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To: Planning Commission

From: Neighborhood and Comprehensive Planning Committee

Subject: Alternative Energy Zoning: Background, Public Hearing and Recommendations

Introduction
On April 15, 2011, the Planning Commission initiated a zoning study to consider amendments to the zoning code pertaining to wind turbines that will address issues specific to wind turbines and conditions under which wind turbines might be permitted in various zoning districts.

In 2013, while staff was studying wind turbine regulation, the Minnesota Legislature passed a suite of laws that are driving the market for solar installations and enabling local government authority. Minnesota Statute 216B.1641 established the Xcel Energy Community Solar Garden Program. This program allows for large solar farms or gardens on structures and on large plots of land. The goal was to allow people who want to use solar energy as part of their energy consumption, but are unable to do so on their own. Saint Paul's zoning code does not accommodate solar installations as a principal use.

This memorandum summarizes the background of the study, the public hearing testimony, and proposed zoning code amendments.

Background - wind
Between 2002 and 2012 several applications for wind turbines were made to the Planning Commission, including for stand-alone "windmill" style horizontal axis wind turbines (HAWT) and for roof-top and standalone "egg beater" style vertical axis wind turbines (VAWT). One HAWT has been approved and is used for educational purposes at Macalester College. Four VAWT models were approved for a structure located in a B2 zoning district at 1010 North Dale.

The rationale for permitting wind energy conversion systems is to incentivize such systems by providing regulatory simplicity and predictability while protecting neighborhoods and deal with wind energy conversion systems as an accessory use, rather than as a primary use. Accessory uses are those that are "clearly incidental to, customarily found in connection with, and (except as provided in section 63.300) located on the same zoning lot as, the principal use to which it is related." This will regulate wind energy conversions systems the same way solar energy systems are regulated. Due to the nature of development and the market in Saint Paul, it is unlikely that a wind energy systems would be proposed as a primary use. Large wind (greater than 5,000 kW and generally a vertical turbine) might be considered as a primary use, but staff believes that users of wind turbines will seek to power a business or facility as an accessory use and not a primary use. If the market or patterns of development changes or interest arrives, wind energy conversion systems as a primary use may be considered.

In 2002 Macalester College applied for and received a Determination of Similar Use (DSU) for a free-standing, 10 kW, 102-foot high wind turbine located on the campus. Since then several people have approached the Department of Safety and Inspections (DSI) seeking information about free-standing

and building-mounted wind turbine regulation in the city. On April 12, 2011 Capitol Lien and Title at 1010 North Dale applied for a DSU for a free-standing wind turbine and three building-mounted wind turbines. This application was approved subject to several conditions, including the completion of a noise study by a qualified acoustical engineer. On December 1, 2011, Metropolitan State University applied for a conditional use permit for a 20kW wind turbine on a freestanding pole 104 feet high. That application was initially approved by the Planning Commission, but upon appeal from the neighborhood was denied by the City Council in 2012.

This section of the memo outlines types of wind turbines; contains a survey of city and county ordinances regulating turbines or WECS; and makes recommendations for a Saint Paul ordinance related to WECS.

Research

Categories and design of wind turbines

There are two categories of wind turbines, according to the industry. The first is "large wind" which refers to turbines with a capacity of 5,000 kilowatts or more. "Small wind" is any turbine with a capacity of less than 5,000 kilowatts. The State of Minnesota Wind Siting Act (Chapter 203-S.F. No. 1076) uses the same categories in its wind turbine definitions.

Wind turbines also come in two different designs. Horizontal-axis turbines have blades that rotate perpendicular to the ground. These turbines must face into the wind in order to function and are similar to those seen in large wind farms, or locally at Macalester, in North Saint Paul, and in Maple Grove. Vertical-axis turbines have blades or rotors that rotate parallel to the ground and can capture turbulent wind, or wind in any direction. They have an egg beater-like appearance. Local examples include the three roof-top mounted, and one free-standing turbines at the Capitol Lien and Title company on Dale Street, on Como Avenue between Western and Virginia, and at the newly constructed Hy-Vee Grocery stores around the metro, including Oakdale, on the solar- and wind-powered electrical vehicle charging stations in their parking areas.

Like the Hy-Vee electrical vehicle charging station example, there are other hybrid wind/solar fixtures, usually light fixtures for use in parking lots or in public right of way with a solar power element and a wind power element. The solar element is a photovoltaic system and the wind element is a vertical axis wind turbine, or a small wind turbine.

Vertical-axis turbines in use in the US tend to generate less energy and fall into the "small wind" category. Commercial/industrial wind farm installations in the US have typically been horizontal-axis turbines. Generally speaking, urban installations tend to both have lower generation capacity and be vertical-axis turbines.

Practical applications

According to The Renewable Energy Hub web site (https://www.renewableenergyhub.us/wind-turbines/how-much-does-wind-turbines-cost.html), residential sites should:

- have a wind speed minimum of 5 meters per second (to test, you can install an anemometer, which many states supply);
- ensure there are no obstructions (e.g., other houses, trees) that could cause turbulence;
- make sure your building is not subject to any state, federal or even county restrictions, whether you are installing a roof mounted system or free-standing one;
- decide if you have enough land for foundations if you are installing a free-standing wind turbine; and
- check whether you need planning permission to install a wind turbine.

Wind turbines for residential use vary in power from 0.2kW to 25 kW and can be used as a supplemental energy source. According to data from Xcel Energy, the average residence in Minnesota uses about 9000kWh/year. The average cost for a roof-mounted residential turbine is about $5,000, plus annual maintenance. Some wind turbines are able to store power in a battery.

System size	Approx. yearly system output*
.3kW (building-mounted)	669kWh
1kW (building-mounted)	1,750kWh
1.5kW (pole-mounted)	2,600kWh
2.5kW (pole-mounted)	4,400kWh
3.0kW (building-mounted)	6,500kWh
5kW (pole-mounted)	8,900kWh
10kW (pole-mounted)	21,500kWh
15kW (pole-mounted)	36,000kWh

*Assumes the average US wind speed of 5.6m/s for the sake of illustration. The actual system output is predicated upon a large range of factors. Larger, higher output turbines also tend to be mounted at greater heights, where wind speeds are higher, and turbines become more efficient.

Smaller turbines on residential structures are used to supplement electricity production from solar installations, particularly during winter months[a].

For a typical commercial district and commercial building in Saint Paul, similar systems could be applied, but with less effect, given commercial electricity consumption in Minnesota, which averages 80,400 kWh/month, according to Xcel Energy. Free-standing systems producing outputs like below would be horizontal systems, with a look similar to turbines in North Saint Paul, Maple Grove, and on windfarms throughout the country.

Freestanding system size	Approx. yearly system output*
1500 kW (1.5MW)	5,000,000kWh (5,000MWh)
2000 kW (2.0MW)	8,000,000kWh (8,000 MWh)
2500 kW (2.5MW)	11,000,000kWh (11,000 MWh)
3000 kW (3.0MW)	13,000,000kWh (13,0000 MWh)

*Averages from: http://www.windpowerengineering.com/turbine-selector-app/

Vertical-axis wind turbines are small wind generators (200 W - 10kW) can be used as stand-alone systems or as grid connected systems, and both can be paired with other energy conversion systems, such as photovoltaics. With a height from 6 to 32 feet small wind turbines can be placed on rooftops, on streets or in gardens, they have relatively little visual impact and are able to produce energy even from modest wind flows. Places like China, India and Italy have large markets, but small wind installations grow by about 10 percent each year[b].

Although they are installed lower to the ground than horizontal-axis devices, rooftop installations have advantages over ground-mounted turbines. According to Casini's article, if the height of the rooftop mounted turbine shaft is approximately 50 percent of the building height, energy generation will be maximized.

[a] Casini, Marco. "Small Vertical Axis Wind Turbines for Energy Efficiency." *Journal of Clean Energy Technologies*, vol. 4, no. 1, Jan. 2016, pp. 56-65. Accessed 8/18/2017: http://www.jocet.org/vol4/254-H0020.pdf

[b] Ibid.

Potential land use impacts
Siting of wind turbines may have potential land use impacts. For large wind, consideration of the "fall" zone is important. However, wind installations of either variety are unlikely to impact the amount of traffic congestion in the public streets, or impede the normal and orderly development and improvement of the surrounding property. There is debate about the impact on the public health and safety of wind turbine products, which will be discussed later in this memo.

Other cities' regulations:
Staff reviewed nearly 20 ordinances from half a dozen states examining type of wind systems permitted, method of permitting; addressed zoning districts, heights, setbacks and other life/safety concerns, environmental concerns around humans and animals, including model ordinances proposed by sustainability experts in Minnesota and the US. Staff also spoke with regulators at the State and solar and wind-energy providers operating in Minnesota.

Height, setbacks, and blade clearance
Large wind systems generally require a conditional use permit, as in Minneapolis, and are not permitted in residential or office districts. The regulations usually restrict large wind installations to lots of one acre or greater and with no more than one turbine per acre. However, in Maple Grove and Eden Prairie, they are permitted as an accessory structure in all districts.

For large wind, setbacks are generally a 1.1 x height from any property lines (Cleveland, Lincoln, New York State Energy Research and Devt. Authority (NYSERDA)) or simply based on the tower height (Duluth, Madison, Plymouth), sometimes with a total height restriction (Duluth). The Distributed Wind Energy Association's model ordinance suggests a 1.1 to 1.25 x height distance from property lines.

Height of large wind turbines generally depends on the lot size. Minneapolis restricts height to 100' tall on sites of five or more acres and 60' on sites of one to five acres. NYSERDA recommends that the height of the turbine from the ground to the top of the rotor at its highest position be 30', while in Plymouth, blade arcs "shall have a minimum of 30 feet of clearance *over* any accessory structure or tree." The American Wind Energy Association recommends that on a 1/2 to 1-acre lot, the height maximum should be no more than 150'.

Small wind turbines are generally permitted in all districts without a conditional use permit (Wisconsin). Lincoln, NE and Schaumburg, IL permit small wind turbines as a conditional or special use. Ground-mounted units are permitted as an accessory structure (Chicago, Duluth) and roof mounted ones are permitted in all districts (Henderson, NV and Minneapolis). In Minneapolis, one may not install a wind turbine on a residential structure with fewer than four stories.

For small wind, setbacks vary from being a simple 1:1 height ratio (Wisconsin) to 10' to 15' from the property line for smaller units (Oakland, Cleveland, Denver, AWEA). Chicago and Schaumberg, IL both require a 20' setback from all lot lines. Minneapolis sites wind turbines at least 10' from the wall of a structure.

Height restrictions generally refer to building-mounted small wind turbines but there are some restrictions for ground-mounted ones in residential districts. For ground-mounted turbines they must not be more than a certain height taller than the building on the property. This varies from 7' (Oakland) to 75' (Denver). Minneapolis and Chicago, two urban cities surveyed from our region, require the turbine to be not greater than 15' above the rooftop or parapet, whichever is greater.

Noise
Noise regulations of large wind turbines vary from place to place. Cleveland limits sound to not more than 50 decibels measured from the nearest residential property line. This matches the MN Model

ordinance and MN State noise rules (MN Rule 7030). NYSERDA suggests not more than 55 dB(A) at property line and AWEA 60 dB(A) at nearest building or not more than 5 dB(A) above ambient noise. Reno, Nevada and Schaumburg, IL limit wind turbine sound levels to 50 decibels over ambient noise, in residential districts and 60 decibels over ambient noise in other districts, according to "Planning for Wind Energy," a publication of the APA. The APA recommends using that standard. The output of a typical 2 kW turbine (the size to serve a single-family residence) is about 55 dBA at a distance of 50 feet. This is about the same level as a household air conditioning unit at 100 feet. In comparison, a passenger car at 65 mph at 25 ft. is 77 dB, which is noted as being "annoyingly loud to some people," by the acoustic engineering firm IAC Acoustics. Decibels are additive which means a sound that is 50 dB (for example, standing 100 feet away from a large electrical transformer) is 1/4th as loud as that traffic example, and 80 dB is actually two times louder than 70 dB. Vertical-axis devices have very low sound generation, in comparison with horizontal-axis systems[c].

Access

Access to a wind turbine is typically limited by fencing and a lock and/or limiting climbing apparatus to not less than 8' above the ground, with the most common restriction being no climbing apparatus within 12' of the ground (NYSERDA, Minneapolis, Schaumberg, MN Model, Plymouth)

Animal impacts

Bat and bird impacts are not specifically mentioned in any codes currently established in the US. However, there have been some studies that suggest that at large wind sites anywhere from 1 to 3 birds are killed per tower per year. Bats potentially experience a kill rate of almost three times that. Wind turbines generally pose risks to individuals, not populations. Birds are more likely to be killed by other human infrastructure and utilities like vehicles, windows, communications towers, pollution and house cats, according to "Planning for Wind Energy." For most urban applications wind turbines are mounted lower than bird and bat migration paths. "Because of the relatively smaller blades and short tower heights, home-sized wind machines are considered too small and too dispersed to present a threat to birds. Researchers do not consider a study of home-sized wind systems worth funding." (focusonenergy.com) Small WECS have very limited wildlife impacts, according to the APA. The blade areas do not create as much of a hazard and there is typically plenty of maneuvering space around them. The number of birds killed annually by WECS is fewer than by housecats or glass windows and doors. In fact, in 2006 the Audubon Society issued a statement in support of well-located WECS. No research was found specifically about birds or bats and vertical wind turbines. An industry representative has stated that vertical wind turbines appear to be solid objects when spinning, which would cause birds and bats to fly around them, rather than try to go through them. There is no evidence to suggest that vertical wind turbines create enough disturbance in the wind to draw birds or bats in to them.

A review of current literature as of August 20, 2017 demonstrates that there is still little evidence to suggest that wind turbines create enough disturbance in the wind to draw birds or bats into them, particularly in urban areas.

Other regulations

When addressed, the following criteria are found for all wind turbines: The wind turbines are not to interfere with electromagnetic communications; they are not to be used for advertising; the color or finish should blend in with the architecture or be screened or painted a subdued, non-reflective color. The American Wind Energy Association and Boston both refer to the systems minimizing glare and flickering shadows, which may be caused by the rotor spinning. Wind turbines must be removed when abandoned, which is defined differently based on the city, but most commonly after a 12-month period (Minneapolis, Maple Grove).

[c] Ibid.

Hybrid (Wind/Solar) Fixtures

Hybrid (wind/solar) fixtures include light fixtures and mechanisms for powering electric vehicle charging stations are light fixtures for use in parking lots or in public right of way with a solar power element and a wind power element. The solar element is a photovoltaic system and the wind element is a small vertical axis wind turbine. The light fixtures are similar to cobra head lights and reflect downward, as required by the zoning code. The electric vehicle charging stations are similar to existing free-standing models used in city facilities, but with a similar solar/wind element to the light fixtures. The zoning code does not address these stations.

The zoning code as currently written does not preclude the use of a hybrid (wind/solar) light fixture. The hybrid light fixture is similar to standard light fixtures used in parking lots, and would be treated the same by the zoning code. The kinetic feature of the vertical-axis wind turbine is designed to minimize flicker impacts and the solar panel is similar to solar panels on other fixtures on light posts such as solar-powered wireless broadband internet systems in use around the country.

While zoning code does not specify lighting as a use, accessory or otherwise it does set standards in Section 63 and in the T districts.

Section 63.116 Exterior Lighting of the zoning code addresses standards for exterior lighting. It requires that lighting be shielded to reduce glare and arranged as to reflect lights away from all adjacent residential districts in such a way as not to exceed three (3) footcandles measured at the residential district boundary. Lighting illuminating the exterior of a building must also be placed and shielded to avoid interference with the vision of people on highways or adjacent property.

Section 63.318 sets the standard for lighting in parking facilities. It requires that parking facilities be illuminated to a level to allow safe, secure access to the parking facility and within it, and states that all lighting shall conform to Section 63.116.

Additionally, the Traditional Neighborhood district design standards in Section 66.343 state that pedestrian-scale lighting shall be provided in parking areas but that poles shall not be more than 25 feet in eight in parking lots and 16 feet in height along interior sidewalks and walkways.

Chapter 63, Article 2 of the zoning code addresses other parking requirements, and allows for reductions in parking minimums for provision of energy efficient vehicles.

Background - solar

In 2011 Saint Paul amended the zoning code to better accommodate solar installations, permitting them only as an accessory use. Since then, state law enabling the creation of Community Solar Gardens was passed in 2013, and became effective in 2015. Community Solar Gardens are centrally-located solar photovoltaic (PV) systems that provide electricity to participating subscribers. Xcel Energy customers can participate in projects offered by private developers. Because Minnesota state statutes leave most solar development regulation to local governments, it is important for Saint Paul to have development regulations that are “solar ready,” which means ordinances will address all the types of solar land uses the community is likely to see. Based on public hearing testimony, outlined in the next section, *solar energy generation facility, community* is proposed as a new use, with a definition and applicable standards. This amendment is based on accepted practice as described in a model ordinance produced by the Great Plains Institute and funded by the U.S. Department of Energy for the State of Minnesota[d].

[d] http://www.growsolar.org/wp-content/uploads/2015/04/Minnesota-Toolkit.pdf (accessed 11/29/2017)

Public Hearing
On September 22, 2017, the Planning Commission released city-wide recommendations to amend the zoning code regarding wind energy conversion systems for public review and held a public hearing on Nov. 3, 2017. The recommendations were intended to address where and how wind energy systems would be regulated throughout Saint Paul. Comments were accepted through November 6, 2017 and are attached.

Staff received six written comments during the period of public review, and one person spoke at the public hearing. All of the comments were supportive of the effort to provide use of alternative energy systems, including wind, and six of the comments requested the City to consider solar as a principal use. The seventh comment addressed solar access, particularly in areas where increased density is expected proximate to lower density residential structures. The intent and purpose of the zoning code is, in part, to ensure adequate light. Solar access protection is addressed in the Saint Paul Comprehensive Plan, as required by the Metropolitan Land Use Planning Act.

Committee Recommendation
The Comprehensive Planning Committee recommends that the Planning Commission forward this report and the following amendments to Chapters 63, 65 and 66 of the Zoning Code in order to accommodate hybrid solar/wind-powered light fixtures, wind energy conversion systems, and community solar energy generation facilities as a principal use to the City Council for adoption.

NOTE: Existing language to be deleted is shown by ~~strikeout~~. New language to be added is shown by underlining.

Sec. 63.116. Exterior lighting.

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(d) Hybrid (wind/solar) light fixtures will be placed so as to minimize flicker impacts and shall not exceed 25 feet in height.

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Sec. 65.322. Solar energy generation facility, community.

A solar electric (photovoltaic) facility that provides electric power for off-site uses on the distribution grid, consistent with Minn. Statutes 216B.1641.

Standards and conditions:

(a) An interconnection agreement must be completed with the electric utility in whose service territory the system is located.

(b) Power and communication lines running between banks of solar panels and to nearby electric substations or interconnections with buildings shall be buried underground.

(c) Community solar energy generation facilities shall be subject to height and setback standards that apply to buildings in the district, provided that in residential districts the height standards for accessory solar energy systems in section 65.921 shall apply.

(d) A ground-mount (freestanding) community solar energy generation facility shall require a conditional use permit, the application for which shall include a site plan including landscaping and elevations.

(e) For a facility within five hundred (500) feet of an airport or within the A or B safety zones of an airport, the applicant must complete and provide the results of the Solar Glare Hazard Analysis Tool for the Airport Traffic Control Tower cab and final approach paths, consistent with the Interim Policy, FAA Review of Solar Energy Projects on Federally Obligated Airports, or most recent version adopted by the FAA.

(f) A decommissioning plan shall be required to ensure that facilities are properly removed after their useful life. The plan shall include provisions for removal of all structures and foundations, restoration of soil and vegetation, and ensuring financial resources will be available to fully decommission the facility. Decommissioning of solar panels must occur in the event they are not in use for one (1) year.

Sec. 65.323. ~~65.322.~~ Utility or public service building.

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Sec. 65.925. Wind energy conversion system.

Any device such as a windmill or wind turbine that converts wind energy to electrical energy, and associated facilities including the support structure of the system.

Standards and conditions:

(a) A building-mounted wind energy conversion system shall be subject to the maximum building height specified for the district or a maximum of fifteen (15) feet above the height of the building to which it is attached, whichever is greater. In residential districts the system shall be set back a minimum of ten (10) feet from all exterior walls of the building to which it is attached.

(b) In residential, traditional neighborhood and business districts, a conditional use permit is required for a freestanding wind energy conversion system with a capacity of more than two (2) kilowatts.

(c) In residential, traditional neighborhood and business districts, a freestanding wind energy conversion system with a capacity of more than two (2) kilowatts shall be subject to the following standards and conditions:

(1) Freestanding systems shall not exceed one hundred twenty-five (125) feet in height.

(2) The system shall not be located in a required front or side yard and shall be set back one and one tenth (1.1) times the height of the system from residential buildings.

(3) In residential and traditional neighborhood districts, the system shall be on institutional use property at least one (1) acre in area. In business districts, the zoning lot on which the system is located shall be in an area of contiguous business or industrial zoning at least five (5) acres in area. A maximum of one (1) wind energy conversion system per acre of lot area shall be allowed.

(d) In industrial districts, a freestanding wind energy conversion system shall not exceed one hundred fifty (150) feet in height, shall not be located in a required front or side yard, and shall be set back one and one tenth (1.1) times the height of the system from residential buildings.

(e) Wind energy conversion systems shall conform to the uniform building code, electric code, Minnesota Rules Section 7030 governing noise, and Chapter 293, Noise Regulations. System noise shall not exceed 50 dB(A) at the nearest residential property line. For property within a locally designated heritage preservation site or district, the system shall be subject to review and approval of the heritage preservation commission.

(f) Freestanding systems shall be mounted on a monopole type tower with a non-reflective, subdued finish that does not require guyed wires or any other means to support the tower.

(g) Blade arcs created by a freestanding wind energy conversion system shall have a minimum of thirty (30) feet of clearance over any building or tree within a two hundred (200) foot radius.

(h) Wind energy facilities shall be sited in a manner that minimizes shadowing or flicker impacts. The applicant has the burden of proving that this effect does not have significant adverse impact on adjacent uses.

(i) Electrical equipment shall be housed within an existing building whenever possible. If a new equipment building is necessary, it shall be permitted and regulated as an accessory building.

(j) A decommissioning plan shall be required to ensure that facilities are properly removed after their useful life. The plan shall include provisions for removal of all structures and foundations, and ensuring financial resources will be available to fully decommission the facility. Decommissioning of wind energy conversion systems must occur in the event they are not in use for one (1) year.

(k) An applicant for a building permit for a wind energy conversion system shall provide written certification to the building official from a licensed structural engineer that:

(1) For building-mounted systems, the structure has the structural integrity to carry the weight and wind loads; and

(2) The system is designed not to cause electrical, radio frequency, television and other communication signal interference.

(l) If the applicant plans to connect the system to the electricity grid, written evidence that the electric utility service provider serving the property has been informed of the applicant's intent to install a wind energy conversion system shall also be submitted to the building official.

Sec. 66.221. Principal uses.

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Table 66.221. Principal Uses in Residential Districts

Use	RL	R1-R4	RT1	RT2	RM1	RM2	RM3	Definition (d) Standards (s)
Public Services and Utilities								
Antenna, cellular telephone	P/C	P/C	P/C	P/C	P/C	P/C	P/C	(d), (s)
Municipal building or use	P	P	P	P	P	P	P	(d), (s)
Solar energy generation facility, community	P/C	P/C	P/C	P/C	P/C	P/C	P/C	(d), (s)
Utility or public service building	C	C	C	C	C	C	C	(d), (s)
Yard waste site, municipal	C	C	C	C	C	C	C	(d), (s)

P – Permitted use C – Conditional use requiring a conditional use permit

Notes to table 66.221, principal uses in residential districts:

(d) Definition for the use in Chapter 65, Land Use Definitions and Development Standards.

(s) Standards and conditions for the use in Chapter 65, Land Use Definitions and Development Standards.

Sec. 66.321. Principal uses.

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Table 66.321. Principal Uses in Traditional Neighborhood Districts

Use	T1	T2	T3	T4	Definition (d) Standards (s)
Public Services and Utilities					
Antenna, cellular telephone	P/C	P/C	P/C	P/C	(d), (s)
Municipal building or use	P	P	P	P	(s)
Solar energy generation facility, community	P/C	P/C	P/C	P/C	(d), (s)
Utility or public service building	C	C	C	C	(d), (s)

P – Permitted use C – Conditional use requiring a conditional use permit

Notes to table 66.321, principal uses in traditional neighborhood districts:

(d) Definition for the use in Chapter 65, Land Use Definitions and Development Standards.

(s) Standards and conditions for the use in Chapter 65, Land Use Definitions and Development Standards.

Sec. 66.421. Principal uses.

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Table 66.421. Principal Uses in Business Districts

Use	OS	B1	BC	B2	B3	B4	B5	Definition (d) Standards (s)
Public Services and Utilities								
Antenna, cellular telephone	P/C	P/C	P/C	P/C	P/C	P/C	P/C	(d), (s)
Electric transformer or gas regulator substation		C	C	C	P	P	P	(s)
Municipal building or use	P	P	P	P	P	P	P	(s)
Public utility heating or cooling plant							P	
Solar energy generation facility, community	P/C	P/C	P/C	P/C	P/C	P/C	P/C	(d), (s)
Utility or public service building	C	P	P	P	P	P	P	(d), (s)

P – Permitted use C – Conditional use requiring a conditional use permit

Notes to table 66.421, principal uses in business districts:

(d) Definition for the use in Chapter 65, Land Use Definitions and Development Standards.

(s) Standards and conditions for the use in Chapter 65, Land Use Definitions and Development Standards.

Sec. 66.521. Principal uses.

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Table 66.521. Principal Uses in Industrial Districts

Use	**IT**	**I1**	**I2**	**I3**	Definition (d) Standards (s)
Public Services and Utilities					
…					
Sewage treatment plant			P	P	
Solar energy generation facility, community	P/C	P/C	P/C	P/C	(d), (s)
Utility or public service building or yard	P	P	P	P	(d)
...					

P – Permitted use C – Conditional use requiring a conditional use permit

Notes to table 66.521, principal uses in industrial districts:

(d) Definition for the use in Chapter 65, Land Use Definitions and Development Standards.

(s) Standards and conditions for the use in Chapter 65, Land Use Definitions and Development Standards.

Sec. 66.921. Ford district use table.

Table 66.921, Ford district uses, lists all permitted and conditional uses in the F1-F6 Ford districts, and notes applicable development standards and conditions.

Table 66.921. Ford District Uses

Use	F1	F2	F3	F4	F5	F6	Definition (d) Standards (s)
Public Services and Utilities							
Antenna, cellular telephone	P/C	P/C	P/C	P/C	P/C	P/C	(d), (s)
Electric transformer or gas regulator substation			P	P	P	P	(s)
Municipal building or use		P	P	P	P	P	(s)
Public utility heating or cooling plant		P	P	P	P	P	
Solar energy generation facility, community		P/C	P/C	P/C	P/C	P/C	(d), (s)
Utility or public service building	P	P	P	P	P	P	(d), (s)

P – Permitted use C – Conditional use requiring a conditional use permit

Notes to table 66.921, principal uses in Ford districts:

(d) Definition for the use in Chapter 65, Land Use Definitions and Development Standards.

(s) Standards and conditions for the use in Chapter 65, Land Use Definitions and Development Standards.