

November 28, 2011

TO: Other Houghton Community Council members and Planning Commission

RE: Height Regulation Exemptions for Solar Panel installation (KZC115.60.2.a.4)

At the November 15, 2011 City Council meeting, Planning Director Eric Shields, in answer to a query by a City Council member when public and private views were being discussed during review of the Central Houghton and Lakeview Neighborhood Plan Updates, stated "the City manages view (issues) thru Height Regulations" and that the City "has a practice of being "considerate" with regards to views".

This past weekend I spoke to a couple of Realtors that work the Kirkland market and I paraphrase: "anytime a view is partially blocked, the value of the home is affected".

I feel consideration should be given to the Planning Director's comments and the opinions of "professional" Realtors.

Allowing a 20" Height Exemption on flat roofed structures as an incentive for installation of Solar Panels is excessive in Single-family and Multi-family Zones in the City.....especially when current technology has a system with a LOW profile of 8.37" (see attached materials regarding Sunpower's T5 Solar Roof Tile system and the 'Solar Panel Efficiency' from IBOG.org). The T5 system has an efficiency @ 19% most other solar panel systems are @ 11 – 15% efficiency. Conventional "tilt-racking" solar systems are far more intrusive into space and create more 'visual pollution' from the back side than the low-profile T5 solar tile system designed for area- and weight-constrained spaces). Waiting until an installation creates a situation that causes neighbors to complain about losing value of their home is too late. Isn't it better to require technology be used that is least intrusive and available now.

All neighborhoods in Kirkland will be affected, not just Lakeview or Central Houghton. I've driven streets in Moss Bay, Market, Everest, Norkirk, Juanita and Finn Hill and saw many residences that could have property values affected.....and therefore costing the City of Kirkland property tax revenues when the homeowners request adjustments of the King County Assessor's office for the depreciated value of their homes.....not to mention the bad feelings created in the Neighborhood.

The last 2 pages of my handout show a side-by-side installation that creates a solid visual barrier, and photos from a Seattle Times article from October 30, 2011 that illustrates the "un-intended" consequences of installing solar panels on a homeowner's roof (which HE doesn't see, but which his neighbors would) and his pier (which he sees from his home).....and I ask "would Kirkland think this was "consideration" for the neighbors.

Perhaps Height Regulation Exemptions for Flat Roofed structures should be by Zoning Area:

- Single-family Zones – limit to Best ‘current’ technology or 8.37” (as of 2011)
- Multi-family Zones – limit to no higher than the height of the parapet of the structure
- Industrial or Commercial Zones – limit to 20”

Thank you for allowing me to present what information I have found in my research on Solar Panel installation.

georgine foster

Houghton Community Council member

(recent appointee so a little behind in comment on this proposed change in regulations)

What's a typical solar panel efficiency rating?

Most solar panels are around 11-15% efficient (check out this handy comparison table of [solar panel efficiency](#) to see the differences between brands). The efficiency rating measures what percentage of sunlight hitting a panel gets turned into electricity that you can use. The higher the efficiency, the less surface area you'll need in your solar panels. Although the average percentage may sound a little low, you can easily outfit a typical roof with enough power to cover your energy needs.

What are the most efficient solar panels?

In the lab, scientists have developed solar panels that are 40% efficient, or even slightly more than that. But there's a big difference between the lab and the real world. Manufacturers haven't figured out how to take these experiments and produce economically viable products yet. Waiting for new whiz-bang technology is one of the [Top 5 Solar Myths](#).

Out of the solar panels on the market, [SunPower](#) makes some of the most efficient—one of their models is 19% efficient. They've managed to reach that number by using several techniques, including a reflective coating that can capture more light from an angle. They also offer a line of panels that's 18% efficient. Sanyo, another solar panel manufacturer, offers efficient models as well.

Should I choose the most efficient solar panels available?

High efficiency doesn't mean better, it just means you use less space for the solar array on your roof. Efficiency isn't usually a critical concern unless you have an unusually small space for your solar panels. In that case, you'll probably choose to spend a little more for higher efficient panels.

In [1BOG's solar campaigns](#), the installers we work with usually offer a choice of different recommended panels, including a more efficient type of panel for people concerned about space. If you have a normal amount of roof space to work with, you can focus more on the price and annual expected kilowatt production of your panels. Your installer will be experienced in choosing the best solar panels for your particular conditions; for example, if you live in a hot climate, some solar panels will be better for you.

Getting the best power performance

In addition to efficiency and size, there are other factors that affect how much power your solar panels will create. It's important to make sure that the panels are installed in the optimal position, which is why you want to find a skilled, experienced installer (like the ones we select at 1BOG for our campaigns). Your installer will decide on the correct orientation for your panels based on the direction and angle of your roof and issues with shading. They'll also make sure the panels are installed with the proper amount of airflow so they can stay cool—solar panels don't like it hot, and will produce more power if they're the right temperature. To learn more, check out this article on [how solar panels work](#).

If you just go to the Big Box store and slap on a bunch of panels, you could waste a lot of money. A quality installer designs a system and considers many factors in order to get the most electricity out of every inch of your solar panels.

georgine foster

From: "SunPower - Customer Service" <crmadmin@sunpowercorp.com>
To: [REDACTED]
Sent: Monday, October 31, 2011 3:11 PM
Attach: SunPower 225 Solar Panel.pdf; SunPower 230 Solar Panel.pdf; SunPower 240 Solar Panel.pdf; SunPower 320 Solar Panel.pdf; T5 Solar Roof Tile.pdf; T10 Solar Roof Tile.pdf
Subject: SunPower - The Most Powerful Solar: Acknowledgement Email

1-800-SUNPOWER

Hello Ms. Foster,

I enjoyed speaking to you today and thank you for your interest with SunPower - The Planet's Most Powerful Solar!

SunPower holds the world record for solar efficiency which means **Highest Energy Return** and **Fastest Energy PayBack** compared to conventional panels. The World record is confirmed by the National Renewable Energy Lab (NREL) of the U.S. Department of Energy. In fact, The U.S. Department of Energy is one of the Major Companies that turned to SunPower.

SunPower's best technology. More Light = More Energy.

- No front gridlines so there is nothing to block the light.
- Backside mirror reflects light back to the cell.
- Captures more sunlight in low-light conditions.
- Performs better in high and low temperatures.
- SunPower Systems require significantly less roof space.
- SunPower performs better year after year!

SunPower's industry leading warranty, 10-year guarantee on workmanship and our 25-year guarantee on performance, your system will be protected for years to come. SunPower Warranty.

Largest SunPower dealer network. Dealer Locator

If you would like to know more about our SunPower Products & Services you may check our website www.sunpowercorp.com.

For financing www.financing.sunpowercorp.com and for State and Local Rebates www.dsireusa.org.

I have attached PDF Data Sheets of the SunPower Solar Panels on this email for your reference.

Thank you for your time. My name is John and I'll be available if you have any other questions.

Best Regards,

John
SunPower Customer Care Team
www.sunpowercorp.com

Electrical Data

Measured at Standard Test Conditions (STC): Irradiance 1000W/m², AM 1.5, and cell temperature 25° C

Peak Power *	P _{max}	320 W (+5/-3%)	327 W (+5/-3%)
Rated Voltage	V _{mpp}	54.7 V	54.7 V
Rated Current	I _{mpp}	5.86 A	5.98 A
Open Circuit Voltage	V _{oc}	64.8 V	64.9 V
Short Circuit Current	I _{sc}	6.24 A	6.46 A
Maximum System Voltage	UL	600 V	
Temperature Coefficients	Power	-0.38% / K	
	Voltage (V _{oc}) Current (I _{sc})	-176.6 mV / K 3.5 mA / K	
NOCT		45° C +/- 2° C	
Series Fuse Rating		20 A	

Tested Operating Conditions

Temperature	-40° F to +185° F (-40° C to +85° C)
Max load	50 psf 245kg/m ² (2400 Pa) front and back – e.g. wind
Impact Resistance	Hail 1 in (25 mm) at 52mph (23 m/s)

*Other laminates may be available upon request

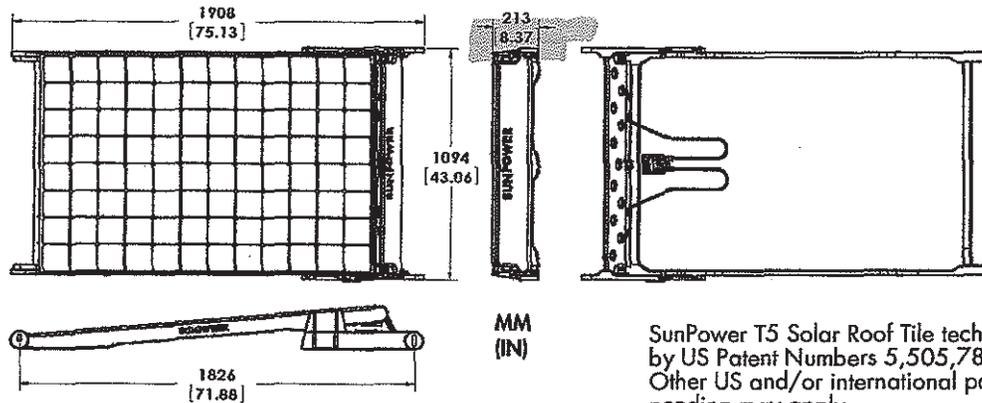
Mechanical Data

Solar Laminate	SunPower™ 320 Solar Laminate, or SunPower 327 Solar Laminate	Attachment 10
Solar Cells	96 SunPower all-back contact monocrystalline	
Front Glass	SunPower 320 Solar Laminate: High transmission tempered glass with anti-reflective (AR) coating SunPower 327 Solar Laminate: High transmission tempered glass with anti-reflective (AR) coating	
Junction Box	IP-65 rated with 3 bypass diodes, 32 x 155 x 128 (mm)	
Output Cables	1000 mm length cables / MultiContact (MC4) connectors	
Frame	Polymer material with fiber reinforcement, PPE+PS	
Tile Weight	47 lbs (21.3 kg)	
Roof Coverage	85% N-S	

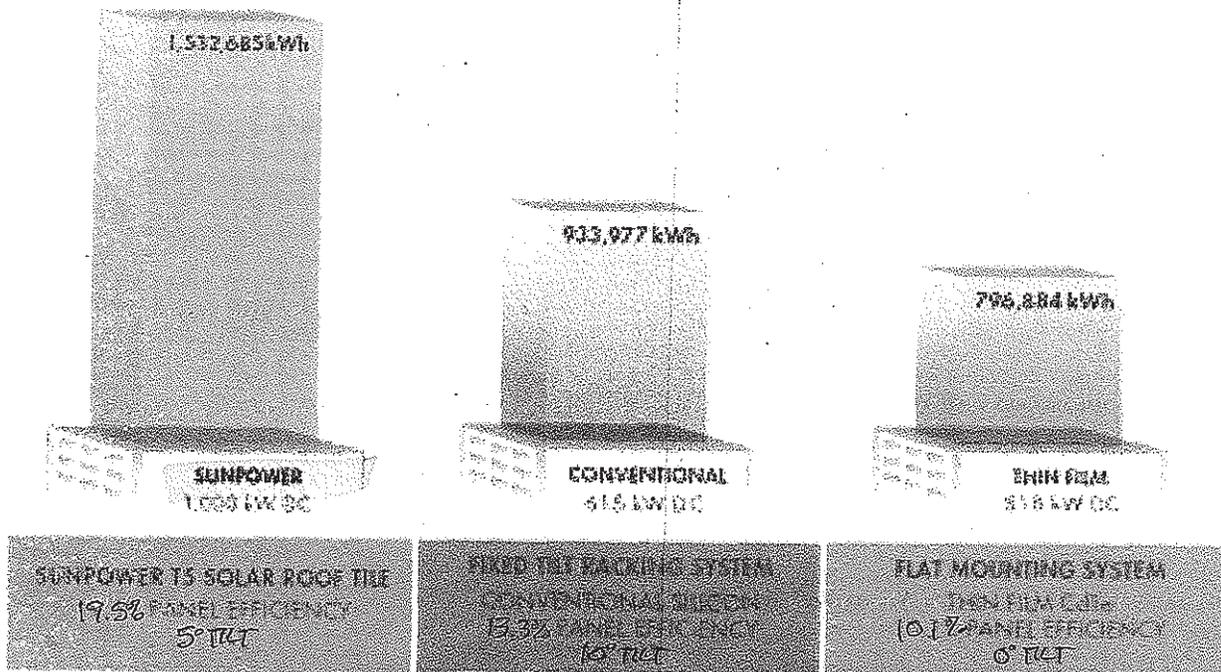
Warranties and Certifications

Warranty	25-year limited power warranty 10-year limited product warranty
Certifications	CSA listed (Tested to UL 1703), Class C Fire Rating
Built in the USA. Complies with the "Buy American" clause of The American Recovery and Reinvestment Act of 2009.	

Dimensions



SunPower T5 Solar Roof Tile technology is protected by US Patent Numbers 5,505,788 and RE 38,988. Other US and/or international patents issued or pending may apply.



BENEFITS

The Most Energy per Rooftop

Produces more energy in an area- or weight-constrained space than any other roof system available today

Easy to Install with All-In-One Design

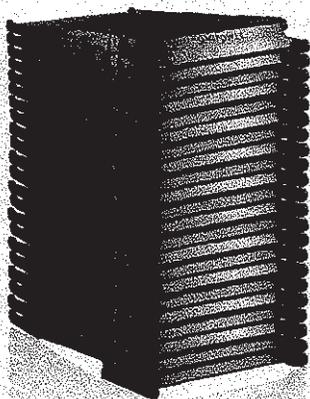
Solar panel, frame, and mounting system are integrated into one unit. No grounding or roof penetration needed

Roof-Preserving

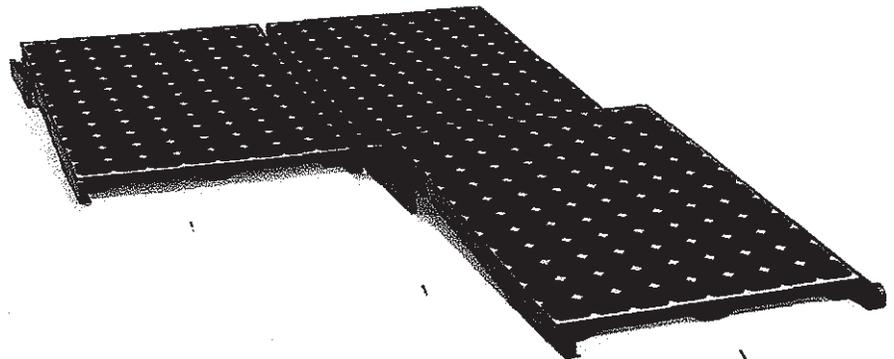
Compatible with all roof membranes. Smooth, lightweight design, combined with a non-penetrating installation, protects the roof and preserves roof warranties

Long Lasting Durability

Aerodynamic design is resistant to high winds. Strong glass-filled polymer material offers long-term durability. Soiling is minimized with easy water runoff



ships nested in pallets



The SunPower™ T5 Solar Roof Tile is the most powerful solution for area- or weight-constrained flat rooftops. The T5 is the first photovoltaic roof product to combine solar panel, frame, and mounting system into a single pre-engineered unit. The nonpenetrating tiles position SunPower highest efficiency solar panels at a 5-degree tilt, for greatest energy production.

Tiles interlock for secure, rapid installation and maximum power output. Smooth-edged, durable and lightweight polymer material designed for a 30-year life protects the roof and eliminates the need for electrical grounding. The patented design resists high winds and corrosion and is flexible to adapt to virtually any flat or low-slope roof.

HIGHLIGHTS

Solar Laminates	320	327
Peak Watts / ft ² (m ²) [array]	15.50 (167)	15.84 (171)
Array Base, Weight, lbs/ft ² (kg/m ²)	2.18 (10.64)	
Wind Resistance, mph (kph)	120 (193)	

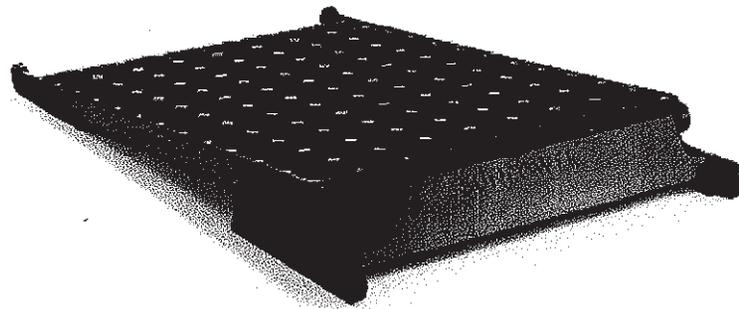
About SunPower

SunPower designs, manufactures and delivers high-performance solar electric technology worldwide. Our high-efficiency solar cells generate up to 50% more power than conventional solar cells. Our high-performance solar panels, roof tiles and trackers deliver significantly more energy than competing systems.

SunPower® T5 Solar Roof Tiles

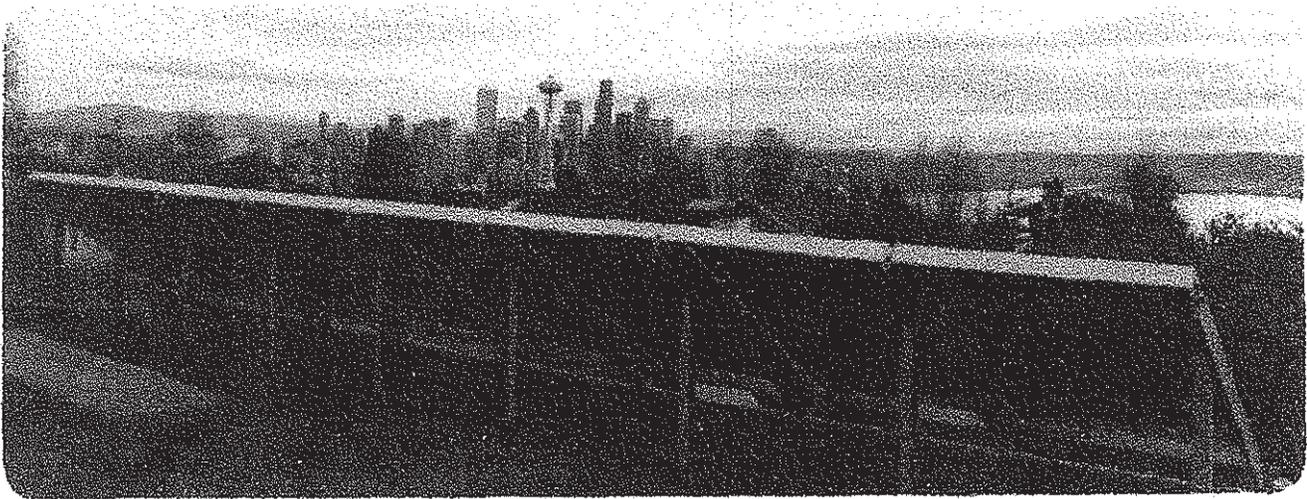
Greatest Solar Energy Output

The SunPower T5 roof tile is the world's first photovoltaic (PV) roof product to combine the solar panel, frame, and mounting system into a single pre-engineered unit. Each Non-penetrating T5 roof tile positions the highest efficiency SunPower solar panels at a 5-degree tilt for greatest energy production, making the T5 the most powerful SunPower solution for area-constrained or weight-constrained flat rooftops.

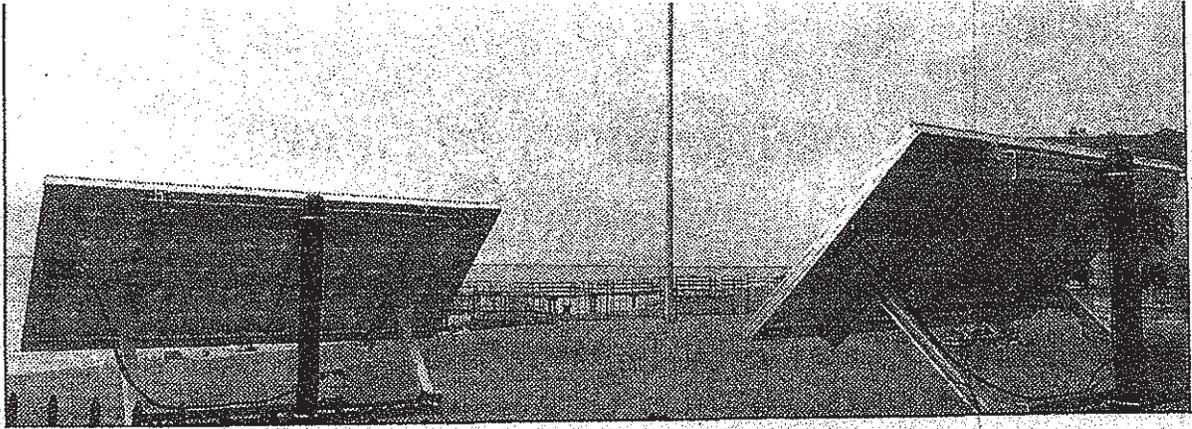


Simple Installation

The T5 Solar Roof Tiles interlock for secure, rapid installation and maximum power output. Smooth-edged, durable and lightweight polymer material designed for a 30-year life protects the roof and eliminates the need for electrical grounding. The patented design resists high winds and corrosion and is flexible to adapt to virtually any flat or low-slope roof.



SIDE TO SIDE INSTALLATION -
SOLID VISUAL BARRIER



Here are solar panels and a wind turbine used by Buzard to augment the electrical needs of his home.

HOME OWNER'S ROOF ↑



Solar panels installed on the roof on a pier help supply power to Buzard's home.

HOME OWNER'S VIEW ↑

WOULD KIRKLAND THINK THIS TO BE
"CONSIDERATE" OF NEIGHBORS ?

January 4, 2012 R

RE: Green Codes Project File ZON10-00031
 Zoning Code Chapter 115.60.2.a.4
 Height Regulations – Exemptions

Kirkland does not need to sacrifice adjacent neighbor's views (and property values) to achieve good "green" solar incentives. As Eric Shields mentioned, "Kirkland manages views thru Height Regulations" and "being considerate"(of neighbors, I assume). We should not alter the citywide Height Regulations, to which ALL neighborhoods have developed and rely on to maintain the neighborhoods' character. As a City Council member told me (and I paraphrase): it is better to get it right the first time rather than having to invoke "emergency" changes to the Code to address any un-intended and un-foreseen consequences.....we've done that enough.

Recent studies tell us that variations in tilt and orientation have far less impact on overall solar energy system efficiency than previously espoused. In fact, overall system efficiency stays within surprisingly narrow ranges as tilt angle stray from the theoretical "design ideal". According to an MIT calculator at <http://ocw.mit.edu/ans7870/SP/SP.769/f04/java/pvapplet/PVPanel.html>, the diminishing returns on lower angle tilt from the 30 to 32 degree optimum for the Seattle latitude, the losses at 15 degree tilt is 3.63%; at 20 degree tilt is 2.0%; and at 25 degree tilt (as Harvest House remodel on 108th is angled) a loss of .77% efficiency. (Jon Lange of Sunergy Systems of Ballard, a resource used by the planning staff, confirms this information). A smaller tilt is not a significant issue. So lower profile solar energy solutions are very feasible.

An article in Solar Daily dated December 15, 2011, "Breakthrough design (by Solar3D) will produce conversion efficiency far in excess of current solar technology" --- New solar cell design projects the conversion efficiency to be in excess of 25% (not the currently common 11-15% average efficiency) and "a high efficiency solar cell manufactured with LOW cost silicon could result in the LOWEST cost per watt in the industry". Solar energy development is moving at a fast pace. (see article attached.)

A product produced by Global Solar (PowerFLEX BIPV 300W) is a high efficiency CIGS solar module with a rating @ 12.6%, AND lies FLAT on the roof., has excellent LOW light performance and lower installation costs (when indirect project costs are divided by the total array, PowerFlex's higher power density can result in a comparative savings advantage of up to 50% vs. other Technologies - see attached documentation for this product).

With the development of more efficient solar cells, such as by Solar3D, higher efficient panels can be installed at a lower angle and still be more efficient in energy production than current glass solar panels. The company Mounting Systems, Inc only manufactures mounting systems 'to-fit' any solar panels dimensions at a standard of 15 degree pitch and a profile height of under 11". So when used in conjunction with a 20-25% efficiency rated panel, the loss of efficiency still leaves a higher rating than currently available with conventionally racked panels at 30-32 degrees.

(see attached information & photo on Mounting Systems, Inc)

After conducting this additional research, I would like to amend my suggestion for maximum allowable Height Regulation Exemptions for FLAT ROOF structures that I presented at the November 28, 2011 meeting to:

- Single-family Zones – when adjacent neighbors’ views are affected – limit to 10” (subject to even Lower height Profiles when readily available industry-wide). If no neighbors views are affected – 20” exemption (as proposed by staff)
- Multi-family Zones – limit to no higher than the height of the parapet of the structure
- Industrial or Commercial Zones – limit to 20” exemption.

In conclusion, any proposed solar energy system that exceeds the maximum allowed height in a zoning district should be subject to a process that provides the owners of neighboring properties an opportunity for the impacts to their property to be considered. This might take the form of a variance request, or an administrative conditional approval process. In either process, neighboring properties should be notified and given adequate time to document the impacts on their property from the solar energy system construction.

Thank you for your consideration.

georgine foster
a member of the HCC but expressing my own views

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Breakthrough design will produce conversion efficiency far in excess of current solar technology

by Staff Writers Santa Barbara CA (SPX) Dec 15, 2011

Solar3D has announced the results of a simulated test of its new solar cell design that projects the conversion efficiency to be in excess of 25%. The test results indicate that the company's innovative design will produce conversion efficiency far in excess of current solar technology.

"We are very encouraged by these test results," said Jim Nelson, President and CEO of Solar3D.

"We are now evaluating various methods of fabricating a prototype. If the results of our tests hold up in fabrication, as we expect, then our product's performance will be among the very highest conversion efficiencies achieved by silicon solar cells."

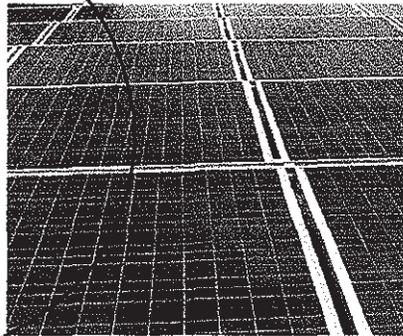
After completion of its prototype, the company's management plans to seek a manufacturing partner that will participate in bringing its 3-dimensional solar cell to market. Likely manufacturing partners include some of the world's largest semiconductor manufacturers.

Nelson continued, "These test results are very exciting and give us a great deal of confidence in the development path we have chosen. We think that our novel 3-dimensional solar cell has the potential to dramatically change the economics of solar power. A high efficiency solar cell manufactured with low cost silicon could result in the lowest cost per watt in the industry."

"Increasing conversion efficiency and reducing manufacturing costs will ultimately drive solar to economic parity with the low cost alternatives," said Nelson.

"With the increased efficiency that comes from our new design, we take a giant step in that direction."

Related Links



File image.

Solar Cells Blowout Sale

Solar Cells Up To 53% Off 2011 Holiday Season Sale Has Begun!

Solar Panels Systems

Looking For Solar Panels Systems? Find Expert Tips Online Now!

2012 GMC Sierra

View Specs, Photos & Offers for the GMC Sierra at the Official Site.

There's safety in numbers.

Volkswagen has more 2011 IIHS Top Safety Picks, including the all-new Passat, than any other brand.



AdChoices

low cost

POWER the Possibilities

SEARCH



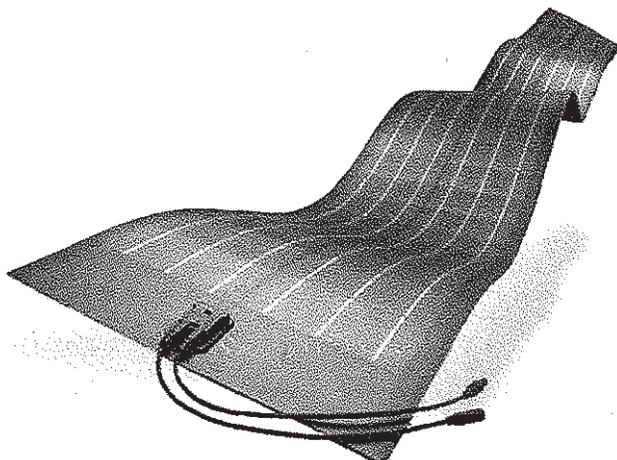
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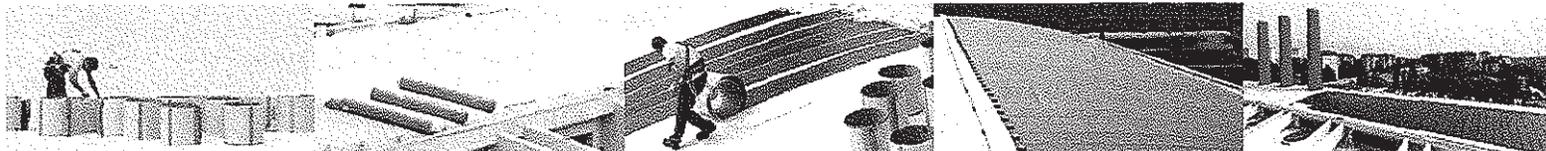
Featuring PowerFLEX Technology™

PowerFLEX™ BIPV 300W

Applications include metal roofs, synthetic membranes, and Bitumen membranes.

PowerFLEX™ BIPV. Global Solar's high efficiency CIGS solar modules are designed for rooftops. The flexible module fits all roof shapes, is lightweight, and requires no roof perforations or mounting hardware. We increase the value of each rooftop through improved roof surface coverage, high efficiency, and excellent low light performance.

- » [Download our data sheet](#)
- » [Download our brochure](#)
- » [See sample installations](#)



Designed specifically for roofs

Integrates with roof surface

- » No mounting hardware
- » No roof penetrations
- » No additional wind load

Flexible module

- » Flexible module
- » Durable, non-breakable

Lightweight

- » 3.5 kg / m² (0.71 lb / ft²) with adhesive
- » No structural reinforcement required

More energy per roof

High efficiency CIGS

- » 10.5% to 12.6% aperture efficiency
- » 50% more efficient than flexible a-Si

High performance

- » Performs in all light conditions
- » Shade tolerant

Covers entire roof area

- » Lays flat. No tilt required
- » No module spacing required
- » Conforms to roof shape

Lower installed system costs

Large format module

- » 250-300 Watt
- » 5.74m x 0.5m dimensions
- » 30 to 40% BOS & Installation cost savings

How PowerFLEX Compares with a-Si and c-Si based on 1000 m² in Munich, Germany

CHARACTERISTICS	MODULE	ANNUAL PRODUCTION
	PowerFLEX	Flexible Lightweight No rack or structural reinforcement required Flat Low Wind Uplift
		300 Watts 3.5 kg / m²
		81.5 kW (DC) 67,400 kWh (AC)
	a-Si	Flexible Lightweight No rack or structural reinforcement required Flat Low Wind Uplift
		144 Watts 3.5 kg / m ²
		44.4 kW (DC) 42,300 kWh (AC)
	c-Si	Rigid Glass Heavy Rack and structural reinforcement required Fixed Tilt High Wind Uplift
		235 Watts 20 - 50 kg / m ²
		33.6 kW (DC) 34,600 kWh (AC)

Lower installation costs per watt

DIRECT COSTS

BOS | Installation Labor | Mounting Racks

When direct project costs are divided by its 300-Watt module rating, the PowerFLEX system offers a cost advantage of up to 40% vs other technologies.

INDIRECT COSTS

Permits | Engineering & Design | Overhead

When indirect project costs are divided by the total array power, PowerFLEX's higher power density can result in a comparative savings advantage of up to 50% vs other technologies.

[SYSTEM REQUIREMENTS](#) [FREQUENTLY ASKED QUESTIONS \[FAQ\]](#) [NEXT PAGE](#)

In the news

Global Solar Energy Forges Strategic Partnerships to Bring PowerFLEX™ BIPV to U.S. Rooftops

Thursday, 13 October 2011 17:00



[Come see us](#)

[Find us at the next trade show](#)

Feed-in Tariff Bonus for Global Solar Modules "Made in the EU"

Monday, 10 October 2011 10:00



[Innovation](#)

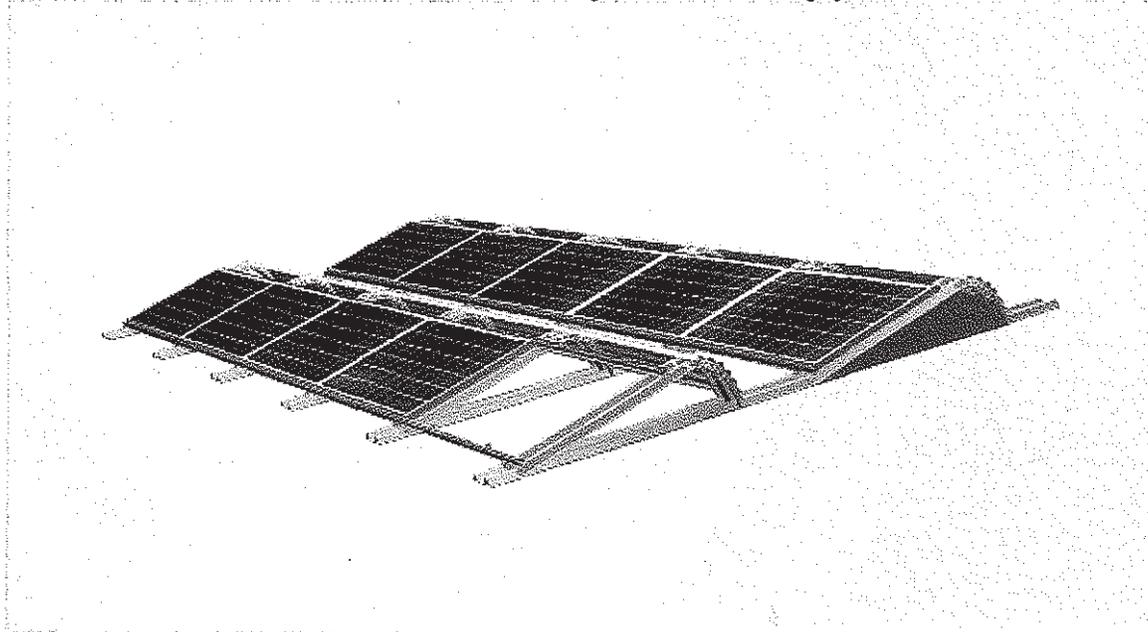
[See how we partner with industry leaders to develop new solar applications](#)

Global Solar Energy Secures New Partnerships

Monday, 03 October 2011 17:00

- Products
- Company
- References
- Services
- Career
- Contact

Mounting Systems, Inc. > Products > Flat roof > Lambda Light - Flat roof mounting system for PV installations



Lambda Light Flat roof

Flat roof wizardry

- Versatile, easily ballasted flat roof for framed modules
- standard with 15° pitch of the modules (other on request)
- Individual planning and project support for specific requirements on flat roofs
- Rapid installation with high levels of pre-fitting and

pre-assembly



keywords

Lambda Light documentation



Product data sheet (pdf) EN
 Technical planning aid (pdf) EN

Client login

Username

Password

Remember me

Lost Password?



Mounting Systems, Inc. | 820 Riverside Parkway | West Sacramento, CA 95605

Hello Ms. Foster

I thought I would prepare this for you regarding our conversation we had on the phone.

First your question about power vs. angle, I wanted to give you an idea of how angle will affect the power captured by the panels. Houghton is fairly far north so the optimum angle would be nearly 45 degrees. Because of wind loads vs. diminishing returns on angle normally solar mounts max out at 30 degrees. I chose 30 degrees as my baseline.

Angle	0°	5°	10°	15°	20°	25°	30°
Losses	10.89%	8.25%	5.75%	3.63%	2.00%	0.77%	0.00%

These numbers are based off of a calculator MIT provides.

<http://ocw.mit.edu/ans7870/SP/SP.769/f04/java/pvapplet/PVPanel.html>

It uses measured data from Portland Oregon based on the solar angle and average weather patterns. It is as close as the app allows me to get to Houghton WA. I have attached a spread sheet where it will do calculations on the angles you choose. Looking at the data I would say 15 degrees is the sweet spot of height vs. efficiency and all our systems can do it in less than 16 inches.

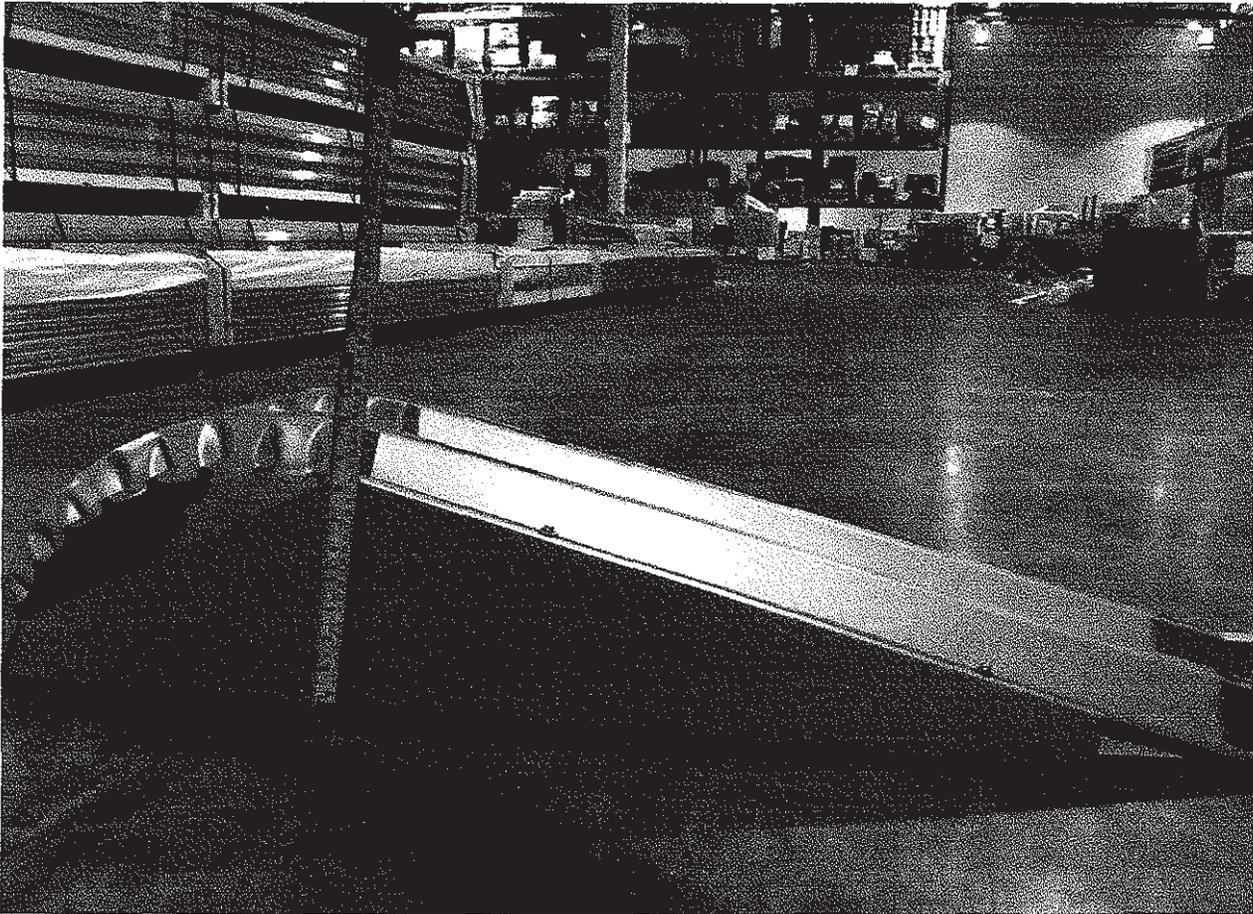
The 2nd is on pricing of our systems. I don't want to give you exact USD prices because it may be more helpful to talk about relative pricing. Our prices are very competitive, so if System 1 cost 20% more than System 2, it would be ok to assume a similar system 1 from our competitors is 20% more than our competitors' version of system 2.

Lambda Light ----

The Lambda Light system we offer is mostly for larger commercial buildings. It is for instances where they do not want to drill holes into the supporting structure of the roof. We often recommend to put a piece of rubber we supply to prevent damage of the roof. So it is safe to say that the Lambda Light is less than 12 inches, the panels will add another 2 inches (roughly 14 inches total). We'll use the Lambda Lights pricing as a baseline. So it is 100% of the baseline cost. The Lambda light is a ballasted system, so instead of using bolts to anchor it to the roof we use concrete stepping stones. I am not including the price of these stones because we do not sell them.



LAMBDA LIGHT ↓



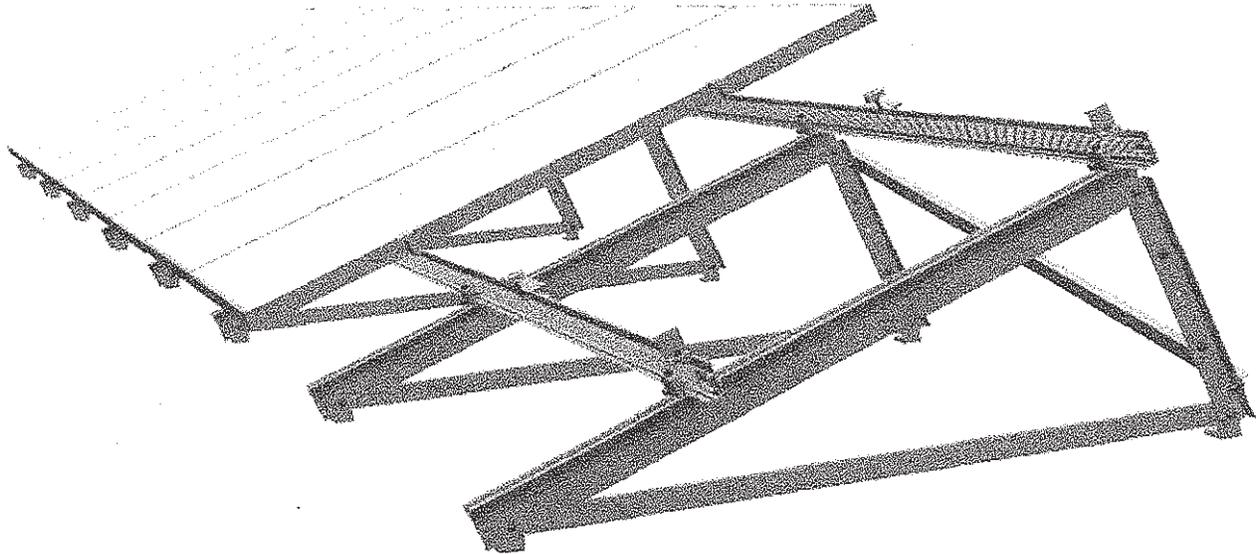
Lambda— (PHOTO ON NEXT PAGE)

The Lambda is for cases when the customer allows us to penetrate their roof. Cost wise it is 52% of the Lambda light baseline, nearly half the cost. It is not as pretty in the rear but can boast a similar height (in landscape orientation) as the Lambda Light.



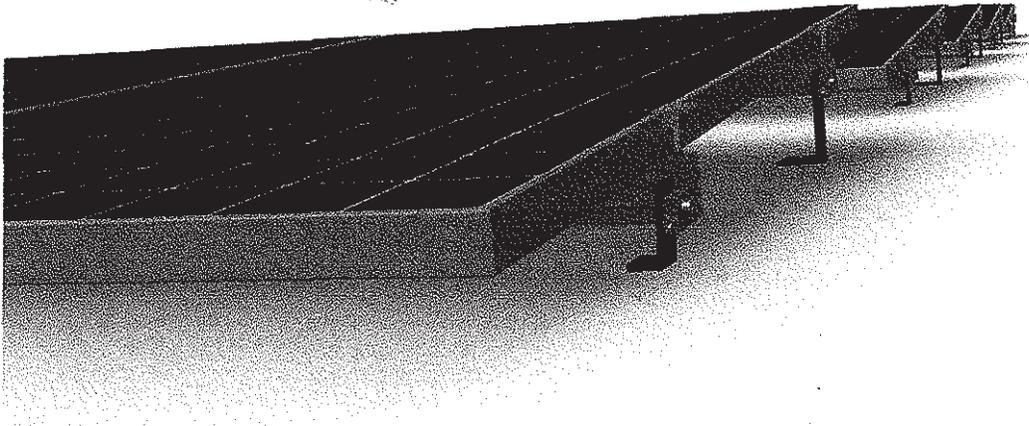
mounting
systems

LAMBDA

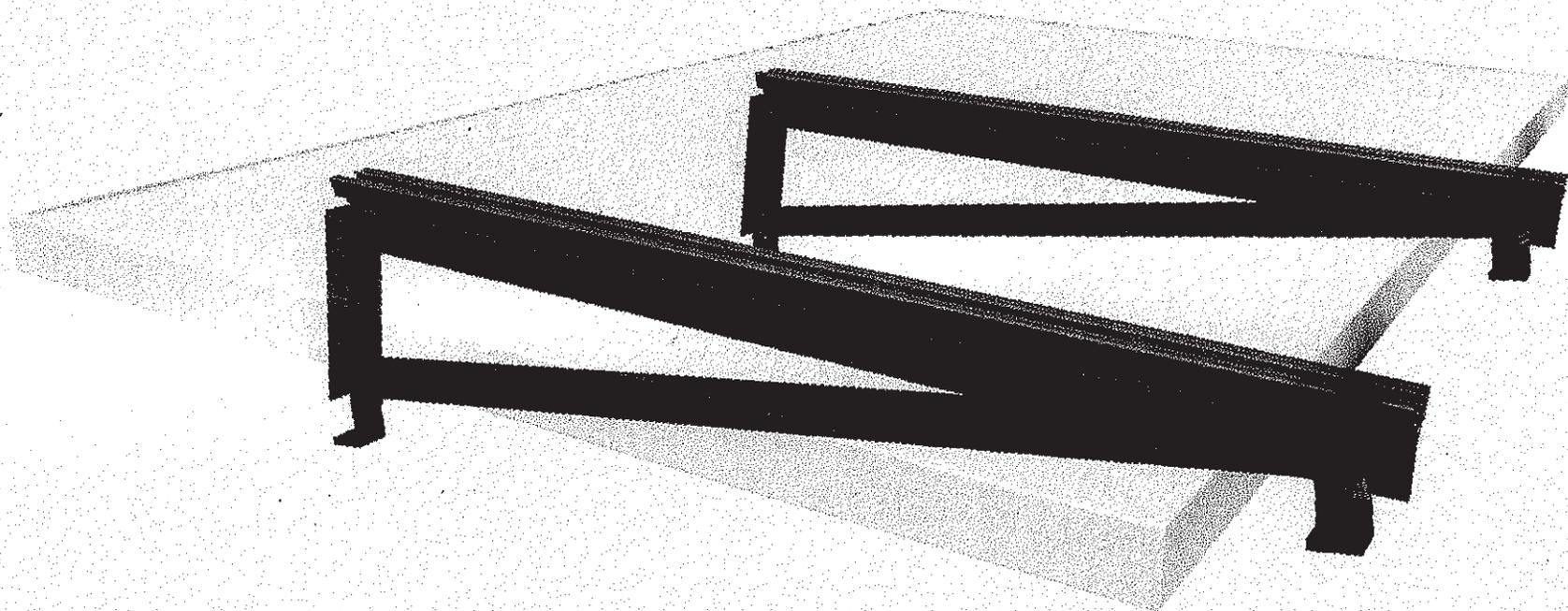


Alpha —

The Alpha is our flat roof system. But it is possible to put it at an angle of 0-10 degrees. The Alpha costs 30% of baseline cost. For mounting 25 panels (5 rows of 5) I would expect to pay near \$1000. This system is the most cost effective and has the lowest profile, from 0-10 degrees. Like the Lambda it requires penetrating the roof.



Thank You,
Wayne Boissicat (W.Boissicat@Mounting-Systems.us)
Technical Sales
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Solar Panel Comparison Table

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Show/Hide Columns

Manufacturer / ID / Rating / PTC Rating / Power Temp Coef. / Density / Efficiency / Tier

Show 100 entries
Search:

Manufacturer	ID	Rating	Density	Efficiency	Tier
SunPower	T5-SPR-318E	318	16.68	19.50	1
SunPower	SPR-415E-WHT-D	415	16.55	19.20	1
SunPower	PL-SUNP-SPR-315E	315	16.52	19.31	1
SunPower	SPR-315E-WHT-D	315	16.52	19.31	1
SunPower	SPR-315E-WHT-U	315	16.52	19.31	1
SunPower	SPR-315NE-WHT-D	315	16.52	19.31	1
SunPower	T5-SPR-315	315	16.52	19.31	1
SunPower	T5-SPR-315E	315	16.52	19.31	1
SunPower	SPR-410NE-WHT-D	410	16.35	18.96	1
SunPower	SPR-240E-WHT-D	240	16.34	19.29	1
SunPower	SPR-240E-WHT-U-ACPV	240	16.34	19.29	1
SunPower	PL-SUNP-SPR-310	310	16.25	19.01	1
SunPower	SPR-310E-WHT-D	310	16.25	19.01	1

TS SOLAR TILE SYSTEM @ 5°
ANGLE/TILT

		WATT		MODULE EFFICIENCY	
Sanyo Electric	HIT-N220A01	220	15.23	17.64	1
SunPower	PL-SUNP-SPR-290	290	15.17	17.78	1
SunPower	SPR-290-WHT-U	290	15.17	17.78	1
SunPower	T5-SPR-290	290	15.17	17.78	1
SunPower	SPR-220-WHT-U	220	14.95	17.68	1
Sanyo Electric	HIP-200BA19	200	14.89	17.24	1
Sanyo Electric	HIP-200BA20	200	14.89	17.24	1
Sanyo Electric	HIP-215NKHA1	215	14.87	17.24	1
Sanyo Electric	HIP-215NKHA5	215	14.87	17.24	1
Sanyo Electric	HIP-215NKHA6	215	14.87	17.24	1
Sanyo Electric 72 cells	HIT-N215A01	215	14.87	17.24	1
Znshine PV-Tech	ZX290W(36)P	290	14.85	17.72	1
SunPower	PL-SUNP-SPR-215	215	14.81	17.28	1
SunPower	SPR-215-WHT-U	215	14.81	17.28	1
SunPower	SPR-220-BLK-U	220	14.80	17.68	1
SunPower	SPR-217-WHT-U	217	14.74	17.44	1
Sanyo Electric	HIP-205BA3	205	14.59	17.39	1
SunPower	PL-PLT-63L-BLK-U	63	14.58	17.95	1
Sanyo Electric	HIP-200BA3	200	14.54	16.96	1
Sanyo Electric	HIP-210NKHA1	210	14.52	16.84	1
Sanyo Electric	HIP-210NKHA5	210	14.52	16.84	1
Sanyo Electric	HIP-210NKHA6	210	14.52	16.84	1
Sanyo Electric	HIT-N210A01	210	14.52	16.84	1
Sanyo Electric	HIP-195BA19	195	14.50	16.81	1
Sanyo Electric	HIP-195BA20	195	14.50	16.81	1
SunPower	SPR-210-WHT-U	210	14.45	16.88	1
Mitsubishi Electric	PV-MLU260HC	260	14.29	17.02	1
Sanyo Electric	HIP-200DA3	200	14.26	16.49	1
Sanyo Electric	HIP-195BA3	195	14.17	16.54	1
Sanyo Electric	HIP-205NKHA1	205	14.17	16.44	1
Sanyo Electric	HIP-205NKHA5	205	14.17	16.44	1
Sanyo Electric	HIP-205NKHA6	205	14.17	16.44	1
Sanyo Electric	HIT-N205A01	205	14.17	16.44	1
Sanyo Electric	HIP-190BA19	190	14.13	16.38	1
Sanyo Electric	HIP-190BA20	190	14.13	16.38	1
SunPower	SPR-208-WHT-U	208	14.11	16.72	1

DIMENSIONS
31.4 x 62.2

Manufacturer	Model	W	STC Rating	PTC Rating	Tier
SunPower	SPR-210-BLK-U	210	14.11	16.88	1
Suntech Power	PLUTO210-Ada	210	14.04	16.44	1
Suntech Power	PLUTO210-Ade	210	14.04	16.44	1
Mitsubishi Electric	PV-MLU255HC	255	14.01	16.69	1
Suntech Power	PLUTO210-Adb	210	13.98	16.44	1
Suntech Power	PLUTO210-Adf	210	13.98	16.44	1
Sanyo Electric	HIP-195DA3	195	13.90	16.08	1
Upsolar	UP-M270P	270	13.88	16.76	1
Ningxia Yinxing Energy Photovoltaic Equipment Manufacturing	YXGF-210M72	210	13.84	16.44	1
Sanyo Electric	HIP-186BA19	186	13.82	16.03	1
Sanyo Electric	HIP-186BA20	186	13.82	16.03	1
Sanyo Electric	HIP-200NKHA1	200	13.81	16.04	1
Sanyo Electric	HIP-200NKHA5	200	13.81	16.04	1
Sanyo Electric	HIP-200NKHA6	200	13.81	16.04	1
Sanyo Electric	HIT-N200A01	200	13.81	16.04	1
ET Solar Industry	ET-M572185	185	13.79	16.61	1
ET Solar Industry	ET-M572185WWZ	185	13.79	16.61	1
SunPower	SPR-205-BLK-U	205	13.76	16.48	1
Cuquantum Solar	SUNPORT 275P	275	13.74	16.37	1
Mitsubishi Electric	PV-MLU250HC	250	13.73	16.36	1
Juli New Energy	JLS215P	215	13.72	16.84	1
Suntech Power	PLUTO205-Ada	205	13.70	16.05	1
Suntech Power	PLUTO205-Ade	205	13.70	16.05	1

EFFICIENCY

Asst
S105
40x60

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Definitions:

Manufacturer = Solar Company; Brand

ID = Specific solar module identification code; module name

Rating (W) = STC (Standard Testing Conditions) Rating; nameplate rating under laboratory conditions

PTC Rating (W) = PTC (PVUSA Testing Conditions) Rating; rating under more realistic outdoor conditions

Power Temp Coef. (% / degree C) = Power Temp Coefficient; output change per degree Celsius from STC rating at 25 degrees Celsius; output loss at hotter temperatures, or gain at colder temperatures

Density (W) = Efficiency per area; realistic output per area, the higher the more output in a given area

Efficiency (%) = Output per input light irradiance using STC; energy conversion efficiency; module efficiency

Tier = Solar Panel Efficiency Tier. 1 is highest, 5 is lowest

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Two great questions many people ask about solar panels are: “Which panels have the highest efficiency?” and, “Which solar PV panels are the best?”

This solar power panel comparison chart below compares the density and module efficiency ([huh?](http://sroeco.com/solar/solar-efficiency-basics) (<http://sroeco.com/solar/solar-efficiency-basics>)) of the most popular 200 W solar panels. All of the modules on this chart are label rated at 200 Watts, which means in strict laboratory conditions, they produce the same output. However, I have compared them based on their PTC ratings which is the rating given under realistic test conditions. Sanyo, SunPower, Canadian Solar, Suntech, Trina, Kyocera, Schuco, BP, Yingli and Sharp are **common solar panel** (<http://sroeco.com/solar/most-popular-solar-panel-brands>) manufacturers used by installers in the US.

(Updated 12.11.2011)

[\(<http://sroeco.com/solar/solar-panel-efficiency-tiers>\)](http://sroeco.com/solar/solar-panel-efficiency-tiers)

Of the highest output panels, **both Sanyo and SunPower panels have the highest efficiency per surface area** in real world conditions. Given a limited roof area with which to install solar panels, these panels are the best choice to produce the most electric output per square foot. However, this doesn't mean that these panels will always be the best choice. Well, how should you choose solar

SunPower® Residential Solar Panels

It's a fact: Residential solar panels from SunPower produce the most energy of all solar panels on the market. Because SunPower home solar panels are so efficient, you can make the most of your roof space to produce significantly more electricity. What does this mean for you? Highly efficient solar panels from SunPower generate more energy over the lifetime of your system than other panels. Which means that over the lifetime of your system, you'll generate more electricity and save more money on your electric bills.

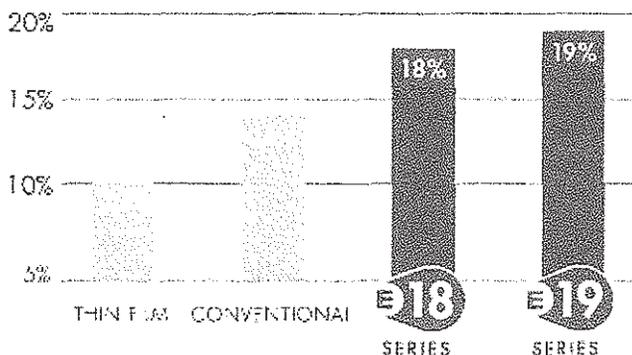


Solar Elegance

Not only are SunPower solar panels the most powerful and efficient on the market, they're also the best-looking.

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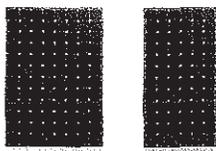
SUNPOWER'S HIGH EFFICIENCY ADVANTAGE



Highest Efficiency Solar

Compared to other solar panels, SunPower converts the greatest percentage of sunlight into electricity. SunPower solar panels deliver up to 50 percent more energy than conventional panels. We've integrated our revolutionary, patented SunPower® Maxeon™ solar cell technology into two solar panel series, to provide you with the right solution for your needs, with 18% or 19% efficiency.

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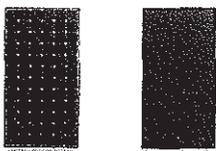
SunPower E19 Series Solar Panels

SunPower E19 Series solar panels deliver maximum electricity over the lifetime of your system. The E19 Series integrates SunPower Maxeon™ solar cell technology with our larger high efficiency solar cells, so we can fit more square silicon cells onto the panel. The E19 Series panels also include a patented, anti-reflective coating to increase sunlight absorption. So instead of reflecting it back, we capture more light to generate even more solar electricity.

[SunPower E19 / 320 Residential Solar Panel \(PDF\)](#)
[SunPower E19 / 240 Residential Solar Panel \(PDF\)](#)

96 CELLS — 41.2 x 61.4 ≈ 19.6% EFF.
 72 CELLS — 31.4 x 61.4 ≈ 19.3% EFF.

[Less](#)



SunPower E18 Series Solar Panels

SunPower E18 Series solar panels deliver high efficiency solar technology for reliable solar power. If you're looking for the ultimate in solar elegance, this series offers you our SunPower Signature™ black solar panels, for supreme aesthetics.

[More](#) E18/230 PANEL

72 CELLS — 31.4 x 61.4 ≈ 18.5%
 72 CELLS — 31.4 x 61.4 ≈ 18.1%

Electrical Data

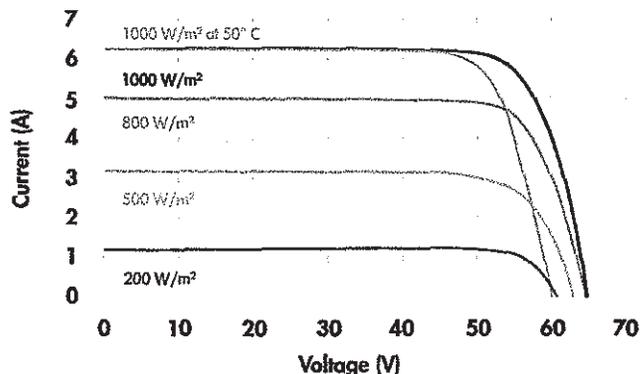
Measured at Standard Test Conditions (STC): irradiance of 1000W/m², AM 1.5, and cell temperature 25° C

Peak Power (+5/-3%)	P _{max}	320 W
Efficiency	η	19.6 %
Rated Voltage	V _{mpp}	54.7 V
Rated Current	I _{mpp}	5.86 A
Open Circuit Voltage	V _{oc}	64.8 V
Short Circuit Current	I _{sc}	6.24 A
Maximum System Voltage	UL	600 V
Temperature Coefficients	Power (P)	-0.38% / K
	Voltage (V _{oc})	-176.6mV / K
	Current (I _{sc})	3.5mA / K
NOCT		45° C +/-2° C
Series Fuse Rating		15 A

Mechanical Data

Solar Cells	96 SunPower all-back contact monocrystalline
Front Glass	High transmission tempered glass with anti-reflective (AR) coating
Junction Box	IP-65 rated with 3 bypass diodes Dimensions: 32 x 155 x 128 (mm)
Output Cables	1000mm length cables / MultiContact (MC4) connectors
Frame	Anodized aluminum alloy type 6063 (silver); stacking pins
Weight	41.0 lbs [18.6 kg]

I-V Curve



Current/voltage characteristics with dependence on irradiance and module temperature.

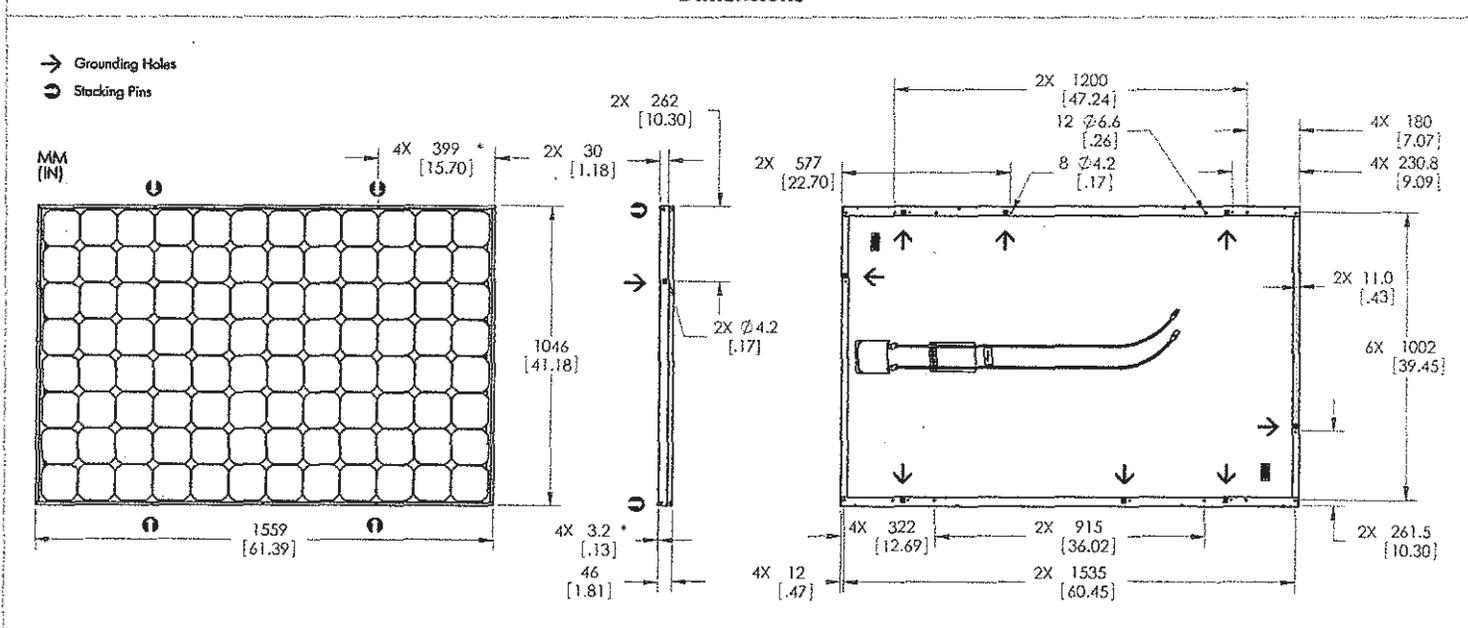
Tested Operating Conditions

Temperature	-40° F to +185° F (-40° C to + 85° C)
Max load	113psf 550 kg/m ² (5400 Pa), front (e.g. snow) w / specified mounting configurations 50 psf 245 kg/m ² (2400 Pa) front and back – e.g. wind
Impact Resistance	Hail 1 in (25 mm) at 51mph (23 m/s)

Warranties and Certifications

Warranties	25 year limited power warranty 10 year limited product warranty
Certifications	Tested to UL 1703, Class C Fire Rating

Dimensions



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Visit www.sunpowercorp.com for details.

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ELECTRICITY FROM THE SUN

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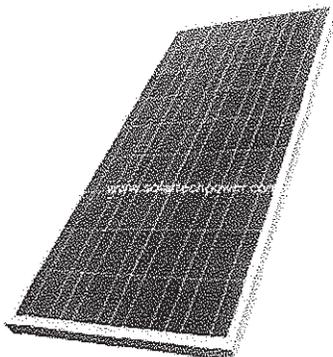
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Solartech SPM130P-WP 130 Watt Multicrystalline Solar Panel 24 Volts



Item#: SPM130P-WP-24V

Our Price: \$455.00

Quantity:



Availability

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ITEM DESCRIPTION **DETAILS** **YOU**

**Solartech 130 Watt Multicrystalline Solar Module
24 Volts Nominal**

The Solartech SPM130 module is perfectly suited for grid-tie applications as well as battery charging. This is a 24 volt nominal module that can be used with pulse width modulation (PWM) charge controllers for charging 24 volt battery banks. An array of these modules can also be configured for charging 12 volt or 48 volt battery banks. This module comes with prefabricated wire leads with MC4 connectors for easy wiring.

Specifications:

Vmp	34.0 Volts
Imp	3.75 Amps
Voc	41.5 Volts
Isc	4.5 Amps
Pmax	130 Watts
Tolerance	+/- 5%
Length	57.7 Inches
Width	26 Inches
Depth	1.97 Inches

UL and ETL listed
25 Year Limited Warranty:

EXAMPLES
26" WIDE PANEL

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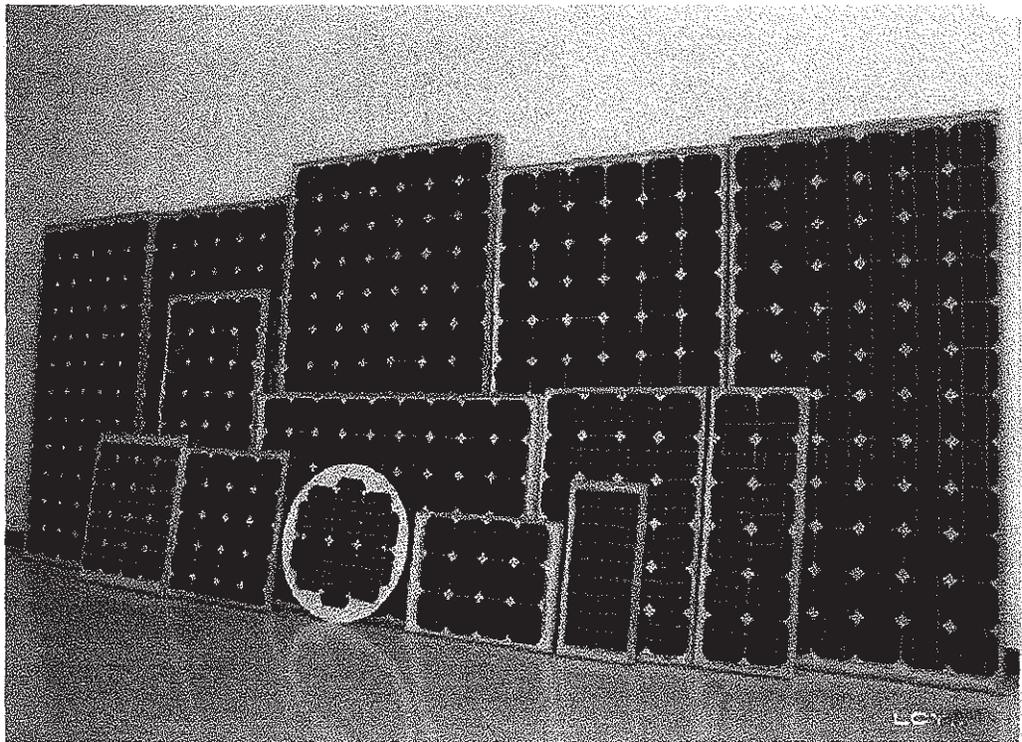
Solar Panel

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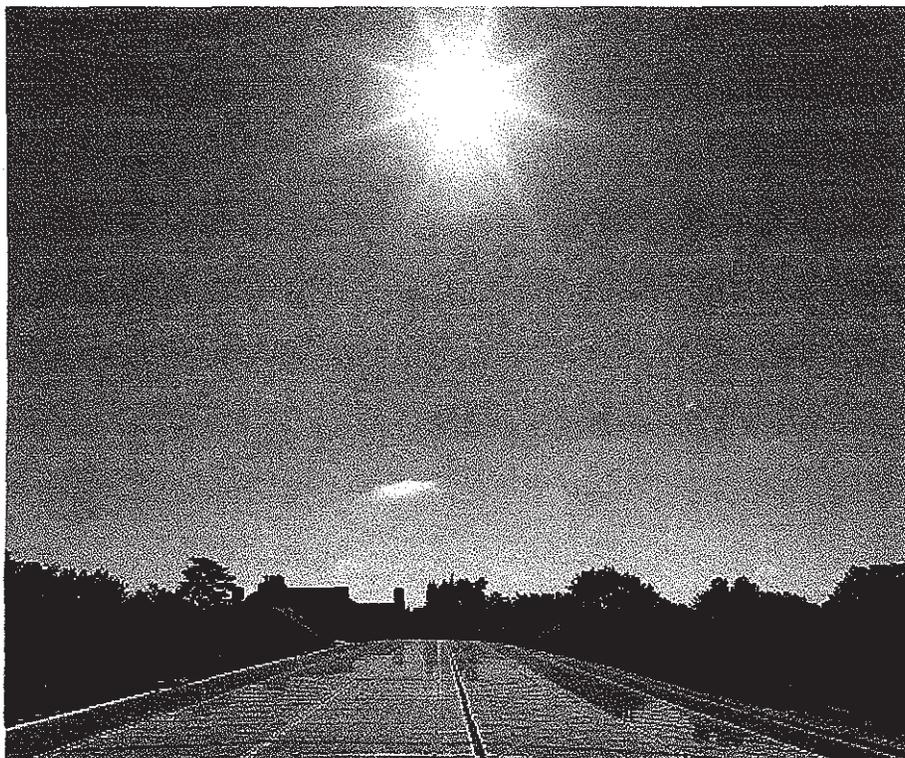


image via Berkeley Lab

Gallium arsenide is considered a great material for making solar cells because, according to Yablonovitch, it “absorbs photons 10,000 times more strongly than silicon for a given thickness but is not 10,000 times more expensive.” But what the Berkeley researchers focused on was the next part of the process: Sunlight absorbed in a solar cell produces electrons that need to be pulled from the cell as electricity – and if they aren’t pulled quickly enough, the power dissipates, sometimes as heat, further degrading power output.

Calculations by co-researcher Owen Miller showed that if this released energy exits the cell as external fluorescence, it would boost the cell’s output voltage – bringing efficiency closer to the accepted efficiency limit (known as the Shockley-Queisser, or SQ, Limit) of 33.5-percent for a single p-n junction solar cell.

This theoretical knowledge was put to work by Alta Devices, which used a single-crystal thin-film technology developed earlier by Yablonovitch, called “epitaxial liftoff,” that squeezes more energy out of the cell. According to the Berkeley Lab, the cells “not only smashed previous solar conversion efficiency records, but can be produced at well below the cost of any other solar cell technology.” And it won’t be long before these cells are on the market: Alta Devices expects to have gallium arsenide solar panels on the market within a year, the lab said.

Article printed from EarthTechling: <http://www.earthtechling.com>

URL to article: <http://www.earthtechling.com/2011/11/the-insight-behind-record-solar-efficiency/>

RECOMMENDED FOR YOU

Proposed Amendment to KZC 115.60.2.a.4 – This amendment applies to detached dwelling units in Low Density Residential Zones:

Height Regulations – Exceptions

4) Solar panels on sloped roof forms (greater than 2:12) may exceed height limits by a maximum of six (6) inches. Solar panels on flat roof forms (less than or equal to 2:12) may exceed height limits by a maximum of twenty (20) inches.

Staff has done research and spoken to several solar panel installation companies in the greater Seattle area. There are a few points that both SunEnergy and Puget Sound Solar felt that were important to note regarding solar panel height when installing on flat roofs in the Pacific Northwest.

1. The optimum angle that the solar panel should be at is 30 – 35 degrees. Most people do not buy panels that have a tilt function to adjust for the exact angle throughout the year. Therefore on a flat roof installation, the installer does his/her best to site the panels at an angle that will capture the most solar rays during the whole year and will not require the homeowner to have to go on the roof to adjust or maintain panels.
2. Solar panels that are installed on flat roofs generally require more cleaning and maintenance if not installed at an angle. This is due to built up of water, dirt, leaves and branches that can fall on the panels. It is a best management practice to make sure that panels are not laying flat on a flat roof for maximum efficiency.

Power Density

SunEnergy discussed a strategy that they employ called power density. Staff understands this to mean that the more panels that are installed on a roof, the more power that can be generated. The focus is not necessarily to get the solar panels at the most optimum angle of 30- 35 degrees, but a lesser angle and more panels. There is a limited amount of space on a given roof, and if the solar panels are at a 30-35 degree angle, they can shade some of the adjacent panels and reduce the amount of power that is created. This may be more costly initially to pursue this path due to the cost of buying more solar panels.

Washington State Incentives for Solar Panels and Inverters

Solar panels along with their inverter boxes are given certain incentives if manufactured in Washington State. Currently, Washington State has three solar panel manufacturers. Staff was not able to find any in State manufacturer's that make a low profile panel. This fact provides a financial disincentive to install solar panels and can significantly increase the return on investment. The lower profile panels also sit at an angle of about 5-10 degrees which is less than optimal for production of energy. The exact incentives for Washington State are attached below.



WASHINGTON

Incentives/Policies for Renewables & Efficiency



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Washington Renewable Energy Production Incentives

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Last DSIRE Review: 06/24/2011

Program Overview:

State:	Washington
Incentive Type:	Performance-Based Incentive
Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Wind, Anaerobic Digestion
Applicable Sectors:	Commercial, Residential, Nonprofit, Local Government, Utility
Amount:	\$0.12/kWh - \$1.08/kWh through 6/30/2020, depending on project type, technology type and where equipment was manufactured
Maximum Incentive:	\$5,000/year
Terms:	Off-grid properties are not eligible
Eligible System Size:	Community solar projects: up to 75 kW
Ownership of Renewable Energy Credits:	Customer-generator
Funding Source:	Utilities pay incentives and earn a tax credit equal to the cost of those payments
Start Date:	8/31/2006
Expiration Date:	6/30/2020
Web Site:	http://www.energy.wsu.edu/
Authority 1:	RCW 82.16.110 et seq.
Date Enacted:	5/6/2005 (subsequently amended)
Date Effective:	7/1/2005
Expiration Date:	6/30/2020
Authority 2:	WAC 458-20-273
Date Effective:	8/31/2006

Summary:

In May 2005, Washington enacted Senate Bill 5101, establishing production incentives for individuals, businesses, and local governments that generate electricity from solar power, wind power or anaerobic digesters. The incentive amount paid to the producer starts at a base rate of \$0.15 per kilowatt-hour (kWh) and is adjusted by multiplying the incentive by the following factors:

For electricity produced using solar modules manufactured in Washington state: 2.4

For electricity produced using a solar or wind generator equipped with an inverter manufactured in Washington state: 1.2

For electricity produced using an anaerobic digester, by other solar equipment, or using a wind generator equipped with blades manufactured in Washington state: 1.0

For all other electricity produced by wind: 0.8

These multipliers result in production incentives ranging from \$0.12 to \$0.54/kWh, capped at \$5,000 per year. Ownership of the renewable-energy credits (RECs) associated with generation remains with the customer-generator and does not transfer to the state or utility.

In May 2009, Washington passed [SB 6170](#), effective July 1, 2009. With the passage of this legislation, community solar projects are able to receive the production incentive. Community solar projects are defined as solar energy systems up to 75 kilowatts (kW) that are owned by local entities and placed on local government property or owned by utilities and funded voluntarily by utility ratepayers. The legislation excludes utility-owned projects from receiving the production incentive if the utility has annual sales greater than 1,000 megawatt-hours (MWh). In June 2009, the Department of Revenue clarified this exclusion, stating that utility-owned community solar projects that are voluntarily funded by rate-payers are eligible for this production incentive. This ruling was formalized with the passage of [SB 6658](#) in March 2010. This legislation also allows projects on local government property that are owned by limited liability companies, cooperatives, or mutual corporations or associations to receive the incentive. The company itself is not eligible, but owners may take advantage of the incentive. The base rate for community solar projects is \$0.30/kWh and the multipliers are the same as those used for other renewable

energy technologies. The actual production incentives range from \$0.30/kWh to \$1.08/kWh, as the incentive rate is higher for modules and inverters manufactured in Washington. The incentive is capped at \$5,000 per year. Each participant in a community solar project, or each owner of a project, can apply to receive this incentive and may receive up to \$5,000 per year.

The state's utilities will pay the incentives and earn a tax credit equal to the cost of those payments. SB 6170 also increased the tax credit that utilities may claim for awarding production incentives. Previously, the credit could not exceed the greater of \$25,000 or 0.25% of a utility's taxable power sales. Now, the credit cannot exceed the greater of \$100,000 or 0.5% of a utility's taxable power sales. Incentive payments to community solar projects cannot exceed 25% of the total allowable credit. The incentive amount may be uniformly reduced if requests for the incentive exceed the available funds.

The incentives apply to power generated as of July 1, 2005, and remain in effect through June 30, 2020. A utility may not claim any tax credits for incentive payments after June 30, 2021.

Click [here](#) for the DOR renewable energy system certification form and [here](#) for the community solar project certification form. Click [here](#) for the DOR annual incentive payment application and [here](#) for the DOR annual incentive payment application for community solar projects.

Contact:

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E-Mail: loup@energy.wsu.edu

Beth Mills
Washington State Department of Revenue
6500 Linderson Way SW
Suite 102
Tumwater, WA 98501
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E-Mail: bethm@dor.wa.gov
Web Site: <http://dor.wa.gov>

NC STATE UNIVERSITY

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115.33 is a new section

115.33 Electric Vehicle Infrastructure

1. Purpose and Intent - It is the intent of these development regulations to encourage the use and viability of electric vehicles as they have been identified as a solution to energy independence, cleaner air and significantly lower green house gas emissions.

Electric vehicles need access to Electric Vehicle Infrastructure (EVI) in appropriate locations. In 2009 the Washington State Legislature passed House Bill 1481 relating to electric vehicles. The bill addressed EVI which includes the structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

The purpose of the development regulations in this section is to meet the State of Washington requirements and to also allow battery charging stations and battery exchange stations in appropriate use zones throughout the City.

1. General – This section establishes where the components of Electric Vehicle Infrastructure are allowed within the City.

Exceptions-

Electric Vehicle Infrastructure may not be located in any sensitive areas, their buffer or buffer setbacks.

2. All Use Zones

Level I and Level II Battery Charging Stations are allowed as an accessory use to an approved use within all Use Zones.

3. Commercial Zones

- a. A Battery Exchange station is allowed as an accessory use to all commercial zones where repair or maintenance of vehicles is permitted.
- b. A Rapid Battery (Level III) Charging Station is allowed as an accessory use to all commercial zones where repair and maintenance of vehicles is permitted including Gas Stations.

4. Industrial Zones

- a. A Rapid Battery(Level III) Charging Station is allowed as an accessory use to an approved use within the Light Industrial Technology (LIT) or other Industrial zones where Repair and Maintenance of vehicles is permitted.
- b. A Battery Exchange Station is allowed as an accessory use to an approved use within the Light Industrial Technology (LIT) or other industrial zones where repair and maintenance of vehicles is permitted.

5. Institutional Uses

A Rapid Battery Charging Station (Level III) is allowed as an accessory use to an

approved institutional use.

6. Signage is required to identify a charging station for the exclusive use of an electric vehicle. Onsite signage shall also be required to provide directional assistance. (See Plate 45 in KZC 180).

5.10 Definitions

5.10.071 Battery Charging Station (Level I, II and III)

- An electrical component assembly or cluster of component assemblies designed specifically to charge batteries within electric vehicles, which meet or exceed any standards, codes, and regulations set forth by chapter 19.28 RCW as amended and consistent with rules adopted under RCW 19.27.540 as amended. The terms 1, 2, and 3 are the most common electric vehicle charging levels, and include the following specifications:

- Level 1 is considered slow charging.
- Level 2 is considered medium charging.
- Level 3 is considered fast or rapid charging.

5.10.071.5 Battery Electric Vehicle (BEV)

- Any vehicle that operates exclusively on electrical energy from an off-board source that is stored in the vehicle's batteries, and produces zero tailpipe emissions or pollution when stationary or operating.

5.10.071.6 Battery Exchange Station

- A facility that will enable an electric vehicle with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery.

5.10.271 Electric Vehicle

- Any vehicle that operates, either partially or exclusively, on electrical energy from the grid, or an off-board source, that is stored on-board for motive purpose. "Electric vehicle" includes: (1) a battery electric vehicle; (2) a plug-in hybrid electric vehicle

5.10..272 Electric Vehicle Charging Station

-Electrical Vehicle Charging Station - A public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle.

.273 Electric Vehicle Infrastructure (EVI)

- Structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

.274 Electric Vehicle Parking Space

- Any marked parking space that identifies the use to be exclusively for the parking of an electric vehicle.

5.10.667 Plug-in-Hybrid Electric Vehicle (PHEV)

- An electric vehicle that (1) contains an internal combustion engine and also allows power to be delivered to drive wheels by an electric motor; (2) charges its battery primarily by connecting to the grid or other off-board electrical source; (3) may additionally be able to sustain battery charge using an on-board internal-combustion-driven generator; and (4) has the ability to travel powered by electricity.

5.10.756 Rapid Charging Station

- An industrial grade electrical outlet that allows for faster recharging of electric vehicle batteries through higher power levels and that meets or exceeds any standards, codes, and regulations set forth by chapter 19.28 RCW and consistent with rules adopted under RCW 19.27.540.

5.10.682 Preferential Parking

Parking for Carpools, HOV's, high efficiency/low emission electric and alternative fuel vehicles.

105 Parking

105.67 Parking Area Design – Preferential Parking Allowance

Parking stalls may be allocated for Preferential Parking. A restriction on types of vehicles using preferred stalls applies from 7AM to 10AM daily.

105.34 Covered Bicycle Storage

If covered and secured bicycle storage is provided on site, a credit towards parking requirements at a ratio of one less parking stall per 6 bicycle spaces will be granted. The Planning Official may increase credits according to size of development and anticipated pedestrian and bicycle activity and proximity to transit facilities. A maximum reduction of 5% of required parking stalls may be granted. If a reduction of 5 or more stalls is granted, then changing facilities including showers, lockers shall be required.

5.10.177 Covered Bicycle Storage

An enclosure or shelter in which bicycles can be secured and provides fully covered protection for bicycles from inclement weather and theft.

Summary of comments from 2/4/2011 Technical Advisory Committee on Green Codes

- Utilize integrated drainage plan approach.
- Predictability vs. flexibility (innovative, creativity) but make sure process is clear.
- Incentive ideas to consider:
 - Lot coverage
 - Height
 - Front yard setback
 - Non-conforming expansion limitations (save the house)
- Undertake a pilot/demonstration project
- Integrate into codes – don't separate (see Sammamish, Redmond, Fife)
- Look at other city's codes.
- If you reduce lot coverage, acknowledge but also demonstrate what you are getting
- Tree canopy will be lost with high lot coverage
- Handouts for the public
- Consider special inspections (independent)
- Consider site conditions/characteristics (not all sites are suitable for LID e.g. clay)
- Be clear on what to incentivize and what is required.
- How do you incentivize when it is required?
- How do we ensure that the incentive will result in benefits over time (e.g. keeping the rain garden)
- Think the long view 40-50 years
- Green roofs are a big challenge
- Use ROW for LID treatment/pocket parks/gardens.
- Consider sidewalks on one side only
- Abolish paved alleys (replace with pervious)
- Abolish mandatory parking

- Surface parking is bad – de-incentivize
- Reduce lot coverage
- Incent alternative energy
- If you can't do LID – have an in-lieu option (Lynnwood?)
- Identify barriers in other City, State Codes (ie Fire)
- Highlight Successful projects (provided by Technical Advisory Board)
- Consider setback reductions for green roof- Administrative Decision

Draft Code Alternatives

Green Infrastructure

(A.1) –Bicycle Storage

Issue: In Kirkland the ratio of bike racks to parking stalls for new development is (One bike stall for every 12 vehicle parking stalls). Covered bicycle storage is not a requirement in the Zoning Code or the design regulations. This may cause fewer people (customers and employees) to make sustainable alternative transportation choices.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Bicycle Storage required when building new multi-Family, Office or Commercial development. Storage size is percentage of buildings gross floor area	Neighboring cities require bike racks but not bicycle storage. Kirkland's CTR does not require	Encourages non-motorized transportation	Additional costs or design to provide storage
Alternative 2:	If Covered Bicycle storage is provided, reduce parking by one or more stalls		Costs less to provide basic storage than	Perceived less parking in development

			parking stall. Encourages employees to ride to work and lessens parking load on public streets.	
Alternative 3:				

-Low Emission/Fuel Efficient Vehicle Parking

Issue: Kirkland’s Parking regulations do not reflect or provide priority parking for hybrid, low emission and fuel efficient or electric vehicles.

Code Alternatives	Description	Notes	Pros	Cons
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<p>Alternative 1:</p>	<p>5% of required parking stalls could be identified for low emission/fuel efficient vehicles when developing new parking lots for (Office, Multi-Family and Commercial uses).</p>	<p>Not required in neighboring cities, but A.2 below will require infrastructure allowances for Electric Vehicle Charging stations. This alternative would complement the WA State requirement.</p>	<p>Encourages non-motorized transportation and provides parking that is specific to higher efficiency vehicles.</p>	<p>Restricts parking to certain vehicles which could also be considered an equity issue. Where to draw line between fuel efficiency and low emission (ie motorcycles are fuel efficient but not low emission).</p>
<p>Alternative 2:</p>	<p>5% of required parking stalls be designated for preferential parking which would also include HOV/Vanpool parking. (Office, Multi-Family and Commercial).</p>	<p>Many new parking lots currently have some kind of preferential parking for HOV/Vanpool Parking</p>	<p>Provides designated parking for higher efficiency and higher occupancy vehicles. Equity issue is eliminated.</p>	<p>Does not provide exclusive parking for Electric Vehicles</p>
<p>Alternative 3</p>	<p>Allow Electric Vehicle Charging Stations to count for parking requirements. Redmond has this as their policy. (Office, Multi-Family and Commercial).</p>	<p>The item is discussed in greater detail in Section 3.2.01 of PSRC's Electric Vehicle Infrastructure: A Guidebook for Local Governments</p>	<p>Takes advantage of existing space and doesn't require more parking to be provided</p>	<p>Vehicles that are not electric do not have access to the parking space.</p>

(A.2) –Electric Vehicle Infrastructure (EVI)

Issue: Kirkland is not in compliance with the following Washington State requirements.

In 2009 the Washington State Legislature passed and the Governor signed into law House Bill 1481 an Act relating to electric vehicles.¹ The law addresses electric vehicle infrastructure which are defined as the structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

The law requires that local government development regulations allow electric vehicle infrastructure as a use in all zones except those zoned for residential, resource, or critical areas. This guidance extends the permitted use to these zones as well, although with some restrictions and limitations. The requirements apply to local jurisdictions as follows:

- By July 1, 2010, municipalities greater than 20,000 in population in King County that are adjacent to Interstate 5, Interstate 90, Interstate 405, or State Route 520, and all municipalities adjacent to I-5 in Pierce, Snohomish and Thurston Counties, must allow electric vehicle infrastructure (Kirkland has been identified as one of these municipalities).

The Washington State Department of Commerce and the Puget Sound Regional Council have developed a resource called [Electric Vehicle Infrastructure: A Guidebook for Local Governments](#)

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Allow Commercial Electric Vehicle Charging stations in all zones except Single Family Residential, resource or critical areas. Amend KZC 115 and KZC 5 to show where allowed and create definition of Electric Vehicle Infrastructure (EVI).	Required by WA State by June 2010. Bellevue has recently done an ordinance to comply.	Increases use of electric vehicles by allowing necessary infrastructure in Kirkland	None
Alternative 2:				
Alternative 3:				

Stormwater & Landscaping

(B1 & B2) Stormwater & Landscaping Sustainable Actions– Promote low impact development through lot coverage/open space standards; by incorporate vegetated roof provisions into the zoning code; and, provide for incentives for clustered housing.

Issue – Stormwater runoff is created largely when stormwater flows uncontrolled from impervious surfaces, such as roofs and paved surfaces, leading to channel erosion and soil erosion. The growing area of impervious surfaces in Kirkland contributes to the increase of both volume and velocity of runoff. Stormwater runoff is related to three main issues in Kirkland – flooding, reduced water quality, and damage to aquatic habitat. Large amounts of stormwater runoff could lead to flooding and property damage. Additionally, sedimentation and channel erosion clogs Kirkland’s surface water infrastructure, resulting in expensive maintenance and repair. Stormwater runoff carries pollutants, machine oils, heavy metals, and animal waste from lawns, roads, and parking lots into urban creeks and streams leading to poor water quality and habitat degradation.

The following alternatives promote the utilization of low impact development (LID) which is a stormwater management strategy that more closely mimics natural hydrologic patterns in residential, commercial, and industrial settings.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Code amendment to Lot Coverage Section 115.90 replacing exceptions with LID techniques described in 2009 King County Surface Water Design Manual, Kirkland Addendum to the King County manual, and LID design criteria found within COK PW Pre-Approved Plans . The percentage of the exception will be based on the percentage of impervious of the LID method being used.	May need exceptions for sites with high groundwater, steep slopes or other physical limitations.	This amendment will only affect one section of code and has City-wide implications on new construction.	No reduction to the lot coverage percentage and doesn't promote open space.
Alternative 2:	Code Amendment to reduce lot coverage percentage within low-density use zones to 40%. <i>Research suggests that 40 to 50 percent open space protection in urban areas with medium and high densities is necessary to retain a healthy</i>	May need exceptions for sites with high groundwater, steep slopes or other physical limitations.	Promotes open space.	May result in development limitations on lots not meeting the minimum lot

	<p><i>watershed (Low Impact Development Technical Guidance Manual for Puget Sound). By setting the lot coverage (impervious) percentage at 40% allows for a property to develop its structures fully and employ the following LID techniques to achieve the desired level of hardscape.</i></p> <p>Base exemptions on performance levels of LID techniques described in 2009 King County Surface Water Design Manual, Kirkland Addendum to the King County manual, and LID design criteria found within COK PW Pre-Approved Plans.</p> <p><i>Not all LID techniques perform equally and should be credited based on its infiltration performance.</i></p>			size.
Alternative 3:	<p>For commercial and residential (with densities greater than five dwelling units per acre) uses allow for LID improvements to enter the R-O-W. KMC amendment would be required.</p> <p><i>As an optional compliance to achieve the desired level of infiltration LID techniques could be used in the R-O-W.</i></p>	May need exceptions for sites with high groundwater, steep slopes or other physical limitations.	Allows more opportunities for LID installation, even when lot size is small.	Will require additional City staff to provide maintenance, or private maintenance agreements.
Alternative 4:	<p>Remove lot coverage regulation and replace with open space minimum and pervious regulation.</p> <p><i>This would be the closest regulatory means to achieve a City-wide open space target (see alternative 2). The targets could be set at a City or basin level based on the aggregate percentage of impervious area.</i></p> <p>Open space should be a percentage of the lot size</p>	May need exceptions for sites with high groundwater, steep slopes or other physical limitations.	Promotes open space.	Would require significant code amendments.

	<p>and focus on native vegetation retention or rehabilitation (see AHBL's Low Impact Development Chapter for guidance). Pervious requirements shall be based on performance targets defined by the City and utilize measures described in 2009 King County Surface Water Design Manual, Kirkland Addendum to the King County manual, and LID design criteria found within COK PW Pre-Approved Plans.</p> <p><i>Not all LID techniques perform equally and should be credited based on its infiltration performance.</i></p>			
Alternative 5	<p>Clustering of Homes approach (like King County does now). Create a separate Mini Planned Unit Development (PUD), possibly an innovative project. Prescribe a choice of LID standards for different lot sizes.</p>		<p>May be a better approach for multiple parcels or larger lot. Possible to achieve greater than 60% open space. May be a way to achieve greater setbacks from sensitive areas than under Chapter 90.</p>	<p>May not be used as much due to lack of available parcels or lack of large parcels in City.</p>

(B3) – Revise standards to encourage pervious surfaces for driveways, private roads, and parking lots.

Encouraging the use of Low Impact materials in place of traditional asphalt or concrete surfaces lessens impervious surfaces, pollution generation, flooding, heat island effect and increases water quality.

There are several types of pervious surfaces allowed in the adopted surface water design manual, but they are not included in the current zoning code. The surfaces are:

- Modular grid pavement
- Grassed modular grid pavement
- Ribbon grass strips for residential driveways
- Pervious concrete and asphalt

Current zoning code requires private parking areas to be surfaced with a material “comparable or superior” to the right-of-way providing direct vehicle access (which is always impervious), and private roads to be surfaced with asphalt concrete. The code limits the use of pervious surfaces for parking lots and private roads. Pervious surfaces are allowed for private driveways, but often the same surface type is used for both the private road and the driveway. The intent of the existing code was to prevent gravel parking lots, not to limit the use of new technology.

The code for private streets includes an allowance for the Department of Public Works to authorize a modification to the standards for a paved surface on a case-by-case basis, which has allowed pervious pavement on some private streets in Kirkland. The parking lot surface code does not include this allowance. As a resource, the City of Seattle provides information to assist the development of [Green Parking Lots](#).

There are concerns allowing pervious surfaces on public streets because of the high traffic volume and vehicle velocity. But this restriction should not limit the use of pervious surfaces on low volume and low velocity private streets and parking lots. Changing the code to allow the option of pervious surfaces for driveways, private roads, and parking lots, and then providing standard details for pervious surfaces will encourage their use.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Leave existing code text as written.		none	Code does not allow pervious surfaces for parking lots, and does not encourage use.
Alternative 2:	Leave existing text as written for KZC 105.10 (for		Code allows	Code does not

	private roads), but add a similar qualifier to KZC 105.100 (for parking lots) that allows Public Works to authorize a different surface on a case-by-case basis. Add standard details for pervious surfaces to the Public Works Pre-Approved Plans.		pervious surfaces in parking lots. Pre-Approved plans would provide details for applicants.	encourage the use of pervious surfaces.
	Note that Alternatives 2 and 3 are different in that Alt 2 provides for PW to approve different surfaces on a case by case basis. Whereas Alt 3 provides specific examples which we would allow with a prescribed percentage of perviousness. It might be a good idea to combine Alt 2 and Alt 3 to read that certain LID materials are allowed and get a certain perviousness attached to them while also giving PW the ability to approve other LID Materials on a case by case basis.			
Alternative 3:	Add standard details for pervious surfaces to the Public Works Pre-Approved Plans, and revise KZC 105.10 and 105.100 to allow: <ul style="list-style-type: none"> • Pervious concrete/asphalt for parking lots, driveways, and access roads. • Modular grid pavement for driveways, access roads, and parking lots. • Grassed modular grid pavement for driveways, access roads, parking lots. • Ribbon grass strips for driveways. 		Code allows pervious surfaces in parking lots, encourages their use but does not mandate it. Pre-Approved plans would provide details for applicants.	

(B4) – Revise landscape regulations to incorporate natural drainage structures and native plant requirements for commercial and multi-family sites.

Parking lots are required to have landscaping, and natural stormwater drainage options can be incorporated into these landscaped areas. Natural drainage options reduce potable water use, reduce flooding, and increase water quality. Natural drainage options include:

- Bioswales
- Rain gardens
- Bioinfiltration boxes
- Native plant lists
- Amended soil

Incorporating natural drainage options into the parking lot zoning code would encourage their use.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Leave existing code text as written.		none	Code does not encourage the use of natural drainage options.
Alternative 2:	Revise text in KZC 95.44 to include the following natural drainage options: <ul style="list-style-type: none"> ○ Bioswales ○ Rain gardens ○ Bioinfiltration boxes ○ Native plant lists ○ Amended soil 		Codes encourages natural drainage options, but does not mandate it.	

(B5) – Incorporate soil amendment provisions into KZC Chapter 95.50.

Good quality soil and vegetation provide important stormwater functions including: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant bioinfiltration; water inflow storage and transmission; and pollutant decomposition. These functions are largely lost when development strips away native soil and vegetation and replaces it with minimal topsoil and sod. Not only are these important stormwater functions lost, but such landscapes themselves become pollution-generating pervious surfaces due to increased use of pesticides, fertilizers and other landscaping and household/industrial chemicals, the concentration of pet wastes, and pollutants that accompany roadside litter.

The existing KZC 95.50 states the organic content of soil *“shall be as necessary to provide adequate nutrient and moisture-retention levels”*. This text is vague and therefore difficult for the applicant to use and the inspector to verify.

Our NPDES permit through WA State Department of Ecology and the adopted surface water design manual require specific soil criteria for amended soil, and for the compost used to amend the soil. This requirement applies to landscaped areas of projects 1 acre or larger. Amended soil must have a minimum organic matter content of 10% dry weight in planting beds (5% organic matter content in turf areas), a pH from 6.0 to 8.0 (or matching the pH of the original undisturbed soil), and the compost used to amend the soil must have an organic matter content of 35% to 65%, and a carbon to nitrogen ratio below 25:1.

Changing this code would extend the same requirements to smaller sites. It would provide specific organic soil requirements for applicants and inspectors, and provide consistency with the adopted surface water design manual, municipal code, and zoning code.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Leave existing code text as written.			Level of organic matter is not defined, difficult for applicant to meet and inspector to verify.
Alternative 2:	Revise text in KZC 95.50 to include 5% and 10% organic matter in amended soil. Why not do both Alternative 2 and Alternative 3? Seems like a good idea.		Code at least requires a specific level of organic matter in amended soil.	Code does not include all healthy soil requirements. Adds a little cost to project.

<p>Alternative 3:</p>	<p>Revise text in KZC 95.50 to include all amended soil requirements:</p> <ul style="list-style-type: none"> • 10% organic matter in amended soil • A pH from 6.0 to 8.0 (or matching the pH of the original undisturbed soil) • Compost used to amend the soil must have an organic matter content of 35% to 65%, and a carbon to nitrogen ratio below 25:1. 		<p>Code requirements will increase the likelihood of healthy vegetation, and easier for the inspector to verify from soil delivery tickets.</p>	<p>Adds greater cost to project and more inspections.</p>
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(B6) Allow modifications to setbacks for moderate retention trees that are retained during development. The current Zoning Code (below) supports modifications for high retention trees. The modification could be extended to moderate retention trees as an alternative mechanism to retain viable trees.

Revise KZC 95.32 Incentives and Variations to Development Standards

In order to retain trees, the applicant should pursue provisions in Kirkland’s codes that allow development standards to be modified. Examples include but are not limited to number of parking stalls, right-of-way improvements, lot size reduction under Chapter 22.28 KMC, lot line placement when subdividing property under KMC Title 22, Planned Unit Developments, and required landscaping, including buffers for lands use and parking/driving areas.

Requirements of the Kirkland Zoning Code may be modified by the Planning Official as outlined below when such modifications would further the purpose and intent of this chapter as set forth in KZC [95.05](#) and would involve trees with a **high** retention value.

1. Common Recreational Open Space. Reductions or variations of the area, width, or composition of required common recreational open space may be granted.
2. Parking Areas and Access. Variations in parking lot design and/or access driveway requirements may be granted when the Public Works and Planning Officials both determine the variations to be consistent with the intent of City policies and codes.

- 3. Required Yards. Initially, the applicant shall pursue options for placement of required yards as permitted by other sections of this code, such as selecting one front required yard in the RSX zone and adjusting side yards in any zone to meet the 15-foot total as needed for each structure on the site. The Planning Official may also reduce the front or side required yards; provided, that:
 - a. No required side yard shall be less than five feet; and
 - b. The required front yard shall not be reduced by more than five feet in residential zones. There shall not be an additional five feet of reduction beyond the allowance provided for covered entry porches.
- 4. Storm Water. Requirements pertaining to stormwater may be varied if approved by the Public Works Official under KMC 15.52.060.
- 5. Additional Variations. In addition to the variations described above, the Planning Official is authorized to require site plan alterations to retain trees with a high retention value. Such alterations include minor adjustments to the location of building footprints, adjustments to the location of driveways and access ways, or adjustment to the location of walkways, easements or utilities. The Planning Official and the applicant shall work in good faith to find reasonable solutions.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Revise Chapter 95.32.5 to allow front or side yard setbacks to be reduced when a moderate retention tree is saved during development. Require an equal amount of space be reduced from allowed lot coverage for proposed setback encroachment	High retention trees have this option	More tree retention of significant trees	Potentially less setbacks from street
Alternative 2:				
Alternative 3:				

Energy Efficiency & Independence

(C1) – Create regulations that incentivize small scale wind, photovoltaic, solar hot water and passive solar design. The City of Seattle has provided some guidance for [Solar Energy Systems](#) that help explain how solar panels and solar hot water heater work.

Issue: There are barriers in the Zoning Code that if changed could help residents or businesses place Solar panels on their rooftops and generate clean, green energy or heat hot water for domestic uses.

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	For Flat roofs allow all solar panels up to go 20 inches above maximum height in Use Zone. For sloped roofs allow panels to go 12 inches above maximum height for Use Zone.	Panels are not efficient if placed horizontal on flat roof.	Encourages panels to be sited for maximum energy generation	May affect some views. Additional structural costs.
Alternative 2:	Allow Solar panels on Flat roofs to go 12 inches above maximum height in Use Zone. For sloped roofs allow panels to go 6 inches above height maximum.	Panels could still have efficiency, but it would be lessened more on flat roofs	Encourages panels to be sited for acceptable energy generation	May affect some views. Additional structural costs
Alternative 3:	Allow Solar panels on Flat roofs to go 6 inches above maximum height in Use Zone. For sloped roofs allow panels to go 6 inches above height maximum	Panels could still have efficiency, but it would be lessened substantially on flat roofs	Still provides incentive to install panels by eliminating lower height barrier	Less tilt of panels on flat roofs means more Dirt, dust debris deposits on panels which further reduces energy generation capacity

(C2) – Allow building envelopes to encroach into setback yards for existing homes or buildings so that exterior rigid insulation can be increased and for new structures that exceed the WSEC requirements. Some of the benefits of [Super insulation](#) are described in this link along with how it works with retrofitting older homes.

Issue: The Passive House movement in the United States is now certifying homes that meet rigid standards for energy efficiency. The design and implementation using these Passive House concepts can be used when retrofitting existing structure to help them perform better and use less energy.

Existing Structures-

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Allow up to 8 inch encroachment into setback yards for existing older homes to add additional insulation and exterior rigid insulation	Passive Houses have 12 inch wall thickness at a minimum.	Helps building operate more efficiently	Perception of less separation between structures
Alternative 2:	Allow up to 5-6 inch encroachment into setback yard for newer existing home to add additional insulation and exterior rigid insulation. Most houses to current code have walls that are 7 inches thick	This would allow for adherence to an important Passive House prerequisite	Helps building operate more efficiently	Perception of less separation between structures
Alternative 3:	Allow up to 4 inch encroachment into setback yards for existing homes to add exterior rigid insulation	Would not meet prerequisite, but would be a noticeable improvement to building envelope	Helps building operate more efficiently	

New Structures-

Code Alternatives	Description	Notes	Pros	Cons
Alternative 1:	Allow up to 6 inch encroachment into setback yards for buildings that are certifying under Passive House certification.	Passive Houses have 12 inch wall thickness	Helps building operate more efficiently	Perception of less separation between structures
Alternative 2:	Allow up to 4 inch encroachment into setback yard for buildings that are pursuing Passive House certification.		Helps building operate more efficiently	Perception of less separation between structures
Alternative 3:				

DRAFT

Fact Sheet

Action Sponsor and Lead Agency	City of Kirkland Department of Planning and Community Development
Proposed Action	Legislative adoption of Amendments to Kirkland Zoning Code Chapters 5, 18, 95, 105, 110, 115, new Chapter 114 and Kirkland Municipal Code Chapters 15 and 22 – Green Codes pursuant to Chapter 160 KZC (Process IV).
Responsible Official	 Eric R. Shields, AICP Planning Director
Contact Person	David Barnes - Planner/Project Manager, City of Kirkland (425) 587-3250.
Required Approvals	Adoption by Kirkland City Council Approval by Houghton Community Council for amendments within its jurisdiction.
Location of Background Data	File ZON10-00031 City of Kirkland Department of Planning and Community Development 123 Fifth Avenue Kirkland, WA 98033
Date of Issuance	January 4, 2012

City of Kirkland

Process IV – Green Codes

EIS Addendum dated January 4, 2012

File No. ZON10-00031

I. Background

The City of Kirkland proposes to amend Kirkland Zoning Code Chapters 5, 18, 95, 105, 110, 115, new Chapter 114 and Kirkland Municipal Code Chapters 15 and 22 as part of Green Codes. The amendments will be reviewed using the Chapter 160 KZC, Process IV with adoption by City Council and final approval by the Houghton Community Council as the amendments are within their jurisdiction.

This Environmental Impact Statement (EIS) Addendum is intended to fulfill the environmental requirements pursuant to the State Environmental Policy Act (SEPA) for the proposed Zoning Code amendment.

II. EIS Addendum

According to the SEPA Rules, an EIS addendum provides additional analysis and/or information about a proposal or alternatives where their significant environmental impacts have been disclosed and identified in a previous environmental document (WAC 197-11-600(2)). An addendum is appropriate when the impacts of the new proposal are the same general types as those identified in the prior document, and when the new analysis does not substantially change the analysis of significant impacts and alternatives in the prior environmental document (WAC 197-11-600(4)(c), -625 and -706).

The City published the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*. This EIS addressed the 2004 Comprehensive Plan, Zoning Code and Zoning Map updates required by the Washington State Growth Management Act (GMA). Elements of the environment addressed in this EIS include population and employment growth, earth resources, air quality, water resources, plants and animals, energy, environmental health (noise, hazardous materials), land use, socioeconomics, aesthetics, parks/recreation, transportation, and public services/utilities.

This addendum to the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update* is being issued pursuant to WAC 197-11-625 to meet the City's SEPA responsibilities. The EIS evaluated plan alternatives and impacts that encompass the same general policy direction, land use pattern, and

environmental impacts that are expected to be associated with the proposed amendments to Kirkland Zoning Code Chapters 5, 18, 95, 105, 110, 115, new Chapter 114 and Kirkland Municipal Code Chapters 15 and 22 as part of the Green Codes as discussed herein. While the specific location, precise magnitude, or timing of some impacts may vary from those estimated in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*, they are still within the range of what was evaluated and disclosed there. No new significant impacts have been identified.

III. Non-Project Action

Decisions on the adoption or amendment of zoning ordinances are referred to in the SEPA rules as "non-project actions" (WAC 197-11-704(2)(b)). The purpose of an EIS in analyzing a non-project action is to help the public and decision-makers identify and evaluate the environmental effects of alternative policies, implementation approaches, and similar choices related to future growth. While plans and regulations do not directly result in alteration of the physical environment, they do provide a framework within which future growth and development – and resulting environmental impacts – will occur. Both the adoption of the Comprehensive Plan evaluated in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update* and eventual action on the Kirkland Zoning Code Chapters 5, 18, 95, 105, 110, 115, new Chapter 114 and Kirkland Municipal Code Chapters 15 and 22 as part of Green Codes are "non-project actions".

IV. Environmental Analysis

The *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update* evaluated the environmental impacts associated with adoption of proposed policies and land use designations. The plan's policies are intended to accomplish responsibilities mandated by the Washington State Growth Management Act (GMA), and to mitigate the impacts of future growth. In general, environmental impacts associated with the proposed Zoning Code amendment are similar in magnitude to the potential impacts disclosed in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*. As this proposal is consistent with the policies and designations of the Comprehensive Plan and the environmental impacts disclosed in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*, no additional or new significant impacts beyond those identified in the EIS for the Comprehensive Plan are anticipated.

V. Description of the Proposal

Green Codes proposes changes to Kirkland Zoning Code (KZC) Chapters 5, 18, 95, 105, 110, 115, new Chapter 114 and Kirkland Municipal Code Chapters 15 and 22. The changes are summarized as follows:

- Revising Code language to allow pervious surfaces where it was not previously allowed
- Allowing reductions in setback yards for retention of moderate value trees
- Allowing gaps in parking lot curbing and providing examples of natural drainage solutions for Internal Parking lots
- Revising code language to promote use of pervious materials and low impact solutions for lot coverage calculations
- Allowing pervious materials in alleys and privately maintained stormwater facilities in right-of-way with approval from the Public Works Director.
- Creating a new chapter KZC 114 to promote Low Impact Development, smaller lot sizes, and clustering of homes at a short plat or subdivision scale
- Creating new section KZC 115.33 Electric Vehicle Infrastructure (EVI) to comply with the State of Washington requirements (RCW 35.63.125) and make provisions to allow EVI such as charging stations and battery exchange stations and clarify where they are allowed.
- Revising code language to promote alternative fuel vehicles and covered bicycle storage
- Providing height exemptions for solar panels on flat and sloped roofs
- Allowing setback reductions for thicker, energy efficient insulated walls for existing structures
- Adding new definitions and terms

VI. Public Involvement

Staff invited various development professionals (landscape architects, a stormwater engineer and several architects) to attend and contribute their expertise at three meetings held at City Hall. The meetings were meant to obtain input from the perspective of the various professional to help staff identify opportunities for Code changes. Over the course of three meetings and engaging discussions during February and March 2011, staff was able to utilize ideas from the Technical Advisory Board (TAB) meeting to develop the first iteration of proposed Code Changes.

A presentation about the Green Codes project and its intent was made to the Kirkland Alliance of Neighborhoods on November 9th 2011. The presentation was well received and the neighborhood leaders were very complimentary of staff efforts.

On November 17th 2011, staff convened a few local developers and an engineering firm to review and brainstorm about a major project component, a new LID projects chapter. The meeting was very effective in giving staff feedback on what developers liked, did

not like which incentives were the most attractive. The developer's comments were passed on to the Planning Commission and the Houghton Community Council and several new ideas emerged.

The Planning Commission and the Houghton Community Council will hold a hold joint public hearing on January 12, 2012. Public notice of the amendments and the public hearing and meeting is being provided in accordance with State law. The City Council will take final action on the proposal in March 2012. All dates are subject to change.

VII. Conclusion

This EIS Addendum fulfills the environmental review requirements for the proposed amendments to the Kirkland Zoning Code Chapters 5, 18, 95, 105, 110, 115, new Chapter 114 and Kirkland Municipal Code Chapters 15 and 22 as part of the Green Codes update. The impacts of the proposal are within the range of impacts disclosed and evaluated in the *City of Kirkland 2004 Draft and Final Comprehensive Plan 10-year Update*; no new significant impacts have been identified. Therefore, issuance of this EIS Addendum is the appropriate course of action.

Attachments:

1. New Low Impact Development (LID) Chapter 114, related draft code for KZC 5.490.5, KMC 22.28.042 and KZC 18.10
2. Draft Code for KZC 115.90 – Calculating Lot Coverage
3. Draft Code for KZC 95.32, 95.44, 95.50
4. Draft Code for KZC 105.10, 105.77, 105.100
5. Draft Code for KZC 110.25 and KZC 110.27
6. Draft Code for KMC 15.52.060
7. Draft Code for 115.60.2.a.4, KZC 115.60.2.b.4, KZC 5.10.881.1, KZC 5.10.817 and KZC 115.115.3.q
8. Draft Code for new section KZC 115.33 (EVI), related chapter 5 definitions and KZC 105.67
9. Draft Code for new section 105.34 – Covered Bicycle Storage and KZC 5.10.177

Chapter 114 – LOW IMPACT DEVELOPMENT

Sections:

- 114.05 User Guide
- 114.10 Voluntary Provisions and Intent
- 114.15 Parameters for Low Impact Development
- 114.20 Design Standards and Guidelines
- 114.25 Review Process
- 114.30 Additional Standards
- 114.35 Required Application Documentation

114.05 User Guide

This chapter provides standards for an alternative type of site development that ensures low impact development (LID) facilities are utilized to manage stormwater on project sites in specified low density zones. If you are interested in proposing detached dwelling units or two unit home that reduce environmental impacts or you wish to participate in the City's decision on a project including this type of site development, you should read this chapter.

114.10 Voluntary Provisions and Intent

The provisions of this chapter are available as alternatives to the development of typical lots in low density zones.. In the event of a conflict between the standards in this chapter and the standards in KZC Chapters 15, 17 or 18, the standards in this chapter shall control except for the standards in KZC 83 and 141.

The goal of LID is to conserve and use existing natural site features, to integrate small-scale stormwater controls, and to prevent measurable harm to streams, lakes, wetlands, and other natural aquatic systems from development sites by maintaining a more hydrologically functional landscape. LID may not be applicable to every project due to topography, high groundwater, or other site specific conditions.

The LID requirements in this code do not exempt an applicant from stormwater flow control and water quality treatment development requirements. LID facilities can be counted toward those requirements, and in some cases may meet the requirements without traditional stormwater facilities (pipes and vaults).

The purpose of this chapter is to allow flexibility, establish the development guidelines, requirements and standards for low impact development projects. Because all projects are required to use some form of LID techniques and facilities as feasible, the use of LID techniques does not necessarily fulfill all the requirements for a LID project. This chapter is intended to fulfill the following purposes:

- (1) Manage stormwater through a land development strategy that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic predevelopment hydrologic conditions.
- (2) Encourage creative and coordinated site planning, the conservation of natural conditions and features, the use of appropriate new technologies and techniques, and the efficient layout of streets, utility networks and other public improvements.
- (3) Minimize impervious surfaces.
- (4) Encourage the creation or preservation of permanent forested open space.

(5) Encourage development of residential environments that are harmonious with on-site and off-site natural and built environments.

(6) Further the goals and the implementation of the policies of the Comprehensive Plan.

114.15 Parameters for Low Impact Development

Please refer to KZC 114.30 and 114.35 for additional requirements related to these standards.

Permitted Housing Types	<ul style="list-style-type: none"> • Detached Dwelling Units • Accessory Dwelling Units • 2/3 Unit Homes
Minimum Lot Size	<ul style="list-style-type: none"> • Individual lot sizes must be at least 50% of the minimum lot size for the underlying Zone.
Minimum Number of lots	<ul style="list-style-type: none"> • 4 lots
Maximum Density	<ul style="list-style-type: none"> • As defined in underlying zone's Use Zone Chart • Bonus Density of 10% is under consideration
Low Impact Development	<ul style="list-style-type: none"> • LID techniques must be employed to control stormwater runoff generated from 50% of all hard surfaces. This includes all vehicular and pedestrian access. LID facilities must be designed according to Public Works stormwater development regulations as stated in KMC 15.52.
Locations	<p>Allowed in Low density Residential Zones with the exception of the following:</p> <p>PLA 16, PLA 3C, RSA 1, RSA8 , RS 35 and RSX 35 zones in the Bridle Trails neighborhood, and the Holmes Point Overlay zone. Any property or portion of a property with shoreline jurisdiction must meet the regulations found in Chapter 83 KZC, including minimum lot size or units per acre and lot coverage.</p>
Review Process	<ul style="list-style-type: none"> • Short Plats shall be reviewed under KMC 22.20.15 and Subdivisions shall be reviewed under KMC 22.12.015.
Parking Requirements	<ul style="list-style-type: none"> • 2 stalls per detached dwelling unit • 1 stall per accessory dwelling unit • 1.5 stalls per unit in multi-unit home, rounded to next whole number • See KZC 105.20 for guest parking requirements • Parking pad width required in KZC 105.47 may be reduced to 10 feet.

	<ul style="list-style-type: none"> • Parking Pad may be counted in required parking • Tandem Parking is allowed where stalls are share by the same dwelling unit. • Shared garages in separate tract are allowed • All required parking must be provided on the LID project site.
Ownership Structure	<ul style="list-style-type: none"> • Subdivision • Condominium
Minimum Required Yards (from exterior property lines of the LID project)	<ul style="list-style-type: none"> • 20 feet for all front yards • 10 feet for all other required yards
Minimum Required Yards (from internal property lines)	<ul style="list-style-type: none"> • Front: 10 feet • Side and Rear: 5 feet • Zero Lot line for 2/3 unit homes
Front Porches	<ul style="list-style-type: none"> • Must comply with KZC 115.115.3.(n), except that Front Entry porches may extend to within 5 feet of the interior required front yard.
Garage Setbacks	<ul style="list-style-type: none"> • Must comply with KZC 115.43, except that attached garages on front façade of dwelling unit facing internal front property line must be setback 18 feet from internal front property line.
Lot Coverage (All impervious surfaces)	<ul style="list-style-type: none"> • Maximum lot coverage for entire site is based on maximum lot coverage percentage of underlying zone.
Common Open Space	<ul style="list-style-type: none"> • Minimum of 40% of entire development • Native & undisturbed vegetation is preferred • Allowance of 1% of common open space <u>area</u> for shelters or other recreational structures • Paths connecting <u>and through</u> open space to development must be pervious • Landscape Greenbelt Easement is required to protect and keep open space undeveloped in perpetuity
Maximum Floor Area	<ul style="list-style-type: none"> • Maximum Floor Area is 50% of the minimum lot size of the underlying zone.

114.20 Design Standards and Guidelines

1. Required Low Impact Development Stormwater Facilities

Low Impact Development (LID) Stormwater facilities shall be designed to control stormwater runoff from 50% of all hard surfaces created within entire development. This includes all vehicular and pedestrian access. LID facilities shall be designed according to Public Works stormwater development regulations, as stated in KMC 15.52.060. The maintenance of LID facilities shall be maintained in accordance with requirements in KMC 15.52.120. The proposed site design shall incorporate the use

of LID strategies to meet stormwater management standards. LID is a set of techniques that mimic natural watershed hydrology by slowing, evaporating/transpiring, and filtering water, which allows water to soak into the ground closer to its source. The design should seek to meet the following objectives:

- 1) Preservation of natural hydrology.
- 2) Reduced impervious surfaces.
- 3) Treatment of stormwater in numerous small, decentralized structures.
- 4) Use of natural topography for drainage ways and storage areas.
- 5) Preservation of portions of the site in undisturbed, natural conditions.
- 6) Restoration of Disturbed Sites
- 7) Reduction of the use of piped systems. Whenever possible, site design shall use multifunctional open drainage systems such as rain gardens, vegetated swales or filter strips that also help to fulfill landscaping and open space requirements.

2. Required Common Open Space

Common open space shall support and enhance the project's LID stormwater facilities; secondarily to provide a sense of openness, visual relief, and community for Low Impact Development projects. The minimum percentage for common open space is 40% (~~35-40%, exact % is to be determined~~) and is calculated using the size of the whole development. The common open space must be outside of wetlands, streams and their buffers, and developed and maintained to provide for passive recreational activities for the residents of the development.

- 1) Conventional Surface water management facilities, such as vaults and tanks shall be limited within common open space areas and shall be placed underground at a depth to sufficiently allow landscaping to be planted on top of them. Low Impact Development (LID) features are permitted, provided they do not adversely impact access to or use of the common open space for passive recreation. Neither conventional or LID stormwater facilities can result in the removal of healthy native trees, unless a positive net benefit can be shown and there is no other alternative for the placement of stormwater facilities. The Public Works Director must approve locating conventional stormwater facilities within the Common Open Space.
- 2) Existing native vegetation, forest litter and understory shall be preserved to the extent possible in order to reduce flow velocities and encourage sheet flow on the site. Invasive species, such as Himalayan blackberry, must be removed and replaced with native plants (see Kirkland Native Plant List). Undisturbed native vegetation and soil shall be protected from compaction during construction.
- 3) If no existing native vegetation, then applicant may propose a restoration plan that shall include all native species. No new lawn is permitted and all improvements installed must be of pervious materials.

- 4) Vegetation installed in common open space areas shall be designed to allow for access and use of the space by all residents, and to facilitate maintenance needs. However, existing mature trees should be retained.

114.25 Review Process

1. Approval Process – Low Impact Development Projects

- a. The City will review and process an application for a LID project concurrent with and through the same process as the underlying subdivision proposal (Process I, Chapter 145 KZC for Short Plats; Process IIA, Chapter 150 KZC for Subdivisions. However, public notice for LID projects shall be as set forth under the provisions of Chapter 150 KZC (Process IIA). A Process I review will be required for projects that use a condominium ownership structure and do not subdivide the property into individually platted lots.
- b. Lapse of Approval

Unless otherwise specified in the decision granting Process I approval, the applicant must begin construction or submit to the City a complete building permit application for development of the subject property consistent with the Process I approval within four years after the final decision granting the Process I approval or that decision becomes void. The applicant must substantially complete construction consistent with the Process I approval and complete all conditions listed in the Process I approval decision within six years after the final decision on the Process I approval or the decision becomes void. "Final decision" means the final decision of the Planning Director.

2. Approval Process – 2/3 Unit Homes

The City will review and process a LID project application that includes a 2/3 unit home with an additional land use process as follows:

One 2/3 unit home requires a Process I review

More than one 2/3 unit home requires a Process IIA review

3. Approval Process – Requests for Modifications to Standards

a. Minor Modifications

Applicants may request minor modifications to the general parameters and design standards set forth in this chapter. The Planning Director under a Process I, KZC 145 or Hearing Examiner under Process IIA, KZC 150 may modify the requirements if all of the following criteria are met:

- 1) The site is constrained due to unusual shape, topography, easements or sensitive areas, and
- 2) The modification is consistent with the objectives of this chapter, and
- 3) The modification will not result in a development that is less compatible with neighboring land uses.

114.30 Additional Standards

1. The City's approval of a Low Impact Development project does not constitute approval of a subdivision or short plat. An applicant wishing to subdivide in connection with a development under this chapter shall seek approval to do so concurrently with the approval process under this chapter.
2. To the extent there is a conflict between the standards set forth in this chapter and Title 22 of the Kirkland Municipal Code, the standards set forth in this chapter shall control.

114.35 Required Application Documentation

1. Site Assessment documents to be submitted with application include:
 - a. Survey prepared by a registered land surveyor or civil engineer.
 - b. Location of all existing and proposed lot lines and easements.
 - c. Location of all sensitive areas, including lakes, streams, wetlands, flood hazard areas, and steep slope/erosion hazard areas.
 - d. Landscape Plan showing existing and proposed trees and other vegetation.
2. Soil report prepared by a licensed civil engineer, geotechnical engineer, or engineering geologist.
3. Stormwater Drainage Report/Technical Information Report

Chapter 5 Amendments:

- 5.490.5 Low Impact Development
- A stormwater management and land development strategy applied at the parcel and the subdivision scale that emphasizes conservation and the use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic predevelopment hydrologic functions.

New - Kirkland Municipal Code Amendment

22.28.042 Lots---Low Impact Development

In multiple lot subdivisions (4 lots or more) not located in an RSA 1 zone or in the Holmes Point Overlay and not subject to Sections 22.28.030 and 22.28.040, the minimum lot area shall be deemed to have been met if the minimum lot area is not less than 50% of the lot area required of the zoning district in which the property is located as identified on the zoning map; provided that all lots meet the following standards:

- (a) Within the RSA 6 zone, the lots shall be at least 2,550 square feet.
- (b) Within the RSA 4 zone, the lots shall be at least 3,800 square feet.
- (i) The lots within the Low Impact Development meet the design standards and guidelines and approval criteria as defined in Chapter 114 of the Kirkland Zoning Code.

KZC 18.10 Special Regulation Amendments

1. Maximum units per acre is as follows:
 - a. In RSA 1 zone, the maximum units per acre is one dwelling unit.
 - b. In RSA 4 zones, the maximum units per acre is four dwelling units.
 - c. In RSA 6 zones, the maximum units per acre is six dwelling units.
 - d. In RSA 8 zones, the maximum units per acre is eight dwelling units.

In RSA 1, 4, 6 and 8 zones, not more than one dwelling unit may be on each lot, regardless of the size of the lot.
2. Minimum lot size per dwelling unit is as follows:
 - a. In RSA 1 zone, newly platted lots shall be clustered and configured in a manner to provide generally equal sized lots outside of the required open space area.
 - b. In RSA 4 zones, the minimum lot size is ~~7,600~~ 3,800 square feet.
 - c. In RSA 6 zones, the minimum lot size is ~~5,400~~ 2,550 square feet.
 - d. In RSA 8 zones, the minimum lot size is 3,800 square feet.
3. Road dedication and vehicular access easements or tracts may be included in the density calculation, but not in the minimum lot size per dwelling unit.
4. Floor Area Ratio (F.A.R.) allowed for the subject property is as follows:
 - a. In RSA 1 zone, F.A.R. is 20 percent of lot size.
 - b. In RSA 4 zones, F.A.R. is 50 percent of lot size.
 - c. In RSA 6 zones, F.A.R. is 50 percent of lot size.
 - d. In RSA 8 zones, F.A.R. is 50 percent of lot size; provided, that F.A.R. may be increased up to 60 percent of lot size for the first 5,000 square feet of lot area if the primary roof form of all structures on the site is peaked, with a minimum pitch of four feet vertical to 12 feet horizontal.

F.A.R. is not applicable for properties located within the jurisdiction of the Shoreline Management Act regulated under Chapter 83 KZC.
See KZC 115.42, Floor Area Ratio (F.A.R.) Calculation for Detached Dwelling Units in Low Density Residential Zones, for additional information.
5. On corner lots, only one front yard must be a minimum of 20 feet. All other front yards shall be regulated as a side yard (minimum five-foot yard). The applicant may select which front yard shall meet the 20-foot requirement.
6. Garages shall comply with the requirements of KZC 115.43, including required front yard.
7. Chapter 115 KZC contains regulations regarding home occupations and other accessory uses, facilities and activities associated with this use.

Chapter 115 Zoning Code Amendments

115.90 Calculating Lot Coverage

1. General – The area of all structures and pavement and any other impervious surface on the subject property will be calculated as a percentage of total lot area. If the subject property contains more than one (1) use, the maximum lot coverage requirements for the predominant use will apply to the entire development. The following exceptions shall not exceed an area equal to ten percent of the total lot area. Lot area not calculated under lot coverage must be devoted to open space as defined in KZC 5.610.
2. Exceptions¹
 - ~~a. Wood decks may be excluded if constructed with gaps between the boards and if there is pervious surface below the decks.~~
 - ~~ba. An access easement or tract that is not included in the calculation of lot size will not be used in calculating lot coverage for any lot it serves or crosses.~~
 - ~~c. For detached dwelling units in low density zones and having a front yard, 10 feet of the width of a driveway, outside of the required front yard, serving a garage or carport; provided, that:

 - ~~1) This exception cannot be used for flag or panhandle lots;~~
 - ~~2) The portion of the driveway excepted from lot coverage calculations shall not exceed 10 percent of the lot area; and~~
 - ~~3) The portion of the driveway excepted is not located in an access easement.~~~~
 - ~~d. Grass grid or brick pavers and compact gravel, when installed over a pervious surface, will be calculated as impervious surface at a ratio of 50 percent of the total area covered.~~
 - ~~e. Outdoor swimming pools.~~
 - ~~f. Pedestrian walkways required by Chapter 83 KZC and KZC 105.18.~~
 - ~~gb. Pervious areas below eaves, balconies, and other cantilevered portions of buildings.~~
 - ~~hc. Landscaped areas at least two (2) feet wide and 40 square feet in area located over subterranean structures if the Planning Official determines, based on site-specific information submitted by the proponent and prepared by a qualified expert, soil and depth conditions in the landscaped area will provide cleansing and percolation similar to that provided by existing site conditions.~~
 - ~~i. Retaining walls not immediately adjacent to other impervious areas.~~
3. Exemptions – The following exemptions will be calculated at a ratio of 50 percent of the total area covered. Exempted area shall not exceed an area equal to ten percent of the total lot area. Installation of exempted surfaces shall be done in accordance with the current adopted King County Stormwater Design Manual.

1. Permeable pavement (non-grassed).
2. Grassed modular grid pavement.
3. Open grid decking over pervious area.
4. Pervious surfaces in compliance with the stormwater design manual adopted in KMC 15.52.06.

Footnote¹: An exemption for Swimming pools is allowed in the Houghton Jurisdiction if the pool cover is self-draining into the swimming pool and does not cause surface water runoff as determined by the Planning Official.

Chapter 5 - Definitions

5.10.610 Open Space

~~Land not covered by buildings, roadways, parking areas or surfaces through which water can percolate into the underlying soils. Vegetated and pervious land not covered by buildings, roadways, sidewalks, driveways, parking areas, plazas, terraces, swimming pools, patios, decks, or other similar impervious or semi-impervious surfaces.~~

Chapter 95

95.32.3 Incentives and Variations to Development Standards

In order to retain trees, the applicant should pursue provisions in Kirkland's codes that allow development standards to be modified. Examples include but are not limited to number of parking stalls, right-of-way improvements, lot size reduction under Chapter 22.28 KMC, lot line placement when subdividing property under KMC Title 22, Planned Unit Developments, and required landscaping, including buffers for lands use and parking/driving areas.

Requirements of the Kirkland Zoning Code may be modified by the Planning Official as outlined below when such modifications would further the purpose and intent of this chapter as set forth in KZC 95.05 and would involve trees with a high or moderate retention value.

1. Common Recreational Open Space. Reductions or variations of the area, width, or composition of required common recreational open space may be granted.
2. Parking Areas and Access. Variations in parking lot design and/or access driveway requirements may be granted when the Public Works and Planning Officials both determine the variations to be consistent with the intent of City policies and codes.
3. Required Yards. Initially, the applicant shall pursue options for placement of required yards as permitted by other sections of this code, such as selecting one (1) front required yard in the RSX zone and adjusting side yards in any zone to meet the 15-foot total as needed for each structure on the site. The Planning Official may also reduce the front, ~~or~~ side or rear required yards; provided, that:
 - a. No required side yard shall be less than five (5) feet; and
 - b. The required front yard shall not be reduced by more than five (5) feet in residential zones. There shall not be an additional five (5) feet of reduction beyond the allowance provided for covered entry porches.
 - c. Rear yards that are not directly adjacent to another parcel's rear yard but that are adjacent to an access easement or tract, may be reduced by (5) feet.
 - d. No required yard shall be reduced by more than (5) feet in residential zones.

95.44 Internal Parking Lot Landscaping Requirements

The following internal parking lot landscape standards apply to each parking lot or portion thereof containing more than eight (8) parking stalls.

1. The parking lot must contain 25 square feet of landscaped area per parking stall planted as follows:
 - a. The applicant shall arrange the required landscaping throughout the parking lot to provide landscape islands or peninsulas to separate groups of parking spaces (generally every eight (8) stalls) from one another and each row of spaces from any adjacent driveway that runs perpendicular to the row. This island or peninsula must be

surrounded by a 6-inch-high vertical curb and be of similar dimensions as the adjacent parking stalls. Gaps in curbs are allowed for stormwater runoff.

- b. Landscaping shall be installed pursuant to the following standards:
 - 1) At least one (1) deciduous tree, two (2) inches in caliper, or a coniferous tree five (5) feet in height.
 - 2) Groundcover shall be selected and planted to achieve 60 percent coverage within two (2) years.
 - 3) Natural drainage landscapes (such as rain gardens, bio-infiltration swales and bioretention planters) are allowed when designed in compliance with the stormwater design manual adopted in KMC 15.52.060.
- c. Exception. The requirements of this subsection do not apply to any area that is fully enclosed within or under a building.

95.50.4 Installation Standards for Required Plantings

- 4. Soil Specifications. Soils in planting areas shall have adequate porosity to allow root growth. Soils which have been compacted to a density greater than one and three-tenths (1.3) grams per cubic centimeters shall be loosened to increase aeration to a minimum depth of 24 inches or to the depth of the largest plant root ball, whichever is greater. Imported topsoils shall be tilled into existing soils to prevent a distinct soil interface from forming. After soil preparation is completed, motorized vehicles shall be kept off to prevent excessive compaction and underground pipe damage. ~~The soil quality organic content of soils in any landscape area shall comply with the soil quality requirements of the Public Works Pre-Approved Plans. be as necessary to provide adequate nutrient and moisture-retention levels for the establishment of plantings.~~ See subsection (9) of this section for mulch requirements.

105.10.2.d Vehicular Access Easement or Tract Standards

- d. The paved surface in an easement or tract shall have a minimum of two (2) inches of asphalt concrete over a suitably prepared base which has a minimum thickness of four (4) inches of crushed rock or three (3) inches of asphalt-treated base. The Department of Public Works is authorized to modify the standards for a paved surface on a case-by-case basis. Pervious surfaces (such as pervious concrete or asphalt, and modular or grassed modular grid pavement) can be used in compliance with the stormwater design manual adopted in KMC 15.52.060.

105.77 Parking Area Design – Curbing

All parking areas and driveways, for uses other than detached dwelling units, must be surrounded by a 6-inch high vertical concrete curb. Gaps in Curbs are allowed for stormwater runoff.

105.100 Parking Area Design – Surface Materials

1. General – The applicant shall surface the parking area and driveway with a material comparable or superior to the right-of-way providing direct vehicle access to the parking area. Pervious surfaces (such as pervious concrete or asphalt, and modular grid pavement) can be used in compliance with the stormwater design manual adopted in KMC 15.52.060.
2. Exception – ~~Grass grid pavers~~ Grassed Modular Pavement may be used for emergency access areas that are not used in required permanent circulation and parking areas.

110.25 Required Public Improvements

1. General – KZC 110.27 through 110.50 establish different improvements for the different classifications of rights-of-way listed in KZC 110.20 and 110.22. KZC 110.52 establishes specific sidewalk and other public improvement standards in Design Districts. Except as specified in subsections (2), (3) and (4) of this section, the applicant shall install the specified improvements from the center line of the right-of-way to the applicant's property line. The applicant may increase the dimensions of any required improvement or install additional improvements in the right-of-way with the written consent of the Public Works Director.
2. Half-Street Improvements – If the one-half (1/2) of the right-of-way opposite the subject property has not been improved based on the provisions of this chapter, the applicant shall install improvements in the right-of-way as follows:
 - a. Alleys. The applicant shall install the required improvements for the entire width of the alley.
 - b. All Other Rights-of-Way.
 - 1) The applicant shall install the required improvements from his/her property line to and including the curb.
 - 2) The applicant shall grade to finished grade all the required driving and parking lanes in the entire right-of-way and a 5-foot-wide shoulder on the side of the right-of-way opposite the subject property.
 - 3) The applicant shall pave outward 20 feet from the curb adjacent to his/her property or as required by the Public Works Director. Pervious pavement is permitted for this section between the edge of the road way to the private driveway.
3. Required Paved Connection – In all cases except for alleys, if the access point for the subject site is not connected to an existing improved street by an improved hard surface, the applicant shall provide a hard surface improvement, of at least 20 feet in width, to the existing improved street. Pervious pavement can be permitted as the hard surface. The applicant may request a modification, deferment or waiver of this requirement through KZC 110.70.
4. Capital Improvement Projects – If the City Council has approved a capital improvements plan for a particular public right-of-way, that plan will govern the improvements required for right-of-way. To the extent feasible, public projects shall be designed pursuant to the standards established for each Design District contained in the Public Works Pre-Approved Plans manual.

110.27 Alleys

The pavement width of an alley must be at least 12 feet but may be required to be increased by the Public Works Director or Fire Marshall. For all commercial, industrial, office, or multifamily projects, the applicant shall improve the alley abutting the subject property and extend it to the existing improved street, and may be required to improve an additional 30 feet past the property frontage to provide emergency turnaround. For single-family dwellings using the alley for primary vehicular access, the applicant shall pave a 12-foot-wide asphalt apron

extending 20 feet from the nearest improved street toward the subject property. For all types of development permits, the Public Works Director shall determine the extent and nature of other improvements required in alleys on a case-by-case basis. Typical improvements include, but are not limited to, replacement of the alley driveway apron and curb, installation of storm drainage, repair of existing paving, and installation of crushed rock in gravel alleys. The use of pervious pavement in alleys will be considered if approved by the Public Works Director.

15.52.060 Design and construction standards and requirements.

(a) The standard plans as defined in Section 15.04.340 shall include requirements for temporary erosion control measures, storm water detention, water quality treatment and storm water conveyance facilities that must be provided by all new development and redevelopment projects. These standards shall meet or exceed the thresholds, definitions, minimum requirements, and exceptions/variances criteria found in Appendix I of the Western Washington Phase II Municipal Stormwater Permit, the 2009 King County Surface Water Design Manual, and the City of Kirkland Addendum to the 2009 King County Surface Water Design Manual as presently written or hereafter amended.

(b) Unless otherwise provided, it shall be the developer's and property owner's responsibility to design, construct, and maintain a system which complies with the standards and minimum requirements as set forth in the standard plans.

(c) In addition to providing storm water quality treatment facilities as required in this section and as outlined in the standard plans, the developer and/or property owner shall provide source control ~~BMPs~~ best management practices as described in Volume IV of the 2005 Stormwater Management Manual for Western Washington, such as structures and/or a manual of practices designed to treat or prevent storm water pollution arising from specific activities expected to occur on the site. Examples of such specific activities include, but are not limited to, carwashing at multifamily residential sites and oil storage at auto repair businesses.

(d) Privately maintained stormwater structures are not allowed within the public right-of-way, except on a case by case basis with approval from the Public Works Director.

~~(d)~~(e) The city will inspect all permanent storm water facilities prior to final approval of the relevant permit. All facilities must be clean and fully operational before the city will grant final approval of the permit. A performance bond may not be used to obtain final approval of the permit prior to completing the storm water facilities required under this chapter.

~~(e)~~(f) Adjustment Process. Any developer proposing to adjust the requirements for, or alter design of, a system required as set forth in the standard plans must follow the adjustment process as set forth in the standard plans.

~~(f)~~(g) Other Permits and Requirements. It is recognized that other city, county, state, and federal permits may be required for the proposed action. Further, compliance with the provisions of this chapter when developing and/or improving land may not constitute compliance with these other jurisdictions' requirements. To the extent required by law, these other requirements must be met. (Ord. 4214 § 1, 2009; Ord. 3711 § 4 (part), 1999)

115.60.2.a.4 Height Regulations – Exceptions

- 4) Solar panels on sloped roof forms(greater than 2:12) may exceed height limits by a maximum of six (6) inches. Solar panels on flat roof forms(less than or equal to 2:12) may exceed height limits by a maximum of twenty (20) inches.

115.60.2.a.4.b.4b. Other Structures

- 1) Rooftop appurtenances and their screens, subject to KZC 115.120, including roof forms pursuant to KZC 115.120(3).
- 2) The provisions in Chapter 117 KZC related to personal wireless service facilities supersede the provisions of this section to the extent an appurtenance falls within the definition of a personal wireless service facility.
- 3) Skylights may exceed the height limit by a maximum of six (6) inches.
- 4) Solar panels on sloped roof forms(greater than 2:12) may exceed height limits by a maximum of six (6) inches. Solar Panels on flat roof forms(less than 2:12) may exceed height limits by a maximum of twenty (20) inches.

115.115.3.q Required Yards

- q. Insulation, installed in or on an existing structure, may encroach eight (8) inches into a required yard unless precluded by Fire or Building Codes.

5.10.817 Rooftop Appurtenances

– HVAC equipment, mechanical or elevator equipment and penthouses, roof access stair enclosures, and similar equipment or appurtenances that extend above the roofline of a building, but not including personal wireless service facilities as defined by KZC 117.15. or solar panels as defined by KZC 5.10.881.1.

5.10.881.1 Solar Panel

-A panel designed to absorb the sun's rays for generating electricity or heating.

115.33 is a new section

115.33 Electric Vehicle Infrastructure

1. Purpose and Intent - It is the intent of these development regulations to encourage the use and viability of electric vehicles as they have been identified as a solution to energy independence, cleaner air and significantly lower green house gas emissions.

Electric vehicles need access to Electric Vehicle Infrastructure (EVI) in appropriate locations. In 2009 the Washington State Legislature passed House Bill 1481 relating to electric vehicles. The bill addressed EVI which includes the structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

The purpose of the development regulations in this section is to meet the State of Washington requirements and to also allow battery charging stations and battery exchange stations in appropriate use zones throughout the City.

1. General – This section establishes where the components of Electric Vehicle Infrastructure are allowed within the City.

Exceptions-

Electric Vehicle Infrastructure may not be located in any sensitive areas, their buffer or buffer setbacks.

2. All Use Zones

Level I and Level II Battery Charging Stations are allowed as an accessory use to an approved use within all Use Zones.

3. Commercial Zones

- a. A Battery Exchange station is allowed as an accessory use to all commercial zones where repair or maintenance of vehicles is permitted.
- b. A Rapid Battery (Level III) Charging Station is allowed as an accessory use to all commercial zones where repair and maintenance of vehicles is permitted including Gas Stations.

4. Industrial Zones

- a. A Rapid Battery(Level III) Charging Station is allowed as an accessory use to an approved use within the Light Industrial Technology (LIT) or other Industrial zones where Repair and Maintenance of vehicles is permitted.
- b. A Battery Exchange Station is allowed as an accessory use to an approved use within the Light Industrial Technology (LIT) or other industrial zones where repair and maintenance of vehicles is permitted.

5. Institutional Uses

A Rapid Battery Charging Station (Level III) is allowed as an accessory use to an

approved institutional use.

6. Signage is required to identify a charging station for the exclusive use of an electric vehicle. Onsite signage shall also be required to provide directional assistance. (See Plate 45 in KZC 180).

5.10 Definitions

5.10.071 Battery Charging Station (Level I, II and III)

- An electrical component assembly or cluster of component assemblies designed specifically to charge batteries within electric vehicles, which meet or exceed any standards, codes, and regulations set forth by chapter 19.28 RCW as amended and consistent with rules adopted under RCW 19.27.540 as amended. The terms 1, 2, and 3 are the most common electric vehicle charging levels, and include the following specifications:

- Level 1 is considered slow charging.
- Level 2 is considered medium charging.
- Level 3 is considered fast or rapid charging.

5.10.071.5 Battery Electric Vehicle (BEV)

- Any vehicle that operates exclusively on electrical energy from an off-board source that is stored in the vehicle's batteries, and produces zero tailpipe emissions or pollution when stationary or operating.

5.10.071.6 Battery Exchange Station

- A facility that will enable an electric vehicle with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery.

5.10.271 Electric Vehicle

- Any vehicle that operates, either partially or exclusively, on electrical energy from the grid, or an off-board source, that is stored on-board for motive purpose. "Electric vehicle" includes: (1) a battery electric vehicle; (2) a plug-in hybrid electric vehicle

5.10..272 Electric Vehicle Charging Station

-Electrical Vehicle Charging Station - A public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy (by conductive or inductive means) to a battery or other energy storage device in an electric vehicle.

.273 Electric Vehicle Infrastructure (EVI)

Attachment 8

- Structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

.274 Electric Vehicle Parking Space

- Any marked parking space that identifies the use to be exclusively for the parking of an electric vehicle.

5.10.667 Plug-in-Hybrid Electric Vehicle (PHEV)

- An electric vehicle that (1) contains an internal combustion engine and also allows power to be delivered to drive wheels by an electric motor; (2) charges its battery primarily by connecting to the grid or other off-board electrical source; (3) may additionally be able to sustain battery charge using an on-board internal-combustion-driven generator; and (4) has the ability to travel powered by electricity.

5.10.756 Rapid Charging Station

- An industrial grade electrical outlet that allows for faster recharging of electric vehicle batteries through higher power levels and that meets or exceeds any standards, codes, and regulations set forth by chapter 19.28 RCW and consistent with rules adopted under RCW 19.27.540.

5.10.682 Preferential Parking

Parking for Carpools, HOV's, high efficiency/low emission electric and alternative fuel vehicles.

105 Parking

105.67 Parking Area Design – Preferential Parking Allowance

Parking stalls may be allocated for Preferential Parking. A restriction on types of vehicles using preferred stalls applies from 7AM to 10AM daily.

105.34 Covered Bicycle Storage

If covered and secured bicycle storage is provided on site, a credit towards parking requirements at a ratio of one less parking stall per 6 bicycle spaces will be granted. The Planning Official may increase credits according to size of development and anticipated pedestrian and bicycle activity and proximity to transit facilities. A maximum reduction of 5% of required parking stalls may be granted. If a reduction of 5 or more stalls is granted, then changing facilities including showers, lockers shall be required.

5.10.177 Covered Bicycle Storage

An enclosure or shelter in which bicycles can be secured and provides fully covered protection for bicycles from inclement weather and theft.

Green Codes Project Schedule

Revised December 29, 2011

DATE	ITEM
January 4, 2011	City Council Update and Direction
January 27, 2011	Planning Commission (PC) Study Session – Scope/Work Program
February 4, 2011	Meetings with Technical Advisory Board & internet outreach
February 28, 2011	Houghton Community Council (HCC) Study Session – Review Project
March 4, 2011	Technical Advisory Board
March 24, 2011	PC Study Session – Review Alternatives
March 28, 2011	HCC – Review Alternatives
April 28, 2011	PC – 1 st Draft of Code Amendments
May 23, 2011	HCC – 1 st Draft of Code Amendments
June 9, 2011	PC - Study Session
June 27, 2011	HCC - Study Session
August 22, 2011	HCC – Clustered Housing/LID & City Council Action Items
August 25, 2011	PC– Clustered Housing/LID & City Council Action Items
August 2011	Outreach via Social Media Survey
September 2011	Convene Developers to review Clustered Housing/LID Concept
September 30, 2011	Technical Advisory Board Meeting – Comments on Draft Codes
October 13, 2011	PC – Draft Code Regulations
October 24, 2011	HCC –Draft Code Regulations
November 12, 2011	Kirkland Alliance of Neighborhoods Presentation
November 17, 2011	Developer’s Advisory Meeting
November 28, 2011	HCC/PC Joint Study Session - Draft Code Regulations
December, 2011	SEPA Review and Determination
January, 2011	Notice to Commerce (at least 60 days prior to City Action)
January 12, 2012	PC/HCC Joint Public Hearing
January 23, 2012	HCC Recommendation
February 9, 2012	PC – Make Recommendations
March 6, 2012	City Council –Recommendations and Direction (Action?)
March 20, 2012	City Council Final Action
April 23, 2012	HCC Final Action

