September 15, 2022

Dear Planning Board Members,

I listened to the July 13th Planning Board's initial discussion about the Solar Ordinance, which led me to conclude, in retrospect, that I should have attended that meeting.

One of the concerns expressed was that the Planning Board's previous work on the ordinance was "all for naught". I want to stress that is not the case.

As I explained during my presentation to the Planning Board in January, the proposed ordinance is a revision to and builds on the Planning Board's original proposal. As we all know, the first draft can be the heaviest lift, so I appreciate the Board's significant earlier work.

I have attached the proposed ordinance with areas highlighted where I have kept the text of the original ordinance ("the Planning Board's"). You can see that the majority of the original ordinance and text was retained, and that the original ordinance was the foundation to this ongoing effort.

What are the major changes and why were they made?

(1) Utility-Scale and Group Net Metering Solar Energy Systems (previously called "Enterprise and Community Solar Energy Systems") and where they can be located

Board members expressed concern about both the terms and definitions of "Enterprise Solar Energy System" and "Community Solar Energy System" and how they relate to definitions used by the PUC and RSAs.

Some members continued to express this concern when work on the latest proposal started. Those two terms were changed to "Utility Scale Solar Energy System" and "Group Net Metering Host" to better describe their functions, and the definitions were better aligned to the RSAs.

According to the U.S. Energy Information Administration, New Hampshire has only one Utility-Scale Solar System in current operation. However, our neighboring states operate hundreds of utility systems sized between 1 and 45 MW. New Hampshire's regulatory environment and incentives will likely continue to limit their deployment. That said, it is important to address these systems today, given the unforeseeable policy changes that can result from political shifts in our state government. Given also New Hampshire's lack of experience with these systems, predicting their potential impact, both positive and negative, on the Durham Community, could require a crystal ball.

However, a look at Utility-Scale Solar Systems in Massachusetts, Maine, and Vermont provides insight into their potential impact on Durham. Some systems make excellent reuse

of abandoned commercial land (e.g., gravel pits) or are co-located with existing intense land uses (e.g., airports)—none of which are options for Durham. Most systems would be both problematic and controversial in Durham, because they require large areas of forests to be cleared—10 to 80 acres per system. Forests are critical to carbon sequestration and water quality. Utility-Scale Solar Systems located on agricultural land use the land in a manner inconsistent with both agriculture and agrivoltaics/agrisolar. That is not to say that solar systems can't coexist with some types of agriculture, but national investors, like Goldman Sachs, expect to maximize land use for energy production and investment return – not agriculture

The Energy Chapter of the Master Plan details the need for and benefits of residential solar. It also expounds on the need for the Power Purchase Agreement 2 (PPA-2) system located at the Lee Gravel pit to meet the electrical energy needs of Durham's municipal facilities. We implemented the PPA-2 in 2018. The Chapter is silent about utility scale solar, but it does recommend that Durham "establish policies to guide decision-making about solar energy system deployment on public and private land. These policies may address solar access protection, street and building orientation**, or preferential locations for new solar energy systems**."

The Future Land Use chapter, too, is silent about the balance between renewable energy generation and Durham's land. The Master Plan does, however, clearly state that maintaining Durham's rural character is important (a reflection of citizen input through the Master Plan survey). That goal should be an important guide in developing ordinances.

At the September 21st meeting, I will present an overview of several utility scale systems, using both current and past satellite imagery and information provided by the U.S. Energy Information Agency. I hope this information will better inform the Planning Board and the public as to why the proposed ordinance limits utility scale solar systems to our western commercial zoning districts.

I also encourage board members to review the Durham Greenhouse Gas Inventory report that can be found at https://www.ci.durham.nh.us/sites/default/files/fileattachments/energy_committee/page/59161/town_of_durham_municipal_carbon_and_nitrogen_inventory_2019.pdf to better understand the critical climate-change-mitigation role of carbon sequestration that Durham forests and natural areas perform.

(2) More options for the placement for Residential Freestanding Systems

One of the primary goals of the proposed ordinance is to **create more options** for residents to place freestanding solar without having to seek a Special Exception. I understand that has been a concern shared by some Board members. The original ordinance's strict placement options, combined with a proliferation of residential solar, would have increased the

volume of Special Exception ZBA applications significantly. But I would also point out that over the past five years, the ZBA granted 89.5% of Special Exception applications.

The cost of providing more options can be to make zoning a little more complicated, but I think we may find the complexity a valuable tradeoff. The original ordinance required that freestanding systems be placed behind a residence—reasonable in dense neighborhoods with smaller lots like we see in the Residence A and B districts. On the other hand, lots in the Rural and Coastal districts are more than seven times larger than in Residence A and thus provide more options for solar placement.

The revised ordinance reflects this difference. It provides more placement options for freestanding residential solar when the system is either located away from a public road or can't be seen from the road.

On Wednesday night, I will show examples of placements so you can visualize these options. I will also explain why allowing residential solar to function as a net-metering host may become an important way to extend lower-cost renewable energy to households without good solar access.

Changes the Planning Board should Consider

Both the Conservation Commission and residents have recommended changes to the proposed ordinance since the Town Council referred it to the Planning Board. I would encourage the Planning Board to incorporate some of these changes with other changes the Planning Board may recommend.

These interim suggestions include:

Freestanding Solar in the WCOD and SPOD – The Conservation Commission recommends that freestanding solar systems not be permitted in the WCOD and SPOD. I concur with this recommendation. Freestanding solar systems are an intense land use when you consider both the installation requirements and the ongoing maintenance of the areas around the system.

Freestanding Solar System Height – We have learned that some two-axis tracking arrays with 48 solar panels, providing up to 20 kW, are being deployed in the area. Even though this reflects a large amount of energy-generation capacity, it is less than the 30 kW maximum we have targeted for residential solar. These 48 solar panel systems can be 30-35' high, and exceed the proposed 25' height limit.

Residents' comments also noted that our zoning allows, by Special Exception, building heights slightly higher than what is permitted in the Residence and Rural districts. I would ask that the Planning Board similarly recommend allowing systems taller than 25', up to a

maximum of 35', by Special Exception. This would allow larger systems in areas where the installation does not negatively impact neighbors or neighborhoods.

Maximum Residential Capacity – The proposed ordinance restricts the size of freestanding residential systems to an area of 1,800 square feet (equivalent to approximately 30 kW). One suggestion is that changing the specification from maximum area to maximum system capacity will make it easier for both residents and code enforcement. Both the Energy Committee and I think that setting a system size limit based on generation capacity, i.e., 30kW, rather than using the physical size of 1,800 sf, would be beneficial. I urge the Planning Board to consider making this recommendation.

Small Group Net Metering Host – Accessory Use to a Single Family or Duplex Residence – I would highly recommend that the Table of Uses be changed so that allowing a residential system to be a Group Net Metering Host would be Permitted in all zones.

Text Correction for Carport-Mounted Solar Energy System. I apologize for some of the confusion about solar on carports. There is a text error. Although correcting it does not address all of the concerns raised at the July 13th meeting, the text should have read:

> "Carport Mounted Solar Energy System – A solar energy system may be mounted on a carport when the carport is attached to the single-family or duplex residence or [not "and"] the carport is located beyond the fully enclosed part of the residence closest to the public road."

Thank you for your consideration of this information, and I look forward to our discussion next Wednesday.

Jim Lawson

SOLAR ENERGY SYSTEMS
***DRAFT ORDINANCE VERSION* 4.6 - Durham, New Hampshire**
Initiated by the Town Council on [Date to be Determined]

Proposed amendments to the Durham Zoning Ordinance to accommodate solar energy systems.

❖ ***Make the following changes in Article II. Definitions.***

➢ ***Add this new section for "Solar Energy Systems." Place this section right before "Solid Waste" and retain the order as shown here.***

SOLAR ENERGY SYSTEMS – Specific definitions pertinent to solar energy systems follow.

Building-Mounted Solar Energy System − A solar energy system attached to and completely supported by a building that does not extend more than 5 feet beyond the building footprint. The system may include necessary accessory equipment that is ground mounted.

Freestanding Solar Energy System − A ground-mounted solar energy system, including a stationary or tracking system (either single axis or dual axis). A Solar Photovoltaic (PV) Parking Canopy is not a Freestanding Solar Energy System.

Group Net Metering Host, Small – A Solar Photovoltaic (PV) System less than or equal to 100 KW that shares energy and Net Metering benefits with members of a registered group per N.H. PUC 909.

Group Net Metering Host, Large – A Solar Photovoltaic (PV) System greater than 100 KW and less than 5 MW that shares energy and Net Metering benefits with members of a registered group per N.H. PUC 909.

Multi-unit Residential or Nonresidential Solar Energy System− An accessory use designed to provide solar energy for the principal and accessory uses of Multi-Unit Residential, mixed Use with Residential and other Nonresidential uses.

Solar Energy − Radiant energy emitted by the sun.

Shared Solar Energy System – A solar energy system that serves single family or duplex residential buildings situated on two or more separate and contiguous lots. The system is considered accessory to the uses on each of the lots that it serves.

Single-Family or Duplex Residential Solar Energy System – A Solar Energy System that is an accessory use designed to generate energy for use at the property. A Single-Family or Duplex Residential Solar System may also be a Small Group Net Metering Host up to the size limits specified in 175-109.R.4.

Solar Energy System − A structure and the related components used to transform solar energy into electricity (through a solar photovoltaic system) or heat (through a solar thermal system).

Solar Photovoltaic (PV) Parking Canopy – An elevated structure that supports solar panels over Surface Parking.

Solar Photovoltaic (PV) System − A solar collection, mounting, inversion, storage and distribution system that converts sunlight into electricity.

Solar Thermal System − A solar collection system that directly heats a heat-transfer medium.

Utility-Scale Solar Energy System, Small - A limited electrical energy producer as defined in RSA 362-A:1 with a solar energy generating capacity equal to or less than 100 kW that generates energy for use off site by customers. A Small Utility-Scale Solar Energy System does not function as a Small Group Net Metering Host.

Utility-Scale Solar Energy System, Large – A limited electrical energy producer as defined in RSA 362-A:1 with a solar energy generating capacity of greater than 100 kW and less than 5 MW that generates energy for use off site by customers. A Large Utility-Scale Solar Energy System does not function as a Large Group Metering Host

- ***Add this new section in Article II definitions***

CARPORT – A roofed structure designed to shelter motor vehicles and that is open on at least two sides. A carport may be a freestanding structure or attached to a building.

❖ ***Modify the Table of Uses as follows:***

Add the new uses below in the Table of Uses in Section 175-53 under Subsection VI. Utility & Transportation Uses at the end after Personal Wireless Services Facility:

CATEGORY OF USES	RESIDENTIAL ZONES				COMMERCIAL CORE ZONES					RESEARCH-INDUSTRY ZONES			
	Rural (R)	Residence A (RA)	Residence B (RB)	Residence C (RC)	Central Business (CB)	Professional Office (PO)	Church Hill (CH)	Courthouse (C)	Coe's Corner (CC)	Office Research - Route 108 (OR)	Mixed Use and Office Research (MUDOR)	Office Research Light Industry (ORLI)	Durham Business Park (DBP)
VI. UTILITY & TRANSPORTATION USES													
Single family or duplex residential solar energy system - accessory use (See Article XX)	P	P	P	P	P	P	P	P	P	P	P	P	P
Multi-unit residential or nonresidential solar energy system - accessory use (See Article XX)													
• Building-mounted	P	P	P	P	P	P	P	P	P	P	P	P	P
• Freestanding	P	P	P	P	SE	P	P	P	P	P	P	P	P

CATEGORY OF USES	RESIDENTIAL ZONES				COMMERCIAL CORE ZONES					RESEARCH-INDUSTRY ZONES			
	Rural (R)	Residence A (RA)	Residence B (RB)	Residence C (RC)	Central Business (CB)	Professional Office (PO)	Church Hill (CH)	Courthouse (C)	Coe's Corner (CC)	Office Research - Route 108 (OR)	Mixed Use and Office Research (MUDOR)	Office Research Light Industry (ORLI)	Durham Business Park (DBP)
Small Utility-Scale solar energy system - principal use (See Article XX)													
• Building-mounted	X	X	X	X	P	P	P	P	P	P	P	P	P
• Freestanding	X	X	X	X	X	X	X	X	X	P	P	P	P
Large Utility-Scale solar energy system - principal use (See Article XX)													
• Building-mounted	X	X	X	X	X	X	X	X	X	P	P	P	P
• Freestanding	X	X	X	X	X	X	X	X	X	X	CU	CU	X
Small Group Net Metering Host - principal use (See Article XX)													
• Building-mounted	X	X	X	X	P	P	P	P	P	P	P	P	P
• Freestanding	X	X	X	X	X	X	X	X	X	P	P	P	P
Large Group Net Metering Host - principal use (See Article XX)													
• Building-mounted	X	X	X	X	X	X	X	X	X	P	P	P	P
• Freestanding	X	X	X	X	X	X	X	X	X	X	CU	CU	X

CATEGORY OF USES	RESIDENTIAL ZONES				COMMERCIAL CORE ZONES					RESEARCH-INDUSTRY ZONES			
	Rural (R)	Residence A (RA)	Residence B (RB)	Residence C (RC)	Central Business (CB)	Professional Office (PO)	Church Hill (CH)	Courthouse (C)	Coe's Corner (CC)	Office Research - Route 108 (OR)	Mixed Use and Office Research (MUDOR)	Office Research Light Industry (ORLI)	Durham Business Park (DBP)
Solar PV Parking Canopy - accessory use to surface parking (See Article XX)	**X**	**X**	**X**	**X**	**X**	**CU**	**CU**	**CU**	**CU**	**CU**	**CU**	**CU**	**CU**
Small Group Net Metering Host - accessory use to a single-family or Duplex residence (See Article XX)													
• Building-mounted	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**	**P**
• Freestanding (less than 30 kW of capacity as Specified in Article XX)	**SE**	**SE**	**SE**	**SE**	**SE**	**SE**	**SE**	**SE**	**SE**	**P**	**P**	**P**	**P**

❖ ***Modify the Wetland Conservation Overlay District and Shoreland Preservation Overlay District as follows:***

➢ ***Add the following use at the end of Section 175-60. Permitted Uses in the WCOD Subsection A.:***

10. Building-mounted solar energy system.

➢ ***Add the following use at the end of Section 175-71. Permitted Uses in the SPOD Subsection A.:***

10. Building-mounted solar energy system.

➢ ***Add the following use at the end of Section 175-61. Conditional Uses in the WCOD:***

6. Freestanding solar energy system.

➢ ***Add the following use at the end of Section 175-72. Conditional Uses in the SPOD:***

6. Freestanding solar energy system.

❖ ***Add the following as a new section in Article XX – Standards for Specific Uses, Section 175-109, and reletter R. Temporary Sawmill (including the table shown at the end).***

R. ***Solar Energy Systems***. Solar energy systems shall be allowed in conformance with the following standards and procedures (See Definitions for solar energy systems).

1. **Authority**. This ordinance is adopted pursuant to RSAs 362-F, 374-G, 477:49, 672:1 III-a, and 674:17 (I)(j).

2. **Purpose**. The purpose of this ordinance is to:

a. Encourage the implementation of solar energy systems in accordance with the recommendations stated in the Energy Chapter of the 2015 Durham Master Plan;

b. promote environmental sustainability while respecting the rural character and scenic landscape of Durham and the use of productive agricultural lands; and

c. comply with and support the State of New Hampshire's goal of developing clean, safe, renewable energy resources as provided for in the statutes referred to in 175-109.R.1 above.

3. **Applicability**. Solar installations that are designed to generate less than one kilowatt and are not connected to the electrical grid are not covered by this ordinance, though they may be subject to other specific regulations.

4. **Single-Family or Duplex Residential Solar Energy System – accessory use**. The following provisions apply to single-family or duplex residential solar energy systems.

   a. Basic requirements. This accessory use serves single-family or duplex residences situated on the same lot. A Freestanding Solar Energy System may occupy a ground area of up to 1,800 square feet.

   b. Placement – A Freestanding Solar Energy System shall be placed in a location conforming to the setbacks of Table 175-51 "Table of Dimensions" and shall meet one or more of the following criteria.

      (1) The system is placed where it is largely not visible from a public road abutting the property, as determined by the Code Enforcement Officer, due to land topography or existing structures or vegetation that are expected to be maintained until the Solar Energy System is decommissioned.

      (2) The system is placed 150 feet or more from any portion of a public road.

      (3) When a system is equal to or less than 12 feet in height and does not meet the requirements of 175-109.R.4.b. (1) or (2) above, the system shall be placed behind the fully enclosed part of the residence closest to the public road. Systems in the Rural and Rural Coastal Zones must also comply with 175-109.R.4.b (5) below.

      (4) When a system is greater than 12 feet in height and does not meet the requirements of 175-109.R.4.b. (1) or (2) above, the system shall be placed behind the fully enclosed part of the residence that is furthest from the public road. Systems in the Rural and Rural Coastal Zones must also comply with 175-109.R.4.b (5) below.

      (5) Systems in the Rural and Rural Coastal Zones should meet the placement criteria 175-109.R.4.b (1) or (2) above. The system may be placed in accordance with 175-109.R.4.b (3) or (4) above, but shall not extend 40' beyond the side of the residence.

   c. Carport Mounted Solar Energy System – A solar energy system may be mounted on a carport when the carport is attached to the single-family or duplex residence and the carport is located beyond the fully enclosed part of the residence closest to the public road.

d. Special Exception. A proposed Single-Family or Duplex Residential Solar Energy System that does not conform with 175.109.R.4.a. or b. or c. above may be approved by a special exception.

5. **Multi-unit or Nonresidential Solar Energy System – accessory use**. The following provisions apply to multi-unit or nonresidential solar energy systems.

The following standards and procedures apply to freestanding multi-unit residential or non-residential systems.

a. Site plan review and approval by the Planning Board is required.

b. No part of the system may be placed closer to the front property line (and side property line in the case of a corner lot) than the part of the fully enclosed principal building closest to the street. In addition, for a system that exceeds 12 feet in height (any part of the system), no part of the system may be placed closer to the front property line (and side property line in the case of a corner lot) than the fully enclosed part of the principal building furthest from the street.

c. In cases where there is no building or no distinct principal building on the lot or where there are multiple lots, the system shall be set back at least 100 feet from the front property line and buffered from the road.

d. A proposed system that does not conform with 175-109.R.5.b. or c. above, may be approved by a special exception.

e. The Solar Energy System shall be sized to provide up to the projected annual energy needs of the multi-unit or nonresidential use including approved ancillary uses.

f. Where the nonresidential use is Commercial Agriculture, the system may be sized to generate up to 100 kW more than the projected annual energy needs of the Principal Use, and the Solar Energy System may function as a Small Utility-Scale Solar Energy System or Small Group Net Metering Host.

6. **Small and Large Utility-Scale Solar Energy System – principal use**. The following provisions apply to Utility-Scale Solar Energy Systems.

The following standards and procedures apply to freestanding Utility-Scale Solar Energy Systems.

a. Site plan review and approval is required.

b. Freestanding systems shall be set back at least 100 feet from the front property line. The system shall be buffered from single family homes, neighboring roads and abutting properties in accordance with the Site Plan Regulations and as reasonably determined by the Planning Board.

7. **Small and Large Group Net Metering Host – principal use**. The following provisions apply to Group Net Metering Hosts.

The requirements of this Section 175-109.R.7 do not apply to Single-Family or Duplex Residential Solar Energy System functioning as a Group Net Metering Host.

The following standards and procedures apply to freestanding Group Net Metering Hosts.

a. Site plan review and approval is required.

b. Freestanding systems shall be set back at least 100 feet from the front property line. The system shall be buffered from single family homes, neighboring roads and abutting properties in accordance with the Site Plan Regulations and as reasonably determined by the Planning Board.

8. **Solar PV Parking Canopy – *accessory use*.** The following apply to a Solar PV Parking Canopy.

a. A Site plan review is required for all systems.

b. The parking must be an approved use specified in Section 175-53 "Table of Uses" excluding parking for Single-Family and Duplex Residences.

c. The height of the canopy, including panels, above the ground shall not exceed the height limit permitted in the zone and be no greater than 35 feet.

d. The structure supporting the photovoltaic panels and the panels of a Solar PV Parking Canopy must be located on or over the surface parking.

e. A Solar PV Parking Canopy may function as a Multi-unit or Non-Residential Solar Energy System, a Utility-Scale Solar Energy System (Large or Small) or a Group Net Metering Host (Large or Small).

9. **Other provisions**. The following additional provisions apply to all solar energy systems.

a. Building permit. A building permit is required for the installation of any system.

b. Setbacks. Every part of a freestanding system, including components elevated above the ground, components that track and move, and necessary accessory equipment that is ground mounted, shall conform to required setbacks for the zoning district.

c. Maximum height. For building-mounted systems, the maximum height for any part of the system is ten feet above the ridge of the roof of the primary building or ten feet above the highest part of the roof of the primary building where there is no ridge. The maximum height for freestanding systems is 25 feet (excludes Solar PV Parking Canopy).

d. Impervious surface. The maximum impervious surface ratio in the Table of Dimensions does not apply to solar energy systems.

e. Submission requirements. Applicants for projects that require a site plan shall submit all pertinent information, including specifications for the equipment, to the Planning Board, as specified in the Site Plan Regulations. Applicants for a special exception shall submit plans showing all pertinent aspects of the project and all elements specified by the Zoning Board of Adjustment.

f. Decommissioning. Applicants for a Solar Energy System that requires a Site Plan review shall submit a plan as part of that review for the removal of the structures and reclamation of the site when the system is no longer in use. It is expected that the decommissioning plan will specify the removal and disposal of photovoltaic panels using a means allowed by applicable state and federal regulations at the time of decommissioning.

g. Historic District. Additional procedures and standards for proposed solar energy systems located within the Durham Historic District are contained in Article XVII of this ordinance.