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MEMORANDUM

TO: Sunfish Lake Planning Commission
Sunfish Lake City Council

FROM: Michelle Barness

DATE: January 27, 2016

RE: Sunfish Lake – Alternative Energy System Ordinance

FILE: 211.02

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Mtg.
Agenda Item
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BACKGROUND AND ANALYSIS

The City Council considered a draft alternative energy system ordinance at the December 2015 meeting and tabled consideration of the ordinance in order to gather additional information on solar energy systems. Planning staff contacted Brian Ross, Senior Program Director for the Great Plains Institute for Sustainable Development, to discuss the Council's questions in more detail. Mr. Ross assisted the Minnesota Division of Energy Resources in the creation of the State's model solar ordinance, and was recommended by staff from the Division of Energy Resources as being very knowledgeable on alternative energy issues. He will attend the Council meeting on February 2, 2016 to share his expertise on the topic.

The Council raised the following questions with regards to solar energy systems at the December meeting:

1. How will solar energy systems be screened from adjacent properties?

Staff Response: The draft alternative energy ordinance and zoning district amendments as previously presented to the Council establish solar and geothermal energy systems as accessory uses in the zoning districts. Therefore, according to accessory ordinance Section 1217.01.H. these systems are required to "be screened from neighboring properties and the public right-of-way and the design and positioning of any such building, structure, or use shall minimize the impact upon abutting properties."

In discussing this issue with Mr. Ross, he stated that if Sunfish Lake regulates the appearance of accessory structures, requiring screening for detached solar energy systems is reasonable within the purview of the existing accessory regulations. However, his best practice recommendation was that screening requirements are specified to the extent that the screening does not affect the performance of the energy

system. Otherwise, the ordinance is unreasonably regulating the property owner's solar access rights.

In response to City concerns, and with Mr. Ross's comments in mind, staff has revised the draft alternative energy system amendment to state the following with regards to the screening of solar energy systems:

"6. Visibility. Roof mounted solar energy systems shall be designed to blend into the architecture of the building, and shall be screened to the extent possible without impacting their function. As a permitted detached accessory use, ground mounted solar energy systems are required to adhere to accessory screening requirements from adjacent properties and public right-of-ways as provided in Section 1217.01 of this Article."

2. Is glare from solar energy systems an issue?

Staff Response: In discussions with installers who have worked with solar energy systems it was indicated that glare is no longer a significant issue for this technology, which has been improved over time to minimize the occurrence. Further, Mr. Ross explained that building windows actually pose a more significant glare issue than solar collectors in his experience. During his presentation Mr. Ross will address the issue of glare from solar collectors in more detail.

The current draft of the alternative energy system ordinance states the following with regards to glare:

"8. Aesthetics. All solar energy systems shall minimize glare towards vehicular traffic and adjacent properties."

After hearing Mr. Ross's presentation, the Council can address whether this current language is sufficient to address glare. The Council may also determine that a standard regulating glare for solar installations is not necessary due to the success of current technology in minimizing the issue.

3. Are there potential safety issues with ground mounted solar energy installations?

Staff Response. Mr. Ross explained that assuming that the solar energy system is meeting electric code and other basic safety requirements it should not pose any safety issues. Anything that is electrified is a hazard at some point (even Christmas lights), but the hazard can be reasonably mitigated by requiring conformance with basic safety regulations.

The draft of the alternative energy ordinance reviewed by Council at the December Council meeting required solar energy systems to meet the minimum standards outlined by **"the International Electrotechnical Commission, the American Society of Heating, Refrigerating, and Air Conditioning Engineers, ASTM International, the British Standards Institution, the International Organization for Standardization,**

Underwriter's Laboratory, the Solar Rating and Certification Corporation or other standards as determined by the City Building Official."

Since December, staff has further revised the draft ordinance to additionally specifically require conformance with the Minnesota State Electric Code and the Minnesota State Plumbing Code.

4. Will allowing ground mounted solar structures up to the accessory building height limitation of 16 feet negatively impact adjacent properties?

Staff Response. As previously described, as a detached accessory structure ground mounted solar energy systems are required to be screened from adjacent properties and the public right-of-way. The screening requirement would apply to a solar energy system no matter the height. Further, Mr. Ross has suggested that holding ground mounted solar installations to the height limitation for other accessory uses provides consistency, and as such is a reasonable requirement. In addition, he explained that ground mounted solar energy system height is mainly an issue to allow the collector to be above the shade. Presumably, a height limit of 16 feet would be flexible enough to permit this to occur.

5. How large does a ground mounted solar installation need to be?

Staff Response: In Mr. Ross's experience, a ground mounted system should be at least 250-300 square feet to be effective in meeting energy needs. This size would allow as much as 3KW of capacity, which he suggests is slightly less than half of what a typical home needs to be "net zero". Sunfish Lake homes probably would need twice that much due to the larger home sizes. 1,000 square feet would be the maximum size that he recommends for a residential home unless it is on a very large lot (10 acres or more).

The Sunfish Lake Ordinance does not currently limit the area of accessory structures, with the exception of those structures less than 18 in. located between principal structures and the shoreline setback, and those within the required rear yard. Therefore a ground mounted solar energy system between 250 and 1,000 square feet in area would conform to existing area/coverage standards.

However, the City may choose to specify additional area standards for solar energy systems. Several of the precedent alternative energy system ordinances reviewed by planning staff limited the area of ground mounted solar systems to no more than 25% of rear yards. However, this standard also typically coincided with limiting the location of ground mounted systems to rear yards only, which would need to be specified in the alternative energy system ordinance.

Sunfish Lake's accessory ordinance limits accessory buildings to 1,000 square feet in area, a standard which could be specified for solar energy structures as well. Alternatively, the State's model solar energy ordinance takes a different approach by requiring that the surface area of pole or ground mount solar systems do not exceed half the building footprint of the principal structure. The model ordinance requirement

that roof mounted systems allow for adequate roof access has already been added to the draft ordinance as this appears to be a best practice.

The draft alternative energy system ordinance as presented to the Council on February 2, 2016 incorporates the area limitations from the State's model ordinance. The Council should discuss whether this standard makes sense for the needs of the Sunfish Lake community, or whether the Council would like to limit the area of ground mounted solar energy systems in a different way. Mr. Ross may also be able to answer questions regarding area/coverage limitations during the course of his presentation.

Given concerns about the appearance of ground mounted solar energy systems, the Council may wish to discuss location requirements for these systems. The State's model ordinance does not specify location requirements for ground mounted systems, but instead regulates location by requiring that principal or accessory structure setbacks be met. Setback requirements for solar energy systems can already be found in Sunfish Lake's draft alternative energy ordinance. However, once setbacks have been met, Sunfish Lake's accessory ordinance would permit ground mounted solar energy systems in all yards (with the exception of required front and shoreline setback areas), unless stated otherwise.

6. Have communities with existing alternative energy ordinances received complaints regarding installed solar energy systems?

Staff Response: Planning staff contacted four communities that have alternative energy system ordinance in place and that have seen solar energy system installation occur at a residential scale. The communities of Woodbury, Eden Prairie, Lester Prairie, and Roseville all indicated that they have not received complaints regarding installed solar energy systems to date.

7. Can the City choose to prohibit ground mounted solar energy systems if concerns regarding potential land use impacts cannot be alleviated?

Staff Response: In discussing this issue with Mr. Ross, it appears that while solar access is protected at the State level, solar energy systems are not a protected land use at the current time. So it is within the City's zoning authority to prohibit them, provided the prohibition is not arbitrary (solar arrays should be not more restricted than other accessory uses without good reason). Ideally, if the City has concerns about the appearance of solar energy systems, they should identify what they are willing to allow, then apply additional screening or CUP requirements to those installations that do not meet their standards.

CONCLUSION

The most recent draft of the alternative energy system ordinance is attached for consideration. The most recent revisions to the draft are bolded. The revisions are either discussed in this memorandum, or are minor text revisions drawn from review of the State's model solar energy ordinance. After reviewing this memorandum and the attached ordinance, and hearing the

presentation by Brian Ross of the Great Plains Institute, staff requests that the Council discuss the questions raised and provide guidance on how to finalize the draft alternative energy system ordinance. A final version of the Ordinance will then be presented to the City Council at the March 1, 2016 meeting.

c: Catherine Iago, City Clerk
Tim Kuntz, City Attorney
Don Sterna and Eric Eckman, City Engineers
Mike Andrejka, Building Official
Jim Naves, City Forester
Ron Wasmund, Septic System Inspector

**CITY OF SUNFISH LAKE
DAKOTA COUNTY, MINNESOTA**

ORDINANCE NO. 2015-_____

**AN ORDINANCE AMENDING THE SUNFISH LAKE CITY CODE,
ARTICLE XII (ZONING REGULATIONS), TO ESTABLISH
ALTERNATIVE ENERGY SYSTEM REGULATIONS**

THE CITY COUNCIL OF SUNFISH LAKE DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Section 1202.02 (Definitions) of Article XII (Zoning Regulations) shall be amended to add the following definitions:

Alternative Energy System: A ground source heat pump or solar energy system.

Ground Source Heat Pump System Related:

1. Closed Loop Ground Source Heat Pump System: A system that circulates a heat transfer fluid, typically food-grade antifreeze, through pipes or coils buried beneath the land surface or anchored to the bottom in a body of water.
2. Ground Source Heat Pump System: A system that uses the relatively constant temperature of the earth or a body of water to provide heating in the winter and cooling in the summer. System components include open or closed loops of pipe, coils or plates; a fluid that absorbs and transfers heat; and a heat pump unit that processes heat for use or disperses heat for cooling; and an air distribution system.
3. Horizontal Ground Source Heat Pump System: A closed loop ground source heat pump system where the loops or coils are installed horizontally in a trench or series of trenches no more than twenty (20) feet below the land surface.
4. Heat Transfer Fluid: A non-toxic and food grade fluid in accordance with Minn. Rules 4725.7050.
5. Ground Water Thermal Exchange Devices. A heating or cooling device that depends on extraction and reinjection of groundwater from an independent aquifer to operate, as defined in Minn. Stat. § 103I.005.
6. Bored Geothermal Heat Exchangers: An earth-coupled heating or cooling device consisting of a sealed closed-loop piping system installed in a boring in the ground to transfer heat to or from the surrounding earth with no discharge, as defined in Minn. Stat. § 103I.005.

Solar Energy System Related:

1. Building-integrated Solar Energy System: A solar energy system that is an integral part of a principal or accessory building, rather than a separate mechanical device, replacing or substituting for an architectural or structural component of the building including, but not limited to, photovoltaic or hot water solar systems contained within roofing materials, windows, skylights and awnings.
2. Flush-mounted Solar Energy System: A roof-mounted system mounted directly abutting the roof. The pitch of the solar collector may exceed the pitch of the roof up to five (5) percent but shall not be higher than ten (10) inches above the roof.
3. Passive Solar Energy System: A system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.
4. Photovoltaic System: A solar energy system that converts solar energy directly into electricity.
5. Solar Energy System: A device or structural design feature, a substantial purpose of which is to provide daylight for interior lighting or provide for the collection, storage and distribution of solar energy for space heating or cooling, electricity generation or water heating.

Section 2. Article XII (Zoning Regulations), Section 1230 (Reserved) is hereby amended to read as follows:

1230. ALTERNATIVE ENERGY SYSTEMS

- 1230.01 Purpose
- 1230.02 Ground Source Heat Pump Systems
- 1230.03 Solar Energy Systems

SECTION 1230.01 PURPOSE: The purpose of this section is to:

- A. Accommodate alternative energy sources by removing regulatory barriers and creating a clear regulatory path for approving alternative energy systems.
- B. Create a livable community where development incorporates sustainable design elements such as resource and energy conservation and use of renewable energy.
- C. Protect and enhance air quality and decrease use of fossil fuels.
- D. Accommodate alternative energy development in locations where the technology is viable and environmental, economic and social impacts can be mitigated.

SECTION 1230.02 GROUND SOURCE HEAT PUMP SYSTEMS:

A. Zoning District Allowance. Ground source heat pump systems in accordance with the standards in this section are allowed as a permitted accessory use in all zoning districts.

B. Standards.

1. System Requirements.

a. Only closed loop ground source heat pump systems utilizing heat transfer fluids as defined in Minn. Rules 4725.7050 are permitted. Ground water thermal exchange devices as defined by Minn. Stat. § 103I.005 are not permitted.

b. Ground source heat pump systems located within public waters are prohibited.

2. Setbacks. All components of ground source heat pump systems including pumps, borings and loops shall be set back at least twenty-five (25) feet from all lot lines and the ordinary high water level of any public water body. Systems must otherwise comply with required well and boring setbacks as identified in Minn. Rules Chapter 4725.

3. Easements. Ground source heat pump systems shall not encroach on public drainage, utility roadway or trail easements.

4. Noise. Ground source heat pump systems shall comply with Minnesota Pollution Control Agency standards outlined in Minnesota Rules Chapter 7030.

5. Safety. Ground source heat pumps shall meet the requirements of the State Building Code.

C. Abandonment. If a ground source heat pump system remains nonfunctional or inoperative for a continuous period of one (1) year, the system shall be deemed to be abandoned and shall constitute a public nuisance. The property owner shall remove the abandoned system and restore vegetation upon the site at his/her expense after a demolition permit has been obtained. If the property owner does not remove the abandoned system within thirty (30) days after the system becomes abandoned, the City shall send a written notice to the owner and direct the owner to remove the abandoned system. If the owner does not remove the abandoned system within ninety (90) days after the date of the written notice, the City shall have the power under Minn. Stat. § 429.021, Subd. 1(8) to abate the public nuisance by ordering the abatement after a public hearing pursuant to Minn. Stat. § 429.031. The public hearing shall be preceded by mailed and published notices as required by Minn. Stat. § 429.031. If abatement has been ordered, the City may remove the abandoned system and charge the expense to the property owner. If the property owner has not paid the charges by the date set by the Council the charges may be specially assessed against the property pursuant to the procedures of Minn. Stat. § 429.061. Removal of the system shall be in accordance with the following:

1. The heat pump and any external mechanical equipment shall be removed.

2. Pipes or coils below the land surface shall be sealed in accordance with applicable regulations. Heat transfer fluid shall be captured and disposed of in accordance with applicable regulations. The top of the pipe, coil or boring shall be uncovered and grouted.

D. Permits. A building permit shall be obtained for any ground source heat pump system prior to installation. Borings for vertical systems are subject to approval and permitting by the Minnesota Department of Health.

SECTION 1230.03 SOLAR ENERGY SYSTEMS:

A. Zoning District Allowance. Solar energy systems in accordance with the standards in this section are allowed as a permitted accessory use in all zoning districts.

B. Standards.

1. Exemption. Passive or building-integrated solar energy systems are exempt from the requirements of this Section and shall be regulated as any other building element.
2. Height. Roof-mounted solar energy systems shall comply with the maximum height requirements in the applicable zoning district. Ground-mounted solar energy systems shall not exceed **sixteen (16) feet in height when oriented at maximum tilt.**
3. Setbacks. Ground-mounted solar energy systems shall comply with all accessory structure setbacks in the applicable zoning district, **and may not extend into setbacks when oriented at minimum design tilt.** Roof-mounted systems shall comply with all building setbacks in the applicable zoning district and shall not extend beyond the exterior perimeter of the building on which the system is mounted. **Exterior piping for solar hot water systems shall be allowed to extend beyond the perimeter of the building on a side yard exposure.**
4. Roof Mounting. Roof-mounted solar collectors may be flush-mounted or bracket-mounted. Bracket-mounted collectors shall be permitted only when a determination is made by the City Building Official that the underlying roof structure will support apparatus, wind, and snow loads and all applicable building standards are satisfied.
5. Easements. Solar energy systems shall not encroach on public drainage, utility roadway or trail easements.
6. ~~Screening. Solar energy systems shall be screened from view to the extent possible without impacting their function.~~ **Visibility. Roof mounted solar energy systems shall be designed to blend into the architecture of the building, and shall be screened from view to the extent possible without**

impacting their function. As a permitted detached accessory use, ground mounted solar energy systems are required to adhere to accessory screening requirements from adjacent properties and public right-of-ways as provided in Section 1217.01 of this Article.

7. Maximum Area Coverage. Roof or building mounted solar energy systems, excluding building-integrated systems, shall allow for adequate roof access to the south-facing or flat roof upon which the panels are mounted. The surface area of pole or ground mount systems shall not exceed half the building footprint of the principal structure.
8. Aesthetics. All solar energy systems shall minimize glare towards vehicular traffic and adjacent properties.
9. Feeder lines. The electrical collection system shall be placed underground within the interior of each parcel.

C. Safety.

1. Standards. Solar energy systems shall meet the minimum **applicable** standards outlined by the International Electrotechnical Commission (IEC), the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE), ASTM International, British Standards Institution (BSI), International Electrotechnical Commission (IEC), **the Minnesota State Electric Code, the Minnesota State Plumbing Code**, International Organization for Standardization (ISO), Underwriter's Laboratory (UL), the Solar Rating and Certification Corporation (SRCC) or other standards as determined by the City Building Official.
2. Certification. Solar energy systems shall be certified by Underwriters Laboratories, Inc. and the National Renewable Energy Laboratory, the Solar Rating and Certification Corporation or other body as determined by the ~~Community Development Director~~ **City Planner**. The City reserves the right to deny a building permit for proposed solar energy systems deemed to have inadequate certification.
3. Utility Connection. All grid connected systems shall have an agreement with the local utility prior to the issuance of a building permit. A visible external disconnect shall be provided if required by the utility.

- D. Abandonment. If a solar energy system remains nonfunctional or inoperative for a continuous period of one (1) year, the system shall be deemed to be abandoned and shall constitute a public nuisance. The property owner shall remove the abandoned system and restore vegetation upon the site at his/her expense after a demolition permit has been obtained. Removal includes the entire structure including transmission equipment. If the property owner does not remove the abandoned system within thirty (30) days after the system becomes abandoned, the City shall send a written notice to the owner and direct the owner to remove the abandoned system. If the owner does not remove the abandoned

system within ninety (90) days after the date of the written notice, the City shall have the power under Minn. Stat. § 429.021, Subd. 1(8) to abate the public nuisance by ordering the abatement after a public hearing pursuant to Minn. Stat. § 429.031. The public hearing shall be preceded by mailed and published notices as required by Minn. Stat. § 429.031. If abatement has been ordered, the City may remove the abandoned system and charge the expense to the property owner. If the property owner has not paid the charges by the date set by the Council the charges may be specially assessed against the property pursuant to the procedures of Minn. Stat. § 429.061.

E. Permit. A building permit shall be obtained for any solar energy system prior to installation. All active solar energy systems shall meet approval of local building code officials, consistent with the State of Minnesota Building Code, and solar thermal systems shall comply with HVAC-related requirements of the Energy Code.

Section 3. Section 1241.04 (R-1 District Accessory Uses) is hereby amended to add the following:

M. Ground source heat pump and solar energy systems as regulated by Section 1230 of this Ordinance.

Section 4. Section 1242.04 (INS District Accessory Uses) is hereby amended to add the following:

D. Ground source heat pump and solar energy systems as regulated by Section 1230 of this Ordinance.

Section 5. This Ordinance shall be in full force and effective from and after its passage and publication according to law.

ADOPTED this 1st day of March 2016 by the City Council of Sunfish Lake.

Molly Park, Mayor

ATTEST:

Catherine Iago, City Clerk