ISO 9/23/21.
- Possible expansion of TMUD Phase C8 Hammond Street, Carver solar project, and
- Possible expansion of TMUD Phase C6 "Golden Field" 59 Federal Road, Carver solar project.

Details about these six projects are on the ISO-NE website.² See, e.g. <https://www.iso-ne.com> proposed plan application status list at <https://www.iso-ne.com/system-planning/transmission-planning/proposed-plan-applications>

In addition, ADM and Borrego Solar have commenced planning for a ground mounted solar project on an 11.6 acre parcel on Jordan Road in the TMUD area as documented in a October 13, 2020 letter from Brona Simon, State Historic Preservation Officer, Executive Director, State Archeologist, Massachusetts Historic Commission to Zak Farkas, project manager for Borrego Solar. The letter describes how Borrego has submitted a Project Notification Form for the project to MHC, on ADM land, “immediately adjacent to the 140 Tihonet Road South solar array within the overall ADM Tihonet Mixed-Use Phase C Development.”

These public records show ADM has engaged in at a minimum “initiation of any preparatory phase of the Project” within the definition of “Commencement of a Project” under MEPA.

The MEPA regulations define “Commencement of a Project” to include, “initiation of any preparatory phase of the Project, including any action or expenditure of funds on the financing, marketing, or development of the Project.” 301 CMR 11.00. “Expansion” is defined as “any material increase in Capacity, demand on infrastructure, or physical dimensions of a Project or frequency of activity associated with the Project.” (Beals+Thomas acts as ADM’s permitting consultant for solar projects and it is implausible that BT does not know about these projects in the TMUD area.) Further, these projects constitute an “expansion” of the TMUD project as they are a material increase in Capacity of ADM’s solar projects, expand the physical dimensions and acreage within the Project and the frequency of activity associated with the Project.

FEIR misleads MEPA and the public about ADM’s future development plans in the TMUD area in an effort to evade MEPA review. For example, the FEIR states,

“No new projects are proposed **as part of this filing.**” FEIR Section 1.1 (Emphasis supplied)

“**While it is possible** that ADM will consider other potential projects within the TMUD **at some point in the future, such projects are not part of any present planning** and may simply never occur. For that reason, such possibilities are not included in this FEIR. Should the Proponent decide to pursue any new jurisdictional projects in the TMUD that trigger MEPA review at any point following closure of the SRP, the Proponent will coordinate with MEPA.” (Emphasis supplied)

“New small- to mid-scale renewable energy projects **may be developed in the future in the Phase C BDOD and elsewhere in Phase C.**” Section 1.1.2. (Emphasis supplied)

These misleading statements are grounds to reject the FEIR as incomplete.

² ADM also plans another large solar project on bogs and upland it owns on Maple Springs Road. Maple Springs Solar and Battery project, Wareham. 4.99 MW solar, project ES-21-G73.

2. Carver Cell Tower

In 2021, ADM sought approval from the Town of Carver to install a cell tower on its Read Custom Soils “blending facility” on Federal Road in the “Phase C1” TMUD area. ADM failed to disclose this in the FEIR. See, comments to Town of Carver, December 2021 included with these comment. While apparently expanding the uses in the Phase C1 area ADM has apparently not completed the Transfer of Development rights or other mitigation for this area. MHC issued an archeological survey permit for the cell tower and issued a review letter.

B. Long term impacts of multi-phase development

The FEIR and EENFs filed to date fail to describe the nature and extent of the Damage to the Environment caused by ADM’s TMUD large ground mounted solar projects (including Phases C 3, 4, 7, 8, 9, 10, 11 and 12). The solar projects are only one phase of the development at each site. In some cases, the land has been used first for a multi-year aggregate mining operation, as described below. Second, the land has been leased for 20 years to a solar company. Then when the solar infrastructure is removed, ADM will use the land for purposes such as residential subdivision according to ADM’s CEO Jim Kane.

301 CMR 11.07(6)(e) requires an EIR to describe the object of the Project, contain a timetable, methods and timetable for construction of the Project. Neither the FEIR nor any other MEPA review contains a timetable for ADM’s multi-step and multi-phase development of the solar sites and the Damage to the Environment associated with each step. Some of the ground mounted solar projects are already installed and may come to the end of their 20-year life before the soonest date of SRP expiration in 2032. This multi-step development and the associated Damage to the Environment must be reviewed under MEPA.

ADM’s multi-phase plans for the TMUD solar sites was described in 2016, by ADM CEO Jim Kane when he publicly explained to the Wareham Planning Board his company’s timetable for the TMUD solar developments:

“Well, that’s access for the parcel on which the solar field is located today..say the lease comes up in about 20 years, solar’s a another fad gone by, the solar company pulls all of its junk out of there and then we come in for a subdivision road way that comes [from the] two points and accesses something in the back. That’s all just looking ahead.”

Available at: Save the Pine Barrens You Tube, [“AD Makepeace Company CEO Jim Kane on solar.”](#)

The FEIR contains major misrepresentations claiming that the “significantly reimagined” TMUD that replaces residential, commercial and light industrial use with industrial scale energy generating facilities followed by housing subdivisions are a “lower impact use”. It notes that replacing residential and commercial development “in favor of the approved solar and agricultural uses reduces Phase C wastewater generation and commensurate nutrient loading from sewage disposal systems, as well as other environmental impacts associated with traffic, roadways and impervious surfaces.” FEIR Section

1.4. Neither the FEIR nor the EENFs for the solar projects describe the Damage to the Environment from the work to be done to replace the solar “junk” with residential subdivisions that will generate the very wastewater, nutrient loading and impervious surfaces” ADM claims the solar project avoid.

The FEIR fails to contain an accurate and complete description of the second or third phase of the project (depending on whether aggregate mining has been done first) which includes the impacts of subdivisions and roadways. The Secretary must find it inadequate.

III. Project development has departed significantly and materially from the SRP

ADM’s commitment to the SRP was a public promise to do what it described in its SRP application in exchange for “MEPA lite” review. ADM has reneged on that promise, duped MEPA and is engaged in Damage to the Environment on a massive scale in the most ecologically sensitive and significant area of the state, and indeed a global biodiversity hotspot.

The 2007 Certificate stated “the Proponent intends to “replicate the traditional New England village development in a manner consistent with villages in the project area.”

No such thing has occurred. Instead, the globally rare ecosystem has been decimated by ongoing strip mining, deforestation for large scale industrial solar greenwashed as a climate benefit, dumping, and industrial sand and aggregate processing.

This is a drastic change from the mixed use, multi-year Village concept (some of which was built and which itself appears to be preceded by strip mining).

ADM’s bait and switch deprived EEA of the opportunity to review the decisions and actions at the time with the result that new and different projects were done without adequate review by or input of the MEPA Unit and the public - and sometimes with no review at all. This disadvantaged the MEPA Unit and cut out the public. Now the company is seeking an off-ramp from MEPA without ever reviewing new phases that have been commenced but not yet constructed and that are being hidden (such as proposed solar projects) and work that was never disclosed at all like industrial sand mining at the Carver sites. These are described below.

A. Carver earth removal sites disguised as agriculture and wrongfully commenced without MEPA review

The SRP procedure and multiple MEPA certificates say future Phase C development will include “agricultural projects.” Now, ADM claims three new mining projects – disguised as agriculture - are exempt from the SRP.

FEIR Section 1.1 identifies “three active Earth Removal Permits” for ADM’s commercial earth removal operations in Carver. STPB brought these industrial operations to MEPA’s attention in the July 2021 NPC which wrongfully MEPA rejected.

The FEIR claims this commercial mining is outside the because there is Agency Action triggering MEPA jurisdiction and “such activities were undertaken in accordance with agricultural rights and exemptions and consistent with local bylaws.” ADM is wrong on both counts.

First, this work is development within the TMUD area (see Section 1 above) and is causing Damage to the Environment and the SRP applies. The SRP is not limited to work that requires Agency Action or Financial Assistance because the entire Project triggered MEPA.

Second, even if Agency Action or Financial Assistance is needed to trigger MEPA jurisdiction, there is Agency Action here. MHC has issued archeological survey permits and concurrence letters for the three Carver earth removal projects ADM claims are exempt.

NHESP issued a permit for the 46 Federal Road work. At all three sites it appears groundwater is or has been withdrawn from the aquifer sand washing operations, possibly triggering the Water Management Act.

Third, there is no “agricultural exemption” in MEPA as ADM seems to imply in the FEIR. ADM used the ruse of “agricultural projects” to obtain earth removal permits from the Town of Carver and in an attempt to dupe MEPA again in the FEIR. Commercial earth removal under the pretense of agriculture is an outdated, indefensible ruse ADM successfully used to dupe MEPA in 2011 and 2012 obtaining Phase C1 and Phase C3 MEPA Certificates for commercial mining extraction of over 9 million cubic yards of sand and gravel (worth about \$36 million, dwarfing revenues from the alleged cranberry bogs that have never been built). This was a ruse then and it is now.

Fourth, it appears that ADM is planning to install ground mounted solar projects all three sites, based on the project descriptions provided by Eversource and cited above.

Further details about these three mining projects are below.

1. 46 Federal Road, Carver mining site - Phase C 1 “Wankinko Bog” expansion

The FEIR gives an erroneous and misleading description of ADM’s commercial mining and processing operation at 46 Federal Road at the intersection of Cranberry Road and Federal Road.

First, the plans for Phase C1 in the NHESP CMP take permit # 011-183 purporting to authorize the destruction of 27 acres of Eastern Box Turtle habitat is the same location where ADM is conducting this mining operation. See, CMP permit 001-183, DFW, Attachment A, Project Site Plan. The FEIR admits the “authorized limits of earth removal overlap with the limit of work for the Phase C1 Wankinko Cranberry

Bog Expansion previously reviewed by MEPA.” FEIR Section 1.1. “Overlapping” means the work is in the Phase C1 area and it is therefore subject to MEPA review under the SRP.

Second, since this is in the Phase C1 area, there must be an accurate accounting of the volume of sand and gravel extracted and sold commercially. The FEIR claims that the volume is “up to 945,200” cubic yards. This is less than half of what the earth removal permits actually say – numerous rubber-stamp Carver permits show over 2,385,000 cubic yards at this location.

Third, the agricultural ruse for sand mining here is exposed in multiple documents and records. In 2011 and 2017 ADM submitted the same recycled cranberry bog plans to Carver as a ruse to obtain earth removal permits which were unlawfully granted and extended based on the misleading permit applications. The cranberry bogs have never been built some 12 years later. The FEIR claims the earth removal is being done “in advance of agricultural uses.” FEIR 1.1, the same argument it has used since 2010 in multiple MEPA reviews and EENFs. The agricultural projects are not built and ADM’s claims are not credible. This appears to be the location of the “Wankinko” solar site approved by Eversource. See, Wankinko Federal Road Carver Solar, 4.99 MW PV in Carver applied for on August 3, 2021, project ES-21-G35, approved by ISO in 2021, described above. MEPA review must include this proposed use of the Phase C1 area.

Earth materials extracted from this site supply Read. ADM customers also routinely pick up sand and gravel from the site directly. (source: eye witnesses, 2021, 2022, Carver earth removal records).

Fourth, the prior MEPA review for Phase C1 is inadequate and fails to assess the nature and extent of the ongoing Damage to the Environment. There has never been an EIR for this massive project. The 11/12/2010 MEPA Certificate says ADM’s “bog expansion” here would “take approximately five years to complete and will result in 32 acres of land alteration and up to 100 truck trips per day during the construction period...The bog expansion is located within potential endangered species habitat and within an area considered to be highly sensitive for archeological resources.” The FEIR, in Section 1.2.3.1 admits the cranberry project is not built. (The “Wankinko Cranberry Bog expansion area has been cleared and the cranberry bog system **will be built**...”) ADM has had over 10 years to build the bogs and instead of doing so it has expanded earth removal operations throughout the 539 acre Phase C1 area and has clear-cut forested MESA endangered species habitat, likely destroyed a significant ancient Native American historic site and is conducting an industrial mining operation with hundreds of truck trips per day hauling sand and gravel. The work has expanded to at least 47 acres, 10 acres beyond what was reviewed in the 2010 Certificate

Impacts not described in the Phase C1 9/22/2010 ENF for Phase C1 and not addressed in the FEIR include (these same issues are relevant to all work within the TMUD area).

- Truck traffic, emissions, and noise impacts The FEIR fails to address the non-stop truck traffic and industrial equipment operations at the Phase C1 site going on since at least 2010. There is no

credible documentation of the actual truck traffic, as opposed to the fictional number cited by the FEIR based on the illegal and expired Carver Earth Removal Permit. The Vanessee & Associates (VAI) draft Jan. 2022 traffic study with the FEIR is wholly deficient (see Cumulative Impacts section below). Neither the FEIR or prior MEPA reviews account for the daily diesel emissions from constant operation of logging, excavation, material processing and sorting and other industrial equipment or the constant truck traffic.

- Historic impacts MHC identified the Phase C 1 work area including the current expanded mining area as potentially eligible for listing on the National Register of Historic Places, and “highly sensitive” archaeologically. The 11/12/2010 MEPA Certificate for Phase C1 states “The Proponent has indicated to the MEPA office that the project will be designed to avoid the Wankinko Bog Site and find spots. The Proponent should continue consultations with MHC” regarding protection of significant cultural resources. MHC’s 10/29/2010 review letter recommended a site examination if the ancient archeological sites could not be avoided. The FEIR and prior MEPA reviews do not answer these questions:

Has ADM destroyed the historic site that is/was potentially eligible for the National Register?

What has ADM done to “avoid the Wankinko Bog Site and find spots”?

Have ADM, MHC and MEPA consulted with the Wampanoag Nation about the potential destruction of this significant archeological area?

Has the NHPA Section 106 consultation been done?

Where is the record that ADM took the actions requested by MHC in the 10/29/2010 review letter?

- Impacts to endangered species, priority habitat and BioMap2 habitat, MESA listed plant and animal species On 6/9/2011, NHESP issued take permit 001-183 for Phase C1. The area is now obliterated. The permit expired at least twice and has been extended with no explanation of how the conditions of the permit can be implemented on an obliterated site.

The FEIR and prior MEPA reviews do not answer these questions:

Where is the record of inspections required by the CMP?

Where is the notice of start work?

Where are records of compliance with the Oxbow Consulting Turtle Plan for the site?

Have all CMP conditions been followed?

Where did ADM disclose to MEPA the status of the permit, its expiration and compliance with terms and conditions that are supposed to mitigate Damage to the Environment under MEPA?

What are the cumulative impacts on endangered and listed species from ADM’s work in Phase C1 and the other TMUD phases in the Project area?

Where is the NHESP Section 61 finding?

- Impacts on groundwater, surface water and water bodies. ADM's 12 year industrial mining work at the Phase C1 site has altered topography and removed groundwater protection. The following questions are not addressed in the FEIR or prior MEPA reviews:

Where is an analysis of the changes in topography caused by ADM's aggregate mining operation on water drainage and stormwater?

What is the volume of earth materials removed at this location?

What is the impact of removing the volume of earth at this site on protection of groundwater?

What is the impact of removing earth at this site on groundwater quality and quantity?

How many trees were removed?

How much top soil was removed?

What is the impact on the Atlantic Coastal Pine Barrens ecosystem viability of removing Pitch Pines and other unique and rare tree species at this site?

Where is the NPDES GCP for the 10-year mining operation at this site?

What is the impact on stormwater runoff and drainage on the Wankinko River from this operation?

Explain aerial images that appear to show mining and earth removal has been done below 4 feet and into the groundwater table.

Has aggregate processing occurred on the site and what are the impacts?

Has water been withdrawn from the aquifer for onsite sand washing or other material processing?

Has filling occurred as seems to be indicated on aerial images?
- Where is evidence of mitigation?

Where is evidence that ADM completed the Transfer of Development Rights that was required by the CMP permit for Phase C1?

ADM's 2016 conservation map states the mitigation for this site is 47 acres next to MSSF.

Has this land been put into permanent conservation?

Is ADM "double dipping" and using this 47 acres as mitigation for other sites where Damage to the Environment is occurring?

ADM has conducted and is conducting activities outside of and beyond the scope of what was disclosed in the 9/2010 EENF, FEIR and MEPA reviews. It has expanded geographically at least 12 acres beyond the 32 acres reviewed in the 2010 Certificate and the duration of the work has extended 6 years past the original 5 year construction period and is ongoing. A new ENF, draft EIR and final EIR are required. The FEIR is inadequate. A new ENF, draft EIR and final EIR must be required.

2. 59 Federal Road, Carver (expansion of Phase C6 mining)

This 85 acre site is subject to the SRP as an expansion of the Phase C6 solar and mining operation, it is in the TMUD area and is development that is causing Damage to the Environment. The FEIR, while denying this work is subject to the SRP, omits material facts and provides inaccurate and misleading information.

Here, ADM simply kept mining north and west of the 50 acre Golden Field Phase C6 mining and solar site. The total area mined or to be mined is 135 acres. As shown below there was no MEPA review of the Damage to the Environment from the mining that preceded the 50-acre Golden Field solar Phase C6.

In 2020, after it started this expansion work, ADM obtained a Carver earth removal permit under the pretense of agriculture for commercial mining of 4,045,000 cubic yards. This permit is for almost four times the FEIR volume of “139,800 cy yards in two phases.” This is an egregious, material and intentional misrepresentation of the nature and extent of the work being done in this area of the TMUD. There is no credible accounting of the actual volume of earth removed and to be removed. ADM’s claims to the Carver earth removal committee and MEPA that this is an agricultural project is not credible for all of the reasons stated elsewhere in these comments and in the NPC. A pending legal action challenges the Carver Earth Removal Permit and this mining operation. Plaintiffs include two members of the Wampanoag Nation and Save the Pine Barrens.

Earth materials extracted from this site supply Read. ADM customers also routinely pick up sand and gravel from the site directly. (source: eye witnesses, 2021, 2022).

This appears to be one of the locations approved by Eversource for expansion of the Golden Field solar project.

The site is directly across the street from ADM’s Read Custom Soils and the earth materials removed from the site are used to supply Read.

Photo below: Location of 50 acre Golden Field mining site. In 2020, ADM started expanding the mining operation on to the abutting undisturbed forested uplands. The total area to be impacted is 135 acres.



ADM misrepresented the nature and purpose of the work being done to extract 4,045,000 cubic yards at this location as an agricultural project in seeking a permit and concurrence letter from MHC. MHC's letter, dated 10/31/2019 references the "AD Makepeace Federal Road West Agriculture Project, Carver MA. MHC # RC.66869". This is not an "agriculture project" but a commercial sand and gravel mining operation to extract material for sale. Historic resources are or were on the site according to MHC:

"The find spot includes a low density deposit of the lithic debris byproducts of stone tool maintenance and manufacture...[and] information on ancient Native American land use in the inland portion of Carver...".

MHC's permits and concurrence letter trigger MEPA.

Among the questions to be answered in MEPA review are the following:

Where is a recording showing that the Wampanoag Nation was informed of the presence of Native American land use on the site?

Has the Wampanoag Nation consented to the work?

Has the evidence of Native American use of the site been destroyed by ADM?

Where is documentation of the public participation and review of the impacts to historic resources?

This site abuts an Environmental Justice community. Neither the FEIR nor prior MEPA review address the state's Environmental Justice Policy for this work.

3. Hammond Street/ Federal Road, Carver - Smith Hammond bog site

Here again, ADM makes misleading and false claims that a commercial earth removal operation is for an agricultural project. The site is 27 acres within the TMUD adjacent to Phase C8. It abuts ADM's 50-acre Hammond Street solar project and is across the street from ADM's Read Custom Soils. Earth materials extracted from this site supply Read. ADM customers also routinely pick up sand and gravel from the site directly. (source: eye witnesses, 2021, 2022)

As stated before, ADM's agricultural claims made repeatedly over decades for the purpose of obtaining MEPA review and local permits are not credible. New bogs are not built and large volumes of earth have been removed. (See, e.g., Phase C1, Phase C 2 (only 11/% of claimed bogs built, see below), and the adjacent 59 Federal Road site above). Where ADM has claimed the earth is removed for use on its own bogs, the volumes of earth belie this claim: it is simply impossible that the millions of cubic yards removed was used on ADM's "own landholdings" for bog sanding and/or construction.

ADM cannot deny this work is causing Damage to the Environment. See for example the photographs below taken at the site on March 29, 2022 using a telephoto lens from a public road. Trucks are routinely observed hauling earth materials from the site and photographs are available. This work is causing Damage to the Environment within the meaning of MEPA.



There is Agency Action for MEPA jurisdiction in the form of a MHC permit and concurrence letter. See, MHC RC # .40500, with survey report dated 9/10/2019. In seeking the MHC permit and concurrence, ADM described the work as creation of an “agricultural reservoir.” MHC’s 9/10/2019 letter to ADM’s CEO stated,

“In MHC’s staff opinion, the agricultural reservoir project as proposed is unlikely to affect significant archeological resources. If project plans change in the future, then current information should be submitted to MHC for review and comment.”

This letter shows: 1. Archeological and historic resources were found on the site, even if MHC declared them unilaterally to be “not significant”; 2. MHC’s review was based on ADM’s spurious claim of building an agricultural reservoir. Since that is not a credible claim, MHC should be notified immediately and all work stopped. ADM’s failure to include this work in MEPA review has denied the public, including the Wampanoag Nation the opportunity to have input and to participate in the review of the damage to their historic and cultural resources that this project is undoubtedly causing.

Every aspect of Damage to the Environment must be address for this phase of work in the TMUD area including but not limited to impacts to historic resources, wetlands, waterways, BioMap2 resources, wildlife corridors, adjacent Priority Habitats (Golden Field Pond and Raccoon Pond) identified by NHESP, individual and cumulative truck emissions, emissions from logging and heavy equipment, erosion, groundwater quality, quantity and loss of protection of groundwater caused by removal of forests, soils and sand and gravel.

B. FEIR and prior MEPA review has not adequately assessed the nature and extent of Damage to the Environment for TMUD Phases A through C.

Neither the FEIR nor the prior MEPA reviews have adequately addressed the nature and extent of Damage to the Environment. The FEIR gives only “brief summaries” of the TMUD projects claiming they have been “previously reviewed by MEPA.” FEIR Project Status, Section 1.2. Entire categories of Damage to the Environment have been ignored in the FEIR and prior MEPA reviews. Cumulative impacts have never been addressed in a credible way. A brief description of the major deficiencies for each Project phase is given below.

1. Phase A

See, FEIR Section 1.2.1

The FEIR and prior MEPA review fail to address the aggregate mining operations conducted from about 2010 to 2021 on the 46 acre Phase A TMUD area prior to installation of the 77 Farm to Market industrial solar project, Rosebrook Business Park, and cranberry bog.

Prior MEPA review of this Phase included EENFs, a single review document for Phase A1 and A2 (7/11/2008) and a waiver to begin Phase 1 without an EIR (2/20/2010). The FEIR contains no specific information about what review was done for the 77 Farm to Market solar project, if any. The EENF of 3/18/2011 refers to this as a “disturbed area” without assessing the volume of earth removed, Damage to the Environment from the earth removal operations, including loss of groundwater protection, and other issues. BT’s 12/5/2018 letter to the Wareham Planning Board for solar permitting at the site states the site was “extensively cleared for other operations” –that is sand and gravel mining operations.

Aerial images show aggregate mining operations at this location. ADM did not obtain an earth removal permit from the Town of Wareham for this work, as required by the Wareham Earth Removal Bylaw, nor did it establish it qualified for an exemption. Neither the FEIR or prior MEPA review provide information about the volume of earth removed and consequent Damage to the Environment.



2. Phase B

See, FEIR Section 1.2.2.

Neither the FEIR nor the prior MEPA review adequately address the nature and extent of the Damage to the Environment on this approximately 337 acre Phase B area.

Available MEPA records show the Phase B solar project, Charlotte Furnace, now at over 50 acres was first addressed in the FEIR of 3/1/2011 as Phase B, at 3.6 MW, smaller than the current project which is almost twice that size. The MEPA Certificate of 1/27/2017 refers to the 50 acre solar project but does not give a reference to assessment of Damage to the Environment. There is no record of a MEPA review of the Damage to the Environment from this phase of the Project.

According to aerial imagery, earth removal operations were conducted at this site starting in about 2010, prior to construction of Rosebrook Place, Rosebrook Business Park, and Charlotte Furnace Solar. MEPA review has not addressed the earth removal impacts including changes in topography, loss of groundwater protection, stormwater runoff, and historic impacts.

The approximately 50-acre Charlotte Furnace solar project was done in phases and was segmented, starting in 2010. This allowed ADM to evade an assessment of the cumulative impacts of Damage to the Environment from the entire project. Solar permitting documents from 2018 state that the site was “previously cleared for other operations.” 11/25/2018 Wareham Town Engineer’s letter. BT’s letter to the Town of 12/5/2018 states the site was “extensively cleared for other operations.” The “other operations” were sand and gravel mining for commercial sale. This earth removal was not disclosed in the FEIR or prior MEPA review. ADM did not obtain an earth removal permit from the Town of Wareham for this work, as required by the Wareham Earth Removal Bylaw, nor did it establish it qualified for an exemption. An unknown volume of earth was removed. It appears on site processing of sand and gravel occurred.

MHC reviewed the first phase of the Charlotte Furnace solar project in 2010 (Letter from MHC dated July 22, 2010). The project was expanded after that and now is at least 50 acres. Neither the FEIR nor prior MEPA reviews show that MHC reviewed the entire Charlotte Furnace solar project area as required by the SRP. There is no record of consultation with the Wampanoag Nation or their concurrence in the findings of MHC. This violates the Environmental Justice Policy.

The images below document some of the earth removal at the Phase B site.





NHESP issued take permit CMP #011-185 for a 41 acre Charlotte Furnace solar project in the Phase B are. NHESP found the work would result in a take of the Eastern Box Turtle as a “result of the permanent loss of the suitable upland forest habitat and disruption to the feeding, breeding, overwintering and migratory behaviors of the species.” The FEIR and no MEPA review addresses compliance with the CMP or cumulative impacts of the Phase A-C work on listed species. Neither the FEIR nor any prior MEPA review adequately address compliance with the CMP nor impacts to MESA listed species at the site.

3. Phase C

Phase C1: Wankinko Bog expansion as an agricultural project to disguise aggregate mining. Caver

See section above: 46 Federal Road, Carver mining site - Phase C 1 “Wankinko Bog” expansion

Phase C2: Read Custom Soils, alleged agricultural project to disguise aggregate mining. Plymouth

The Phase 2 is 252-acres in Plymouth bordered to the west by the Wankinko River and east by Frogfoot Brook/Reservoir. There are four components that have not been adequately addressed in the FEIR or prior MEPA reviews:

- ADM's aggregate mining, sorting, processing and sales and distribution center in Carver (disguised as a "soil blending facility" in MEPA review documents),
- A 93-acre site where earth removal and dumping occurred, now covered over with cranberry bogs (formerly the Carverside Bogs)
- 10-20 year mining operation on 140 acres purportedly for the purpose of building a cranberry bog
- An 11-acre bypass canal for cranberry bog discharges and irrigation return flows

Since 2011, in numerous documents, plans, permit applications and reports, ADM and its consultants have failed to disclose material information about the actual work conducted in the Phase C2 project area.

ADM's 2012 EENF misrepresents Phase C2 as agricultural project and Read Custom Soils operation as "soil blending facility". It also makes vague references to replacing old style bogs with new bogs. The 12/28/2012 Certificate waived an EIR for Phase C2, even though the work is subject to a mandatory EIR. (Full waiver granted in FROD 2/13/2013.) The EENF described the work as having "relatively small impacts" (page 2) and erroneously claimed the earth removal was not an "extractive industry" (page 35). MEPA's grounds for granting a full EIR waiver included that the project would help the cranberry industry and the temporary "soil blending facility" would enable ADM to build new bogs. This was a farce then and it is now.

Phase C2 is a commercial earth removal operation disguised as yet another cranberry bog.

ADM's continued preposterous claim that it needs to strip mine 217 acres and remove 7.2 million cubic yards of earth at Phase C2 cannot be countenanced any longer by MEPA. ADM has "old style bogs" lying fallow and has not built the new bogs at Phase C1 at the corner of Federal Road and Cranberry Road in Carver in over a decade yet has mined over 2 million cubic yards of earth. Phases A, B, C1, C4, C5 C7, and the three Carver earth removal sites all use agriculture or site preparation as a ruse to conduct aggregate mining, processing and sales in the TMUD area.

The "state of the art" "soil blending facility" described in the MEPA Certificate of 12/28/2021 is what is now Read Custom Soils. Instead of the facility it said it would build, ADM operates Read from Quonset huts and open processing stations adjacent to the Wankinko River and wetland areas.

Only 11% of the Phase C2 140 acre bog has been built. At least 50 acres of land in the 140 acre bog area has been cleared and large volumes of earth removed. Aerial images show what appears to be aggregate processing on the 140 acre bog site, including sand washing on the site using water from a pond

excavated into the groundwater. An earth removal permit granted by Plymouth for 7.2 million cubic yards of aggregate mining has expired. Conditions to protect groundwater, wildlife, priority endangered species habitat, and surface water protection are being violated, among other things. The volume of water being withdrawn from the 1/3 acre pond excavated on the site for use in sand washing is unknown.

ADM's mining and dumping in the Phase C2 area around ADM's "Carverside Bogs" has never been reviewed by MEPA. Aerial images clearly and explicitly show forest clearing and aggregate mining around Carverside Bogs starting in about 2010. The images show likely excavation in the groundwater and filling with semi-solid liquid and solid waste. ADM covered up the dumping with a cranberry bog and combined it with Carverside Bogs to create a new 93 acre bog. It appears the new 93 acre bog is not able to produce a crop

There is no known NPDES CMP or industrial stormwater SPPP for the operations at the Read processing site. Instead of bogs, earth removal, logging, sand washing and material processing is being conducted while ADM stalls and delays the alleged purpose of the earth removal - to build bogs - just long enough to get a MEPA off ramp to evade MEPA review for the next bait and switch - from cranberry bogs to another use of the Phase C2 area.

There is no information in any MEPA review or the FEIR to show ADM completed the required GHG analysis for the Phase C2 project as required by the 2012 Certificate. At the May 12, 2022 MEPA informational session, when questioned about this, Staci Minihane of Beals + Thomas stated that the only GHG analysis done for the TMUD projects was the 2021 analysis for Phases C10-12 and it is "assumed" that this analysis applies to all of the other GHG impact of projects in the TMUD. This is inadequate and does not comply with MEPA and the state's current or prior GHG and climate policies, plans and regulations.

Save the Pine Barrens has filed two requests for enforcement of the Plymouth Zoning Bylaw regarding the expired earth removal permit and violations of permit conditions. Both were denied and one is on appeal before the zoning board.

Damage to the Environment that is ongoing and beyond the scope of the 2012 Certificate and not address in the FEIR includes: removing groundwater protection, cumulative destruction of forests and endangered species habitat destroyed, damage to historic resources, water supply, surface water, biodiversity, and GHG impacts, excavating into the groundwater table to construct a pond, the cumulative impacts of truck traffic both from the Phase C2 mining site in Plymouth, transport of materials from Plymouth to Carver to Read for processing, then the impacts of trucks leaving Read with material for commercial sale. Documentation and eyewitness testimony shows hundreds of trucks have been leaving Read loaded with earth materials for a decade. This "temporary" soil blending facility disguised under Phase C2 as "agricultural" is the hub of the East Coast's largest aggregate mining sales, distribution and processing facility. There has been no accurate assessment of the nature and extent of diesel emissions, air pollution, noise, dust, fumes and other impacts of industrial equipment operations at the Phase C 2 site, or any other.

Impacts to MESA protected species and BioMap 2 habitat

Did MEPA review the grounds for DFG extension of CMP permit and if so where is the MEPA analysis of the impacts on wildlife, including cumulative impacts on MESA listed species from Phase C1 and other TMUD Activities that have caused damage to wildlife and MESA protected species and habitat?

Impacts on groundwater, surface water and water bodies

What is the daily water withdrawal for apparent sand washing operations on the site?

Where is the local permit saying sand washing is allowed at the site?

If sand washing is allowed at the site, is a Water Management Act permit required for water withdrawals to conduct sand washing?

Where is an analysis of the change in topography caused by aggregate mining operations in the entire Phase C 2 area, including the location of the 93-acre bogs?

How did earth removal, land alterations and topographical changes alter surface and groundwater flow?

What is the volume of earth materials removed?

What is the impact of the earth removal on groundwater protection?

What is the impact of the earth removal on groundwater quality and quantity?

How many trees were removed?

How much top soil was removed?

What is the impact on the Atlantic Coastal Pine Barrens ecosystem viability of removing Pitch Pines and other unique and rare tree species?

Where is the NPDES GCP and SPPP for the 20-year mining operation at this site?

What is the impact on the topographic changes and land alteration on stormwater runoff and drainage and the Wankinko River, Frogfoot Brook, Frogfoot Reservoir, wetlands, and rivers and streams from this operation?

Explain aerial images that appear to show mining and earth removal has been done below 4 feet and into the groundwater table. Is this allowed?

Has aggregate processing occurred on the site and what are the impacts?

Where is the Order of Conditions for work in wetland resource areas; Beals+Thomas admits in the 2012 EENF that the work will impact jurisdictional wetlands and requires an Order of Conditions from Plymouth.

No evidence of completed mitigation provided in MEPA review or FEIR

Where is evidence of mitigation?

Where is evidence that ADM completed the conservation of land that was required?

What was required by CMP by the CMP permit for the MESA CMP?

Is ADM “double dipping” and using this 47 acres as mitigation for other sites where Damage to the Environment is occurring?

Phase C3

FEIR, Section 1.2.3.3

This is described as a 1.4 MW solar project. The FEIR and prior MEPA reviews do not adequately address the nature and extent of Damage to the Environment for Phase C3.

A 9/20/2013 MEPA Advisory Opinion that appears to apply to Phase C3 stated a EENF was not required. The MEPA review record is ambiguous and unclear. The work appears to include earth removal prior on Farm to Market Road near or in connection with installation of the solar project. There is no information about the volume of earth removed or the Damage to the Environment caused by the earth removal, including impacts to groundwater, wildlife etc. There is no accounting of the volume of earth removed. No earth removal permit was granted by Wareham. GIS maps show the spot elevation was about 64 feet (Tihonet Pond is 35 feet) indicating ADM leveled off about 30 feet in the Farm to Market area. This would seem to indicate about 500,000 cubic yards of earth was removed.

C4 and C7: 276 Federal Road, Tihonet West Solar

FEIR Sections 1.2.3.4 and .7

The FEIR and prior MEPA reviews do not adequately address the nature and extent of the Damage to the Environment of these two phases covering 72 acres. ADM completely destroyed this area with strip mining, alteration of topography and installation of industrial energy facilities. The comment in the FEIR that there were dying red pines implying that this justified the obliteration of 72 acres Biomap2 Core Habitat and Priority Natural Community, soils, and the entire ecosystem is a disgrace. The site abuts the Wankinko River and wetlands with stormwater runoff basins adjacent to the river.

An EENF and MEPA Certificate dated 4/22/2019 and 5/2/2019 respectively give the wrong location for what appears to be this 72 acre project, stating this is “south and adjacent to the 8.4 MW Federal Road solar “(Phase C6). Phase C4 and C7 solar is on the opposite side of the street from Phase C 6 not adjacent to it.

In 2014, ADM started clearcutting and strip mining the site. By 2016 had clear cut about 46 acres for phase 1 and recently completed phase 2. MEPA’s 5/2/2019 Certificate states 36 acres were cleared in 2019 and “Topography on the site ranged from 62 ft to 86 ft NAVD 88; final elevation will range from approximately 64 ft to 80 ft NAVD 88.” MEPA Certificate EEA #13940, May 2, 2019. This is an admission that earth removal occurred.

The Certificate did not adequately address the impact of the Damage to the Environment caused by ADM’s commercial mining that preceded the solar installation. The Damage to the Environment that was not reviewed included changes to topography on stormwater runoff, drainage groundwater, removal of groundwater filtration and protection by the aggregate removal. This site is within about a mile of the other Phase B and C sites where massive volumes of earth materials have been removed in the last ten

years and are still being removed. There is and has been no MEPA review of the cumulative impact of the rapid deforestation, removal of vast quantities of earth materials and changes in topography that have been and are being caused by all of the TMUD work.

ADM claimed to the Carver Planning Board that the earth removed for Phase C7 would be used for its cranberry bogs:

“The proposed topography is dictated by the proposed solar use which will require a generally level but slightly sloping area to accommodate the arrays and facilitate drainage. The topography will be visually consistent with the existing topography as well as agricultural use common in this region. The volume of cut proposed to bring the Site down to generally elevation 76’ is **consistent with ADM’s on-going agricultural operations on its properties**; specifically to minimize overall land disturbances by **obtaining necessary earth materials for bog operations from proposed development locations.**” Beals+Thomas Carver Planning Board Site Plan Review Application, Section 2.2.1

This is completely unbelievable, a pattern of misinformation that has been repeated from Phase A through to Phase C7 and beyond. ADM has removed tens of millions of cubic yards of earth materials from the TMUD Project area, and more from its landholdings outside the TMUD (see, for example, the massive ongoing mining operations at ADM’s Swan Holt bog and solar site in Carver and the Borrego/ADM Cranebrook solar project on Cranberry Road in Carver where earth mining occurred, digging into the groundwater. The Cranebrook solar project sits on top of a hole that ADM dug for the mining operation and then filled in for solar. This can be seen clearly on aerial images such as Google Earth.)

MEPA cannot accept at face value ADM’s repeated claim that the extensive aggregate mining it has been conducting for over 10 years in and around the TMUD area is for so-called “agricultural projects”. MEPA requires that ADM provide credible, objective data of the volume of earth removed from the TMUD area and consequent impacts to the Sole Source Aquifer.

A lawsuit brought by individual plaintiffs including two members of the Wampanoag Nation and Save the Pine Barrens is pending in Superior Court challenging the Carver Earth Removal Committee’s illegal permitting of ADM’s aggregate mining operations at Phase C 4 and Phase C7.

ADM must be required to address all Damage to the Environment at Phase C4 and C7 including the following:

Historic impacts

MHC requested an intense Archeological Survey for Phase C4. See, letters dated 3/14/2014, 3/7/2014, 9/10/2014. The FEIR and prior MEPA review does not show the results of the survey.

Were Native American cultural features, evidence of human habitation or artifacts destroyed?

Was the Wampanoag Nation properly consulted, informed and given the chance for full, free prior informed consent?

What were the alternatives ADM considered to avoid or mitigate the destruction of historic resources of the Commonwealth at this site?

Impacts on MESA listed species, ecology and Pine Barrens habitat

DFG issued CMP Permit 009-139 for the Phase C4 and C7 solar project. Where is the following:

Information about compliance with limit of work, inspections, notice of start of work.

Long term conservation plans required by Condition 10 of the CMP permit.

Documentation that ADM is in full compliance with the CMP conditions requiring escrow account payments.

Documentation that ADM is in full compliance with the Turtle Protection Plan required by the CMP permit.

C5: 160 Tihonet Road, Wareham (Tihonet East Solar)

See EENF 1.2.3.5

Phase C5 work has caused significant Damage to the Environment within the TMUD area due to the extent of the aggregate mining and processing that occurred for several years before the 50 acre solar project was installed and the impact on MESA listed species. NHESP issued a take permit for ten species listed as endangered, threatened or special concern for the Phase C5 work. Neither the FEIR nor prior MEPA review address the nature and extent of the Damage to the Environment, including historic resources, wildlife and wildlife habitat, impacts to groundwater from mining operations, and GHG.

ADM segmented the project into two solar phases undermining the ability of MEPA and the public to ascertain the full and cumulative impact of the Damage to the Environment.

The FEIR and prior MEPA review are incomplete, inadequate, superficial and greenwash this destructive ground mounted solar project and strip mining as a benefit to the climate. Nothing could be further from the truth.

ADM's 3/2015 EENF for Phase C5 misleadingly called the project a benefit to the state's "admirable goals" for renewable energy. No GHG analysis ever done to show the climate impacts of the land alterations, soil emissions, forest clearcut and loss of biodiversity.

The 2015 MEPA Certificate admits ADM would be conducting aggregate mining and extracting earth materials. This was no secret. Wareham's Town Engineer wrote on 11/25/18 when ADM applied to Wareham for solar approval that the Phase C5 had been "extensively cleared for other operations" – in other words more sand and gravel mining.

The EENF never disclosed the Damage to the Environment from the multi-year mining operation other than giving a superficial review of "temporary truck traffic" for the mining operation.

ADM misrepresented the purpose of the earth removal, stating: “The volume of excavation to bring the site down to the proposed elevation is consistent with ADM’s on-going agricultural operations on its properties; specifically to minimize overall land disturbances by obtaining necessary earth materials for bog operations from proposed development locations.”

Vehicle traffic was represented as 20 vehicle trips/day needed for “site preparation and construction of the solar project” and ADM “anticipated that excavated earth material will be used in the vicinity of the site such that travel via town roads will be avoided.” The logical conclusion here is that the earth materials were hauled over the Wankinko River to Read Custom Soils about ½ mile away for further processing and distribution.

Wareham’s engineer’s report states groundwater was present at the mining site in 2018, which is consistent with photographs provided to MEPA previously and aerial images showing groundwater and likely sand washing operations on the site. There is no earth removal permit from Wareham and the volume of earth removed has never been reported in MEPA review.

Photographic and aerial images show the nature and extent of ADM’s aggregate mining operation that preceded installation of the solar project. This shows the presence of groundwater on the site and possible sand washing and dewatering operations. Aerial images of the site appear to show that the site was used for historical dumping prior to being altered and excavated for aggregate mining and the installation of ground mounted solar.

The FIER and prior MEPA review are inadequate and incomplete.

C6: 59 Federal Road, Carver, Golden Field Solar and aggregate mining

This 50 acre mining and solar site abuts the 85 acre site described above.

For reasons stated above and in the NPC the MEPA review and FEIR are inadequate and do not describe the nature and extent of the Damage to the Environment.

A lawsuit brought by individual plaintiffs including two members of the Wampanoag Nation and Save the Pine Barrens is pending in Superior Court alleging that ADM conducted unlawful earth removal at the Phase C 6 site without an earth removal permit under the Carver Earth Removal Bylaw. The lawsuit challenges ADM’s claim that the earth removed from this site was transported to another ADM site to use for agricultural purposes such as building or sanding bogs. This claim defies logic and is not credible.

Phase C8: Hammond Street Solar, Carver and potential aggregate mining

This 50 acre mining operation and solar project caused Damage to the Environment that was never fully disclosed by ADM.

For reasons stated above and in the NPC the MEPA review and FEIR are inadequate and do not describe the nature and extent of the Damage to the Environment. Among the questions to be addressed include impacts to historic resources and the sole source aquifer from deforestation, earth removal and changes in topography.

The work at this site resulted in a discharge of pollutants to the perennial stream on the east side of the site. This violation of the Wetlands Protection Act and Clean Waters Act was reported to MassDEP in 2021 which reported that it is “investigating” this. Photographs show the discharge of gravel into the stream and discolored water appearing to contain oils. This Damage to the Environment must be addressed by MassDEP and ADM.

A pending lawsuit challenges ADM’s earth removal activities at this site.

Phases C10-C12

The May 2021 comments on the Phase C10-12 EENF by Community Land & Water Coalition, members of the Wampanoag nation, PFPI and others are incorporated by reference herein.

MHC has found the 140 and 150 Tihonet Road sites to be archeologically sensitive. The FEIR and no prior MEPA review shows that Wampanoag people were provided the opportunity for meaningful input and opportunity for comment on the archeological survey of the site and provided free, prior informed consent to destruction of Native American culture by ADM in performing the work.

The FEIR and prior MEPA review fail to show compliance with MEPA’s and the state’s Environmental Justice Policy.

III. Cumulative impacts

The FEIR and prior MEPA reviews fail to address and account for the cumulative Damage to the Environment of the past and proposed development work in the TMUD area. FEIR Table 2-1 Cumulative Impact Summary is deficient, misleading, incomplete and erroneous. It contains material misrepresentations and omissions that render it useless.

The Table below shows earth removal sites and volumes based on best available information. The FEIR Cumulative Impacts section is inadequate because it fails to identify the volumes of earth removed for each phase of the work and the associated Damage to the Environment, including loss of groundwater protection and the impact of removing the total volume of earth.

Table: Earth Removal Volumes: ADM TMUD Area 2007 to 2022
Estimated: 24.6 million cubic yards

Notes:

1. Estimated based on earth removal permits where available. Where no permits obtained, volume must be provided by ADM.
2. Typically, ADM mining sites yield about 500,000 cubic yards per 25 acre site (see, e.g. Smith Hammond mining site Carver)
3. Additional earth removal in the TMUD area occurred and was ongoing prior to the SRP in 2007 so cumulative impact of earth removal 2007 to 2022 must take into account existing baseline conditions
4. Earth removal also has been conducted on other ADM landholdings in Plymouth, Carver and Wareham and is ongoing (Swan Holt bogs, Redbrook, Cranebrook bogs/solar), creating additional Damage to the Environment and loss of groundwater protection.
5. Value of 1 million cubic yards of sand and gravel in the region is about \$9 million

Phase A	77 Farm to Market Solar	Unpermitted, volume unreported, 23 acres, admits earth removal	Claimed agricultural use of sand and gravel, Wareham
Phase B	Rosebrook Park etc.	Unpermitted, volume unreported	
Phase B Solar	Charlotte Furnace Solar	Unpermitted, volume unreported, 50 acres mined, admits earth removal	Claimed agricultural use of sand and gravel, Wareham
Phase C1	Wankinko site, Federal Road and Cranberry Road	2.1 million cubic yards, Carver permits	Claims agricultural end use, build bogs
Phase C2	Plymouth mining, bogs claimed	7.2 million cubic yards, Plymouth permit	Claims agricultural end use, bogs etc.
Phase C3	Farm to Market Road Solar	Unpermitted, volume unreported	Claimed agricultural use of sand and gravel, Wareham
Phase C4	276 Federal Road solar	176,000 permitted, additional not reported	Claimed agricultural use of sand and gravel, Carver

Phase C5	160 Tihonet solar	Unpermitted, estimated 500,000 cy minimum, volume unreported, 50 acres mined	Claimed agricultural use of sand and gravel, Wareham
Phase C6	Golden Field solar	Unpermitted, total area mined 50 acres mined, volume unreported	Claimed agricultural use of sand and gravel, Carver
Phase C7	276 Federal Road solar	Unpermitted, total area mined with Phase C7 72 acres, volume unreported	Claimed agricultural use of sand and gravel, Carver
Phase C8	Hammond solar	Unpermitted, 50 acres mined/alterd, volume unreported	
Phase C9	299 Farm to Market solar	Unpermitted, total area mined about 30 acres, volume unreported	Claimed agricultural use of sand and gravel, Wareham
Phase C10	27 Charge Pond Road	Claims no earth removal	
Phase C11	140 Tihonet Road	1.2 million cubic yards minimum	Claims agricultural use of sand and gravel, Wareham
Phase C12	150 Tihonet Road	Claims no earth removal	
Phase C6 expansion	59 Federal Road	4,045,000 cubic yards, Carver permit	Claims building agricultural project
Hammond Street	Smith Hammond bog area	581,000 cubic yards, Carver permit	Claims building agricultural project
Total permitted or admitted		16.6 million cubic yards	

Total sites unknown volumes		358 acres strip mined, yield about 8 million cubic yards	
Estimated value		\$216 million	

Cumulative impacts not addressed in the FEIR and prior MEPA reviews include but are not limited to:

- Vast and rapid deforestation and land alterations, removing ancient forests, soils that have built up over 30,000 years
- Destruction and removal of entire ecosystems of plants, animals, trees, soils, biota
- Destruction of vast areas of land and soils containing evidence of human habitation of Native American and ancient people, including workshops, homesites and cultural sites
- Habitat fragmentation, eliminating and obliterating wildlife corridors for multiple species
- Obliteration of vast areas of habitat for 220 species of plants and animals listed under MESA
- Possible loss of a “significant percent of the local population” of listed species in violation of MESA, no cumulative impact of the multiple CMP permits, takes and loss of habitat ever performed, mitigation incomplete.
- Cumulative impact of habitat loss on ability of plant, animal and tree species to survive, including 220 species listed under MESA
- Impact on global biodiversity loss due to obliteration of vast areas of Pine Barrens, one of three remaining Pine Barrens systems on earth
- Irreversible alteration of topography due to earth removal and mining that has flattened the highest hills and leveled the land, changing drainage, stormwater runoff and water flow patterns across vast interconnected areas
- Impact of stormwater flow, runoff and drainage on waterways in the TMUD area including the Wankinko River, Harlow Brook, Weweantic River, Rose Brook and numerous other perennial streams and rivers
- Impact to wetlands and Riverfront Areas from activities that have dredged, filled and altered Resource Areas protected under the Wetlands Protection Act
- Water withdrawals from the Sole Source Aquifer (protected under the federal Safe Drinking Water Act) for aggregate mining and processing operations including on site sand washing at sites including Phase C2, Phase C5, Phase C 6 and possibly others
- Uncontrolled stormwater runoff at aggregate mining and processing sites, without a General Construction Permit under the NDPES indirect stormwater runoff program at multiple sites, including three Carver earth removal sites (Read, 59 Federal Road, and Hammond Street)
- Failure to obtain General Construction Permit under the NDPES indirect stormwater runoff for mining operations and land clearing greater than one acre at multiple solar sites, prior to beginning solar installation, including Phase C5, Phase C6 and possibly others.
- Cumulative impact of diesel truck emissions, truck traffic, noise, dust and vibration from operating multiple sand and gravel operations hauling sand and gravel off site for commercial

sale, running multiple sites simultaneously including for example, since at least 2014, a minimum of 250 trucks a day at Read Custom Soils while also running 50 trucks (100 truck trips) at other sites.

- Cumulative impact on air quality, health and well being of residential neighborhoods in Carver and Wareham on the truck routes used by over 250 trucks a day along Federal Road, Tihonet Road, Cranberry Road, Route 25 and all local roads leading to interstate highways including Route 3, Route 495, Route 24 and Route 25.
- Cumulative impact of truck traffic at Read Custom Soils for trucks serving its Westborough, MA operation
- No GHG analysis for Project as a whole or individual phases for direct and indirect emissions from land use change, loss of forested lands, carbon accumulation associated with earth removal and installation of ground mounted solar.
- Use of land within the TMUD area to dump liquid and solid waste, including into holes excavated by earth removal operations.
- Impact on climate resiliency of Carver, Plymouth and Wareham due to loss of forest cover, impact on ability to mitigate and deal with sea level rise due to loss of forests that slow and absorb runoff and help prevent flooding
- Impact on ability of Plymouth Carver Sole Source Aquifer to deal with salt water intrusion due to loss of massive volumes of sand and gravel and changes in topography that help mitigate threat of salt water intrusion
- Impact on water quality, recharge, ground water purity and quality of the Plymouth Carver Sole Source Aquifer due to loss of groundwater protection previously provided by forested lands, soil, and layers of sand and gravel
- Increase in flooding and stormwater flows due to changed topography, loss of sand and gravel that absorbed floodwaters and precipitation, in the face of increased precipitation predicted due to climate change
- Loss of open spaces and natural areas
- Obliteration of entire Pitch Pine Scrub Oak Natural Communities and other ecosystem types
- Cumulative impact on Wankinko and Wewantic rivers that are within a 1 mile radius of ADM's massive on going earth removal, mining and processing
- Cumulative impact on Wankinko River from tens of thousands if not hundreds of thousands of truck trips on "agricultural sand tracks" crossing over the Wankinko River to and from mining sites in the TMUD area
- Impact of water withdrawal from aquifer of unknown quantities of water for on site sand washing operations that may require a Water Management Act permit
- No cumulative assessment of GHG impacts of TMUD development

IV. GHG Emissions

As described in STPB's NPC for the TMUD project, for over a decade ADM ignored and failed to provide the GHG and climate analysis required by the many MEPA certificates issued for the TMUD development.

Finally, when this egregious breach of the Secretary's pronouncements that a GHG would be done, after many years ADM submitted a GHG analysis for the Phase C10-12 Wareham ground mounted solar projects. That analysis does not suffice for the other work in the TMUD area, including the three mining projects in Carver that do not even have the pretense of MEPA review.

The FEIR's superficial and apples to oranges comparison of solar to "residential development" foregone misses the mark and is the wrong comparison.

The nature and extent of the Damage to the Environment caused by the TMUD development past and proposed must be addressed.

In support of these comments SPTB submits the May 2021 PFPI report and the Affidavit of William Stubblefield PhD., incorporated by reference herein.

V. Environmental Justice

The FEIR and prior MEPA review do not adequately address the Environmental Justice impacts of the TMUD development, past and proposed. The Damage to the Environment that has been caused and will be caused by the work in the TMUD area impacts Environmental Justice populations.

All of the TMUD phase work is located in or impacts the Towns of Carver and Wareham. Both towns have significant environmental justice populations according to the state's environmental justice maps.

MEPA has adopted new environmental justice policies and protocols, including *Public Involvement Protocol for Environmental Justice Populations* adopted October 2021. This states in part, MEPA "shall continue to promote meaningful public involvement by EJ populations after filing the ENF/EENF..." as well as before.

Environmental justice populations in Carver and Wareham are impacted by ADM's TMUD development work in the following ways:

Truck traffic, diesel emissions, noise, dust and vibration from truck traffic.

ADM's earth removal and trucking operations the last 10 year or more have resulted and continue to result in hundreds of trucks per day entering and exiting the towns of Carver and Wareham and traveling to and from highways including Route 25, Route 24, Route 495 and local roads such as Federal Road, Cranberry Road, and Tihonet Road. EJ populations live abutting and on these highways and roads and are and will be subjected to air pollution, increased levels of PM 2.5 from diesel truck traffic carrying earth removed from ADM's mining operations in Phases C1, C2 and earth removal sites in Carver. They have been impacted by increased air pollution, noise, dust and vibration during the time that ADM conducted earth removal throughout the TMUD site since at least 2007.

ADM's truck traffic on road and through residential neighborhoods in Carver and Wareham include **at least** the following **current cumulative truck traffic of 450 trucks per day** traveling through EJ communities:

250 trucks a day: Read Custom Soils: 6 days a week since at least 2014 from Read Custom Soils on Federal Road in Carver, traveling on Tihonet Road, Cranberry Road and Federal Road to and from Routes 25, 24 and 495: 250 trucks per day, minimum as allowed in Carver permit for Read, double or triple that amount according to documentary videos and citizen reports

150 trucks a day: Earth removal sites at Hammond Street (Smith Hammond Bogs), 59 Federal Road (4.045 m cy earth removal site), and Wankinko Bog site on Federal Road: at least 50 trucks per day under the Carver earth removal permits for a total of 150 per day, and far more according to observations, all traveling on the same roads as the Read Custom Soils trucks as well as Wareham Rod

50 trucks a day: Phase C 2 Plymouth earth removal site to and from Read and using routes including Cranberry Road, Federal Road and Tihonet Road to access Routes 495, 25 and 24 according to Plymouth earth removal permit.

In addition to earth removal: logging trucks removing timber off site for commercial sale following forest clearing, trucks transporting logging equipment and industrial mining, processing and sand washing equipment to and from sites

Over the last 10 years, ADM's mining and site preparation for solar at Phase C1, C2, C3, C4, C5, C6, C7, C8 and C9 have all resulted in increased truck traffic through EJ neighborhoods as the trucks hauling sand and gravel removed from the site, logs being hauled off site for commercial sale and equipment pass through these neighborhoods. Neither the FEIR nor any MEPA review addressed the nature and extent of the Damage to the Environment and impacts on EJ populations of this truck and heavy equipment traffic. The FEIR and prior MEPA reviews have erroneously referred to the truck traffic as "temporary" and minimized, understated the truck numbers.

Truck traffic has been and is major, significant and ongoing. Individual testimonials, videos and documentary evidence all provide objective credible information about truck traffic generated by ADM's operations individually and cumulatively since 2007 throughout the TMUD area. The impacts on surrounding neighborhoods, residential areas, school busses, and EJ populations has never a been addressed.

Neither the FEIR nor any prior MEPA review shows the Project complies with the state's Environmental Justice Policy.

VI. No mitigation, required and proposed mitigation incomplete and inadequate

The FEIR Summary of Mitigation Measures is inadequate. Section 3.1.

The Secretary should require a mitigation analysis that calculates the economic loss of ecosystem services resulting from the deforestation and strip mining at the Phase A, B and C sites and the 59 Federal Road, 46 Federal Road and Hammond Street aggregate mining sites that have been deforested, denuded and rendered sterile.

Rare Species and Wildlife Habitat

The SRP cannot be “closed out” because ADM has not completed the mandated mitigation.

The SRP, MEPA certificates, MHC reviews and DFC CMP permits all require avoidance or mitigation of Damage to the Environment. The required mitigation included but is not limited to: donating land to conservation, donating money to escrow funds for a “pine barrens” research or stewardship program at DFG and avoidance of impacts to historic resources.

The FEIR 3.1.1 admits that in the 15 years since the 2007 Certificate it has not mitigated the Damage to the Environment in the form of donating land to conservation. ADM states it “has committed approximately 1,500 acres to conservation”, plus additional lands “to be formally or informally conserved.” The SRP cannot be closed out until all commitments to conserved land have been completed in the letter and spirit of the SRP. “Informal” conservation does not count.

Instead of donating land to conservation, ADM sold land to the state so that taxpayers paid ADM to mitigate its Damage to the Environment. There is no accounting of the acres required for each Phase of the TMUD Damage to the Environment. It appears ADM is double dipping on acreage, using the same acre as mitigation for numerous phases of the TMUD. Further, it uses the same acre as mitigation commitments made to towns. In Plymouth, ADM committed to put 300 acres in conservation for the Town in exchange for the earth removal permit for 7.2 million cubic yards at Phase C 2 of the TMUD. There is no evidence that ADM has donated this land as mitigation to the town of Plymouth. (A legal challenge is pending over the 300 acres). In Carver, ADM CEO Jim Kane publicly stated at Planning Board meetings that for each acre of forest destroyed by the TMUD solar projects, ADM was conserving land “2:1”.

Wetlands and Water Resources

FEIR Section 3.1.2 ignores the wetlands and water resources impacts of Phases B and C. The mitigation for Phase C10 is a commitment by ADM to clean up a dump site on its own property prior to destroying the forested lands for a ground mounted solar project? Cleaning up an illegal dump on one’s own property falls within the definition of mitigation under MEPA?

GHG mitigation: See GHG section above.

In addition, there is no accounting for the GHG emissions from over 15 years of operating heavy equipment for industrial logging, land clearing, stump grinding, excavation and regrading at the earth

removal and solar sites. There is no accounting for the over 500,000 diesel tractor trailer trucks that have hauled sand and gravel off the TMUD site, and that have hauled sand and gravel within the TMUD to and from Read for processing, sorting and commercial sale.

Miscellaneous Mitigation

FEIR 3.1.5 has the audacity to say that mitigation by ADM will be paying “economic benefit” of tree clearing for Phases C10-12 to Wareham. This is about \$80,000.00 - a mere fraction of the ecosystem services provided by the almost 200 acres of the Phase C 10-12 sites that will be clearcut, stripped of vegetation, soil and gravel and permanently denuded. Lost ecosystem services include loss of flood control, groundwater protection, wildlife habitat and more. This “miscellaneous mitigation” is an insult and a slap in the fact of the MEPA process.

MEPA review is needed to address each aspect of mitigation for each aspect of work, past and proposed, in the TMUD area, including but not limited to:

Where are the acres donated for conservation and for what Phase of the TMUD are the acres for?

Where are the acres donated as mitigation to the Town of Plymouth and is ADM double dipping, using TMUD acres?

Where is the Transfer of Development Rights area for Carver committed as part of the CMP permit for Phase C1?

Where is the money for state conservation programs and are all escrow payments required by the CMP DFG permits up to date?

How much taxpayer money did ADM receive in exchange for the friendly taking that it now claims as mitigation acreage?

VII. Public participation requirements violated

ADM short cut the public participation process of Section 62C by filing EENFs instead of EIRs since 2009 under the SRP. For some of the work it did not even file an EENF. Now, it proposes to avoid a draft EIR. Instead, ADM seeks an after the fact MEPA rubber stamp for activities conducted under the guise of the SPR and without the transparency and accountability required by MEPA. ADM did not do proper scoping, MEPA did not do site visits, and informational meetings were not held. This violated fundamental precepts of MEPA environmental review.

The shortcuts and failure to conduct an adequate review of the nature and extent of the Damage to the Environment has violated and continues to violate the state’s and MEPA’s Environmental Justice policy, including denying the Wampanoag Nation the opportunity for meaningful and timely comment and input on the work in the TMUD that has destroyed and continues to destroy evidence of Native American and ancient people’s use and occupation of sovereign lands in the TMUD area.

A SRP is required to “serve the purposes of MEPA, including providing meaningful opportunities for public review, analysis of alternatives, and consideration of cumulative environmental impacts.” 301 CMR 11.09(2).

SRP did not require a CAC under 11.09(3) “given the relationships among the proponent, host communities and environmental organizations...” Finding 9, page 5-6. ADM failed to ensure engagement of the host communities, Wareham, Plymouth and Carver, evidenced by the fact that for almost a decade no official or representation of a host community ever attended the Quarterly Meetings or commented on the EENFs. Town officials are largely unaware of the SRP and ignored the connection between the TMUD and individual projects in the local permitting process. When the Phase 10, 11 and 12 projects were proposed in Wareham in 2021, the Town Planner was asked if the projects were in the TMUD. His response “good question, I don’t know.” Conv. w Meg Sheehan with Town Planner. Instead of transparency and public accountability. ADM operated under the radar. Finally, in March 2021 when ADM held the “informational” meeting for Phases C 10, 11 and 12, the CEO Jim Kane was asked pointed questions about earth removal quantities and where it went. He promised to meet with members of the public to give answers. Then he reneged. (Video available on Facebook and letters available on request).

After the public shined the light on ADM’s duplicity at the March 2021 MEPA meeting, ADM refused to hold any of the mandated quarterly meetings in 2021.

The 2007 SRP stated, “The proponent has committed to a transparent collaborative process...” Item 9, page 6. It was signed by Mike Hogan, CEO AD Makepeace. This worked as long as no one asked questions. Now ADM has reneged on every aspect of the SRP and shows nothing but disdain for the public’s questions and the “relationships” with host communities consist of town officials looking the other way as in Carver and environmental organizations that are no longer engaged for the most part. ADM has not carried out its responsibility to ensure public engagement in the SPR. MEPA must not allow an off ramp by closing out the SRP.

VIII. Conclusion

Makepeace? Or Make-believe?

Save the Pine Barrens Comments to MEPA
May 23, 2022
ADM TMUD, EEA 13940
EXHIBITS

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Save the Pine Barrens Comments to MEPA
May 23, 2022
ADM TMUD, EEA 13940

Exhibit #1
STPB Notice of Project Change, July 2021

Community Land & Water Coalition
Save the Pine Barrens, Inc.
158 Center Hill Preserve
Plymouth MA 02360
www.savethepinebarrens.org
environmentwatchesoutheasternma@gmail.com

July 30, 2021

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114
Via email to MEPA@mass.gov

Re: ADM Tihonet Mixed Use Development, EEA 13940: Request for a Notice of Project Change (NPC) EEA # 13940

Dear Secretary Theoharides,

Save the Pine Barrens, Inc., and Community Land & Water Coalition (collectively, “STPB”) request that you determine that ADM Development Services, LLC (“ADM”), Proponent of the ADM Tihonet Mixed Use Development (“TMUD”) EEA 13940 must file a Notice of Project Change (“NPC”) pursuant to MEPA regulation 301 CMR 11.10.

STPB is a Massachusetts non-profit corporation. Community Land & Water Coalition is a program of STPB and is a network of groups and individuals seeking to protect, steward and restore lands and waters in Southeastern Massachusetts. STPB members live, work, and recreate in Southeastern Massachusetts in, on, and near the TMUD area. STPB and its members have suffered and continue to suffer discrete, concrete harm from the Damage to the Environment that is occurring and will occur due to the Project. CLWC and its members have a direct and concrete interest in avoiding and mitigating actual or probable Damage to the Environment as defined by MEPA regulation 301 CMR 11.02. They will be harmed by the failure to require a NPC and comprehensive EIR that documents all past and future Damage to the Environment, including that from the proposed Phases C10, C11, and C12 projects as described in the EENF submitted on March 15, 2021, EEA # 13940.

I. ADM concealed material facts, submitted false information, and improperly segmented the project, which constitutes an NPC.

Under 301 CMR 11.10(5), where the Secretary determines that project proponent knowingly or inadvertently conceals a material fact, submits false information, or improperly segments a project the Secretary may consider this an NPC. No further showing about material

changes in the project is required. The Secretary need only determine that a material fact was concealed, false information was submitted, or the project was improperly segmented. Here, all three circumstances are present as shown by the naked eye, public maps, and ADM's own documentation. The Secretary "may" consider this to be an NPC. Given the extent and gravity of the concealment of material facts and false information submitted to MEPA and the repeated knowing segmentation such a finding is mandatory.

The regulation, 301 CMR 11.10(5) states,

"If the Secretary determines that a Proponent has, either knowingly or inadvertently, concealed a material fact or submitted false information during MEPA review, or has segmented the Project, the Secretary may consider the determination to be a Notice of Project change."

Based on the documentary evidence provided to the Secretary here and in previous filings, STPB submits that ADM and Beals+Thomas, by concealing facts about the TMUD development projects has, in fact, committed fraud within the meaning of Massachusetts law.

STPB's comments on the March 15, 2021 EENF # 13940 and subsequent June 7, 2021, NPC provided the Secretary with detailed information showing ADM has knowingly concealed material facts, submitted false information, and improperly segmented the Project. The Secretary rejected STPB's June 7, 2021 NPC request on technical grounds relating to our description of "material change" in the Project. Those alleged deficiencies have been corrected with the submittal of the attached Exhibit A: Figure 11, March 1, 2021 Beals+Thomas "Updated Context Map" (hereafter "Figure 11").

The Secretary did not address our request for an NPC based on 301 CMR 11.10(6) which is repeated and expanded upon here. We request that the secretary determine that material facts were concealed, false information submitted, and that the project was improperly segmented, and find that this constitutes an NPC.

TMUD Phase C1, Carver. ADM has concealed the material fact that it has not constructed the agricultural project for Phase C 1. The naked eye can see that the 32-acre agricultural project has not been built in the location that was the subject of MEPA review. Instead, ADM has expanded strip mine operations across the Phase C-1 site, a 500+ acre lot (Lot 2-4). It continues to strip mine the site, conducting an industrial sand mining operation and not explaining this in the EENF.

ADM falsely stated that the Phase C-1 agriculture project was done, their March 2021 EENF states, "32 acres Agricultural (constructed as Phase C1)" on page 3-4. CLWC's June 7, 2021 NPC informed the Secretary that the Phase C-1 agricultural project was not built, yet the Certificate erroneously represented that it was. The June 9, 2021 Certificate states that, "Phase C1 included the construction of the Wankinko Bog, 1 16.5-acre bog, 2.5-acre reservoir and

tailwater recovery pond, 13 acres of bog roads/graded areas and preservation of 24 acres of open space.”



Further, ADM used the agricultural project in Phase C-1 as a ruse to obtain a “take” or Conservation and Management Permit¹ for the Eastern Box Turtle from MassWildlife under the Massachusetts Endangered Species Act. The 32-acre project has not been built in the location identified in the CMP permit.

ADM also used the agricultural project to obtain a sign-off from Massachusetts Historical Commission. According to the October 29, 2010 MHC sign off letter, the site may have met criteria of eligibility for “listing in the National Register of Historic Places because it contains information on ancient Native American occupation and land use within the inland portions of Carver during at least the Archaic Period.” Phase C1 Wankinko Cranberry Bog expansion, Carver, PAL #2503, MHC # RC 3804, letter from Brona Simon, October 29, 2010, for review of agricultural project that was never built. On information and belief, and due to the refusal of MHC to provide information, it appears these sites were destroyed.

¹ CMP 011-183



Above: July 2021: Phase C 1 location: no bogs built at the location shown on the 2011 ADM plans. Location of sites identified by MHC as potentially eligible for National Historic Preservation listing is unknown.

TMUD Phase C2, Plymouth and Carver. ADM made concealed material facts and submitted false information during MEPA review about the “soil blending facility” and the extent of strip mining and earth removal at this location. The soil blending facility was described in the Phase C-2 Certificate and ENF as an approximately 34,000 square foot building with offices, to be built to energy efficient standards and possibly use geothermal to save energy pursuant to the state’s GHG policies. See, page 5 of EENF. The ENF implied this facility would “blend” soils for ADM’s agricultural operations. **It does not appear this facility was ever built, nor that MEPA was notified.** Instead, the Phase C 2 activities are an industrial operation selling sand commercial via the ADM subsidiary, Read Custom Soils².

² www.readcustomsoils.com

TMUD Phase C3, Carver. ADM and Borrego concealed facts about the nature and extent of an earth removal operation taking out about 500,000 cubic yards of sand. These facts are material because of the Damage to the Environment that was not described or mitigated.

TMUD Phases C4 and C7. Combined total about 83 acres, Carver earth removal and industrial solar project. ADM and Borrego concealed facts about the nature and extent of earth removal. This was once pristine Pine Barrens Forest abutting the Wankinko River. At least 400,000 cubic yards of earth were removed according to a Carver Earth Removal permit and an unknown quantity was removed without a permit. ADM claimed to the Carver Planning Board that the earth would be used for “agricultural purposes” and asserted it was exempt from the requirement for an Earth Removal Permit. This claim has never been verified by anyone and is not credible. These facts are material because of the Damage to the Environment that was not described or mitigated.

TMUD Phase C5. Tihonet Road East (aka 160 Tihonet Road) 50-acre site, Wareham. ADM and Borrego concealed facts and submitted false information about the earth removal undertaken prior to installation of the Phase C5 solar project. ADM removed several million cubic yards of earth and never applied for or obtained an earth removal permit from the Town of Wareham. It represented that the earth removed – 2 to 4 million cubic yards – was for the companies own on-site agricultural uses. In 2014, ADM stated in the EENF that the earth removed would be used in its agricultural operations. CEO Jim Kane repeated this at the March 2021 MEPA informational meeting in public, on video. This has never been verified or documented, despite Kane’s public pledge to explain where and how the earth removed from the Phase C-5 site was used for ADM’s agricultural operations.

ADM concealed facts and submitted false information about the transportation impacts of the earth removal at the 160 Tihonet Road site, stating in the EENF that there would be 20 vehicle trips per day, and it was “anticipated that excavated earth material will be used in the vicinity of the site such that travel via town roads will be avoided.” Eyewitness testimony is such that the earth removal from the site did result in up to hundreds of truck trips per day on local roads and that the trucks traveled to interstate highways from 160 Tihonet Road. The facts concealed are material because These facts are material because of the Damage to the Environment that was not described or mitigated.

Finally, ADM’s March 15, 2021 EENF for Phases C10, C11, and C12 conceals material facts because it fails to accurately describe the cumulative impacts of Phase C5 activities when combined with the adjacent Phase C11 and C12 projects which are on the same parcel of land owned by the same landowner (ADM) and will be undertaken by the same developer (Borrego Solar).

TMUD Phase C6. “Golden Field” Borrego Solar, 50-acre site, Federal Road, Carver. ADM and Borrego concealed material facts and submitted false information during MEPA review about the earth removal at this site. The EENF states 40,000 cubic yards of earth would be removed. It further states this volume will “be transported and used on other ADM land” and it

will take eight weeks to accomplish the earth removal prior to the solar installation³. On page 3, the EENF states “The volume of cut necessary is anticipated to be readily stored or used elsewhere on ADM’s overall land holdings.” Topographical maps appear to indicate that 2-4 million cubic yards were removed.

ADM’s misrepresentation of 40,000 cubic yards is the concealment of a material fact and submittal of false information. As a company in the earth removal business and reported to be the largest aggregate mining operation East of the Mississippi, it is not plausible that ADM and Beals+Thomas underestimated the volume of earth to be removed from the site by orders of magnitude. The concealment of these material facts and submittal of false information resulted in the inaccurate assessment of Damage to the Environment.

TMUD Phases C8. At the 0 Hammond Street Borrego Solar, 50-acre site in Carver, ADM and Borrego concealed the nature and extent of their earth removal. They failed to accurately disclose the volume of earth removed and the environmental impacts of taking the height of land down about 20 feet across the site. Based on topographic maps about 2-4 million cubic yards of earth were removed and there was an extensive earth removal operation with transportation, wetland, waterways, and other environmental impacts that were not accurately disclosed. ADM is also conducting a massive earth removal operation under a permit from Carver on adjacent land and has failed to describe the environmental impacts of that to MEPA.

TMUD Phase C9. Farm to Market Road, Wareham, Borrego Solar. ADM conducted earth removal activities prior to the solar installation. It never applied for or received an Earth Removal Permit from the Town of Wareham. ADM concealed material facts about earth removal at the site so that the Damage to the Environment was not adequately assessed.

TMUD Phases C10-C12. These Phases have been segmented to avoid the Energy threshold. The project has resulted in the construction of new electricity generating facilities with total capacity of 25 or more megawatts. In addition, in May 2021 ADM announced plans to build 400 more acres of land based solar utilities in Wareham, adding more megawatts in the region. ADM concealed this material fact from MEPA review by not disclosing it in the March 2021 EENF.

Failure to disclose earth removal activities within the TMUD area. ADM has concealed material facts about its industrial sand mining extraction in Plymouth, Carver and Wareham, including traffic and historical resource impacts. The result is that Damage to the Environment was not adequately assessed.

- 59 Federal Road, Carver, Assessor’s Map 131, Lot 1-2C: Ongoing industrial sand mining operation, 4.4 million cubic yards adjacent to Golden Field Pond, a priority habitat. ADM is using the ruse of an agricultural project as the basis for this industrial sand mining extraction. ADM used the ruse of an agricultural project to

³ EENF Notice, EEA 15617, page 2, footnote.

obtain a sign off from Massachusetts Historical Commission to destroy Native American features. See, Letter to Jim Kane from Brona Simon, *Mass Historical Commission, Makepeace Federal Road West Agriculture Project, Carver, MA MHC #RC.66869*. This is not a legitimate agricultural project.

- Hammond Street, Carver: Ongoing industrial sand mining operation also under the ruse of an agricultural operation.
- Read Scale Custom Soils: Ongoing industrial sand mining operation also under the ruse of an agricultural operation on Assessors Map 131, Lot 2-4, the same lot as TMUD Phase C-1 above. This is not a legitimate agricultural operation despite the submittal, year after year, of plans from GAF Engineering to the Carver Earth Removal Committee showing the construction of “bogs and a tailwater recovery pond.” (Plans available from the Carver Earth Removal Committee) The plans show basically the same bog and pond in the same location with a slight expansion. They have never been built.

II. Notice of Project Change for material change in a Project under 301 CMR 11.01(1)

MEPA regulation 301 CMR 11.10(1) provides that prior to the taking of all Agency Actions for the Project, unless the Secretary in a certificate or special review procedure has determined otherwise, if there is a material change a Project any Person may file an NPC. The Secretary has not precluded an NPC and all Agency Action are not complete. STPB, as a Person within the meaning of 301 CMR 11.00 has the legal right to request this NPC.

Below are descriptions of material changes in the Project set forth in narrative format and addressing the categories of MEPA’s NPC Form. 301 CMR 11.01(1),

A. General description of the material change in the Project

In its July 2008 EENF, ADM described the Project as “a mixed-use village community that will incorporate principles of smart growth, open space preservation, low impact development (LID), traditional village design, and pedestrian orientation.” See, February 13, 2013, Final Record of Decision. The 6,107 acres of the TMUD area was described as having “undeveloped lands considered ecologically significant due to the presence of BioMap Core Habitat, Priority Habitat for rare and endangered species, and the underlying sole source aquifer.”

The January 29, 2007 “Special Review Procedure” (SRP), and MEPA’s subsequent waivers of the requirements for ENFs and EIRs over the last 10+ years, has been an egregious dereliction of the of the responsibilities vested in the Secretary by General Laws Chapter 30, Section 61. Further, the Secretary’s failure to establish a Citizens Advisory Committee under 301 CMR 11.09(3)(c) has denied and continues to deny the public the right to a meaningful opportunity for input on the Project.

B. Permits/Financial Assistance

Numerous Permits are and have been required. Financial assistance is described in the various Certificates and includes the direct and indirect support of state energy subsidy programs.

C. MEPA thresholds met or exceeded (301 CMR 11.03)

The MEPA thresholds warranting an NPC include, but are not limited to, the following:

11.03(1)(a)1 Land: There has been, and continues to be, the direct alteration of 50 or more acres of land caused by commercial strip mining and “site preparation” for solar installations. ADM has concealed and/or misrepresented the actual volumes of earth removed from the TMUD area for solar and for individual earth removal operations. This includes massive earth removal operations at 59 Federal Road in Carver (ongoing removal of over 4 million cubic yards), 0 Hammond Street, and on the 500 plus acre Read Custom Soils site. This is a material change in the Project.

11.03(1)(a)4 Conversion of land in active agricultural use to nonagricultural use: Including land with qualified USDA soils, ADM has converted hundreds of acres of agricultural land to industrial uses without describing the environmental impacts.

11.03(2) State listed Species under the Massachusetts Endangered Species Act: The actual individual and cumulative destruction of listed species has never been described in an EIR. ADM has caused or contributed to the extinction of state listed species including the Endangered Persius Duskywing, Northern Barrens Tiger Beetle, Threatened Barren’s Dagger Moth, Melsheimer’s Sack Bearer, and Special Concern species Frosted Elfin, Gerhard’s Underwing moth, Slender Clearwing Sphinx, Barren’s Buckmoth, Pink Swallow Moth and Cow Path Tiger Beetle.

11.03(3) Wetlands and Waterways: The changed uses have cumulatively altered thousands of square feet of wetlands, altered topography by removing several hills of at least 100 feet over hundreds of acres altering the runoff patterns, and caused stormwater discharges to waterways during and after construction.

11.03(4)(a) and/or (b) Water withdrawals and construction of new water mains: ADM CEO Jim Kane has stated that subdivisions are planned for the Phase C area but water withdrawals to serve the residential uses have never been disclosed. The long-term ADM development plans have been concealed and not disclosed in an ENF.

11.03(6)(a)6 Transportation: The large volume of earth removed off the TMUD area (about 20 million cubic yards, minimum) for commercial sale throughout the Northeast has generated at last 3,000 or more New average daily trips on roadways providing access to a single location (ADM lands). Eyewitness testimony and photographic evidence shows that

ADM's earth removal activities under the Phase C1 and C 2 projects are generating in excess of 90,000 truck trips coming from Carver sites alone with more from the Phase 2 bog expansion area.

11.03(7)(b) Energy: Phases C1-C12 have been segmented to avoid the Energy threshold. The project has resulted in the construction of new electricity generating facilities with total capacity of 25 or more megawatts. In addition, in May 2021, ADM announced plans to build 400 more acres of land based solar utilities in Wareham, adding more megawatts in the region.

11.03(10)(b)2 Historical and Archeological Resources: It appears that Phases C1 to C12 have destroyed and will destroy Native American heritage without the free, prior, and informed consent of the local Indigenous community, in violation of UNDRIPP. The purported "permission" granted by MHC to A.D. Makepeace and Borrego Solar to destroy Wampanoag cultural resources in order to conduct strip mining and to erect industrial land based solar violates fundamental principles of environmental justice and basic human rights. ADM failed to fully disclose this damage to appropriate persons.

III. Project change description (factors a-d)

The material changes and significance of changes in the TMUD with reference to the factors in 301 CMR 11.10(6) are described below. Due to improper segmentation, cumulative impacts have been accurately described. No mitigation has occurred.

- Open space preservation has not been achieved, material misrepresentations have been made about land put into conservation, and commitments have not been honored.
- Primary uses have changed from residential, commercial, and light industrial, to industrial energy utilities and sand mining.
- No mitigation for Damage to the Environment has occurred.
- No greenhouse gas analyses for Phase C2-C9 projects have been conducted as required by numerous MEPA Certificates. The Greenhouse Gas Policy has been ignored and the Global Warming Solutions Act violated by MEPA.
- Cumulative loss of biodiversity and loss of endangered, threatened, and rare species and their habitats has occurred, including likely extinction of globally unique species.
- Groundwater and surface water protection has been impaired due to the loss of forest cover, vegetation, and soils, threatening the long-term viability of the Plymouth Carver Sole Source Aquifer.
- Cumulative impacts to Indigenous historical and cultural areas/sites have occurred.
- Greenhouse gas impacts from the operation of fossil fuel fired industrial earth removal and logging equipment have occurred and never been accounted for.
- Decreased and diminished climate resiliency due to loss of forest cover and vegetation is ongoing and being exacerbated by erosion.
- Increase in vulnerability due to flooding and sea level rise due to lowering of topography.

- Alteration of surface waters flow due to altering and/or removing large volumes of earth and topography.

IV. Conclusion

The Secretary should determine that an NPC is required.

Should you have any questions or seek and documentation or verification of any of the facts here, we will readily provide them. We can be contacted at 508-259-9154 or environmentwatchsoutheasternma@gmail.com

Very truly yours,

Margaret E. Sheehan, Esq.
Volunteer
Community Land & Water Coalition
158 Center Hill Road
Plymouth MA 02360
c. 508.259.9154

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #2:

STPB Notice of Project Change, Phase C2 and Phase C1

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs ■ MEPA Office

For Office Use Only
Executive Office of Environmental Affairs

MEPA Analyst: Deidre Buckley

Phone: 617-626-

Notice of Project Change

The information requested on this form must be completed to begin MEPA Review of a NPC in accordance with the provisions of the Massachusetts Environmental Policy Act and its implementing regulations (see 301 CMR 11.10(1)).

EEA # 13940		
Project Name: Tihonet Mixed Use Development Project, Phase C 2 - Proposed Cranberry Bogs/Infrastructure		
Street Address: off Tihonet Road		
Municipality: Plymouth, Wareham, Carver	Watershed: Buzzards Bay	
Universal Transverse Mercator Coordinates:	Latitude: 41.816698 Longitude: 70.707003	
Estimated commencement date:	Estimated completion date: Bypass Canal 2013, Soil Blending Facility Spring 2014, Bogs 2023-2033	
Project Type: Agricultural	Status of project design: %complete	
Proponent: ADM Development Services, LLC		
Street Address: 158 TIHONET RD.		
Municipality: WAREHAM	State: MA	Zip Code: 02571
Name of Contact Person: Stacy H. Minihane		
Firm/Agency: Beals and Thomas, Inc.	Street Address: 32 Court Street	
Municipality: Plymouth	State: MA	Zip Code: 02360
Phone: (508) 366-0560	Fax: (508) 366-4391	E-mail: sminihane@bealsandthomas.com
<p>With this Notice of Project Change, are you requesting:</p> <p>a Single EIR? (see 301 CMR 11.06(8)) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>a Special Review Procedure? (see 301CMR 11.09) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>a Waiver of mandatory EIR? (see 301 CMR 11.11) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>a Phase I Waiver? (see 301 CMR 11.11) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)? 11.03(1)(a)1 Land, 11.03(6)(a)6 Transportation, 11.03(7)(b) Energy, 11.03(10)(b)2. Historical and Archeological Resources</p> <p>Which State Agency Permits will the project require? Conservation and Management Permit from NHESP,</p> <p>Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:</p>		

PROJECT INFORMATION

In 25 words or less, what is the project change? The project change involves . . .

ADM materially misrepresented the nature of their work when it came to the construction of the Soil blending facility, which never occurred, when in fact they are conducting commercial sand mining.

See full project change description beginning on page 3.

Date of publication of availability of the ENF in the Environmental Monitor: (Date:)

Was an EIR required? ☐ Yes ☒ No; if yes,
was a Draft EIR filed? ☐ Yes (Date:) ☐ No
was a Final EIR filed? ☐ Yes (Date:) ☐ No
was a Single EIR filed? ☐ Yes (Date:) ☐ No

Have other NPCs been filed? ☐ Yes (Date(s):) ☒ No

If this is a NPC solely for lapse of time (see 301 CMR 11.10(2)) proceed directly to
ATTACHMENTS & SIGNATURES.

PERMITS / FINANCIAL ASSISTANCE / LAND TRANSFER

List or describe all new or modified state permits, financial assistance, or land transfers not previously reviewed: **dd w/ list of State Agency Actions (e.g., Agency Project, Financial Assistance, Land Transfer, List of Permits)**

Are you requesting a finding that this project change is insignificant? A change in a Project is ordinarily insignificant if it results solely in an increase in square footage, linear footage, height, depth or other relevant measures of the physical dimensions of the Project of less than 10% over estimates previously reviewed, provided the increase does not meet or exceed any review thresholds. A change in a Project is also ordinarily insignificant if it results solely in an increase in impacts of less than 25% of the level specified in any review threshold, provided that cumulative impacts of the Project do not meet or exceed any review thresholds that were not previously met or exceeded. (see 301 CMR 11.10(6)) ☐ Yes ☒ No; if yes, provide an explanation of this request in the Project Change Description below.

FOR PROJECTS SUBJECT TO AN EIR

If the project requires the submission of an EIR, are you requesting that a Scope in a previously issued Certificate be rescinded?

☐ Yes ☐ No; if yes, provide an explanation of this request_____.

If the project requires the submission of an EIR, are you requesting a change to a Scope in a previously issued Certificate?

☐ Yes ☐ No; if yes, provide an explanation of this request_____.

SUMMARY OF PROJECT CHANGE PARAMETERS AND IMPACTS

Summary of Project Size & Environmental Impacts	Previously reviewed	Net Change	Currently Proposed
LAND			
Total site acreage			
Acres of land altered			
Acres of impervious area			
Square feet of bordering vegetated wetlands alteration			
Square feet of other wetland alteration			
Acres of non-water dependent use of tidelands or waterways			
STRUCTURES			
Gross square footage	34,000		0
Number of housing units			
Maximum height (in feet)			
TRANSPORTATION			
Vehicle trips per day	460±		
Parking spaces			
WATER/WASTEWATER			
Gallons/day (GPD) of water use			
GPD water withdrawal			
GPD wastewater generation/ treatment			
Length of water/sewer mains (in miles)			

Does the project change involve any new or modified:

1. conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97? ☐ Yes ☒ No

2. release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction? ☐ Yes ☒ No

3. impacts on Rare Species? ☐ Yes ☒ No

4. demolition of all or part of any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?
☐ Yes ☒ No

5. impact upon an Area of Critical Environmental Concern? ☐ Yes ☒ No

If you answered 'Yes' to any of these 5 questions, explain below:

PROJECT CHANGE DESCRIPTION (attach additional pages as necessary). The project change description should include:

- (a) a brief description of the project as most recently reviewed
- (b) a description of material changes to the project as previously reviewed,
- (c) if applicable, the significance of the proposed changes, with specific reference to the factors listed 301 CMR 11.10(6), and
- (d) measures that the project is taking to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts. If the change will involve modification of any previously issued Section 61 Finding, include a draft of the modified Section 61 Finding (or it will be required in a Supplemental EIR).

ADM made concealed material facts and submitted false information during MEPA review about the "soil blending facility" and the extent of strip mining and earth removal at this location. The soil blending facility was described in the Phase C-2 Certificate and ENF as an approximately 34,000 square foot building with offices, to be built to energy efficient standards and possibly use geothermal to save energy pursuant to the state's GHG policies. See, page 5 of EENF. The ENF implied this facility would "blend" soils for ADM's agricultural operations. It does not appear this facility was ever built, nor that MEPA was notified. Instead, the Phase C 2 activities are an industrial operation selling sand commercial via the ADM subsidiary, Read Custom Soils.

ADM has continued to conduct industrial scale earth removal from the site without ever constructing the soil blending site the were approved for. It is our position that, in misrepresenting the nature of the soil blending facility, which has yet to be constructed, ADM has materially misrepresented the nature of their work. We request that the secretary find that this materially misrepresentation (whether knowingly or not) constitutes an NPC as per 301 CMR 11.05(10) and Require an EIR assessing, among other relevant issues, the amount of earth being removed from the site, the actual amount daily truck visits, and the uses towards which the removed earth is being put.

Additional Explanation for MEPA Thresholds:

11.03(6)(a)6 Transportation: The large volume of earth removed off the TMUD area (about 20 million cubic yards, minimum) for commercial sale throughout the Northeast has generated at last 3,000 or more New average daily trips on roadways providing access to a single location (ADM lands). Eyewitness testimony and photographic evidence shows that ADM's earth removal activities under the Phase C1 and C 2 projects are generating in excess of 90,000 truck trips coming from Carver sites alone with more from the Phase 2 bog expansion area.

11.03(7)(b) Energy: Phases C1-C12 have been segmented to avoid the Energy threshold. The project has resulted in the construction of new electricity generating facilities with total capacity of 25 or more megawatts. In addition, in May 2021, ADM announced plans to build 400 more acres of land based solar utilities in Wareham, adding more megawatts in the region.

11.03(10)(b)2 Historical and Archeological Resources: It appears that Phases C1 to C12 have destroyed and will destroy Native American heritage without the free, prior, and informed consent of the local Indigenous community, in violation of UNDRIPP. The purported "permission" granted by MHC to A.D. Makepeace and Borrego Solar to destroy Wampanoag cultural resources in order to conduct strip mining and to erect industrial land based solar violates fundamental principles of environmental justice and basic human rights. ADM failed to fully disclose this damage to appropriate persons.

ATTACHMENTS & SIGNATURES

Attachments:

1. Secretary's most recent Certificate on this project
2. Plan showing most recent previously-reviewed proposed build condition
3. Plan showing currently proposed build condition
4. Original U.S.G.S. map or good quality color copy (8-1/2 x 11 inches or larger) indicating the project location and boundaries
5. List of all agencies and persons to whom the proponent circulated the NPC, in accordance with 301 CMR 11.10(7)

Signatures:

9/23/2021 /s Margaret Sheehan	9/23/2021 /s James T. Mooney
Date	Date
Signature of Responsible Officer or Proponent	Signature of person preparing NPC (if different from above)
Margaret Sheehan	James T. Mooney
Name (print or type)	Name (print or type)
Save the Pine Barrens, inc.	Save the Pine Barrens, inc.
Firm/Agency	Firm/Agency
158 Center Hill Road	158 Center Hill Road
Street	Street
Plymouth MA 02360	Plymouth MA 02360
Municipality/State/Zip	Municipality/State/Zip
(508) 259-9154	(508) 259-9154
Phone	Phone

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs ■ MEPA Office

For Office Use Only
Executive Office of Environmental Affairs

MEPA Analyst: Aisling Eglington

Phone: 617-626- 1024

Notice of Project Change

The information requested on this form must be completed to begin MEPA Review of a NPC in accordance with the provisions of the Massachusetts Environmental Policy Act and its implementing regulations (see 301 CMR 11.10(1)).

EEA # 13940		
Project Name: Phase C1 - Wankinco Cranberry Bog Expansion, ADM Tihonet Mixed Use Development		
Street Address: Off Federal Road and Cranberry Road		
Municipality: Carver	Watershed: Buzzards Bay	
Universal Transverse Mercator Coordinates:	Latitude: 41 d 50' 17.1 2" N Longitude: 70d 43' 4.1 3" W	
Estimated commencement date: Nov. 201 0	Estimated completion date:	
Project Type:	Status of project design:	%complete
Proponent: ADM Development Services, LLC		
Street Address: 158 TIHONET RD.		
Municipality: WAREHAM	State: MA	Zip Code: 02571
Name of Contact Person: Stacy H. Minihane		
Firm/Agency: Beals and Thomas, Inc.	Street Address: 32 Court Street	
Municipality: Plymouth	State: MA	Zip Code: 02360
Phone: (508) 366-0560	Fax: (508) 366-4391	E-mail: sminihane@bealsandthomas.com
<p>With this Notice of Project Change, are you requesting:</p> <p>a Single EIR? (see 301 CMR 11.06(8)) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>a Special Review Procedure? (see 301CMR 11.09) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>a Waiver of mandatory EIR? (see 301 CMR 11.11) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>a Phase I Waiver? (see 301 CMR 11.11) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)? 11.03(6)(a)6, 11.03(7)(b), 11.03(10)(b)2</p> <p>Which State Agency Permits will the project require? Conservation and Management Permit from NHESP,</p> <p>Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:</p>		

PROJECT INFORMATION

In 25 words or less, what is the project change? The project change involves . . .

ADM has materially misrepresented the nature of their work, as demonstrated by their failure to build the bog that they claimed was the goal and instead continuing to strip mine the site

See full project change description beginning on page 3.

Date of publication of availability of the ENF in the Environmental Monitor: (Date:)

Was an EIR required? ☐ Yes ☒ No; if yes,
was a Draft EIR filed? ☐ Yes (Date:) ☐ No
was a Final EIR filed? ☐ Yes (Date:) ☐ No
was a Single EIR filed? ☐ Yes (Date:) ☐ No

Have other NPCs been filed? ☐ Yes (Date(s):) ☒ No

If this is a NPC solely for lapse of time (see 301 CMR 11.10(2)) proceed directly to
ATTACHMENTS & SIGNATURES.

PERMITS / FINANCIAL ASSISTANCE / LAND TRANSFER

List or describe all new or modified state permits, financial assistance, or land transfers not previously reviewed: **dd w/ list of State Agency Actions (e.g., Agency Project, Financial Assistance, Land Transfer, List of Permits)**

They received a Conservation and Management Permit from NHESP, which was amended twice and extended in 2016, with the most recently approved expiration date (as reflected in NHESP's response to our PRR) being 6/9/2020. They also received an Order of Conditions from the Carver Conservation Commission, Earth Removal Permit from the Carver Earth Removal Committee, and a NPDES Construction General Permit from the US EPA

Are you requesting a finding that this project change is insignificant? A change in a Project is ordinarily insignificant if it results solely in an increase in square footage, linear footage, height, depth or other relevant measures of the physical dimensions of the Project of less than 10% over estimates previously reviewed, provided the increase does not meet or exceed any review thresholds. A change in a Project is also ordinarily insignificant if it results solely in an increase in impacts of less than 25% of the level specified in any review threshold, provided that cumulative impacts of the Project do not meet or exceed any review thresholds that were not previously met or exceeded. (see 301 CMR 11.10(6)) ☐ Yes ☒ No; if yes, provide an explanation of this request in the Project Change Description below.

FOR PROJECTS SUBJECT TO AN EIR

If the project requires the submission of an EIR, are you requesting that a Scope in a previously issued Certificate be rescinded?

☐ Yes ☐ No; if yes, provide an explanation of this request_____.

If the project requires the submission of an EIR, are you requesting a change to a Scope in a previously issued Certificate?

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SUMMARY OF PROJECT CHANGE PARAMETERS AND IMPACTS

Summary of Project Size & Environmental Impacts	Previously reviewed	Net Change	Currently Proposed
LAND			
Total site acreage			
Acres of land altered			
Acres of impervious area			
Square feet of bordering vegetated wetlands alteration			
Square feet of other wetland alteration			
Acres of non-water dependent use of tidelands or waterways			
STRUCTURES			
Gross square footage	196		0
Number of housing units			
Maximum height (in feet)			
TRANSPORTATION			
Vehicle trips per day	100		
Parking spaces			
WATER/WASTEWATER			
Gallons/day (GPD) of water use			
GPD water withdrawal			
GPD wastewater generation/ treatment			
Length of water/sewer mains (in miles)			

Does the project change involve any new or modified:

1. conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97? ☐ Yes ☒ No

2. release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction? ☐ Yes ☒ No

3. impacts on Rare Species? ☐ Yes ☒ No

4. demolition of all or part of any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth? ☐ Yes ☒ No

5. impact upon an Area of Critical Environmental Concern? ☐ Yes ☒ No

If you answered 'Yes' to any of these 5 questions, explain below:

PROJECT CHANGE DESCRIPTION (attach additional pages as necessary). The project change description should include:

- (a) a brief description of the project as most recently reviewed
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- (d) measures that the project is taking to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts. If the change will involve modification of any previously issued Section 61 Finding, include a draft of the modified Section 61 Finding (or it will be required in a Supplemental EIR).

ADM has concealed the material fact that it has not constructed the agricultural project for Phase C 1. The naked eye can see that the 32-acre agricultural project has not been built in the location that was the subject of MEPA review. Instead, ADM has expanded strip mine operations across the Phase C-1 site, a 500+ acre lot (Lot 2-4). It continues to strip mine the site, conducting an industrial sand mining operation and not explaining this in the EENF. ADM falsely stated that the Phase C-1 agriculture project was done, their March 2021 EENF states, "32 acres Agricultural (constructed as Phase C1)" on page 3-4. CLWC's June 7, 2021 NPC informed the Secretary that the Phase C-1 agricultural project was not built, yet the Certificate erroneously represented that it was. The June 9, 2021 Certificate states that, "Phase C1 included the construction of the Wankinco Bog, 1 16.5-acre bog, 2.5-acre reservoir and 3 tailwater recovery pond, 13 acres of bog roads/graded areas and preservation of 24 acres of open space." Further, ADM used the agricultural project in Phase C-1 as a ruse to obtain a Conservation and Management Permit for the Eastern Box Turtle from MassWildlife under the Massachusetts Endangered Species Act. The 32-acre project has not been built in the location identified in the CMP permit.

ADM also used the agricultural project to obtain a sign-off from Massachusetts Historical Commission. According to the October 29, 2010 MHC sign off letter, the site may have met criteria of eligibility for "listing in the National Register of Historic Places because it contains information on ancient Native American occupation and land use within the inland portions of Carver during at least the Archaic Period." Phase C1 Wankinco Cranberry Bog expansion, Carver, PAL #2503, MHC # RC 3804, letter from Brona Simon, October 29, 2010, for review of agricultural project that was never built. On information and belief, and due to the refusal of MHC to provide information, it appears these sites were destroyed.

The Project, as initially and most recently reviewed, was the construction of a cranberry bog on the 32 acre site. This (contrary to ADM's previous filings) has still not happened, despite the extensions provided to them by NHESP on their CMP, which it appears they have still overshot, as it was extended until 06/06/2020 according to NHESP's Amanda Veinotte in a 2016 email to Stacy Minihane. ADM has materially misrepresented the work that they are performing as agricultural bog construction, and are in fact conducting commercial mining and sand extraction. It also appears (based on Google Earth imaging) that they have not constructed the 196 square foot pump house for the bog, both of which were approved in their original build condition.

We request that the secretary find that ADM has knowingly or inadvertently concealed a material fact, or submitted false information, and that that finding be treated as an NPC as per 301 CMR 11.10(5). We request that the secretary require ADM to submit an EIR accurately reflecting the volume of earth removed, where it is being sent, for what purpose it is being used, and explaining their failure to follow through on the previously approved Bog Construction.

Additional Explanation for MEPA Thresholds:

11.03(6)(a)6 Transportation: The large volume of earth removed off the TMUD area (about 20 million cubic yards, minimum) for commercial sale throughout the Northeast has generated at last 3,000 or more New average daily trips on roadways providing access to a single location (ADM lands). Eyewitness testimony and photographic evidence shows that ADM's earth removal activities under the Phase C1 and C 2 projects are generating in excess of 90,000 truck trips coming from Carver sites alone with more from the Phase 2 bog expansion area.

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ATTACHMENTS & SIGNATURES

Attachments:

1. Secretary's most recent Certificate on this project
2. Plan showing most recent previously-reviewed proposed build condition
3. Plan showing currently proposed build condition
4. Original U.S.G.S. map or good quality color copy (8-1/2 x 11 inches or larger) indicating the project location and boundaries
5. List of all agencies and persons to whom the proponent circulated the NPC, in accordance with 301 CMR 11.10(7)

Signatures:

9/23/2021	/s Margaret Sheehan	9/23/2021	/s James T. Mooney
Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing NPC (if different from above)
Margaret Sheehan		James T. Mooney	
Name (print or type)		Name (print or type)	
Save the Pine Barrens, inc.		Save the Pine Barrens, inc.	
Firm/Agency		Firm/Agency	
158 Center Hill Road		158 Center Hill Road	
Street		Street	
Plymouth MA 02360		Plymouth MA 02360	
Municipality/State/Zip		Municipality/State/Zip	
(508) 259-9154		(508) 259-9154	
Phone		Phone	

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #3:

Affidavit of Dr. William Stubblefield

AFFIDAVIT OF J. WILLIAM STUBBLEFIELD, PhD

I, J. William Stubblefield, duly sworn, depose and say:

Qualifications and Experience

1. I am submitting this Affidavit in support of the Amicus Brief of Save the Pine Barrens, Inc. in the above-referenced matter with regard to the Massachusetts zoning laws on solar energy.
2. I have a Bachelor of Arts and a Masters Degree in Biology from the University of California at Riverside and a Doctorate in Biology from the Department of Organismic and Evolutionary Biology at Harvard University. I conducted post-doctoral work at the University of Utah in the areas of the mathematical theory of sex ratio evolution, the origins of sociality, and the behavioral ecology of solitary wasps.
3. I reside in Wendell, Massachusetts where I am involved in a number of activities regarding forest protection and climate change.
4. My scientific work has been focused in two main areas. The first of these is the systematics, behavior, and ecology of Aculeate Hymenoptera, a major group of insects characterized by a highly modified ovipositor (egg-laying organ) that functions as a sting capable of injecting venom to subdue prey or ward off predators. This group includes ants, bees, and many kinds of wasps. My ongoing work with such a large and diverse group of insects and their interactions with other organisms has provided a rich and detailed acquaintance with the living diversity of Massachusetts. The other area of scientific work concerns sex-ratio evolution and related problems in evolutionary biology. Much of this work has been of a theoretical and mathematical nature giving me a working understanding of dynamical models in population genetics and ecology that are closely related to current modeling efforts in connection with the intertwined emergencies of climate disruption and biodiversity loss.
5. From 1988 to 2003, I worked for an international energy consulting firm, Cambridge Energy Research Associates (CERA), eventually becoming Director of Information Services. Through my work at CERA, I gained a working familiarity with the energy industry and the way it thinks and operates. This experience is highly relevant to the dual emergencies of climate disruption and biodiversity loss because energy operations must not be allowed to undermine the ecological integrity of the planet.
6. After leaving CERA, I was engaged from 2005 to 2015 as a Senior Scientist with the Fresh Pond Research Institute in Cambridge working on the evolution of resource transfers between generations and the trajectory of the human sex ratio from conception

to birth.

7. I am currently retired and spend my professional time applying my scientific training and expertise to support efforts to increase public understanding of the essential role natural ecosystems play in maintaining human existence. I am involved with a number of volunteer groups, including Forest Facts, Wendell State Forest Alliance and the Massachusetts Sierra Club Forest Protection Team. I am also part of a subcommittee that is drafting new bylaws for the Town of Wendell relating to solar and other renewable energy projects. I have devoted much time and effort to the study of how forests and wetlands can help address the climate crisis in Massachusetts.
8. I have witnessed first hand the challenges facing municipalities that attempt to limit the loss of forests and wetlands by ground-mounted solar energy installations that are subsidized by the Commonwealth's SMART solar program.

The Dual Emergencies of Climate Disruption and Biodiversity Loss

9. We face multiple planetary emergencies of unprecedented scale, including the intertwined threats of climate disruption and biodiversity loss (Rockström *et al.* 2009; Steffen *et al.* 2015). The climate crisis is caused by the build up of greenhouse gases (GHGs) in the atmosphere, mostly CO₂ from the burning of fossil fuels. Now at levels never previously experienced by humans, GHGs are having profound effects on global climate. At the same time, the world faces alarming rates of biodiversity loss with disturbing consequences for the ecological services necessary for our continued survival.
10. Forests and other natural systems capture and store vast amounts of carbon, and they play an equally vital role in maintaining the complex web of life upon which human survival depends. The protection of forests and wetlands is of critical importance in preventing biodiversity loss and the risk of ecological collapse. Forests contain an enormous fraction of terrestrial diversity and their continued vitality is critical to maintaining ecological integrity.
11. Deforestation for whatever reason results in the loss of forest benefits. Climate mitigation and biodiversity protection are of critical importance, but forests provide many other benefits as well, including water filtration, flood mitigation, evaporative cooling, outdoor recreation, nature study, tourism, enhanced physical and mental health, and spiritual replenishment. These benefits should be readily available to all residents of Massachusetts, and their protection for current and future generations is a major contribution to public welfare.

Climate Disruption

12. The latest report from the Intergovernmental Panel on Climate Change (IPCC) released in 2021 raised the alarm over the accelerating climate emergency to the highest level yet.

Without exaggeration, UN Secretary General António Guterres referred to the report as “code red for humanity.”

13. A global average temperature rise of more than a dangerous 1.5°C is already certain, whatever we do. Under all scenarios, the planet will likely cross this limit within the next decade or two. The only reasonable hope for a livable future is to act now to eliminate emissions of CO₂ from burning fossil fuels and to remove vast quantities from the atmosphere. If both of these things are done, the IPCC consensus is that it would still be possible to pull global temperature back to a relatively safe level after exceeding 1.5°C for a brief period.
14. A variety of technologies for carbon capture and storage are under development, but they are all in their infancy, and the prospect of deploying them on a planetary scale is highly problematic and enormously costly. The only available means for achieving the removal of CO₂ from the atmosphere at anywhere near the scale required is to enhance accumulation of carbon in natural ecosystems, especially forests and wetlands. If protected from human intervention, forests here in New England could capture and store more than twice as much carbon as they do now, and continue to do so far into the future (Nunery and Keeton 2010, Keeton *et al.* 2011, Leverett *et al.* 2021).
15. The IPCC (2019) reports that natural sinks alone are likely not sufficient to stabilize the climate and that new technology will also be needed. What is clear is that failure to protect natural sinks will guarantee a more dangerous future. This requires that we keep forests as forests and minimize the harm we inflict on them.
16. It is estimated that covering a mere 0.3% of the Earth’s land surface with solar arrays using existing technology could supply all the energy that humans now use (Bond *et al.* 2021). Given its location and variable weather, Massachusetts would need several times that much in order to be self-sufficient but still only a small fraction of total land area.
17. Massachusetts does not have to give up forested land that sequesters carbon nor productive agricultural land in order to generate sufficient solar electricity to reach its climate goal of net zero by 2050. Massachusetts can meet most of its energy needs by putting solar energy systems on parking lots, south-facing roofs and walls, as well as land already degraded by landfills or industrial pollution.
18. Some assert that replacing forests with solar arrays is a net positive for the climate because solar arrays decrease CO₂ emissions through the reduced use of fossil fuels by an amount that is larger than the amount that would have been removed from the atmosphere if the forest had been allowed to continue growing. This is misleading in at least two important respects. First, any advantage of reduced emissions evaporates unless each additional increment of solar power is matched by an equal or greater reduction in power generated by burning fossil fuels. Merely growing the supply of solar electricity does nothing to reduce emissions. Second, and more importantly, greenhouse gas emission

reduction and CO₂ removal are both essential, and one cannot be substituted for the other without compromising our ability to achieve net-zero emissions.

19. A reasonable and prudent energy policy requires that we invest our limited funds and effort in reducing greenhouse gas emissions as much and as fast as we can, while we expand and protect natural carbon sinks such as forests and wetlands at the same time.

Biodiversity Loss

20. Forests and other natural ecosystems are also central to the global crisis of biodiversity loss. Extinction rates from human activities are increasing and already far exceed those of the recent geological past. Protecting ecosystems from further degradation is of critical importance for a fully functioning biosphere and our own survival.
21. Forests are the terrestrial equivalent of coral reefs in terms of the biodiversity they support. It is often suggested that some 80% of terrestrial species are dependent on forests for their ongoing survival. There is no doubt that a great percentage of terrestrial species depend on forests, although the 80% figure suggests a measure of accuracy that exceeds current knowledge. A few examples are sufficient to show the critical importance of forests as bastions of biodiversity. Some 5000 amphibian species (80% of all known species), 7500 bird species (75%), and 3700 mammal species (68%) all depend on forest habitat around the globe (Vié, Hilton-Taylor, and Stuart 2009). Similar estimates could be cited for organisms spanning the tree of life; if they live on land, they probably live in a forest.
22. Anthropogenic extinction is a planetary crisis with impacts on human well-being at least equal to, and likely worse than, the threat of climate disruption (Rockström *et al.* 2009; Steffen *et al.* 2015). Extinction rates are now comparable to those of the five mass extinction events of the geological past. This alarming situation is often referred to as the Sixth Extinction (*e.g.* Leakey and Lewin 1995 and Kolbert 2014). It has been estimated that current extinction rates are some 1000 times the background rate and increasing (Pimm *et al.* 2014). Barnosky *et al.* (2011) noted difficulties with comparing current extinction rates with those in the geological past, but, nonetheless, concluded (p. 56) that “there are clear indications that losing species now in the ‘critically endangered’ category would propel the world to a state of mass extinction that has previously been seen only five times in about 540 million years.” The UN panel on biodiversity and ecosystem services (IPBES 2019) reported that a million species are at risk of imminent extinction.
23. Terrestrial vertebrates are especially well-studied and provide a clear indication of the extinction crisis we face (Ceballos *et al.* 2015, Ceballos, Ehrlich, and Dirzo 2017, Ceballos, Ehrlich, Raven 2020). Extinction rates of terrestrial vertebrates are appallingly high, and patterns of invertebrate extinction are “equally dire” (Dirzo *et al.* 2014). Declines in abundance typically precede extinction, and it is therefore concerning that North America has experienced a net loss of nearly 3 billion birds since 1970, a 29%

decline (Rosenberg *et al.* 2019). It is sobering to note that the total global biomass of humans and their livestock now dwarfs that of all amphibians, reptiles, birds, and mammals combined (Bar-On, Phillips, and Milo 2018).

24. Insects comprise a large fraction of terrestrial diversity and play essential roles in terrestrial ecosystems. It is therefore noteworthy that long-term sampling of insect populations has often revealed dramatic declines, especially in agricultural areas, so much so that we hear of an Insect Apocalypse (for an accessible summary see Goulson 2021). Although many insect species are thriving and some actually benefit from climate change, the overall trends are downward and alarming (Wagner 2020; Wagner *et al.* 2021).
25. There is little appreciation of just how little we know about the living world. A widely cited attempt to estimate the number of species on Earth came up with a total of 8.7 (± 1.3) million species, of which 2.2 (± 0.2) are marine (Mora *et al.* 2011 and commentary by May 2011). These authors estimated that about 1.2 million species have been described, suggesting that some 86% of existing species on Earth still await description. Striking as this is, assigning names is only the barest beginning of what we need to know in order to understand the ecological interactions among the millions of species with which we share the Earth. The most important thing we can do to stem the tide of extinction and guarantee ecological integrity for future generations is to act now to reduce human impacts on natural ecosystems.
26. As noted in the press release for the joint report from IPBES and the IPCC (2021), “Any measures that focus too narrowly on climate change mitigation should be evaluated in terms of their overall benefits and risks, such as some renewable energies generating surges of mining activity or consuming large amounts of land.”

Massachusetts Climate Goals and the Role of Forests and Wetlands

27. An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, enacted in 2021, commits Massachusetts to achieving “net zero” greenhouse gas emissions by 2050, which means that any remaining emissions into the atmosphere are balanced by equal removals from the atmosphere. In order to reach this ambitious goal, the Commonwealth must both greatly reduce emissions and remove vast quantities of CO₂ from the atmosphere. The only available means for removing CO₂ at anywhere near the required scale is to enhance carbon accumulation in natural ecosystems, especially forests and wetlands. This requires that we protect these critical ecosystems and minimize the harm inflicted upon them by human actions.
28. A growing threat to ecological integrity of Massachusetts is the complete removal of forest cover to install ground-mounted solar arrays on an industrial scale. In its *Losing Ground 2021 Report*, Mass Audubon reported that between June 2012 and June 2017 large-scale, ground-mounted solar installations accounted for about 6000 out of a total of

24,700 acres of natural land lost to development based on a statewide land-use data set compiled by Boston University. Most of this solar energy development was on previously forested land that Massachusetts needs for carbon accumulation and biodiversity protection. This is a growing trend and constitutes a grave threat to the natural landscape of Massachusetts. The fundamental importance of protecting natural systems is not adequately recognized in Massachusetts regulatory programs on industrial solar siting.

29. Deforestation for large-scale solar development has reached alarming levels here in Massachusetts. As Mass Audubon (2020) wisely notes: “We must encourage the continued growth of the solar energy sector while emphasizing rooftop and parking lot canopy systems rather than ground-mounted arrays that degrade wildlife habitat and other important values of natural land.” There is plenty of sunlight for all of us if we use our collective wisdom to site solar energy installations where they best serve the welfare of all people and not just a few profiteers.
30. Municipalities in Massachusetts, such as my own, must be able to use their zoning powers to protect natural ecosystems, and especially forests and wetlands, so they can continue to accumulate carbon and provide other ecological services essential for a habitable world. This is a matter of grave concern at this time when governing bodies at state, national, and international levels continue to falter in their efforts to ensure a livable future for humanity. Indeed, the protection of ecosystems and the organisms they contain is the most effective and least expensive means now available to mitigate the dual emergencies of climate disruption and biodiversity loss (Moomaw *et al.* 2019). Ensuring such protection should be a central goal of land-use policy in Massachusetts and around the world.

Signed under the pains and penalties of perjury this 7th day of February 2022



J. William Stubblefield, PhD

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Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #4:

Affidavit of Mark Andrews

COMMONWEALTH OF MASSACHUSETTS

Supreme Judicial Court

SJC-13195

TRACER LANE II REALTY, LLC

Appellee

v.

CITY OF WALTHAM AND WILLIAM L. FORTE, in his capacity as Inspector of
Buildings for the City of Waltham,

Appellants

ON APPEAL FROM AN AWARD OF SUMMARY JUDGMENT BY THE LAND COURT

CASE NO. 19 MISC 289

AFFIDAVIT OF MARK ANDREWS

I, Mark Andrews, duly sworn depose and say,

1. My name is Mark Andrews. I am Senior Cultural Resource Monitor (CRM) for the Aquinnah Wampanoag Tribal Nation.
2. I am submitting this Affidavit in support of the Amicus Brief filed by Save the Pine Barrens, Inc. in the above-referenced case regarding the zoning powers of municipalities in the Commonwealth of Massachusetts.
3. In my role as Senior CRM, I am responsible for the protection and preservation of cultural resources throughout our Indigenous lands. In my job, I observe private and public construction projects to ensure compliance with regulatory requirements regarding Native American cultural resources.
4. The lands and waters of Massachusetts contain about 30,000 years of cultural history of the Native American form of artifacts, burial sites, workshops and settlements and practices. This cultural history is buried in millennia of soil and sand deposits that has built up over the lands as the glaciers receded over the Eastern Seaboard of the United States.
5. In my job as CRM, I have been involved in up to twelve large industrial solar construction projects in multiple areas of Southern New England. I participated in archeological surveys and the construction activities for these projects. The construction impacts I have observed include the types of earth disturbing activities that have the potential to harm Native American cultural history.
6. It is my view that the destruction of the environment including cutting down forests and removing soils for large scale industrial solar threatens natural resources and Native American culture in Massachusetts.
7. Local municipalities can play a key role in protecting our land and waters from the threats of large ground mounted industrial solar projects. It is my view that this local power should not be diminished.

Signed under the pains and penalties of perjury this 10 day of February 2022.



Mark Andrews
Senior Cultural Resource Manager
Aquinnah Wampanoag Tribal Nation

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #5:

Comments of PFPI on EENF for TMUD Phases 10-12, May 2021



Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114
Via email to MEPA@mass.gov

Re: Expanded Environmental Notification Form, March 15, 2021 and May 11, 2021 Supplement
ADM TMUD Wareham Solar Projects
EEA No. 13940-ADM Tihonet Mixed Use Development
Wareham, Plymouth, Carver, Massachusetts

Dear Secretary Theoharides,

The Partnership for Policy Integrity (PFPI) submits the following comments on the Expanded

Environmental Notification Form. The focus of the state policy matters
has up to this point largely been confined to biomass energy. However, we are very concerned at how the
large-scale solar energy appears to be promoting projects that result in net damage to
ecosystems, and accordingly are submitting these comments on particular aspects of the
Wareham solar projects.

Failure to address climate change is a failure. It is shocking to see
clearing for solar. Climate change mitigation is not just about reducing fossil fuel emissions. Climate
modeling is crystal-clear that we need to not only reduce emissions, but actually sequester CO2 that has
already been emitted. Restoring and expanding forests is the only means under our control to achieve
this at scale. Accordingly, anything that undermines forest carbon uptake is actively undermining climate
mitigation. The state should not have a policy that pits solar against forests. Policies should offer
incentives for preserving and expanding forests, not destroying them.

Satellite imagery from Global Forest Watch shows that forest loss in the vicinity of the project is
particularly high. Figure 1 shows forest loss just since 2000¹
conversion to cranberry bogs and other uses from before 2000. In fact, pulling back, this area appears to
have one of the highest rates of forest loss since 2000 in the entire state of Massachusetts.

¹ Data from Global Forest Watch at <https://bit.ly/3ukdyc0>

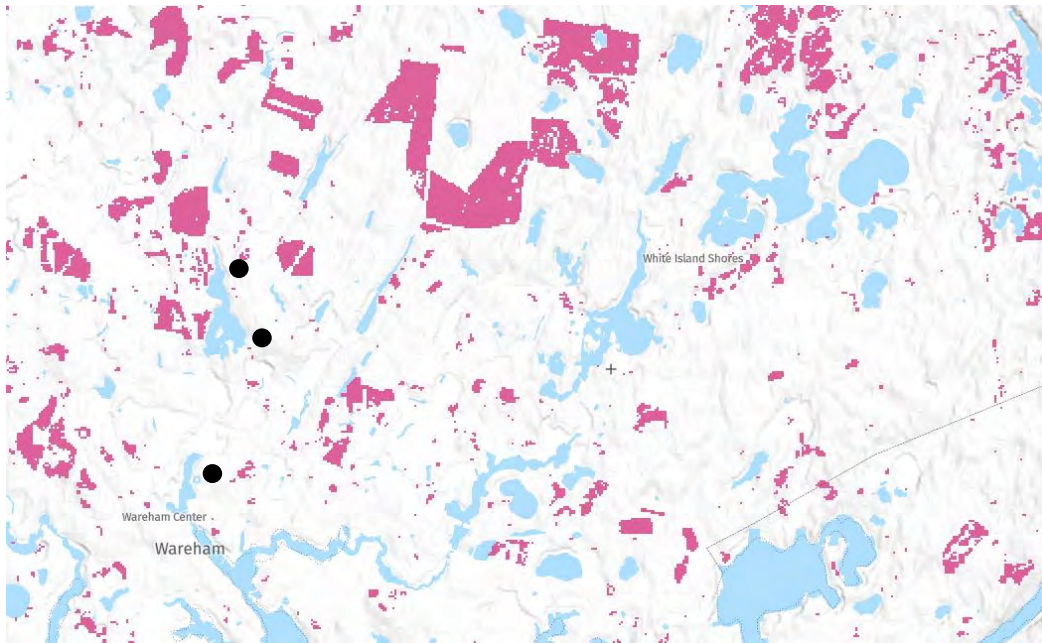


Figure 1. Global Forest Watch overview of forest loss in the area of the project. The three proposed solar fields are marked with black dots.

Regarding this specific project, it is tone-deaf for the EENF to claim (page 11) that *“Furthermore, the Master Plan’s Natural and Cultural Resources Goal 1 is to, ‘Coordinate and strategically implement several ongoing efforts to increase climate resilience in Wareham.’ While the Project will not contribute directly to climate resilience specifically in Wareham, it will advance the Commonwealth’s renewable energy initiatives, which broadly address the issues surrounding climate change.”*

We would argue that any project that causes more forest loss in Wareham is actually undermining the town’s climate resilience.

General comments on the project

These projects are extraordinarily damaging

Using Google Earth to view other solar projects installed in the same area as the proposal makes it evident how damaging these projects are. Removal of forest and land preparation scrapes the soil down to essentially white sand, and even beyond this, further sand mining is occurring. This essentially resets the ecosystem to where it was right after the glaciers retreated. Transpiration from vegetation cools and moistens the air, but the sand pit is a glaring, radiating zone without any ability to affect or modify its microclimate. The subsoil is sterile sand with few available nutrients, meaning nothing much will grow here again in any human timeframe, even after the solar panels are removed. This may be within the owner’s rights – but why is it being subsidized with Massachusetts clean energy subsidies? Approval of the project and receipt of the subsidies should at a minimum be made contingent on the ability to fully restore the site to forest. In few years, these projects are going to be seen as dinosaurs and be viewed with shame for the forest destruction they caused. Assuming a sane climate policy prevails, forest protection and restoration will be prioritized, and solar will be built in places that are already sacrifice zones, such a parking lots, road medians, and perhaps the cranberry bogs of Wareham.



Figure 2. A recent solar and sand mining project in the vicinity of the proposed project (at 41.800214°, -70.703461°)

Comments on the analysis for the proposal

The proposal contains questionable assumptions and analyses in at least two respects – consideration of mitigation for the loss of forests, and consideration of net GHG impacts of the project.

Mitigation of habitat loss

The 2014 certificate on the ENF states, “NHESP indicates that a long term net benefit can be developed through a) permanent protection of appropriate habitat in the vicinity of previously designated conservation areas, and b) providing funding for long-term habitat management to benefit the affected species.”

We wonder if the program would use similar language today. There is no “net” benefit given the accelerating forest loss in the region, as shown in Figure 1.

At page 5 of the March 2021 EENF, it states, “Although portions of the 150 Tihonet Road PV+ES Project lie within identified but unmapped pine barrens habitat, the Proponent is coordinating with NHESP and will undertake appropriate mitigation in the form of conservation lands and habitat funding.”

Even if these minimal set-asides are actually happening, this does not constitute “mitigation” given that the entire pine barrens ecosystem is being obliterated where the solar panels are installed. Setting aside other land for conservation is nice, but there is a net loss of ecosystem that is occurring. There is no “mitigation.”

Other impacts

The loss of vegetation also changes the hydrology of the site. The proponent is developing stormwater retention basins, the planning for which needs to take into account changes in rainfall amount and intensity now underway with climate change. Has this occurred? Does the modeling actually recognize non-stationarity of rainfall?

The ponds already have issues with dissolved oxygen and phosphorous pollution, which is evident with satellite photos that show extensive algae growth. Also, it appears that there is potentially some planting activity planned for the area under the solar panels. We wonder if the project will use herbicides to reduce growth of the meadow? If so, has the potential for water contamination been evaluated, given the sandy soils and the proximity to ponds?

We also note that wetland resources in this rare pine barrens ecosystem are being disturbed. This area of eastern MA has extremely fragile ecosystems. It seems a real failure of state policy, both in terms of MEPA review and in terms of solar incentives, that this project is moving forward and seemingly headed for state approval and even financial support.

GHG analysis

Failure of the state to provide guidance

The 2014 certificate discusses developing a protocol for evaluating GHG impacts, but apparently this has not been done. Why not? There has been plenty of time. There should have been a protocol for the proponents to follow, instead of being left to make it up as they go along. Why is the state so lax on these matters?

Failure to include ecosystem carbon loss

In calculating the GHG “benefit” of the project, the proponent simply ignores the carbon emissions from removing the forest from the site. Why do they assume this is legitimate? It is not, because this is stored carbon. They appear to claim it would only be emitted to the atmosphere if it were burned (page 2 of memo), but in fact even if the trees were converted into long-lived wood products, a significant portion of the wood would be lost right away during processing.

The basic IPCC protocol for assessing emissions impacts of forest clearing treats felling trees as an instantaneous emission of stored carbon, though more refined approaches are possible when data are available. The appropriate protocol to require here appears to be the one for “Other Land”²:

Tier 1

*A Tier 1 method follows the approach in Equation 2.16 in Chapter 2 where the amount of above-ground biomass that is removed is estimated by multiplying the area (e.g., forest area) converted annually to Other Land by the average carbon content of biomass in the land prior to conversion (B_{BEFORE}). In this case, B_{AFTER} in Equation 2.16 is set to zero by default. **The default assumption for the Tier 1 calculation is that all carbon in biomass (less harvested wood products removed from the area) is released to the atmosphere immediately (i.e., in the first year after conversion) through decay processes either on- or off-site.***

Tier 2

² https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_09_Ch9_Other_Land.pdf

A Tier 2 method can be developed and used if country-specific data on carbon stocks before conversion to Other Land (i.e., B_{BEFORE} in Equation 2.16) are obtainable. B_{AFTER} remains at zero. In addition, under Tier 2, carbon losses can be apportioned to specific conversion processes, such as burning or harvesting. This allows for more accurate estimation of non-CO₂ greenhouse gas emissions. A portion of biomass removed is sometimes used as wood products or as fuel wood. Chapter 2, Section 2.4 provides the basic method for estimating non-CO₂ greenhouse gas emissions from biomass burning. Chapter 12 provides guidance for estimation techniques for carbon stored in harvested wood products.

Tier 3

A Tier 3 method requires more detailed data/information than the Tier 2 approach, e.g.,:

- *Geo-referenced disaggregated areas converted annually are used for each land use converted to Other Land;*
- *Carbon densities are based on locally specific information and; and*
- *Biomass stock values are based on inventories and/or the model estimations.*
- *Where data are available, Tier 3 methods may be used to track the dynamic behaviour of carbon stocks and greenhouse gas emissions following conversion. **Where the land remains in a vegetation-free state (due to severe degradation), there will generally be a continuing decline in carbon stocks.** If this is not the case, countries should consider whether the land should be classified under another land use, as indicated in Chapter 3.*

In the case of this project, where stumps and roots will be removed, the loss of biomass carbon is especially notable. The loss of soil carbon is also extreme. According to the data the proponents themselves cite (from EPA), soil carbon can constitute more than 50 - 60% of ecosystem carbon. The total removal of topsoil and the layers of subsoil that are most likely to store soil organic carbon in dissolved forms also needs to be taken into consideration. The state should require the proponents to find data that accurately reflect the aboveground and belowground carbon loss, including from soils, and do the calculation properly.

Failure to include timing of GHG emissions

The proponent draws attention to the future gain of carbon on the site, stating that the calculations are “likely conservative” because they do not include the carbon that will be sequestered in the “meadow” growing beneath the solar panels (to be planted?) and the future carbon sequestration in the forest that will replace the solar panels when the project is decommissioned. These hypothetical impacts are in the future, while the liquidation of site carbon is happening now, just when it is most urgent to reduce emissions. Carbon loss happening in the near term with certainty needs to be valued more highly than future potential carbon gain. Further, it appears that the proponent is actually misrepresenting the developer’s intentions when they say the area will be reforested, because the developer is on video³ as saying that after the “fad” of solar passes, the “junk” will be hauled away and the site will be turned into a housing development.

Sequestration analysis is incorrect

The proponents’ assessment of carbon emissions from the project is confined to estimates of future forest carbon sequestration that will be foregone. They analyze this using two approaches. The first approach uses data they say they obtained from Northeast Survey Consultants, but they do not say what the data are, or how they were obtained, though they do refer to diameter at breast height (DBH)

³ <https://www.youtube.com/watch?v=nh7fnq2y3Sg>

measurements “where applicable.” It is not clear what this means. It is also not clear how the tree volume estimates were made or how they relate to the DBH. The report further makes an error in converting the dry weight to green weight of 72.5%, citing an unpublished online document⁴ with no citations which states, “Taking all species in the table into account, the average tree is 72.5% dry matter and 27.5% moisture.” This is not correct for trees in New England, where moisture content of freshly harvested wood is around 50% and sometimes more.

Given this failure and the proponents’ evident unfamiliarity with protocols for ecosystem carbon assessment, we have no confidence in the approach to calculating increased DBH and volume through time, which uses a “simplified, linear growth rate formula.” They do cite a reference for this approach, but it is not clear if their analysis of forest biomass takes into account the fact that trees with bigger circumference tend to also be taller, meaning their overall volume is greater. In fact, the regression curve that proponents provide for volume/weight (cubic meters) looks very similar to a standard curve of the relationship between diameter and area of a cross-section of a tree (square meters), which if the trunk is circular in cross-section would follow the relationship of “pi-r-squared.” We graphed up that simple relationship (in blue) and overlaid it on the on the proponents’ graph (Figure 3):

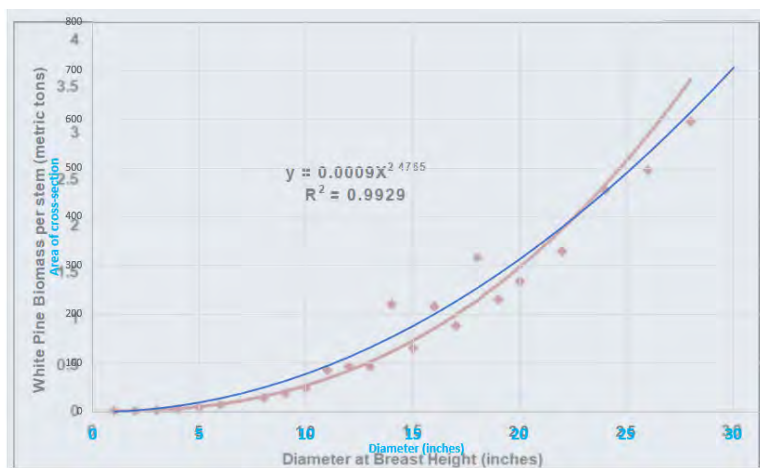


Figure 3. The graph of the relationship between diameter and area (square meters) overlaid on the proponents’ graph of diameter and volume (cubic meters) translated in some unknown way to weight of biomass.

It appears that the proponents’ analysis of biomass per stem does not correctly reflect the overall increase in volume, because it traces a relationship of DBH to stem cross-sectional area, rather than full tree volume. Further, a stem analysis does not really tell much about forest biomass as a whole, unless there is a detailed count of stems per acre, and the analysis includes the volume of stumps and roots. Even with that information, the analysis of carbon *stocks* is incomplete, because it does not include soil carbon. For an analysis of future sequestration (carbon sinks), however, soil carbon may be difficult to quantify.

For a more credible approach, at a minimum the proponents could use the USFS Forest Inventory and Analysis data and tools that the Forest Service makes available for estimating forest carbon stocks and sinks. Additionally, research suggests carbon sequestration by larger, older trees has in some cases been

⁴ https://www.unm.edu/~jbrink/365/Documents/Calculating_tree_carbon.pdf

underestimated, for instance see Stephenson et al 2014⁵ and most recently Leverett et al 2021,⁶ with Figure 1 from that paper reproduced below. While growth patterns from individual trees can not be directly extrapolated to whole stands, the data suggest that the *apparent* “slowing” of growth by older trees is often not reflected in their volume, which continues to increase.

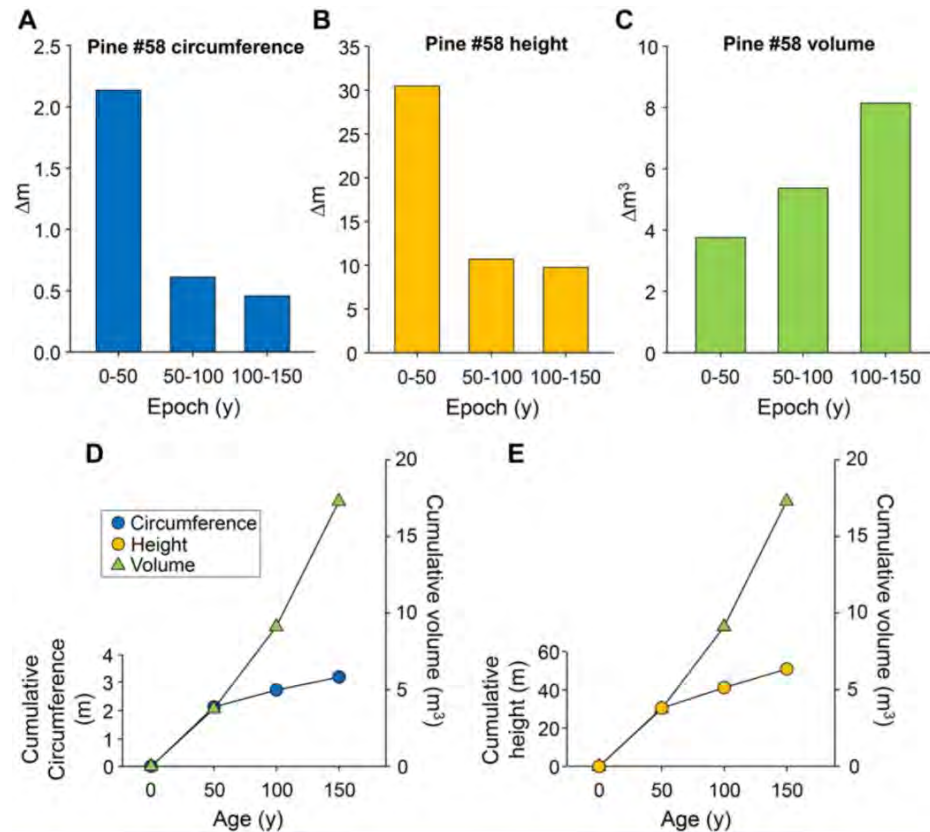


Figure 4, which is Figure 1 from Leverett et al, 2021. *Changes in circumference, height and volume of a stand-grown individual eastern white pine (Pine #58) in three 50-y intervals. Upper panels (A) Change in circumference during 0–50, 50–100, and 100–150 years. (B) Change in height between 0–50, 50–100, and 100–150 years. (C) Change in above-ground tree volume (trunk plus limbs) between 0–50, 50–100, and 100–150 years. Lower panels (D) Cumulative circumference at 50, 100, and 150 years compared to cumulative above-ground volume. (E) Cumulative height at 50, 100, and 150 years compared to cumulative above-ground volume. On each lower panel initial slopes were matched to reflect the rapid change in circumference and height during the first 50-years interval. Note that volume is a proxy for above-ground carbon. Values for circumference, height and volume of Pine #58 were determined by a combination of direct measurement and chronosequence and described in the text and in Supplement.*

⁵ Stephenson, N. L., et al. (2014). "Rate of tree carbon accumulation increases continuously with tree size." *Nature* 507(7490): 90-93. <https://www.nature.com/articles/nature12914#Sec14>. Supplementary information at <https://www.nature.com/articles/nature12914#Sec14>

⁶ Leverett, R. T., et al. (2021). "Older Eastern White Pine Trees and Stands Accumulate Carbon for Many Decades and Maximize Cumulative Carbon." *Frontiers in Forests and Global Change* 4(40). <https://www.frontiersin.org/articles/10.3389/ffgc.2021.620450/full>

The second approach employed by the proponents to estimate foregone sequestration relies on an EPA estimate of forest carbon stocks that includes soil carbon, deadwood, etc. However, the proponents incorrectly apportion sequestration based on stocks, assuming that because living biomass constitutes 31% of the ecosystem carbon, then it must be responsible for the same proportion of active carbon sequestration. If only this were true! If mineral soils added new carbon to stocks at the same rate as living biomass, maybe we wouldn't have a climate crisis (though we'd be up to our eyeballs in soil). In fact among the several problems with this analysis, the proponents have underestimated the amount of ecosystem carbon uptake for which living biomass is responsible, so have underestimated the total ecosystem C sink.

Assumption of fossil fuel displacement is not valid

The entire GHG benefit of the project is based on the assumption that it will displace fossil fuels. The proponents make several statements to this effect. However, for there to be a net reduction in GHG emissions, there does need to be actual, verifiable substitution. Climate warming is a function of the total amount of CO₂ loading, not the GHG intensity of generation. Therefore if solar and other relatively emission-free technology comes online, but the total amount of fossil fuel burning stays the same or increases, there will be no decrease in the amount of CO₂ emitted per year. Yes, it seems likely that fossil fueled electricity generation decreases as solar and wind generation come online and become cheaper, but the other thing that happens is that electricity use increases as consumers become aware that more "green" energy is available, and as electricity becomes cheaper. As electrification increases, for instance of vehicles, overall use will rise, keeping pressure on fossil generators to continue operating. Substitution can only occur if the total amount of electricity generation from fossil sources is capped⁷ - otherwise there is simply additional generation, and no net reduction in emissions. As there is no requirement for fossil generation to be taken offline as new solar generation comes online, there can be no assumption that substitution is occurring – as attractive as this concept appears.

Valuing forests solely as "carbon sinks"

Overall, the very concept embodied in the EENF, that forests are valued in this context solely for their ability to sequester carbon is, frankly, insane. Yes, it is probably possible to calculate a GHG "benefit" to building the solar field and replacing forests, making dubious assumptions as the proponent does. In that case, why not clear all the forests in Wareham? Isn't that the logical outcome of such calculations? Perhaps the state should provide incentives to remove *all* the forest in eastern MA and replace it with solar – then we could claim even more GHG "reductions."

The obvious absurdity of that suggestion indicates that there is some scale at which this policy of allowing forest removal for solar no longer makes sense. To us, it seems obvious that this point has already been reached. Forest loss occurring for any reason is hugely counterproductive for ecosystem values and climate alike; clearing forests for solar, specifically, when there are so many alternative places it could be built, is repugnant.

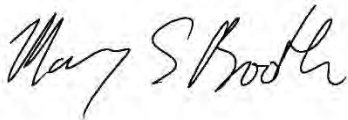
⁷ Leturcq, P. (2020). "GHG displacement factors of harvested wood products: the myth of substitution." Scientific Reports 10(1): 20752. <https://doi.org/10.1038/s41598-020-77527-8>

Decommissioning should include reforestation

The proponent states that funds are set aside for decommissioning. In fact, given the current rapid rate of forest loss in the region now, we suspect that in the future, the highest use of the site will be as forest. Accordingly, the decommissioning cost should include reforestation as a value to society. There is precedent for this – for instance, the landowner has currently been benefitting from Chapter 61, which is a program that reduces taxes because of the public benefit of keeping land in forests. Making approval of these projects and receipt of publicly funded renewable energy subsidies contingent on future mitigation back to the natural state is completely reasonable. At a minimum, state officials should require real mitigation, which returns the land to its natural forested state, as a condition for approval. If this can not be assured, the project should not be approved. Ideally, the state should change its policies and stop approving any so-called “green” energy projects that rely on clearcutting, and in this case obliterating, the natural ecosystem. In the case of this particular project, it seems likely this area will functionally be a waste land, and that forest regeneration will be paltry, if it occurs at all, due to sandy soils that will be rendered even more nutrient-poor with removal of topsoil and sand mining.

Thank you for the opportunity to comment.

Mary S. Booth, PhD
Director, PFPI

A handwritten signature in black ink that reads "Mary S Booth". The signature is written in a cursive, flowing style.

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #6:

Improper Pre-Filing Meeting Notice - AD Makepeace Project 1833.116,
January 2022

Via email to:

Secretary Kathleen A. Theoharides (via Tori Kim and Alex Stryisky)
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Stacey H. Minihane
Beals and Thomas
32 Court Street
Plymouth, Ma. 02360

James Kane (via Stacey H. Minihane)
AD Makepeace Company
Tihonet Road
Wareham, Ma. 02571

January 13, 2022

RE: Improper Pre-Filing Meeting Notice - AD Makepeace Project #1833.116

Yesterday the ADM Makepeace Company (ADM), thru its consultants Beals and Thomas (Beals), provided notice (Notice) of its intent to conduct a MEPA "Pre-Filing Meeting" in Carver, Massachusetts, on January 26, 2022.

This Notice was defective and unreasonable. ADM must be instructed to cancel this 'pre-filing' meeting and schedule instead two separate quarterly meetings – followed later by the pre-filing meeting it now seeks to railroad.

Improper Notice/Gimmickry

The Notice states that "the purpose of the meeting is to present information about the upcoming Final Environmental Impact report filing, which is intended to close-out the Special Review Procedure for the overall Project."

This is the second time ADM and Beals have sought to circumvent the unambiguous obligations of the Special Review Procedure by attempting to accelerate its desired "pre-filing" meeting as a replacement for the two separate quarterly meetings it deliberately refused to conduct.

You are reminded that MEPA saw thru this eye-popping gimmickry in December 2021 when it flatly rejected Beals' same efforts to escape the missed quarterly meetings by unlawfully merging them into a pre-filing session.

MEPA stated then – as it must repeat now - that because ADM failed to hold two of its required 2021 quarterly meetings, those two quarterly meetings should be held promptly, and **"then the required public outreach meetings prior to filing the MEPA document can be held later."**

In other words, before a pre-filing meeting is valid, ADM must first correctly notice and complete the two quarterly meetings it failed to conduct, as these quarterly meetings are prerequisites to a pre-filing eligibility.

COVID

In addition to ADM and Beal's legally flawed meeting maneuver, the proposed January 26, 2022, session is set to be held in Carver, Massachusetts, during a time of unparalleled COVID transmissibility. No less, the meeting room ADM deliberately selected is inadequately ventilated and grossly undersized. According to the host location, the room's maximum capacity is just thirty persons. With proper social distancing, the number of occupants could be substantially less. On the other hand, the meeting invitation was sent to individuals and organizations, amounting to hundreds of people.

Carver's reported positive COVID infection rates are already 40% higher than the statewide average. In fact, Carver presently has one of the highest COVID positive infection rates in the entire State and a worrisomely low vaccination rate – indeed one of the lowest in the entire State.

Combine this with the fact that many of the other meeting attendees live or work in neighboring Wareham, where infection rates are also problematic and where vaccination rates are likewise below the state average.

Add to this the disturbing level of accelerating breakthrough infections and the fact that reported infections in Carver, Wareham, and Plymouth likely represent a fraction of the actual cases due to the number of carriers without symptoms.

The Tobey Hospital and Jordan Hospital (the most proximate medical centers) report that they are already swamped. To say nothing of the fact that experts – worldwide - advise practicing preventative measures, which the proposed Carver location is unable to provide.

Subjecting participants to this potential super-spreader environment is also unconscionable because there is no arrangement for remote participation or local television broadcasting.

Gathering people into an undersized room without proper ventilation and without the ability to meaningfully social distance is either negligence of the highest order (some might even say bad faith) – or recklessly indifferent to human health (some might say bad faith of an even higher variety).

For the reasons noted, the compulsory quarterly meetings (emphasis added) must be appropriately noticed and scheduled with attention to common sense and human decency (facilities included). Delaying these same meetings until the current surge in COVID infections recedes meaningfully should also be encouraged. In any case, the meetings should be scheduled such that at least two weeks prior notice is provided thru the Environmental Monitor. ¹

Sincerely,

Barry C. Cosgrove

¹ The Notice has not been published in the Environmental Monitor, and it cannot be so published until January 21, 2022 - thus providing insufficient notice to many potential attendees.

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #7:

Comments of STPB on case 131-4-3, request for special permit by
Industrial Tower and Wireless, LLC, December 2021

Save the Pine Barrens, Inc.

158 Center Hill Road

Plymouth MA 02360

www.savethepinebarrens.org

environmentwatchesoutheasternma@gmail.com

December 07, 2021

Stephen G. Gray, Esq.
Chair
Zoning Board of Appeals
Town of Carver
108 Main St.
Carver, MA 02330

Re: Case 131-4-3, Industrial Tower and Wireless, LLC,

**Request for special permit for Map 131, lot 4-3, land owned by AD Makepeace, Co.
0 Federal Road, Carver MA**

Dear Chairman Gray and members of the Board:

Save the Pine Barrens, Inc. ("STPB") submits these comments on the special permit application of Industrial Tower and Wireless, LLC's ("the Applicant") to put an industrial cell tower ("the Project") on land owned by AD Makepeace within the Tihonet Mixed Use Development zone ("TMUD").

The TMUD is approximately 6,500 acres of land in Plymouth, Carver and Wareham where development is controlled by the Massachusetts Environmental Policy Act (MEPA), M.G.L. c.30, §§61- 62I and the regulations 301 CMR 11.00 et seq. **A map of the TMUD area is below.** These controls were put in place under a special deal AD Makepeace made with the public and with the Commonwealth of Massachusetts in 2007 and continues in effect today. This deal was negotiated by non-profit environmental groups including members of STPB. The deal set up the MEPA Special Review Procedure guaranteeing public meetings, MEPA review, and

public input on all development in the TMUD area. This applies to the cell tower Project. These are legally binding commitments contained in MEPA Certificate # EEA 13940, dated 1/29/2007 issued by the Secretary of Energy and Environmental Affairs (“EEA”). The State MEPA Office is mandated to ensure environmental review and public participation in the siting of the Project. Makepeace is required to comply with the Special Review Procedure for all development in the TMUD including the Project.

To educate yourself about this you can examine the MEPA Certificates and environmental impact reports and the deal itself which are supposed to be stored in a public repository in the Carver Town Hall. You can also contact the MEPA staff person in charge:

Alex Strysky MEPA alexander.strysky@state.ma.us
MEPA Office
100 Cambridge Street
Boston, MA 02114
Cell: (857) 408-6957 (preferred)
Office: (617) 626-1025

The ZBA must consider the applicable, legally binding requirements of the MEPA deal before permitting this Project. The ZBA is hereby notified that construction of this Project will violate the MEPA deal.

It appears from the permit application that AD Makepeace and the Applicant hid the MEPA deal from the ZBA. ADM must:

- Mitigate “Damage to the Environment” under MEPA by putting land into conservation, which Makepeace has not done to the level required by state permits; and
- Minimize “Damage to the Environment” under MEPA which Makepeace has not done.

Why didn’t the Applicant disclose the TMUD requirements to the ZBA?

Instead of fully informing the ZBA about the MEPA deal, AD Makepeace and its CEO Jim Kane appear to have hidden material facts from a regulatory body. Industrial Tower and Wireless participated in this when it agreed to accept the “Authorization to Represent Property Owner” form signed by Mr. Kane on September 13, 2021. Mr. Kane did not disclose the MEPA

requirements when he wrote his October 26, 2021 letter to the Carver ZBA stating Makepeace's "show of support for Industrial Tower and Wireless' petition for a Special Permit to construct a cell phone tower on an unused portion of our land."

Makepeace's deal with MEPA and the public was to ensure that the TMUD development would be a leading model of "smart growth", residential, commercial and light industrial, characterized by open space and things like bike paths. Instead of keeping this promise, Makepeace has engaged in material misrepresentations to local and state regulators turning the TMUD, including the once globally rare Pine Barrens forest around the cell tower site, into a wasteland of industrial strip mines, deforestation and industrial energy projects. The Project abuts land where Makepeace is operating Read Custom Soils, initially represented to state and local officials as a "temporary" soil blending facility for "processing" earth removed from the TMUD area to build cranberry bogs. This is now a major industrial sand mining operation.

Maybe the ZBA already knew about the MEPA deal, but chose to ignore it. Curiously, at the October 26, 2021 public hearing on the Project, when Ms. Sheehan of STPB asked "who owns the land" the ZBA Chair, Mr. Gray, feigned ignorance, as did the rest of the ZBA, pretending not to know that Makepeace was the landowner. See Video recording of ZBA hearing, Oct. 26, 2021. Mr. Kane was at the ZBA on Oct. 26, 2021 for the public hearing on STPB request for enforcement then promptly left before Makepeace's cell tower project public hearing started. Was this an attempt to hide the fact that Makepeace was doing yet another industrial project in the TMUD area and evade accountability?

As the ZBA is well aware, serious allegations regarding ADM's unlawful and unregulated strip mining operations in the TMUD area abutting the Project site on all sides are the subject of numerous legal proceedings. These legal proceedings include an appeal of the

ZBA's denial of STPB's request for enforcement of the Zoning Bylaw abutting the land where the Applicant intends to locate this latest industrial use within the "green" "smart growth" TMUD area. These actions include requests for a Notice of Project Change under MEPA, 301 CMR 11.01(6)(a). The NPC documents Makepeace's knowing and/or inadvertent concealment of material facts and submitting of incomplete and misleading information to the state MEPA as recently as March, 2021. This has caused and continues to cause Damage to the Environment that has not been mitigated.

Is the ZBA going to look the other way at the long history of Makepeace's broken promises and misrepresentations and pretend that the cell tower site is somehow isolated from the surrounding unlawful strip mining — even though it is abutting the strip mine area where those activities are located?

Is the ZBA aware that one of Makepeace's broken promises and violations of the MEPA Certificate is the failure to give the Town of Carver a transfer of development rights (TDR) for the very location where this project is proposed? That is, at 0 Federal Road. Yes, indeed - in exchange for state permits to destroy Native American cultural sites and endangered species habitat so that it could build a cranberry project at 0 Federal Road at the intersection of Federal Road and Cranberry Road, ADM was supposed to give the Town TDR rights. Where are they? Where is the cranberry bog? Makepeace reneged on both. Is the ZBA going to look the other way on this too?

If the ZBA isn't responsible for the proper development of land in Carver, who is?

The Project violates the Bylaw

- The Project violates the purposes of the Bylaw which include to preserve the cultural, historical and agricultural heritage of the community. Article 1. Purpose.

- The Project does not meet the Special Permit requirements of Zoning Bylaw 4660:
- 4664: it will have a negative impact on neighborhood character including aesthetics, which the MEPA Certificate requires to be studied.
- .4665: the Project will have negative impacts on the natural environment, including visual impacts aesthetics by adding yet another industrial use in an area designated by the TMUD for smart growth and conservation, and will have visual impacts far beyond the TMUD area.
- 4677: the Project does not minimize adverse visual effects on the environment.
- The Project requires site plan review under Section 3110 of the Bylaw.
- The Agendas for October 26, 2021 and December 7, 2021 violate the Open Meeting Law by failing to identify the landowner of the project site, AD Makepeace, intentionally attempting to shield this industrial use and AD Makepeace from public scrutiny.

Cumulative damage to the environment, including historic resources

Whatever claims Makepeace and the Applicant are making to the ZBA about lack of impacts to historic resources and ecosystems is incomplete if it fails to provide accurate information about Makepeace's destruction of all of environmental and historic and archeological resources that have occurred in the TMUD area. These impacts cannot be segmented by lot lines; the entire area along the Wankinko River and Federal Road was identified under MEPA in 2010 as having cultural and ecological significance. The Project is located near and within what the MEPA Special Review Procedure identifies as "Phase C1, Wankinco Bog" and "Phase 2" the 6.5 million cubic yard earth removal and claimed agricultural

project across the River from Read Custom Soils. As the ZBA well knows from the STPB enforcement action, Makepeace has yet to complete the agricultural project at 0 Federal Road, showing clearly that this was just a ruse for strip mining. The Phase 1 area on Federal Road north of the proposed Project site was identified as eligible for the National Registry of Historic Places. Has Industrial Towers or Makepeace documented the study that was supposed to be done to ensure that this site of potential national significance was not destroyed were the potential cultural artifacts “blended” into “custom soil products” and sold for commercial purposes by Makepeace’s subsidiary, Read Custom Soils?

The Project is sandwiched among three TMUD sites - Phase 1, the 27 acre bog that was never build even though the land was strip mined, Phase C2, the Plymouth strip mine site, and Phase C 6, the 50 acre strip mine and solar project and the expanded strip mine at 59 Federal Road. All three of these areas contained globally rare Pine Barrens ecosystems – 220 plants and animals protected under the Massachusetts Endangered Species Act. They contained Indigenous artifacts and historical objects, and are part of a large, culturally and historically sensitive area, according to the Massachusetts Historical Commission.

Since at least 2010, Makepeace has shown a repeated disregard for the historical and cultural damage that its strip mining and industrial development has caused and continues to cause. The Industrial Tower and Wireless project is more of the same. An intensive Archaeological Survey that shows what Makepeace has destroyed with its stripmining throughout the TMUD area, cumulatively since 2010, before Massachusetts Historical Commission or MEPA can complete a legitimate review of this project.

Segmentation

This Project represents an improper segmentation of A.D. Makepeace's development within the TMUD region, as it is not being subjected to the same environmental review as the rest of the project and evades MEPA review. A.D. Makepeace was required to undergo MEPA review for its TMUD projects, including the Reed Custom Soils Facility immediately adjoining this site, and was required to account for the environmental destruction caused by their projects. This Project will cause additional destruction that Makepeace has failed to disclose to MEPA. This represents an improper segmentation.

STPB is a non-profit volunteer-led coalition of groups and individuals that works to educate and serve the public interest. The mission is to protect, restore, and steward the lands and waters of Southeastern Massachusetts including the lands protected by the TMUD Certificate. Its interests, mission and members will be harmed by the failure to minimize and mitigate the damage to the environment from this Project.

Sincerely,

Margaret E. Sheehan, Esq.

Margaret E. Sheehan
Attorney
Save the Pine Barrens, Inc.
158 Center Hill Road
Plymouth MA 02360
environmentwatchsoutheasternma@gmail.com
tel. 508-259-9154

cc:

Herring Pond Wampanoag Tribe, Melissa Ferretti, President and Chairlady
Rishi Reddi, EEA, EEA, Environmental Justice Program

Secretary of Energy and Environmental Affairs, Katherine Theoharides and Alex Stryisky,
MEPA Unit, Boston MA
Massachusetts Historical Commission, Brona Simon, Director
Holly Herbster, Public Archeological Lab to hherbster@palinc.com

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #8:

MEPA demand letter for quarterly public update meeting re: EEA 13940,
October 2021

Save the Pine Barrens, Inc.
158 Center Hill Road
Plymouth MA 02360
www.savethepinebarrens.org

October 29, 2021

BY EMAIL TO:
MEPA Office
EEA No. 13940
100 Cambridge Street-9th Floor
Boston, MA 02114

RE: EEA 13940 ADM Tihonet Mixed Use Development (TMUD) EEA ADM Development Services, LLC

Dear Secretary Theoharides,

This is a demand that the Massachusetts Environmental Policy Act (MEPA) office immediately direct ADM Development Services, LLC (ADM), the project proponent for the above-referenced Project, to notice and hold a quarterly public update meeting as mandated by the MEPA Certificate dated January 29, 2007 (*January 29, 2007, Certificate of the Secretary of Environmental Affairs Establishing a Special Review Procedure*) (the Certificate).

The Certificate established a Special Review Procedure (SRP) under 301 CMR 11.09. Condition 7 of the Certificate states,

“In addition, the proponent ***shall be required to hold quarterly public update meetings***, which meetings shall be open to the public, held in a publicly accessible location in one of the three host towns, and notice of which shall be provided in each of the three communities at least seven (7) days prior to the meeting. The proponent shall also establish and maintain a publicly accessible website to advertise such meetings, to make documents available for public review, and to provide Project updates as appropriate.” (Emphasis supplied)

ADM has not held a quarterly public update meeting since March 22, 2021. It never held the legally mandated quarterly meetings for June 2021 or September 2021. This is blatant violation of the Certificate, Section 7 and of MEPA, G.L. c. 30, Section 62A which authorizes the establishment of a SPR and of the MEPA SPR regulation, 301 CMR 11.09.

We note for the record that in 2007 when it established the SPR, the Secretary declined to require a Citizens Advisory Committee (CAC) under the SPR provisions of the MEPA Regulations, stating, “The proponent has committed to a transparent collaborative process, and based on comment letters received, has a long history of working collaboratively with host communities.”

The Secretary established the SPR at the request of ADM. According to the Certificate, the basis for the request was that ADM stated its intent to “replicate the traditional New England village development pattern in a manner consistent with the project area. The proposed project

will include residential, commercial, industrial and recreational components, and will be guided by the principles of smart growth, low-impact design, and pedestrian-scaled development.” Certificate page 1. In the fourteen years since the Certificate, ADM pivoted from the original purpose of the SPR and the TMUD plan to implement a strategic business plan for strip mining, industrial energy development and commercial sand and gravel production, trucking and sales. ADM has failed to meet its commitment to a “transparent collaborative process” referred to by Secretary Bowles when he declined to establish a CAD under the SPR regulations.

At the last SPR Quarterly Meeting on March 22, 2021, the public asked ADM’s CEO and President, Jim Kane, and its consultants, Beals+Thomas, a number of material, significant, and important questions about the three proposed solar projects in Wareham and ADM’s ongoing and proposed earth removal operations throughout the three towns that make up the TMUD area (Plymouth, Carver and Wareham). ADM and its consultant, Beals+Thomas did not answer many of the public’s questions about these issues. In the public meeting on March 22, 2021, which is recorded and available on YouTube, Mr. Kane offered to meet with members of the public to answer questions. Despite a written request from the public following up on Mr. Kane’s offer, some seven months later, the company has refused to answer questions and instead has continued to dodge and evade important questions about its Damage to the Environment. This is an indication that ADM is not engaged in a “transparent and collaborative process” with the public and is actively undermining the purposes and intent of MEPA which include public accountability for Damage to the Environment. Beals+Thomas and MEPA are complicit in allowing this to occur.

Save the Pine Barrens has notified MEPA of ADM’s lack of transparency by filing three Notices of Project Change, two of which were unjustifiably rejected. The third was filed on October 29, 2021 in the form a Request for an Advisory Opinion under 301 CMR 11.00. These NPC’s provide detailed documentation of the lack of transparency and collaboration that now characterizes the SRP under MEPA.

MEPA has no grounds for excusing ADM from the legal obligation under the Certificate to conduct the mandatory quarterly meetings. We demand that a quarterly meeting be scheduled and held immediately.

Very truly yours,

Margaret E. Sheehan

Margaret E. Sheehan
For Save the Pine Barrens, Inc.
185 Center Hill Road
Plymouth MA 02360

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #9:

Comments from Massachusetts Historical Commission on Borrego Solar
Array, 0 Jordan Road, AD Makepeace Property, Wareham, MA, October
2020



October 13, 2020

The Commonwealth of Massachusetts

Zak Farkes
Borrego Solar Systems, Inc.
55 Technology Drive, Suite 102
Lowell, MA 01851

William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

RE: Borrego Solar Array, 0 Jordan Road, AD Makepeace Property, Wareham, MA. MHC #RC.68789.

Dear Mr. Farkes:

Staff of the Massachusetts Historical Commission (MHC) have reviewed Project Notification Form (PNF) for the project referenced above. The proposed projects include the construction of an approximately 11.6 acre solar array in Wareham.

The project is immediately adjacent to the 140 Tihonet Road South solar array (MHC #RC.66364) within the overall ADM Tihonet Mixed-Use Phase C Development (MHC #RC.40500; EEA #13940). The PNF does not disclose whether or not the project requires MEPA review as part of the overall development. Please submit scaled existing and proposed conditions project plans, size no larger than 11 inches by 17 inches, to the MHC for review and comment.

The PNF indicates that the projects requires a Construction General Permit from the Environmental Protection Agency. The MHC continues to disagree with the US Environmental Protection Agency (EPA) concerning its approaches to and procedures for compliance with the National Historic Preservation Act of 1966 as amended (16 USC 470), particularly with Sections 106 and 110 (16 USC 470f and 470h-2), and with the regulations (36 CFR 800) of the Advisory Council on Historic Preservation (ACHP) implementing Section 106.

The archaeological reconnaissance survey conducted in 2007 for the overall ADM project indicates that the project impact area is archaeologically sensitive. Archaeological sites have been identified in the immediate vicinity during the recent archaeological survey for the adjacent 140 Tihonet Road South solar array. The MHC requests that an intensive (locational) archaeological survey (950 CMR 70) be conducted for the archaeologically sensitive portions of the project impact area. The purpose of the survey is to locate and identify any significant historic or archaeological resources that may be affected by the project, well in advance of construction. The results of the survey will provide information to assist in consultation to avoid, minimize, or mitigate any adverse effects to significant archaeological resources. A State Archaeologist's permit application (950 CMR 70) should be submitted to the MHC by the PAL.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), Massachusetts General Laws, Chapter 9, Sections 26-27C (950 CMR 70-71), and MEPA (301 CMR 11). Please contact Jonathan K. Patton of my staff if you have any questions.

Sincerely,

Brona Simon
State Historic Preservation Officer
Executive Director
State Archaeologist
Massachusetts Historical Commission

xc: Jim Kane, AD Makepeace
Thelma Murphy, EPA
Mike Stover, EPA
David Weeden, Mashpee Wampanoag Tribe
Bettina Washington, Wampanoag Tribe of Gay Head (Aquinnah)
Wareham Historical Commission
Deborah C. Cox, PAL

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #10:

Comments from Massachusetts Historical Commission identifying lithic
debris on AD Makepeace Federal Road West Project, Carver, MA,
October 2019



The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

October 31, 2019

Jim Kane
A.D. Makepeace Company
158 Tihonet Road
Wareham, MA 02571

RE: A.D. Makepeace Federal Road West Agriculture Project, Carver, MA. MHC #RC.66869.

Dear Mr. Kane:

Staff of the Massachusetts Historical Commission (MHC) have reviewed the archaeological report, *Intensive (Locational) Archaeological Survey, A.D. Makepeace Federal Road West Project, Carver, Massachusetts*, prepared and submitted by the PAL for the project referenced above.

The intensive (locational) archaeological survey conducted for the project identified the Federal Road West Find Spot. The find spot includes a low density deposit of the lithic debris byproducts of stone tool maintenance or manufacture. While the find spot provides information on ancient Native American land use and occupation in the inland portion of Carver, it does not possess substantial research value. No further archaeological investigations of the find spot is recommended. In the MHC's opinion, the proposed project is unlikely to affect significant historic and archaeological resources.

These comments are offered to assist in compliance with Massachusetts General Laws, Chapter 9, Sections 26-27C (950 CMR 70-71) and MEPA (301 CMR 11). If you have any questions, please contact Jonathan K. Patton at this office.

Sincerely,

A handwritten signature in cursive script, appearing to read "Brona Simon".

Brona Simon
Executive Director
State Historic Preservation Officer
State Archaeologist
Massachusetts Historical Commission

xc: Deborah C. Cox, PAL, Attn: A. Peter Mair, II

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #11:

AD Makepeace Request for Special Review Procedure, December 2006

Request for Special Review Procedure

ADM Tihonet Mixed Use Development

**Wareham, Carver and Plymouth,
Massachusetts**

Prepared for:

**ADM Development Services LLC
158 Tihonet Road
Wareham, Massachusetts 02571**

Prepared by:

**Beals and Thomas, Inc.
32 Court Street
Plymouth, Massachusetts 02360**

**Rubin and Rudman, LLP
50 Rows Wharf
Boston, Massachusetts 02110**

***Submitted in compliance with the
Massachusetts Environmental Policy Act***

December 15, 2006

BEALS AND THOMAS, INC.

Reservoir Corporate Center
144 Turnpike Road (Route 9)
Southborough, Massachusetts 01772-2104

Tel: 508-366-0560
Fax: 508-366-4391
mail@btiweb.com
www.btiweb.com

32 Court Street
Plymouth, Massachusetts 02360

Tel: 508-746-3288
Fax: 508-746-6407

December 15, 2006

Secretary Robert W. Golledge, Jr.
Executive Office of Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Via: Hand Delivery

Reference: Request for Special Review Procedure
Tihonet Mixed-Use Development
Wareham, Carver, and Plymouth Massachusetts

Dear Secretary Golledge:

On behalf of ADM Development Services LLC ("ADM"), this letter is to request that pursuant to 310 CMR 11.09 you establish a Special Review Procedure for the evaluation and review of ADM's long-term Tihonet Mixed Use Development in the towns of Wareham, Carver, and Plymouth (the "Development"). ADM plans to file an Environmental Notification Form for the Development in the near future. As described in greater detail below, a Special Review Procedure will ensure that the cumulative impacts of the Development are documented in a timely manner, while allowing for more detailed analysis of individual components of the Development in review documents for each proposed phase of the Development.

Background:

ADM is an affiliate of the A.D. Makepeace Company ("Makepeace"), a leader in the cranberry industry for five generations. Makepeace has cranberry operations encompassing just under 2,000 acres of bogs in the towns of Carver, Easton, Middleborough, Norton, Plymouth, Rochester, and Wareham. In 1930, Makepeace joined other growers to form a cooperative now known as Ocean Spray Cranberries, Inc. Today, Makepeace is the nation's largest cranberry grower and a developer of unique residential and commercial communities.

The Development, which ADM expects to occur over the next 25 years or more, will be located on an approximately 6,000 acre site in the towns of Wareham, Carver and Plymouth (the "Property"). The Property features wooded uplands, cranberry bogs, streams, wetlands, floodplain, and vernal pools. It also contains the corporate headquarters for the A.D. Makepeace Company. The Property is bisected by Interstate 495, with Route 28 establishing its southern

boundary and Cranberry Road generally establishing its northern limit and it is located west of Myles Standish State Forest in Plymouth (Figure 1).

ADM intends to replicate the traditional New England village development pattern in a manner that is consistent with the villages in other areas of Wareham, Carver and Plymouth. The creation of such village settings, along with more modern, smart-growth style commercial and recreational development components, will require zoning changes by the towns of Wareham, Carver and Plymouth. ADM has commenced coordination with these communities to develop land use concepts achievable through the implementation of innovative zoning and regulatory techniques that will benefit stakeholders and the environment alike. ADM is currently working cooperatively with all three towns to develop and implement Transfer of Development Rights and other innovative zoning by-laws. As a result, any Development will continue to undergo extensive public review during the local zoning approval processes, as well as state permitting review processes.

Understanding its long-term goals, ADM has chosen to focus the first phase of the Development within the Business Development Overlay District (BDOD), as set forth in a zoning Bylaw enacted by Wareham Town Meeting last spring (Figure 2). This is because the Town of Wareham has already clearly identified commercial development in this 1,200-acre area to be an urgent priority and the zoning for the BDOD is currently in place to achieve this goal.

The details of the individual phases and sequence of the phasing within the BDOD, as well as the nature of future phases outside the BDOD, will depend upon a number of factors including market conditions and zoning changes, and will culminate with design plans supported by the host community. Also, since the zoning by-laws are still being developed, ADM cannot state with exact certainty the particular density and configuration of certain portions of the development program. Given these unknowns, as well as the anticipated 20+ year time frame for full build-out, the Development does not fit comfortably within the typical MEPA review process.

Proposed Phases:

ADM's current plans will focus on three "phases" of development. These phases could evolve into more specific sub-phases as project planning proceeds.

Phase A: The initial phase will consist of the development of 150,000-square-foot, one- and two-story building(s) accommodating office/laboratory and manufacturing space, associated primary and emergency access roads, parking, loading docks, landscape amenities and stormwater management facilities. The Phase A development will occur on approximately 14 acres within a 50 acre wooded tract known as Tihonet Technology Park, on Farm to Market Road in Wareham (Figure 3). ADM will request some flexibility to allow the siting of the Phase A development on alternate locations within the larger 50 acre Tihonet Technology Park footprint.

The Phase A development will consist of office/laboratory space and light manufacturing space, with approximately 350 parking spaces. An additional area will be reserved for 150 parking spaces to be constructed of pervious material if and when they are needed by the user; these reserve parking spaces will not be constructed "up front". The development will be served by an on-site Title 5 septic system with enhanced nitrogen removal, and by municipal water and fire services to be provided by the Wareham Fire District. Electric, telephone and cable services will be provided via new underground cable, installed in 2006 to serve other users on Farm to Market and Federal Roads.

Phase B: In 2003, Wareham Town Meeting approved a Business Development Overlay District (BDOD) including Makepeace property located north of Route 25, but attached a requirement that the state Legislature approve a Development Impact Fee. In the spring of 2006, Town Meeting approved an amendment to the original BDOD enabling article, which deleted the Legislative approval requirement and allowed for a development agreement between the Town and Makepeace. Town Meeting also approved an expansion of the BDOD, adding 300 acres in the area south of Route 25 and north of Route 28. The development agreement has been executed.

This BDOD area has been selected as Phase B because it is a large parcel of land (over 1,200 acres) which will benefit from a thorough analysis through the state environmental review process, as well as a well defined local review. As the Town of Wareham has identified this area as a critical economic driver, ADM has also focused on this aspect of the mixed use market.

Currently, the 1200 acres of land in the BDOD could accommodate a program of up to 3.5 million square feet of light industrial, light manufacturing, and research and development space. Allowable uses, with a permit issued by the Planning Board, include:

- Business, professional, medical and administrative offices, research and development laboratories and facilities and other high technology and similar uses
- Light manufacturing, processing, assembly
- Retail and convenience uses accessory to the above allowed uses, health clubs, child care
- Agriculture, horticulture, viticulture or floriculture

In this phase, ADM will also focus on state level permitting for projects on its property in the Strip Commercial District on Route 28 at Lou Ave. ADM's landholdings within the Strip Commercial District total approximately 15 acres. In the case of the BDOD and the Route 28 Strip Commercial District, ADM has generated significant interest from technology based industry clusters which would bring sorely needed jobs to a community where the unemployment rate typically exceeds the statewide rate.

Phase C: The subsequent phases of development could occur over the next five to twenty five years or longer. This phase may consist of a mixture of uses including, but not limited to: village-scale retail and housing, office/commercial development, open space, recreation uses,

water supply well development, renewable energy projects, waste water treatment facilities, and ongoing agricultural operations. It is anticipated that various types of housing and commercial space will be constructed over the development period, facilitated through the use of Transfer of Development Rights to concomitantly protect large contiguous areas of open space. The overarching principles guiding future development will be the application of smart growth, low-impact design and pedestrian-scaled development to achieve vibrant and sustainable villages.

Each of the three towns has made substantial progress toward crafting and enacting innovative land use tools which will enable ADM to develop the property in a manner that is consistent with smart growth principals. However, not all of the required zoning and land use controls initiatives have been completed. ADM can presently evaluate reasonable and predictable development scenarios for the BDOD and Route 28 commercial area. Conversely, until the Town of Wareham enacts more land use tools, and the towns of Plymouth and Carver complete their zoning amendments, ADM will not be able to accurately quantify impacts from potential residential development.

Existing Zoning

Plymouth: The property in the Town of Plymouth is zoned Rural Residential (RR) R-120. ADM has been working with the Town over the past three years to strengthen its TDR Bylaw, and in fact is proceeding with a mixed use project plan based on significant open space preservation as a result. The challenge to ADM in Plymouth will be to identify new "receiving area" for its development rights on land west of the Myles Standish State Forest. This land includes the 1,800+/- acres identified as part of the Tihonet Mixed Use Development Project in this filing. If ADM and the Town are successful in identifying new receiving areas for this parcel, impacts from development could be negligible. Until the necessary zoning changes are enacted, ADM will need to reserve the right to develop this land. ADM will propose to focus on this area in the future as part of the Special Review Procedure.

Carver: The portion of the Tihonet Mixed Use Development located in Carver is zoned as Residential Agricultural (RA). In addition, Carver Town Meeting approved the TDR and Planned Neighborhood Districts (PND) by-laws in June of 2006. ADM's conceptual plans for Carver utilize the TDR Bylaw in order to cluster single- and multi-family development and maintain large tracts of open space. Per the June 2006 amendments, the TDR Bylaw "*allows for the maintenance of low-density land uses, open spaces, historical features, critical environmental resources, and other sensitive features of the sending parcel to be preserved while providing compensation to the property owner*" (Section 2700). Carver is currently developing the Overlay District Mapping that will allow for the orderly implementation of the TDR and PND by-laws. This proposal is currently scheduled to be acted upon at the next Town Meeting.

Wareham: The portion of the Tihonet Mixed Use Development located in the Town of Wareham includes several zoning districts: Industrial (IND), Strip Commercial (CS), Residence 130 (R-130), and Residence 60 (R-60). Additionally, ADM has supported the creation of a TDR by-law

in Wareham and committed a significant parcel of land in excess of 800 acres for preservation using such a by-law when it is enacted. The underlying zoning of the BDOD is R-60.

Coordinated State Agency Review:

The Massachusetts Natural Heritage and Endangered Species Program (MNHESP) has identified portions of the land owned by ADM as either "Priority" or "Estimated" habitat. ADM has been working with the staff of MNHESP to identify appropriate methods to evaluate and protect these areas. ADM expects to request a coordinated review with MNHESP as well as other state agencies as part of the Special Review Procedure.

MEPA Special Review Procedure:

ADM has a unique vision for its landholdings, one that is consistent with both the ongoing need for housing and services while balancing such needs with environmental preservation and agricultural operations. Implementation of this vision will require collaboration with State review agencies and local stakeholders over a lengthy period of time.

Review of this Development under the Massachusetts Environmental Policy Act (MEPA) is required because the Project will exceed several thresholds outlined in 301 CMR 11.00 and will need State agency actions and permits prior to the commencement of development. Due to the anticipated lengthy build-out, ADM is requesting that the Special Review Procedure be tailored to address those portions of the development that are better defined (BDOD and Route 28 Commercial parcels) as well as the future, presently undefined, project components.

In order to accommodate the needs of this unique large-scale, phased development, market uncertainty, and ongoing efforts with zoning changes, as well as ADM's financial objectives, ADM wishes to begin those parts of the Development that are both defined and consistent with the towns' desires, while it continues to plan and refine future phases that cannot yet be described with substantial certainty. The establishment of a Special Review Procedure will achieve these goals while ensuring full environmental review.

Under the MEPA regulations, a Special Review Procedure is appropriate for, as is the case here, "a Project that is *undefined or is expected to evolve* during MEPA review" 301 CMR 11.09(1) (Emphasis added.) Further, the regulations expressly provide that "among other things, a Special Review Procedure may provide for: . . . review of a Project *in phases*." *Id.* (Emphasis added.). Accordingly, ADM proposes the following Special Review Procedure, which will serve ADM's, needs as well as the purposes of MEPA, including providing meaningful opportunities for public review, analysis of alternatives, and consideration of cumulative impacts.

1. The Secretary issues a Certificate establishing the Special Review Procedure and notice is published in the Environmental Monitor as provided in 301 CMR 11.09(2).

2. Within six (6) months of issuance of the Special Review Procedure Certificate, ADM files an Expanded Environmental Notification Form ("EENF") for the Development with a 30 day public comment period and 37 day review period. The EENF shall include, at a minimum:

- Baseline environmental resource assessment and infrastructure assessment of the full 6,000-acre project site;
 - Water Resources – including resource inventory and mapping for groundwater, wetlands and surface water resources;
 - Wildlife Habitat Resources – including, but not limited to, rare species;
 - Landscape/Topography/Drainage (watershed/sub-watershed);
 - Agricultural Resources;
 - Historical/Archaeological Resources;
 - Recreation and Open Space (e.g. existing public uses);
 - Existing Land Uses;
 - Existing Water Supply, Wastewater, Stormwater and Transportation Infrastructure;
 - Other Public and Private Utilities (e.g. electricity, gas)
- Information and analysis of Phase A and its alternatives (at an EIR level of detail with documentation that the Phase A Project is severable from future phases, in accordance with 301 CMR 11.11(4)(a-d)):
 - The potential environmental impacts of phase one, taken alone, are insignificant;
 - Ample and unconstrained infrastructure facilities and services exist to support Phase A;
 - The project is severable, such that phase one does not require the implementation of any other future phase of the Project or restrict the means by which potential environmental impacts from any other phase of the Project may be avoided, minimized or mitigated; and
 - The Agency Action on phase one will contain terms such as a condition or restriction in a Permit, contract or other relevant document approving or allowing the Agency Action, or other evidence satisfactory to the Secretary, so as to ensure due compliance with MEPA and 301 CMR 11.00 prior to Commencement of any other phase of the Project.
- Conceptual Master Plan for Business Development Overlay District (BDOD or Phase B) with sufficient information and analysis (including alternatives considered) to support Phase A Project Review
- Narrative Plan for Phase C (remainder of project site) to include a description of overall project vision/goals and type of uses anticipated, as well as graphic

representation of site outlining areas proposed for development, open space/conservation, agriculture and other uses etc. (i.e. a general envelope/bubble locating different proposed uses). Discuss "Guiding Principles" for overall development and identify critical areas/resources for protection; including:

- *Constraints*

Land use constraints: Identify areas where development should be limited or prohibited due to incompatibility. For example, areas of constraint may include water supply protection zones; important wetland/wildlife habitat areas; archaeological/historical resources; site conditions/accessibility issues.

- *Opportunities (informed by Constraints Analysis)*

- Land use – identify areas considered most suitable for certain types of development (e.g. proposed "zones/bubbles"). Include conceptual mapping of appropriate use zones, based on resource assessment, infrastructure capacity analysis and compatibility of uses.
- Describe overall vision and goals for smart growth, etc...
- Describe potential open space network/wildlife corridors.
- Water supply/Wastewater/Transportation/Stormwater – discuss options at conceptual level (more detailed evaluation expected in alternatives analysis at DEIR/Master Plan level).

- *Environmental Impacts*

To the extent possible, the conceptual plan should give some idea of the size of proposed development and include general identification and discussion of potential impacts (e.g. identify types of impacts; general location of wetland/habitat impacts; provide min-max range where feasible, e.g. approximate # acres to be developed in different zones/bubbles, min-max number for residential units/or development square footage, etc...).

3. Within 37 days of filing the Phase A EENF, the Secretary issues a Certificate with Record Decision (ROD) on the Phase A Project.

4. For each subsequent phase of the Development, the following process shall apply:

- (a) ADM will submit to MEPA a phase-specific ENF or EENF (the "Phase E/ENF") in accordance generally with the provisions of 301 CMR 11.05(4)-(6);
- (b) The Secretary will review the Phase E/ENF in accordance generally with the provisions of 301 CMR 11.06(1)-(6), and shall issue a phase-specific certificate ("Phase Certificate") stating whether or not a phase-specific review

- document ("Review Document") is required, and if so, what to require in a phase-specific Scope ("Phase Scope");
- (c) If required by the Secretary in the Phase Certificate, ADM will prepare and file a Review Document which shall include, at a minimum:

- (i) detailed description of existing conditions;
- (ii) detailed description of proposed phase;
- (iii) Alternatives Analysis;
- (iv) identification of environmental impacts of proposed project phases, including cumulative impacts with any prior phases;
- (v) proposed mitigation measures, if any;
- (vi) updated "Master Plans" and cumulative impact assessments (to include proposed and previous phases, and consideration of future development); and
- (vii) discussion of consistency with concept/master plan and Narrative Plan.

5. Within 2 years of the filing of the first Review Document, ADM files with the Secretary either a subsequent Review Document or a status report.

6. Prior to the filing of each Review Document, ADM will conduct public outreach by scheduling one or more meetings with stakeholders in the town or towns in which the phase-specific project is located. Such meetings will also be open to the general public. At these meetings, ADM will present information about the Review Document to be filed, the stakeholders will have the opportunity to discuss the proposed document, and the members of the general public will have the opportunity to provide comments. ADM will submit meeting minutes with each Review Document. ADM also understands that the MEPA office will undertake public outreach as required.

7. ADM will circulate all Phase E/ENFs and all Review Documents in accordance with Section 11.16 of the MEPA regulations.

8. If ADM wishes to change any provisions in this Special Review Procedure, it will file a request for modification of the Special Review Procedure in the form of a Notice of Project Change.

As described above, the proposed Special Review Procedure clearly serves the purposes of MEPA, including providing meaningful opportunities for public review, analysis of alternatives, and consideration of cumulative impacts. Accordingly and for all of the foregoing reasons, ADM requests that you establish a Special Review Procedure along the lines detailed above.

Secretary Robert W. Golledge, Jr.
Executive Office of Environmental Affairs
Attn: MEPA Office
December 15, 2006
Page 9

Conclusion

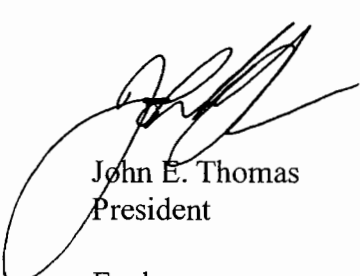
ADM anticipates an ongoing process of collaboration with municipal, regulatory, and business leaders as well as other stakeholders to refine the conceptual design for the Tihonet Mixed Use Development in order to achieve a project consistent with the preservation of ongoing agricultural uses, the preservation of environmentally sensitive habitat and water resource areas, the promotion and implementation of smart growth design principles, and the creation of a "community" in which the mixture of uses and integration of pedestrian and appropriately scaled vehicular space will result in a vibrant place to work and live. Creating a viable community that incorporates environmental stewardship, is economically practicable, and promotes the interaction of its residents is in the interest of ADM, the towns of Wareham, Carver and Plymouth, and the Commonwealth at large.

In conclusion, the submission of this Request for a Special Review Procedure will commence the initial review of this Project under the Massachusetts Environmental Policy Act. Although not required, it is our understanding that notice of this Request for SRP will be published in the next issue of The Environmental Monitor.

Should additional copies of this Request for SRP be required or requested, please direct inquiries to Stacy Minihane at (508) 366-0560 or via email at sminihane@btiweb.com. We appreciate your consideration of this Request for the Establishment of a Special Review Procedure and look forward to working with you throughout this development process. Should you have questions in the interim please do not hesitate to contact us.

Very truly yours,

BEALS AND THOMAS, INC.



John E. Thomas
President

Enclosures



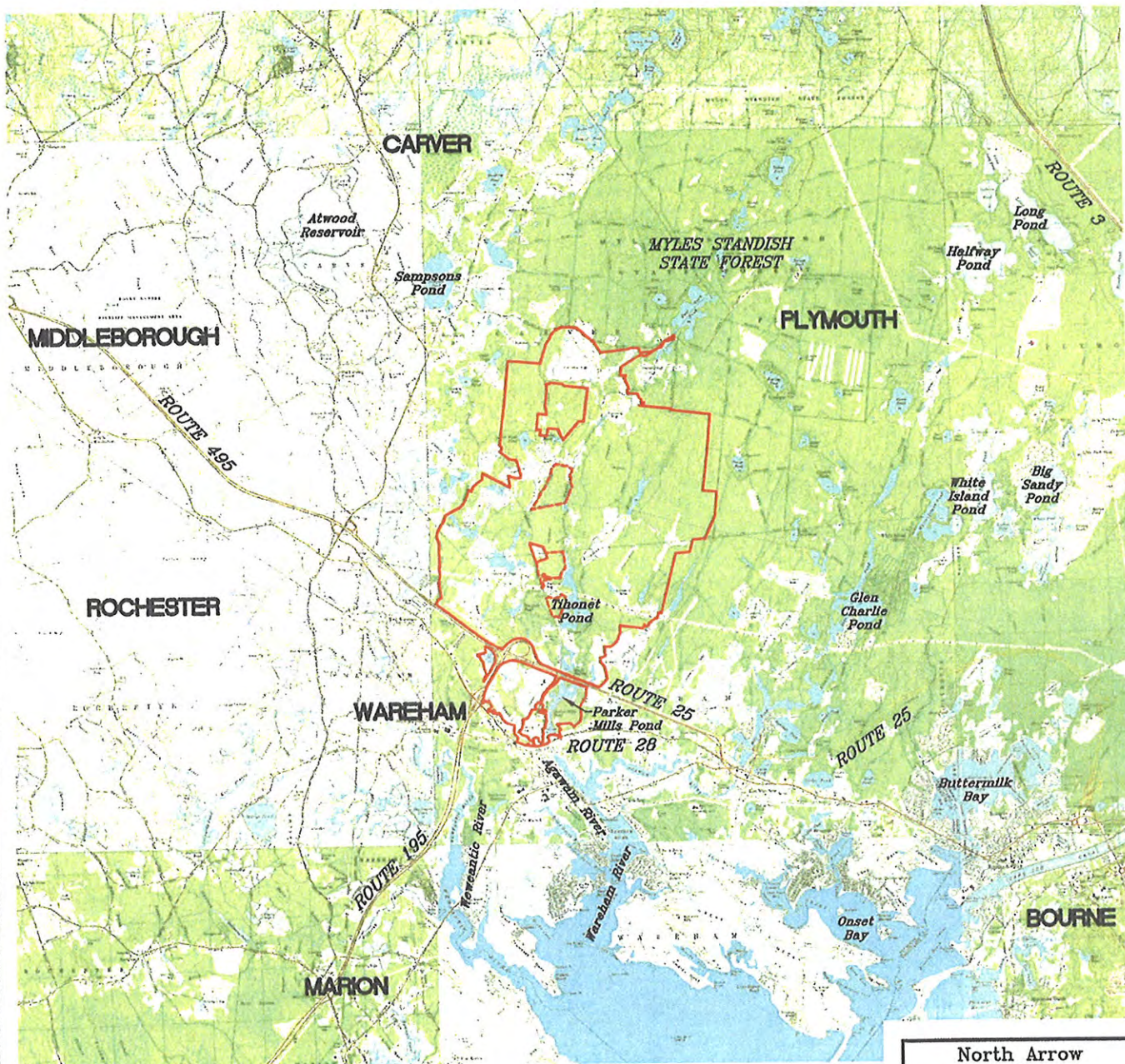
Stacy H. Minihane
Environmental Specialist

cc: Circulation List (via Certified Mail)

183300PT001

BEALS AND THOMAS, INC.

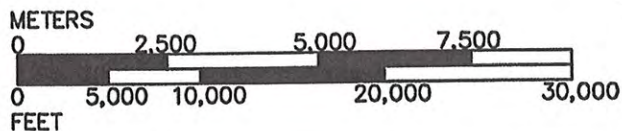
Figures



Sources:

1) Digital A.D. Makepeace property lines (red) provided by Weston and Sampson Engineers, Inc. and FY 2004 Wareham Map & Ownership Volume published by Realty Publishing Center, Inc., maps dated 1973-1991.

2) Digital USGS Maps of Plymouth, Plympton, Snipatuit Pond, and Wareham MA, Dated 1972-1979, provided by the Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs.



North Arrow



NORTH

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A.D. Makepeace Property
Wareham, Carver & Plymouth,
Massachusetts

A.D. Makepeace Company
158 Tihonet Road
Wareham, Massachusetts

Regional Locus Plan

Figure 1

Scale: 1"=10,000'

Date: 12/12/2006

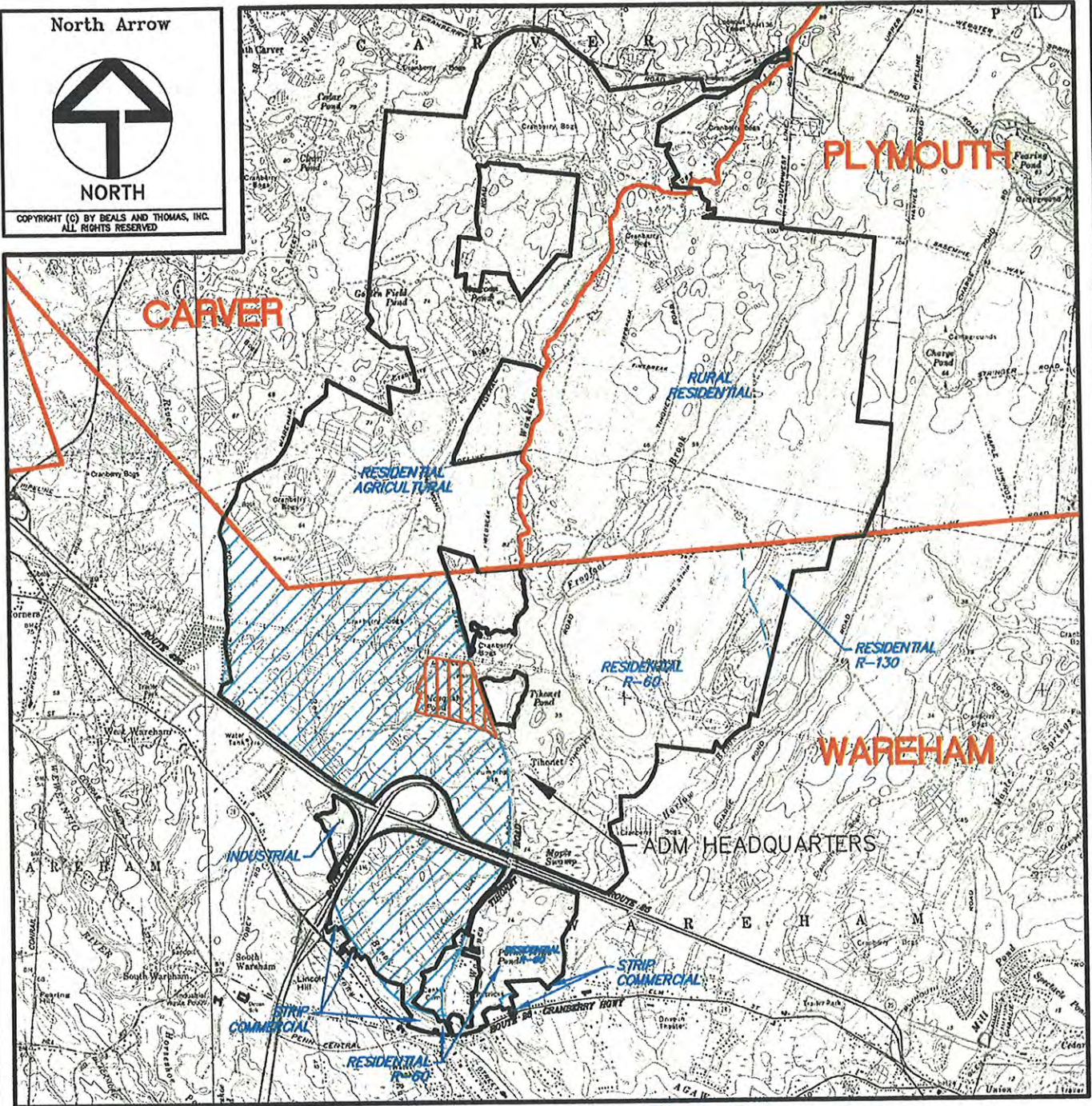
Drawing No. 1833P012A-003

BTI Project No. 1833.00

North Arrow



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 BUSINESS DEVELOPMENT
OVERLAY DISTRICT
(1200± ACRES)

 TIHONET TECHNOLOGY
PARK (50± ACRES)

A.D. Makepeace Property
Wareham, Carver & Plymouth,
Massachusetts

A.D. Makepeace Company
158 Tihonet Road
Wareham, Massachusetts

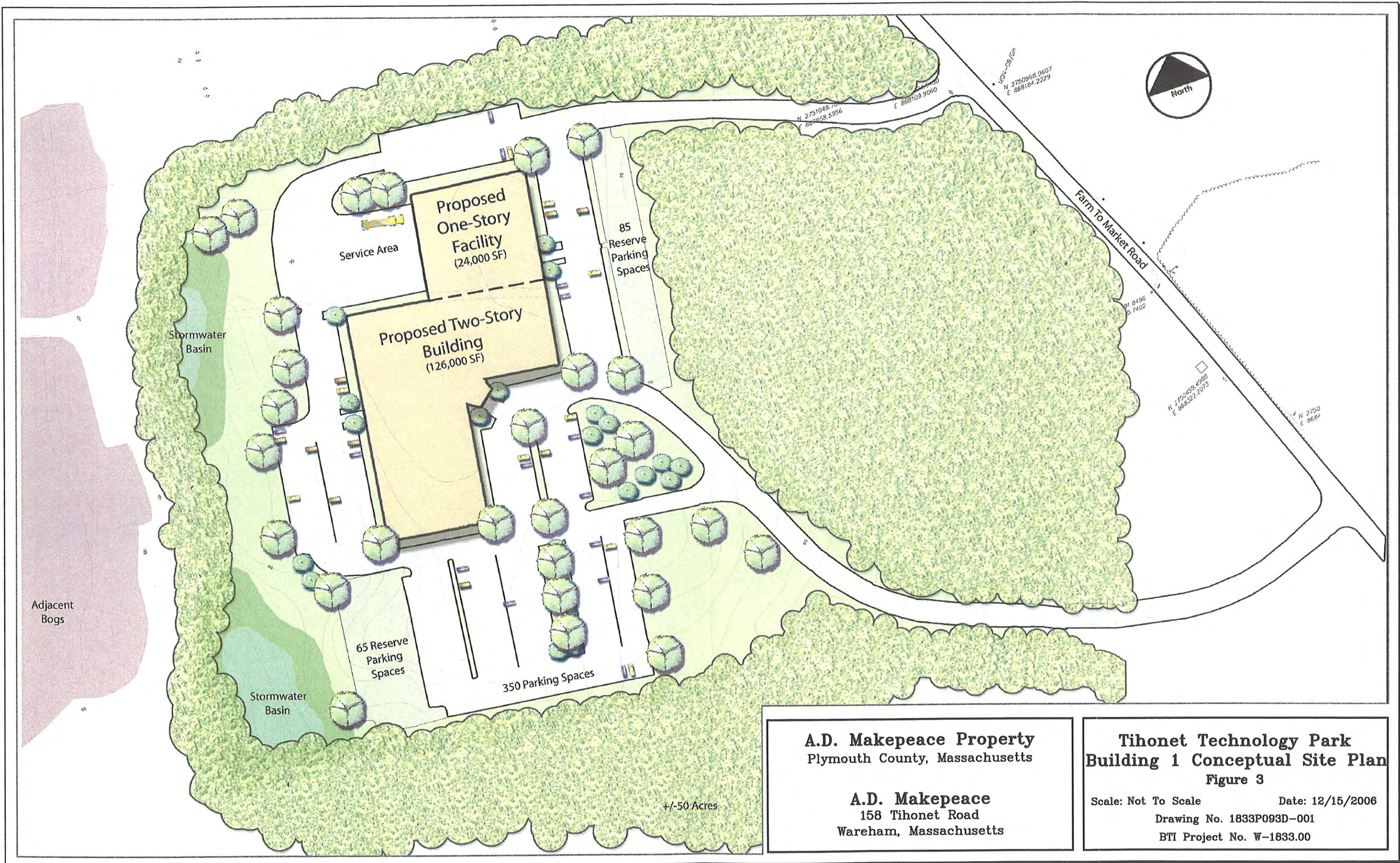
Zoning Map Figure 2

Scale: 1"=4,000'

Date: 12/12/2006

Drawing No. 1833P014B-003

BTI Project No. 1833.00



A.D. Makepeace Property
Plymouth County, Massachusetts

A.D. Makepeace
158 Tihonet Road
Wareham, Massachusetts

**Tihonet Technology Park
Building 1 Conceptual Site Plan**
Figure 3

Scale: Not To Scale Date: 12/15/2006
Drawing No. 1833P093D-001
BTI Project No. W-1833.00

Circulation List

Circulation List

- 1) The MEPA Office: 2 full size copies
- 2) Executive Office of Environmental Affairs--Policy Director
Undersecretary for Policy
100 Cambridge Street, Suite 900
Boston, MA 02114
- 3) Department of Environmental Protection Boston Office
Commissioner's Office
One Winter Street
Boston, MA 02108
- 4) Department of Environmental Protection, Southeast Regional Office
Attn: MEPA Coordinator
20 Riverside Drive
Lakeville, MA 02347
- 5) Executive Office of Transportation
Attn: Environmental Reviewer
10 Park Plaza, Room 3510
Boston, MA 02116-3969
- 6) Massachusetts Highway Department
Public/Private Development Unit
10 Park Plaza
Boston, MA 02116
- 7) Massachusetts Highway Department, District 5
Attn: MEPA Coordinator
Box 111
1000 County Street
Taunton, MA 02780
- 8) Massachusetts Aeronautics Commission
Attn: MEPA Coordinator
10 Park Plaza, Suite 3510
Boston, MA 02116
- 9) Massachusetts Historical Commission
The MA Archives Building
220 Morrissey Boulevard
Boston, MA 02125

- 10) Old Colony Planning Council
70 School Street
Brockton, MA 02401-4097
- 11) Southeastern Regional Planning & Economic Development District
88 Broadway
Taunton, MA 02780
- 12) Town of Carver Board of Selectmen
108 Main Street
Carver, MA 02330
- 13) Town of Carver Planning Board
108 Main Street
Carver, MA 02330
- 14) Richard LaFond, Carver Town Administrator
108 Main Street
Carver, MA 02330
- 15) Jack Hunter, Carver Town Planner
108 Main Street
Carver, MA 02330
- 16) Town of Carver Conservation Commission
108 Main Street
Carver, MA 02330
- 17) Town of Carver Board of Health
108 Main Street
Carver, MA 02330
- 18) Town of Plymouth Board of Selectmen
11 Lincoln Street
Plymouth, MA 02360
- 19) Town of Plymouth Planning Board
11 Lincoln Street
Plymouth, MA 02360
- 20) Mark Sylvia, Plymouth Town Manager
11 Lincoln Street
Plymouth, MA 02360

- 21) Lee Hartmann, Plymouth Town Planner
11 Lincoln Street
Plymouth, MA 02360
- 22) Town of Plymouth Conservation Commission
11 Lincoln Street
Plymouth, MA 02360
- 23) Town of Plymouth Board of Health
11 Lincoln Street
Plymouth, MA 02360
- 24) Town of Wareham Board of Selectmen
54 Marion Road
Town Hall
Wareham, MA 02571
- 25) Town of Wareham Planning Board
54 Marion Road
Town Hall
Wareham, MA 02571
- 26) Wareham Community and Economic Development Authority
54 Marion Road
Town Hall
Wareham, MA 02571
- 27) Charles Gricus, Wareham Town Planner
54 Marion Road
Town Hall
Wareham, MA 02571
- 28) Michael Hartman, Wareham Town Manager
54 Marion Road
Town Hall
Wareham, MA 02571
- 29) Marilyn Whalley, Wareham Community Development Director
54 Marion Road
Town Hall
Wareham, MA 02571

- 30) Town of Wareham Conservation Commission
54 Marion Road
Town Hall
Wareham, MA 02571
- 31) Town of Wareham Board of Health
54 Marion Road
Town Hall
Wareham, MA 02571
- 32) Coastal Zone Management
Attn: Project Review Coordinator
251 Causeway Street, Suite 800
Boston, MA 02114
- 33) Division of Marine Fisheries (South Shore)
Attn: Environmental Reviewer
838 South Rodney French Boulevard
New Bedford, MA 02744
- 34) Department of Agricultural Resources
Attn: MEPA Coordinator
16 West Experiment Station
University of Massachusetts
Amherst, MA 01003
- 35) Natural Heritage and Endangered Species Program
Attn: Thomas French
Commonwealth of Massachusetts
Route 135
Westborough, MA 01581
- 36) Massachusetts Bay Transit Authority
Attn: MEPA Coordinator
10 Park Plaza, 6th Fl.
Boston, MA 02216-3966
- 37) Wayne Klockner, The Nature Conservancy
205 Portland Street, Suite 400
Boston, MA 02114-1708
- 38) Robert Wilber, Mass Audubon
208 South Great Road
Lincoln, MA 01773

39) Jim Munise, Chairman, Wareham Land Trust
P.O. Box 718
Wareham, MA 02571

40) Marie Oliva, Cape Cod Canal Region Chamber of Commerce
70 Main Street
Buzzards Bay, MA 02532-3221

41) Plymouth Area Chamber of Commerce
Attn: Denis Hanks
10 Cordage Park Circle
Suite 231
Plymouth, MA 02360

42) Mark Rasmussen, Coalition for Buzzards Bay
620 Belleville Avenue
New Bedford, MA 02745

Save the Pine Barrens Comments to MEPA

May 23, 2022

ADM TMUD, EEA 13940

Exhibit #12:

Comments of STPB and others on EENF for TMUD Phases 10-12, May
2021

Community Land & Water Coalition
Save the Pine Barrens, Inc.
158 Center Hill Preserve
Plymouth MA 02360
www.savethepinebarrens.org
environmentwatchesoutheasternma@gmail.com

May 24, 2021

Secretary Kathleen A. Theoharides
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114
Via email to MEPA@mass.gov

Re: Expanded Environmental Notification Form, March 15, 2021 and May 11, 2021 Supplement
ADM TMUD Wareham Solar Projects
EEA No. 13940-ADM Tihonet Mixed Use Development
Wareham, Plymouth, Carver, Massachusetts

Dear Secretary Theoharides,

Community Land & Water Coalition ("the Coalition") submits the following comments on the Expanded Environmental Notification Form ("EENF") EEA # 13940 to the Massachusetts Environmental Policy ("MEPA") Unit.

The Coalition is a project of Save the Pine Barrens, Inc. (STPB) a Massachusetts non-profit corporation. The Coalition is a network of groups and individuals seeking to protect, steward and restore lands and waters in Southeastern Massachusetts. STPB members live, work, and recreate in Southeastern Massachusetts in, on and/or near the Environment [definition from MEPA] that will be impacted by the activities described in the EENF and the prior activities reviewed by MEPA for the ADM Tihonet Mixed Use Development (TMUD). CLWC and its members have a direct and concrete interest in avoiding and mitigating actual or probable Damage to the Environment as defined by MEPA regulation 301 CMR 11.02. This Damage to the Environment has been and is being caused by AD Makepeace Company ("ADM") and its subsidiary Read Custom Soils and by Borrego Solar Systems, Inc. ("Borrego" or the "Proponent") in connection with the Project and related projects referred to in the EENF.

The EENF requests environment review for the Projects described in the EENF as "tenth, eleventh, and twelfth Projects being **undertaken by ADM as part of Phase C of the TMUD**. The Proponent alleges the Projects will continue to advance the Commonwealth's commendable goals to foster renewable energy and achieve Net Zero emissions by 2050." (emphasis supplied)

In fact, these claims and others like it in the EENF constitute material misrepresentations and fail to accurately disclose the full scope and scale of the Damage to the Environment of projects “being undertaken by ADM as part of Phase C of the TMUD.”

Over the past 10 years, ADM and Borrego have undertaken a strategy driven by Massachusetts Department of Energy Resources (“DOER”) subsidy projects for so-called renewable energy. ADM has undertaken earth removal activities to install solar projects without permits in the Towns of Wareham and Carver. Simultaneous, ADM is conducting other uncontrolled earth removal projects that are causing Damage to the Environment.

The Secretary, MEPA, and state agencies have failed to exercise due diligence under MEPA and other environmental laws to ensure that “all practicable means and measures to minimize damage to the environment.” G.L. c. 30, § 61. Local boards in Wareham, Plymouth, and Carver have failed to properly exercise their regulatory authority over earth removal, wetlands and waterways and have failed and continue to fail to prevent air pollution, excessive traffic and noise created by these projects.

The ADM/Borrego earth removal and solar projects have deforested hundreds of, if not over a thousand, acres of globally rare Pine Barrens, removed tens of millions of cubic yards of earth that filters and purifies the Plymouth Carver Sole Source Aquifer, emitted untold and uncounted volumes of greenhouse gases through the operation of diesel powered industrial machinery to clear-cut, strip off topsoil, process and remove earth, and export it out of the TMUD area for industrial and commercial sale. The 10th, 11th and 12th ADM-Borrego land based solar projects will result in a total of almost 500 acres of deforestation – replacing a globally rare ecosystem with industrial energy generating utilities. Hundreds more acres have been illegally strip mined with sand and gravel worth at least \$250 million removed from the TMUD area. There has been no cumulative impact study of these projects and the additional land based solar projects causing deforestation in Carver, Wareham and Plymouth.

Finally, the solar projects and industrial earth removal are all located on unceded Wampanoag territory and have been and are being conducted in blatant disregard of the Commonwealth’s Environmental Justice Policy and basic principles of human rights.

ACTION REQUESTED BY MEPA

For the reasons set forth below, CLWC requests that the Secretary:

- (1) Refer this matter to the Attorney General’s Office for investigations of failures to comply with MEPA Certificates, misrepresentations about the type, scope, and scale of the projects and a preliminary and permanent injunction for all ADM ongoing strip-mining activities in Massachusetts;
- (2) Grant the request for a Notice of Project Change (NPC) under M.G.L. c. 30, § 61, 301 CMR 11.10 filed separately;

- (3) Revoke the Special Review Procedure (SPR) established by the Secretary in 2007¹;
- (4) Reject the EENF and require a new ENF and full Environmental Impact Report (EIR) under 301 CMR 11.07
- (5) Require ADM to file an after-the fact ENF and EIR for strip mining activities at all locations in Carver, Wareham and any other locations in MA including specifically at:
 - (i) Phase C 6-Golden Field Pond Solar site and adjacent strip mine site on Carver Assessor's Map 131, Lot 1-2C, and Lot 1-4,
 - (ii) Phase C 1-Wankinko Bog/Read Custom Soils site, Map Lot 2-4,
 - (iii) Phase C 2-Plymouth Read Soils/Bog expansion site (approved without an EIR in 2012) involving over 6.5 million cubic yards of earth removal on over 100 acres. (These sites meet the mandatory EIR threshold of 11.03(1)(a) for Land Alteration over 50 acres, for a discretionary EIR under 11.03(2) for alteration of designated significant habitat, for a mandatory EIR under 11.03(6) and under 11.03(10) for potential destruction of archeological sites or assets of the Commonwealth and for impacts to waterways and wetland.), and
- (6) Require ADM to finance an independent forensic accounting of the volume of all earth, soils, and topsoil removed, the amount of ADM revenues obtained for the commercial sale of these volumes, taxes and fees paid for the volumes removed, and all resulting shortfalls, and assess penalties and fines for any shortfalls in taxes and fees owed to local and state governments.

COMMENTS ON EENF

I. THE MEPA PROCESS HAS BEEN UNDERMINED AND MEANINGFUL PUBLIC COMMENT OPPORTUNITIES DENIED

In part, MEPA is intended to “provide meaningful opportunities for public review of the potential environmental impacts of Projects...” 301 CMR 11.01(1). The public is being denied this opportunity in two ways. First, there have been concerted efforts either by or on behalf of ADM and the Proponent to intimidate members of the public who are attempting to participate in the MEPA process, creating an atmosphere of suspicion, fear and retaliation. These activities have been reported to ADM, local police departments, the Attorney General's Office and MEPA.

Second, the Proponent, ADM and MEPA have failed to make relevant and material documents publicly available for review. Without these documents, including the ADM baseline environmental study for the TMUD, the public cannot meaningfully participate. The Coalition and members of the public participated in the MEPA site visit and informational session, made phone calls, public records requests, and sent emails in an effort to get this information. It has not been produced. At the March 2021 MEPA information meeting, ADM CEO Kane promised

¹ MEPA has failed to make the 2007 SPR document publicly available, negating the legitimacy of the MEPA process for the EENF.

to account for all volumes of earth removed from Wareham. A letter was sent asking for the meeting to follow up on this but has been ignored. **Exhibit 1.**

Further, the burden should not be on the Coalition to file repeated Public Records Requests in order to get MEPA to disclose environmental impact reports and documentation that is the subject of and directly related to the EENF. Without the foundational documents for the SRP public is denied the right to have a meaningful opportunity for public review of the Damage to the Environment.

II. THE EENF IS INADEQUATE

A. Inaccurate and inconsistent identification of the “Project Proponent”

The “Project Proponent” is identified as Borrego but then the EENF described Phases 10-12 as the “tenth, eleventh and twelfth Projects being undertaken by ADM.” There are conflicting statements and obligations under MEPA. Without identifying which entity is responsible, there is no way to hold the Proponent and ADM accountable for complying with MEPA.

For example, the EENF and prior Certificates refer to “mitigation” that consists of land that Makepeace has or will allegedly put into conservation. Borrego, the Proponent of the EENF cannot make commitments on behalf of ADM. As a result, the mitigation statements in all the Certificates and EENFs are meaningless because they cannot be (and clearly have not been) enforced or carried out by either Borrego or ADM. The EENF itself says the 3 proposed solar projects are being “undertaken by ADM.” Why then didn’t ADM sign the MEPA certificate as “Project Proponent”?

MEPA must reject the EENF and require ADM and Borrego to clarify the identity of the Project Proponent.

B. Failure to accurately describe the Projects (Phases C10-12)

The EENF fails to accurately describe the nature and extent of the Projects – a fatal defect that pervades not only this but all the Phase C projects including the “bog development” projects of C1 and C2 that have now morphed into allegedly the largest aggregate mining operation east of the Mississippi.

The EENF and May 11, 2021 Supplemental Information (Supplement) claim that further MEPA review is unnecessary because Phase C 10 and 11 (27 Charge Pond Road and 140 Tihonet Road) are exempt from MEPA other than under the SPR. This is inaccurate because there is state agency action in the form of “Financial Assistance” and “Permits” within the meaning of MEPA as explained in the NPC filed contemporaneously with these comments.

The Supplement further claims that no EIR is needed for 150 Tihonet Road Phase C12 because EIR thresholds are not met. This is only because the Project Proponent has chosen to

shave off eight-tenths of an acre to size the project under the 50-acre mandatory EIR threshold. In every way, these projects are segmented to avoid and evade environmental review in violation of 301 CMR 11.01(c) and DOER regulations at 225 CMR 22.00 and DOER SMART Solar Guidelines. As described below, the Projects are illegally segmented. The two projects at 140 and 150 Tihonet Road are contiguous and almost abutting the 160 Tihonet Road Phase C 5 solar site. ADM has subdivided or is attempting to subdivide the sites in order to segment the projects.

In numerous EENFs for Phase C TMUD Projects, ADM and the Proponent failed to fully and accurately disclose the Damage to the Environment including earth removal activities. Some examples follow.

- The Proponent misrepresents the total site acreage. EENF, Summary of Project Size and Environmental Impacts. It states the total site acreage for Phases C 10, C 11 and C 12 is 42.1, 66.2 and 49.2 acres for a total of about 158 acres. By contrast, the total area ADM states will be converted from agricultural/horticultural use under Chapter 61A and leased to Borrego is 52.6 acres, 83 acres and 75.2 acres for a total of 210.8 acres. See, ADM notices of lease, 2019 to Borrego for the Phase C 10-12 sites.
- The EENF, as in prior submittals, states, the “Landowner has long engaged in a proactive and positive relationship and coordination with NHESP” and has “earmarked land” for conservation, Supplement Page 4. There are no specific facts in the EENF or any prior MEPA submittals to show the exact amount of land and where it is. At the same time, Borrego has made representations to local officials that for every acre of land destroyed for solar, ADM puts 2 acres into conservation:

See, Planning Board Meeting Minutes, Town of Carver, Jan. 22, 2019 on the Phase C8 Hammond Street Project:

“Ms. Boggart (Planning Board member): This is a really big chunk of land (40 acres). Is there a conservation piece? Mr. Farkus [Borrego Solar] AD Makepeace has continued to put land into conservation. For every 1 acre, they designate 2 acres for conservation.” **Exhibit 2.**

If Borrego’s statement is accurate, where is this acreage? Why does the Supplement say that only 436.84 acres have been put into conservation since the start of the TMUD SPR in 2007? Page 4, Supplement. Beals+Thomas and ADM have perpetuated this scheme by obfuscating the actual acreage put into conservation throughout the Phase C ENFs.

Comments on EENF Cover Letter and Form

- EENF Cover Letter, p. 4 states that “ground-mounted solar is a less intensive land use than the large-scale residential developments previously reviewed by MEPA in the TMUD.” [Jim Kane CEO](#) explained to the Wareham Planning Board that after the solar leases expire in 20 years and the “junk” is removed the company plans to use the

cleared solar sites for residential development. Thus large-scale residential developments continue to be part of the TMUD plan as stated by the landlord.

- EENF Form, pp. 3- 4 This is an example of unlawful segmentation because it fails to give total site acreage in describing project size and environmental impacts. The total site acreage exceeds 50 acres requiring a mandatory EIR for the entire project. The EENF fails to give the gross square footage or height of structures. It misrepresents vehicle trips per day, stating there will be 50 “vehicle trips” and they will be “temporary trips associated with site preparation and construction of each solar project.” This does not accurately describe the approximately 2 million cubic yard earth removal operation associated with Phase C 11 (140 Tihonet Road). The EENF fails to give adequate detail about tree removal activities and excavation and does not account for heavy equipment and truck trips for earth removal at 140 Tihonet Road.
- EENF Form Page 5: Alternative Site Uses. This is not an alternatives analysis. MEPA Section 62B requires “reasonable alternatives to the proposed project and their environmental consequences.” The proposed project is generating electricity. The EENF should describe the alternative methods of generating electricity, including placing solar on rooftops, parking lots and already developed land, as opposed to destroying globally rare Pine Barrens habitat, listed species and Wampanoag cultural sites.
- EENF Form Page 5: Mitigation measures: This is not an adequate description of mitigation. This says “the Proponent” – identified elsewhere as Borrego, signed as such under oath -- is “coordinating with NHESP and will undertake appropriate mitigation in the form of conservation lands and habitat funding.” Where is documentation that Borrego is “coordinating with NHESP”? Or is ADM doing this? Where is proof of the mitigation for the prior TMUD projects? How much habitat funding will be provided? Why haven’t MEPA or MassWildlife actually required an escrow account before construction for these habitat funds?
- EENF Form Page 6: This purports to describe actions to “minimize and prevent damage to the environment” as required by Section 61, stating that these actions are “minimizing land disturbance, installing stormwater and maintenance of significant wooded buffers.” This is not mitigation. These are regulatory requirements Borrego and Makepeace have to undertake in order to get permits such as wetlands Orders of Conditions and EPA Clean Water Act requirements. MEPA cannot accept this as action to “minimize and prevent damage to the Environment.” Instead, mitigation under MEPA consists of “developing enforceable mitigation commitments, which will become conditions for the project if and when they are permitted.” <https://www.mass.gov/service-details/purpose-and-intent-of-mepa>

Borrego claims that “mitigation” for purposes of MEPA consists of “renewable energy benefits” and “the estimated economic benefit that results from the tree clearing for the Projects” for the town to use in undertaking its “preferred mitigation project(s)”. It is not credible or acceptable “mitigation.” Land-based industrial solar energy generating facilities that destroy globally rare forests, strip mine, emit fossil fuels is not credible, legitimate “renewable energy”. ADM CEO Jim Kane himself refers to this energy generating installation as a “fad” and “junk” that will be hauled away in 20 years. Then, his company will install residential subdivisions. See video of [Jim Kane CEO](#) As far as the token payment to the Town of the proceeds from clear-cutting, this is not legitimate “mitigation.” The Town is free to spend this money on anything. There is no documentation of what these mitigation projects are, the cost or the environmental benefits.

For the Phase C 10, 27 Charge Pond Road, the EENF claims mitigation is “restoring an area of historic fill/debris/dumping.” This is an illegal dump on ADM’s own property. Borrego seeks MEPA’s green light for “mitigation credit for cleaning up Makepeace’s own negligence in preventing dumping and cleaning up its own mess. It would be shameful for MEPA to give this gimmick any weight at all.

For 150 Tihonet Road, a 50-acre clear-cut, the claimed mitigation is land conservation by Makepeace. Makepeace is not the project Proponent and there are no specific conditions or any information about how Borrego will actually implement an “enforceable mitigation commitment” since it is actually another entity that is supposed to do the mitigation. Page 7, ENF.

- EENF Form, p. 7. Historical and Archeological Resources: the EENF claims there are no historic or archeological resources when the archeological report shows resources on 140 Tihonet. The approach taken with regard to Indigenous rights under the EENF violates the Commonwealth’s Environmental Justice Policy and the UN Declaration on the Rights of Indigenous People (UNDRIP).
- Water Resources: The three solar projects, stripping vegetation off of almost 160 acres on the shores of the Wankinko River/Tihonet Pond and Parker Mills Pond will be adding pollution to already impaired waterbodies. See, Comments of CLWC to Town of Wareham, **Exhibits 3, 4 and 5.**

The issue of the cumulative impacts on Water Resources is not addressed in the EENF, Section 4.0 (see below). With regard to water impacts, the MEPA Certificate 12/28/12 for Phase C2 states MassDEP directed ADM to file a Request for Determination of Applicability (RDA) pursuant to the Waterways Regulations (CMR 9.06) It states that if the Wankinko River and Frogfoot Brook are jurisdictional waterways, proposed water control structures may require a Chapter 91 license, and other C-2 activities may require authorization under c. 91 and a 401 Water Quality Certification. Footnote 1, p. 4 of Certificate. There is no public record that the RDA was filed or that Chapter 91 was

followed. MEPA is hereby asked to provide documentation of compliance with these laws and can consider this a Public Records Request.

There is also no record that ADM responded to or followed up on the comment in the 12/28/2012 Certificate for Phase 2-C that ADM may in the future be required to “provide a nitrogen loading analysis for the Wareham River and identify offsets for proposed projects.” MassDEP raised questions about the offsets of other pollutant loads. Certificate, p. 11-12. This issue must be addressed and current information on the status provided.

- EENF Land Section, p. 10, Part II(B) and (C): Borrego states that no part of the project site has been in active agricultural use in the last five years and no part is in active forestry use. This is inconsistent with the G.L. Chapter 61A Notices of Intent-Conversion of Use sent to the Wareham Board of Selectman and signed by Jim Kane, AD Makepeace Company on March 16, 2021 stating that 140 and 150 Tihonet Road and 27 Charge Pond Road are classified under Chapter 61A as “agricultural and horticultural.” If the land was not in agricultural use as claimed by Mr. Kane, Makepeace seems to be admitting that it unlawfully benefitted from reduced taxes under the Chapter 61A program.
- EENF Form, Page 11, Consistency. The projects violate the Wareham Master Plan for economic development, adequacy of infrastructure and open space. Strip mines, deforestation and land based solar is not the “traditional economic development in a well-planned area” required by the Master Plan. They are blight and will devalue real estate. See, e.g. <https://clarknow.clarku.edu/2021/04/21/geography-research-documents-solar-farms-negative-effects-on-landscape/>; University of Rhode Island: *Here Comes the Sun: Incorporating Resident Preferences into Solar Siting Policy Recommendations for Rhode Island*.

There is no infrastructure benefit from the Projects as claimed. The community will not receive an “environmental benefit through the generation of renewable energy as claimed.” Instead, real estate values will be harmed and climate resiliency of forests will be lost.

Claiming that the Projects are consistent with the Town’s Master Plan open space goal is ludicrous. Page 11, III(B)(3). Borrego claims that the solar projects will “avoid impacts to adjacent agricultural uses where they occur.” The only “agricultural uses” are ADM bogs located some distance away. ADM notably installed the Phase C5 solar project almost directly adjacent to its bogs and other bog growers are putting solar panels on their bogs. This claim of avoiding impacts to “adjacent agricultural uses” is not credible.

The Projects do not comply with the Town’s Bylaw for site planning review. The site plan review is being challenged in a lawsuit filed in April 2021.

The Projects are also inconsistent with the SRPEDD Southeastern Massachusetts Vision 2020 (1990) regional policy as it represents exactly the type of blight and ruination of globally rare forests and pollution of water that Vision 2020 raised the alarm about 21 years ago.

- EENF Form, Rare Species, p. 13. This information is incomplete as no biological survey was done to locate and identify any rare species so Borrego cannot claim that none exist. The correct answer to the questions on page 13, Rare Species Section (1) is “unknown.” There are clearly likely to be species present as the site is in the heart of the highest concentration of biodiversity in the state.

In 2021, Bald Eagles, *Haliaeetus leucocephalus* were documented nesting within 1,000 feet of the 140 and 150 Tihonet Road project sites, Phase C11 and C12, on Tihonet Pond. This is new information not contained in the EENF and warranting a NPC. The Bald Eagle requires a great amount of shoreline habitat containing stands of forest for nesting and trees projecting above the forest canopy for perching with an unimpeded view. The waterbody they choose typically has a good supply of moderate to large sized fish, which is true of Tihonet Pond. <https://www.mass.gov/service-details/learn-about-bald-eagles> This is a species of special concern listed under the Massachusetts Endangered Species Act (MESA). The female laid several eggs in April 2021. During the MEPA site visit on April 22, 2021 at 140 and 150 Tihonet Pond sites, the Bald Eagle was observed on the east side of Tihonet Pond on or near the potential solar sites. Given the destruction of nearby wildlife habitat such as near Frogfoot Reservoir for the Phase C5 and Golden Pond Phase C 6 Borrego solar and earth removal sites, an investigation into whether this eagle siting is related to loss of habitat in the TMUD area.



Photo: March 24, 2021, Nesting Bald Eagle, Tihonet Pond, Wareham MA. Photo credit: Standing Bear Media Network

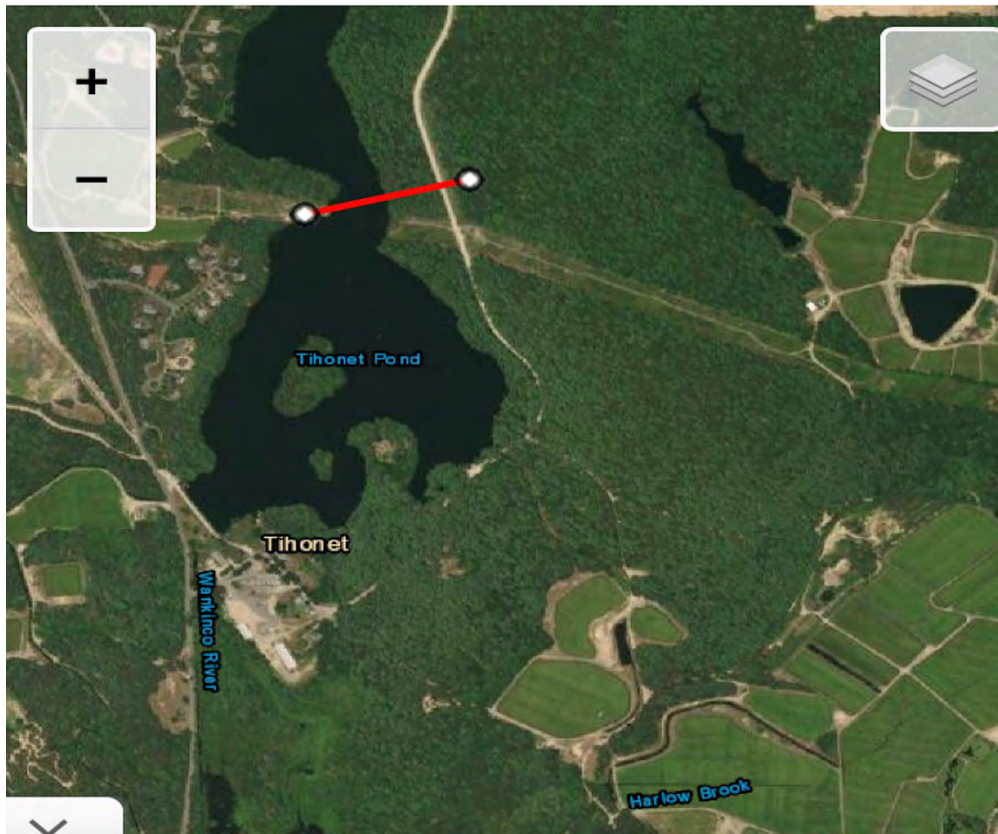


Figure: Location of Bald Eagle on Tihonet Pond, March to present 2021.

Borrego states there will be a take of a listed species, See, II(B), page 13. It claims that “land proximate to previously designated conservation areas...will be permanently preserved as mitigation for impacts to habitats. Habitat funding will also be provided.” Borrego cannot bind Makepeace to this, there is no specific information about the amount of land to be conserved as direct mitigation for the loss of habitat from the three proposed solar sites, where it is, whether taxpayers will fund it or whether Makepeace will donate it. **Why has MassWildlife never required an escrow account prior to ADM and Borrego starting construction?**

- EENF Form, Wetlands and Waterways, p. 14. There are major flaws in the EENF, the Proponent’s Wetlands Protection Act application and the Wareham Conservation Commission Orders of Conditions for all three project sites. The Order of Conditions for 140 Tihonet Road is the subject of a Superseding Order of Conditions, MassDEP File No. SE76-2611 (May 12, 2021).

Phases C 11 and 12 entail significant work in the Buffer Zone to clear trees, remove and grade earth and construct an access road, barrier gate and portion of a stormwater basin. The Proponent has failed to describe how tractor trailer trucks, excavators, logging equipment, woodchippers, and bucket trucks will travel, in close proximity to a wetlands Bank, to and from the Tihonet Road sites.

The EENF relies on 60-year old precipitation data that does not reflect climate change and underestimates large storm events by almost 20%. This means the stormwater infrastructure designed for the three solar sites may be undersized by 20%.

Use of the 60-year old, outdated data, although still permitted under the obsolete MassDEP statute, is incomprehensible today, particularly given that the Proponent constantly cites “climate change” in the EENF as justifying the proposed land based solar installations on the 190 acres of land on the shore of water bodies. Failure to use accurate extreme precipitation data contradicts that claim.

MEPA. G.L. c. 30, § 61, was recently amended to require a Propopent to “consider reasonably foreseeable climate change impacts.” The Proponent professes to be well aware of the reasonably foreseeable climate change impacts which includes increased large storm events that will mean more precipitation than the 1961 data predicts. Given that about 160 acres of upland, pristine Pine Barrens forest and untouched soils will be eliminated-scraped off until the ground is denuded of all vegetation, use of accurate precipitation data is critical. Replacement of 11,000 years of soils and vegetation with solar panels, concrete pads, transformers, and a thin layer of grass seed will cause an increase in post-development stormwater runoff.

- EENF Form, Page IV, Consistency, states that 27 Charge Pond Road is located “at the landward extent of the coastal zone as mapped by MassGIS.” Wareham is vulnerable to sea level rise and storm surges. The solar panels will be vulnerable to this as well.
- EENF Form, Historic and Archeological, page 27. The EENF states that at 140 Tihonet a survey recovered pre-contact cultural materials documenting a Native American presence in the general area. It concludes based on a Mass Historic Commission assessment that “the Projects are not anticipated to impact any potentially significant archeological resources and no further archeological investigations were recommended.” Mass Historic does not have the legal or moral authority to make this determination. This is unceded Wampanoag territory and the Indigenous community should be making this decision, not Mass Historic.
- EENF Report, Section 2.0: Project Narrative. The EENF project narrative, like the EENF Form, fails to accurately describe the size, scope and scale of the TMUD development since 2012. It ignores the earth removal and deforestation associated with the TMUD Phase C1-12 projects.

Comments on EENF Report

- EENF Report, Section 2.1. This states that residential uses that were part of the original TMUD plan are eliminated with Phases C10-12 and “commercial and industrial uses have been reduced to a maximum of 1,070,000 sf.” First, this is inaccurate because ADM CEO Kane has explained that after the solar “junk” is removed from the company’s solar sites, the plan is for residential subdivisions. Second, the square footage number fails to take into account the square footage of the C3 to C12 solar projects. **The square footage is not now a “maximum of 1,070,000” as claimed but rather over 21,000,000 when about 500 acres of solar for all Phases through Phase 12 is taken into account.** The Cumulative Impact Assessment Table 4-1 is also misleading and inaccurate as it fails to account for the 500 acres of solar in the square footage of structures.

The claim that “the proposed solar developments will result in fewer impacts to the environment than the previously-approved residential developments” is completely unsubstantiated and absurd. The claims about greenhouse gas impacts in this section are also unsubstantiated and have been since 2012 (See, Cumulative Impacts Section, below)

Borrego claims that the landowner has “transferred” 480.84 acres to the Commonwealth for conservation purposes. Borrego should document where this land is and whether or not taxpayers funded the purchase from Makepeace. The claim that an additional 409 acres is “earmarked” is not credible and has been repeated time and again in ENF filings for the TMUD by Borrego. Where is the documentation that this ever occurred? At a minimum, this application should be frozen until an accounting is completed and the pledged conservation land transfers have been documented in the registry of deeds.

- EENF Report, Section 2.2 MEPA Review Thresholds. As it has with Phases C5 and 6, for Phase C 12 the Proponent shaved off a few tenths of an acre in order to evade the MEPA mandatory EIR threshold for land alteration of 50 acres or more. The three phases C10-12 are unlawfully segmented and should be considered as a whole for threshold purposes, making the total at least 158 acres. They are also unlawfully segmented under DOER regulations, 225 CMR 20.05(5)(f). ADM is unlawfully subdividing parcels in to site these solar projects, something prohibited by the DOER regulations and SMART Solar Guidelines.
- EENF Report, Section 2.3 Existing and Proposed Conditions. This section fails to describe the total number of trees removed, fails to adequately describe the proximity to Wankinko River, fails to accurately describe truck trips associated with deforestation and industrial scale logging and strip mining of about two million cubic yards requiring at least 160 truck trips on the same dirt road that will be used for logging and construction of both 140 and 150 simultaneously, fails to describe the route to be taken on to State Highway 25, and fails to accurately describe the methods for the removal of earth and

grading up the site. It also fails to accurately describe the globally rare and unique pine barrens ecosystem, fails to document that an ecological assessment was done and fails to adequately describe the wetland resources.

- EENF Report, Section 2.3.3 Rare Species and Wildlife Habitat This section states that site design has been “undertaken to minimize the area of tree clearing while maximizing the energy output from the facilities” and “significant wooded areas will remain on the overall TMUD Parcel in the vicinity of the Sites subsequent to completion of these projects.” This is contrary to the facts. At least 160 acres of pristine, globally rare Pine Barrens ecosystem will be completely denuded and all rare species and wildlife habitat eliminated. At least 158 acres will be surrounded by chain link fence, preventing wildlife migration including the use of existing animal trails and pathways. Unknown quantities and types of wildlife will be exterminated – there has been no biological survey all fauna on and around the site.

Merely referring to NHESP “maps” does not constitute a complete or accurate description of the damage to wildlife and its habitats. The EENF acknowledges that the 150 Tihonet site is “within acknowledged habitat for various pine barrens species and as such permitting with NHESP is being undertaken.” There is no description of what these species are. Over the last 10 years, for Phases C1-C9, discussions with MassWildlife and NHESP occur behind closed doors, out of public view, depriving the public of a meaningful opportunity to comment. In deals with ADM, MassWildlife has issued dozens of “take” permits for TMUD projects, including projects such as Phase C-5 solar involving strip mining of millions of cubic yards, allowing Borrego and Makepeace to destroy dozens of rare species.

MEPA should not exempt the Projects from an EIR based on a promise by Borrego to “undertake” permitting with NHESP.

The Proponent’s vernal pool description is inadequate. All three sites contain potential vernal pools. It is not enough to simply say a “100 foot buffer” will be maintained. Beals+Thomas’ own report states they have observed wood frog masses of sufficient quantity in several of the pools to meet certification standards. MEPA should assume the vernal pools are certifiable and they should be regulated as Outstanding Resource Waters.

Overflow from the multiple stormwater basins is as close as 50 feet from several of the potential vernal pools. It is well established that stormwater discharge into vernal pool habitat alters pH and potentially increases nitrogen and potassium balances in the pools. The scientific community is in concurrence that the 100-foot vernal pool buffer is inadequate to maintain the necessary upland areas used by obligate species found in vernal pools.

There is no public record that Beals+Thomas conducted a Water Budget analysis for the potential vernal pools. This is a critical tool for ensuring that vernal pool hyperperiods will not be altered by the Projects. Without this Water Budget the Beals+Thomas claims in 2.3.3 are inadequate to address damage to wetlands, rare species and habitat.

EENF Report, Section 2.3.4. Topography, Geology and Soils. The statement that the hydraulic installation of the pile basis will avoid “exposure of soils associated with normal construction practices” lacks credibility. The entire 158 acres will be stripped and denuded of all topsoil and vegetation. It is meaningless to compare this to normal construction practices. Further, the detailed description of the soil types contradicts the claim made by Borrego Solar project manager Zach Farkus and Mr. Kane during the April 22nd, 2021 MEPA site visit that Makepeace will decide on the volume of earth to be removed based on soil sampling that is not yet done. The level of detail of soil types in the EENF shows that this information is already known to Makepeace, making it obvious that this solar site, like others, was chosen for the quality and quantity of earth that could be removed under the guise of “site preparation” for “renewable energy.”

There will be extensive grading and topographic alteration on all 158 acres of the three Project locations. Excavation at 140 Tihonet Road, particularly, is far more extensive than necessary for a mere solar array design. Borrego Solar’s Zach Farkus admitted as much during the MEPA site visit. The MEPA EENF is grossly defective on the topic of excavation and alteration of topography.

This excavation will have multiple impacts, including:

- o Potential alteration of groundwater levels which may in turn affect the hydrology of adjacent wetland areas, and
 - o Alteration of surface runoff patterns, which may directly affect vegetation and wildlife habitat characteristics of adjacent parcels.
- EENF Report, Section 2.3.6 Cultural Resources. The approach to and description of cultural resources offends principles of social justice, equity, and inclusion and the state’s Environmental Justice Policy. Beals+Thomas, the Proponent, Mass Historic and an archaeological lab do not have the moral or legal authority to determine what is culturally appropriate or culturally significant to the Indigenous people of the region. These projects are located on unceded Wampanoag territory.
- EENF Report, Section 2.3.7. Recreation and Open Space. The claim that 160 acres of solar projects surrounded by a chain link fence results in fewer open space impacts than “other potential uses” is unsupportable. First, the other potential uses are never described accurately and second, if these were residential homes there would be public ways for walking and recreational activities and people would have backyards for wildlife and recreation. To say nothing of the fact that ADM has called the police to confront residents walking in the area or even driving on public roads in the area. What does

Makepeace suddenly have to hide? If Makepeace has its way the approvals it seeks from MEPA will create a local version of Area 51.

- EENF Report, Section 2.3.9 Transportation. To accomplish the earth removal at 140 Tihonet Road will require at least 160 truck trips per day for at least one year will be required. The project will not be done in phases, so this is in addition to the truck trips needed in order to conduct an industrial logging operation and install a massive construction project of 150,000 solar panels. Tihonet Road is a gravel road that empties out on to Farm to Market Road and State Route 25. The earth removal and construction truck traffic will cause damage to roads, impeded the local flow of traffic and create safety hazards. The excessive earth removal truck traffic from ADM strip mine sites in Carver is on the same route: that traffic is required by Carver to travel south via Federal Road to Farm to Market Road (which intersects with Tihonet Road) and then on to Route 25. There is already a [safety hazard](#) from ADM TMUD industrial and commercial activities in this area. In [May 2021, 258 trucks](#) were observed coming from ADM's earth removal sites along this route to Route 25.
- EENF Report, Section 2.3.10 Water Supply. There is no documentation to support the claim that strip and denuding 160 acres and removing 2 million cubic yards of earth and installing about a dozen stormwater detention basins will "not impact the aquifer."
- EENF Report, Section 2.3.12 Air Quality. This section states that the GHG calculation for 140 Tihonet assumes the clearing will be "completed" by the time the solar project is installed. There is no explanation as to when or how the site will be cleared or who will do the clearing. This goes on to say a portion of the site may be cleared prior to construction in association with **"agricultural operations to harvest high quality sand."** This contradicts prior statements by the Proponent. For example, on April 22, 2021, Mr. Kane stated he did not know the quality of the earth; here it is stated that it is "high quality." The Planning Board site plan review requires an earth removal permit for 140 Tihonet Road. The GHG emissions from this 1.2 m cy earth removal must be calculated and reported in an EIR.

ADM should be required to account for the "agricultural operations to harvest high quality sand" it describes. It is likely that this nomenclature is a deliberate nickname for industrial scale earth removal so as to cloud the related but unpaid taxes attributable to the revenue generated therefrom. The volumes of sand removed by Makepeace under this ruse could never be used only on its own bogs (a genuine agricultural operation). Otherwise, there wouldn't be hundreds of trucks hauling their sand out to towns and states where ADM has no agricultural operations. For example, as ADM's affiliate Read Custom Solis boasts in its website "Over 2,600 tons of 70/30 rootzone delivered to Boston College in two days? No problem!" Scholarly articles define **Rootzone** as "a highly versatile **soil** created from a 60/40 mix of sand and sandy **soils**. The blend is 40% natural sandy **soil** and 60% silica sand consisting of medium fine and medium coarse semi-rounded grains." Where did this sand come from? And certainly sand delivered to

BC is not the same as sand used on ADM's neighboring bogs. And who is monitoring for this silica dust – a potential carcinogen?

The EENF is defective because it fails to address the dust associated with the excavation and site grading. The Mass Department of Public Health has been asked to investigate whether the sand to be mined from the Project sites is carcinogenic silica sand. Elsewhere in the TMUD area, ADM earth mining and trucking operations are causing serious dust problems that have been reported to local officials, MassDEP and the Mass Department of Public Health. The Proponent should be required to provide credible scientific data about the carcinogenic and public health implications of "harvesting high quality sand" as part of site preparation and the earth removal that is part of the Projects. This is Damage to the Environment within the meaning of MEPA.

- EENF Report, Section 1.4 Alternatives analysis. The "reasonable alternatives" (G.L. c. 30, Section 32B) to strip mining 158 acres of pristine globally rare Pine Barrens forest to install a renewable energy generating station include putting solar panels at other more suitable locations such as on rooftops in Wareham Crossing, industrial buildings, and parking lots, conservation, efficiency and locally generated electricity. The so-called alternatives analysis in the EENF violates MEPA.

The facts and public statements reveal that the "alternatives analysis" for the Phases C2-12 was and is driven by which location would generate the most "high quality sand" that could be "harvested" for commercial sale. ADM has already strip mined vast areas under the guise of "bog expansion" in the Phase C1 and C2 TUMUD areas. Instead of siting new bogs and solar there, it is strip mining new areas for lucrative sand claiming it is site preparation for agriculture and solar. See Figure below: Phase C1 TUMUD area which shows denuded areas at Phase C1 (Wankinko Bog area)



- EENF Report, Section 2.4.3 Alternative Site Uses. This section states, **“Given the landowners Phase C2 cranberry bog project, cranberry bogs are not necessary at this time, and these locations [Phases C10-12] are not appropriately sited for agricultural reservoirs in relation to the landowner’s on-going cranberry bog operations.”** This exposes the inconsistencies behind AD Makepeace’s development activities in the TMUD area. Contrast the statements in the ADM July 2020 application to the Carver Earth Removal Committee that it plans to build 18 acres of new bogs and a reservoir on Map 131, Lot 1-2C.
- EENF Report, Section 2.4.4 Preferred Alternative. Removing hills containing lucrative silica sand and topsoil in order to site land based solar is ADM’s “preferred alternative” for maximizing profits. This preferred alternative must be included in the description of the Projects. It is not.
- EENF Report, Section 2.5 Mitigation The environmental impacts have **not** been avoided and minimized to the extent practicable. Indeed, they have been deliberately ignored so as to maximize the economic gain from the projects.

First, as noted, the alternative to denuding 160 acres of pristine Pine Barrens for solar is to put in on already developed sites including rooftops and parking lots—or even ADM’s own already strip-mined land. Second, a mere 436.84 acres of “former TMUD land bordering Myles Standish State Forest” as the alleged “mitigation” for the massive environmental destruction that ADM and Borrego Solar have wrought on the globally rare Pine Barrens ecosystem is not acceptable.

- EENF Report, Section 2.6. Permits/Approvals Required. Phase C 11 requires an Earth Removal Permit from the Wareham Board of Selectmen. Site preparation at Phases C 10 and 12 may also require Earth Removal Permits. Earth removal permits for Phases C 3-C9 were also required and were not obtained. This is not disclosed in the EENF.

The Projects also require approvals from DOER under the regulations at 225 CMR 22.00 and related DOER guidelines for solar siting.

- EENF Report, Section 4.0 Cumulative Impact Assessment. This section is inadequate for reasons state above, and for including the failure to disclose and assess the cumulative impacts of over 10 years of strip mining and earth removal related for Phase C activities, including bog development in Phases C 1 and 2.

o Cumulative impacts of earth removal:

As stated in the *Massachusetts Sand and Gravel Operation Guidelines*: pp. 7-8:

Vegetation and the upper soil horizons provide a pollution buffer for shallow groundwater. Improperly managed sand and gravel operations may reduce this protection and introduce hazardous materials and other toxins directly to groundwater. Massachusetts has developed guidelines for managing sand and gravel operations. The Massachusetts Clean Water Toolkit – NPS Management Manual provides guidance on this and many other subjects regarding nonpoint source pollution.

(See <http://www.mass.gov/dep/water/resources/nonpoint.htm#megaman>).

The EEA Plymouth Carver Sole Source Aquifer Action Report, 2007,² recommends that all towns work on an enforceable bylaw for sand and gravel operations. Although Wareham, Carver and Plymouth regulate sand and gravel the bylaws do not cite state guidelines for sand and gravel extraction. Therefore, MEPA cannot defer to local regulation of earth removal because local regulations

² Urban Harbors Institute, University of Massachusetts Boston, "Plymouth-Carver Sole Source Aquifer: Regional Open Space Plan" (2008). *Urban Harbors Institute Publications*. 9. https://scholarworks.umb.edu/uhi_pubs/9

do not contain state guidelines to protect the aquifer and surface water bodies. This issue must be addressed in a new EIR for all of the C1-C12 projects.

- o Cumulative GHG impacts. ADM has never addressed the **cumulative impacts of GHG emissions** from its activities as required by MEPA regulations and numerous MEPA certificates. For example:

Phase C-2 MEPA Certificate 12/28/2012: EENF states that ADM will conduct a GHG protocol. This was never done.

Phase C-5 MEPA Certificate 4/11/2014 (160 Tihonet Road/Tihonet East-50 acres) (earth removal not disclosed) also required GHG analysis. This was never done.

Phase C-6 MEPA Certificate 1/27/2017 (Golden Field, 50 acres strip mined) required GHG analysis. The Certificate states,

“The ENF asserted that the CO2 offsets over a 30 year period are equivalent to carbon sequestered by 3, 752 acres of trees. This information was provided by a solar vendor and the ENF did not include data or analysis to support this assumption. The Proponent is committed to working with the MEPA Office to develop a specific protocol for quantifying GHG impacts associated with land alternation that can be employed within the context of MEPA review and application of the GHG Policy.” P. 5. “The ENF included confirmation of the Proponent’s commitment to coordinate with EA and MEPA of a protocol to address GHG emissions association with land alteration...In addition, the development of the protocol must be guided by other EEA regulatory programs and studies such as GHG reporting requirements and the Manomet biomass study, in order to ensure a consistent approach for estimating GHG emissions.” Pp. 7-8.

This was never done.

Phases C 7, 8 and 9 MEPA Certificate May 2, 2019 (276 Federal Road, 0 Hammond St., 64 Farm to Market Road, 81.5 acres of land clearing and solar).

The Certificate states, “The ENF did not address the loss of carbon sequestration associated with clearing and regrading the sites. In the ENF filed for the Phase C5 Tihonet East Solar Project, ADM committed to working with the MEPA Office to develop a protocol for quantifying GHG impacts associated with land alternation that can be employed within the context of MEPA review and application of the MEPA Greenhouse Gas Emissions Policy and Protocol. Upon completion of a land alternation protocol, it should be used to quantify individual and cumulative GHG emissions associated with land alteration.”

This was never done.

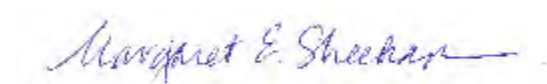
In sum, ADM failed to comply with FOUR MEPA Certificates requiring a GHG analysis. MEPA did nothing and allowed over 300 acres to be strip-mined and cleared for land based solar. Hundreds more acres have been clear-cut and strip mined under the guise of agricultural operations. The EENF GHG analysis is wholly inadequate. MEPA must require ADM to conduct the GHG analysis first required in 2012 for C2 and all subsequent projects.

This is an outrageous breach of the spirit and intent of MEPA and violation of the Certificates made more egregious by the false claim in the EENF that the “tenth, eleventh and twelfth” solar projects by ADM and Borrego will help the Commonwealth meet its “admirable renewable energy goals.”

Thank you for consideration of these comments. We expect that MEPA will take appropriate action to remedy the violations and inadequacies identified here instead of rubber-stamping yet another ADM-Borrego false climate solution.

We request a response to these comments immediately. Please contact me at 508-259-9154 or environmentwatchsoutheasternma@gmail.com to explain how these concerns will be addressed.

Very truly yours,

A handwritten signature in blue ink that reads "Margaret E. Sheehan". The signature is fluid and cursive, with a long horizontal stroke at the end.

Margaret E. Sheehan, Esq.
Volunteer
Community Land & Water Coalition
158 Center Hill Road
Plymouth MA 02360
c. 508.259.9154

MACC Presentation

March 4, 2023

Workshop D 3

Industrial Ground-Mounted Solar: Challenges Municipalities Face while Protecting Wetlands, Rivers, Forests and Farmlands

Fred Bedall - Meg Sheehan
environmentwatchesoutheasternma@gmail.com

WHY MUNICIPALITIES ARE ON THE FRONT LINES!

- Conservation Commission
- Planning Boards
- Zoning Board of Appeals
- Building Inspector

- “These projects are extraordinarily damaging”

Partnership for Policy Integrity, 2021

- Typical project will cause increases in stormwater runoff, increased groundwater recharge, higher post development water table conditions

Scott Horsley, Hydrologist, 2023

OPEN

The Photovoltaic Heat Island Effect: Larger solar power plants increase local temperatures

Received: 16 May 2018
Accepted: 23 September 2018
Published: 01 October 2018

Greg A. Barron-Gafford^{1,2}, Rebecca L. Minor^{1,2}, Nathan A. Allen³, Alex D. Cronin⁴,
Adria E. Brooks⁵ & Mitchell A. Pavao-Zuckerman⁶

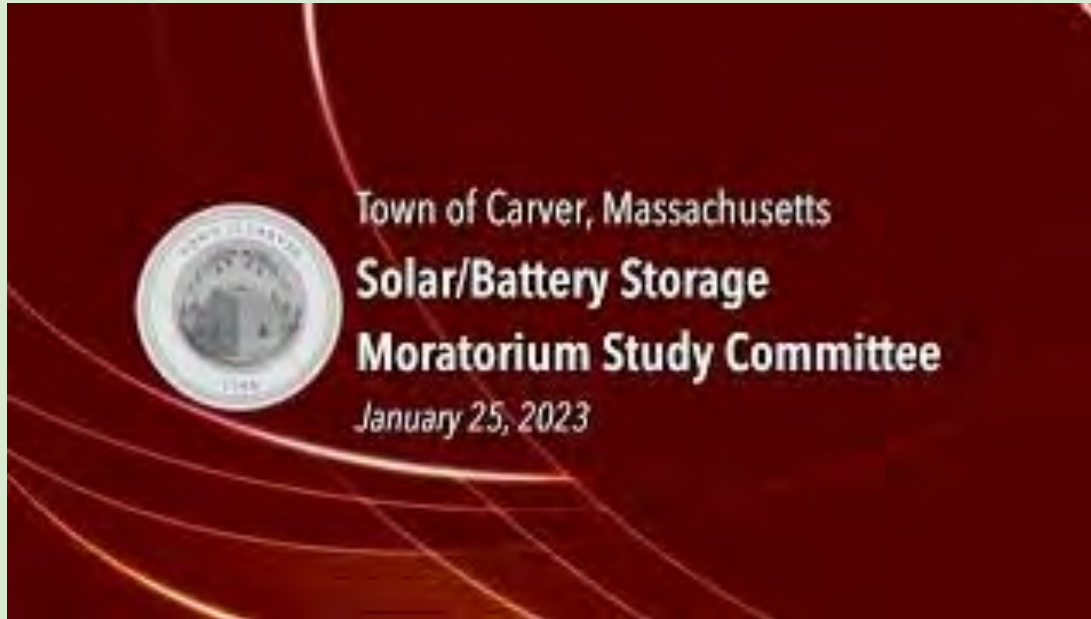
While photovoltaic (PV) renewable energy production has soared, concerns remain about whether or not PV power plants induce a “heat island” (PVIH) effect, much like the increase in ambient temperature relative to wildlands generates an Urban Heat Island effect in cities. Transitions to PV plants alter the way that incoming energy is reflected back to the atmosphere or absorbed, stored, and re-emitted because PV plants change the albedo, vegetation, and structure of the terrain. Prior work on the PVIH has been mostly theoretical or based upon simulated models. Furthermore, past empirical work has been limited in scope to a single biome. Because there are still large uncertainties surrounding the potential for a PVIH effect, we examined the PVIH empirically with experiments that spanned three biomes. We found temperatures over a PV plant were regularly 3–4 °C warmer than wildlands at night, which is in direct contrast to other studies based on models that suggested that PV systems should decrease ambient temperatures. Decoding the underlying cause and scale of the PVIH effect and identifying mitigation strategies are key in supporting decision-making regarding PV development, particularly in semi-arid landscapes, which are among the most likely for large-scale PV installations.

Electricity production from large-scale photovoltaic (PV) installations has increased exponentially in recent decades^{1–3}. This proliferation in renewable energy portfolios and PV powerplants demonstrate an increase in the acceptance and cost-effectiveness of this technology^{4,5}. Corresponding with this upsurge in installation has been an increase in the assessment of the impacts of utility-scale PV^{6–9}, including those on the efficacy of PV to offset energy needs^{10,11}. A growing concern that remains understudied is whether or not PV installations cause a “heat island” (PVIH) effect that warms surrounding areas, thereby potentially influencing wildlife habitat, ecosystem function in wildlands, and human health and even home values in residential areas¹². As with the Urban Heat Island (UHI) effect, large PV power plants induce a landscape change that reduces albedo so that the modified landscape is darker and, therefore, less reflective. Lowering the terrestrial albedo from ~20% in natural deserts¹³ to ~5% over PV panels¹⁴ alters the energy balance of absorption, storage, and release of short- and longwave radiation^{15,16}. However, several differences between the UHI and potential PVIH effects confound a simple comparison and produce competing hypotheses about whether or not large-scale PV installations will create a heat island effect. These include: (i) PV installations shade a portion of the ground and therefore could reduce heat absorption in surface soils¹⁷, (ii) PV panels are thin and have little heat capacity per unit area but PV modules emit thermal radiation both up and down, and this is particularly significant during the day when PV modules are often 20 °C warmer than ambient temperatures, (iii) vegetation is usually removed from PV power plants, reducing the amount of cooling due to transpiration¹⁸, (iv) electric power removes energy from PV power plants, and (v) PV panels reflect and absorb upwelling longwave radiation, and thus can prevent the soil from cooling as much as it might under a dark sky at night.

Public concerns over a PVIH effect have, in some cases, led to resistance to large-scale solar development. By some estimates, nearly half of recently proposed energy projects have been delayed or abandoned due to local opposition¹⁹. Yet, there is a remarkable lack of data as to whether or not the PVIH effect is real or simply an issue

¹School of Geospatial & Development, University of Arizona, Tucson, AZ, USA. ²Office of Research & Development, College of Science, Biosphere 2, University of Arizona, Tucson, AZ, USA. ³Nevada Center for Excellence, Desert Research Institute, Las Vegas, NV, USA. ⁴Department of Physics, University of Arizona, Tucson, AZ, USA. ⁵Department

Presentation to Town of Carver, Solar Bylaw Study Committee, Scott Horsley and others Jan. 25, 2023



MassDEP - Epsilon 2015 MACC

Wetlands Protection Act and Section 401 Permitting Process

Questions & Answers Ground-Mounted Solar Photovoltaic Systems,
December 2012 can be found at:
<http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf>

MassDEP-Epsilon, 2015

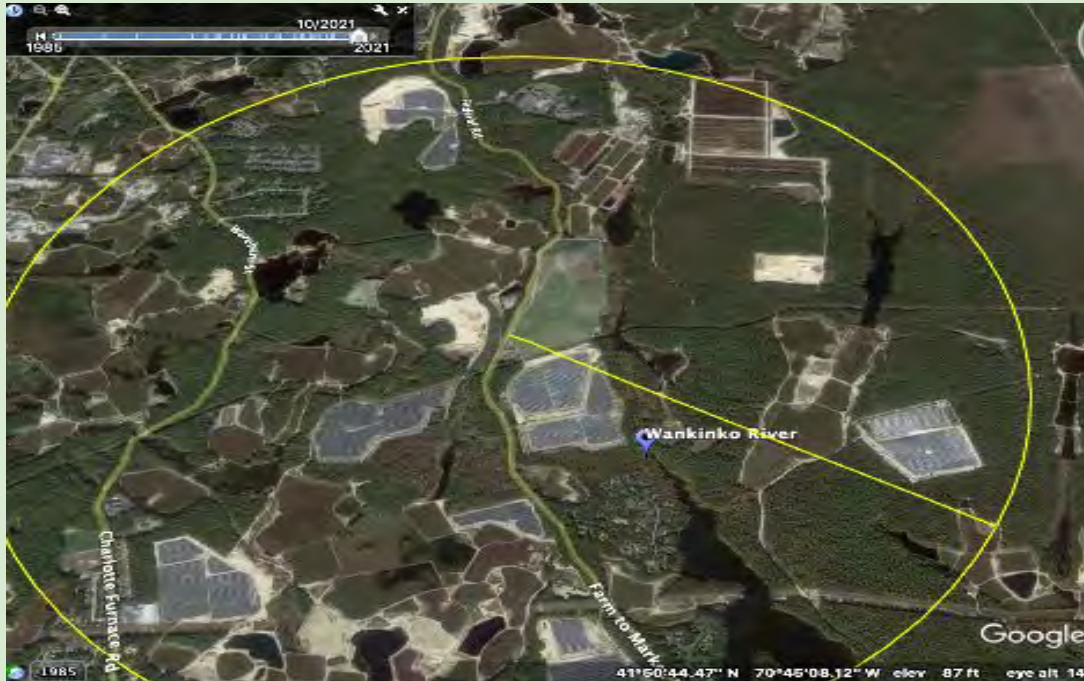
Site Solar Arrays Outside of Wetlands



But in 2023: since 2011 MassDEP Central

- “at least 260 solar projects in or near wetlands since 2011”
- No known numbers for 3 other regions

Wareham-Carver AD Makepeace Co. (landowner)
Borrego Solar: since 2015 1.5 mile radius



Carver MA, 2016 before AD Makepeace Co./Borrego Solar



Carver MA: After 2022 - at least 80 acres



Clean Water Act & Wetlands Violations

Mass AG 2021

- Williamsburg MA: 17 acres over \$1 million in penalties
- Southampton MA: \$700,000 penalty

USEPA 2023

- 4 projects: Alabama, Indiana, Illinois \$1.34 million

“Subsidiaries of large international finance and investment companies”

MA Dept. of Energy Resources (DOER)

“SMART” Solar Program 225 CMR 20.00

October 8, 2020: SMART Solar “Guideline Regarding Land Use, Siting, and Project Segmentation”

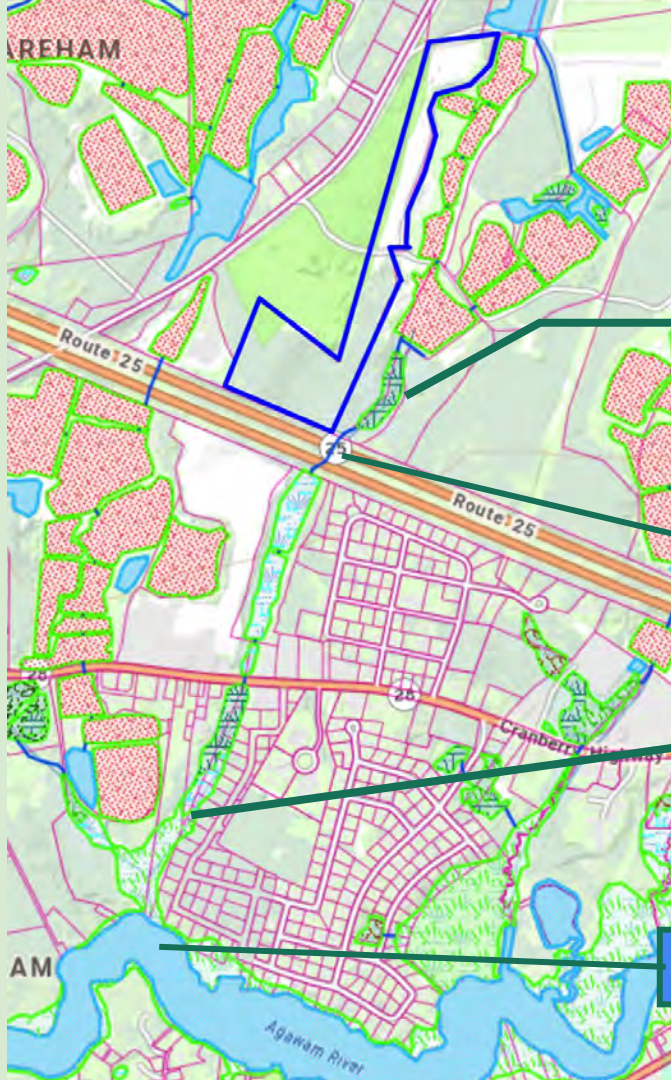
Technical Potential of Solar Siting study underway

MEPA: no programmatic Environmental Impact Report, no MEPA unless an ACEC or other trigger - SMART subsidies are not “Financial Assistance” and DOER “SOQ” is not a permit - MEPA Advisory Opinion, 2022

Long Road Energy LLC, Wareham MA: site preparation for solar = sand mining near cranberry claiming wetlands exemption, Chapter 61A



Hydrologic Impact Assessment



Freshwater Wetlands – water levels, thermal

Stream – flow, nutrients, thermal

Salt Marsh – salinity, nutrients

Estuary – nutrients (cumulative)

TOWN OF WAREHAM

APPROVED BY:
WAREHAM PLANNING BOARD:

DATE OF SIGNATURE _____
PLAN FILED _____
PLAN APPROVED _____

TOWN OF CARVER

APPROVED BY:
CARVER PLANNING BOARD:

DATE OF SIGNATURE _____
PLAN FILED _____
PLAN APPROVED _____

FOR PERMITTING ONLY

PREPARED BY:
SEALS & THOMAS INC.
200 West Street
Wareham, Massachusetts 02576-1890
Tel: 508.548.1234 | www.sealsandthomas.com

ROCKY MAPLE SOLAR FARM AND CARVER, MASSACHUSETTS

SHEET NO. 6 OF 13

100

Solar & Wetlands: MassDEP Info

DEP Policy: 17-1

DEP Guidance, 2018: Agriculture, Solar and Wetlands

DEP FAQs on Floating Solar

Farming in Wetland Resource Areas Manual: 1996 Edition

“Normal Improvement of Land in Agricultural Use” is exempt from wetlands laws



Farming in Wetland Resource Areas

*A Guide to Agriculture and the
Massachusetts Wetlands Protection Act*

Dual Use-Agrovoltaics: “ASGTU” Cranberry Bogs & Reservoirs: Carver MA

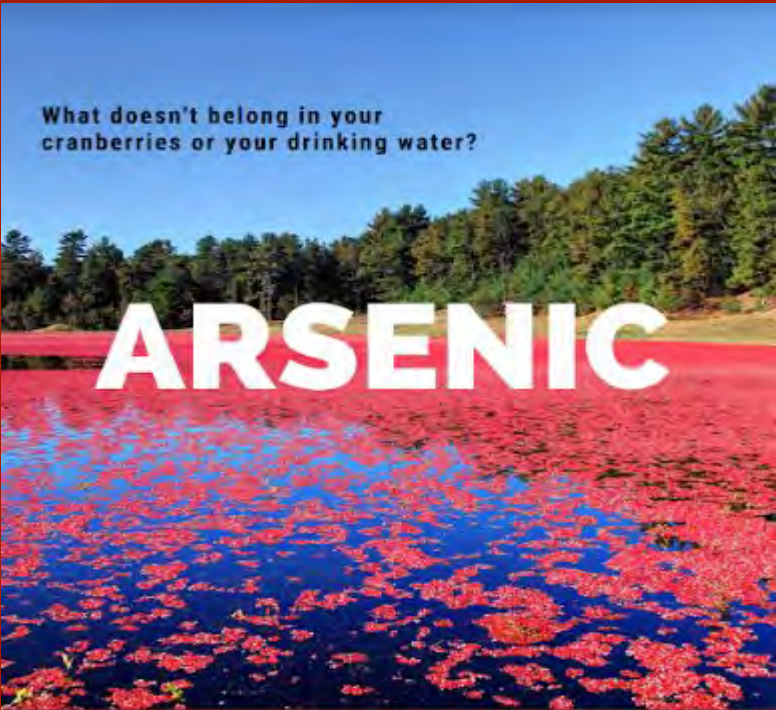


Pine Gate Renewables/Various cranberry bog owners: Carver: \$34 million, 3,500
Copper Chromated Arsenic Poles, Chapter 61A land





CCA toxic poles waiting to be installed at PineGate Renewables solar site at 340 Tremont Street, Carver MA, Sept. 2021



What doesn't belong in your
cranberries or your drinking water?

ARSENIC

Solar projects in Carver are using chromated copper arsenic (CCA) treated poles in solar projects in active cranberry bogs. CCA leaches into the bogs and our drinking water. Act now to stop the contamination.

PULL THE POLES

FOR MORE INFORMATION: WWW.PULLTHEPOLES.ORG

#PULLTHEPOLES

AD Makepeace-Renewable Energy Development Partners

Swan Holt Bog, Carver MA



Carver MA: One mile of solar canopy over stream; toxic poles installed in riverbank. Location approximate. Project of AD Makepeace Co. and REDP solar. Project underway, Oct. 24, 2021

This is a significant archeological site. Makepeace continues to do destructive earth removal here.

Floating Solar: Franklin Marsh Cranberry (landowner) ReWild Renewables LLC



Franklin Marsh Cranberry, industrial mining operation
under ruse of agriculture, creating reservoir



Zoning Permit/Site Plan Review Application

0 CARVER ROAD FLOATING SOLAR

**0 Carver Road
Plymouth, Massachusetts**

Prepared for:
**ReWild Renewables
P.O. Box 1320
Portsmouth, NH 03802**

Prepared by:



BEALS + THOMAS



Photograph 1: View of existing agricultural reservoir

Mass. Zoning Act protection for solar

Mass. General Laws, Chapter 40A, Section 3

1985 law to protect on site residential solar from objections of neighbors

Improperly expanded to protect industrial solar from zoning regulations unless municipality can prove it is necessary for the public, health, safety and welfare

Puts inappropriate and undue burden on municipality, reduces home rule and local power

Mass. Real Estate Tax Statute, G.L. Chapter 61A

2022 amendment via DRIVE energy act

Allows dual use solar farmland to stay in Chapter 61A for tax purposes

Says dual use solar on farmland protected “agriculture” under Zoning Act

BUT: The land must be “primarily and directly” used for agricultural purposes

Solar generates 10 to 30 x more revenue than hay, cranberries

Solar must not reduce the value of the crop

Who's checking?

Examples of helpful local bylaws and zoning ordinances laws

- Warren MA: Phase 1 Environmental Site Assessment
- Shutesbury MA: 4 to 1 acres mitigation for forest clearcut
- Plymouth MA: 5 acres

Add to Wetlands Order of Conditions:

Decommissioning funds to restore forests, wetlands

Protections from potential battery impacts

Groundwater impacts

Heat Islands

ACT!

- Get expert help: Make sure your municipality has G.L. Chapter 53G power-use it for the Town hire a lawyer, consultant for the Con Comm
- Think like a lawyer: write a good decision
- DOER solar siting reform
- Wetlands Protection Act exemption: Is it really “normal improvement of land in agricultural use”?
- MEPA environmental impact reports
- MassDEP revise policies, guidelines
- No Chapter 40A, Section 3 zoning protection for large solar

Resources

Smart Solar Amherst www.smartsolaramherst.org

Smart Solar Shutesbury www.smartsolarshutesbury.org

<https://www.youtube.com/watch?v=9DEvEU4BCKU>

Emily's Story – Solar Development Disaster in Williamsburg MA

MACC 2023 Documents www.savethepinebarrens.org

80% of US energy needs can be met by solar on built environment & battery storage

Don't forget conservation and reducing energy use!

www.savethepinebarrens.org



Save the Pine Barrens
P.O. Box 1699, Plymouth, MA 02362
www.communitylandandwater.org
environmentwatchesoutheasternma@gmail.com

June 22, 2023

Joint Committee on Telecommunications, Utilities and Energy
Hon. Mike Barrett
Senate Chair
Mike.Barrett@masenate.gov

Hon. Jeffrey Roy
House Chair
Jeffrey.Roy@mahouse.gov

Re: CLWC-Save the Pine Barrens

S. 2164: An act to allow municipalities to reasonably regulate solar siting: SUPPORT
H. 3230: An act to allow municipalities to reasonably regulate solar siting: SUPPORT

Dear TUE:

We write in support of the above-referenced bills to allow municipalities to reasonably regulate solar energy.

We are a public interest, non-profit network of groups and individuals seeking to preserve, protect and steward our unique and finite land and water resources. They are irreplaceable and we are losing them fast.

These bills are necessary in order to address an outdated 40-year old provision of the state Zoning Act that provides undue protection for industrial scale solar energy: the G.L. c. 40A, Section 9 "Dover Amendment" protection for solar. This protection was never intended to extend to large ground mounted solar and battery storage. It was adopted in 1985 at a time when there was no such thing as large industrial ground mounted solar and battery storage. It is

an outdated law being used in a way that 1980s legislators would never have intended nor would they have envisioned this. The Dover Amendment protections for solar must be modified.

Solar siting in Massachusetts is accomplished only through local land use planning through the exercise of home rule and zoning powers. There is no state level planning for the siting of industrial scale projects. Instead, the Department of Energy Resources (DOER) is engaged in de facto land use planning through the SMART solar program distribution of ratepayer subsidies for large solar and battery storage. This is not an appropriate means or method to ensure that solar is properly sited and our climate goals are met.

The results of DOER's de facto land use planning have been a disaster: our coalition is dealing with hundreds of solar projects that have not been properly sited. Solar developers target rural and environmental justice communities who are surrounded by relatively inexpensive land. We are watching volunteers boards spend thousands of hours annually to address all of the siting issue: concerns of abutters about vegetated buffers that protect water, hydrology, battery storage safety and emergency response, recycling of solar panels, and decommissioning; stormwater runoff is a particular concern because these projects completely denude the land, stripping vegetation and stumps and leaving the land in a condition where nothing can grow again in human time, in many instances.

Borrego Solar proposed to dump 150 acres of solar panels at the Wareham Transfer Station until the Planning Board asked hard questions.

The dual use solar program is resulting in harm to wetlands. We have had over 3,000 copper chromated arsenic poles installed in the sole source aquifer.

Solar developers are using the 40A, Section 3 Dover Amendment protection for solar as a weapon to sue local communities. This is not NIMBY-ism; the people of Massachusetts in local communities have the right to stand up for the protection of wetlands, their aquifer, and open space to ensure proper solar siting.

Municipalities have to deal with all aspects of the solar panels, inverters, transformers etc themselves-from construction, safety specs, decommissioning, surety bonds, etc. but also the industrial scale Battery Energy Storage Systems (BESS) installed with them. These have a totally different kind of safety health environmental issue to deal with.

We urge TUE to consider the upcoming study to be issued by MassAudubon and Harvard Forest in the summer of 2023, "Gaining Carbon," for the deployment of solar without destroying forests and landscapes, with no net loss of forest carbon.

Please visit YouTube Channel: [Save the Pine Barrens](#) to see examples of "solar gone wrong" and why we need to address the Dover Amendment for solar.

Electricity from large, industrial ground-mounted solar that destroys forests and farmland is not clean, not green, and a false solution to the climate emergency.

DOER's siting regulations are irreversibly flawed and force taxpayers and ratepayers to subsidize the destruction of our forests, waterways and communities.

We stand in solidarity with urban environmental justice communities bearing the cost of air pollution from the burning of fossil fuels in vehicles. Our rural communities cannot, however, continue to be exploited in the current manner to build large industrial solar projects. The Town of Wareham, for example, already has 19 ground mounted solar projects and is facing an onslaught of 1,400 more acres. BE RE LLC-Colorado is suing the Town of Wareham over the Conservation Commission's decision to deny a permit for a large-ground mounted solar project based on its impact to wetlands. Wareham is an environmental justice community and this is unfair.

We urge you to ensure that the above-referenced bills do not further incentivize improperly-sited ground mounted solar projects. With the state's climate plan calling for another 2 gigawatts of solar our communities are alarmed. We will not stand by while our forests and farmland are sacrificed under energy policies that simply have it backwards: does clear-cutting a forest for a "green" solar project really help the climate? The simple answer is no.

Massachusetts Audubon and Clark University's study shows that over 4,000 acres of Massachusetts forests have been lost to solar development and another 100,000 acres are threatened. While more affluent municipalities have managed to enact zoning bylaws that help protect their communities, real estate values and forests, many in the Southeastern part of the state have not. As a result, we are targeted by reckless solar development. Borrego Solar in particular has a foothold in partnership with the strip mining company, AD Makepeace Co. and have denuded and destroyed hundreds of acres of globally rare ecosystems, Native American sites, filled wetlands and riverfront and imposed the burden of this industrial energy in our residential neighborhoods.

A few pictures are attached. More are available on our website, www.communitylandandwater.org

We will contact your Committee to arrange a meeting in the next legislative session so that you can hear from your constituents directly about this issue.

Thank you for considering our comments. Please contact us if you have any questions or if we can provide any further information.

Sincerely,

Meg Sheehan

Meg Sheehan
Coordinator
Save the Pine Barrens, Inc.
508-259-9154
environmentwatchesoutheasternma@gmail.com

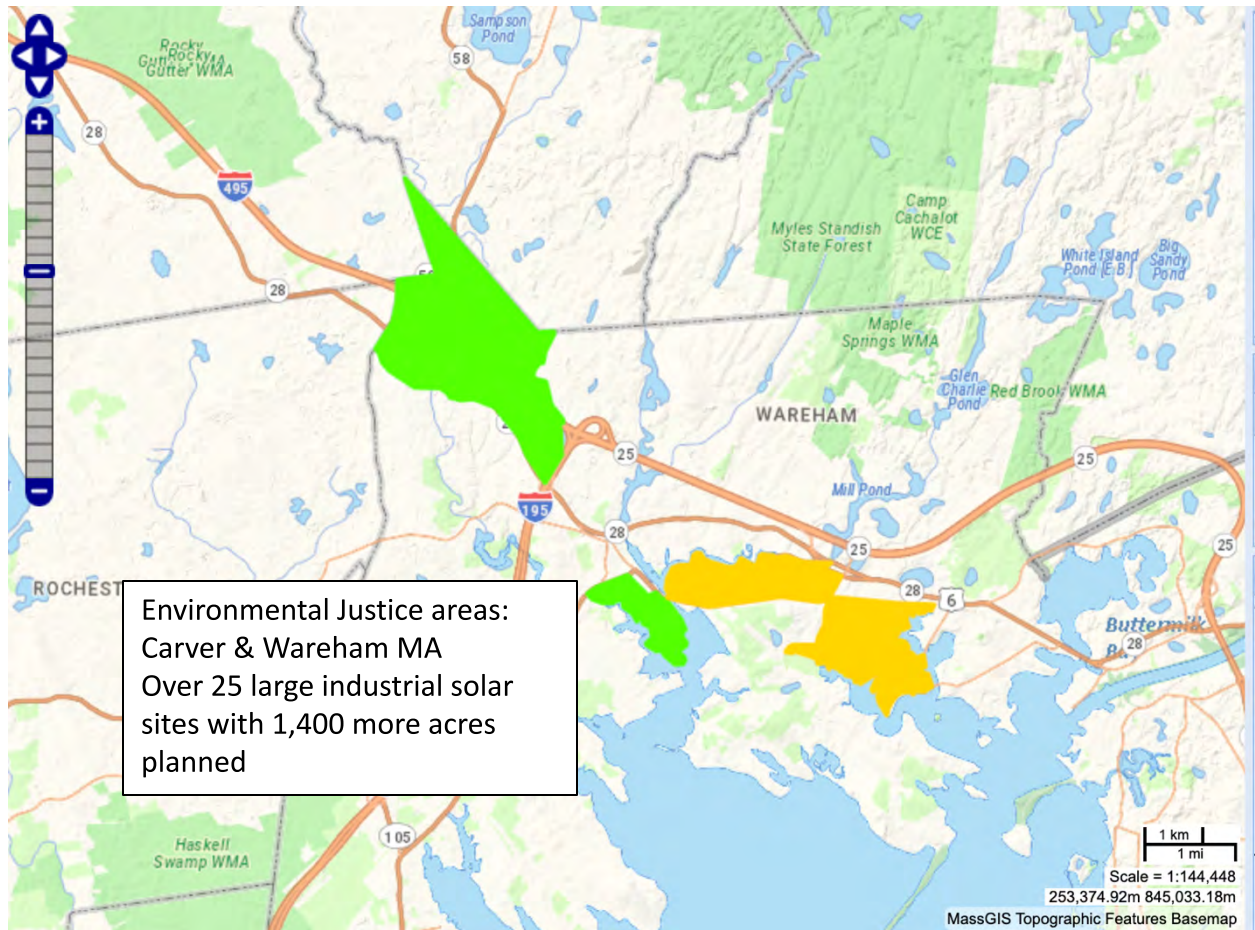
Attachments:
Save the Pine Barrens and Others Amicus Brief



Borrego Solar/AD Makepeace 50 acre project – clear-cut and strip mine of Pine Barrens, Carver MA, Photo Summer 2021



Borrego Solar/AD Makepeace – clear-cut and strip mine of Pine Barrens, c. 2016 to present: 80 acre site Carver (top left), 25 acre site (bottom left) and 50 acre site (right) Wareham c. 2012 to present; solar projects ongoing and expanding here. Image c. 2018



Growing Solar, Protecting Nature

Building the solar Massachusetts needs while protecting the nature we have

Mass Audubon and Harvard Forest | October 2023

Transitioning to clean electric power in less than three decades is an absolute imperative for decarbonizing our economy, and a massive challenge.

Massachusetts has made great initial strides in reducing greenhouse gas (GHG) emissions from electricity production, and has ambitious interim goals in place to complete the transition to nearly carbon-free electric power by 2050. Getting there will require a significant increase in the pace of clean energy deployment, including a growing role for solar of all types, and an unprecedented level of investment in electricity grid upgrades and transmission infrastructure.

Urgency on climate action, however, does not justify the haphazard approach to solar deployment witnessed in the Commonwealth over the past decade. The current trajectory of deployment of large ground-mount solar is coming at too high a

Preferred Citation:

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cost to nature. Concerns about impacts to nature are partly responsible for erosion of public support for solar, with many communities now seeking to slow or entirely stop new ground-mount solar systems.

Growing Solar, Protecting Nature explores a different path forward for scaling up solar energy resources in the Commonwealth. In this vision, solar plays an essential and growing role in cleaning our power grid, while nature is also left intact to continue its irreplaceable role combating climate change, supporting biodiversity, and providing resilience to climate change's worst impacts. This analysis shows that achieving the vision of growing solar while protecting nature is fully within our grasp. But, doing so requires a quick and intentional pivot from current siting practices, with immediate and purposeful changes to energy incentives and programs, enhanced and coordinated state and local planning efforts, and stronger incentives for keeping natural and working lands intact.



Motivation for *Growing Solar, Protecting Nature*

Massachusetts is one of a handful of U.S. states with ambitious laws for tackling the risks of unchecked climate change. Under the *Next-Generation Roadmap for Massachusetts Climate Policy*, passed into law in 2021, the Commonwealth must reach net-zero greenhouse gas (GHG) emissions by 2050.

The challenge is formidable. By 2030, climate-polluting emissions in Massachusetts must be reduced by 50 percent relative to 1990 levels, and by 75 percent by 2040, on the way to net-zero emissions by 2050. Because it is not feasible to eliminate fossil fuel use across the entire economy by 2050, reaching our net-zero goal will also require *removing* carbon from the atmosphere, to counteract our remaining GHG emissions. Massachusetts' forests are our primary and only means of

carbon removal.¹ As of yet, no other technology exists that can perform this function affordably.² Ensuring that nature continues this carbon removal service is among our lowest-cost strategies for meeting the net-zero goal.

But forests can't do it alone. Clean energy is foundational to unlocking reductions in GHG emissions needed across the economy. Massachusetts needs a massive build-out of clean electricity to support the electrification of the building and transportation sectors. In

the *Clean Energy and Climate Plan for 2050*, the state estimates that the clean energy generation mix needed in Massachusetts could be 8 gigawatts (GW) of solar and 4 GW of wind (onshore and offshore) by 2030, and at least 27 GW of solar and 24 GW of wind by 2050.³ Other New England states also need to expand clean power resources: estimates are that the capacity of the New England electric grid will need to expand by 2 to 2.5 times by 2050, and more transmission must also be built to move clean power to where it's needed.

The New England
grid will need to
expand in size by
2.5 times.

Fortunately, Massachusetts and the New England region have abundant solar and wind resources. Massachusetts alone is planning for an estimated 5,600 megawatts (MW) of offshore wind energy by 2027. Both renewable technologies have recently undergone a massive market transformation. The National Renewable Energy Lab (NREL) estimates that, over the last decade, the price of solar photovoltaic modules has declined by 85 percent.⁴

Mass Audubon and Harvard Forest believe that scaling up solar and other clean energy resources is an absolute imperative to meeting the state's climate targets for 2030, 2040, and 2050. All types of solar will be needed, including ground-mount systems as well as "distributed" solar, i.e., rooftop

solar that connects into the electricity distribution system, and solar on canopies erected on top of parking lots.

As we scale up our deployment of solar, **we must also recognize the instrumental role that natural and working lands play in stabilizing our climate system.** More than 60 percent of Massachusetts is covered by diverse forests, which are storehouses of carbon. Our trees alone contain the equivalent amount of carbon as in five years' of statewide fossil fuel emissions.⁵ Forest soils contain a similar amount.⁶ Beyond storage, forests are also actively capturing carbon from the atmosphere at a rate equivalent to 10 percent of our current GHG emissions.⁷ **In addition, forests and natural ecosystems provide valuable, irreplaceable public goods: biodiversity, drinking water filtration, wildlife habitat, recreation, and resilience to impacts of climate change such as flooding and extreme heat.**

1 Massachusetts Executive Office of Energy and Environmental Affairs, "Massachusetts Forest Carbon Study: Workshop 1 (June 2023)."

2 Boston Consulting Group (BCG), "Shifting the Direct Air Capture Paradigm." BCG Global, June 1, 2023. <https://www.bcg.com/publications/2023/solving-direct-air-carbon-capture-challenge>.

Technical carbon removal technologies under development such as Direct Air Capture (DAC) are currently very costly, ranging at about \$600 to \$1,000 per ton of CO₂ removed; if DAC becomes commercially viable, BCG predicts that costs of DAC could drop to \$100 per ton by 2050.

3 Massachusetts Executive Office of Energy and Environmental Affairs, "Massachusetts Clean Energy and Climate Plan 2025 and 2030," June 30, 2022. These goals for clean energy are inclusive of solar and wind capacity already installed, not in addition to today's capacity.

4 David Feldman et al., "U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark (Q1 2020)" (National Renewable Energy Laboratory (NREL), January, 2021), <https://doi.org/10.2172/1764908>.

5 Thompson J.R. et al. "Land Sector Report, Massachusetts 2050 Decarbonization Roadmap." 2020. 62 pp.

6 Adrien C. Finzi et al., "Carbon Budget of the Harvard Forest Long-Term Ecological Research Site: Pattern, Process, and Response to Global Change," *Ecological Monographs* 90, no. 4 (November 2020): e01423, <https://doi.org/10.1002/ecm.1423>.

7 Massachusetts Executive Office of Energy and Environmental Affairs, "Massachusetts Forest Carbon Study: Workshop 1 (June 2023). Note that 10 percent of today's yearly GHG emissions in Massachusetts is equivalent to 7 percent of 1990's yearly GHG emissions, which were nearly 100 MMTCO₂e.



Solar Deployment at Mass Audubon

Solar energy is essential to Mass Audubon's plans to reach net-zero GHG emissions across our properties and operations. We've been committed to solar energy since the early 2000s, when we established a goal to install solar at every staffed sanctuary. Today Mass Audubon owns a total of 45 solar arrays spread across 21 sanctuaries. At a total capacity of 621 kW, our solar systems produced nearly 50 percent of our total electric consumption last year. While most of the arrays are rooftop systems, about a third of our solar generation comes from our 14 ground-mount systems. Solar will certainly play a large role in our future plans: new buildings at Mass Audubon must be net-zero or better, so solar will be part of any new construction.



Mass Audubon's
solar systems produced
NEARLY 50%
of our total electric consumption
last year.

Incentives under the Solar Massachusetts Renewable Target (SMART) program (and its predecessor programs for solar) have been very effective at driving development of ground-mount solar systems onto already-developed lands such as landfills and brownfields. As of 2020, over 50 percent of all landfills in the U.S. with large ground-mount solar projects were located in Massachusetts.⁸ Massachusetts is also among the top 10 states in the U.S. in community and rooftop solar placed on buildings and parking lot canopies on a per capita basis.⁹

However, our clean energy and land policies are still not doing enough to safeguard natural ecosystems and working lands. Under current siting practices, thousands of acres of forests, farms, and other carbon-rich landscapes are being converted to host large-scale solar. Mass Audubon's 2020 *Losing Ground* analysis showed this recent shift: starting around 2010, clearing for ground-mount solar became one of the leading drivers of land-use change in Massachusetts.¹⁰ A loophole in SMART provides state funding to ground-mount projects on high biodiversity lands as long as they are community solar. And with the state's 2030 climate goals only seven years away, combined with new federal incentives for solar provided by the Biden Administration's groundbreaking *Inflation Reduction Act* (IRA), the pace of ground-mount solar development is poised to accelerate.

According to a recent state survey of public attitudes towards solar, over 85 percent of surveyed residents in Massachusetts believe that solar should be built on rooftops, parking lots, landfills, and other developed areas, rather than on cleared forests and on top of productive farmland.

Massachusetts citizens strongly support expansion of solar and other clean energy resources. But local opposition to large ground-mount solar projects is growing, especially in places where the pace and scale of development has been significant, or done without sufficient input from communities. Public opinion is clear: Massachusetts residents expect a solar build-out that is balanced as much as possible with nature and agriculture. In fact, a recent Massachusetts Division of Energy Resources

By 2020,

OVER 50% OF ALL LANDFILLS
IN THE U.S.

with large ground-mount solar projects
were located in Massachusetts.

(DOER)¹¹ survey found overwhelming support from the public for a more balanced approach to solar siting:

- Over 85 percent of surveyed residents in Massachusetts believe that solar should be built on rooftops, parking lots, landfills, and other developed areas, rather than on cleared forests and on top of productive farmland.
- Over 70 percent of residents believe environmental impact is the most important trade-off to consider when siting new solar.

8 Matthew Popkin and Akshay Krishnan, "The Future of Landfills Is Bright" (Rocky Mountain Institute (RMI), October 2021), <https://rmi.org/insight/the-future-of-landfills-is-bright/>.

9 U.S. Energy Information Administration, "Massachusetts State Energy Profile," October 2022, <https://www.eia.gov/state/print.php?sid=MA>.

10 Heidi Ricci et al., "Losing Ground: Nature's Value in a Changing Climate" (Mass Audubon, 2020).

11 Pat Knight et al., "Massachusetts Technical Potential of Solar" (Synapse Energy Economics, Inc. July 6, 2023), <https://www.mass.gov/doc/technical-potential-of-solar-in-massachusetts-report/download>.



Research Questions

Growing Solar, Protecting Nature explores pathways for deploying solar energy at levels aligned with the state's decarbonization goals and timelines, while minimizing impacts on natural and working lands.

Our hypothesis is that there is ample space in Massachusetts to build economically viable solar on already-developed lands, buildings, and parking lots while minimizing solar that drives losses of terrestrial carbon, biodiversity, prime farmland, and lands that provide resilience to flooding, heat waves, and other climate impacts.

We also believe that public opposition to ground-mount solar could grow unless policies are designed to ensure the best possible balance among clean energy, nature, and working lands. This will require adjustments to the status quo—that is, changing our current siting practices and incentives for large ground-mount solar projects, and deploying even more solar on our buildings and already-developed lands.

In *Growing Solar, Protecting Nature*, researchers from Mass Audubon, Harvard Forest, and Evolved Energy Research used the best geospatial data and energy-economic modeling available to answer the following questions:

- How have large ground-mount solar systems affected Massachusetts' forests, habitats, and farms thus far? What would impacts be if roughly ten times as much ground-mount solar is sited in a similar way?
- Can Massachusetts deploy enough solar to meet the GHG emission reduction goals of the state's *Clean Energy and Climate Plan for 2050* while minimizing impacts on lands with the highest value for carbon, biodiversity, and food production, and reducing the impacts of climate change?
- Which sites for ground-mount solar avoid additional losses to nature and farmlands? How much solar can be economically

sited in the built environment?

- What are the cost implications of deploying more solar with minimal impacts on highest value natural landscapes and farms? What is the cost of siting ground-mount solar on natural and working lands when the true value of carbon removal is included?
- What changes to policy and programs are needed to achieve better balance between ground-mount solar, nature, and working lands?



Profiles of Solar Impacts

Solar installations in Massachusetts range from exemplary, nation-leading projects on landfills and brownfields to poorly designed and executed projects that harm unique ecosystems and natural assets. These Profiles of actual projects illuminate both the challenges and opportunities for all types of solar

projects as we scale up this essential clean energy resource over the next few decades.

Challenges

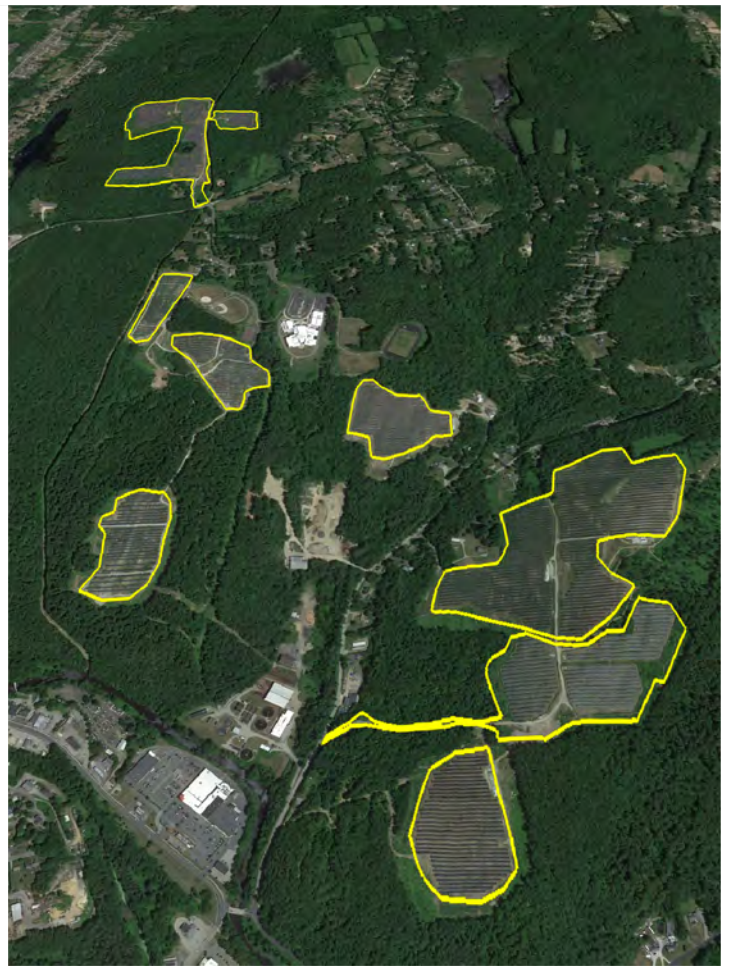
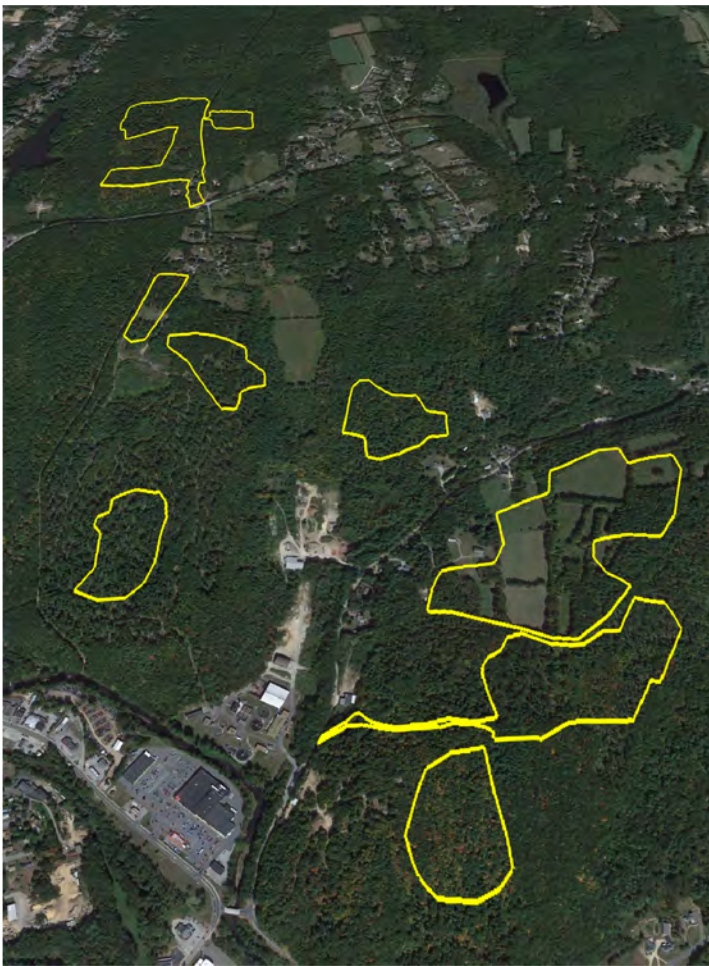
- Forest Loss and Fragmentation
- Conversion of Prime Farmland to Solar
- Biodiversity Impacts
- Erosion and Runoff

Solutions

- Landfills and Brownfields
- Solar Deployment on Commercial Rooftops and Parking Lots
- Redevelopment Opportunities for Solar
- Public Agencies and Non-Profit Institutions

Proceed with Caution

- Agrivoltaics



Challenge: Forest Loss and Fragmentation

Forests not only remove carbon from the atmosphere, they also filter drinking water, provide flood control, cooling and shade, wildlife habitat, and areas for outdoor recreation. However, some solar siting practices are putting Massachusetts' forests at serious risk.

From 2010-2020, nearly half of ground mount arrays (3,753 of 7,900 acres) were sited in forested areas. This resulted in a loss of over 500,000 metric tons of CO₂, equivalent to the annual emissions of more than 110,000 passenger cars. South-central Massachusetts is home to most of these projects, accounting for 37 percent of overall forest loss in the State.

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Challenge: Conversion of Prime Farmland to Solar

To date, nearly 1,600 acres of Massachusetts prime farmland has been converted to host ground-mount solar arrays. These lands are attractive for ground-mount development because they're flat and have workable soils. Construction of large ground-mount arrays directly on productive agricultural land reduces the state's capacity for producing locally-grown food.

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Challenge: Biodiversity Impacts

The Southeast region contains the second largest area of coastal pine barrens in the U.S., supporting more than 200 state-listed species, including globally rare species and habitats.

More than 190 ground mount solar arrays have been built in Plymouth and Bristol Counties across 2,322 acres, resulting in destruction and fragmentation of some of these rare ecosystems. Many more ground-mount projects are planned for this region. Indigenous leaders are concerned about the loss of forests and important cultural sites from ground-mount solar.

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Challenge: Erosion and Runoff

Removing forest on steep slopes to site solar arrays can lead to serious erosion and sedimentation into sensitive wetlands and streams. In [Williamsburg](#), a solar project sited on a steep slope was assessed over \$1 million in penalties for damage to Mill River, a cold-water fishery, due to erosion. Massachusetts [Department of Environmental Protection's guidance](#) for stormwater management on solar arrays encourages avoidance of steep slopes but it does not require the same level of treatment as other impervious surfaces. This policy should be revised.

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Solution: Landfills and Brownfields

Closed landfills have grassy open areas where trees are not allowed to grow in order to protect the landfill cap, and thus can be excellent sites for ground-mounted solar. Due in part to strong state incentives, Massachusetts is a national leader in building solar arrays on closed landfills. As of 2019, 65 utility-scale projects (>1MW) had been built, over half of all such projects nationwide. Many of the best opportunities on landfills have been done, but there is still potential for more. Rocky Mountain Institute estimates that Massachusetts has landfills offering more than 2.5 GW capacity if fully built out. Not all of these sites will be suitable due to slope and soil characteristics, but significant opportunities remain.

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Solution: Solar Deployment on Commercial Rooftops and Parking Lots

Densely developed commercial properties offer many opportunities to install solar systems. These are often located close to load centers, which can help avoid electricity distribution costs in many instances.

Rooftop solar has been widely deployed on commercial buildings such as in the Natick Mall, but many commercial buildings are not built to accommodate the weight of solar systems. Codes for new commercial buildings should require load-bearing capacity for rooftop solar.

With many vacant or uneconomic properties around the state including malls, strip malls, and underutilized parking lots, redevelopment of these sites to mixed-use, i.e., housing plus commercial zones, is an opportunity to integrate new solar onto

rooftops and parking lots while also addressing needs for new affordable housing.

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Solar installation, Natick, MA



Solution: Redevelopment Opportunities for Solar

Developed lands that are no longer economically viable for their original use offer opportunities for redevelopment, which can be a great opportunity to include new ground-mount solar. The former Shirley airport, for example, has been converted to a large ground-mount array on 34 acres of former runway and adjoining land. Closed shopping malls like Eastfield have large paved areas that could host solar.

Of the more than 280 golf courses in Massachusetts, some are no longer viable businesses. Several of these have already been converted to hosting solar, including private clubs in Warren (54 ac), Hardwick (19 ac), and a public driving range in Lancaster (25 ac). While some golf courses and former airfields are strong candidates for ecological restoration and habitat (e.g., Pine Grove Golf Course in Northampton), others with lower ecological value are excellent candidates for new ground-mount systems.

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Solution: Public Agencies and Non-Profit Institutions

State agencies, cities and towns, and public and private non-profit institutions often invest in solar on their developed sites and buildings even when the return on investment timeframes are relatively long, reflecting strong commitments to net-zero climate goals.

Colleges, schools, and many other institutions receiving state funding are leaders on installing canopy solar, including UMass Amherst, Roxbury and Bristol community colleges, and MBTA stations. With an estimated 35,000 acres of parking lots available for hosting solar across the Commonwealth, the potential canopy solar capacity is nearly 10 GW. Canopies are also popular with the public as they shield from sun, rain, and snow. However, most canopy projects require direct funding or

higher program incentives to overcome higher costs relative to rooftop and ground-mount systems.

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Proceed with Caution: Agrivoltaics

Agrivoltaic solar projects involve integrating solar arrays into agricultural fields, using panel spacing and heights that can allow farming to continue underneath. By creating a new source of revenues from energy markets, they may help maintain marginally viable farms from converting to other forms of development.

DOER's SMART includes incentives for 80MW for development of agrivoltaic solar projects. As of June 2023, 44 projects totaling 63MW AC capacity have been approved or are in review under SMART's agrivoltaics incentives. Planned crops include squash, leafy greens, apples, cranberries, hay, cattle, and sheep.

Agrivoltaics are relatively new to Massachusetts. More information is needed on farm viability, crop selection, changes in food production, soil impacts, and costs before any scale-up of agrivoltaics. Studies underway by [UMass Extension](#) and other research should inform program review of incentives and possible future adjustments.

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Methods

This *Growing Solar, Protecting Nature* analysis examines three scenarios depicting Massachusetts solar build-out from now until 2050.

Importantly, each of these scenarios is projected to reach the GHG emissions targets set out in Massachusetts' Clean Energy and Climate Plan for 2050,

though they may employ different levels of clean energy resources like solar, wind, and clean energy imports.¹²

Our analysis relies on the best available geospatial data, maps, and best-in-class energy modeling tools. This analytic approach involved three main steps, described below. More detailed descriptions of our methods, data and assumptions, and modeling tools are available in [Appendix A](#).

Step 1. Estimate technical potential of solar in Massachusetts, using different estimates of lands available for ground-mount solar.

We created three scenarios of *technical* solar potential, defined as where solar can be deployed based on technical and legal considerations only, from now until 2050. Estimates of technical potential do not include any economic considerations. All three scenarios use the same estimate of technical potential for solar on building rooftops and parking lot canopies. Of the ~119,160 acres¹³ of available rooftops in the Commonwealth, NREL estimates that 40,772 acres are currently viable for hosting rooftop, with a technical solar potential of 20.6 GW. With over 55,000 acres of parking lots in the Commonwealth, we estimate that with set-backs, over 35,000 acres of these could viably host solar now, with technical solar potential of 9.9 GW. Combined together, the best rooftop and parking lot spaces in Massachusetts have over 30 GW of technical solar potential.

The key difference among the three scenarios is in how we depict the *lands available to host ground-mount solar projects*. This difference is created in order to estimate the range of impacts that ground-mount solar could have on natural and working lands over the next few decades, in particular to levels of forest carbon removal, biodiversity, climate resilience, and productive farmland. Specific assumptions used for the three scenarios are described below.

- The **Current Siting scenario** approximates the status quo in siting practices for ground-mount solar. In this scenario, ground-mount solar projects comply with existing legal and physical requirements for solar (e.g., relatively low slopes), but otherwise are not constrained by environmental or social goals or considerations.

Under the **Current Siting scenario**, over 1 million acres of lands in Massachusetts have the technical potential for ground-mount solar.

In contrast with the *Current Siting* scenario, two *Protecting Nature* scenarios estimate the technical potential of solar if it is primarily limited to sites on already-developed lands, buildings, and parking lots in order to be highly protective of natural and working lands. By design, the supply of sites for ground-mount solar from now until 2050 is restricted in these scenarios as follows:

- The **Protecting Nature—Mid-Impact scenario** protects the majority of lands featuring high-carbon natural ecosystems, biodiversity, high climate resiliency, and productive farmland from the supply of sites modeled for hosting ground-mount solar.

Under the **Protecting Nature—Mid-Impact scenario**, 94,000 acres have the technical potential for ground-mount solar, which is less than one-tenth of the lands under the *Current Siting* scenario.

- The **Protecting Nature—Low-Impact scenario** is even more protective of nature, farmlands, and other environmental attributes than the Mid-Impact scenario above.

The **Protecting Nature—Low-Impact scenario** identifies only 38,000 acres with the technical potential for ground-mount solar.

Step 2. Estimate how much technical potential for solar is most economically attractive.

As noted above, technical potential for solar only indicates where solar meets minimal legal and technical requirements (e.g., low slope). There is a subset of sites with technical potential that are the most economically attractive—these are the land parcels, buildings, and parking lots that are most likely to be first developed for solar, because they have lower costs compared to other sites. We refer to this portion of technical solar potential with lower relative costs as ‘economic’ or ‘economically attractive’ solar. Using a best-in-class energy-economic model, we evaluated the technical solar potential for each scenario to identify the portion of land parcels, rooftops, and parking lots of the technical potential that are the most economically attractive for hosting solar systems.

Many projects that rank as higher cost will still be developed by homeowners and business owners because of state policy incentives, preferences, and other reasons for installing solar.

Our economic analysis takes into account the effect of federal renewable energy incentives created by the *Inflation Reduction Act* on future solar capacity. Importantly, it does not include existing state-level incentives that impact the relative cost-effectiveness of solar. State incentives are a key policy tool available to encourage the types of renewable energy development that align with state priorities. By leaving the state-level incentives for solar out of the economic analysis, we are able to understand how changing them would impact future solar capacity. It is important to note that the solar identified as the most economic in our least-cost energy model is not a limit to how much solar can get built. Many projects that rank as higher cost will still be developed by homeowners and business owners because of state policy incentives, preferences, and other reasons for installing solar.

Step 3. Estimate impacts of economic ground-mount solar on natural and working lands.

For each scenario, parcels identified as most economically attractive for ground-mount solar were then evaluated for the environmental impacts of converting the parcel for development, including changes in forest carbon, biodiversity, climate resiliency, and prime farmland. We used a statistical technique (i.e., Monte Carlo resampling; see [Appendix A](#)) to account for the uncertainty in exactly which sites are most likely to get built, then calculated differences among the scenarios to estimate the net impacts to nature and working lands.

¹² Massachusetts Executive Office of Energy and Environmental Affairs, "Massachusetts Clean Energy and Climate Plan 2025 and 2030" (Massachusetts Executive Office of Energy and Environmental Affairs, June 30, 2022).
¹³ Pieter Gagnon et al., "Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment," January 1, 2016, <https://doi.org/10.2172/1236153>.



Key Findings

KEY FINDING #1

Ground-mount solar systems installed in Massachusetts since 2010 have caused significant losses to forest carbon, biodiversity, and productive farmland. State goals for carbon removal, biodiversity, and climate resilience will be at high risk unless siting of ground-mount solar changes, and quickly.

As of 2023, Massachusetts has an estimated 4.2 GW of solar energy capacity, currently among the top 15 states in the U.S.¹⁴ Most of this capacity—roughly 2.8 GW—is distributed solar on rooftops and canopies over parking lots. The remaining roughly

1.4 GW is estimated to be ground-mount solar. Starting around 2010, the build-out of ground-mount solar began to have a major impact on the state's natural lands.

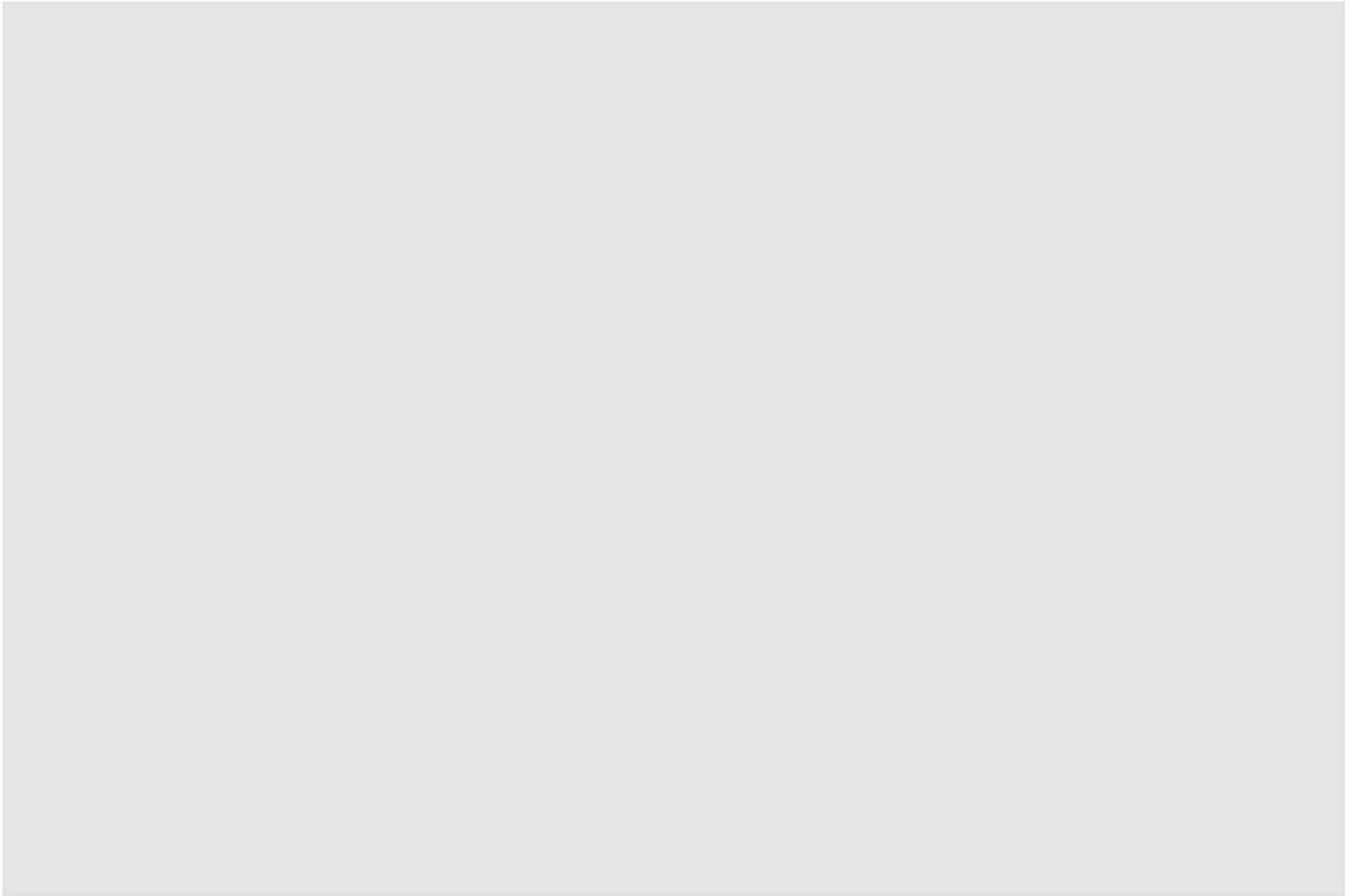


Figure 1:

Ground-Mounted Solar Systems in Massachusetts, 2010–2021

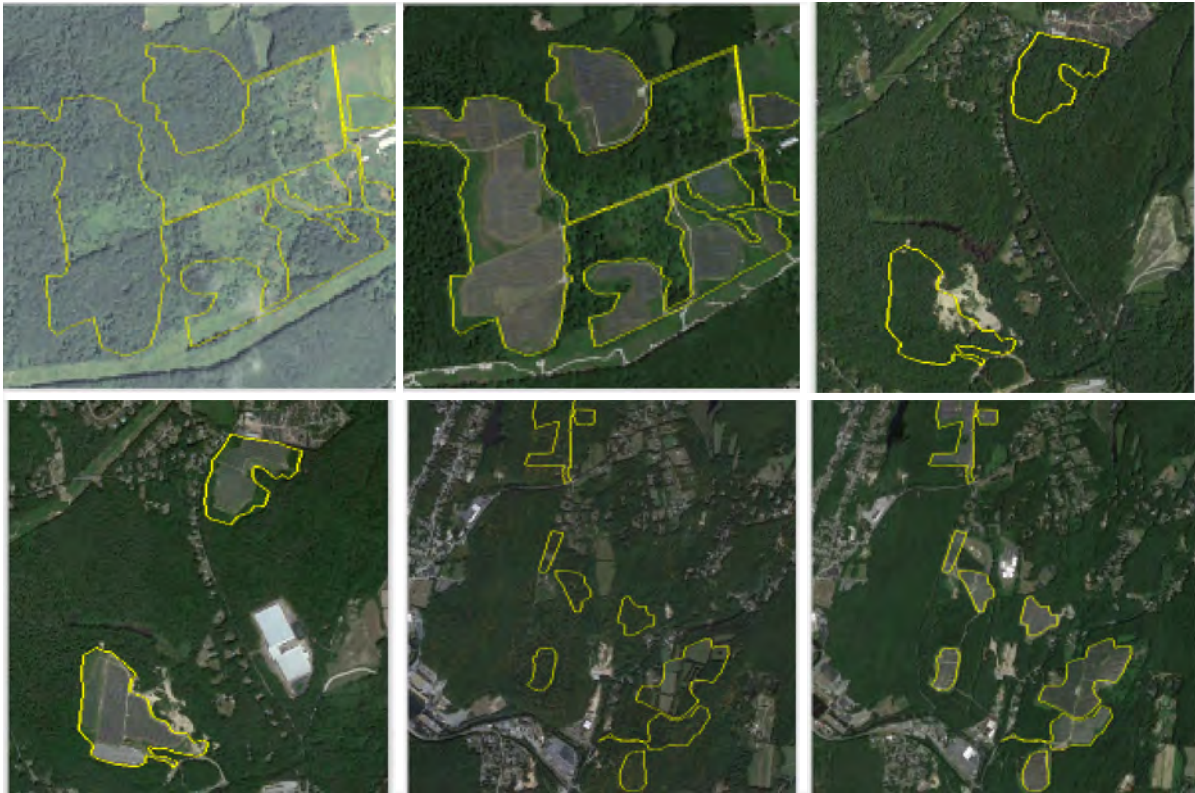
This map reflects the location and size of hundreds of ground-mount solar projects which were built between 2010 and 2020, covering more than 8,000 acres in Massachusetts. Nearly 2,000 additional acres have been converted since 2020. Large ground-mount solar projects are highly concentrated in south-central and southeastern Massachusetts, where solar energy and transmission infrastructure are most abundant. Just four counties—Worcester, Hampden, Plymouth, and Bristol—account for 75 percent of the total ground-mount solar capacity, with Worcester County accounting for most of this.

The impacts of over hundreds of ground-mount solar projects on our natural and working lands over the last decade have been broad and deep. Before these sites hosted ground-mount solar, 60 percent of the land was forested. We estimate that conversion of forests resulted in emissions of more than 500,000 metric tons of CO₂—equivalent to the annual GHG emissions from 112,000 passenger cars.

Ground-mount solar has resulted in losses to more than forest carbon. Sixteen percent of these sites were previously agricultural land. Almost 10 percent of solar acres built during this decade overlap with core wildlife habitat, and 11 percent overlap with critical natural landscapes identified by the state's map of lands supporting high levels of biodiversity, called BioMap.¹⁵ Moreover, approximately 15 percent of the affected areas are designated as "above average" for providing resilience to impacts of climate change, according to The Nature Conservancy.¹⁶

If current trends of ground-mount solar construction continue, we stand to lose more than 20,000 additional acres of the most valuable wildlife habitat in the state, including 9,000 acres in the globally rare pine barrens habitat of southeastern Massachusetts and another 9,000 acres in largely forested areas of central and western Massachusetts. When left intact and connected, these areas are habitat for most of the Commonwealth's 432 endangered, threatened, and special concern species such as Blue-spotted Salamander, Northern Long-eared Bat, and Eastern Whip-poor-will. Connected forests also support our more common species and provide critical movement corridors for wide-ranging species such as bobcat, fisher, and black bear. Conversion to ground-mount solar, like other forms of development, drastically alters these natural communities, fragments the landscape, and interrupts wildlife movement patterns. These new forest openings also serve as entry points for invasive plants and provide favorable conditions

for increased white-tailed deer density which has further negative impacts on the surrounding forest.



Examples of valuable forests that were cleared for solar installations. From left to right: Oxford, Shirley, Southbridge, MA. Click each image to enlarge.

Beyond the direct impacts to wildlife, a fragmented landscape is a less resilient landscape, one that is less able to adapt as the climate continues to change. In Massachusetts, more than a quarter of the forest area is within 65 feet of a non-forest edge,¹⁷ so it's imperative that we keep our remaining forests intact. Connected and resilient landscapes allow for the slow range shifts of plants and animals in response to shifting temperature and precipitation patterns. They are better able to support our communities by absorbing and filtering stormwater, reducing flooding and protecting our rivers and drinking water supplies. By breaking up the landscape, we reduce resilience and put these precious ecosystem services at risk.

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- 14 Solar Energy Industries Association, "Massachusetts Solar | SEIA," accessed September 5, 2023, <https://www.seia.org/state-solar-policy/massachusetts-solar>.
- 15 Pal Knight et al., 2023. "Massachusetts Technical Potential of Solar."
- 16 MassGIS. "BioMap: The Future of Conservation," [Dataset], November 2022.
- 17 The Nature Conservancy, "Resilient Lands Mapping Tool," [Mapping Tool], 2016, <https://maps.tnc.org/resilientland/>.
- 18 Reinmann, Andrew B., Ian A. Smith, Jonathan R. Thompson, and Lucy R. Hutyrá. "Urbanization and Fragmentation Mediate Temperate Forest Carbon Cycle Response to Climate." *Environmental Research Letters* 15, no. 11 (November 2020): 114036. <https://doi.org/10.1088/1748-9326/abb116>.
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KEY FINDING #2

Massachusetts has ample sites for solar to reach the state's GHG emission reduction goals without further sacrifices of natural and working lands.

Results for the *Protecting Nature* scenarios show that Massachusetts has ample locations to site economically attractive solar, meeting the Commonwealth's GHG emissions targets while being highly protective of nature. Under the first of these scenarios—the *Protecting Nature—Mid-Impact* scenario—solar deployment is at nearly 80 percent of the levels called for by the *Clean Energy and Climate Plan for 2050*. Reaching the solar levels described in the *Clean Energy and Climate Plan* can be achieved while protecting nature and working lands, but will require a shift in current state incentives to bring in even more distributed (i.e., rooftop and canopy) solar while also changing the type and location of new ground-mount solar.

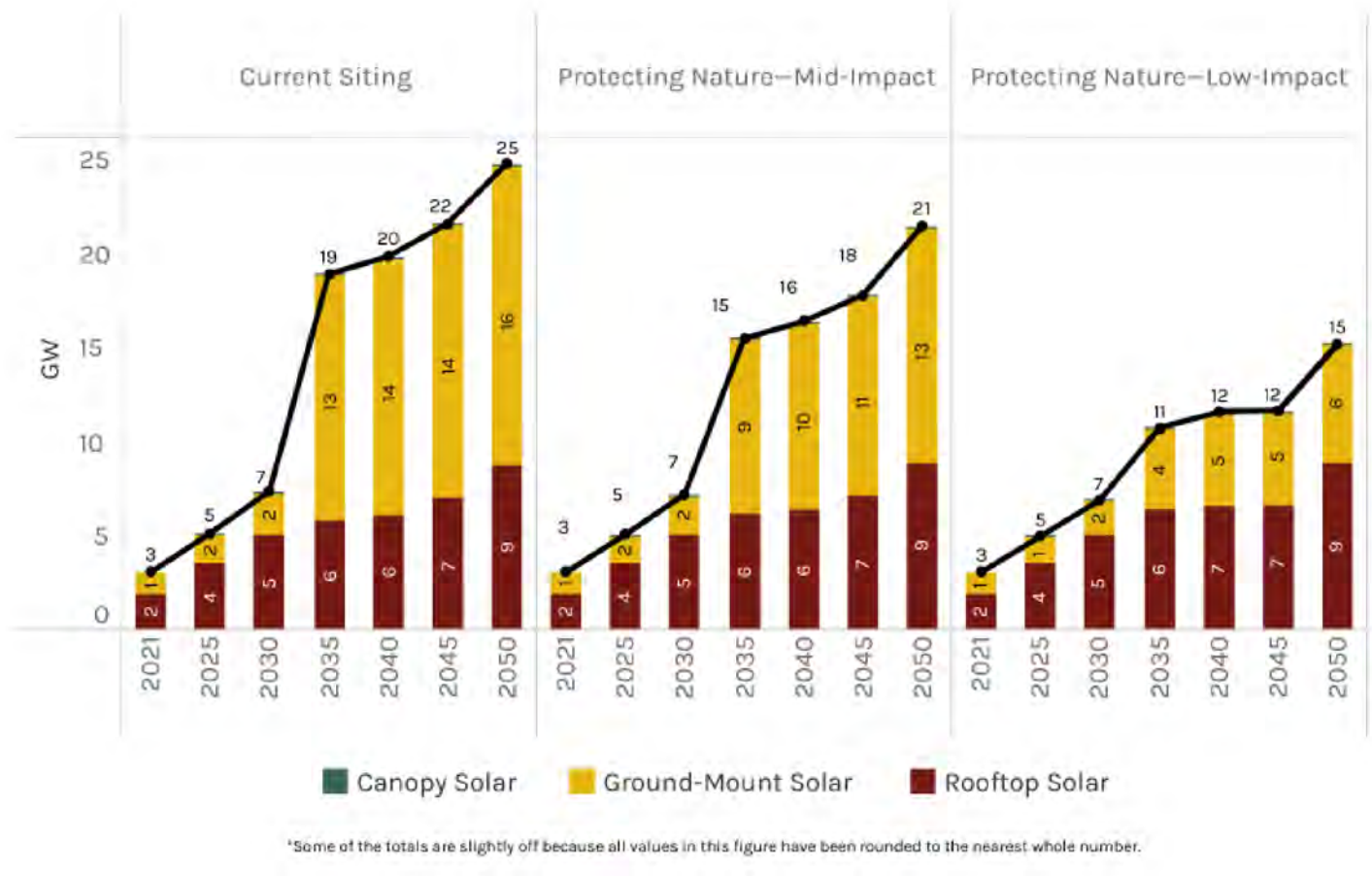


Figure 2:
Estimated Economic Solar Capacity to 2050

The Massachusetts electric portfolio reflected in the *Clean Energy and Climate Plan* includes a total of 8 GW of solar by 2030, and 27 GW by 2050. With just over 4 GW of solar capacity already in Massachusetts, this means an additional ~4 GW could be needed by 2030, and an additional 23 GW by 2050.¹⁸ Least-cost modeling of the *Current Siting* scenario results in total economic solar capacity of 7 GW by 2030 and 25 GW by 2050. Under the *Protecting Nature—Mid-Impact* scenario, total potential for the most economic solar nearly reaches this level, with 7 GW of solar by 2030 and 21 GW by 2050. Under the *Protecting Nature—Low-Impact* scenario, which is more protective of nature when siting ground-mount projects, solar capacity is projected to be 10 GW lower than *Current Siting* in 2050. To meet our 2050 renewable energy goals, adding state-level incentives will be necessary to locate these 10 GW of solar somewhere other than on the ground.

Because canopy solar on parking lots is more expensive than most rooftop and ground-mount systems, it is not chosen at all using least-cost economic modeling. So it will likely need more incentives to further take advantage of its nearly 10 GW of statewide capacity.

18 Modeling for Massachusetts *Clean Energy and Climate Plan* for 2050 estimates New England-wide renewable electricity capacity in 2050 to include 74 GW of solar PV (including both ground-mount and rooftop) and 51 GW of wind (including both onshore and offshore wind).

KEY FINDING #3

Massachusetts has over 30 GW of solar potential on buildings and parking lots alone. Maximizing solar in the built environment would unlock a better balance between clean energy and natural and working lands.

Ground-mount solar systems generally enjoy economies of scale over rooftop solar systems, which on average are smaller, and involve higher ‘soft costs’ (e.g., permitting, marketing).¹⁹ Placing solar canopy systems over parking lots is very popular with the public, and the Commonwealth has supported deployment of many successful canopy systems on state-owned parking lots, state universities, and community colleges. However, canopies have higher average costs than most ground-mount and rooftop projects due to the additional materials and labor needed to elevate solar panels. These systems would benefit from additional incentives to be more attractive for developers.

If soft costs of rooftop and canopy systems can be reduced relative to the cost of ground-mount solar over the next few

decades, the financial edge that large ground-mount systems currently have will be even lower. And our results project that solar will remain competitive with all other forms of electricity generation over the full timeframe to 2050.

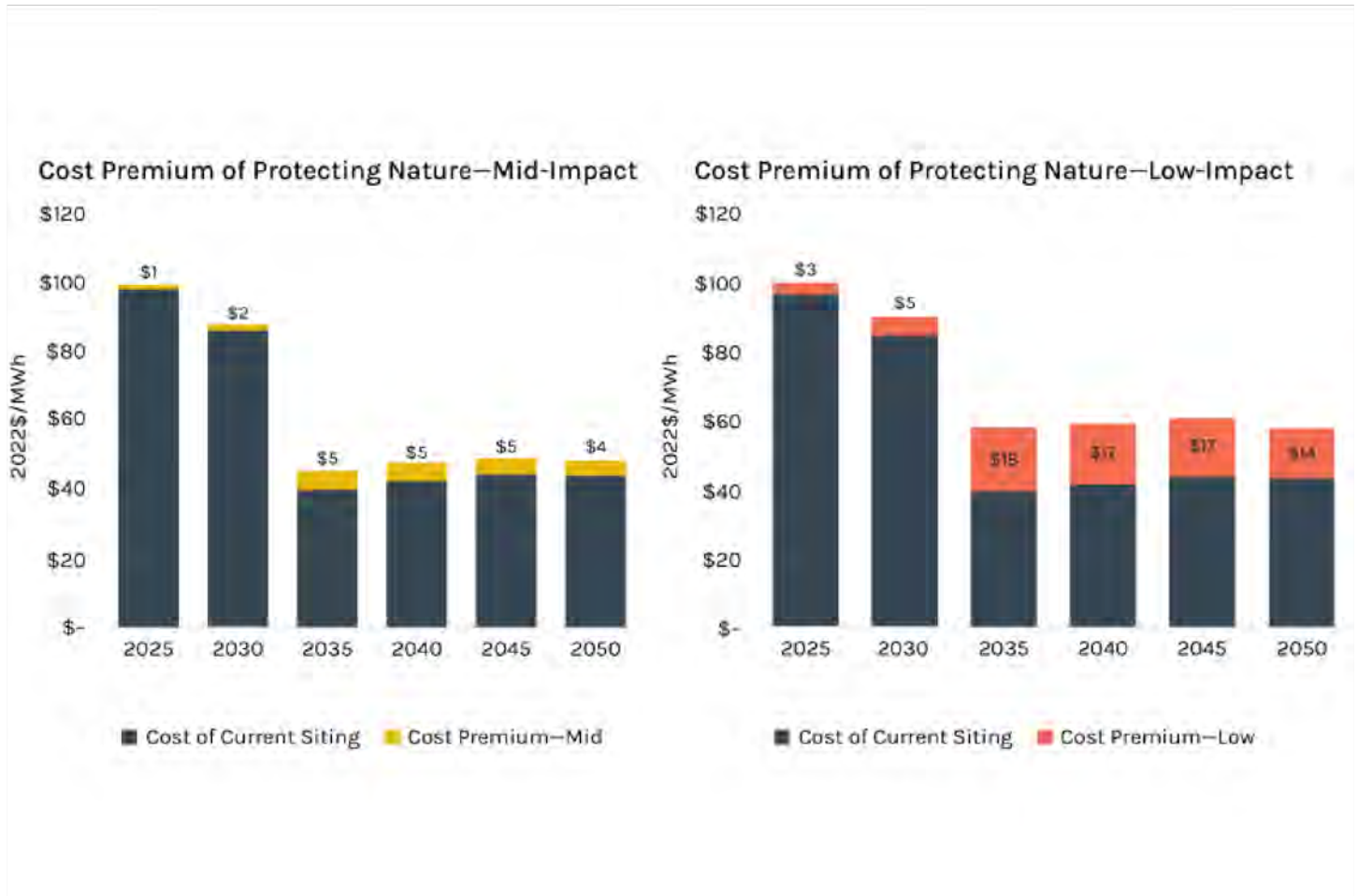


Figure 3:
Projected Costs of Solar to 2050

On average, the cost of solar in the *Protecting Nature—Mid-Impact* scenario is 2.6 percent higher per MWh than in the *Current Siting* scenario in 2030, and 10 percent higher in 2050. In all scenarios, the average cost of solar in Massachusetts declines dramatically from 2030 to 2035: this is because IRA incentives, combined with gradually declining solar costs over time,²⁰ make it economic to add a large quantity of new solar in 2035 before incentives expire. The higher average costs of solar in the *Protecting Nature* scenarios result from shifting large ground-mount solar projects to small ground-mount installations and

rooftop projects. When aggregating the total costs of achieving Massachusetts' GHG emissions targets through 2050, the *Protecting Nature—Mid-Impact* scenario costs \$900 million more than the *Current Siting* scenario in present value terms. In relative terms, this is a very small fraction of the aggregate cost of the energy system in Massachusetts over multiple decades.

Soft costs like permitting and marketing make up a large portion of rooftop solar costs. We see an opportunity to reduce those costs via policy interventions, which has been achieved in some international markets like Australia. To evaluate the impact of reducing soft costs for rooftops, we modeled potential reductions in these costs of 30 percent.²¹

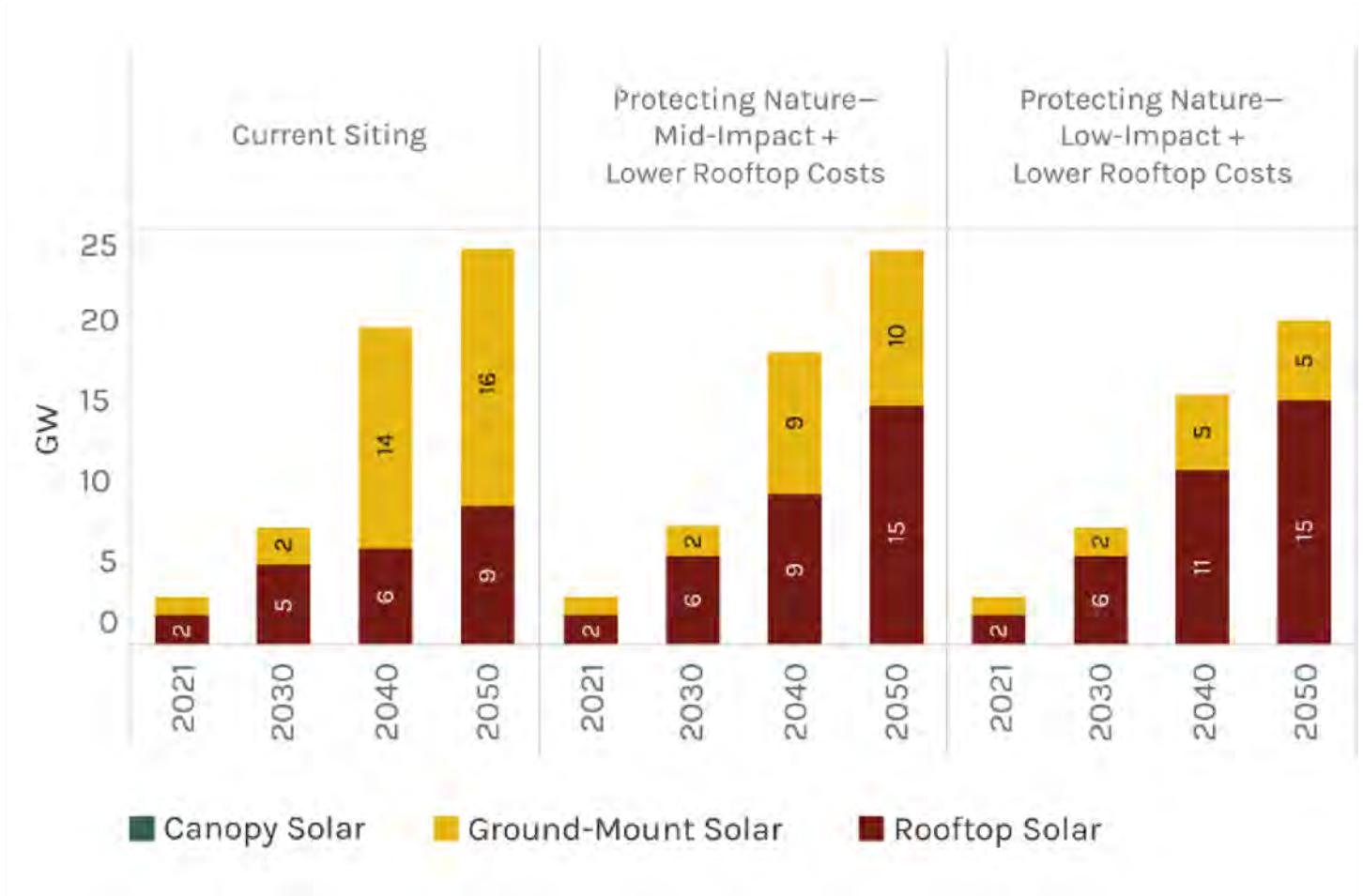


Figure 4:
Estimated Economic Solar Capacity to 2050, Lower Rooftop Costs

Under a sensitivity analysis using a reduction of 30 percent in rooftop costs, we found that the quantity of ground-mount solar needed declines, by 19 percent and 38 percent under the *Protecting Nature—Mid-Impact* and *Low-Impact* scenarios, respectively. Meanwhile, rooftop solar capacity increases by two-thirds, from 9 to 15 GW by 2050 in both scenarios. This finding strongly encourages approaches to reducing ‘soft costs’ of rooftop systems, including streamlining permitting and marketing, in order to increase the competitiveness of these systems and reduce the need for ground-mount systems.

It is critical to note that the cost comparisons above apply to differences in costs in the energy system only—when the social costs of cumulative losses to nature and farmland by 2050 are included in the analysis, the costs of different approaches to siting ground-mount solar shifts to favor lower-impact siting, as described later in these Findings.

19 Latika Gupta et al., “Long Island Solar Roadmap Economic Research Report” (The Nature Conservancy, 2019), <http://solarroadmap.org/wp-content/uploads/2021/02/Long-Island-Solar-Roadmap-Interim-Economic-Research-Report.pdf>. Our ground-mount rooftop solar cost estimates are derived from NREL’s Annual Technology Baseline (ATB) 2021, with ground-mount costs correlated to system size using empirical data from Massachusetts Clean Energy Center’s Production Tracking System. Under our 2050 assumptions, commercial and industrial rooftop solar is approximately 10 percent more costly than small ground-mount systems (smaller than 1 MW) and 20 percent more costly than large ground-mount systems (larger than 1 MW) on a dollar per kW basis. We assume that canopy systems on parking lots cost 1.8 times more than commercial rooftop systems in all years, on a dollar per kW basis, based on values from Long Island’s Solar Roadmap study and developer feedback.

20 Evolved Energy Research’s ground-mount solar costs are derived from NREL’s 2021 ATB, which assumes a gradual reduction in cost over time to reflect improvements in solar panel performance and project installation efficiency.

21 This 30 percent reduction case is based on the National Renewable Energy Lab’s “advanced technology” estimates.

KEY FINDING #4

Achieving *Protecting Nature* can be done using 100,000 acres or less for ground-mount solar.

The *Protecting Nature—Mid-Impact* scenario estimates there are 41,000 acres of highly economic ground-mount solar, which is only 10,000 fewer acres than in the *Current Siting* scenario, and another 53,000 acres that could support slightly more costly ground-mount projects. Even though the total acres identified under *Current Siting* and *Protecting Nature—Mid-Impact* are only

10,000 acres apart, the land parcels identified in the Protecting Nature scenarios are very different from those indicated in the Current Siting scenario. On average, the Current Siting scenario features the largest parcels which are located primarily in forests and on other natural and working lands. Because the Protecting Nature scenarios are intentionally designed to avoid sites with high-carbon, high-biodiversity forests and farmland, it shifts both the location and size of ground-mount solar sites. Results also show these scenarios would also maintain much higher forest carbon sequestration capacity by 2050 relative to the Current Siting scenario, as described in greater depth in Finding #5 below. Gains in biodiversity, climate-resilient lands, and productive farmlands can also be achieved by shifting away from our Current Siting pathway.

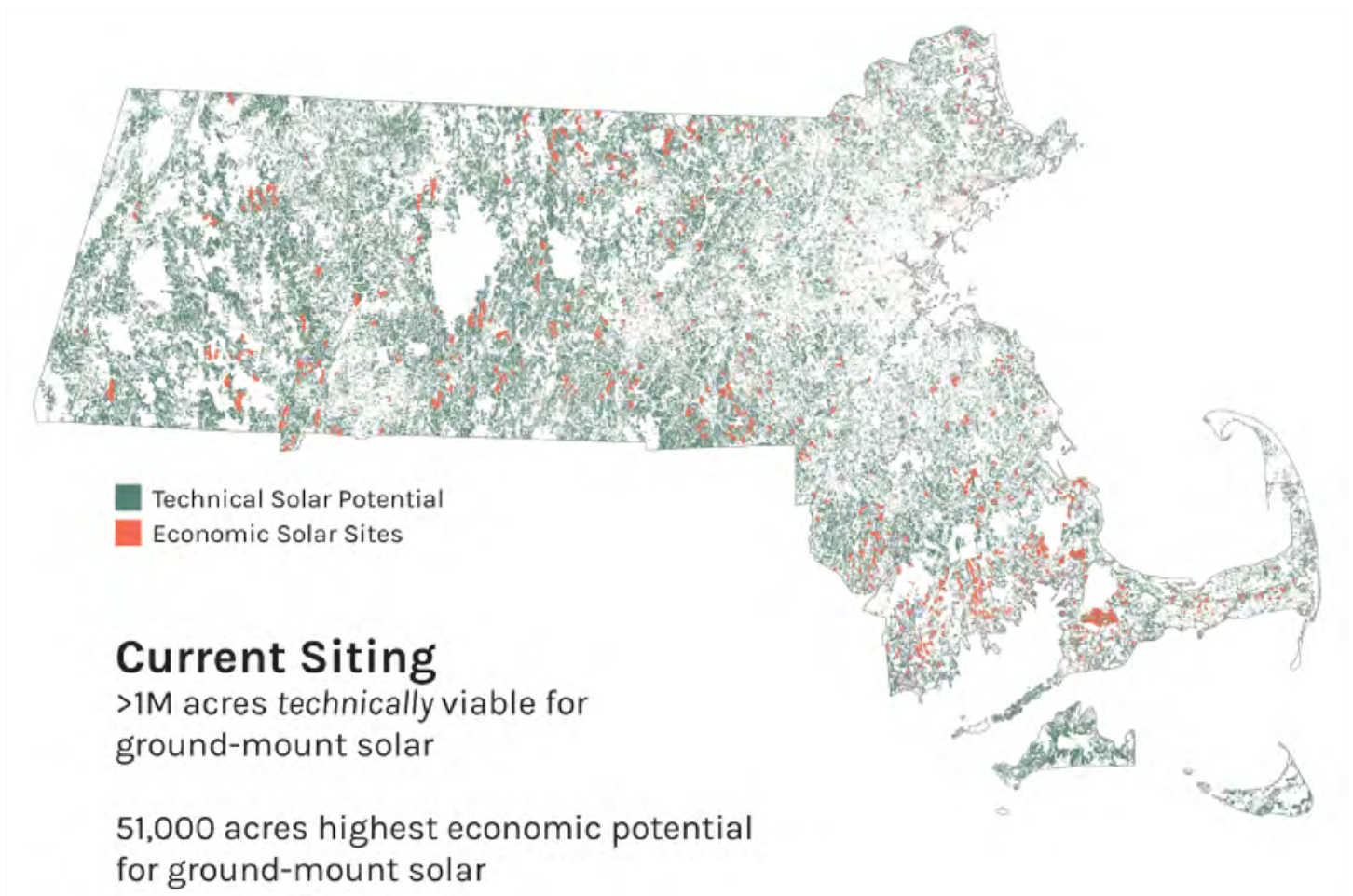


Figure 5:

Sites for Ground-Mount Solar, Current Siting scenario

Over half of the 14 GW of capacity for new ground-mount projects under the *Current Siting* scenario are projects larger than 10 MW, at a minimum of 36 acres in area.

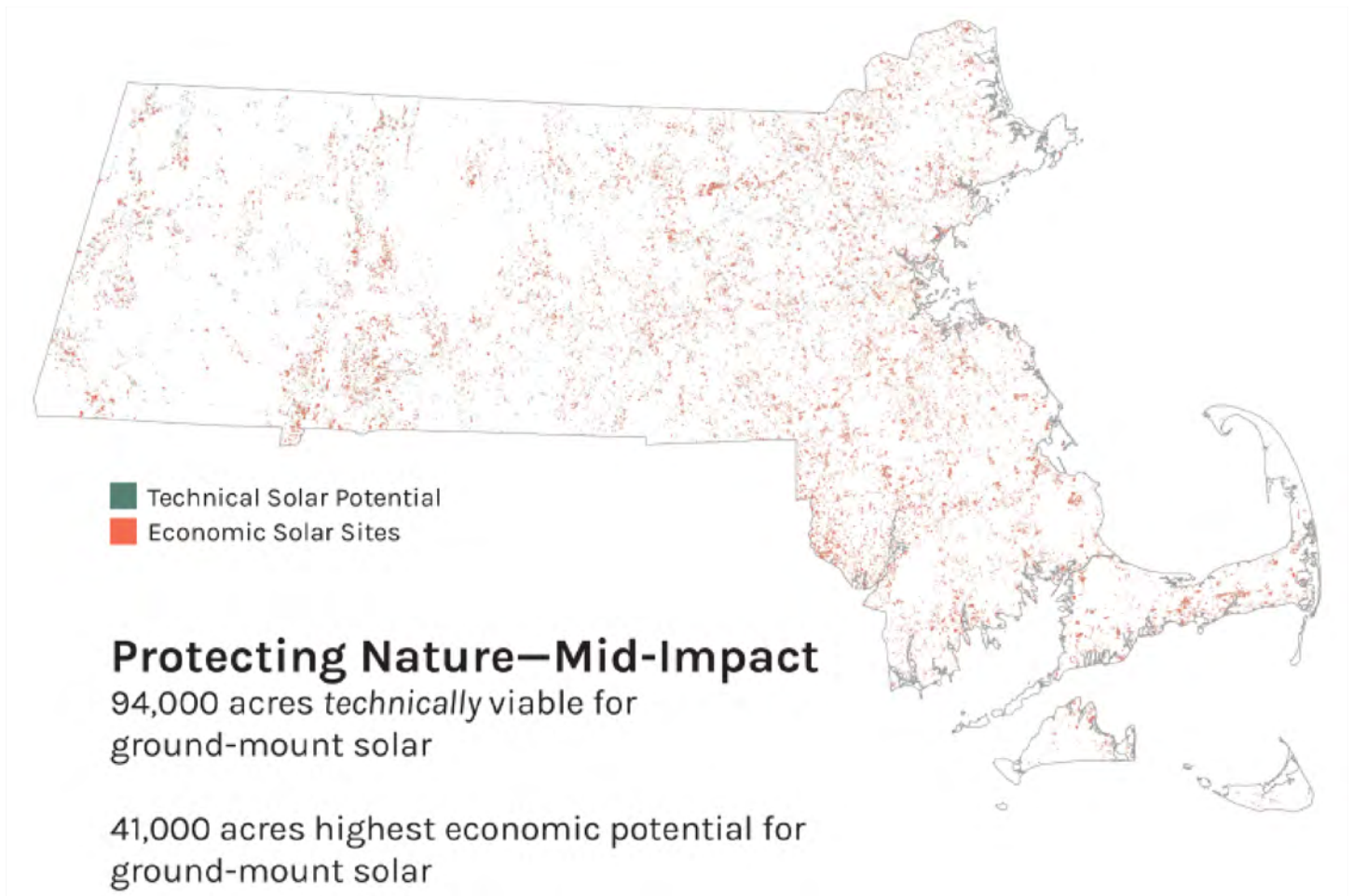


Figure 6:
Sites for Ground-Mount Solar, *Protecting Nature—Mid-Impact* scenario

In contrast, under the *Protecting Nature—Mid-Impact* scenario, the most economic ground-mount systems are smaller, with over 80 percent of economic projects ranging from 1 to 10 MW_{ac} in size, each requiring an area roughly 3.6 to 36 acres.²²

22 Mark Bolinger and Greta Bolinger, “Land Requirements for Utility-Scale PV: An Empirical Update on Power and Energy Density,” *IEEE Journal of Photovoltaics* 12, no. 2 (March 2022): 589–94, <https://doi.org/10.1109/JPHOTOV.2021.3136805>. We assume energy density (also known as a packing factor) for ground-mount solar of 1 MW_{ac} on 3.6 acres.

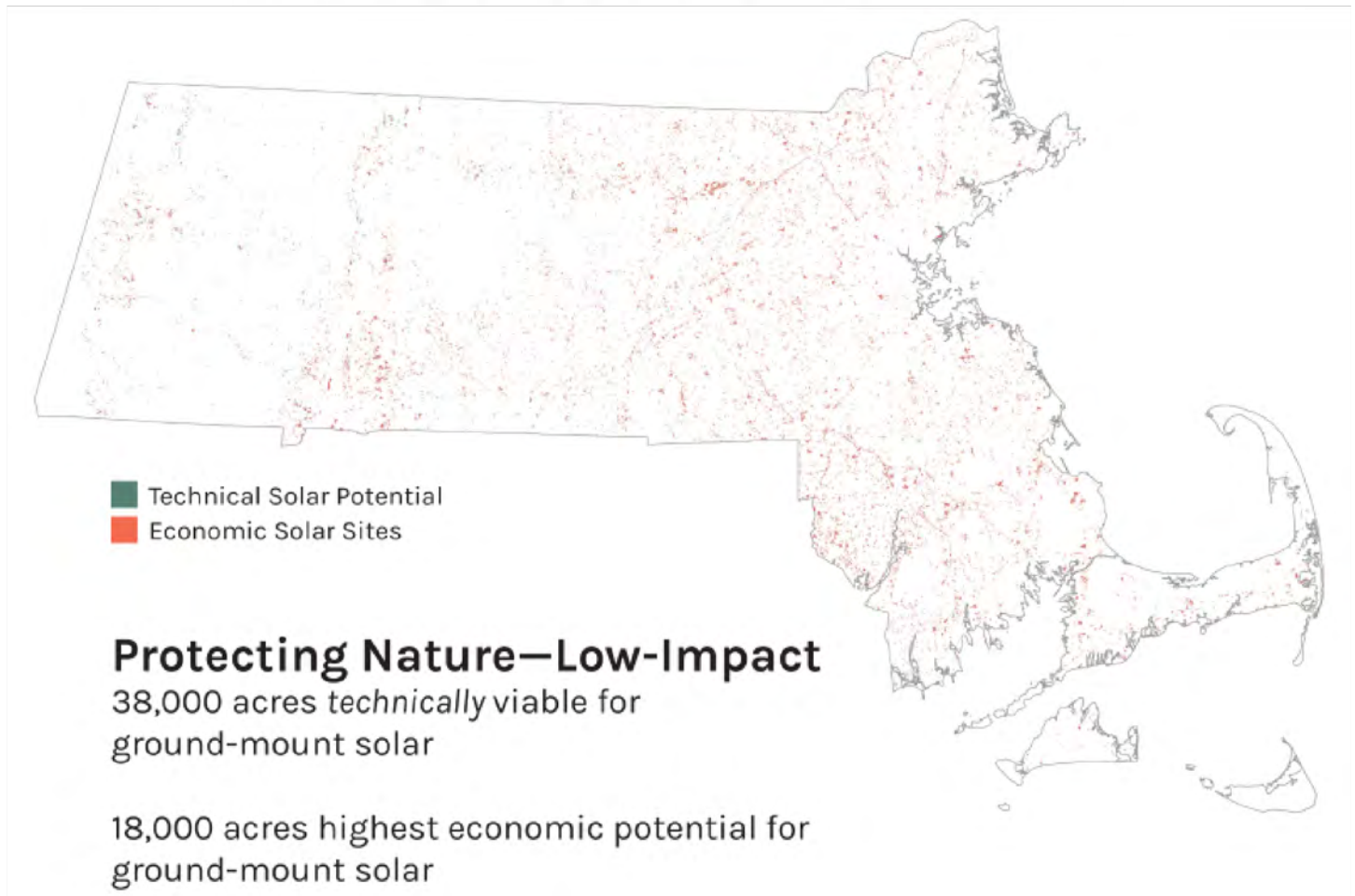


Figure 7:

Sites for Ground-Mount Solar, *Protecting Nature—Low-Impact* scenario

Capacity for economic ground-mount solar under both *Protecting Nature* scenarios is also much more geographically distributed around the state—every county in Massachusetts has many sites for these smaller systems, but no one county (or group of counties) dominates.

KEY FINDING #5

When the true value of carbon removal by forests is considered, the *Current Siting* approach is more costly than *Protecting Nature* through 2050.

Nature's prodigious benefits to society are not valued in markets, even though these are critical services that society needs and are not readily replaceable. Carbon removal by forests is just one ecosystem service that fares considerably worse under a continuation of current solar siting practices. The *Current Siting* scenario results in a significant loss of carbon from forests ranging from 5.7 to 5.9 MMTCO₂e.²³ This is 4.7 to 4.9 MMTCO₂e higher than projected losses of forest carbon under the *Protecting Nature—Mid-Impact* and *Low-Impact* scenarios, respectively. To understand what would be needed to make up for this loss of carbon removal by forests and still meet the 2050 net-zero emissions, we calculated the costs of making up this decrement to forests' carbon removal capacity by achieving other types of GHG emission reductions.

Using an estimate that achieving additional GHG reductions from the energy system in the latter part of this timeframe (2050) will cost approximately \$200/ton CO₂e, replacing this quantity of natural carbon removal alone could cost up to \$940M to \$980M. The cost of replacing carbon removed by forests is actually greater than the difference in the energy costs (in present value terms) between the *Current Siting* and the *Protecting Nature—Mid-Impact* scenario.²⁴ And because this estimate only reflects losses in carbon, and does not include the costs of losing other services when nature and working lands are converted, like flood protection, drinking water filtration, wildlife habitat, and local food production, it actually *underestimates* the costs to the public of further conversion and fragmentation of forests, other terrestrial ecosystems, and farms.

Adding together past and projected future effects of Current Siting, we estimate that by 2050, ground-mount solar will be responsible for the cumulative loss of 39,150 acres of forest, 9,397 acres of prime farmland and 22,794 acres of lands featuring high biodiversity.

In sum, the *Protecting Nature* scenarios result in markedly lower impacts to nature and the vast number of services it provides. Indeed, continuing along the *Current Siting* trajectory would not only result in the emissions of millions more tons of carbon than the *Protecting Nature* scenarios—it would also incur major additional losses to biodiversity, acres of productive farmland, and areas most important for resilience to climate change, on top of losses already incurred from the 2000s to the present.

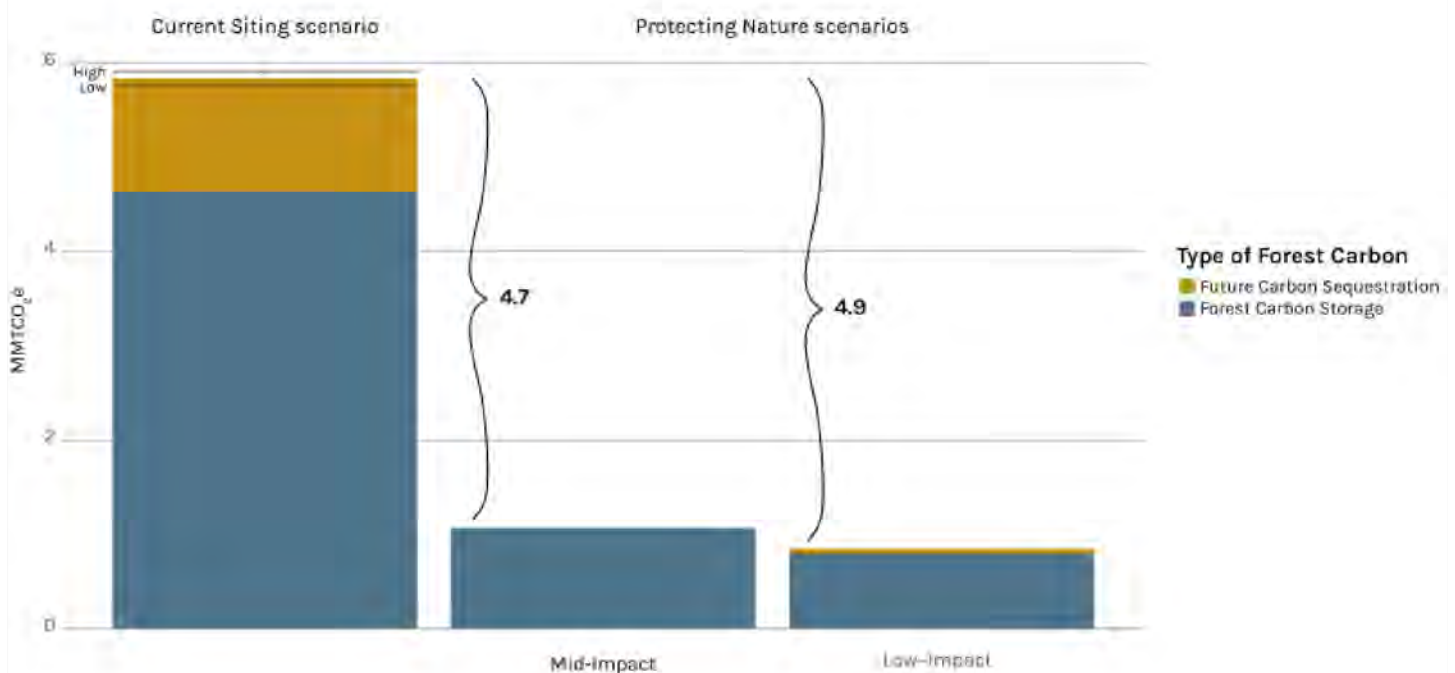


Figure 8:

Cumulative Emissions from Loss of Forest Carbon, to 2050

Under the *Current Siting* scenario, clearing of forests and high-carbon ecosystems is projected to result in 5.8 MMT of CO₂ emissions by 2050. Because the *Protecting Nature—Mid-Impact* and *Low-Impact* scenarios avoid forests and other carbon-rich sites, CO₂ emissions from forest loss are much lower, at 1.1 MMTCO₂e (Mid) and 0.9 MMTCO₂e (Low), respectively.

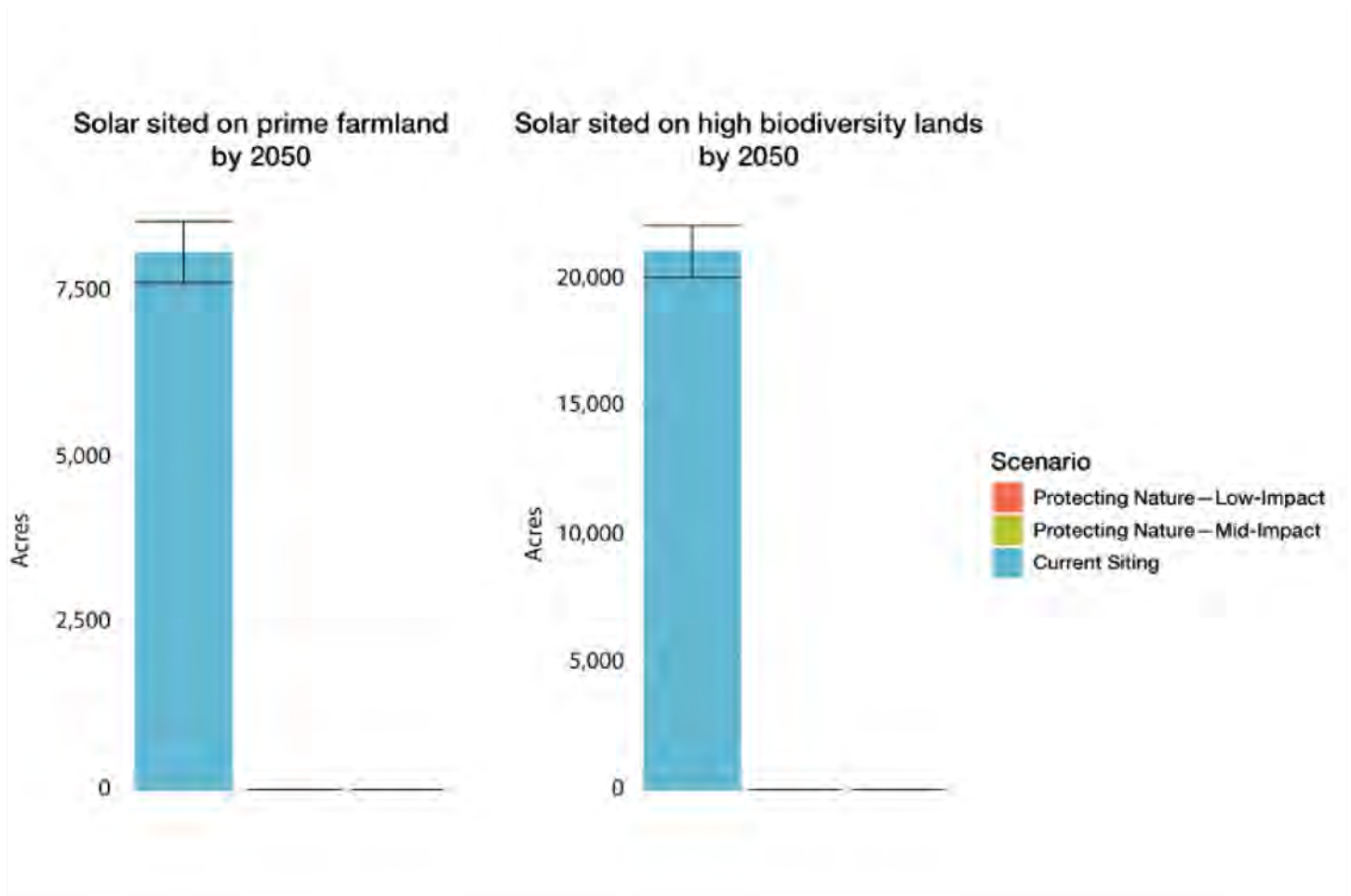


Figure 9:

Projected Impacts on Biodiversity and Prime Farmland from Ground-Mount Solar to 2050

The *Current Siting* scenario is projected to displace more than 8,000 acres of prime farmland and 21,000 acres of BioMap core habitat by 2050, while both *Protecting Nature—Mid-Impact* and *Low-Impact* scenarios would leave these sites intact. These projected losses to farmland and high biodiversity lands are *additional* to

those documented earlier from ground-mount solar systems installed up to 2020. Adding together past and projected future effects of *Current Siting*, we estimate that by 2050, ground-mount solar will be responsible for the cumulative loss of 39,150 acres of forest, 9,397 acres of prime farmland and 22,794 acres of lands featuring high biodiversity.

23 MMTCO_{2e} refers to million metric tons of carbon dioxide equivalents. From EPA, The unit "CO_{2e}" represents an amount of a GHG whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO₂), based on the global warming potential (GWP) of the gas.

24 Based on the cost of additional marginal emissions reductions from the energy system through 2050, we estimate a marginal value of carbon removal at \$200/ton CO_{2e}. We calculated the present value (i.e., a stream of values over time discounted to a present value using a discount rate that reflects the time value of money) of additional carbon losses under *Current Siting* compared to *Protecting Nature—Mid-Impact* and *Low-Impact* as follows:

$$\begin{aligned} & (\text{Current Siting Carbon Emissions} - \text{Protecting} \\ & \text{Nature} - \text{Mid-Impact Carbon Emissions}) * (\text{Marginal cost of} \\ & \text{GHG abatement, 2050}) \\ & (5.8\text{MMTCO}_2\text{e} - 1.1\text{MMTCO}_2\text{e}) * \$200/\text{ton CO}_2\text{e} = \$940\text{M} \end{aligned}$$

$$\begin{aligned} & (\text{Current Siting Carbon Emissions} - \text{Protecting} \\ & \text{Nature} - \text{Low-Impact Carbon Emissions}) * (\text{Marginal cost of} \\ & \text{GHG abatement, 2050}) \\ & (5.8\text{MMTCO}_2\text{e} - 0.9\text{MMTCO}_2\text{e}) * \$200/\text{ton CO}_2\text{e} = \$980\text{M} \end{aligned}$$

KEY FINDING #6

Interconnection challenges are slowing deployment of solar and other clean energy resources. Clearing the backlog of projects waiting for interconnection is an opportunity to

support solar projects with low impacts on nature.

This analysis shows that reducing losses of terrestrial carbon and other impacts to high-value natural lands will require a shift to siting ground-mount solar away from larger, forested parcels to smaller projects on lower-impact parcels. A solar build-out which features smaller ground-mount projects also means projects would likely be more evenly distributed around the state, rather than continuing to concentrate in a few counties where the largest, least expensive land parcels are available.

Ultimately, the economic viability of ground-mount solar projects depends on the availability and cost of connecting to transmission infrastructure. As of late 2022, approximately 6 GW of proposed solar projects in New England were waiting for approval to be interconnected to the grid; many of these will not get built due to high interconnection costs.²⁵ In order to minimize impacts to natural and working lands, interconnection policies should favor smaller ground-mount projects located closer to electric load. Nationally, smaller solar projects (i.e., under 5 MW) are being interconnected about one year faster than large solar projects (i.e., 5-20 GW).²⁶ Thus, policies focused on smaller ground-mount projects may also result in more solar being brought online more quickly compared to the current pathway of siting larger projects.

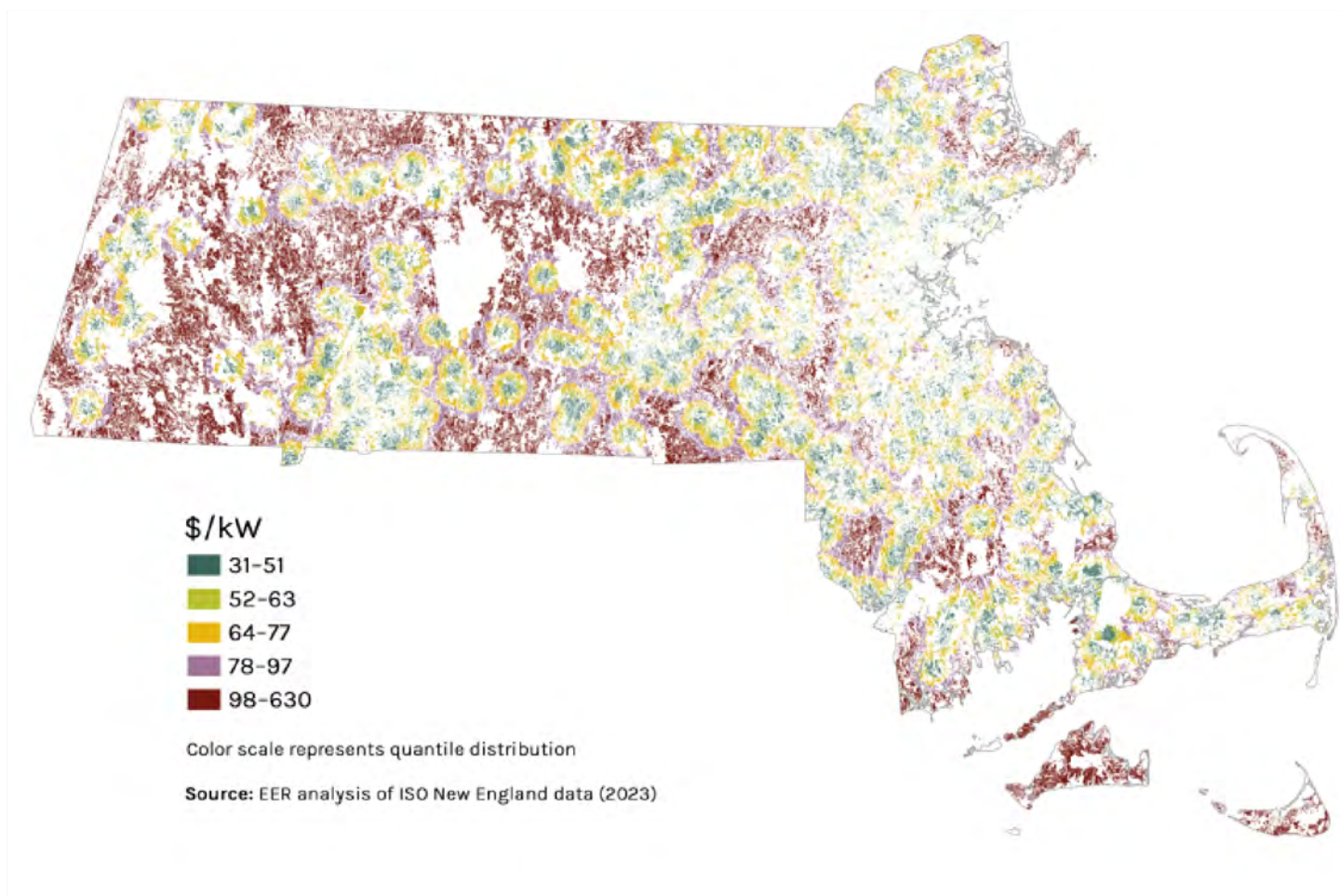


Figure 10:
Solar Project Interconnection Cost per kW

Our estimates of interconnection costs in Massachusetts assume that costs increase linearly with distance from substations, with lowest cost areas shown in green in Figure 10. Areas where ground-mount solar development has been highest coincide with many of these green areas. Our estimates, however, do not reflect the fact that hosting capacity is now very constrained at many of these sites. This lack of hosting capacity is playing a large part in driving higher costs for solar projects waiting for interconnection.

25 Lawrence Berkeley National Lab, “Generation, Storage, and Hybrid Capacity in Interconnection Queues,” accessed August 15, 2023, <https://emp.lbl.gov/news/grid-connection-requests-grow-40-2022-clean>.

26 Julie Kemp et al., “Interconnection Cost Analysis in ISO-New England,” June 21, 2023, <https://doi.org/10.2172/1986022>.

Lawrence Berkeley National Lab (LBNL) estimates that at the end of 2022, there was approximately 4,112 MW of solar and 1,993 MW of solar paired with battery storage in ISO-New England’s interconnection queue. LBNL estimates that current interconnection costs for solar in ISO-New England are \$450/kW, basically representing a doubling of costs since 2018 compared to 2010-2017.

KEY FINDING #7

New federal incentives can boost community solar in the built environment and on low-impact lands.

Massachusetts is a national leader in community solar projects, which are a way for multiple households to buy and benefit from a single solar project. Community solar is a principal means to provide access to affordable solar to low- and moderate-income households in environmental justice communities and beyond, small businesses, and other electricity customers who otherwise cannot finance or host their own solar projects. Solar developers who specialize in residential and commercial rooftop systems state that the IRA’s specific provisions for community energy projects are already boosting their ability to finance these projects. Another component of IRA funding is the U.S. EPA’s new \$8 billion *Solar for All* competitive grant program—this is designed to boost the ability of states, territories, Tribal governments, municipalities, and eligible non-profits to expand solar’s benefits more equitably to low-income ratepayers.²⁷ Building partnerships among the state, cities, non-profit

partners, and developers to make certain that Massachusetts takes full advantage of IRA funding for solar and secures a Solar for All grant should be a paramount priority for the state. These federal funds should be used strategically to secure community solar for low-income customers, and direct deployment towards opportunities on built environment and ground-mount projects on already-developed lands, not on natural and working lands.



City of Newton: ‘Leading by Example’ on Municipal Solar

Governments and large non-profit institutions in Massachusetts are playing a lead role in solar and clean energy deployment. State, city, and town governments, universities, hospitals, and other non-profits own and manage large amounts of land and many large buildings and facilities, including town halls, dorms, landfills, libraries, parking lots, and many other structures, so

these institutions have a significant opportunity to deploy solar on properties and buildings.



In 2013, the City of Newton began construction on solar facilities on municipal-owned land and buildings to reduce GHG emissions and produce net energy savings on behalf of residents. As of early 2023, Newton operates a solar portfolio with over 4,000 KW of capacity, including rooftop solar, innovative parking lot canopies, and a municipal landfill. Together, they generate just over 6 million kWh per year, or approximately 30 percent of total municipal electric load.



Though space is at a premium in Newton, the city has creatively maximized its available spaces to deploy solar and advance carbon reduction goals. Newton estimates that the energy savings flowing to the city from these solar installations amounted to nearly \$780K in FY2022. In addition, these facilities are located in a dense area of metropolitan Boston. Locating clean energy generation close to electric demand creates other benefits to the public, including avoided distribution costs and improved grid performance.



A portion of Newton's solar is "community energy," which are projects deployed on behalf of low and moderate-income residents who are not able to host their own solar system but nonetheless benefit from lower electric bills. Savings from one of the City's 18 solar projects was used to share solar credits to all of the city's 1,300 low-income residential ratepayers, equaling approximately \$40 per household per year. This program is implemented in conjunction with Action for Boston Community Development and Eversource.



Community solar projects like Newton's make up the largest additions of solar capacity in Massachusetts since 2021. Even more community energy should be done by cities and non-profits to bring energy savings from solar to consumers and businesses who cannot host their own projects.



Newton exemplifies a city leading creative solar deployment with little to no impact on natural resources, while also delivering benefits to low-income households and municipal finances. Taking advantage of new federal incentives under the IRA and EPA's Solar for All program, plus adjustments to state incentives and programs for municipalities like Green Communities, will open up more opportunities for communities to follow Newton's lead.



One of two parking lot solar canopies at Newton North High School in Newtonville, MA, interconnected in Sept. 2021.

The IRA provides tax credits to help home and building owners and renewable energy developers deploy more solar and other clean energy systems.²⁸ These federal incentives will expire by 2035, which favors strong acceleration of new solar builds over the next decade. It is important to note that the IRA's tax credits are structured in a way that could further widen the gap in cost competitiveness between new ground-mount systems and rooftop and canopy systems, even with the latter being supported by net metering policy. Massachusetts' SMART incentives and net metering policy are levers that should be revisited to encourage development of rooftop and canopy systems.

27 U.S. Environmental Protection Agency, "Solar for All," Collections and Lists, June 2023, <https://www.epa.gov/greenhouse-gas-reduction-fund/solar-all>.

28 We modeled the following IRA solar incentives: a 30 percent Investment Tax Credit (ITC) for rooftop solar installations, and a \$26/MWh Production Tax Credit (PTC) for ground-mount solar installations. Ground-mount solar projects are eligible for either the ITC or the PTC; we assume those projects elect the PTC over the ITC. The IRA's solar incentives include "Bonus" credits that can increase tax incentive levels for real-world projects above the levels represented here.

KEY FINDING #8

The Commonwealth, cities and towns, and non-profit institutions own (or manage) thousands of the best sites for low-impact solar.

In addition to Mass Audubon and Harvard University, the Commonwealth and many cities and towns such as Boston, Cambridge, Amherst, Somerville, Plymouth, and Worcester, along with many non-profit institutions, have strong public commitments to significantly reduce their GHG emissions and to protect biodiversity. Many of these institutions also own and/or manage large campuses with many buildings, parking lots, and highly developed lands that could host low-impact solar.

Moreover, many of these entities have the ability to install solar projects which may have longer payback periods in comparison to the private sector, but would benefit from incentives for more costly low-impact solar opportunities such as canopies.

Residential homeowners and commercial and industrial businesses also own significant acres of sites for ground-mount solar—ranging from nearly 15,000 on the low-end to 40,000 acres on the high end—which could be used to host economic low-impact solar. While many homeowners will prefer rooftop solar, those with large lots (e.g., >1 acre) are good candidates for creative small ground-mount systems. Some portion of the 5,000 to 10,000 acres of other already-developed open spaces that may be underutilized—such as shuttered golf courses—are also potential candidates for hosting ground-mount solar.

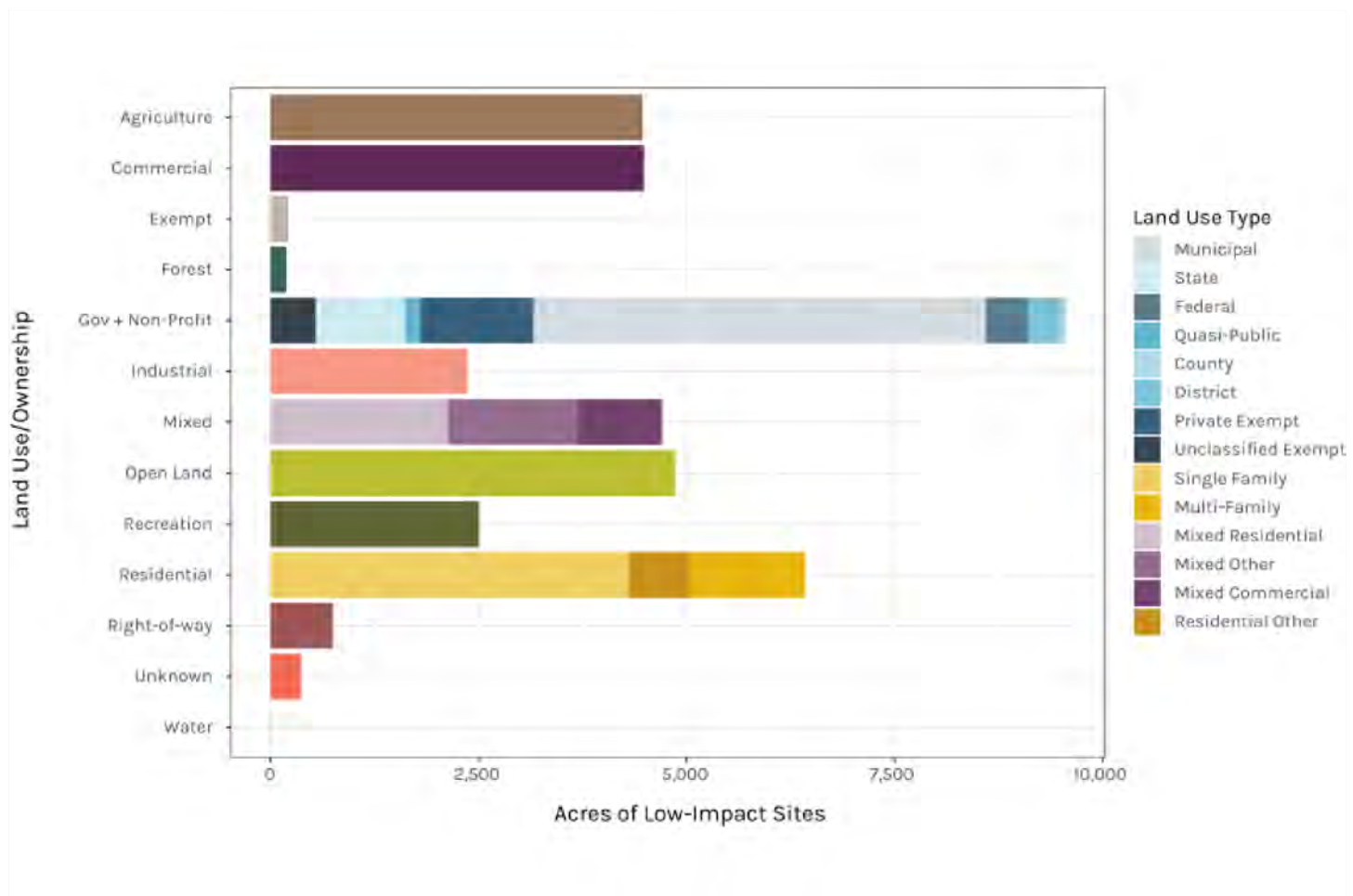


Figure 11:
Land Use/Ownership of Sites for Low-Impact Ground-Mount (Low-end)

Figures 11 and 12 show our estimated range of acres for economic low-impact ground-mount solar under the *Protecting Nature—Mid-Impact* scenario, broken out by ownership types for these sites. The Commonwealth, cities and town, and non-profits own many attractive sites for low-impact ground-mount solar, from nearly 9,600 on the low-end to almost 17,000 acres on the high-end.

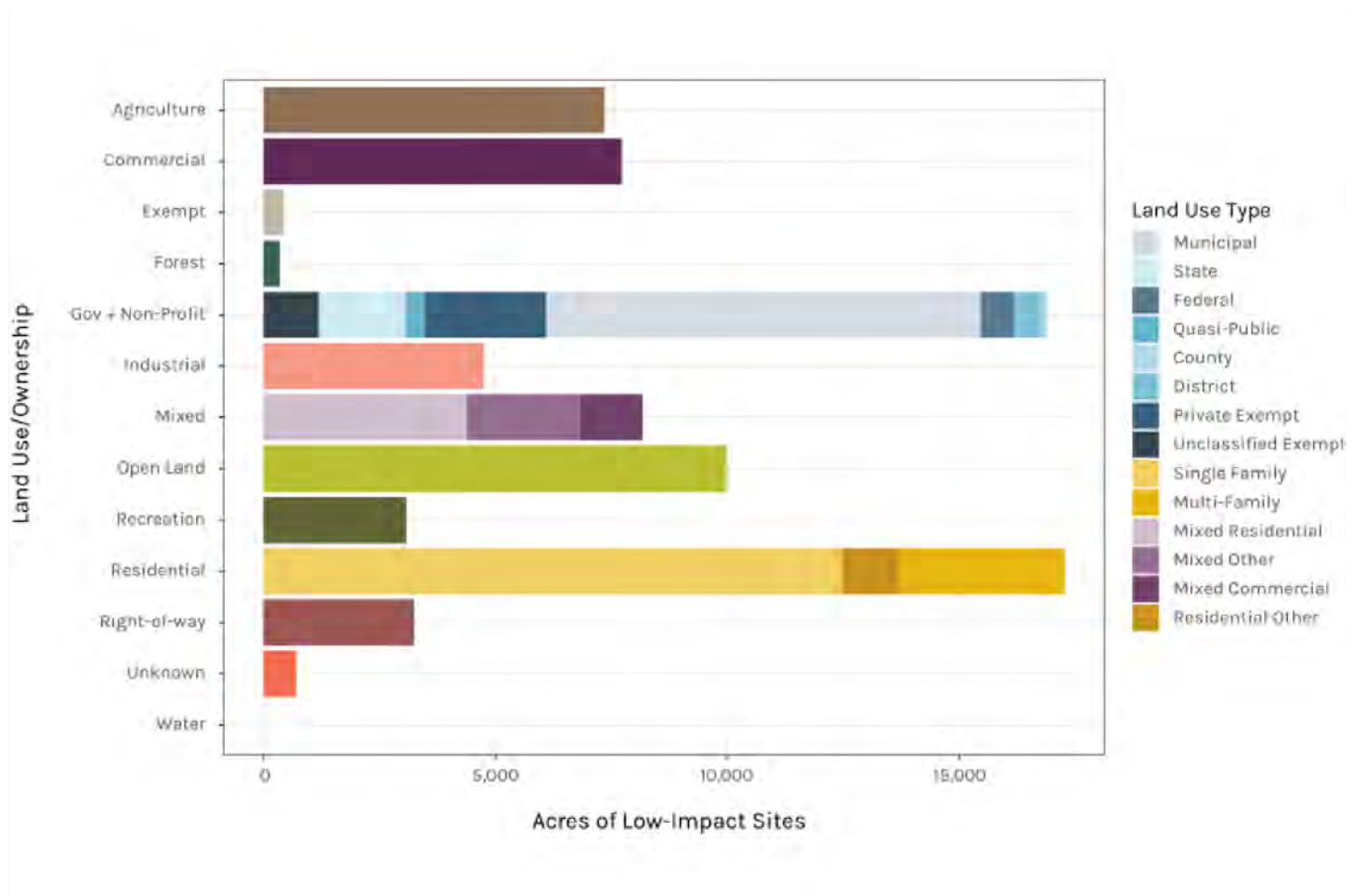


Figure 12:
Land Use/Ownership of Sites for Low-Impact Ground-Mount (High-end)

Homeowners along with commercial and industrial landowners also own many low-impact sites for ground-mount solar, ranging from nearly 15,000 on the low-end to nearly 40,000 acres on the high end. Other developed open lands under various ownerships could also host low-impact solar, on an additional 5,000 to 10,000 acres. Note that these estimates are for sites for ground-mount solar only; many of these owners of low-impact lands also own buildings and parking lots which could also host solar.



Policy Recommendations

Growing Solar, Protecting Nature shows that the current approach to siting ground-mount solar has exacted too high a price on the natural and working lands of Massachusetts. Continuing on the same trajectory will jeopardize our goals for climate, biodiversity, local food production, and climate resilience.

Solar's impacts on forests and farms are part of what is undermining public support for this resource, with many communities now seeking to slow or block new ground-mount projects. The people of Massachusetts strongly support solar, but also highly value nature as a climate solution and an irreplaceable source of biodiversity and wildlife habitat, recreation, clean water and air, and public health benefits.

Growing Solar, Protecting Nature results show that a more constructive path forward is possible, one that is both highly protective of nature AND scales up affordable solar to communities across the state.

To build and sustain long-term support for ground-mount solar, state policies, incentives, and plans must better align with the public's strong desire for a better balance between clean energy resources, nature, biodiversity, and local food production.

We identify three major areas where innovative new policies, as well as changes to current policies and programs, are needed: energy incentives and investments; state and local planning and community outreach; and policies specifically focused on protection of forest carbon, biodiversity, and productive farmlands.



Energy Incentives and Investments

Solar incentives under SMART (and previous incentive programs) have played a major role in elevating Massachusetts to national leadership on solar, especially for distributed solar, community solar, and low-impact

ground-mount solar on landfills and brownfields. Yet, by also supporting large ground-mount solar projects on natural and working lands, these incentives have also played a partial role in the loss of critical natural assets. Although the SMART program was adjusted in 2020 to shift incentives away from conversion of prime farmland towards solar integrated into farming activities (i.e., ‘agrivoltaics’), it still supports conversion of high

biodiversity lands for community solar projects. Many of the community solar projects enrolled in the SMART program over the last five years, for example, have been built on converted forests and other valued landscapes.

We strongly advocate for eliminating SMART incentives (including pass-through of federal funds) supporting large ground-mount solar projects on natural and working lands.

Our results show that with just IRA funds alone, economic solar capacity of low-impact solar is nearly 80 percent of that projected under Current Siting. To boost building of low-impact solar, SMART should be further adjusted by increasing incentives for rooftop and canopy systems, especially for community solar. This will help to partially adjust for the fact that federal IRA credits are relatively more advantageous to large ground-mount systems, which are already more economically attractive than rooftop and canopy systems at the outset. Our specific recommendations include the following:

- Eliminate incentives under SMART for ground-mount solar systems on any natural and working lands and for ‘public entity’ solar located on BioMap Core and Priority Habitat lands.
- Increase SMART incentives for canopy, rooftop, and ground-mount systems sited on already-developed, low-impact lands.
- Create new SMART incentives for residential ground-mount and industrial and commercial rooftop projects with potential to avoid electric distribution upgrades.
- Establish interconnection rules that support smaller, low-impact solar projects located close to electric loads. Allow distributed and low-impact ground-mount projects in the interconnection queue to connect first.
- Require reporting of impacts to land use for SMART-funded projects, and produce annual SMART reports showing aggregate incentives, average cost for installed capacity, and land use impacts for all project categories.

- Set requirements for solar within the state's Lead by Example and other programs that require rooftop and canopy solar on all new buildings and parking lots receiving state funding.
- Delineate specific performance goals for rooftop, canopy, and low-impact solar within overall *Clean Energy and Climate Plan* goals for 2030, 2040, and 2050.
- Leverage existing programs focused on building efficiency and decarbonization to streamline enhance incentives for rooftop solar:
 - Require Mass Save program to evaluate rooftops for solar suitability during energy audits and discuss with customers.
 - Direct Clean Energy Center to create grant program for roof evaluation, repair, and replacement, with priority for low- and moderate-income households and small businesses.
- Consider separate feed-in tariff for larger ground-mount systems outside SMART that utilize already-developed, low-impact sites.
- Require solar on new buildings, parking lots, and commercial and multi-family developments receiving state funding.
- Prepare for end-of-life fate and establish recycling requirements of solar photovoltaics from all projects receiving state funding.



Planning and Community Outreach

Siting of ground-mount solar on natural and working lands in Massachusetts has been significant but haphazard, with developers of larger ground-mount systems pursuing opportunities for the largest, least expensive parcels from

landowners interested in leasing or selling. Our results show that absent changes to existing incentives and policies, a similar siting pattern will likely continue over the next few decades, with a notable acceleration from now until 2035 while IRA incentives are available. Moving to a deployment of solar that leaves nature

largely intact, as portrayed by the *Protecting Nature* scenarios in this analysis, will require more intentional, forward-thinking planning and guidance. Because cities and towns in Massachusetts play an essential role in local land use, the state needs to provide resources and support for municipalities to shift solar to lower-impact sites and the built environment.

Inadequate transmission infrastructure and a need for distribution upgrades are limiting deployment of solar and other clean energy resources. Space for new transmission infrastructure is only one source of potential increased demand for land over the next 25 years. Two of the state's current advisory processes—the Grid Modernization and Energy Infrastructure Siting and Permitting advisory groups—should leverage geospatial mapping from this and related analyses, and explicitly require that all recommendations for distribution and transmission system investments, respectively, must show consideration of options with lowest impact to natural and working lands.

Federal and state funds should be directed to help cities, towns, non-profits, and homeowners and businesses to capitalize on these opportunities for solar with low impacts to nature and working lands. For example, the state's Green Communities program can leverage the IRA opportunity to increase incentives for cities and towns to plan for and support more low-impact solar and connect to landowners with low-impact sites for both ground-mount and distributed solar. The state's plans for transportation and building decarbonization, promulgating a clean heat standard, and energy storage should be integrated in order to capture the best opportunities for distributed and low-impact solar with clean heat, EV charging, and energy storage.

Finally, the state should conduct a statewide land-use analysis and planning effort that evaluates transmission and distribution upgrades and new capacity needed to reach all clean energy goals, and plan for co-locating ground-mount solar projects close

to locations where electric load will be highest under future electrification. This analysis should also anticipate land needs for new affordable housing and commercial developments. Increasingly, communities are encountering solar projects that incorporate battery storage into project design, and seek guidance on managing siting of new energy storage technologies. Our specific recommendations include the following:

- Require Grid Modernization and Energy Infrastructure Siting and Permitting advisory processes to evaluate and reflect options with lowest impacts for natural and working lands and consistency with state goals for forest carbon, biodiversity, Healthy Soils and Resilient Lands.
- Conduct a statewide planning effort to inform and identify zones for deployment of land-efficient, low-impact clean energy resources (including storage) and transmission. These sites can also anticipate new affordable housing and commercial development, and transportation and water infrastructure. Opportunities for redevelopment of commercial (e.g. shopping malls) and industrial sites should be prioritized.
- Provide update of 2014 model zoning by-laws for solar that align with state goals for natural and working lands and streamlining permitting for solar projects within developed lands.
- Provide municipalities with updated guidance on solar project decommissioning, battery storage siting and permitting, and related technical topics. Decommissioning should include plans for solar PV end-of-life as well as future land uses.
- Conduct direct outreach to industrial and commercial landowners with highest potential for ground-mount and rooftop solar that avoids electric distribution costs.
- Review UMass Clean Energy Extension and other recent empirical research to evaluate first tranche of agrivoltaics using SMART incentives, and update incentives and guidance on farming practices, local property tax assessments, projects

in farmed wetlands and floodplains, and Agricultural Preservation Restrictions (APR).

- Add requirements for municipal eligibility under Green Communities to assess potential for low-impact solar siting on municipally-owned buildings, schools, and parking lots.
- Increase Green Communities cap on municipal solar from \$300K (may depend on success in securing EPA Solar for All grant).



Nature and Carbon Removal Policies

Adjusting incentives within the SMART program to reduce support of projects with negative impacts on nature and working lands is necessary, but not sufficient to protect these lands: many large ground-mount solar projects are

being financed with energy revenues and renewable energy credits alone, and thus do not rely on SMART incentives. We need stronger policies that redirect solar and other clean energy infrastructure towards already-developed lands and the built environment where feasible. Other jurisdictions with ambitious climate laws—including the European Union, Washington, and California—are advancing mandatory requirements and standards for carbon removal from natural and working lands. In response to the global biodiversity crisis, still others are setting biodiversity targets and goals to be joined with climate requirements.

Moreover, Massachusetts has major goals for natural and working lands. Under the state's Resilient Lands Initiative, the Commonwealth has goals to achieve 'No Net Loss' of forests and farmlands, and to increase carbon storage and climate resiliency capacity of natural and working lands. Over the next few years, we need policy drivers working on nature's behalf that go beyond changes to clean energy incentives alone. This requires

imagining innovative policies focused on protecting forests, farms, and other natural ecosystems for long-term provision of carbon removal, biodiversity, climate resilience, and food production. Policies for financially compensating forest landowners and farmers for the carbon and ecosystem services these lands currently provide, as well as any additions or enhancements to these natural assets over time, will incentivize keeping these as forest and farms.

Adjusting incentives within the SMART program
to reduce support of projects with negative impacts on nature and working lands is necessary, but not sufficient to protect these lands.

We advocate for an integrated policy approach that begins to internalize the non-market values of benefits provided by natural and working lands: carbon removal, biodiversity, flood protection, climate resilience, clean drinking water, local food production, and recreation, among others. The cost of replacing carbon removal services lost from forests calculated in this analysis—\$200/ton CO₂e—is a solid point of departure for such a valuation but should be considered a floor value, given that it only reflects the carbon benefits of natural lands. Our specific recommendations include the following:

- Establish a statewide goal for biodiversity that sets clear, measurable goals at timelines aligned with climate planning intervals (e.g., 2030, 2040, and 2050).
- Establish permanent statewide funding source, at annual levels that are commensurate with goals to protect lands featuring highest carbon removal, biodiversity, and resilience to climate change.
- Develop and promulgate a performance standard for natural and working lands that embeds long-term carbon removal, biodiversity, water resource protection, climate resilience, and food productivity goals.
- Require developers to pay fees for losses of forest carbon, biodiversity, and other ecosystem services from conversion of

natural and working lands, and use proceeds to establish a revolving fund for protection of at-risk nature and farms.

- Scope the parameters of a state-level carbon and biodiversity market to draw in private capital by establishing credits that can be applied to mandatory carbon and biodiversity performance standards.



Get Involved

You can help us advocate for the policy changes we need to reach our solar goals while protecting natural and working lands. Mass Audubon's Climate Champions program is a network of hundreds of volunteer grassroots advocates working together to advance an ambitious environmental policy agenda. We hope you'll join us as we work to make Massachusetts an international leader in protecting biodiversity and the climate.

[Join Today](#)



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Appendices

Appendix A: Detailed Methods Summary

Detailed Methods Summary

Appendix B: Economics of Newton's Solar Scale-up

City of Newton: 2022 Output of Online Solar Facilities (Phase 1 + 2)					
Category	Number of Facilities	Total Capacity (kW AC)	Average Annual Output per Facility (KWh)	Total Annual Output for FY22 (KWh)	Net Savings (\$)
Rooftop	10	994.5	119,757	1,197,569	\$210,787
Parking Lot	2	603	403,410	806,820	
Landfill	1	1,671	2,667,579	2,667,579	\$446,126
2023 Projected Outputs of Phase 3 Solar Facilities					
Category	Number of Facilities	Total Capacity (kW AC)	Average Annual Output per Facility (KWh)	Estimate First-Year Output (KWh)	Net Savings (\$)
Rooftop	7	449	111,983	783,881	TBD
Parking Lot	10	1,718	300,866	3,008,660	TBD

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