Meeting Agenda

Heritage Commission

City Hall
601 4th Avenue E
Olympia, WA 98501

Heritage Commission
Contact: Marygrace Goddu
(360) 753-8031

Monday, October 18, 2021 **12:00 PM** **317 4th Avenue East**

Heritage Review Committee

1. CALL TO ORDER

1.A ROLL CALL

2. APPROVAL OF AGENDA

3. APPROVAL OF MINUTES

3.A 21-0975 Approval of August 2, 2021 Heritage Review Committee Meeting Minutes

Attachments: Minute

4. PUBLIC COMMENT

During this portion of the meeting, community members may address the Advisory Committee or Commission regarding items related to City business, including items on the Agenda. In order for the Committee or Commission to maintain impartiality and the appearance of fairness in upcoming matters and to comply with Public Disclosure Law for political campaigns, speakers will not be permitted to make public comments before the Committee or Commission in these two areas: (1) on agenda items for which the Committee or Commission either held a Public Hearing in the last 45 days, or will hold a Public Hearing within 45 days, or (2) where the speaker promotes or opposes a candidate for public office or a ballot measure.

5. BUSINESS ITEMS

5.A 21-0976 Special Tax Valuation: 317 4th Avenue East, Annie's Artist Studios

Attachments: OMC 3.6 Special Tax Valuation
Special Valuation Guide to Eligible Expenses
HRC Review SOI Checklist
HistoricInventory-0717 - Ward Building
Certification and Applications 20210723_141608
Owner Statement Scope of Work
Photos
Expense Summary

5.B 21-0982 Permit review for 301 18th Ave SE - Solar Installation

Attachments: Guidelines for Solar Installations

Photos

Shade Report

Design

6. ADJOURNMENT

Accommodations

The City of Olympia is committed to the non-discriminatory treatment of all persons in employment and the delivery of services and resources. If you require accommodation for your attendance at the City Advisory Committee meeting, please contact the Advisory Committee staff liaison (contact number in the upper right corner of the agenda) at least 48 hours in advance of the meeting. For hearing impaired, please contact us by dialing the Washington State Relay Service at 7-1-1 or 1.800.833.6384.

City Hall
601 4th Avenue E.
Olympia, WA 98501
360-753-8244

Heritage Commission

Approval of August 2, 2021 Heritage Review Committee Meeting Minutes

Agenda Date: 10/18/2021
Agenda Item Number: 3.A
File Number:21-0975

Type: minutes **Version:** 1 **Status:** In Committee

Title
Approval of August 2, 2021 Heritage Review Committee Meeting Minutes

Meeting Minutes - Draft

Heritage Commission

City Hall
601 4th Avenue E
Olympia, WA 98501

Heritage Commission
Contact: Marygrace Goddu
(360) 753-8031

Monday, August 2, 2021 **12:00 PM** **On Site: 204 4th Avenue West**

Heritage Review Committee

1. CALL TO ORDER

Chair Miller called the meeting to order at 12:09 p.m.

1.A ROLL CALL

Present: 5 - Chair Holly Davies, Commissioner Jessica Bieber, Commissioner Kenneth House, Commissioner Garner Miller and Commissioner Gary Stedman

Excused: 1 - Commissioner Sheila Swalling

1.B OTHERS PRESENT

Historic Preservation Officer Marygrace Goddu
Building Owners Tom and Sandra Glaspie
Business Partner Andre Scott

2. APPROVAL OF AGENDA

The agenda was approved.

3. APPROVAL OF MINUTES

3.A 21-0753 Approval of June 21, 2021 Heritage Review Committee Meeting Minutes

Attachments: 6-21-21 Minutes

The minutes were approved.

4. PUBLIC COMMENT - None

5. BUSINESS ITEMS

5.A 21-0752 **Special Tax Valuation:** 204 4th Avenue West, The Angelus Hotel

Attachments: Special Valuation Guide to Eligible Expenses

Special Valuation HRC Review SOI Checklist

OMC 3.60 Special Property Tax Valuation

Inventory listing and historic photos

Assessor certification

Owner Statement of Scope (2)

Signed Angelus Contract (4)

Invoices_full (2)

Summary of invoicing

Angelus_SPV_photos

Ms. Goddu shared a presentation with the Committee on the work that was completed on the exterior of The Angelus Hotel and walked the full perimeter of the site.The owners provided additional detail on the work completed. The Committee was also given a tour of the interior public hallways and was able to enter and tour one unoccupied apartment space.

Commissioner House moved, seconded by Commissioner Stedman that the Heritage Review Committee find the work completed at the Angelus Hotel to be in compliance with the U.S. Secretary of the Interior's standards for Rehabilitation, specifically with regard to standards 1 through 7, and recommends the application for Special Valuation to the full Commission for approval pending resolution by staff of an outstanding question relative to financial documentation.

6. ADJOURNMENT

The meeting adjourned at 12:55 p.m.

City Hall
601 4th Avenue E.
Olympia, WA 98501
360-753-8244

Heritage Commission

Special Tax Valuation: 317 4th Avenue East, Annie's Artist Studios

Agenda Date: 10/18/2021
Agenda Item Number: 5.A
File Number:21-0976

Type: decision **Version:** 1 **Status:** In Committee

Title
Special Tax Valuation: 317 4th Avenue East, Annie's Artist Studios

Recommended Action
Move to recommend to the full Heritage Commission that the subject property be approved for Special Property Tax Valuation based on adherence to the Secretary of the Interior's Standards for Rehabilitation and compliance with program requirements.

Report
Issue:
Whether to recommend that the Heritage Commission recommend the subject property be approved for Special Valuation based on the completed rehabilitation work adherence to applicable standards, i.e., "the rehabilitation upon which the application is based has not altered or on any way adversely affected those elements of the property which qualify it as historically significant." (OMC 3.6.020C)

Staff Contact:
Marygrace Goddu, Historic Preservation Officer, Community Planning & Development, 360.480.0923

Presenter(s):
Marygrace Goddu, Historic Preservation Officer, Community Planning & Development, 360.480.0923
Jessie Wilson, Development Manager, Urban Olympia

Background and Analysis:
The City of Olympia has received an Application and Certification of Special Valuation on Improvements to Historic Property from the owner of 317 4th Avenue E. This property is individually listed as the Ward's Building, constructed in 1928.

The Historic Preservation Officer has confirmed that the subject property meets basic program eligibility criteria for Special Valuation per OMC 3.60:

- historic structure included in a historic district or individually registered;
- application filed no later than two years after beginning the work*; and
- per applicant's documentation, the qualified rehabilitation expenditures total at least 25% of the assessed value of the property exclusive of land value prior to the rehabilitation.

* The project start date was September 14, 2018. It was expected to reach completion by April 2020 but the project experienced significant delays due to Covid. The applicant has provided evidence of qualified rehabilitation expenditures for the 24 months prior to the date of application, July 2019 - July 2021.

Timeline for Special Valuation Review and Approval:
October 18 Heritage Review Committee (HRC) evaluation and recommendation.
October 27 Heritage Commission Review of HRC recommendation
November City Council Consideration
December Submit signed agreement to Assessor

Options:

1. The project work meets the Standards and the program requirements of OMC 3.60 should be recommended to the Heritage Commission for Special Valuation.
2. Only [certain listed work] meets the Standards and/or requirements, and project eligibility should be further evaluated.
3. The completed work does not meet the Standards and/or requirements and the committee does not recommend referral to the Heritage Commission.

Attachments:

OMC 3.60 Special Tax Valuation
Special Valuation Guide to Eligible Expenses
HRC Checklist
Historic Inventory Form
Assessor Signed Valuation
Owner Statement of Scope
Project photos
Documentation of Expenses

(32 hits)

Chapter 3.60
SPECIAL PROPERTY TAX VALUATION

3.60.000 Chapter Contents

Sections:

(Ord. 6370 §2, 2005, New Chapter).

3.60.010 Properties Eligible for Special Property Tax Valuation; Criteria

Properties eligible for the special property tax valuation under Chapter 449, Laws of 1985 (RCW 84.26), shall include properties on which one or more buildings have been substantially rehabilitated (i.e., the actual cost of the rehabilitation incurred by the property owner is equal to at least twenty-five (25) percent of the assessed value of the building, exclusive of the assessed value attributable to the land, prior to construction of the improvements, where the buildings meet the following criteria:

A. All buildings individually placed upon the Olympia Heritage Register pursuant to OMC 18.12, and which have retained major historic features; or

B. Buildings in the pivotal and primary classifications of buildings within a Heritage Register Historic District and which have retained major historic features; or

C. Buildings which are on the Olympia Heritage Register or are within an Olympia Heritage Register Historic District and which have lost major design feature(s). The Secretary of the Interior Standards for Treatment of Historic Properties (as amended) shall guide the restoration or improvement under this section. Provided, that the developer of the property shall have the option of replacing lost features through an accurate restoration or improving the property through a new adaptive design which is compatible with the size, scale, material and color of the historic building or the original feature.

(Ord. 6370 §2, 2005).

3.60.020 Process to reduce property tax

A. The Olympia City Council is hereby designated as the local Review Board to carry out the duties specified in this Chapter and in Chapter 449, Laws of 1985, Section 5 (RCW 84.26).

B. A person seeking to establish a special property tax valuation for property eligible under OMC Section 3.60.010 and Chapter 449, Laws of 1985 (RCW 84.26), shall submit an application to the County Assessor under RCW 84.26.040 within twenty-four (24) months of the commencement of the rehabilitation for which the special property tax valuation is sought, and no later than October 1 of the calendar year preceding the first assessment year for which classification is requested. The County Assessor shall submit the application to the Olympia Heritage Commission within ten (10) days of receiving the application. The Heritage Commission shall review the application and make a recommendation to the local Review Board within sixty (60) days of receipt of the

application, but not later than September 1 of the calendar year preceding the first assessment year for which the classification is requested.

C. The local Review Board shall approve an application for a special property tax valuation if the property is eligible under Section 3.60.010 of this Chapter and under RCW Chapter 84.26.030, the property owner enters into an agreement with the local Review Board for a ten-year period meeting the requirements set forth below, and the rehabilitation upon which the application is based have not altered or in any way adversely affected those elements of the property which qualify it as historically significant. Whether an alteration adversely affects those elements which qualify a property as historically significant, shall be determined by the Review Board based on the Secretary of the Interior Standards for Treatment of Historic Properties (as amended). For purposes of this section, the elements of the property which are historically significant shall be those specified with the designation to the Heritage Register. The ten-year agreement with the local Review Board shall commence on the date of its approval and require the owner to:

1. Monitor the property for its continued qualification for the special valuation.

2. Comply with rehabilitation plans and minimum standards of maintenance as defined in the agreement.

3. Make the historic aspects of the property accessible to public view one day a year, if the property is not visible from the public rights-of-way.

4. Apply to the local Review Board for approval or denial of any demolition or alteration of the property.

5. Comply with any other provisions in the original agreement as may be appropriate.

D. Once an agreement between an owner and the Review Board has become effective pursuant to Chapter 449, Laws of 1985 (RCW 84.26), there shall be no changes in standards of maintenance, public access, alteration or report requirements, or any other provisions of the agreement, during the period of the classification without the approval of all parties to the agreement.

E. An application for classification of an historic property as eligible for a special property tax valuation shall be approved or denied by the Review Board before December 31 of the calendar year in which the application is made. Prior to making its decision to approve or deny an application, the local Review Board is authorized to examine an applicant's records.

F. The Review Board shall notify the County Assessor and the applicant of the approval or denial of the application.

G. If the Review Board determines that the property qualifies as eligible historic property, the Review Board shall certify the fact in writing and shall file a copy of the certificate with the County Assessor within ten (10) days. The certificate shall state the facts upon which the approval is based.

H. Any decision of the Review Board acting as the local Review Board on any application for classification as historic property eligible for special valuation may be appealed to Superior Court under RCW 34.05.510 - .598 in addition to any other remedy of law. Any decision on the disqualification of historic property eligible for special valuation, or any other dispute, may be appealed to the County Board of Equalization in accordance with RCW 84.40.038.

(Ord. 6491 §1; 2007; Ord. 6370 §2, 2005).

3.60.030 Tax reduction –Expiration

When property has once been classified and valued as eligible historic property, it shall remain so classified and be granted the special valuation provided by this Chapter and RCW 84.26.070 for ten (10) years, or until the property is disqualified by the circumstances set forth in RCW 84.26.080 or as it may be amended from time to time. Whenever property granted a special property tax valuation hereunder becomes disqualified for the special valuation, additional tax shall be assessed and payable as provided in RCW 84.26.090 - .100, as they may be amended from time to time.

(Ord. 6370 §2, 2005).

Special Valuation: Eligible Expenses

The Washington State Special Valuation program provides tax relief for approved repairs to designated historic properties. Expenses are reviewed and recommended for approval by the Olympia Heritage Commission to ensure that they meet certain standards and definitions.

Qualified Rehabilitation Expenditures are defined by the IRS. These generally include:

1. Direct construction costs;

2. Certain soft costs, including:

    a. Architectural and engineering fees;
    b. Construction permit fees;
    c. Development management fees;
    d. Construction loan interest and fees;
    e. Utilities, taxes, and insurance for the construction period; and
    f. State sales tax.

The following costs are generally **not** considered Qualified Rehabilitation Expenditures:

1. Costs related to the acquisition of the property;

2. Expenditure attributable to enlargement of the building, except to make the building fully usable such as adding a bathroom or kitchen if one is not initially existing;

3. Costs of valuation and permanent financing of the property; and

4. Overhead costs or other "costs of doing business".

Eligible costs are further defined here:

- **Actual Cost of Rehabilitation, as per WAC-254-20-030**: "Actual cost of rehabilitation" means costs incurred within twenty-four months prior to the date of application and directly resulting from one or more of the following:
    a) Improvements to an existing building located on or within the perimeters of the original structure; or
    b) Improvements outside of but directly attached to the original structure which are necessary to make the building fully useable but shall not include rentable/habitable floorspace attributable to new construction; or
    c) Architectural and engineering services attributable to the design of improvements; or
    d) All costs defined as "qualified rehabilitation expenditures" for the purposes of the federal historic preservation investment tax credit.
- **Qualified Rehabilitation Expenditure, as per Internal Revenue Code Section 47(c)(2)**: In general. The term "qualified rehabilitation expenditure" means any amount properly chargeable to capital account…in connection with the rehabilitation of a qualified rehabilitated building. Certain expenditures not included--
    a) Cost of Acquisition: The cost of acquiring any building or any interest therein;
    b) Enlargements: Any expenditure attributable to the enlargement of the existing building except attachments to make the building fully usable.

Reference on Expense Eligibility

Provided each expense is determined by the Olympia Heritage Commission to meet the **Washington State Advisory Council's Standards for the Rehabilitation and Maintenance of Historic Properties**, below is a list of the types of expenses that:

✓ Generally **are** considered eligible ✘ Generally **are not** considered eligible

Appliances & Comfort Systems	
✓	✘
Water heaters HVAC & A/C units Furnaces Ventilation systems	Kitchen & other home appliances Home electronics
Furnishings	
✓	✘
Built-ins Shelves Cabinetry Window seats/nooks	Moveable furniture
Plumbing & Electrical	
✓	✘
Fixtures Required exterior infrastructure (like sewer lines) Fire suppression systems Other code-related requirements	Security & alarm systems (like CCTV) Moveable lamps
Landscaping	
✓	✘*
Sitework required for rehabilitation (like clearing, disposal and stabilization) Sitework required for utilities and foundation Landscape stabilization	Plants Soil amendments Landscape design Accent lighting Sprinkler systems **If the landscape itself is landmarked, landscape design and plantings may be included.*

City of Olympia Special Valuation Review Checklist

The local Review Board shall approve an application for a special property tax valuation if the property is eligible under Section 3.60.010 of this Chapter and under RCW Chapter 84.26.030, the property owner enters into an agreement with the local Review Board for a ten-year period meeting the requirements set forth below, and the rehabilitation upon which the application is based have not altered or in any way adversely affected those elements of the property which qualify it as historically significant. Whether an alteration adversely affects those elements which qualify a property as historically significant, shall be determined by the Review Board based on the ***Secretary of the Interior Standards for Treatment of Historic Properties*** *(as amended). (OMC 3.60.020(C))*

Standard 1	
Complies ❒ **Conflicts** ❒ **N/A** ❒	A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
Justification, Conditions & other Notes:	

Standard 2	
Complies ❒ **Conflicts** ❒ **N/A** ❒	The historic character of a property will be retained and preserved. The removal of distinctive materials or alterations of features, spaces, and spatial relationships that characterize a property will be avoided.
Justification, Conditions & other Notes:	

Standard 3	
Complies ❒ **Conflicts** ❒ **N/A** ❒	Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
Justification, Conditions & other Notes:	

Standard 4	
Complies ❒ **Conflicts** ❒ **N/A** ❒	Changes to a property that have acquired historic significance in their own right will be retained and preserved.
Justification, Conditions & other Notes:	

Standard 5	
Complies ❒ **Conflicts** ❒ **N/A** ❒	Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
Justification, Conditions & other Notes:	

Standard 6	
Complies ❒ **Conflicts** ❒ **N/A** ❒	Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.
Justification, Conditions & other Notes:	

Standard 7	
Complies ❒ **Conflicts** ❒ **N/A** ❒	Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
Justification, Conditions & other Notes:	

Standard 8	
Complies ❒ **Conflicts** ❒ **N/A** ❒	Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
Justification, Conditions & other Notes:	

Standard 9	
Complies ❒ **Conflicts** ❒ **N/A** ❒	New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
Justification, Conditions & other Notes:	

Standard 10	
Complies ❒ **Conflicts** ❒ **N/A** ❒	New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.
Justification, Conditions & other Notes:	

Historic Property *Ward's Building*

Inventory Report for *317 East 4th Olympia, Thurston, 98506*

LOCATION SECTION

Historic Name: Ward's Building
Common Name: (#34-690)
Property Address: 317 East 4th Olympia, Thurston, 98506
Comments: OLYMPIA

Field Site No.: 717
OAHP No.:

County	Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	Quadrangle
Thurston	T18R02W	14	SW		TUMWATER

UTM Reference
Zone: 10 **Spatial Type:** Point **Acquisition Code:** TopoZone.com
Sequence: 0 **Easting:** 507830 **Northing:** 5209930

Tax No./Parcel No.
78503400300

Plat/Block/Lot
Sylevester l3 Blk 34

Supplemental Map(s)
City of Olympia Planning Department

Acreage
.17

IDENTIFICATION SECTION

Field Recorder: Shanna Stevenson **Date Recorded:** 10/16/1985 **Survey Name:** OLYMPIA

Owner's Name: B & L, LLC
Owner Address: 3114 41st Way SE
City/State/Zip: Olympia, WA 98501

Classification: Building
Within a District? No
Contributing?

Resource Status
Survey/Inventory
Local Register

Comments

National Register Nomination: 0
Local District:
National Register District/Thematic Nomination Name:

DESCRIPTION SECTION

Historic Use: Commerce/Trade - Business
Current Use: Commerce/Trade - Business

Plan: Rectangle **No. of Stories:** 2 plus new m

Structural System: Concrete - Block

Changes to plan: Extensive
Changes to original cladding: Intact
Changes to windows: Moderate
Changes to interior: Extensive
Changes to other:
Other (specify):

Cladding Brick, Concrete
Foundation Concrete - Poured
Style Commercial
Form/Type
Roof Material Asphalt / Compostion - Rolled
Roof Type Unknown

Historic Property *Ward's Building*

Inventory Report for *317 East 4th Olympia, Thurston, 98506*

NARRATIVE SECTION

Study Unit	**Other**
Architecture/Landscape Architecture	
Commerce	

Date Of Construction: 1928
Architect:
Builder:
Engineer:

Property appears to meet criteria for the National Register of Historic Places: No
Property is located in a historic district (National and/or local): Yes
Property potentially contributes to a historic district (National and/or local):

Statement of Significance The Wards Building built in 1928 by the Casco Company has long been a part of the mercantile scene in Olympia. One of the first chain stores to locate in Olympia, the Wards store was for many years a catalogue outlet. In the early 1960's, the building was also used by the Olympia School District as a site of the original Olympia Vocational Technical Institute, the forerunner of the present South Puget Sound Community College. The building was renovated retaining a number of its historic exterior features, but completely changing the interior. Listed on the Olympia Register

Description of Physical Appearance This is a rectangular concrete building of two stories, with a full basement and a newly-added mezzanine. Its brick front (north) facade is topped by a stepped and arched Mission Revival style parapet, edged by decorative brickwork. The upper story has three bays separated by engaged pilasters, containing wide tripartite windows with rectangular transoms. The ground floor has a new wood and plate glass storefront with a projecting wooden planter box, but maintains the original tile kickplate and full-width transom of small fixture glass tiles. (The mezzanine level is recessed from the front wall, but gains light through the transom.) One of the two original recessed entries with its mosaic tile floor has been retained, but the other has been filled in flush with the sidewalk and incorporated into the new storefront. The remaining entry is topped by a fabric awning. The interior has a new full-height atrium with a large skylight, and the floors and divided into offices and a restaurant.

Major Bibliographic References Knox, Esther, A Diary of the Olympia School District, 1852-1976, Olympia School District, 1976.

PHOTOS

View of NW corner
taken 10/16/1985
Photography Neg. No. (Roll No./Frame No.): 26-2A
Comments:

Department of Revenue
Washington State

Application and Certification of Special Valuation on Improvements to Historic Property

Chapter 84.26 RCW

ASSESSOR
JUL 22 2021
RECEIVED

File With Assessor by October 1

File No: HIS2021-0001

I. Application

See Attached for additional 3 parcels that make up the whole building (exhibits A, B + C)

County: Thurston

Property Owner: Urban Olympia 4 LLC

Parcel No./Account No: 82210000100

Mailing Address: PO Box 7534 Olympia WA 98507

Legal Description: Section 14 Township 18 Range 2W Quarter NE SW Condominium WARD BUILDING CONDOMINIUM UNIT 1 BASEMENT Document 3901493

Property Address (Location): 317 4th Ave E, Olympia WA 98501

Describe Rehabilitation: Remodeled the old Montgomery Ward building into apartments and work space.

Property is on: (check appropriate box) ☐ National Historic Register ☒ Local Register of Historic Places

Building Permit No: 17-5455 Date: 12/19/2017 Jurisdiction: Thurston/Olympia (County/City)

Rehabilitation Started: 09/14/2018 Date Completed: 4/14/2021

Actual Cost of Rehabilitation: $ 2,000,000.00 = includes all 4 parcels - 82210000100 82210000200, 82210000300 82210000400

Affirmation

As owner(s) of the improvements described in this application, I/we hereby indicate by my signature that I/we am/are aware of the potential liability (see reverse) involved when my/our improvements cease to be eligible for special valuation under provisions of Chapter 84.26 RCW.

I/We hereby certify that the foregoing information is true and complete.

Signature(s) of All Owner(s):

II. Assessor

The undersigned does hereby certify that the ownership, legal description and the assessed value prior to rehabilitation reflected below has been verified from the records of this office as being correct.

Assessed value exclusive of land prior to rehabilitation: $ 654,900 = includes all 4 parcels

Date: 7/23/21

Assessor/Deputy

For tax assistance, visit http://dor.wa.gov/content/taxes/property/default.aspx or call (360) 570-5900. To inquire about the availability of this document in an alternate format for the visually impaired, please call (360) 705-6715. Teletype (TTY) users may call 1-800-451-7985.

REV 64 0035e (w) (7/14/06)

Department of Revenue
Washington State

Application and Certification of Special Valuation on Improvements to Historic Property

Chapter 84.26 RCW

File With Assessor by October 1

File No: _____

I. Application

"Exhibit A"

County: Thurston

Property Owner: Urban Olympia 4 LLC

Parcel No./Account No: 82210000200

Mailing Address: PO Box 7534 Olympia WA 98507

Legal Description: Section 14 Township 18 Range 2W Quarter NE SW Condominium WARD BUILDING CONDOMINIUM UNIT 2 FIRST FLOOR Document 3901493

Property Address (Location): 317 4th Ave E Olympia WA 98501

Describe Rehabilitation: Remodeled the old Montgomery Ward building into apartments and work space.

Property is on: (check appropriate box) ☐ National Historic Register ☒ Local Register of Historic Places

Building Permit No: 17-5455 Date: 12/19/2017 Jurisdiction: Thurston/Olympia (County/City)

Rehabilitation Started: 09/14/2018 Date Completed: 04/14/2021

Actual Cost of Rehabilitation: $ 2,000,000.00

Affirmation

As owner(s) of the improvements described in this application, I/we hereby indicate by my signature that I/we am/are aware of the potential liability (see reverse) involved when my/our improvements cease to be eligible for special valuation under provisions of Chapter 84.26 RCW.

I/We hereby certify that the foregoing information is true and complete.

Signature(s) of All Owner(s):

_____

_____

_____

II. Assessor

The undersigned does hereby certify that the ownership, legal description and the assessed value prior to rehabilitation reflected below has been verified from the records of this office as being correct.

Assessed value exclusive of land prior to rehabilitation: $ _____

Date: _____ _____ Assessor/Deputy

For tax assistance, visit http://dor.wa.gov/content/taxes/property/default.aspx or call (360) 570-5900. To inquire about the availability of this document in an alternate format for the visually impaired, please call (360) 705-6715. Teletype (TTY) users may call 1-800-451-7985.

Department of Revenue
Washington State

Application and Certification of Special Valuation on Improvements to Historic Property

Chapter 84.26 RCW

File With Assessor by October 1

File No: _____

I. Application

"Exhibit B"

County: Thurston

Property Owner: Urban Olympia 4 LLC

Parcel No./Account No: 82210000300

Mailing Address: PO Box 7534 Olympia WA 98507

Legal Description: Section 14 Township 18 Range 2W Quarter NE SW Condominium WARD BUILDING CONDOMINIUM UNIT 3 SECOND FLOOR Document 3901493

Property Address (Location): 317 4th Ave E Olympia WA 98501

Describe Rehabilitation: Remodeled the old Montgomery Ward building into apartments and work space.

Property is on: (check appropriate box) ☐ National Historic Register ☒ Local Register of Historic Places

Building Permit No: 17-5455 Date: 12/19/2017 Jurisdiction: Thurston/Olympia (County/City)

Rehabilitation Started: 09/14/2018 Date Completed: 04/14/2021

Actual Cost of Rehabilitation: $ 2,000,000.00

Affirmation

As owner(s) of the improvements described in this application, I/we hereby indicate by my signature that I/we am/are aware of the potential liability (see reverse) involved when my/our improvements cease to be eligible for special valuation under provisions of Chapter 84.26 RCW.

I/We hereby certify that the foregoing information is true and complete.

Signature(s) of All Owner(s):

_____

_____

_____

II. Assessor

The undersigned does hereby certify that the ownership, legal description and the assessed value prior to rehabilitation reflected below has been verified from the records of this office as being correct.

Assessed value exclusive of land prior to rehabilitation: $ _____

Date: _____ _____ Assessor/Deputy

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Department of Revenue
Washington State

Application and Certification of Special Valuation on Improvements to Historic Property

Chapter 84.26 RCW

File With Assessor by October 1

File No: _____

I. Application

"Exhibit C"

County: Thurston

Property Owner: Urban Olympia 4 LLC

Parcel No./Account No: 82210000400

Mailing Address: PO Box 7534 Olympia WA 98507

Legal Description: Section 14 Township 18 Range 2W Quarter NE SW Condominium WARD BUILDING CONDOMINIUM UNIT 4 THIRD FLOOR Document 3901493

Property Address (Location): 317 4th Ave E Olympia WA 98501

Describe Rehabilitation: Remodeled the old Montgomery Ward building into apartments and work space.

Property is on: (check appropriate box) ☐ National Historic Register ☒ Local Register of Historic Places

Building Permit No: 17-5455 Date: 12/19/2017 Jurisdiction: Thurston/Olympia (County/City)

Rehabilitation Started: 09/14/2018 Date Completed: 04/14/2021

Actual Cost of Rehabilitation: $ 2,000,000.00

Affirmation

As owner(s) of the improvements described in this application, I/we hereby indicate by my signature that I/we am/are aware of the potential liability (see reverse) involved when my/our improvements cease to be eligible for special valuation under provisions of Chapter 84.26 RCW.

I/We hereby certify that the foregoing information is true and complete.

Signature(s) of All Owner(s):

_____

_____

_____

II. Assessor

The undersigned does hereby certify that the ownership, legal description and the assessed value prior to rehabilitation reflected below has been verified from the records of this office as being correct.

Assessed value exclusive of land prior to rehabilitation: $ _____

Date: _____

_____
Assessor/Deputy

For tax assistance, visit http://dor.wa.gov/content/taxes/property/default.aspx or call (360) 570-5900. To inquire about the availability of this document in an alternate format for the visually impaired, please call (360) 705-6715. Teletype (TTY) users may call 1-800-451-7985.

Annie's Studios Scope of Work

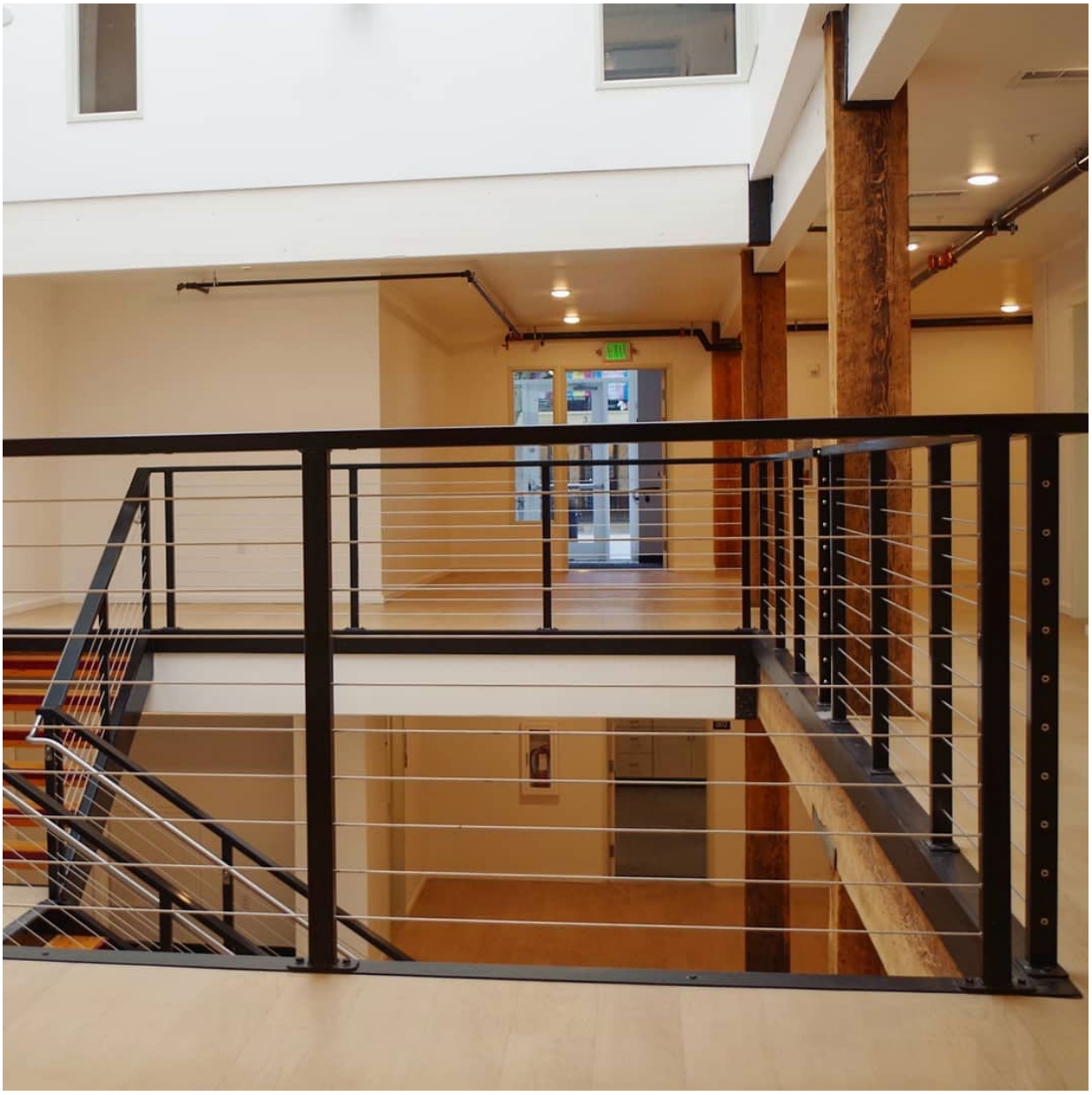
In 2016 Urban Olympia 4 LLC purchased the building known as the Ward Building, located at 317 4th Ave E in Downtown Olympia, from Legion Square LLC. The purpose of this was to renovate the existing historical building, keeping in line with as much of the exterior historical features as possible. From the photos you can see that we kept the exterior, existing brick and tile work as close to the original building as possible. On the interior we kept a lot of the existing beams and exposed sprinkler pipes to keep with the character of the original building. The current project now consists of 18 apartment units, 12 work/art studios and a large open atrium (original to the building, but updated and reworked) to serve as gallery and/or event space.

Historic Photos - Ward's building

Façade, Before and After

Entry, before and after. Tile photos have been preserved.

Entry windows rehabilitated



Annie's Studios Expense Summary
for July 2019 - July 2021

Design:

Cross Engineers, Inc.	3,750.00
Fast Signs	5,983.80
Hultz BHU Engineers Inc.	200.00
PCS Structural Solutions, Inc.	4,285.00
Richmond Engineering LLC	1,800.00
Thomas Architecture Studio	2,139.19
Total:	18,157.99

Construction:

Always Safe & Lock	3,103.56
Bailey General Contractors	34,678.50
Berq Scaffolding, INC.	13,452.92
Berschauer Enterprises	104,220.00
Bilco	3,066.56
Builders FirstSource	56,005.73
Card Member Service	78,526.35
Doors Unlimited INC	78,801.00
Excaliber Roofing & Repair, Inc.	39,081.00
Extreme Excavation, LLC	15,168.44
Ferguson	439.41
Graphic Communication's	525.28
GTS Interior Supply	26,808.60
Home Depot	112.19
Insulation Northwest	44,179.00
JMG Painting	62,336.00
Kell-Chuck Glass	13,673.18
Knight Fire Protection, Inc.	34,434.00
Magic Cleaners	6,404.00
Materials Testing & Consulting, Ir	3,064.25
McKinney's Appliance Center Inc	27,846.30
Meyer Floor Covering	33,777.32
Miller Kitchen & Bath LLC	27,696.17
Northwest Concrete Cutting, LLC	1,148.95
Olivia Beach Construction Co.	8,414.04
Olympia Sheet Metal Inc	10,601.94
Olympic Plumbing Technology	139,680.30
Pioneer Fire & Security	31,319.81
Safety Kleen	514.41
Schindler Elevator Corporation	72,094.00
Southwest Electric Inc.	174,540.00
Star Rentals Inc	34,761.12
Steelhead Framing & Drywall Inc.	263,220.00
Stephen O'Malley (Reim)	501.39
Tacoma Screw Products, INC.	3,557.32

	Topline Counters, LLC	9,444.16
	Tumwater Tool & Fastener LLC	108.74
	WA Department of Ecology	111.00
	WA Dept L&I - Elevator Program	160.30
	Zieglers Welding	109,881.44
Total:		1,567,458.68
Management Fees:		
	Urban Management Company, LL	10,483.75
Permitting:		
	City of Olympia	20,441.82
Insurance:		
	Liberty Mutual Insurance	21,029.52
Utilities:		
	City of Olympia - Utilities	9,067.61
	Comcast	1,848.52
	Puget Sound Energy	43,290.52
Total:		54,206.65
Loan:	Commencement Bank	71,438.93
Total Expense:		1,763,217.34

City Hall
601 4th Avenue E.
Olympia, WA 98501
360-753-8244

Heritage Commission

Permit review for 301 18th Ave SE - Solar Installation

Agenda Date: 10/18/2021
Agenda Item Number: 5.B
File Number:21-0982

Type: decision **Version:** 1 **Status:** In Committee

Title
Permit review for 301 18th Ave SE - Solar Installation

Recommended Action
Act on the permit request following consideration of the characteristics of this property and requested solar application (see options below); and determine whether to recommend amendments to the Commission's Guidelines for Solar Installations.

Report
Issue:
Whether to approve the homeowner's proposed solar installation as an exception to the Commission's current Guidelines for Solar Installations, and if so, whether to recommend amendment to the Guidelines for Solar Installations for consideration by the Heritage Commission.

Staff Contact:
Marygrace Goddu, Historic Preservation Officer, Community Planning & Development, 360.480.0923

Presenter(s):
Garner Miller, Heritage Review Committee Chair

Background and Analysis:
The Commission adopted Guidelines for Solar Installations for historic buildings and districts in February 2021. The guidelines support placement of panels on roof areas not visible from the street and discourage placement on street-facing roofs, but do provide some flexibility for street-facing placement when there are no other "viable" options. "Viable" is defined as a Total Solar Resource Fraction (TSRF) of 80% or higher, to be assessed and documented by a professional solar consultant or installer.

This homeowner is able to exceed the viability threshold using roof sections at the rear of the home but is seeking to place additional panels on the street-facing side of the home to increase the overall capture of solar energy. The proposed location is on the roof of a shed-dormer, which is expected to have very limited visibility from street-level. The panels in this location would not meet the 80% TSRF.

The Commission's Guidelines for Solar Installations are not clear regarding the placement of panels on the street-facing side of the home when the proposed locations are not visible or are minimally visible.

Additional clarification may be helpful regarding how the 80% TSRF is to be applied. Other measurable considerations could be considered, such as the total solar offset to be gained and/or a homeowner's efforts to improve the home's energy efficiency and reduce energy consumption prior to proposing solar on the front of the home.

The Guidelines are currently interpreted to mean that street-facing placement is allowable when the following two conditions occur:

1) The proposed street-facing, visible location receives enough sunlight to generate a minimum of 80% Total Solar Resource Fraction (TSRF);

and,

2) An 80% TSRF cannot be achieved with any other combination of less visible rooftop locations on the property - meaning the homeowner looked at other placement options first.

The Committee is asked to consider:

1. Whether this permit should be approved, and by what reasoning.
2. Whether and how the Guidelines for Solar Installations might be amended.

Neighborhood/Community Interests (if known):
Historic homeowners and historic districts.

Options:

Approve the permit as an exception and recommend to the full Heritage Commission that the Guidelines for Solar Installations be amended to clarify them or to adjust the review method or measurement.

Do not approve the permit.

Approve the permit with conditions.

Attachments:
Guidelines for Solar Installations
Photos
Shade Study
Solar Panel Design

Guidelines for Solar Installations

for Locally Designated Historic Properties

Introduction

Sensitive retrofitting of historic buildings ensures their continued use and optimal functioning, contributes to sustainability by preserving energy, and makes for happier historic homeowners.

To that end, the Olympia Heritage Commission encourages historic property owners to pursue energy-saving retrofits that achieve reasonable energy savings, at reasonable costs, with the least intrusion or impact on the character of the building, including the use of use renewable energy sources such as solar power.

The installation of solar panels is an adaptive alteration that need not conflict with historic preservation. Recognizing that the characteristics of individual properties will vary greatly, the principles and guidelines presented here will be applied.

All solar panel installations should conform to the **Secretary of the Interior's Standards for Rehabilitation.*** This means that the system must be compatible with the historic building, it must be reversible, and it must not destroy or conceal character-defining historic features.

***The Applicable Standards are:**

Standard Two: The historic character of a property shall be retained and preserved. The removal of historic materials or alterations of features that characterize a property shall be avoided.

Standard Nine: New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property.

In reviewing proposals in the context of these standards, the Heritage Commission will consider the following:

1. **Location. Ideally, solar panels and other equipment will not be visible from a public street.**
2. **Historic Features. Historic features and materials should not be damaged or obscured, and installations should be fully reversible.**
3. **Overall Impact. The physical and visual impact of the installation should be subordinate to the design, proportions, and overall appearance of the home.**

Roof locations that are not visible from public streets, locations within the rear yard, or on secondary structures are preferred for solar arrays.

OHC will consider solar panel placement that is visible from public streets (on primary elevations) only if no other location is viable.

"Viable" is defined as a Total Solar Resource Fraction (TSRF) of 80% or higher, to be assessed and documented by a professional solar consultant or installer.

Secondary Elevations

- Solar panels should be installed on rear slopes or other locations not easily visible from the public right-of-way. Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage the historic integrity of the resource and district.

- Flat roof structures should have solar panels set back from the roof edge to minimize visibility. Pitch and elevation should be adjusted to reduce visibility from public right-of-way.

- Solar panels should be positioned behind existing architectural features such as parapets, dormers, and chimneys to limit their visibility without impeding effectiveness whenever possible.

- Use solar panels and mounting systems that are compatible in color to established roof materials.

- Mechanical equipment associated with the solar panel system such as conduits, junction boxes, and safety disconnect switch boxes should be placed as unobtrusively as possible and painted or treated to match surrounding material.

- Use of solar systems in non-historic windows or on walls, siding, or shutters should be installed as to limit visibility from the public right of way.

Freestanding or Detached

- Freestanding or detached on-site solar panels should be installed in locations that minimize visibility from the public right of way. These systems should be screened from the public right of way with materials seen elsewhere in the district such as fencing, or vegetation of suitable scale for the district and setting.

- Placement and design should not detract from the historic character of the site or destroy historic landscape materials.

New Construction in Historic Site or District

- Solar panels should be integrated into the initial design of new construction or infill projects, when possible, to assure cohesion of design within the historic context.

- Solar panels should be installed on rear slopes or other locations not highly visible from the public right of way whenever possible. Panels should be installed flat and not alter the slope of the roof.

- Flat roof structures should have solar panels set back from the roof edge to minimize visibility. Pitch and elevation should be adjusted to reduce visibility from the public right-of-way.

- Use solar panels and mounting systems that are compatible in color to established roof materials.

- Solar systems in windows or on walls, siding, or shutters should be installed with limited visibility from the public right-of-way.

- Mechanical equipment associated with the solar panel system such as conduits, junction boxes, and safety disconnect switch boxes should be placed as unobtrusively as possible and painted or treated to match surrounding material.

Primary Elevations

For most properties, locating solar panels on the primary facade is the least desirable option because it will have the greatest adverse effect on the property's character-defining features. All other viable options (those with TSRF of 80% or higher) should be pursued.

- Utilization of low-profile solar panels is recommended. Solar shingles, laminates, glazing, or similar materials should not replace original or historic materials. Use of solar systems in windows or on walls, siding, and shutters should be avoided.

- Panels should be installed flat and not alter the slope of the roof. Installation of panels must be reversible and not damage the historic integrity of the resource or district.

- Solar panels should be positioned behind existing architectural features such as parapets, dormers, and chimneys to limit their visibility without impeding effectiveness whenever possible.

- Use solar panels and mounting systems that are compatible in color to established roof materials.
- Associated equipment such as conduits, junction boxes and safety disconnect switch boxes should not be located on the primary building facade.

Not Recommended for Any Reason

- Removal of historic roofing materials during the installation of solar systems.

- Removing or otherwise altering historic roof configuration – dormers, chimneys, or other features – to add solar systems.

- Any other installation procedure that will cause irreversible changes to historic features or materials.

These standards have been developed in consideration of current materials and techniques (2021). In the future, it is likely that technologies will change, prompting a re-examination of standards to address new retrofit options.

301 18th Ave SE

Aurora Shade Report

Customer
John Saunders

Designer
Karin Williams

Organization
Capstone Solar

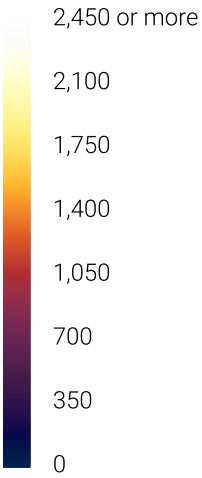
Address
301 18th Ave SE
Olympia, WA 98501, USA

Coordinates
(47.032156, -122.898097)

Date
1 October 2021

Annual irradiance

kWh/m^2/year



Summary

Array	Panel Count	Azimuth (deg.)	Pitch (deg.)	Annual TOF (%)	Annual Solar Access (%)	Annual TSRF (%)
1	8	180	16	96	92	88
2	8	180	30	99	87	86
3	8	360	16	75	91	68
Weighted average by panel count	-	-	-	-	89.7	80.6

Monthly solar access (%) across arrays

Array	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	77	82	87	95	95	95	95	96	92	87	79	73
2	68	75	82	91	92	93	93	92	86	79	71	63
3	85	83	88	92	92	93	93	93	91	84	84	85

Customer
John Saunders

Designer
Karin Williams

Organization
Capstone Solar

Address
301 18th Ave SE
Olympia, WA 98501, USA

Coordinates
(47.032156, -122.898097)

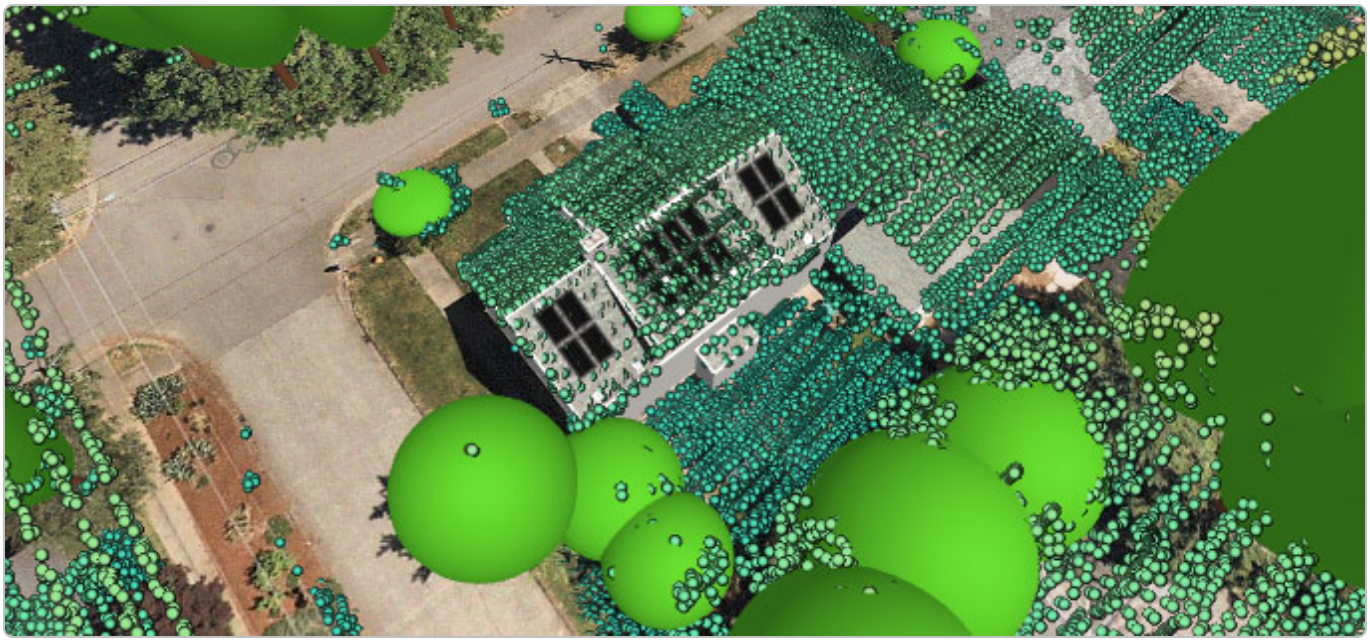
Date
1 October 2021

Zoomed out satellite view

3D model

3D model with LIDAR overlay

76 ft



Customer
John Saunders

Address
301 18th Ave SE
Olympia, WA 98501, USA

Designer
Karin Williams

Coordinates
(47.032156, -122.898097)

Organization
Capstone Solar

Date
1 October 2021

Street view and corresponding 3D model

I, **Karin Williams**, certify that I have generated this shading report to the best of my abilities, and I believe its contents to be accurate.

SCOPE OF WORK

PROPOSED NEW 8.16 KW (DC) ROOF MOUNTED PHOTOVOLTAIC (PV) SYSTEM WITH FOLLOWING EQUIPMENT:

(24) HANWHA Q CELLS Q.PEAK DUO BLK-G8+ 340 SOLAR MODULES

(1) SOLAREDGE SE7600H-US INVERTER

UNIRAC SOLARMOUNT FLUSH RACKING SYSTEM

SITE SPECIFICATIONS

ELECTRIC UTILITY PROVIDER: PUGET SOUND ENERGY
ELECTRIC SERVICE RATING: 200A

ROOF MATERIAL: COMPOSITE SHINGLE
SEISMIC CATEGORY: D
ASCE 7-10 WIND EXPOSURE CATEGORY: B
ASCE 7-10 GROUND SNOW LOAD: 25 PSF
ASCE 7-10 WINDSPEEDS (3 SEC GUST IN MPH)
-RISK CATEGORY I: 125
-RISK CATEGORY II: 135 *Vult*
-RISK CATEGORY III-IV: 140
ASCE 7-05 WINDSPEED: 85 (3-SEC PEAK GUST IN MPH)
ASCE 7-93 WINDSPEED: 71 (FASTEST MILE IN MPH)

CODE AUTHORITY

2018 WASHINGTON STATE FIRE CODE (2018 IFC)
2020 WAC 296-46B (2020 NEC, WITH WAC AMENDMENTS)
2018 WASHINGTON STATE ENERGY CODE (2018 IECC)
2018 WASHINGTON STATE BUILDING CODE (2018 IBC)
2018 WASHINGTON STATE RESIDENTIAL CODE -
(2018 INTERNATIONAL RESIDENTIAL CODE, WASHINGTON AMENDMENTS 2018 WAC51-51-2300 SECTION M2301)
2018 WASHINGTON STATE PLUMBING CODE (2018 UPC)
2018 WASHINGTON STATE MECHANICAL CODE (2018 UMC)

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

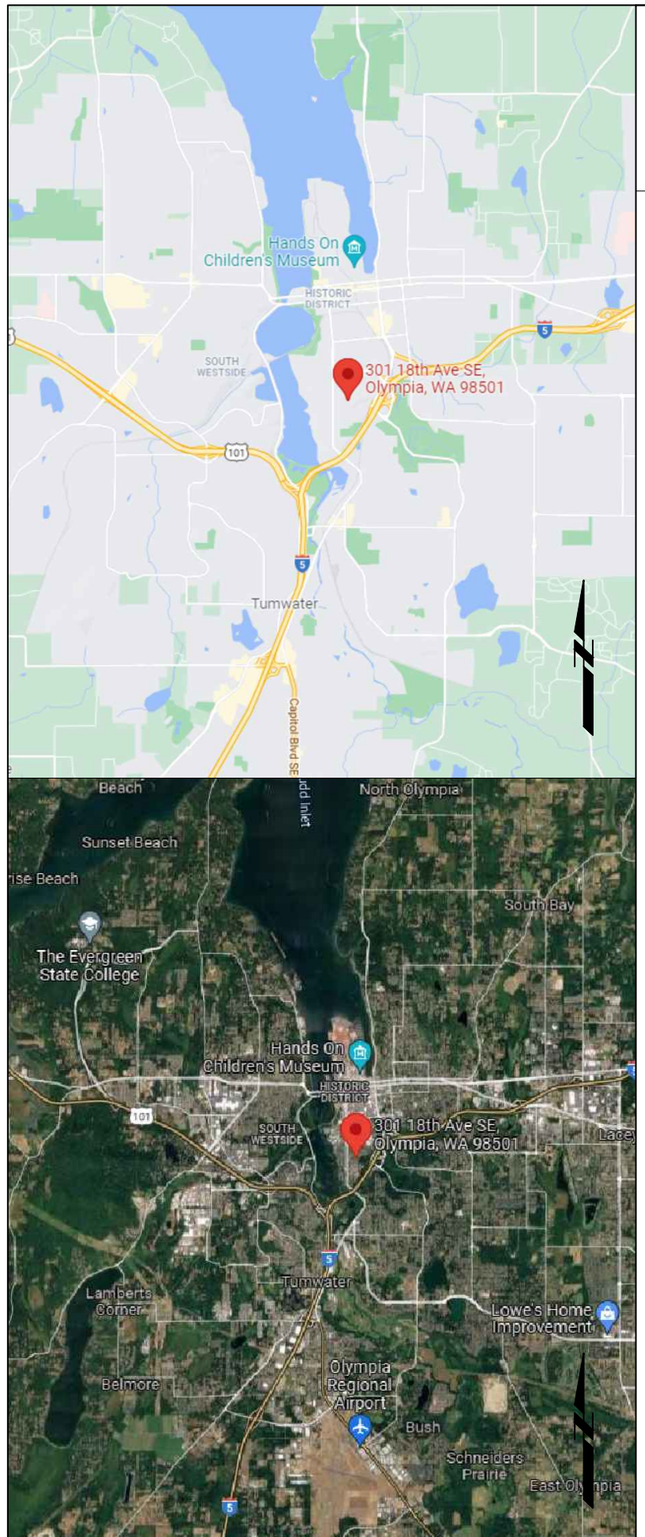
DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE
System Engineer
TIM WACHTMAN
System Designer
JOHN CANFIELD
Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500
Project Details
8.16 KW
ROOFTOP PV
SYSTEM
TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH
AZIMUTH
0° / 180°
DC SYSTEM RATING
8.16 kW
AC SYSTEM RATING
7.6 kW
ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
NOTES, INDEX, SITE INFO, PROJECT DATA, CODE
Sheet
A-1

SHEET INDEX

PHOTOVOLTAIC NOTES

1. AN INVERTER OR AN AC MODULE IN AN INTERACTIVE PHOTOVOLTAIC SYSTEM SHALL AUTOMATICALLY DE-ENERGIZE ITS OUTPUT TO THE CONNECTED ELECTRICAL PRODUCTION AND DISTRIBUTION NETWORK UPON LOSS OF VOLTAGE IN THAT SYSTEM AND SHALL REMAIN IN THAT STATE UNTIL THE ELECTRICAL PRODUCTION AND DISTRIBUTION NETWORK VOLTAGE HAS BEEN RESTORED. (NEC 690.61)
2. ALL EXTERIOR ELECTRICAL METALLIC TUBING(EMT) CONDUIT FITTING SHALL BE RAIN TIGHT THREAD-LESS COMPRESSION TYPE.
3. MODULES AND SUPPORT STRUCTURES SHALL BE GROUNDED.
4. NAMEPLATES SHALL BE PROVIDED FOR ALL CIRCUITS IN THE SERVICE DISTRIBUTION AND POWER DISTRIBUTION SWITCH BOARDS, PANEL BOARDS, DISCONNECTING SWITCHES, TERMINAL CABINETS, ETC. ALL NAMEPLATES SHALL BE PERMANENTLY ATTACHED AND BE OF SUFFICIENT CAPACITY TO WITHSTAND THE WEATHER.
5. JUNCTION BOX/COMBINER BOX HAVE TO USE COMPRESSION TYPE STRAIN RELIEF POSITIONED FOR APPROPRIATE WATER RUN OFF.
6. CONDUIT RUNS SHALL BE PROVIDED WITH SUFFICIENT WEATHERPROOF PULL BOXES OF JUNCTION BOX/COMBINER BOXES PER APPROPRIATE NEC REQUIREMENTS.
7. SEE PROVIDED CUT SHEETS FOR ADDITIONAL EQUIPMENT SPECIFICATIONS
8. WIRING MATERIALS SHALL BE SUITABLE FOR THE SUN EXPOSURE AND WET LOCATIONS. FIELD APPLIED PROTECTIVE COATINGS ARE NOT ACCEPTABLE.
9. JUNCTION, PULL AND OUTLET BOXES LOCATED BEHIND MODULES SHALL BE SO INSTALLED THAT THE WIRING CONTAINED IN THEM CAN BE RENDERED ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF MODULE(S) SECURED BY REMOVABLE FASTENERS AND CONNECTED BY A FLEXIBLE WIRING SYSTEM. (NEC 690.34)
10. IN AN UNDERGROUND PHOTOVOLTAIC SYSTEM, THE POWER SOURCE SHALL BE LABELED WITH THE FOLLOWING WARNING AT EACH JUNCTION BOX, COMBINER BOX, DISCONNECT AND DEVICE WHERE THE UNGROUNDED CIRCUITS MAY BE EXPOSED DURING SERVICE : "WARNING - ELECTRIC SHOCK HAZARD. THE CURRENT CIRCUIT CONDUCTORS OF THIS PHOTOVOLTAIC POWER SYSTEM ARE UNGROUNDED BUT MAY BE ENERGIZED WITH THE RESPECT TO GROUND DUE TO LEAKAGE PATHS AND/OR GROUND FAULTS." (NECE 690.35(F.))
11. ALL PHOTOVOLTAIC MODULES AND ASSOCIATED EQUIPMENT AND WIRING MATERIAL SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE.
12. ALL ELECTRICAL DEVICES AND UTILIZATION EQUIPMENT SHALL BE LISTED BY AN APPROVED TESTING AGENCY.
13. OUTDOOR EQUIPMENT SHALL BE AT LEAST NEMA 3R RATED.
14. ALL SPECIFIED WIRING IS BASED ON THE USE OF COPPER
15. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS AND SHALL COORDINATE ALL INSPECTION, COMMISSIONING AND ACCEPTANCE WITH THE CLIENT, UTILITY CO. AND CITY INSPECTORS AS NEEDED
16. DRAWINGS ARE DIAGRAMMATIC ONLY, ROUTING OF RACEWAYS SHALL BE AT THE OPTION OF THE CONTRACTOR UNLESS OTHERWISE NOTED AND SHALL BE COORDINATED WITH OTHER TRADES.
17. IF DISTANCES OF CABLE RUNS ARE DIFFERENT THAN SHOWN, THE CONTRACTOR SHALL NOTIFY ELECTRICAL ENGINEER TO VALIDATE THE WIRE SIZE. FINAL DRAWINGS WILL BE RED-LINED AND UPDATED AS APPROPRIATE.
18. WHENEVER A DISCREPANCY IN QUANTITY OF EQUIPMENT, ARISES ON THE DRAWINGS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL AND SERVICES REQUIRED BY THE STRICTEST CONDITIONS NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS TO ENDURE COMPLETE COMPLIANCE AND LONGEVITY OF THE OPERABLE SYSTEM REQUIRED BY THE ARCHITECT/ENGINEER.
19. ALL BROCHURES, OPERATION MANUALS, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE HANDED OVER TO THE OWNER'S REPRESENTATIVE AT THE COMPLETION OR WORK.
20. ALL WIRING CONCEALED IN WALL AND CEILING SPACES SHALL BE IN METAL CONDUIT.
21. THE SEISMIC BRACING AND ANCHORAGE OF ELECTRICAL CONDUITS SHALL BE IN ACCORDANCE WITH THE "SMACNA"-GUIDLINES FOR SEISMIC RESTRAINS OF MECHANICAL SYSTEMS AND PLUMING PIPING SYSTEMS.
22. ALL OF THE LISTED SYSTEMS REQUIRED THAT THE SEISMIC LATERAL FORCE F INCLUDING CONSIDERATION OF a^P AND ^P BE DETERMINED AT EACH LEVEL OF THE BUILDING SO THAT BRACE SPACING CAN BE CALCULATED. THE DISTRICT STRUCTURAL ENGINEER CAN APPROVE THE SEISMIC LATERAL FORCE DETERMINATION.
23. A COPY OF THE CHOSEN BRACING SYSTEM(S) INSTALLATION GUIDE/MANUAL SHALL BE ON THE JOB SITE PRIOR TO STARTING THE INSTALLING OF HANGERS AND/OR BRACES.
24. WHEN INSTALLING DRILLED-IN ANCHORS AND/OR POWDER DRIVEN PINS IN EXISTING NON-PRESTRESSED REINFORCED CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE REINFORCED BARS. WHEN INSTALLING THEM INTO EXISTING PRE-STRESSED CONCRETE TENDONS BY USING A NON-DESTRUCTIVE METHOD PRIOR TO INSTALLATION. EXERCISE EXTREME CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE TENDONS DURING INSTALLATION. MAINTAIN A MINIMUM CLEARANCE OF ONE INCH BETWEEN THE REINFORCEMENT AND THE DRILLED-IN ANCHOR.
25. THE WORKING CLEARANCES AROUND THE EXISTING ELECTRICAL EQUIPMENT AS WELL AS THE NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26.
26. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT. (NEC 300.6 (D), 310.8 (D.)
27. GROUNDING BUSHINGS ARE REQUIRED AROUND PRE-PUNCHED CONCENTRIC KNOCKOUTS ON THE DC SIDE OF THE SYSTEM. (NEC 250.97.)
28. THE GROUNDING ELECTRODE CONDUCTOR MUST BE PROTECTED FROM PHYSICAL DAMAGE IF SMALLER THAN #6 COPPER WIRE. (NEC. 250.64 B.)
29. GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AT BUSBARS WITHIN LISTED EQUIPMENT. (NEC 250.64 C.)
30. RACEWAY FOR GROUNDING ELECTRODE CONDUCTOR SHALL BE BONDED AT EACH END. (CEC 250.64 (E.)
31. WHERE ALL TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A SIGN WILL BE PROVIDED WARNING OF THE HAZARD PER NEC 690.17. 34. EACH UNGROUNDED CONDUCTOR OF THE MULT-WIRE BRANCH CIRCUIT WILL BE IDENTIFIED PER PHASE AND SYSTEM PER NEC 210.5.
32. CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH NEC 250.97 & 250.92 (B) & LAMC 93.2509.7.
33. DC CONDUCTORS EITHER DO NOT ENTER THE BUILDING OR ARE RUN IN METALLIC RACEWAYS OR ENCLOSURES TO THE FIRST ACCESSIBLE DC DISCONNECTING MEANS PER NEC 690.31 (E.), LAMC 93.6903.1 (E.)
34. ALL METALLIC FRAME RAILS AND OTHER CURRENT CARRYING METALLIC COMPONENTS (CONDUIT, JUNCTION & PULL BOXES, RACEWAY, ETC.) SHALL BE SOLIDLY GROUNDED PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS LAMC 93.6901.10.3 & 93.110.3(D.).
35. SCREWS, NUTS, BOLTS & WASHERS THAT ATTACH EQUIPMENT GROUNDING LUGS SHALL BE STAINLESS STEEL LAMC 93.110.3(D.).
36. NO PIPING, DUCTS OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE LOCATED WITHIN THE DEDICATED SPACE ABOVE THE ELECTRICAL EQUIPMENT.
37. ALL FIELD INSTALLED JUNCTION, PULL AND OUTLET BOXED LOCATED BEHIND MODULES OR PANELS SHALL BE ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE (S) OR PANEL (S) SECURED BY REMOVABLE FASTENERS.
38. REMOVAL OF A DWP-INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BONDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PHOTOVOLTAIC SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR.
39. THE ROOF MOUNTED PHOTOVOLTAIC MODULES, PANELS, OR SOLAR VOLTAIC ROLL ROOFING MATERIAL SHALL HAVE THE SAME OR BETTER LISTED FIRE-RESISTANCE RATING THAN THE BUILDING ROOF-COVERING MATERIAL.
40. ALL ROOF MOUNTED CONDUIT WILL BE A MINIMUM 1" OFF THE ROOF SURFACE.

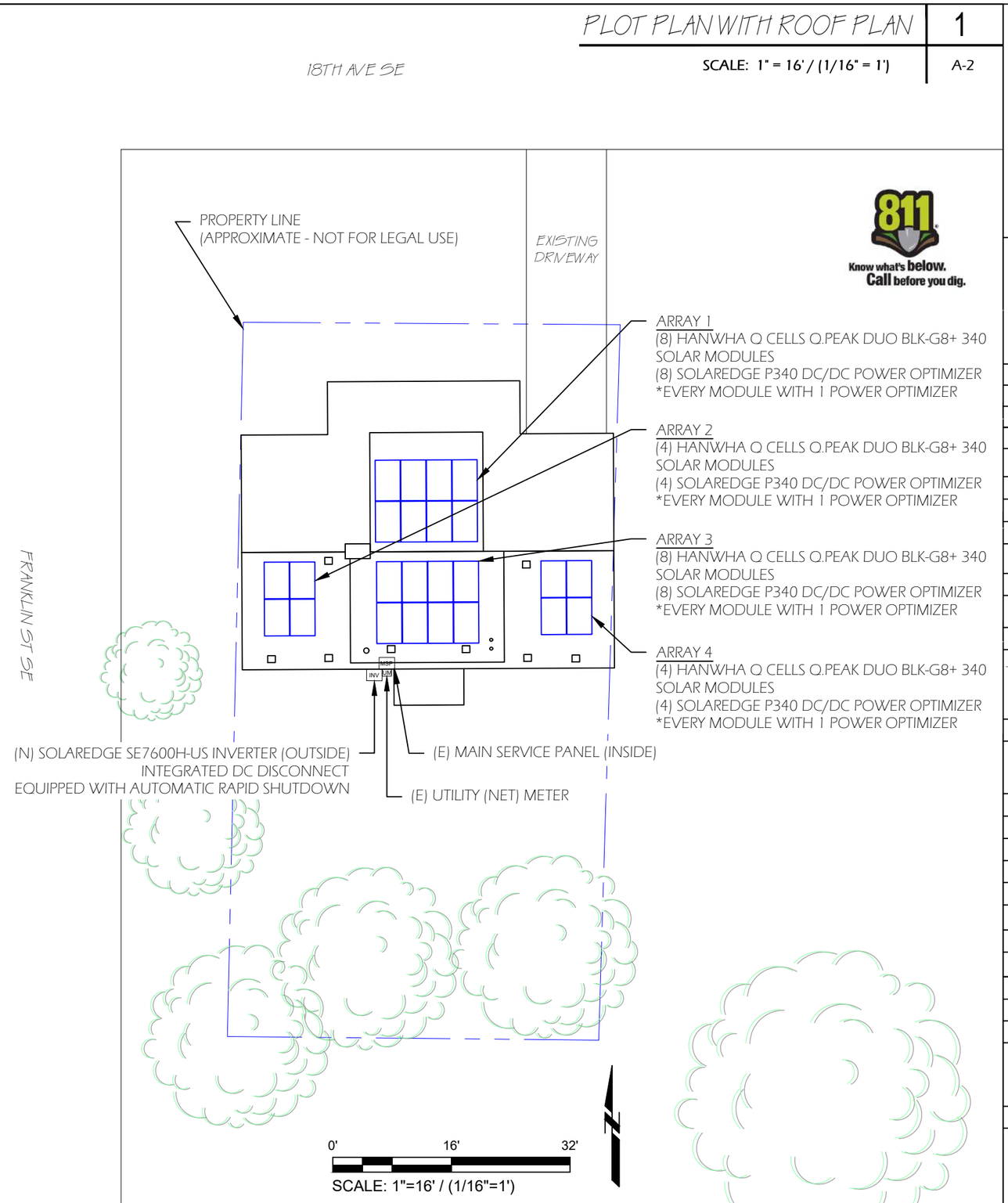


PLOT PLAN WITH ROOF PLAN

1

SCALE: 1" = 16' / (1/16" = 1')

A-2



811 Know what's below. Call before you dig.

2"X2" AHJ APPROVAL STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

Project Details
8.16 KW
ROOFTOP PV
SYSTEM

TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH

AZIMUTH
0° / 180°

DC SYSTEM RATING
8.16 kW

AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
SITE PLAN

Sheet
A-2

1

ROOF PLAN & MODULES

A-3

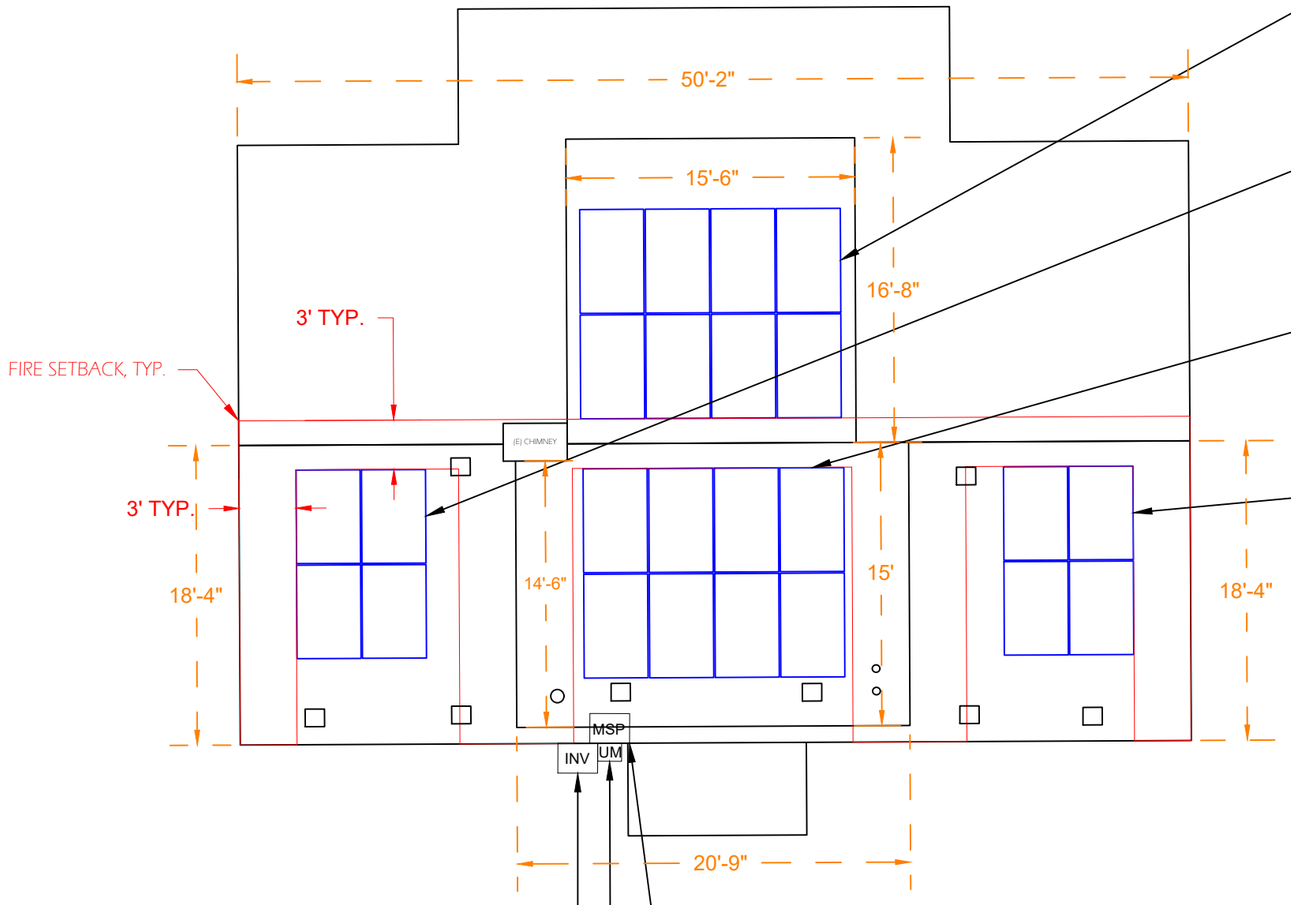
SCALE: 1" = 8' / (1/8" = 1')

NOTE TO PV INSTALLERS:

1. *ATTACHMENTS MUST BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS, REFER TO INSTALLATION GUIDE ON S-1.*
2. LOCATE RAFTERS/TRUSSES LOCATIONS.
3. BACKFILL ALL PILOT HOLES WITH SEALANT.
4. ATTACHMENTS MUST BE LAG MOUNTED INTO RAFTERS/TRUSSES.
5. DRIVE LAG BOLT UNTIL ATTACHMENT IS FIRMLY IN PLACE. WHEN THE PROPER TORQUE IS REACHED, THE EPDM RUBBER BACKING ON THE SEALING WASHER SHOULD EXPAND BEYOND THE EDGE OF THE METAL WASHER. DO NOT OVERTIGHTEN.
6. INJECT CHEMLINK DURALINK 50 SEALANT INTO PORT UNTIL SEALANT EXITS BOTH VENTS.

MOUNTING CALCULATIONS				
A	MOUNTING SYSTEM AND MANUFACTURER	UNIRAC SOLARMOUNT FLUSH		
B	TOTAL WEIGHT OF MODULES, RAILS, ATTACHMENTS, & OPTIMIZERS		1235.3	LBS
	MODULE WEIGHT (43.9) X NUMBER OF MODULES	24	1053.6	LBS
	OPTIMIZER WEIGHT (1.4) X NUMBER OF OPTIMIZERS	24	33.6	LBS
	RACKING COMPONENTS		181.7	LBS
C	ATTACHMENTS WEIGHT (1.8) X NUMBER OF ATTACHMENTS	56	100.8	LBS
D	WEIGHT PER ATTACHMENT POINT (B/C) (POINT LOAD)	NOT TO EXCEED 45 LBS	22.1	LBS
E	MAXIMUM RAIL CANTILEVER		16	IN
F	TOTAL SURFACE AREA OF PV MODULES	19.31 SQ FT X MODULES	463.4	SQ FT
G	DISTRIBUTED WEIGHT OF PV MODULE ON ROOF (B/F) (DEAD LOAD)	1235.28 LBS / 463.4 SQ FT	2.7	PSF

RAFTERS 2" X 6" @ 24" O.C., V.I.F.



ARRAY 1
(8) HANWHA Q CELLS Q.PEAK DUO BLK-G8+ 340 SOLAR MODULES
(8) SOLAREDGE P340 DC/DC POWER OPTIMIZER
*EVERY MODULE WITH 1 POWER OPTIMIZER

ARRAY 2
(4) HANWHA Q CELLS Q.PEAK DUO BLK-G8+ 340 SOLAR MODULES
(4) SOLAREDGE P340 DC/DC POWER OPTIMIZER
*EVERY MODULE WITH 1 POWER OPTIMIZER

ARRAY 3
(8) HANWHA Q CELLS Q.PEAK DUO BLK-G8+ 340 SOLAR MODULES
(8) SOLAREDGE P340 DC/DC POWER OPTIMIZER
*EVERY MODULE WITH 1 POWER OPTIMIZER

ARRAY 4
(4) HANWHA Q CELLS Q.PEAK DUO BLK-G8+ 340 SOLAR MODULES
(4) SOLAREDGE P340 DC/DC POWER OPTIMIZER
*EVERY MODULE WITH 1 POWER OPTIMIZER

CONDUIT 3/4", TYP.
ELECTRICIAN TO DETERMINE FINAL CONDUIT LOCATIONS IN FIELD

(N) ATTACHMENT POINTS, SPACED NO MORE THAN 48" APART, LAG MOUNTED AND SEALED WITH CHEMLINK DURALINK 50 SEALANT, PER MANUFACTURER'S SPECIFICATIONS, TYP.

(N) SOLAREDGE SE7600H-US INVERTER (OUTSIDE)
INTEGRATED DC DISCONNECT
EQUIPPED WITH AUTOMATIC RAPID SHUTDOWN

(E) UTILITY (NET) METER

(E) MAIN SERVICE PANEL (INSIDE)

0' 8' 16'

SCALE: 1"=8' / (1/8"=1')

Know what's below. Call before you dig.

2"X2" AHJ APPROVAL STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

Project Details
8.16 KW
ROOFTOP PV
SYSTEM

TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH

AZIMUTH
0° / 180°

DC SYSTEM RATING
8.16 kW

AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
PV LAYOUT AND COMPONENT LOCATION

Sheet
A-3

	CONDUIT	WIRE		RATING	DERATE FOR TEMPERATIRE		ISC	WIRE	VOLTAGE DROP CALCULATIONS	RUN LENGTH	AMPS	VOLTAGE DROP	VOLTAGE DROP %	VOLTAGE AT LOAD
A	¾" PVC SCHEDULE 40 CONDUIT	(3) 8 AWG THHN (Black, Red, White)	(1) 8 AWG Cu Bond Conductor (Green or bare)	8 AWG RATE 90°C = 55A	TEMPERATURE DE-RATING @ 104°F = 0.91	55A x 0.91 = 50.05A	ISC x 1.25 x 1.25 = 15.52A	8 AWG OK IAW NEC 690.8 (B)(1)	Vd = $\frac{2 \times 12.9 \times 50' = 1290 \times 32A}{16510}$ = 2.50 volts	50	32	2.50	1.04	237.50
B	¾" EMT CONDUIT	(2) 10 AWG THHN (Positive, Negative)	(1) 8 AWG Cu Bond Conductor (Green or bare)	10 AWG RATE 90°C = 30A	TEMPERATURE DE-RATING @ 104°F = 0.91	30A x 0.91 = 27.3A	ISC x 1.25 x 1.25 = 15.52A	10 AWG OK IAW NEC 690.8 (B)(1)	Vd = $\frac{2 \times 12.9 \times 50' = 1290 \times 15A}{10380}$ = 1.86 volts	50	15	1.86	0.78	238.14
C	PV WIRE IN FREE AIR OR THHN IN CONDUIT	MINIMUM 10AWG Cu (90° RATED) WIRE	POSITIVE, NEGATIVE	BARE Cu EGC OR INSULATED EGC IN CONDUIT										

2"X2"
AHJ APPROVAL
STAMP

UTILITY METER
BI-DIRECTIONAL (NET)
CL 200, FM2S, 60Hz
1-PHASE, 3W, 120/240V
METER #: B023385639

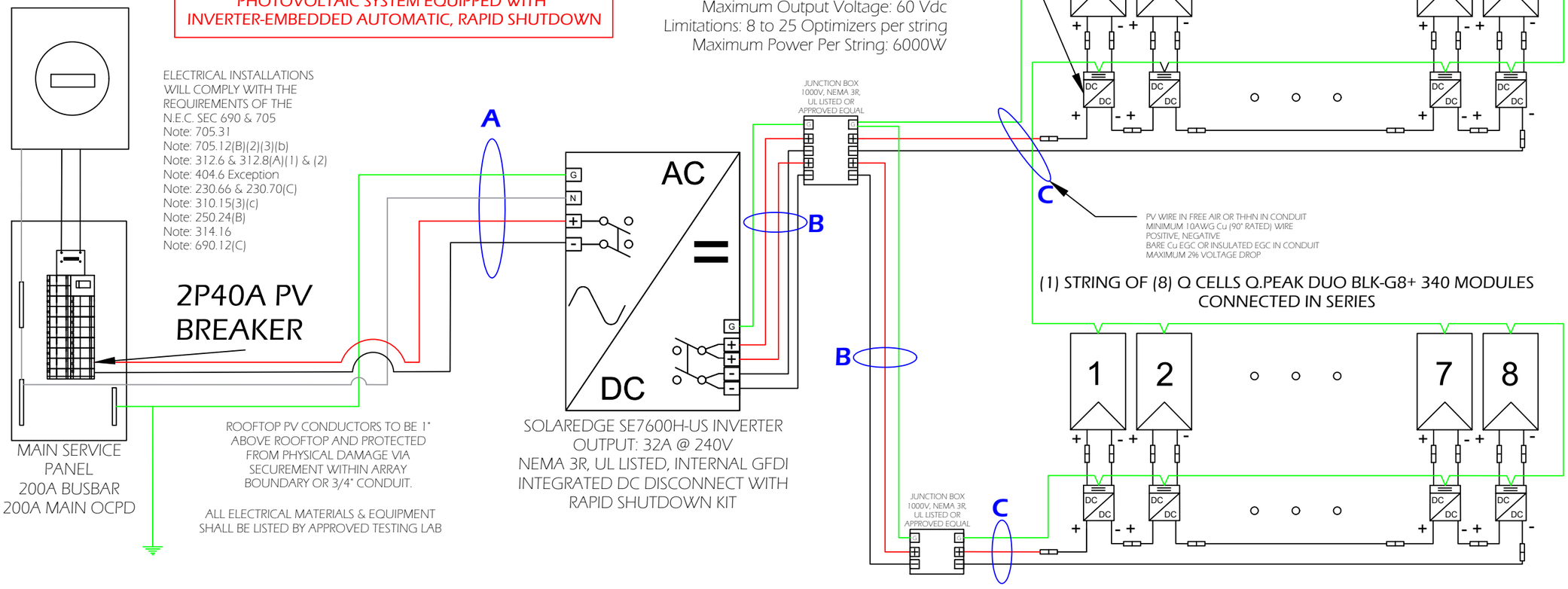
CONTROLLED CONDUCTORS ARE LIMITED TO:
- NOT MORE THAN 30 VOLTS AND 240 VOLTAMPERES WITHIN 30 SECONDS OF RAPID SHUTDOWN INITIATION OUTSIDE THE ARRAY.
- NOT MORE THAN 80 VOLTS AND 240 VOLTAMPERES WITHIN 30 SECONDS OF RAPID SHUTDOWN INITIATION INSIDE THE ARRAY.

THE RAPID SHUTDOWN INITIATION IS PERFORMED BY EITHER DISCONNECTING THE AC FEED TO THE INVERTER, OR – IF
THE INVERTER DC SAFETY SWITCH IS READILY ACCESSIBLE – BY TURNING OFF THE DC SAFETY SWITCH.

PHOTOVOLTAIC SYSTEM EQUIPPED WITH INVERTER-EMBEDDED AUTOMATIC, RAPID SHUTDOWN

SolarEdge Power Optimizer P340
DC Input Power: 340 watts
Maximum Input Voltage: 48 Vdc
MPPT Range: 8 to 48 Vdc
Maximum Short Circuit Current (Isc): 11 Adc
Maximum Output Current: 15 Adc per string
Maximum Output Voltage: 60 Vdc
Limitations: 8 to 25 Optimizers per string
Maximum Power Per String: 6000W

ELECTRICAL INSTALLATIONS
WILL COMPLY WITH THE
REQUIREMENTS OF THE
N.E.C. SEC 690 & 705
Note: 705.31
Note: 705.12(B)(2)(3)(b)
Note: 312.6 & 312.8(A)(1) & (2)
Note: 404.6 Exception
Note: 230.66 & 230.70(C)
Note: 310.15(3)(c)
Note: 250.24(B)
Note: 314.16
Note: 690.12(C)



CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
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System Engineer
TIM WACHTMAN
System Designer
JOHN CANFIELD
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OLYMPIA, WA 98501
PARCEL # 39400200500
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ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
ELECTRICAL LINE DIAGRAM
Sheet
E-1

Module Information

PV MODULE: Q CELLS Q.PEAK DUO BLK-G8+ 340

ELECTRICAL DATA PER MODULE (STC):
MAXIMUM POWER - Pmax (Wp): —— 340
MAXIMUM POWER VOLTAGE -Vmpp (V): —— 34.34
MAXIMUM POWER CURRENT - Impp (A): —— 9.9
OPEN CIRCUIT VOLTAGE - Voc (V): —— 40.7
SHORT CIRCUIT CURRENT Isc (A): —— 10.4
MODULE EFFICIENCY: —— 19.8%

Inverter Specifications

SOLAREDGE SE7600H-US

RATED/MAXIMUM AC POWER OUTPUT: —— 7600W
MAX. CONTINUOUS OUTPUT CURRENT: —— 32A
MAX.DC INPUT POWER: —— 11800@240V
MAX. INPUT VOLTAGE: —— 480V
NOMINAL DC INPUT VOLTAGE: —— 400V
MAX. INPUT CURRENT: —— 20A@240V
CEC WEIGHTED EFFICIENCY: —— 99%
MAX. EFFICIENCY: —— 99.2%

Conductor Calculation

MAX BRANCH DC CONDUCTOR AMPACITY:
340W x 16 = 5440W / 400V = 13.6A x 125% = 17A
P340 MAXIMUM OUTPUT CURRENT = 15A
10 AWG Cu 90° RATED=40A(.91)=36.4A(1)=36.4A
36.4A ≥ 17A OK TO INSTALL IAW NEC 690.8(B)(1-2)

MAX BRANCH AC CONDUCTOR AMPACITY:
32A MAXIMUM CONT. OUTPUT CURRENT
32A x 125%=40A
8 AWG Cu 90°=55A x .91=50.05A x 1=50.05A
50.05A ≥ 40A OK TO INSTALL IAW NEC 690.8(B)(1-2)

Interconnection Method

SOLAR CIRCUIT CONNECTED INTO EXISTING 200A MAIN SERVICE PANEL WITH NEW 2P40A SOLAR BREAKER (OCPD) TO BE INSTALLED AT OPPOSITE END OF BUSBAR FROM OCPD PROTECTING THE BUSBAR NEC 705.12(B)(3)(2)

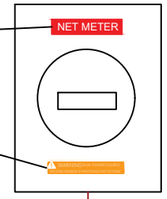
200A RATED BUSS x 120% = 240A - 200A MAIN OCPD = 40A
2P40A BREAKER OK
INSTALL PERMANENT LABEL ADJACENT TO THE BACK-FED BREAKER WITH FOLLOWING OR EQUIVALENT WORDING:
WARNING: POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

NET METER

UTILITY/ AHJ (PHENOLIC)

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(B)(3)



PHOTOVOLTAIC

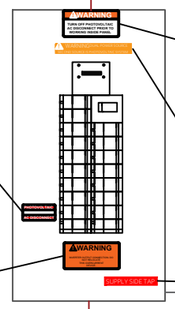
AC DISCONNECT

NEC 690.13(B)

WARNING

INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

NEC 705.12(B)(2)(3)(b)



WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEC 110.21(B) & NEC 705.12

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

NEC 705.12(B)(3)

SUPPLY SIDE TAP

AS REQUIRED IF PV INTERCONNECTION IS MADE TO SUPPLY SIDE OF SERVICE DISCONNECT

NEC 690.53

PHOTOVOLTAIC DC DISCONNECT

MAXIMUM VOLTAGE	480 Vdc
MAXIMUM CIRCUIT CURRENT	32 A

NEC 690.56

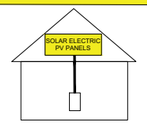
PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

NEC 690.31(G)(3) & (4)

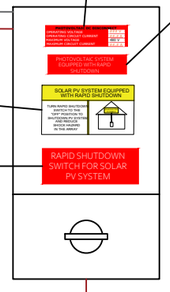
WARNING: PHOTOVOLTAIC POWER SOURCE

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



NEC 690.56(C)(1)(a)



RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

NEC 690.56(C)(3)

WARNING: PHOTOVOLTAIC POWER SOURCE

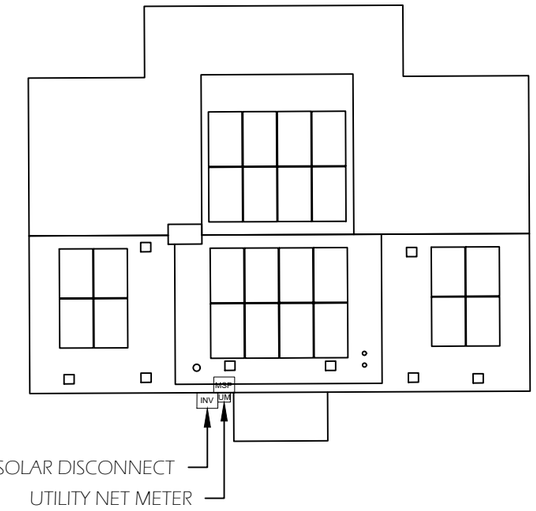
NEC 690.31(G)(3) & (4)

SYSTEM DC CIRCUIT CONDUCTORS. EXPOSED RACEWAYS, CABLE TRAYS & OTHER WIRING METHODS. COVERS OR ENCLOSURES OF PULL BOXES & JUNCTION BOXES. CONDUIT BODIES IN WHICH ANY OF THE AVAILABLE CONDUIT OPENINGS ARE UNUSED.

LABELS OR MARKINGS SHALL BE VISIBLE AFTER INSTALLATION. REFLECTIVE WITH ⅜" UPPERCASE, WHITE ON RED. EVERY SECTION OF THE WIRING SYSTEM SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS. SPACING BETWEEN LABELS OR MARKINGS SHALL NOT BE MORE THAN 10'

CAUTION

POWER TO THIS BUILDING IS SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECT LOCATED AS SHOWN



SERVICED BY QUALIFIED PERSONNEL ONLY

ADHESIVE FASTENED SIGNS:
- THE LABEL SHALL BE SUITABLE FOR THE ENVIRONMENT WHERE IT IS INSTALLED.
- WHERE REQUIRED ELSEWHERE IN THIS CODE, ALL FIELD APPLIED LABELS, WARNINGS, AND MARKINGS SHOULD COMPLY WITH ANSI Z535.4 [NEC 110.21(B) FIELD MARKING].
-ADHESIVE FASTENED SIGNS MAY BE ACCEPTABLE IF PROPERLY ADHERED. VINYL SIGNS SHALL BE WEATHER RESISTANT. [IFC 605.11.1.3]

1. ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
2. ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 DEGREE C WET ENVIRONMENT.
3. WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
4. WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC 110.26.
5. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
6. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
7. ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
8. MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
9. MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER G.E.C. VIA WEED LUG OR ILSCO GDL-4DDT LAY-IN LUG.
10. THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE

2'X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
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0° / 180°

DC SYSTEM RATING

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7.6 kW

ESTIMATED ANNUAL PRODUCTION

7,177 kWh/Yr

Drawing

LABELING INFORMATION

Sheet

E-2

powered by Q.ANTUM DUO

Q.PEAK DUO BLK-G8+

335-350

ENDURING HIGH PERFORMANCE

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2020

25 YR Warranty Product & Performance

Q CELLS Yield Security

Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.8%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behavior.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID and Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminum alloy frame, certified for high snow (5400Pa) and wind loads (4000Pa).

A RELIABLE INVESTMENT
Inclusive 25-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative 12-busbar design with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (−1500V, 168h)
[2] See data sheet on rear for further information

THE IDEAL SOLUTION FOR:

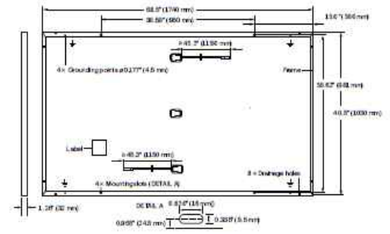
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	68.5 × 40.6 × 1.26 in (including frame) (1740 × 1030 × 32 mm)
Weight	43.9 lbs (19.9 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodized aluminum
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction Box	2.09–3.98 × 1.26–2.36 × 0.59–0.71 in (53–101 × 32–60 × 15–18 mm), Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥45.3 in (1150 mm), (−) ≥45.3 in (1150 mm)
Connector	Stäubli MC4; IP68

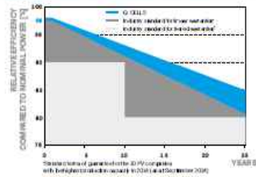


ELECTRICAL CHARACTERISTICS

POWER CLASS			335	340	345	350
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)						
Minimum	Power at MPP[1]	P_{MPP} [W]	335	340	345	350
	Short Circuit Current[1]	I_{SC} [A]	10.34	10.40	10.45	10.51
	Open Circuit Voltage[1]	V_{OC} [V]	40.44	40.70	40.95	41.21
	Current at MPP	I_{MPP} [A]	9.86	9.90	9.96	10.01
	Voltage at MPP	V_{MPP} [V]	34.01	34.34	34.65	34.97
	Efficiency[1]	η [%]	≥18.7	≥19.0	≥19.3	≥19.5
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]						
Minimum	Power at MPP	P_{MPP} [W]	250.9	254.6	258.4	262.1
	Short Circuit Current	I_{SC} [A]	8.33	8.38	8.42	8.47
	Open Circuit Voltage	V_{OC} [V]	38.13	38.38	38.62	38.86
	Current at MPP	I_{MPP} [A]	7.75	7.79	7.84	7.88
	Voltage at MPP	V_{MPP} [V]	32.36	32.67	32.97	33.27

[1] Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

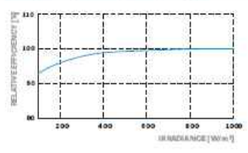
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54 % degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organization of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.35	Nominal Module Operating Temperature	NMOT	[°F]	109 ± 5.4 (43 ± 3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1000 (IEC) / 1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730	TYPE 2
Max. Design Load, Push / Pull[3]	[lbs/ft²]	75 (3600 Pa) / 55 (2667 Pa)	Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Test Load, Push / Pull[3]	[lbs/ft²]	113 (5400 Pa) / 84 (4000 Pa)		

[3] See Installation Manual

QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells)

PACKAGING AND TRANSPORT INFORMATION

Horizontal packaging	70.1 in 1780 mm	42.5 in 1080 mm	47.6 in 1208 mm	1485 lbs 674 kg	28 pallets	26 pallets	32 modules
Vertical packaging	70.9 in 1800 mm	45.3 in 1150 mm	47.2 in 1200 mm	1505 lbs 683 kg	28 pallets	26 pallets	32 modules

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information or approved installation and use of this product. Q CELLS supplies solar modules in two different backsheet technologies, depending on the location of manufacture (modules are packed horizontally or vertically). You can find more detailed information in the document "Packaging and Transport Information", available from Q CELLS.

Hanwha Q CELLS America Inc.
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | **TEL** +1 949 748 59 96 | **EMAIL** inquiry@us.q-cells.com | **WEB** www.q-cells.us

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ROOFTOP PV
SYSTEM

TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH

AZIMUTH
0° / 180°

DC SYSTEM RATING
8.16 kW

AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
PV MODULE SPECIFICATION SHEETS

Sheet
E-3

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US /
SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020 per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

solaredge.com

solaredge

Single Phase Inverter with HD-Wave Technology for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V[2]	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V[2]	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (optional)							
Revenue Grade Data, ANSI C12.20	Optional[3]							
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule 14 (HI)							
Emissions	FCC Part 15 Class B							
INSTALLATION SPECIFICATIONS								
AC Output Conduit Size / AWG Range	1" Maximum / 14-6 AWG					1" Maximum /14-4 AWG		
DC Input Conduit Size / # of Strings / AWG Range	1" Maximum / 1-2 strings / 14-6 AWG					1" Maximum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in / mm
Weight with Safety Switch	22 / 10		25.1 / 11.4	26.2 / 11.9		38.8 / 17.6		lb / kg
Noise	< 25				<50			dBA
Cooling	Natural Convection							
Operating Temperature Range	-13 to +140 / -25 to +60[4] (-40°F / -40°C option)[5]							°F / °C
Protection Rating	NEMA 4X (Inverter with Safety Switch)							

[1] For other regional settings please contact SolarEdge support
[2] A higher current source may be used; the inverter will limit its input current to the values stated
[3] Revenue grade inverter P/N: SExxxxH-US000NNC2
[4] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf
[5] -40 version P/N: SExxxxH-US000NNU4

RoHS

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

Project Details
8.16 KW
ROOFTOP PV
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AZIMUTH
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DC SYSTEM RATING
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AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
INVERTER SPECIFICATION SHEETS

Sheet
E-4

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P485 / P505

POWEROPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com

solaredge

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P485 / P505

Optimizer model (typical module compatibility)	P320 (for 60-cell modules)	P340 (for high-power 60-cell modules)	P370 (for higher-power 60 and 72-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for high-voltage modules)	P485 (for high-voltage modules)	P505 (for higher current modules)	
INPUT								
Rated Input DC Power[1]	320	340	370	400	405	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		60	80	125[2]		83[2]	Vdc
MPPT Operating Range	8 - 48		8 - 60	8 - 80	12.5 - 105		12.5 - 83	Vdc
Maximum Short Circuit Current (Isc)	11			10.1			14	Adc
Maximum DC Input Current	13.75			12.5			17.5	Adc
Maximum Efficiency	99.5							%
Weighted Efficiency	98.8						98.6	%
Overvoltage Category	II							
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)								
Maximum Output Current	15							Adc
Maximum Output Voltage	60				85			Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)								
Safety Output Voltage per Power Optimizer	1 ± 0.1							Vdc
STANDARD COMPLIANCE								
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3							
Safety	IEC62109-1 (class II safety), UL1741							
Material	UL94 V-0 , UV Resistant							
RoHS	Yes							
INSTALLATION SPECIFICATIONS								
Maximum Allowed System Voltage	1000							Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters							
Dimensions (W x L x H)	129 x 153 x 27.5 / 5.1 x 6 x 1.1		129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9			129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	630 / 1.4		750 / 1.7	845 / 1.9			1064 / 2.3	gr / lb
Input Connector	MC4[3]					Single or dual MC4[3][4]	MC4[3]	
Input Wire Length	0.16 / 0.52							m / ft
Output Wire Type / Connector	Double Insulated / MC4							
Output Wire Length	0.9 / 2.95	1.2 / 3.9	1.2 / 3.9	1.2 / 3.9			1.2 / 3.9	m / ft
Operating Temperature Range[5]	-40 - +85 / -40 - +185							°C / °F
Protection Rating	IP68 / NEMA6P							
Relative Humidity	0 - 100							%

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% power tolerance are allowed
(2) NEC 2017 requires max input voltage be not more than 80V
(3) For other connector types please contact SolarEdge
(4) For dual version for parallel connection of two modules use the P485. In the case of an odd number of PV modules in one string, installing one P485 dual version power optimizer
(5) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details.

PV System Design Using a SolarEdge Inverter[6][7]		Single Phase HD-Wave	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P320, P340, P370, P400	8		10	18	
	P405, P485, P505	6		8	14	
Maximum String Length (Power Optimizers)		25		25	50[8]	
Maximum Power per String		5700 (6000 with SE7600-US - SE11400-US)	5250	6000[9]	12750[10]	W
Parallel Strings of Different Lengths or Orientations		Yes				

(6) For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
(7) It is not allowed to mix P405/P485/P505 with P320/P340/P370/P400 in one string
(8) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
(9) For 208V grid: it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W
(10) For 277/480V grid: it is allowed to install up to 17,550W per string when the maximum power difference between each string is 2,000W

Intertek RoHS

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

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AZIMUTH
0° / 180°

DC SYSTEM RATING
8.16 kW

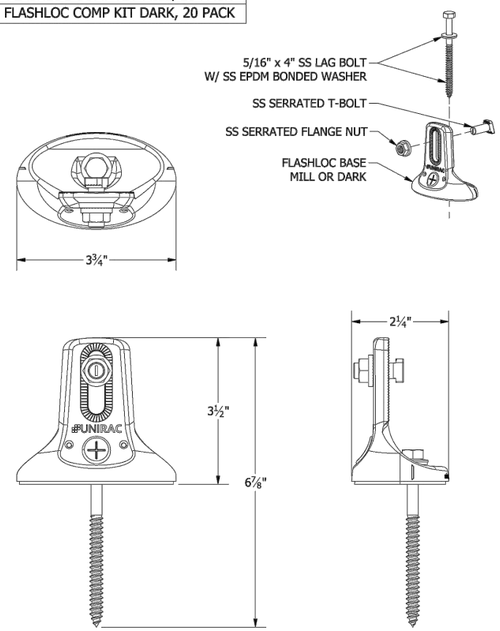
AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
DC/DC POWER OPTIMIZER
SPECIFICATION SHEETS

Sheet
E-5

PART TABLE	
P/N	DESCRIPTION
004085M	FLASHLOC COMP KIT MILL, 20 PACK
004085D	FLASHLOC COMP KIT DARK, 20 PACK



UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DRAWING
DESCRIPTION:	FLASHLOC COMP KIT
REVISION DATE:	4/28/2020

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

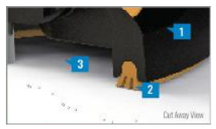
FL-A01
SHEET

FLASH LOC

UNIRAC
BETTER SOLAR STARTS HERE

FLASHLOC is the ultimate attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the lag bolt and inject sealant into the base. **FLASH**LOC's patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with lag bolts, sealant, and hardware for maximum convenience. Don't just divert water, **LOC it out!**

PROTECT THE ROOF
Install a high-strength waterproof attachment without lifting, prying or damaging shingles.



LOC OUT WATER
With an outer shield 1 contour-conforming gasket 2 and pressurized sealant chamber 3 the Triple Seal technology delivers a 100% waterproof connection.

HIGH-SPEED INSTALL
Simply drive lag bolt and inject sealant into the port 4 to create a permanent pressure seal.

FASTER INSTALLATION. 25-YEAR WARRANTY.
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FLASH LOC

INSTALLATION GUIDE

UNIRAC
BETTER SOLAR STARTS HERE

PRE-INSTALL
Snap chalk lines for attachment rows. On shingle roofs, snap lines 1-3/4" below upslope edge of shingle course. Locate rafters and mark attachment locations.

At each location, drill a 7/32" pilot hole. Clean roof surface of dirt, debris, snow, and ice. Next, BACKFILL ALL PILOT HOLES WITH SEALANT.

NOTE: Space mounts per racking system install specifications.

STEP 1: SECURE
Place **FLASH**LOC over pilot hole with lag on down-slope side. Align indicator marks on sides of mount with chalk line. Pass included lag bolt and sealing washer through **FLASH**LOC into pilot hole. Drive lag bolt until mount is held firmly in place.

NOTE: The EPDM in the sealing washer will expand beyond the edge of the metal washer when proper torque is applied.

STEP 2: SEAL
Insert tip of UNIRAC provided sealant into port. Inject until sealant exits both vents.

Continue array installation, attaching rails to mounts with provided T-bolts.

NOTE: When **FLASH**LOC is installed over gap between shingle tabs or vertical joints, fill gap/joint with sealant between mount and upslope edge of shingle course.

USE ONLY UNIRAC APPROVED SEALANTS: Chemlink Duralink 50, Chemlink M-1, Geocel 4500, or Geocel S-4

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

Project Details
8.16 KW
ROOFTOP PV
SYSTEM

TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH

AZIMUTH
0° / 180°

DC SYSTEM RATING
8.16 kW

AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
RACKING SYSTEM, ROOF ATTACHMENT

Sheet
S-1

FLASHLOC™ DUO

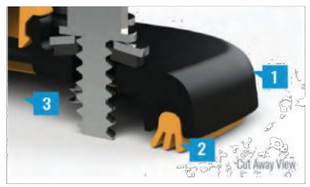
THE MOST VERSATILE DIRECT TO DECK ATTACHMENT

UNIRAC
BETTER SOLAR STARTS HERE

FLASHLOC™ **DUO** is the most versatile direct to deck and rafter attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast — no kneeling on hot roofs to install flashing, no prying or cutting shingles, no pulling nails. Simply drive the required number of screws to secure the mount and inject sealant into the base. **FLASH**LOC's patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with two rafter screws, sealant and hardware for maximum convenience (deck screws sold separately). Don't just divert water, **LOC it out!**

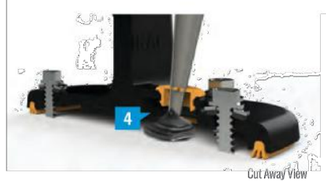
PROTECT THE ROOF

Install a high-strength waterproof attachment without lifting, prying or damaging shingles.



LOC OUT WATER

With an outer shield 1 contour-conforming gasket 2 and pressurized sealant chamber 3 the Triple Seal technology delivers a 100% waterproof connection.



HIGH-SPEED INSTALL

Simply drive the required number of screws and inject sealant into the port 4 to create a permanent pressure seal.

JUNE2021_FLASHLOCDUO_V2

FLASHLOC™ DUO

INSTALLATION GUIDE

UNIRAC
BETTER SOLAR STARTS HERE

PRE-INSTALL: CLEAN SURFACE AND MARK LOCATION

Ensure existing roof structure is capable of supporting loads prescribed in Flashloc Duo D&E Guide. Clean roof surface of dirt, debris, snow and ice.

Snap chalk lines for attachment rows. On shingle roofs, snap lines 1/4" below upslope edge of shingle coarse. This line will be used to align the upper edge of the mount.

NOTE: Space mounts per span charts found in FLASHLOC DUO state certification letters.

STEP ONE: SECURE

ATTACHING TO A RAFTER: Place FLASHLOC DUO over rafter location and align upper edge of mount with horizontal chalk line. Secure mount with the two (2) provided rafter screws. BACKFILL ALL PILOT HOLES WITH SEALANT.

ATTACHING TO SHEATHING: Place FLASHLOC DUO over desired location and align upper edge of mount with horizontal chalk line. Secure mount with the two (2) provided rafter screws. Next, secure mount with four (4) deck screws by drilling through the FLASHLOC DUO deck mount hole locations. Unirac recommends using a drill as opposed to an impact gun to prevent over-tightening or stripping roof sheathing.

IMPORTANT: SECURELY ATTACH MOUNT BUT DO NOT OVERTIGHTEN SCREWS.

STEP TWO: SEAL

Insert tip of UNIRAC approved sealant into port and inject until sealant exits vent. Continue array installation, attaching rails to mounts with provided T-bolts. Follow sealant manufacturer's instructions. Follow sealant manufacturer's cold weather application guidelines, if applicable.

NOTE: When FLASHLOC DUO is installed over gap between shingle tabs or vertical joints, fill gap/joint with sealant between mount and upslope edge of shingle course.

CUT SHINGLES AS REQUIRED: DO NOT INSTALL THE FLASHLOC SLIDER ACCROSS THICKNESS VARIATIONS GREATER THAN 1/8" SUCH AS THOSE FOUND IN HIGH DEFINITION SHINGLES.

NOTE: When installing included rail attachment hardware, torque T-bolt nut to 30 ft-lbs.
NOTE: If an exploratory hole falls outside of the area covered by the sealant, flash hole accordingly.
NOTE: Read and comply with the Flashloc Duo Design & Engineering Guide prior to design and installation of the system.

USE ONLY UNIRAC APPROVED SEALANTS. PLEASE CONTACT UNIRAC FOR FULL LIST OF COMPATIBLE SEALANTS.

FASTER INSTALLATION. 25-YEAR WARRANTY.
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

Project Details
8.16 KW
ROOFTOP PV
SYSTEM

TILT
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AZIMUTH
0° / 180°

DC SYSTEM RATING
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AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
RACKING SYSTEM, ROOF ATTACHMENT

Sheet
S-2

intertek
Total Quality. Assured.

UNIRAC, INC.
MIAMI-DADE TEST REPORT

SCOPE OF WORK
TAS 100(A) TESTING ON FLASHLOC, ROOF MOUNTS

REPORT NUMBER
K1187.01-109-18

TEST DATE(S)
09/09/19

ISSUE DATE 09/24/19 **REVISED DATE** 09/24/19

RECORD RETENTION END DATE
09/09/29

MIAMI-DADE COUNTY NOTIFICATION NO.
ATI 19048

LABORATORY CERTIFICATION NO.
18-0524.13

PAGES
18

DOCUMENT CONTROL NUMBER
ATI 00651 (08/21/17)
RT-R-AMER-Test-2816
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intertek
Total Quality. Assured.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR UNIRAC, INC.
Report No.: K1187.01-109-18
Revision 1: 09/24/19
Date: 09/24/19

REPORT ISSUED TO:
UNIRAC, INC.
1411 Broadway Blvd. NE
Albuquerque, New Mexico 87102-1545

SECTION 1
SCOPE
Intertek Building & Construction (B&C) was contracted by Unirac, Inc. to perform TAS 100(A) testing in accordance with Miami-Dade County requirements on their FLASHLOC, Roof Mounts. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the Intertek B&C test facility in York, Pennsylvania. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

DANIEL C. CULBERT LICENSE No. 83035 STATE OF FLORIDA PROFESSIONAL ENGINEER

For INTERTEK B&C:

COMPLETED BY:	Robert J. Beatty	**REVIEWED BY:**	Daniel C. Culbert, P.E.
TITLE:	Technician – Product Testing	**TITLE:**	Senior Project Engineer
SIGNATURE:	Digitally Signed by: Robert Beatty	**SIGNATURE:**	Digitally Signed by: Daniel Wing Culbert
DATE:	09/24/19	**DATE:**	09/24/19

RJB:wnl

2019.09.25 09:59:48 -04'00'

intertek
Total Quality. Assured.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR UNIRAC, INC.
Report No.: K1187.01-109-18
Revision 1: 09/24/19
Date: 09/24/19

Test Specimens #3 and #4 with M-1® sealant

Test Procedure: The wind speed intervals were conducted as follows:

Interval No.	Wind Speed (mph)	Time (min)	Water Spray
1	35	15	On
2	0	5	Off
3	70	15	On
4	0	5	Off
5	90	15	On
6	0	5	Off
7	110	5	On
8	0	5	Off

Test Results: The TAS 100(A) test results are as follows:

Wind Speed	Results	Allowed
35 mph	0 oz.	N/A
70 mph	0 oz.	N/A
90 mph	0 oz.	N/A
110 mph	0 oz.	N/A
Total	0 oz.	13.6 oz.

Results: Pass

General Note: Each configuration was evaluated separately with no leakage at the mount locations during or after the test.

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE
System Engineer
TIM WACHTMAN
System Designer
JOHN CANFIELD
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301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500
Project Details
8.16 KW
ROOFTOP PV
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AZIMUTH
0° / 180°
DC SYSTEM RATING
8.16 kW
AC SYSTEM RATING
7.6 kW
ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
EQUIPMENT:
RACKING SYSTEM,
ENGINEERING
Sheet
S-3

FLASHLOC DUO

GETTING STARTED | 1 PAGE

DESIGN & ENGINEERING GUIDE

Getting Started

This manual is for professional engineers, designers, installers, and permitting authorities. For assistance with your array's engineering and a Bill of Materials, see our U-builder at https://design.unirac.com/

The Flashloc Duo attachment is designed to be used with the Unirac SOLARMOUNT Flush-to-Roof system.

Some of the features of this product include:

- Designed per the ASCE 7-10 and ASCE 7-16 Building Code
- Component testing
- Rigorous Engineering Analysis
- Ability to be attached both to a rafter or directly to roof sheathing that meets the requirements outlined in this document
- Flashloc triple seal technology which saves time, preserves the roof, and protects the penetration
- Kitted with two rafter screws, sealant, and rail attachment hardware for maximum convenience
- Compatible with comp shingle and rolled comp roofs

FLASHLOC DUO

INSTALLER RESPONSIBILITY | 2 PAGE

DESIGN & ENGINEERING GUIDE

Installer Responsibility & Disclaimer

Please review this guide and the SOLARMOUNT Installation Guide thoroughly before installing your SOLARMOUNT system. These guides provide supporting documentation for building permit applications, planning, and assembling the SOLARMOUNT system.

The installer is solely responsible for:

- Complying with all applicable local or national building codes, including code requirements that can be more stringent than the guidelines set forth in this manual;
- Maintaining and enforcing all aspects of a safe working environment;
- Ensuring that Unirac and other products are appropriate for the particular installation and the installation environment;
- Ensuring that the roof, its rafters, connections, and any other structural support members can support the array under all code level loading conditions (this total building assembly is referred to as the building structure);
- Using only Unirac parts and installer-supplied parts as specified by Unirac (substitution of parts may void the warranty and invalidate the letters of certification in all Unirac publications);
- Ensuring that attachment strength is adequate to support loads in your installation location
- Ensuring the attachment of the roof deck to the rafters is adequate to support all loads when attaching to sheathing (See Expedited Permit Process at https://www.dvrpc.org/solar/pdf/Structural_Commentary_for_the_National_Simplified_Residential_Roof_Photovoltaic_Array_Permit_Guidelines_2017-06-03.pdf;
- Maintaining the waterproof integrity of the roof, including selection and proper installation of appropriate flashing techniques, if required;
- Ensuring safe installation of all electrical aspects of the PV array, including proper grounding/bonding;
- Array shading and output analysis;
- Ensuring correct and appropriate design parameters are used in determining the design loading used for design of the specific installation. Parameters, such as snow loading, wind speed, exposure and topographic factor should be confirmed with the local building official or a licensed professional engineer;
- Comply with module manufacturer's specifications.

Unirac shall not be liable for any losses, damages, or injuries that directly or indirectly result from any non-conformance with the above

FLASHLOC DUO

TOOLS AND SPECIFICATIONS | 3 PAGE

DESIGN & ENGINEERING GUIDE

TECHNICAL SPECIFICATIONS:
Material Types: A380 diecast aluminum
Seals: Injection molded EPDM
Hardware: 300 series stainless steel
Bonding and Grounding: See SOLARMOUNT D&E GUIDE

TOOLS REQUIRED OR RECOMMEND FOR LAYOUT, ATTACHMENTS, AND INSTALLATION:

- Drill (**Do Not Use an Impact Driver**)
- 5/16" Socket
- Torque Wrench
- Tape Measure
- Chalk Reel

GENERAL HARDWARE:

- #12-14 x 2.5" Hex Head, Self-drilling, Screws

SAFETY:
All applicable OSHA safety guidelines should be observed when working on a PV installation job site. The installation and handling of PV solar modules, electrical installation and PV racking systems involves handling components with potentially sharp metal edges. Rules regarding the use of gloves and other personal protective equipment should be observed.

Detail drawings available for basic geometry at Unirac.com

FLASHLOC DUO

TEST DATA AND RESULTS | 4 PAGE

DESIGN & ENGINEERING GUIDE

TEST DATA:
Wood Types for sheathing attached systems:

- 24/16 APA rated 7/16" OSB,
- 32/24 APA rated 15/32" Plywood

Test Setup:

- Performed on sheathing thicknesses per IRC 2018.
- Performed with the farthest upslope screw in a 1/8" gap between sheathing panels.
- Included rail and clamp connections, meaning allowable loads cover entire racking system
- Applies only when rails are mounted parallel to eave and ridge
- Assume all installation requirements are followed correctly

TESTS RESULTS:

- OSB
  - Allowable load in Uplift = 135 lbs
  - Allowable load in Downforce = 124 lbs
  - Allowable load in Shear = 82 lbs
  - Allowable load in Lateral = 102 lbs
- Plywood
  - Allowable load in Uplift = 166 lbs
  - Allowable load in Downforce = 170 lbs
  - Allowable load in Shear = 127 lbs
  - Allowable load in Lateral = 140 lbs
- Rafter
  - Allowable load in Uplift = 495 lbs
  - Allowable load in Downforce = 907 lbs
  - Allowable load in Shear = 190 lbs
  - Allowable load in Lateral = 488 lbs

Spans are calculated such that the point loads on the roof will not exceed these allowable loads.

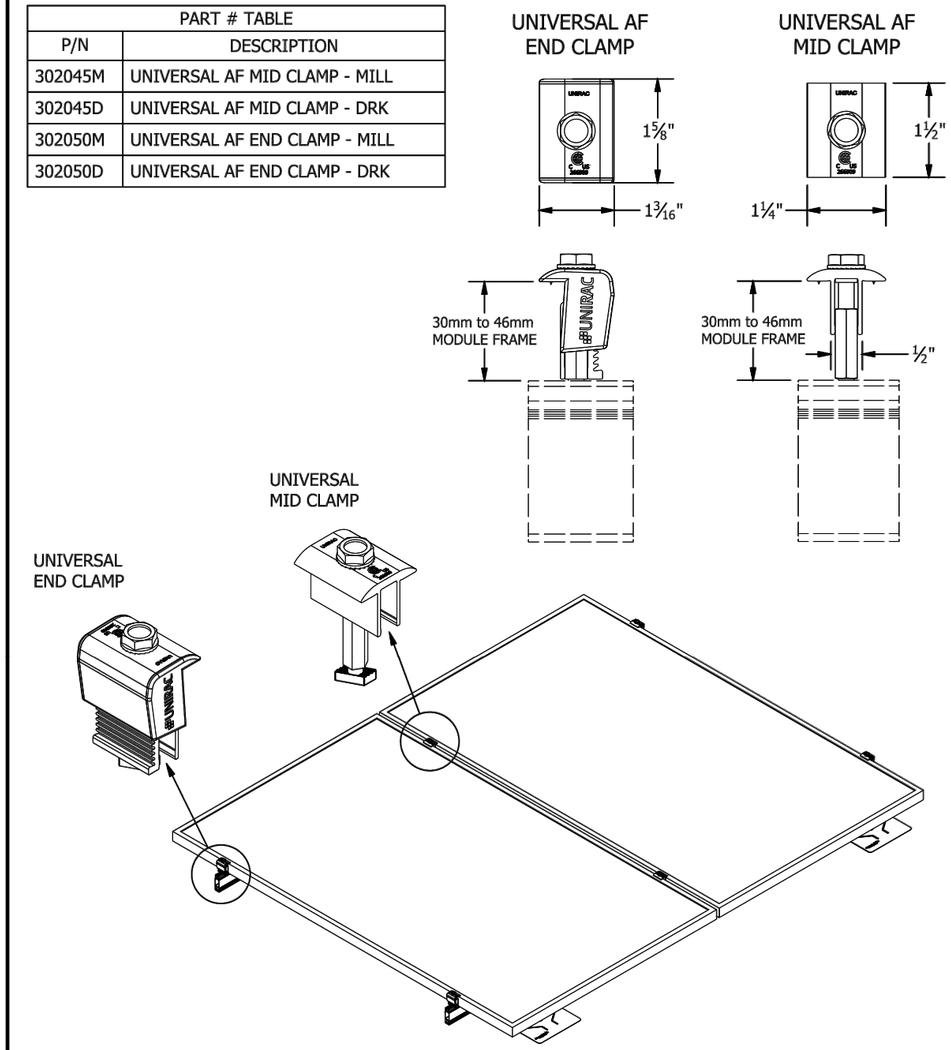
2'X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE
System Engineer
TIM WACHTMAN
System Designer
JOHN CANFIELD
Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500
Project Details
8.16 KW
ROOFTOP PV
SYSTEM
TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH
AZIMUTH
0° / 180°
DC SYSTEM RATING
8.16 kW
AC SYSTEM RATING
7.6 kW
ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
EQUIPMENT:
RACKING SYSTEM,
ENGINEERING
Sheet
S-4

PART # TABLE	
P/N	DESCRIPTION
302045M	UNIVERSAL AF MID CLAMP - MILL
302045D	UNIVERSAL AF MID CLAMP - DRK
302050M	UNIVERSAL AF END CLAMP - MILL
302050D	UNIVERSAL AF END CLAMP - DRK



UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	UNIVERSAL AF CLAMPS
REVISION DATE:	9/28/2020

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01B
SHEET

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE
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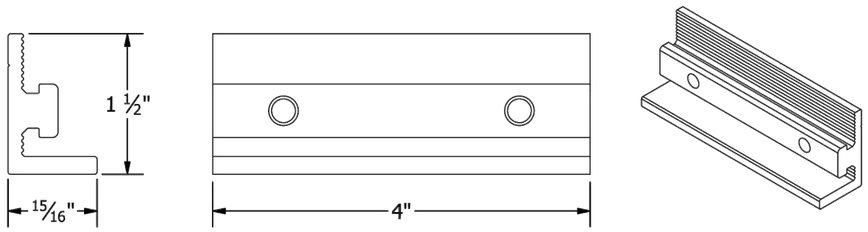
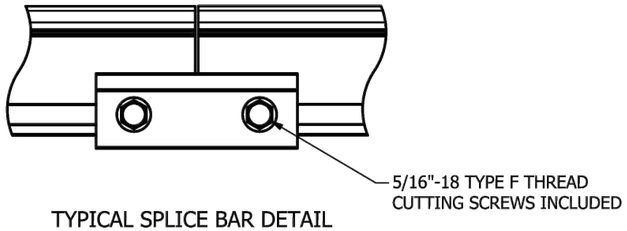
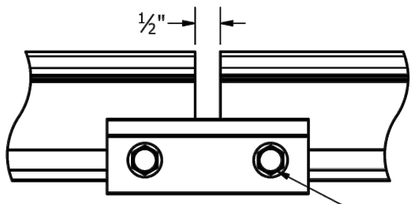
7.6 kW
ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
EQUIPMENT:
RACKING SYSTEM, CLAMPS
Sheet
S-5

BONDING SPLICE BAR





TYPICAL SPLICE BAR DETAIL



TYPICAL EXPANSION JOINT DETAIL

PART # TABLE	
P/N	DESCRIPTION
303019M	BND SPLICE BAR PRO SERIES MILL
303019D	BND SPLICE BAR PRO SERIES DRK

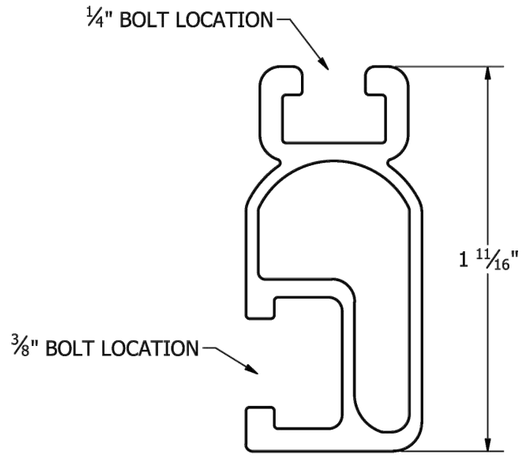
UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

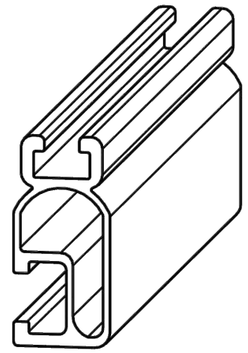
PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	BONDING SPLICE BAR PRO SERIES
REVISION DATE:	8/23/2018

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A05
SHEET





PART # TABLE		
P/N	DESCRIPTION	LENGTH
315168M	SM LIGHT RAIL 168" MILL	168"
315168D	SM LIGHT RAIL 168" DRK	168"
315240M	SM LIGHT RAIL 240" MILL	240"
315240D	SM LIGHT RAIL 240" DRK	240"

UNIRAC
1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	LIGHT RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS
LEGAL NOTICE

SM-P02
SHEET

2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE

System Engineer
TIM WACHTMAN

System Designer
JOHN CANFIELD

Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500

Project Details
8.16 KW
ROOFTOP PV
SYSTEM

TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH

AZIMUTH
0° / 180°

DC SYSTEM RATING
8.16 kW

AC SYSTEM RATING
7.6 kW

ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
RACKING SYSTEM, RAIL

Sheet
S-6

April 28, 2020

Unirac
1411 Broadway Blvd. NE
Albuquerque, NM 87102

Attn.: Unirac - Engineering Department

Re: Engineering Certification for the Unirac U-Builder 2.0 SOLARMOUNT Flush Rail

PZSE, Inc. - Structural Engineers has reviewed the Unirac SOLARMOUNT rails, proprietary mounting system constructed from modular parts which is intended for rooftop installation of solar photovoltaic (PV) panels; and has reviewed the U-builder Online tool. This U-Builder software includes analysis for the SOLARMOUNT LIGHT rail, SOLARMOUNT STANDARD rail, and SOLARMOUNT HEAVY DUTY rail with Standard and Pro Series hardware. All information, data and analysis contained within are based on, and comply with the following codes and typical specifications:

1. Minimum Design Loads for Buildings and other Structures, ASCE/SEI 7-05, ASCE/SEI 7-10, ASCE/SEI 7-16
2. 2006-2018 International Building Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
3. 2006-2018 International Residential Code, by International Code Council, Inc. w/ Provisions from SEAOC PV-2 2017.
4. AC428, Acceptance Criteria for Modular Framing Systems Used to Support Photovoltaic (PV) Panels, November 1, 2012 by ICC-ES.
5. 2015 Aluminum Design Manual, by The Aluminum Association, 2015

Following are typical specifications to meet the above code requirements:

Design Criteria: Ground Snow Load = 0 - 100 (psf)
Basic Wind Speed = 85 - 190 (mph)
Roof Mean Height = 0 - 60 (ft)
Roof Pitch = 0 - 45 (degrees)
Exposure Category = B, C & D

Attachment Spacing: Per U-builder Engineering report.

Cantilever: Maximum cantilever length is L/3, where "L" is the span noted in the U-Builder online tool.

Clearance: 2" to 10" clear from top of roof to top of PV panel.

Tolerance(s): 1.0" tolerance for any specified dimension in this report is allowed for installation.

Installation Orientation: See SOLARMOUNT Rail Flush Installation Guide.
Landscape - PV Panel long dimension is parallel to ridge/eave line of roof and the PV panel is mounted on the long side.
Portrait - PV Panel short dimension is parallel to ridge/eave line of roof and the PV panel is mounted on the short side.

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
T 916.961.3960 F 916.961.3965 W www.pzse.com
Experience | Integrity | Empowerment

Components and Cladding Roof Zones:
The Components and Cladding Roof Zones shall be determined based on ASCE 7-05, ASCE 7-10 & 7-16 Component and Cladding design.

Notes:
1) U-builder Online tool analysis is only for Unirac SM SOLARMOUNT Rail Flush systems only and do not include roof capacity check.
2) Risk Category II per ASCE 7-16.
3) Topographic factor, kzt is 1.0.
4) Array Edge Factor $Y_E = 1.5$
5) Average parapet height is 0.0 ft.
6) Wind speeds are LRFD values.
7) Attachment spacing(s) apply to a seismic design category E or less.

Design Responsibility:
The U-Builder design software is intended to be used under the responsible charge of a registered design professional where required by the authority having jurisdiction. In all cases, this U-builder software should be used under the direction of a design professional with sufficient structural engineering knowledge and experience to be able to:

- Evaluate whether the U-Builder Software is applicable to the project, and
- Understand and determine the appropriate values for all input parameters of the U-Builder software.

This letter certifies that the Unirac SM SOLARMOUNT Rails Flush, when installed according to the U-Builder engineering report and the manufacture specifications, is in compliance with the above codes and loading criteria.

This certification excludes evaluation of the following components:

1) The structure to support the loads imposed on the building by the array; including, but not limited to: strength and deflection of structural framing members, fastening and/or strength of roofing materials, and/or the effects of snow accumulation on the structure.
2) The attachment of the SM SOLARMOUNT Rails to the existing structure.
3) The capacity of the solar module frame to resist the loads.

This requires additional knowledge of the building and is outside the scope of the certification of this racking system.

If you have any questions on the above, do not hesitate to call.

Prepared by:
PZSE, Inc. – Structural Engineers
Roseville, CA

PAUL K. ZACHER
STATE OF WASHINGTON
52035
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES 08/02/2021

1478 Stone Point Drive, Suite 190, Roseville, CA 95661
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2"X2"
AHJ APPROVAL
STAMP

CAPSTONE SOLAR

DESCRIPTION	DATE	REVISION
INITIAL	2021.SEPT.7	1

Solar Specialist
EVIE ABERCROMBIE
System Engineer
TIM WACHTMAN
System Designer
JOHN CANFIELD
Customer Info
JOHN SAUNDERS & KATHRYN CHOLAKIAN
301 SE 18TH AVE,
OLYMPIA, WA 98501
PARCEL # 39400200500
Project Details
8.16 KW
ROOFTOP PV
SYSTEM
TILT
16° / 4:12 PITCH & 30° / 7:12 PITCH
AZIMUTH
0° / 180°
DC SYSTEM RATING
8.16 kW
AC SYSTEM RATING
7.6 kW
ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
EQUIPMENT:
RACKING SYSTEM,
ENGINEERING STAMP
Sheet
S-7

ENGINEERING REPORT

Plan review

Distributed Dead Load	2.59 psf
Average Roof Point Dead Load	21.46 lbs

TOTAL NUMBER OF MODULES	24
TOTAL KW	8.16 KW
TOTAL MODULE AREA	~464 ft^2

Loads Used for Design

BUILDING CODE	ASCE 7-10
BASIC WIND SPEED	110.00 mph
GROUND SNOW LOAD	25.00 psf
SEISMIC (SS)	1.32
ELEVATION	215.00 ft
WIND EXPOSURE	B

Loads Determined by Zip 98501

CITY, STATE	Olympia, WA
BASIC WIND SPEED	110.00 mph
GROUND SNOW LOAD	15.00 psf

Inspection

PRODUCT	SOLARMOUNT FLUSH
MODULE MANUFACTURER	Q-Cells
MODEL	24 - Q.PEAK DUO BLK-G8+340
MODULE WATTS	340 watts
MODULE LENGTH	68.50"
MODULE WIDTH	40.60"
MODULE THICKNESS	1.26"
MODULE WEIGHT	43.90 lbs
EXPANSION JOINTS	Every 40'
RAILS DIRECTION	CROSS-SLOPE
BUILDING HEIGHT	30.00 ft
ROOF TYPE	Shingle
ATTACHMENT TYPE	Flashloc Comp Kit
RAFTER SPACING	1.00"
TOTAL WEIGHT	1201.68 lbs

Roof Area 1 / Roof Area 1 - Array 1

Portrait Modules - Rails Running Across Slope

SOLARMOUNT LIGHT RAIL SPANS [IN]	ZONE 1	ZONE 2	ZONE 3
DESIGN SPAN	48	48	48
Max Cantilever	16	16	16
Max Span	68	68	51

DESIGN PRESSURES [PSF]	ZONE 1	ZONE 2	ZONE 3
Up	-8.7	-17.6	-27.5
Down	20.2	20.2	20.2
Downslope	6.0	6.0	6.0
Lateral	2.2	2.2	2.2

MAXIMUM POINT LOADS [LBS]	ZONE 1	ZONE 2	ZONE 3
Up	-99.3	-200.9	-314.0
Down	230.6	230.6	230.6
Downslope	68.5	68.5	68.5
Lateral	25.1	25.1	25.1
Tributary Area [ft^2]	11.4	11.4	11.4
ROOF PITCH:	18°		

Roof Area 2 / Roof Area 2 - Array 1

Portrait Modules - Rails Running Across Slope

SOLARMOUNT LIGHT RAIL SPANS [IN]	ZONE 1	ZONE 2	ZONE 3
DESIGN SPAN	48	48	48
Max Cantilever	16	16	16
Max Span	68	68	51

DESIGN PRESSURES [PSF]	ZONE 1	ZONE 2	ZONE 3
Up	-8.7	-17.6	-27.5
Down	20.2	20.2	20.2
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Lateral	2.2	2.2	2.2

MAXIMUM POINT LOADS [LBS]	ZONE 1	ZONE 2	ZONE 3
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Down	230.6	230.6	230.6
Downslope	68.5	68.5	68.5
Lateral	25.1	25.1	25.1
Tributary Area [ft^2]	11.4	11.4	11.4
ROOF PITCH:	18°		

2"X2"
AHJ APPROVAL
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AZIMUTH
0° / 180°
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8.16 kW
AC SYSTEM RATING
7.6 kW
ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr
Drawing
EQUIPMENT:
RACKING SYSTEM, SITE
SPECIFIC ENGINEERING
Sheet
S-8

DETAILED PARTS DESCRIPTION

		QTY
	**Rail** 315168D SM LIGHT RAIL 168" DARK Structural aluminum extrusion containing slots that accept module and roof attachment hardware, electrical bonding accessories, and splice bars.	16
	**Mid Clamp** 302045D UNIVERSAL AF SERIES MID CLAMP DARK Universal Aesthetic Fastener (Mid), Universal for modules between 30-46mm and features twist and lock installation, 1 tool install, UL2703 integrated bonding, and low profile hardware and 1/2 module gap for optimal aesthetics. Made from Aluminum and Stainless Steel hardware.	32
	**End Clamp** 302050D UNIVERSAL AF SERIES END CLAMP DARK Universal Aesthetic Fastener (End), Universal for modules between 30-46mm without the use of spacers or extra parts, Features twist and lock installation, 1 tool install, UL2703 integrated bonding, and low profile hardware for optimal aesthetics. Clamps can be placed anywhere on the rail and rail can be cut flush with the clamp for optimal aesthetics. Made from Aluminum and Stainless Steel hardware, Caps are PC/ASA.	32
	**Flashing** 004085D FLASHLOC COMP KIT DRK FLASHLOC is the ultimate attachment for composition shingle and rolled comp roofs. The all-in-one mount installs fast and looks great with dark anodized finish. Simply drive the lag bolt and inject sealant into the base. FLASHLOC's patented TRIPLE SEAL technology preserves the roof and protects the penetration with a permanent pressure seal. Kitted with lag bolts, sealant, and hardware for maximum convenience.	56
	**Microinverter Mounting** 008013S MICRO MNT BND T-BOLT 1/4in x 3/4in SS Attaches micro-inverter flange to beam using 3/4" x 1/4" bonding T-Bolt.	24
	**Grounding Lug (Weeb)** 008002S GROUND WEEBLUG #1 For electrical bonding of PV modules and rails. Accepts one 14AWG to 6AWG or two 12 AWG to 10 AWG copper wires. Tin plated copper body, 1/4" stainless steel fasteners.	8
	**Conduit Mount** 00802CM E-BOSS CONDUIT MOUNT COMP KIT Attach conduit mount directly to deck, using an included flashing and hardware or mounted to a rail or L-Foot using T-bolt. Accomodates both 1" and 3/4" conduit.	20

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AZIMUTH
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DC SYSTEM RATING
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AC SYSTEM RATING
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ESTIMATED ANNUAL PRODUCTION
7,177 kWh/Yr

Drawing
EQUIPMENT:
RACKING SYSTEM, BILL OF MATERIALS

Sheet
S-9