



## PLANNING AND ZONING COMMISSION AGENDA – Regular Meeting

Monday, October 8, 2018  
Ketchum City Hall  
480 East Avenue North, Ketchum, ID 83340

1. **4:00 PM - SITE VISIT – Long Solar Project; 420 Sage Rd. #2** (Winter Sun Condos Lot 25 Unit 2)
2. **4:30 PM - SITE VISIT – Kingen Variance; 206 Skiway Dr.** (Warm Springs Village Sub Lot 2, Block 2)
3. **5:00 PM - SITE VISIT – Northwest Institute of Energy Medicine Conditional Use Permit, 100 Bell Drive, Unit B** (Industrial Park Sub Lot 2)
4. **5:15 PM - SITE VISIT – Argyros Sign Variance, 120 S. Main St.** (Ketchum Lot 4A, Block 1)
5. **5:30 PM - CALL TO ORDER: City Hall, 480 East Avenue North, Ketchum, Idaho**
6. **PUBLIC COMMENT** - Communications from the public for items not on the agenda.
7. **CONSENT CALENDAR—ACTION ITEMS**
  - a. **Minutes:** September 10, 2018
  - b. **Minutes:** September 25, 2018
8. **PUBLIC HEARINGS AND COMMUNICATIONS FROM STAFF – ACTION ITEMS**
  - a. **ACTION - Zoning Code Amendment:** Residential Use in the Light Industrial Districts. The Commission will consider a City-initiated amendment to Title 17, the zoning ordinance, of the Ketchum Municipal Code by amending: section 17.08.020: terms defined; section 17.18.140 through 17.18.160: purpose of the light industrial districts number 1, 2, and 3; section 17.12.010: zoning and overlay districts and map; section 17.12.020: district use matrix; section 17.12.030: dimensional standards, districts matrix; section 17.12.050: LI-1, LI-2, and LI-3 dimensional standards, district matrix; section 17.124.090: residential: light industrial districts; section 17.124.130: fences, hedges and walls.
  - b. **ACTION ITEM - Long Solar Energy Project Mountain Overlay Design Review:** 420 Sage Road #2: (Winter Sun Condominiums: Lot 25: Unit 2). *Continued from August 13, September 10, 2018.* The Commission will consider and take action on an application for a 598 square foot ground mounted solar array and a roof mounted solar thermal water heating system. The ground mounted solar array is proposed to be sited within the common area of Winter Sun Condominium.
  - c. **ACTION - Kingen Variance Request:** 206 Skiway Drive (Warm Springs Village Sub Lot 2 Block 2) The Commission will consider and take action on a request by Gerald Kingen for a variance from the 15-foot setback required in the Tourist-3000 Zoning District to accommodate an elevator addition to an existing, nonconforming single-family residence.
  - d. **ACTION – Northwest Institute of Energy Medicine Conditional Use Permit,** 100 Bell Drive Unit B (Industrial Park Sub Lot 2) The Ketchum Planning and Zoning Commission will consider and take action on a conditional use permit application from Isabella Cazamira The proposed business includes several components: wholesaling and warehousing, which are permitted uses in the LI-2 zoning district, and hoccatt ozone therapy, which falls under the definition of “Health and Fitness Facility”. Hoccatt ozone therapy is a passive exercise conducted with an oxygen breathing device and is intended to increase strength and energy levels. In the LI-2 zoning district “Health and Fitness Facilities” are permitted only with Conditional Use Permit approval.
  - e. **ACTION ITEM - Argyros Performing Arts Center Sign Variance:** 120 S. Main St.: (Lot 4A, Block 1). *Continued from September 10, 2018.* The Commission will consider and take action on a request for a variance by Timothy Mott for a poster-like informational sign for the Argyros Performing Arts Center. This item to be continued to the next meeting.
9. **STAFF REPORTS & CITY COUNCIL MEETING UPDATE**
10. **COMMISSION REPORTS AND EX PARTE DISCUSSION DISCLOSURE**
11. **ADJOURNMENT**

*Any person needing special accommodations to participate in the meeting should contact the City Clerk's Office as soon as reasonably possible at 726-3841. All times indicated are estimated times, and items may be heard earlier or later than indicated on the agenda.*





# Planning and Zoning

## Regular Meeting

~ Minutes ~

480 East Avenue North  
Ketchum, ID 83340

<http://ketchumidaho.org/>

Maureen Puddicombe  
208-726-7801

Monday, September 10, 2018

5:30 PM

Ketchum City Hall

1. **4:00 – SITE VISIT – Felker Residence Mountain Overlay Design Review: 255 Hillside Dr (Lot 33, Block 2, Warm Springs Subdivision #5)**
2. **4:30 PM – SITE VISIT - Light Industrial Tour: Rotary Park**
3. **5:15 PM - SITE VISIT – 760 N Washington Ave Mixed-Use Building Pre-Application Design Review: 760 N. Washington Ave. (Ketchum Townsite, Block 13, Lot 6)**
4. **5:30 PM - Call to Order, 480 East Ave N, City Hall**

Attendee Name	Title	Status	Arrived
Jeff Lamoureux	Chair	Present	
Tim Carter	Commissioner	Present	
Neil Morrow	Vice-Chair	Present	
Matthew Mead	Commissioner	Remote	
Kurt Eggers	Commissioner	Present	

### 5. PUBLIC COMMENT - Communications from the public for items not on the agenda.

No public comments were given.

### 7. PUBLIC HEARINGS AND COMMUNICATIONS FROM STAFF – ACTION ITEMS

- a. **Argyros Performing Arts Center Sign Variance:** Argyros Performing Arts Center, 120 S. Main St.: (Lot4A, Block 1). The Commission will take action to continue review of the Variance request to October 8, 2018.

**Motion To:** Continue Argyros Performing Arts Center Sign Variance to October 8, 2018.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Jeff Lamoureux, Chair
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

- b. **Long Solar Energy Project Mountain Overlay Design Review:** 420 Sage Road #2: (Winter Sun Condominiums: Lot 25: Unit 2). (Continued from August 13th). The Commission will take action to continue review of the Mountain Overlay Design Review Application to October 8, 2018.

**Motion To:** Continue Long Solar Energy Project Mountain Overlay Design Review to October 8, 2018.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Tim Carter, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

- c. ACTION – **Accepting Record of the Decision of the Administrator:** Regarding Floodplain Development Permit Application 18-068 approving the construction of a scour pad by the City of Ketchum within Warm Springs Creek, and to schedule a hearing date for the appeal.

Director John Gaeddert informed to the Commission that the appellant, Miles Stanislaw, has withdrawn this appeal.

**Motion to:** Table indefinitely the scour pad in the Floodplain appeal of Miles Stanislaw.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Tim Carter, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

## 6. CONSENT CALENDAR—ACTION ITEMS

- a. **Minutes:** August 13, 2018

**Motion To:** Approve minutes of August 13, 2018.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Jeff Lamoureux, Chair
<b>SECONDER:</b>	Neil Morrow, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

- 7d. ACTION - **Design Review Administrative Authority:** The Commission will consider City-initiated amendments to Chapter 17.96: Design Review, Section 17.08.020: Terms Defined, and Chapter 17.04: Mountain Overlay Zoning District to modify the authority of the Administrator to review and approve certain Design Review application projects.

Background for the Design Review Administrative Authority text amendment was given by Director John Gaeddert, explaining how the process currently works and how the process for minor modifications would be changed by this amendment.

Public comment called for; none was given.

Chair Jeff Lamoureux questioned how this might conflict with the Building Code as to the definition of minor vs substantial improvements, especially as related to non-conforming structures. Commissioner Neil Morrow liked the amendment but suggested adding a definition of Minor/Substantial Improvement. John Gaeddert added that non-conforming buildings cannot be altered to increase the degree of non-conformity, and that standard would apply whether the changes were minor or substantial. Commissioner Morrow wanted to ensure that non-conformity was not promoted.

Director Gaeddert suggested an edit to the proposed amendment. Associate Planner Abby Rivin stated some projects were exempt from a separate Design Review since they are reviewed during the Building Permit process. Director Gaeddert added that the review for the Building Permit covered all the same criteria as a Design Review but did not include the formal Staff Report.

**Motion To:** Recommend approval to the City Council of the Design Review Administrative Authority text amendment to Chapter 17.96: Design Review, Section 17.08.020: Terms Defined, and Chapter 17.04: Mountain Overlay Zoning District with edits as noted.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Tim Carter, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

- e. **ACTION - Zoning Code Amendment:** Residential Use in the Light Industrial Districts. (Continued from March 6, March 27th, April 9th, May 14, May 29, June 11, June 25, July 9, August 13, 2018.) The Commission will consider City-initiated amendments to Title 17, Section 17.124.090, Residential, Light Industrial Districts, and Section 17.12.020, District Use Matrix.

The Zoning Code Amendment for Residential Use in the Light Industrial District was presented by Senior Planner Brittany Skelton. The focus of this presentation was on building height. Renderings were presented showing visual impact of heights ranging from 35 feet to 58 feet, from five different perspectives in the LI-2 and LI-3.

Chair Jeff Lamoureux called for Public Comment:

Gwen Raney, resident of Northwood, expressed she didn't like the 58-foot height as she thought it was too imposing and was concerned about traffic and density. She asked about when affordable housing is required of a builder. Senior Planner Brittany Skelton explained that the housing requirement is determined by the zone and the Community Core Zone is different from the LI Zone. In the LI, Community Housing would only be required if a building had a fourth or fifth floor.

Heidi Sheinthanner thought 58 feet was too tall. Director John Gaeddert answered residential would not be allowed on the first floor. The goal is to reserve the LI for LI uses. The 18-foot first floor height would allow the building a 40-foot total height. A third or fourth floor would accommodate affordable housing.

Commissioner Kurt Eggers stated he liked the 18-foot first floor, but overall height should be 38-40 feet. He felt 48 or 58 feet was too tall. He supported three stories with first floor commercial, second floor commercial-related and third floor residential, but pointed out a larger building with more residential would increase the pressure on parking. Commissioner Tim Carter agreed with Eggers. He felt 48 feet might work in some locations, but 58 feet was a big impact and didn't think the public would support it. He felt the LI-1 should be included in this amendment. Commissioner Neil Morrow expressed that 38 feet would not yield additional floor space, but 48 feet might. The 58-foot height was just too big. Commissioner Matthew Meade agreed with the prior comments and thought the third and fourth floors didn't add to the business but would have a negative effect on the purpose of the LI.

Chair Jeff Lamoureux pointed out that the renderings were just boxes and buildings would have more design to them. He stated he would be amenable to the 58' and would like to hear comments by the public. He suggested the LI-3 might also be a buffer zone to the three- or four-story buildings in the LI-2. A discussion of building height and location was held. Several renderings of differing heights and locations were reviewed and discussed. Senior Planner Brittany Skelton asked the Commission about allowed uses on the first floor

in the LI. In previous meetings it was determined that physical activities such as Pilates or yoga would be allowed, but what was the Commissions' thought on static activity, such as massage, acupuncture or stone therapy? Commissioners Lamoureux and Morrow stated it might be allowed on a second or third floor but would be outside the intent of the LI for the first floor. It would also conflict with the neighboring uses.

**Motion To:** Continue to October 8, 2018 for fully noticed Public Hearing on that date.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Jeff Lamoureux, Chair
<b>SECONDER:</b>	Neil Morrow, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

- f. **ACTION – 760 N. Washington Mixed-Use Building Pre-Application Design Review:** 760 N. Washington Ave.: (Ketchum Townsite: Block 13: Lot 6). The Commission hear public comment, consider, and provide feedback on a Pre-Application Design Review for a new three-story, mixed-use building containing commercial/retail space and one (1) community housing unit on the first-floor and one (1) residential unit on the second and third floors.

Associate Planner Abby Rivin presented the Pre-Application Design Review for the 760 N. Washington Mixed-Use Building. Planner Rivin reviewed the conditions to be addressed prior to the Design Review Application.

Applicant Andrew Castellano expressed that he and his wife wanted to contribute to the development of the Community Core. They planned to live on the second and third floors and conduct their business on the ground floor. They planned to use modular units to lower the construction impact to the neighbors. Solar panels were proposed, and he explained the proposed exterior materials.

Chair Jeff Lamoureux supported the building. Commissioner Kurt Eggers liked the building and appreciated the preservation of the large trees but wanted to see a tree protection plan as part of the Construction Activity Plan. Commissioner Matthew Meade liked the project design and the modular building concept. Commissioner Tim Carter supported the project with conditions as noted.

**Motion To:** Advance the 760 N. Washington Ave Mixed-Use Building to Design Review.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Kurt Eggers, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

- g. **ACTION – Felker Residence Mountain Overlay Design Review:** 255 Hillside Dr. (Lot 33, Block 2, Warm Springs Subdivision #5) The Commission will consider and take action on a Mountain Overlay Design Review Application for a single-family residence in the Mountain Overlay.

Commissioner Kurt Eggers recused himself from this agenda item.

Senior Planner Brittany Skelton presented the Mountain Overlay Design Review Staff Report for the Felker Residence located in the Mountain Overlay. Staff recommended approval of the Design Review and the Findings of Fact and Conclusions of Law for this project.

Chair Jeff Lamoureux questioned if the plan addressed avalanche standards and the shedding of snow onto adjacent properties or the public right-of-way. Commissioner Neil Morrow noted this issued was just discussed regarding the residence at 124 Sage Road.

Applicant representative Daniel Hollis presented the project overview, Although the owner had a currently approved Design Review, the project has been re-designed to decrease the scale of the building and better accommodate the topography of the site. He reviewed setbacks, snow storage, floor plan, roof lines, and exterior finishes.

Chair Jeff Lamoureux called for Public Comment:

Heide Scheinthanner asked about utilities in each building and setback of the driveway and structures.

Cindy Enahosa, neighbor, expressed concerns regarding snow diversion and the possibility of three rental units.

Ron Stadiotto, neighbor, was concerned about avalanche and snow removal from the long driveway. He liked the placement of the driveway and thought the front yard was an attractive feature.

Monika Scheinthanner, neighbor, asked about snow storage and drainage from the long driveway. She thought that from the road, the building looked higher than the maximum allowable height.

Senior Planner Brittany Skelton explained the GR-L Zoning Code as to ADU's and avalanche deflection. Commissioner Morrow asked if the Design Review would be necessary if the lot was not in the Mountain Overlay. Planner Skelton replied, that in another location, only a Building Permit would be required, but the project would have to meet all zoning standards, i.e. height, setbacks, floor area ratio, etc.

Daniel Hollis, architect, responded to questions as to the utilities for each unit. Kurt Eggers, landscape architect, addressed the snow storage and drainage issues.

Commissioner Tim Carter felt the project met zoning requirements and since public comments have been addressed, he was in support of the project. Commissioner Neil Morrow thought that since there are other large houses in the area, this gives a nice balance to the neighborhood and saw no reason not to approve it. Commissioner Matthew Meade liked the design of the building and the engineering for the avalanche zone. Chair Jeff Lamoureux liked the new design and thought the Construction Plan needed to be adhered to so as to minimize the impact to the neighbors.

**Motion to:** Approve Felker Residence Design Review with the recommended Conditions as noted on page 11 of the Staff Report.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Tim Carter, Commissioner
<b>SECONDER:</b>	Neil Morrow, Vice-Chair
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead

## 8. STAFF REPORTS & CITY COUNCIL MEETING UPDATE

### a. Felker Residence Mountain Overlay Findings of Fact and Conclusions of Law

**Motion to:** Approve the Felker Residence Findings of Fact and Conclusions of Law.

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Tim Carter, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

## 9. Commission reports and ex parte discussion disclosure

Senior Planner Brittany Skelton indicated Staff had been discussing the possibility of a public meeting to discuss LI changes. Tuesday, Sept 25, 2018 from Noon to 2:00 PM was chosen as the date for a public information meeting. The location to be determined.

Associate Planner Abby Rivin announced the lot at 100 Northwood Way (formerly Lizzie's Coffee) had been sold. The new owner was proposing minor changes and the Commission agreed that minor changes could be approved administratively.

## 10. ADJOURNMENT

**Motion to:** Adjourn at 8:06 PM

<b>RESULT:</b>	<b>ADOPTED [UNANIMOUS]</b>
<b>MOVER:</b>	Neil Morrow, Vice-Chair
<b>SECONDER:</b>	Tim Carter, Commissioner
<b>AYES:</b>	Lamoureux, Carter, Morrow, Mead, Eggers

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Jeff Lamoureux  
Chairperson



# Planning and Zoning

## Special Meeting

~ Minutes ~

480 East Avenue North  
Ketchum, ID 83340

<http://ketchumidaho.org/>

Maureen Puddicombe  
208-726-7801

Tuesday, September 25, 2018

3:00 PM

Ketchum City Hall

### 1. 3:00 PM - CALL TO ORDER: City Hall, 480 East Avenue North, Ketchum, Idaho

The meeting was called to order at 3:08 PM.

### 2. Call to Order

Attendee Name	Title	Status	Arrived
Jeff Lamoureux	Chair	Present	
Tim Carter	Commissioner	Present	
Neil Morrow	Vice-Chair	Absent	
Matthew Mead	Commissioner	Present	
Kurt Eggers	Commissioner	Present	

### 3. WORKING SESSION: Residential Use in the Light Industrial Districts. (Continued from March 6, March 27th, April 9th, May 14, May 29, June 11, June 25, July 9, August 13, September 10, 2018.) The Commission will consider City-initiated amendments to Title 17, Section 17.124.090, Residential, Light Industrial Districts, and Section 17.12.020, District Use Matrix.

Director John Gaeddert outlined the points to be covered in today's workshop. A fully-noticed Public Hearing was scheduled for the October 8, 2018 Planning and Zoning Commission Meeting.

Changes to Section 7 of the Zoning Code were discussed as to the ownership of units within a mixed-use building. Market-rate housing, workforce housing, and rental vs purchase of property were discussed. Senior Planner Brittany Skelton presented the changes to Design Review concerning flat roofs and the bulk of a building. Skelton also presented the proposed setback requirements. Director John Gaeddert presented the proposed overlay districts with the maximum allowable building height in each district.

Commissioner Tim Carter was excused at 3:30 PM.

Commissioner Matthew Mead asked for clarification of setbacks and building height at different locations. Chair Jeff Lamoureux discussed heights of buildings below the highway level and in the 10<sup>th</sup> Street Light Industrial.

Chair Jeff Lamoureux inquired about the possibility of access from Highway 75 to a multi-story building abutting the highway. Director John Gaeddert replied it would be subject to IDT regulations. Commissioner Kurt Eggers pointed out that Ketchum might want to consult with IDT concerning a sidewalk and a bike path along Highway 75.

Public Comment:

Bob Crosby, Sun Valley Board of Realtors, asked that the Commission seek advice concerning fiscal feasibility before recommending the amendment to the City Council.

Gwen Raney agreed with Bob Crosby, that the Commission should be sure the projects would be financially feasible. She would like to see renderings of possible buildings showing setbacks and pitched roofs with possible exterior materials.

Chair Jeff Lamoureux asked for possible renderings of the area with pitched rooflines to reflect proposed design standards. He would not want to make standards so restrictive that a project could not be built. John Gaeddert will provide additional renderings showing pitched vs flat roofs, in addition to an analysis of land values and construction costs.

Public Comment:

Bob Crosby supported the concept for work-force housing but wanted to be sure the code would support a financially viable project.

Commissioner Matthew Mead questioned the setbacks along Highway 75 from the 48-foot height limit to the 58-foot height limit. Senior Planner Brittany Skelton responded it was intended as a buffer, but it could be extended. Chair Jeff Lamoureux noted there was a landscaping easement in place in that area. Matthew Mead thought the landscape along Highway 75 should be preserved as a buffer to the highway. Jeff Lamoureux suggested bringing in landscaping to break up the buildings. John Gaeddert related that he had been asked if a lot along the highway could be backfilled to provide access from the Highway and landscape screening. John Gaeddert noted there was no answer at this time, but IDT would be consulted. Kurt Eggers liked the landscaping at the north end but was concerned that it also blocks the views and questioned if we really want that. Matthew Mead added that both landscaping and buildings block the view. Eggers replied that is why the max height should stay at 35 feet. He thought the greater height might be OK with setbacks. A discussion of setbacks, heights, and roof lines was held. Matthew Mead liked giving architects more leeway with additional height. He asked about health and safety in the area of Bell Dr.

The Commission discussed the issue of traffic, pedestrian access, sidewalks and greater density on Bell Drive due to the narrowness of that street. Matthew Mead thought work-force housing should not be under-valued or under-served. John Gaeddert added this issue would be included in the next draft.

Public Comment:

Gwen Raney commented on the landscaping belonging to the Northwood HOA. The Northwood HOA had decided not to replace trees that have died. She noted her concerns about parking and urged the Commission not to assume the residents in the LI will not have cars.

John Gaeddert related that the parking requirement in the LI requires a parking spot for each bedroom or living space. Kurt Eggers asked for clarification of the size of residential units allowed in the LI. Brittany Skelton noted the maximum residence size is 1200 square feet with 2 bedrooms which requires 2 parking spaces.

## 4. ADJOURNMENT

**Motion to:** Adjourn at 4:47 PM



**RESULT:**       **ADOPTED [UNANIMOUS]**  
**MOVER:**        Jeff Lamoureux, Chair  
**SECONDER:**   Matthew Mead, Commissioner  
**AYES:**         Lamoureux, Mead, Eggers

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Jeff Lamoureux  
Chairman



## City of Ketchum

October 8, 2018

Ketchum Planning & Zoning Commission

**Recommendation to hold a public hearing, deliberate, and recommend approval to Council of the proposed light industrial district map and text amendments (Ordinance #1192) with any specific edits deemed necessary**

Recommendation and Summary

Staff is recommending the Commission approve the proposed light industrial (LI) district amendment and adopt the following motion:

“I move to recommend approval to Council of Ordinance #1192 (noting any specific edits to the ordinance as shown in Exhibit F)

The reasons for the recommendation include:

- The Planning and Zoning has received extensive public comment on proposed revisions to the LI districts (LI-1, LI-2, and LI-3) over the past 7-8 months of public hearings (see Exhibits A and B), which have been integrated into proposed ordinance #1192 (see Exhibit F)
- The proposed ordinance amendments forward the goals and objectives of the Ketchum Comprehensive Plan for purposes of both retaining and protecting Light Industrial uses while also encouraging residential uses where appropriate (see Exhibit C and D)
- Qualifying ground floor heights and the provision of additional floors within select 48’ and 58’ overlay areas within the LI-2 and LI-3 have been graphically modeled and proposed, along with other variables, to provide incentives for development (see Exhibit E)

Background & Analysis

Previous staff reports have detailed the history of residential uses in the light industrial district and the importance of LI to the city’s employment and service base. While many uses can occur in Ketchum’s LI, which encompasses 60.94 acres and represents 2.9% of the overall land base within Ketchum City Limits (see Exhibit C), many LI uses cannot occur elsewhere in the City.

To accommodate the city’s need for workforce housing while also safeguarding the city’s limited LI land use base, the proposed amendments to Title 17 of the Ketchum Municipal Code (KMC) include, among other provisions, that proposed residential uses be: (a) subordinate to LI in terms of access and location (2<sup>nd</sup> floor or above); (b) be subject to a CUP; and (c) in accordance with residential anti-nuisance provisions.

Additional ordinance edits address the LI purpose sections, residential ownership and rental options, LI fence heights, clarifications within the district use matrix and bulk standards, and mapping of a 48’ and 58’ height overlay district map in the LI for special projects meeting specified criteria such as qualifying ground floors.

For additional details on each of the proposed amendments to the KMC, see proposed ordinance #1192 in Exhibit F.

## Attachments/Exhibits

Attached to this staff report are seven exhibits, A through F, as follows:

A – Public Comment

B – Procedural Items

C – Light Industrial Reference Material

- Comprehensive Plan Analysis RE: Retaining LI as Primary Use in LI Districts
- Ground Floor Clear Heights
- Use Matrix with Definitions Worksheet
- Business License & Related Data

D – Residential Uses in Light Industrial

- Comprehensive Plan Analysis RE: Residential Uses as Secondary Use in LI District
- Ordinance History of Residential Uses in Ketchum's Light Industrial Districts
- Reference Literature

E – LI Height Modeling

F - Draft Light Industrial Ordinance #1192

- Edits Eight Sections of KMC
- Includes 48'/58' Overlay Map

**Exhibit A.**

Public Comment

**Zoning Code Text Amendment**  
**Residential Use in the Light Industrial Area**  
Master Public Comment Compilation

**November 3, 2017** – IME article

Ketchum candidates talk big changes to light-industrial zoning

[https://www.mtexpress.com/news/elections/ketchum-candidates-talk-big-changes-to-light-industrial-zoning/article\\_7ee14e40-c003-11e7-8d3c-1fa13a5c43af.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/news/elections/ketchum-candidates-talk-big-changes-to-light-industrial-zoning/article_7ee14e40-c003-11e7-8d3c-1fa13a5c43af.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

**March 12, 2018** - Continued to Special Meeting March 27, 2018

**March 27, 2018** – **Supports apartments in LI-3 and mixed-use in the LI-2.**

Brian Barsotti - owner of the only 2 undeveloped lots in the LI, stated the housing crisis in Ketchum is an important issue but deed restricted projects don't work. Now looking at micro apartments (350 to 450 square feet) to keep price down. There is a need to create density. He supports the LI-3 zone for apartments and proposes a mix of Industrial and Housing in the LI-2. Brian stated it is hard to make a project work due to the high land and labor costs. He would like to look at the best uses of the land.

**April 9, 2018** – **Opposes housing in the LI, but strongly encourages live/work spaces.**

David Hurd – resident of Ketchum, gave information on the affordable housing issue in many cities requiring creative thinking. He strongly opposes housing in the LI, but strongly encourages live/work spaces.

**April 11, 2018** – IME Article

Ketchum delays LI zoning changes

[https://www.mtexpress.com/news/ketchum/ketchum-delays-li-zoning-changes/article\\_22a4bc00-3d0f-11e8-ac10-67146ac9d2ee.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/news/ketchum/ketchum-delays-li-zoning-changes/article_22a4bc00-3d0f-11e8-ac10-67146ac9d2ee.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

**May 26, 2018** – **Supports ground floor residential in LI-3; has parking concerns.**

Jack Kueneman – resident, wrote: I am a full-time resident of 110 Lindsay Circle. While I support residential development, including on the ground floor, in this part of the Light Industrial District III, I am concerned and strongly opposed to no on-site parking requirements for small units (less than 750 sq ft) or any size. Please do not extend the current downtown Ketchum parking provisions to these parcels. I should add, I'm also opposed to the recently passed on-site parking exclusions for small units

in the downtown area. No on-site parking for residential units in Ketchum is unrealistic, impractical and unworkable.

### **May 29, 2018 – Supports mixed-use.**

Harry Griffith of Sun Valley Economic Development. He thinks it is a great initiative. Complimented Brittany on her analysis. Has been studying the LI changes for the last 2 years and has a lot of similar information from 2016. The character of the LI has changed and need to think about how to leverage those changes in a positive sense for the continued growth and evolution of the community. As it was in 2016, there are a lot of vacant parcels and underdeveloped parcels where the land value is substantially higher than the building.

The change in the LI in our view is permanent and it is not going to be reversed. There were 3,000 trade and construction jobs in the LI. That number since its peak in 2006 has gone down to less than 2,000 and that is not coming back. A lot of those jobs have moved south for a variety of reasons, industrial land is cheaper, a variety of reasons and we think the changes that have occurred are permanent.

I would support Ketchum's plans to rethink how to optimize zoning code and architectural and design restrictions to make this land more valuable to the whole of the community without impacting the character of the city or the underlying focus we have on construction and the trades.

### **Supports residential above the 1<sup>st</sup> floor; no restrictions on noise**

William Glenn - a tenant in the Light Industrial, also a property owner but never developed it. He feels it is important to maintain light industrial uses on the first floor and allow residential above. However, he thought the residential tenants should not be allowed to put limits (time, noise, etc.) on the working times of the industrial spaces. He noted we need the proximity of trades and services to the Ketchum population area. He urged the Commission to maintain the viability of the Light Industrial Zone.

### **Supports residential above, concerns about children in LI.**

David Hurd - spoke in support of keeping the Light Industrial, but not opposed to residential above. There currently are no industrial spaces available for rent or purchase in the LI. He sees a problem with the combination of residential units with small children in close proximity to trucks, fork lifts, etc. He thinks the Community School is a good project but questions the location. He urges the Commission to be mindful of replacing the Industrial Zone with affordable housing.

### **Wants to see housing at North Fork; need housing more than LI.**

Bob Crosby, Sun Valley Board of Realtors, thought Ketchum has problems with housing and traffic, and would like to see development north of East Fork Road and Ketchum. He would like to see housing available at all price points. He thought Ketchum needs housing as much or more than we need Light Industrial.

### **Supports residential above 1<sup>st</sup> floor.**

Jacob Tyler - manager of the Scott-Northwood Building, wanted to add some information: The first floor is 50% occupied due to the owner not wanting to rent long-term as the building is for sale. The 2nd floor is a mix of affordable-housing and full-price residential units. All affordable-housing units are occupied full-time. Six units are on the 3rd floor with about 50% full-time occupants. He agrees housing is an issue. This building has not compromised the purpose of the LI with the addition of housing units. It is an example of how it can work with industrial on the first floor and affordable housing above. He agrees once the LI is gone, it will not come back.

## **June 1, 2018 –**

IME article - Planners kick off debate over light-industrial districts' future in Ketchum.

[https://www.mtexpress.com/news/business/planners-kick-off-debate-over-light-industrial-districts-future-in/article\\_d2b17402-651f-11e8-af2e-4bc4e7a5e8de.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/news/business/planners-kick-off-debate-over-light-industrial-districts-future-in/article_d2b17402-651f-11e8-af2e-4bc4e7a5e8de.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

## **June 11, 2018 - Supports housing in LI-3; supports unbuilt lots; supports 18' ceiling height and mezzanine.**

Kingsley Murphy - LI property owner, thought the area is not perfect, but works well as it is. He would not like to see it evolve too far from what it is now. He thought allowing housing in the LI-3 will not change the use of the rest of the LI. He thought the Building Value vs Land Valuation Ratio was not a reasonable standard to apply to the LI, as it is a lower cost area. The land is supposed to be less valuable than the Community Core. That is the purpose of the LI. The combination of low cost land and small living units under 1,000 square feet keep the cost down. If buildings are more valuable than the land, low cost housing will go away. If you lose the low-cost work areas, you will no longer need the low-cost housing. Some of the Industrial has moved south but others have moved in. The last few years have been tough for Construction. With the economy coming back, the availability of smaller units will help businesses start off with lower costs. He doesn't want to see Ketchum lose that. He disagrees with the Staff observation of empty lots. That is a feature of the LI. Many businesses use those lots for storage of materials and equipment. An unbuilt lot is still a fully-used lot. He thinks it works great as it is and urged the Commission not change it too much.

Neil Morrow agreed with the comments. Planning Director John Gaeddert asked Kingsley for his opinion of options as to what is the heart of the LI, what not to change and what could be improved.

Kingsley Murphy thought the majority of the LI is the LI-2 Zone and shouldn't be changed. Introducing residents into the area will cause friction between the two uses. He related how residents and LI can be in conflict. Even CCR's stating the Industrial has full rights over the residential does not prevent conflict and complaints to the City.

Director John Gaeddert asked about recommendations for first floor ceiling height.

Kingsley Murphy thought 16-18 feet is best for first floor ceiling height. The occupant can install a loft/living space or mezzanine area for storage. He suggested an area of 1000 sq. ft. living space to keep costs down. He reiterated how the LI needs open space for laydown space.

## **June 13, 2018 – IME editorial**

Tightrope Walk

[https://www.mtexpress.com/opinion/editorials/tightrope-walk/article\\_38e29cc4-6e8f-11e8-ad21-9bf98c7d11c9.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/opinion/editorials/tightrope-walk/article_38e29cc4-6e8f-11e8-ad21-9bf98c7d11c9.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

**June 13, 2018    Supports leaving LI for LI; suggests housing located North or South of town.**

John Crews - I have heard that the possibility of allowing apartments to be built in the current Industrial Zone is being discussed by some, and I wanted to weigh in with my thoughts on the matter as a 48-year resident who has watched Ketchum grow and develop.

It is critical that every city have an Industrial Zone to provide convenient locations for Industrial businesses that would not fit well elsewhere in the city, but which are critical to the needs of city residents. It is also important that this zone be reasonably close to city services and the customer base in order to provide easy access for the residents to visit these businesses, and a reasonable distance for the businesses to get out and service their customers. Currently, Ketchum has an ideal Industrial Zone that is well located and thriving. However, due to its location, it would be very difficult for this Zone to ever be expanded, so it is critical that the city keep future needs in mind, and not allow any of the Industrial Zoned area to be rezoned or used for other purposes. To do otherwise would be very shortsighted.

Others will make the argument that Ketchum needs more housing, particularly affordable housing. While this is true and would be a nice issue to address, it must not take priority over the future Industrial business needs of the city to serve all of its residents, both current and future. I do not see that there is any shortage of land for housing in our valley. Yes, land is scarcer and more expensive in Ketchum, but we are fortunate to have a valley that is capable of accommodating current and future land needs for housing by moving progressively south to our neighboring cities and county areas. It would be ideal if everyone that wanted to work or play in Ketchum could live at the base of the mountain or a block from their job, just like it would be nice if everyone that lived in Seattle could either live on Lake Washington or across the street from their job. However, the reality is that almost everyone in Seattle commutes much farther than anyone living anywhere in the valley, both due to zoning priorities and to real estate cost in more desirable areas. In some parts of the country, real estate is very expensive throughout large regions. People in the valley are fortunate in that every housing budget can be accommodated by moving a few miles north or south along our main corridor. If one looks at the average daily commutes for people living in the Bay Area, or in the greater Seattle area, it is hard to argue that the beautiful drive from Bellevue to Ketchum is an extreme hardship. When I first moved to Aspen 50 years ago as a very young person just out of school, the best housing that I could afford was in a trailer park 20 miles out of town. I did not resent this nor see it as a hardship, but just as a reasonable starting point from which to build towards eventual goals.

Bottom line: We have a current Industrial Zone that we cannot afford to take any land away from without it negatively impacting the future of the city and its residents. We do have virtually unlimited land to our south for future housing needs. We must



prioritize our current Industrial Zone versus housing needs based on these two realities, and not let these two priorities become confused or reversed.

### **June 24, 2018 - Supports residential on upper floors; concerns about kids**

Bruce Smith - I currently have a business at 221 Northwood Way and would like to make a few comments regarding the future of LI. I am OK with residential uses as Secondary use as long as they are part of a genuine LI Use that will be the Primary Use. Ideally, LI uses would be on the bottom floor and Residential would be workforce housing on upper levels. Residential Users should never be allowed to complain about noise, dust, odors of other common LI uses. Many of my fears of the Community School being in LI have been realized. Kids going down Northwood Way in Subaru WRXs, Porsches and BMWs at 60 mph+ are a fairly common occurrence. Please keep LI much the same as it is. I spend a lot of time in the area and feel that it is vital to a vibrant community.

### **June 25, 2018 – Supports housing on the first floor; thinks LI could be smaller.**

Bob Crosby - suggested making broader visioning ideas prior to micro level analysis. Commission should address the big picture, i.e. whether the City of Ketchum needs as large an LI District as currently exists. Crosby stated that this is a missed opportunity to address affordable housing. He commented the process should be a policy decision regarding affordable housing. Crosby believes that not permitting residential uses on the ground floor is a lost opportunity.

### **Supports housing on the first floor**

Mary Roland - addressed existing single-story development within the LI. She commented that she would like the Commission to consider work/live on the ground floor rather than solely on the second floor.

### **July 9, 2018 – Suggested no Conditional Use Permits**

Steve Cook – encouraged the Commission and Staff to consider the burdensome qualities of Conditional Use permits for applicants and staff.

### **August 15, 2018 – IME article**

Ketchum planners pitch taller buildings in LI districts

[https://www.mtexpress.com/news/ketchum/ketchum-planners-pitch-taller-buildings-in-li-districts/article\\_23682656-a009-11e8-86c7-7fe7b84d55b4.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/news/ketchum/ketchum-planners-pitch-taller-buildings-in-li-districts/article_23682656-a009-11e8-86c7-7fe7b84d55b4.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

### **August 20, 2018 – Wants LI-1 to be included in changes.**

Leo Brieske – Resident. It seems to me that these changes are directed toward LI 2 and 3 with an exclusion of LI-1! Is this “spot zoning”? Should it not be equal

across all 3 districts? I have lived and owned the property at 920 N Leadville for the last 15 years in LI-1 and feel the exclusion of the LI-1 in this proposal is discriminatory for all present and future property owners in LI-1.

### **September 10, 2018 – Opposed to 58-foot height.**

Gwen Raney - resident of Northwood, expressed she didn't like the 58-foot height as she thought it was too imposing and was concerned about traffic and density. She asked about when affordable housing is required of a builder. Senior Planner Brittany Skelton explained that the housing requirement is determined by the zone and the Community Core Zone is different from the LI Zone. In the LI, Community Housing would only be required if a building had a fourth or fifth floor.

### **Opposed to 58-foot height.**

Heidi Sheinthanner - thought 58 feet was too tall. Director John Gaeddert answered residential would not be allowed on the first floor. The goal is to reserve the LI for LI uses. The 18-foot first floor height would allow the building a 40-foot total height. A third or fourth floor would accommodate affordable housing.

### **September 13, 2018 - Supports mixed-use and ground floor residential**

Mary Rolland - Proposal to change Light Industrial 2 and Northwood Way to legal Live-Work from GROUND floor and ABOVE

The existing Light Industrial 2 is currently outdated and what Ketchum originally defined as "Light Industrial" has been replaced with the "NEW Light Industrial: LI 2 includes offices, storage units, entertainment supplies, dance studio, Bigwood Bakery, wine outlet, catering service, ice cream factory, party rentals, tech companies, architectural studios, art studios, photography studio, lumber yard, Far and Away River Trips, ski repair shop, Glass company, Lutz Rental, SPOT Theater, Dog /Pet store, Deli's, flooring business, wood working, High Altitude Gym, gas station, 2 paint stores, etc). Community school dorms were just issued a variance to provide housing. There are several Live-Work units ground floor and above that are scattered throughout LI 2, including Lewis Street. There is even a person living in a storage unit, with living facilities provided by the owner! The time has come for the City of Ketchum and P&Z to acknowledge that the Light Industrial is no longer the vision they thought it was and what they hope it still could be. The Light Industrial is already a mixed use of business and living. The time has come to make the LI 2 a legal "Mixed Use" of commercial businesses, legal Live-Work, AND affordable housing.

Ketchum is struggling to find suitable locations for affordable housing. Neighborhoods argue "not in my backyard!" "Not next door to me!"

The most suitable and available area is the Light Industrial, especially LI 2. Ketchum struggles with lack of enough employees to service the area .because there is no place for them to live...not in Hailey, Bellevue, or as far South as Shoshone.

Those who do live South of Ketchum, have the horrible daily commute causing wear and tear on our highway, endangerment to our environment, our health, and mental state! More Live-Work in Ketchum will bring more money to Ketchum (Truces, shopping, dining, etc.)

Ketchum must immediately address viable solutions to provide and build affordable housing. Hailey is already far ahead of Ketchum in approving major changes to the main part of town to add more housing. Ketchum lingers and still has made NO decisions at the end of August. This is so unacceptable! New businesses, interested in being in our area, also are affected. They choose not to come to Ketchum because there is no place for them or their employees to live.

This is why I propose legal Live-Work for businesses from the ground floor and above in the LI 2. They can work and live in same space. This saves them cost of paying for a rental for their business and another cost for living elsewhere. AND no more driving from where they live to where they work!

Rezone LI 2 (and or Northwood Way) as "Mixed Use" that includes commercial businesses, Live-Work (ground floor and above) and affordable housing.

UPSIDE

Live-Work ground floor and above with suggested Options

1. (Option #1) Grandfather existing LI 2 Live-Work as legal ground floor and above
2. (Option # 2) Change Northwood Way { Saddle Road to Lewis Street) from LI 2 to be part of LI3 and allow affordable housing AND legal Live-Work from ground floor and above.
3. Option #3 Any illegal Live-Work in LI 2 sign an indemnification agreement with their own Condo Association AND the City/indemnifying their Association and the City from any legal actions taken by anyone against the Association and or the City
4. Legalize existing and new Live-Work from the ground floor and above.
5. Owner or Tenant must provide proof of work with an Idaho business Tax# and any other requirements by the City.
6. Occupant must file tax return for business from the premises used for Live-Work
7. Live-Work unit must be a minimum of at least 50% of the space.
8. Live-Work must observe all City codes and requirements.
9. Live-Work must be occupied by the Owner of the unit and/or its employees only, or by tenant renting from the Owner and used as Live-Work. Tenant must provide proof of work with same as #5, #6, #7, #9, #10
10. Live-Work must have hours posted on premises for business
11. Parking provided per unit (required by City)
12. Occupants acknowledge that noise, traffic, and business operations may be 24n

DOWNSIDE to Live-Work in LI 2 and or Northwood Way, ground floor and above?

**September 14, 2018** – IME article

Ketchum P & Z mulls fourth, fifth floors in LI districts

[https://www.mtexpress.com/news/ketchum/ketchum-p-z-mulls-fourth-fifth-floors-in-li/article\\_f884bb26-b79a-11e8-870b-6b7ec6b29212.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/news/ketchum/ketchum-p-z-mulls-fourth-fifth-floors-in-li/article_f884bb26-b79a-11e8-870b-6b7ec6b29212.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

**September 19, 2018** - IME editorial

Housing puzzle needs new eyes

[https://www.mtexpress.com/opinion/editorials/housing-puzzle-needs-new-eyes/article\\_df2c9726-bb86-11e8-9e15-6b4799756890.html?utm\\_medium=social&utm\\_source=email&utm\\_campaign=user-share](https://www.mtexpress.com/opinion/editorials/housing-puzzle-needs-new-eyes/article_df2c9726-bb86-11e8-9e15-6b4799756890.html?utm_medium=social&utm_source=email&utm_campaign=user-share)

**September 24, 2018** – **Opposes 3<sup>rd</sup> and 4<sup>th</sup> floors**

Carolyn Wicklund - As an architect, I do NOT want to see the LI Business district allow 3rd & 4th floors to bldg. heights. Our mt. views make us unique & beautiful! Why not do as Aspen does & require new housing (of a certain size) to have an affordable rent apt. attached. I have one over my garage & it is always in great demand.

**September 25, 2018** - **Supports housing in the LI**

Ed Sinnott - Affordable housing, work force housing, attainable housing, long term housing.

To the Ketchum Planning and Zoning Commission.

I am sure you will agree that there is a housing crisis in our valley. When we (the 60's, 70 and 80's generation arrived in Ketchum there was work force housing and long-term rentals available throughout our community in places like the Bavarian Village, the blue tops, Andora Villa, Horizons Four, Four Seasons, Trail Creek Village and more. We were able to work, live and eventually settle in Ketchum, and raise our families.

Now the next generation is trying to move in and live in Ketchum and they can't. There is a lack of long term, attainable housing. Our hospital and schools can't find housing for their employees. The airport, Sun Valley Co, hotels, and our cities all need people to work for them. Basic service jobs like snow removal, bus drivers, food service, and mechanics are going unfilled. There were at least 150 openings for jobs in the Mt. Express and only 24 offerings for long term housing.

We must change our ways. Forty years of FAR, strict zoning, setbacks, affordable housing and parking levies (where is all that in lieu money?), height restrictions, and view corridors have led us to the housing crisis that we are now experiencing.

One component of a solution to this crisis that has been identified, is placing work force housing in the light industrial zone. It is not the only solution, but it is certainly worth considering and exploring....and one that deserves a lot of weight.

But what do I hear from the commissioners; protection of view corridors (for the people buried in the cemetery or the Bigwood golfers?), the character of the LI (I eagerly await to hear what the character of tractors, fire training centers, trucks, gas stations, lumber yards, laundries, convenience stores, and paint stores is) and height concerns. Yes 50 + feet will block the view of Baldy. But the Limelight Hotel blocked someone's view, the Argyros Center building will block someone's view as will the Auberge. It's a fact that when you build in front of someone, you will block their views. The LI is 26 to 30 ft below the grade of the highway so the residences along

the Bigwood golf course views will not be impacted. If Baldy views are impacted, it will be in the LI. Consequently, the housing will not appeal to tourists or second family vacation properties. Which is why the LI is great for workforce housing.

I am hearing the same arguments that have contributed to a housing market dominated by second family homes and condos and short-term rentals. It's insane to have the same arguments over and over again and think the results will change. It's that kind of thinking that got us into this mess.

Start thinking outside the box and think about solutions instead of instituting obstacles. Incentivize people to build long term work force housing in the LI, because without housing there are no businesses. Without jobs there is no "next generation." And without "the next generation" there is no Ketchum, so let's give the next generation a place to live.

All I am saying is give housing a chance!

### **September 30, 2018**    **Opposed to current first-floor residents in the Northwood Building**

**From:** Jeff Jensen <[jeff@jensenconsult.com](mailto:jeff@jensenconsult.com)>

**Sent:** Sunday, September 30, 2018 4:14 PM

**To:** Participate

**Cc:** [nbradshaw@ketchumidaho.or](mailto:nbradshaw@ketchumidaho.or); Michael David; Amanda Breen; Courtney Hamilton; Jim Slanetz

**Subject:** LI Residency

Gentlemen,

I am a recent purchaser of a space in the Northwood Industrial Center which is zoned LI. Last week I discovered that people are residing in these first level spaces.

I brought this up to the HOA and inquired what their position was on this. They suggested that I write to the City and express my concerns.

Prior to my purchasing this space, my due diligence included researching allowable uses for this property and since we did NOT have any second levels I was confident that we did not have any residential concerns. I did not realize that the city was selectively enforcing building codes.

This was brought to my attention by one of the residing owners who is lobbying for her and another owner also residing in this complex, to turn a blind eye to this illegal practice.

Though she and the other owner are fully aware this is not a permitted use and thus illegal, they are lobbying the balance of other owners in the complex to allow them to continue to reside there since the city is not enforcing the code.

Why is the city not enforcing this code?

As a developer of Industrial properties outside of the area, I know that residential fire code is very different from industrial fire code.

Are these spaces built to meet current residential occupancy?

Is the fire department aware that these spaces are being used for residency?

Though these are my primary concerns, I have the following secondary concerns;

1. This is a discriminatory practice, as the suggested action is to only allow residency in the two currently occupied spaces and not allow other owners the same rights.
2. Industrial space by code, should not be inhibited by concerns of noise ,truck traffic and other environmental issues that residential spaces must account for.

3. The LI is the only space available in the North Valley that small businesses have available to work out of. If this area is converted from standard LI uses, users will be forced out and traffic and costs will increase as customers will have much longer distances to travel to access the goods and services currently available.

Please advise on what the city's position is and what actions, if any, I can expect on this.

Thank you.  
Jeff Jensen  
503.939.7477  
PO Box 6578  
Ketchum, ID 83340

**October 1, 2018**

**Supports residential on the first floor**

Mary Rolland - I have read that you will be proposing several options at the P&Z meeting October 8, for the Light Industrial.

I hope that you will include my proposal for more legal live/work in the LI 2 including existing single story buildings and ground floors and above for new development.

I have spoken to many locals who all agree that legal live/work in the LI is the ideal solution and incentive to bring more businesses to Ketchum. Providing a combination of live with work will eliminate the cost to pay for each, AND eliminate finding housing for themselves and their employees.

I don't know what your downside is to this, and I will ask that at the October 8 meeting.

You had told me that you want to preserve the LI for LI uses only. But Providing the combination of live/work for ground floors and above, will save the LI, and NOT defer businesses because of no place to live for themselves or their employees.

I gave you a few suggestions as to how to protect live/work in the LI:

1. Owner occupied only / or employee of Owner
2. Owner must have Idaho Business Tax ID number
3. Owner must have Business Tax returns for State and Federal
4. Unit cannot be subleased to anyone

5. City specifies % work / % living allowed based on SF of the unit.

Mary Rolland  
Northwood Way

**Exhibit B.**

Procedural Items



**Light Industrial Zoning Amendments  
Noticing and Public Hearings**

February 14, 2018 – Notice published in Idaho Mountain Express and mailed to governmental agencies

March 6, 2018 – Planning and Zoning Commission Meeting

March 27, 2018 – Planning and Zoning Commission Meeting

April 9, 2018 – Planning and Zoning Commission Meeting

May 14, 2018 – Planning and Zoning Commission Meeting

May 29, 2018 – Planning and Zoning Commission Meeting

June 11, 2018 – Planning and Zoning Commission Meeting

June 25, 2018 – Planning and Zoning Commission Meeting

July 9, 2018 – Planning and Zoning Commission Meeting

August 13, 2018 – Planning and Zoning Commission Meeting

September 10, 2018 – Planning and Zoning Commission Meeting

September 19, 2018 – Notice published in Idaho Mountain Express and mailed to governmental agencies

## **Exhibit C.**

### Light Industrial Reference Material

1. Comprehensive Plan Analysis RE: Retaining LI as Primary Use in LI Districts
2. Ground Floor Clear Heights
3. Use Matrix with Definitions Worksheet
4. Business License Data
5. Land Area and Parcels by Zoning District

**Exhibit C: Retaining LI as Primary Use in LI Districts  
Comprehensive Plan Sections**

**Alignment**

Ch.	Pg #	Goal	Policy
2	16	Goal E-1: Ketchum will work to retain and help expand existing independent small local businesses and corporations.	Policy E-1(a) Support for Local, Independent Businesses  Our community will foster a business climate that helps to retain our existing businesses and to attract and support new independent local businesses.
2	16	Goal E-2: Ketchum will support and attract businesses and industries that diversify and sustain the local economy and level out seasonal fluctuations.	Policy E-2(a) Light Industrial Area as the Primary Location for New Traditional Light Industrial and Corporate Park Business Growth and Jobs
2	17		Policy E-2(d) Targeted Small Business Recruiting
2	17	Goal E-4: Ketchum will contain a balance of businesses that provide services and shopping for local residents' needs and for tourists.	Policy E-4(a) Balance of Business Types Ensure a balance of local and tourism business types throughout the community.
7	42	Goal M-1: Promote land use patterns, densities and mobility planning that maximizes investments and promotes safe and efficient mobility.	Policy M-1.1 Balanced Land Uses and Transportation System
	44		Policy M-7.3 Freight Movements  Facilitate the orderly movement of goods to enhance Ketchum's economic viability.
10	57	Goal CHW-6 Reduce generation of air pollutants and noise	Policy CHW-6.1 Air Emissions  The City will continue to pursue reductions in air emissions / airborne particulates by regulating idling vehicles, street sanding, construction pollution, and other sources. Further, the City will reduce vehicle trips and vehicle miles travelled, and support renewable energy sources.
12	71	Goal LU-1 Promote a functional, compact, and mixed-use pattern that integrates and balances residential and non-residential land uses.	Policy LU-1.1 Integrated and Compatible Mix of Land Uses

**Divergence**

Ch.	Pg #	Goal	Policy
4	27	Goal CD-3: Ketchum will maintain and improve the appearance of its entryway corridors and gateways.	Policy CD-3.1 Scenic Corridors and the Community's Key Gateways.
6	36	Goal OS-3: Preserve the natural and cultural resources of the Ketchum area to help maintain the City's identity; provide connections to usable open space areas; provide low-impact, passive recreation; and enhance scenic entryway corridors to the City.	Policy OS-3.2 Open Space Community Separators Establish and maintain open space buffers in important scenic areas to maintain the community's separate identity from surrounding communities and to protect views and open space.
	36		Policy OS-3.6 Roadway Corridors Establish, preserve, and enhance scenic entryways along major roadways entering the City.



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## Clear Height Considerations

Posted by Miriah On February 2015

By Rob Harley, HTG Architects – Tampa, FL

In 1962, the National Aeronautics and Space Administration purchased 80,000 acres of land on Merritt Island Florida. This land would become Cape Canaveral, and the Saturn V space program was underway. A collective of four New York Firms, known as URSAM, began designing the Vehicle Assembly Building for that site. Max Urbahn was heading up the Architectural efforts and the completed design was formerly approved on September 23<sup>rd</sup>, 1963. The building was, of course, where the Saturn rockets were made, and subsequently, where the space shuttle was assembled. Being that it housed some very tall rockets, it had to have an extraordinary “clear height”. There were many challenges to building a structure with such a tall clear height. It is so vast for example that rain clouds form inside near the top on humid days. The VAB’s clear height is around 465 feet. Fortunately for those of us in the Commercial building world, clear heights are a good bit lower.





Interior of VAB – source, NASA

The simplest definition of “Clear Height” is the distance from the finished floor of a building to any object overhead. In Industrial shell buildings, it is often qualified as “clear height to any steel” since the building hasn’t been fully fitted out. The actual clear height in an occupied building however, must also take into account other items such as suspended lighting, fire protection systems, mechanical equipment, etc. Clear height is one of a handful of basic specifications for industrial buildings, and its dimension has significant implications for a potential user; storage stacking height, forklift maneuverability and safety being the most obvious.

There is a natural “tension” that exists between the need for optimal clear height inside a building and the desire to minimize the buildings overall height for cost savings. For this reason, it was once common in Industrial buildings to specify clear height while ignoring the joist girder depth, since the joist girders typically

fell between back to back loading racks and thus did not cause an overhead obstruction. Under this scenario, a buildings overall height could be lowered, while still claiming a certain clear height within the aisles. This practice has fallen out of favor for new Industrial building designs and the current trend is the “clear to any steel” approach.

Not very long ago, maybe 15 years ago, the standard clear height for class A industrial buildings in most industrial markets, was 24 feet clear. And it is still considered a minimum for class A industrial buildings. Increasingly however, a 30-32 foot clear height is becoming the new normal. For the really large distribution users, 36 feet clear is common. I recently provided a proposal to design a build-to-suit facility that was 50 feet clear. The trend then, is that optimizing cubage is driving clear heights up across the board. The higher clear heights however, do tend to be built in higher through-put, distribution intense markets around the country. From a sheer numbers perspective, most industrial users don't require the higher clear heights, but the trend is still toward more efficiency, and thus, higher clear heights for new buildings.

When an industrial building has a clear height of more than 24 feet, a series of issues begins to become more important to the successful design of the building than they otherwise would. For example, the design of the slab needs to be re-examined relative to lower clear height buildings. Taller racks mean larger slab loads. A 6 inch slab in a 28 or 30 foot clear building, would need to be increased in thickness in a 36 foot clear structure. As clear height goes over 32 feet, the flatness of the slab surface itself may need a tighter specification to ensure rack and load stability. Column spacing's often must be increased to accommodate the larger forklifts required to reach the taller pallet positions, and if exterior walls are load bearing, they'll likely get thicker. Adequate lighting levels at the floor can also become more of a challenge. As a related issue, it is also easy to think of a tall clear height building conceptually like any single story building and overlook the possibility that in some industrial areas, particularly around airports, the building could encroach on height restrictions.

Fire protection systems will most likely need to be upgraded to higher flow rate heads in taller clear height buildings. According to a local fire protection Engineer I spoke with recently, FM and the NFPA are in the process of re-organizing storage sprinkler system nomenclature and it's all based on the height of the underside of the roof deck. “Head pressures increase in 5 foot intervals. If your roof deck is 30 feet one inch, your system will be designed for 35 feet” the Engineer said. This is a useful thing to keep in mind when helping to determine the final clear height of a building.

The majority of pallets in use around the country are 64 inches high. There are other sizes, but if we take this typical dimension and allow for space between levels, a 32 foot clear building will be able to rack 4 to 6 pallets. At 36 feet clear, users can typically rack one more position. Pretty straight forward cost benefit analysis is used by both speculative developers and users to assess whether the added cost of the additional clear height results in a payback via increased efficiency or marketability to users seeking that efficiency. According to a VP at a major national real estate trust, for buildings over 300,000 square feet, the added cost to go from 32 foot clear to 36 feet is around a \$1.20 to \$1.25 per square foot. This will vary regionally to some degree, but it's a ball park figure. The three primary cost drivers are slab, structure and fire protection.

In the 1970's, a typical industrial building had a clear height of 20 feet or less. This means that in current markets around the country there are a lot of buildings with inefficient clear heights that are sitting empty or

are preventing an owners desire to modernize storage capacity. Another clear height trend that is beginning to emerge are companies that specialize in literally, “raising the roof” on existing buildings. These proprietary systems have become efficient enough at hydraulically raising the clear height of existing steel roof structures that in many instances, they are an economically viable option for users or developers of lower clear height buildings.

So while we don’t have to contend with storm clouds forming in our buildings, there are still a number of considerations that present themselves to the designers of higher clear height structures. It looks like we’ll need to get used to it, “30 is the new 24”.

Next Post: “Hey, Concrete Cracks”

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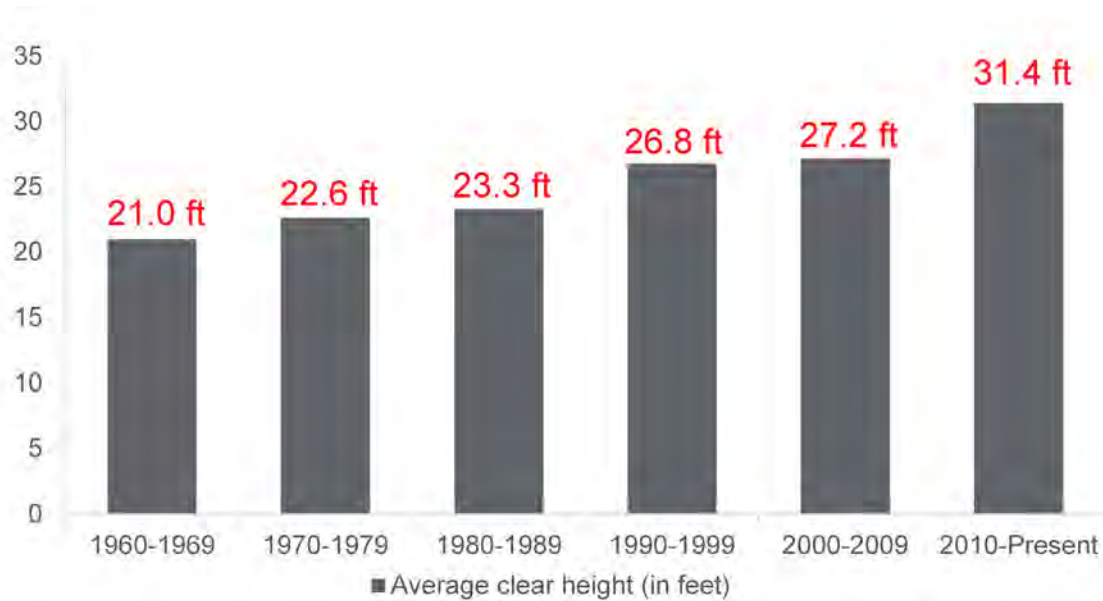


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22 May, 2018

# Average industrial building clear heights increase by 50 percent in the last 60 years

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- Industrial buildings have experienced a 50 percent increase in average clear height in the last 60 years.
- In Orange County, industrial clear heights have increased from an average of 21 feet for buildings constructed in the 1960's to 31.4 feet for buildings delivered in the last decade.
- With vacancy hitting record lows, the extremely low level of available land in Orange County and shifting preferences among tenants, high volume users are "looking up" to increase warehouse efficiency practices.
- Moreover, e-commerce as well as just-in-time inventory management are also making an impact on the industrial landscape as logistics and courier industries benefit from these increased efficiencies (thus cost reductions) obtained through increased stacking heights.

Source: JLL Research

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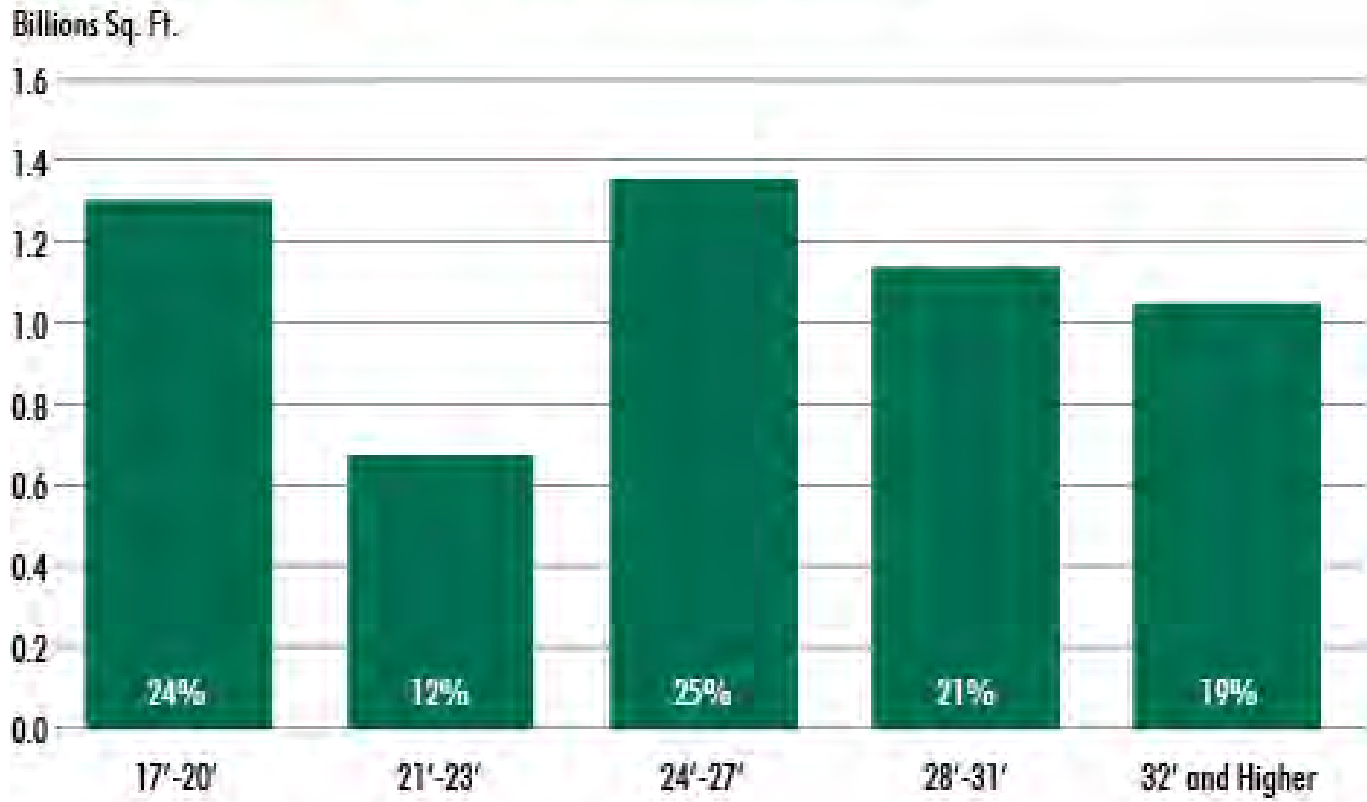
## U.S. MarketFlash | 32' Clear: The over and under by industrial market



**April 21, 2017**

Evolving distribution and fulfillment supply chains are creating opportunities to modernize warehouse stock nationwide. A disproportionate share of modern warehouse demand is for buildings with a clear height of at least 32 feet. While only 19% of warehouses nationally meet this threshold, they accounted for 40% of total demand as measured by net absorption since 2014. Of the 30 largest warehouse markets, 10 are over and 20 are under the national average of total inventory that meets this height requirement.

### Figure 1: Clearance Height for U.S. Warehouse Inventory



Source: CBRE Research, CBRE Econometric Advisors, 2017.

**Figure 2: Warehouse Inventory 32 feet and Higher by Market**

Rank	Market	% 32' or Higher	Rank	Market	% 32' or Higher
1	Indianapolis	43%	16	Cleveland	12%
2	Pennsylvania I-78/I-81 Corridor	35%	17	Sacramento	12%
3	Inland Empire	33%	18	Denver	12%
4	Central NJ	25%	19	Boston	11%
5	Cincinnati	24%	20	Charlotte	9%
6	Dallas/Ft. Worth	24%	21	Oakland/East Bay	8%
7	Columbus	23%	22	Los Angeles	8%
8	Baltimore	23%	23	Washington, D.C.	8%
9	Kansas City	20%	24	Seattle	7%
10	Atlanta	20%	25	Miami	6%
11	Chicago	18%	26	Orange County	6%
12	St. Louis	17%	27	Northern NJ	5%
13	Phoenix	15%	28	Minneapolis	3%
14	Houston	14%	29	Long Island	3%
15	Detroit	13%	30	Portland	3%

Source: CBRE Research, CBRE Econometric Advisors, 2017.

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17.12.020: DISTRICT USE MATRIX:

"P" = PERMITTED "C" = CONDITIONAL "A" = ACCESSORY

DISTRICT USE MATRIX

DISTRICT USES		L R	L R 1	L R 2	G R L	G R H	S T O 0.4	S T O 1	S T O H	T	T 3000	T 4000	C C SD 1	C C SD 2	L I 1	L I 2	L I 3	R U	A F
RES.	Dwelling, Multi-family				p <sup>1</sup>	P			P	P	P	P	p <sup>26</sup>	P	C <sup>14</sup>	C <sup>14</sup>	C <sup>14</sup>	C <sup>19</sup>	
	Dwelling, One-Family	P	P	P	p <sup>2</sup>	P	P	P	P	P	P	P	See Note 28	See Note 28				C <sup>19</sup>	P
	Residential Care Facility	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>26</sup>	P					
	Short-term Rental	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	P	P	P	P	P	p <sup>33</sup>	p <sup>33</sup>
	<u>Work-Live Unit</u>															C <sup>14</sup>	C <sup>14</sup>	C <sup>14</sup>	
Agriculture, Commercial																			P
Adult Only Business																	PC		
Business Support Service													P	P	P	P			
Commercial Off-site Snow Storage										P/C <sup>32</sup>			P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>		
<u>Construction Material Laydown Yard</u>															P	P	P		
Convenience Store										P			P	P	p <sup>12</sup>	p <sup>16</sup>			
<u>Craft/Cottage Industry</u>															P	P	P		
Daycare Center					C <sup>4</sup>	C <sup>4</sup>				p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	P	P	C <sup>17</sup>		C <sup>17</sup>		
Daycare Facility					C <sup>4</sup>	p <sup>4</sup>			C <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	P	P	C <sup>17</sup>		C <sup>17</sup>	p <sup>4</sup>	
Drive-Through Facility													p <sup>9</sup>	p <sup>9</sup>					
Equestrian Facility																		C	C
Food Service										P	p <sup>6</sup>	p <sup>6</sup>	P	P	PC <sup>15</sup>	PC <sup>15</sup>		C <sup>29</sup>	
Golf Course		P	P	P	P	P	P	P	P	P	P	P						C	
Grocery Store													P	P					
<u>Health and Fitness Facility_ wellness focus</u>										P			P	P	p <sup>37</sup>	p <sup>37</sup>			

Work-Live units incorporate residential living space in a non-residential building. Joint live-work units are held in common ownership and cannot be sold or platted as separate condominiums, as documented with a city-approved restrictive covenant recorded against the property.

BUSINESS SUPPORT SERVICE: The use of land for the sale, rental, or repair of office equipment, supplies, and materials, or the provision of services used by office and service establishments. Uses include: Typical uses include, but are not limited to, office equipment and supply firms, small business machine repair shops, convenience printing and copying establishments, or information technology support services.

CONSTRUCTION MATERIAL LAYDOWN YARD: A site identified and approved as part of a Construction Activity Plan or other city-issued permit for a specific construction project. Construction material laydown yards are intended to be used on an intermittent basis in association with a singular, permitted development project.

CRAFT/COTTAGE INDUSTRY: A facility devoted solely to the arts and crafts that produces or makes items that by their nature, are designed or made by an artist or craftsman by using hand skills.

HEALTH AND FITNESS FACILITY: A business or membership organization providing exercise facilities and/or nonmedical personal services to patrons, with a focus on wellness and characterized by low-impact movements and/or lack of mechanized equipment, including, but not limited to, yoga and Pilates studios, dance studios, gymnasiums, personal training studios, private clubs (athletic, health, or recreational), tanning salons, and weight control establishments.

37. In new buildings permitted after [date of ordinance adoption], use is permitted on the second floor and above only. For single-story buildings in existence on [date of ordinance adoption] this use is permitted on the ground floor.

DISTRICT USES	L	L	L	G	G	S	S	S	T	T	T	C	C	L	L	L	R	A
	R	R	R	R	R	T	T	T	0.4	1	H	SD	SD	I	I	I	U	F
Hotel										p <sup>25</sup>	p <sup>25</sup>	p <sup>25</sup>	p <sup>25</sup>					
Hybrid Production Facility												P	P	P	P			
Industrial Design														P	P	P		
Instructional Service												P	P	C <sup>37</sup>	C <sup>37</sup>			
Kennel, Boarding														P	P			
Laundry, Industrial														P	P			
Lodging Establishment									P	P	P	P	P					
Maintenance Service Facility														P	P		C	
Manufacturing														P	P			
Mortuary												C	C					
Motor Vehicle Fueling Station														C <sup>30</sup>	C <sup>30</sup>			
Motor Vehicle Sales														C	C			
Motor Vehicle Service														P	P			
Neighborhood Off-site Snow Storage	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>		P/C <sup>32</sup>	P/C <sup>32</sup>							
Office, Business										C			p <sup>10</sup>	P			P	
Office, Contractor-related business										C			p <sup>10</sup>	P	P	P	P	
Outdoor Entertainment									P	P	P	P	P					
Personal Service									P	p <sup>6</sup>	p <sup>6</sup>	P	P	p <sup>13</sup>				
Professional Research Service														P	P	P		
Recreation Facility, Commercial									C	C	C	p <sup>20</sup>	p <sup>20</sup>				C	
Repair Shop									P	p <sup>6</sup>	p <sup>6</sup>	P	P	P	P			
Retail Trade									p <sup>5</sup>			p <sup>34</sup>	p <sup>34</sup>	p <sup>12</sup>	p <sup>16</sup>		C <sup>29</sup>	
Self-Service Storage Facility														P	P			
Ski Facility									C	C	C						C	C
Storage Yard														P	P	P		

COMMERCIAL

**INDUSTRIAL DESIGN:** The professional service of creating and developing concepts and specifications that optimize the function, value and aesthetics of products and systems for the mutual benefit of both user and manufacturer, often employing design thinking strategies. Typically, industrial design is intended to result in tangible goods that can be mass produced. Industrial design businesses may include on-site prototyping, fabrication, and manufacturing.

**INSTRUCTIONAL SERVICE:** The use of land for the provision of informational, instructional and similar services for personal improvement other than physical improvement. Typical uses include, but are not limited to, health or physical fitness studios, facilities, dance, music, painting, ceramics, arts or photography studios, fiber arts, educational tutoring facilities, handicraft or hobby instruction.

37. In new buildings permitted after [date of adoption of ordinance], permitted on the second floor and above only. For single-story buildings in existence on [date of ordinance adoption] this use is permitted on the ground floor.

**OFFICE, CONTRACTOR-RELATED BUSINESS:** An establishment wherein the primary use is the conduct of a business or profession specifically related to building contracting including, design services, engineering, construction and property management.

**PROFESSIONAL RESEARCH SERVICES:** An establishment that specializes in performing professional, scientific, and technical research services and may include light manufacturing as an accessory use. Uses are limited to: Typical uses include, but are not limited to, construction contractors, physical distribution and logistics, engineering and specialized design services, electronic and computer services, photographic services, research, development and scientific services, and internet or remote sales and marketing. This definition does not include uses which create vibration outside the exterior building walls, or uses that would diminish the quality of air and water in the city.

DISTRICT USES	L	L	L	G	G	S	S	S	T	T	T	C	C	L	L	L	R	A
	R	R	R	R	R	O	O	O	3000	4000	SD	SD	I	I	I	U	F	
Studio, Commercial												P	P	P <sup>35</sup>	P <sup>35</sup>	P <sup>35</sup>		
Tourist House									P	P	P	P <sup>11</sup>	P <sup>11</sup>					
Tourist Housing Accommodation						P	P	P	P	P	P							
Truck Terminal														P	P			
TV and Radio Broadcasting Station														P	P	P		
Veterinary Service Establishment														P	P		C <sup>21</sup>	
Warehouse														P	P	P		
Wholesale														P	P			
Wireless Communication Facility	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>
Assembly, Place of				C <sup>3</sup>	C <sup>3</sup>							C	C					
Cemetery																	C	C
Cultural Facility												P	P				C	
Geothermal Utility											C <sup>7</sup>							
Hospital												C	C					
Medical Care Facility					C				P			P	P					
Nature Preserve	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Parking Facility, Off-Site									C	C	C	C	C					
Parking, Shared									C <sup>8</sup>	C <sup>8</sup>	C <sup>8</sup>	P <sup>8</sup>	P <sup>8</sup>	C <sup>8</sup>	C <sup>8</sup>	C <sup>8</sup>		
Performing Arts Production												P	P				C	
Public Use	C	C	C	C	C	C	C	C	C	C	C	P	P	C	C	C	C	C
Public Utility	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Recreation Facility, Public	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Recreation Facility, high intensity														P	P			
Recycling Center																PC		
School residential campus																	P <sup>30</sup>	
Semi-Public Use					C				C	C	C	P	P				C	C
Agriculture, Urban	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>
Avalanche Protective, Deflective, or Preventative Structure/Earthwork	C	C	C	C	C	C	C	C	C	C	C						C	C
Daycare Home	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>			C <sup>4</sup>				A <sup>4</sup>
Daycare, Onsite Employees														A	A	A		
Dwelling Unit, Accessory	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>					A <sup>18</sup>

35. Commercial studios in the Light Industrial Districts are subject to the standards of section 17.124.150 of this title.

TV AND RADIO BROADCASTING: An installation consisting of one or more transmitters or receivers used for radio, television or cable communications or broadcasting.

PUBLIC UTILITY: An organization that maintains the infrastructure for a public service, which often also provides a service using that infrastructure.

RECREATION FACILITY, HIGH INTENSITY: A recreation facility that, due to the nature of the use, requires floor area or mass and volume, or generates higher decibel levels, that are more appropriately accommodated in the light industrial area or are buffered from residential or pedestrian-oriented commercial activity on a large recreational use zoned parcel district than in the Community Core or a Tourist zone. Uses include indoor shooting range, dryland hockey training facility, gymnastics/tumbling gym, and instructional or personal training facilities wherein the instruction involves throwing, dragging, or launching heavy equipment.

DAYCARE, ONSITE EMPLOYEE: Child care programs that occur in facilities where parents are on the premises.

PUBLIC & INSTITUTIONAL

DISTRICT USES		L R	L R 1	L R 2	G R L	G R H	S T O 0.4	S T O 1	S T O H	T	T 3000	T 4000	C C SD 1	C C SD 2	L I 1	L I 2	L I 3	R U	A F	
ACCESSORY	Electric Vehicle Charging Station	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
	Energy System, Solar	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
	Energy System, Wind	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
	Fallout Shelter	A	A	A	A	A	A	A	A	A	A	A							A	
	Guesthouse	A	A	A	A	A	A	A	A	A	A	A								
	Home Occupation	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Recreation Facility, Residential	A	A	A	A	A	A	A	A	A	A	A	A	A	A <sup>36</sup>	A <sup>36</sup>	A <sup>36</sup>			
	Equestrian Facility, Residential	A	A	A	A	A	A	A	A	A	A	A							A	
	Sawmill, Temporary																			C

- A multi-family development containing up to two (2) dwelling units is permitted.
- Two (2) one-family dwellings are permitted.
- Religious institutions are allowed through the provision of a conditional use permit. No other assembly uses as defined in Chapter 17.08 are permitted.
- Use is not permitted in the Avalanche Zone. Reference Zoning Map.
- Retail trade is permitted but must not exceed 2,500 square feet.
- Uses must be subordinate to and operated within tourist housing and not to exceed ten percent (10%) of the gross floor area of the tourist housing facility.
- Utility for offsite use.
- See section 17.125.070 17.125.080 for shared parking standards.
- Drive-throughs are not allowed in association with food service establishments.
- This is a permitted use, however offices and professional services on the ground floor with street frontage require a conditional use permit.
- Tourist houses shall only be located in existing one-family dwellings. Additions to the home shall not exceed 20 percent (20%) of the existing square footage.
- The following forms of retail trade are permitted: (a) Equipment rental, including sporting equipment and entertainment equipment, (b) Building, construction and landscaping materials; small engines with associated sales (c) Retail in conjunction with manufacturing, warehousing or wholesaling not to exceed 30% gross floor area or 800 square feet, whichever is less; no advertising is displayed from windows or building facades; and no access onto a major arterial is allowed if an alternative access is available.
- Personal service is not allowed except for laundromats and dry cleaning establishments.
- See section 17.124.090 of this title for industrial districts residential development standards.
- Catering and food preparation is permitted. Restaurants require a conditional use permit and shall not exceed 1,000 square feet and serve no later than 9:00 P.M. unless expressly permitted through approval of the conditional use permit.
- The following forms of retail trade are permitted: (a) Equipment rental, including sporting equipment and entertainment equipment (b) Building, construction and landscaping materials; small engines with associated sales (c) Furniture and appliances in conjunction with warehousing not to exceed 18% gross floor area or 900 square feet, whichever is less; (d) Other retail in conjunction with manufacturing, warehousing or wholesaling; it is limited to 10% gross floor area or 500 square feet, whichever is less. --- Retail uses (c) & (d) shall have no advertising displayed from windows or building facades; and no access will be permitted onto a major arterial if an alternative access is available.
- See section 17.124.120.C of this title for industrial districts daycare development standards.
- See section 17.124.070 of this title for accessory dwelling unit development standards.
- A maximum of five (5) dwelling units are allowed through a conditional use permit and shall be a minimum of 400 square feet and not exceed 1,200 square feet in size.
- Indoor only.
- Only allowed in conjunction with an equestrian facility.
- See section 17.124.080 of this title for urban agriculture development standards.
- See chapter 17.140 for wireless communications facility provisions.
- Allowed on the ground floor only.
- See section 17.124.050 of this title for hotel development standards.
- Ground floor street frontage uses are limited to retail and/or office uses. In subdistrict A1 office uses require a conditional use permit.
- Ground floor only.
- Through the provision of a conditional use permit, the planning and zoning commission may approve a 20% increase to the total existing square footage of an existing nonconforming one-family dwelling.
- Use is allowed as an accessory use through the provision of a conditional use permit.
- Development agreement and compliance with §17.124.090.C required.
- Vehicular access from Highway 75 to motor vehicle fueling stations is prohibited.
- All commercial and neighborhood off-site snow storage uses are subject to the standards set forth in section 17.124.160 of this title. Conditional Use Permits are required of all off-site snow storage operations when the project: (a) affects greater than one-half acre; or, (b) has, at the discretion of the Administrator, the potential to negatively impact neighboring uses within 300' of the proposed neighborhood or commercial off-site snow storage operation.

36. Residential recreation facilities in the Light Industrial Districts are not allowed except for residents and guests of a particular residential development.



<b>DISTRICT USES</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>G</b>	<b>G</b>	<b>S</b>	<b>S</b>	<b>S</b>				<b>C</b>	<b>C</b>	<b>L</b>	<b>L</b>	<b>L</b>		
	<b>R</b>	<b>1</b>	<b>2</b>	<b>L</b>	<b>H</b>	<b>0.4</b>	<b>1</b>	<b>H</b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>SD</b>	<b>SD</b>	<b>I</b>	<b>I</b>	<b>I</b>	<b>R</b>	<b>A</b>
										3000	4000	1	2	1	2	3	U	F

- 33. Short Term Rental in the Avalanche Overlay zone is permitted subject to the regulations found in Chapter 17.92, Avalanche Overlay District.
- 34. Gross floor area for individual retail trade is limited to 36,000 gross square feet and net leasable floor area for grouped retail trade is limited to 55,000 net leasable square feet.
- 35. Commercial studios in the Light Industrial Districts are subject to the standards of section 17.124.150 of this title.
- 36. Residential recreation facilities in the Light Industrial Districts are not allowed except for residents and guests of a particular residential development.

### Business Licenses by Zoning District

Zoning District	Business Licences
AF	1
CC	455
GR-H	13
GR-L	6
LI-1	23
LI-2	93
LI-3	2
LR	10
LR-1	6
LR-2	0
RU	1
STO-1	0
STO-4	0
STO-H	0
T	75
T-3000	0
T-4000	0
<b>CITY</b>	<b>685</b>
<b>LI Sub-total</b>	<b>118</b>
<b>Percent of Total</b>	<b>17.2%</b>

Data collected June 2018

## Land Area and Parcels by Zoning District

Zoning District	Acres in District	Total Parcels in District	Total Vacant Parcels	Total Parcels With Residential Characteristics
AF	220.4	11	9	2
CC	101.8	669	45	282
GR-H	31.71	305	38	267
GR-L	265.31	850	135	714
LI-1	12.36	31	3	6
LI-2	42.32	189	11	7
LI-3	6.26	38	3	28
LR	537.51	799	133	666
LR-1	53.2	50	11	39
LR-2	99.42	30	6	24
RU	373.86	40	22	13
STO-1	38.78	22	2	20
STO-4	11.4	13	1	12
STO-H	16.45	26	5	21
T	218.19	1268	177	1091
T-3000	26.61	179	24	155
T-4000	17.49	23	4	19
<b>CITY</b>	<b>2073</b>	<b>4543</b>	<b>629</b>	<b>3366</b>
LI Sub-total	60.94	258	17	41
Percent of Total	2.9%	5.7%	2.7%	1.2%

Parcel and residential data gathered in 2017

## **Exhibit D.**

### Residential Uses in Light Industrial

1. Comprehensive Plan Analysis RE: Residential Uses as Secondary Use in LI District
2. Ordinance History of Residential Uses in Ketchum's Light Industrial Districts
3. Reference Literature

**Exhibit D: Residential Use as Secondary Use in LI  
Comprehensive Plan Sections**

**Alignment**

Ch.	Pg #	Goal	Policy
2	16	Goal E-2: Ketchum will support and attract businesses and industries that diversify and sustain the local economy and level out seasonal fluctuations.	<p>Policy E-2(e) Live-Work Opportunities and Home Businesses</p> <p>Support small home-based businesses that allow people to live and work from their residences and evaluate existing home-occupation, live/work, and related land use standards.</p>
3	20	Goal H-1: Ketchum will increase its supply of homes, including rental and special-needs housing for low-, moderate and median-income households.	<p>Policy H-1.2 Local Solutions to Attainable Housing</p>
	20		<p>Policy H-1.3 Integrated Affordable Housing in Neighborhoods</p> <p>Ketchum supports inclusion of affordable housing into existing neighborhoods to provide diversity. It will evaluate zoning regulations to accommodate this.</p>
	20		<p>Policy H-1.4 Integrated Housing in Business and Mixed-Use Areas</p> <p>Housing should be integrated into the downtown core and light industrial areas, and close to the ski bases. The resulting mix of land use will help promote a greater diversity of housing opportunities as well as social interactions.</p>
3	21	Goal H-3: Ketchum will have a mix of housing types and styles.	<p>Policy H-3.1 Mixture of Housing Types in New Development</p>
7	42	Goal M-1: Promote land use patterns, densities and mobility planning that maximizes investments and promotes safe and efficient mobility.	<p>Policy M-1.3 Compact Development and Housing Downtown and in Activity Centers</p> <p>Encourage compact development, mixed uses, and additional housing density in the downtown and in highactivity areas. This will increase opportunities for walking, bicycling and transit ridership and reduce vehicle trips.</p>
12	71	Goal LU-1 Promote a functional, compact, and mixed-use pattern that integrates and balances residential and non-residential land uses.	<p>Policy LU-1.1 Integrated and Compatible Mix of Land Uses</p>

	71		Policy LU-1.4 Balance between Jobs and Housing
12	71	Goal LU-2 Support infill and redevelopment in the downtown, major activity areas and specific areas that can take advantage of proximity to services and transportation.	Policy LU-2.2 Compatible Residential Infill Appropriate types of infill include the new residential units on vacant lots/areas, additions to existing units, accessory dwelling units, and residential units with businesses. Ensure that residential infill is compatible in character and scale within the surrounding neighborhood.
12	70	Mixed-Use Industrial Land Use - SECONDARY USES	A limited range of residential housing types, and supporting retail are provided for within this category. Uses should generate little traffic from tourists and the general public.

**Divergence**

Ch.	Pg #	Goal	Policy
12	71	Goal LU-2 Support infill and redevelopment in the downtown, major activity areas and specific areas that can take advantage of proximity to services and transportation.	Policy LU-2.1 Infill and Redevelopment Support intensification of land uses on appropriate infill and redevelopment sites in the following areas: · Industrial areas;
12	70	Mixed-Use Industrial Land Use - PRIMARY USES	Light manufacturing, wholesale, services, automotive, workshops, studios, research, storage, construction supply, distribution and offices make up the bulk of development within this district.

ZONING CODE HISTORY OF KETCHUM'S LIGHT INDUSTRIAL ZONING DISTRICTS**1974 – Ord. 208**

Ketchum's first zoning ordinance

- Created the Light Industrial zone (single district)
- No mention of housing as a use

**1976 – Ord. 231**

- Allowed housing for security personnel through a Conditional Use Permit

**1984 – Ord. 389**

- Separated the Light Industrial zone into the three zones still in place today: Light Industrial-1, 2, and 3
- Added the limitation that housing for security personnel could not exceed 600 square feet

**1984 – Ord. 390**

- Required a Light Industrial Business Permit for all businesses located in a light industrial zone

**1991 – Ord. 556**

This ordinance cited two studies about the need for affordable housing in Ketchum as rational and justification for expanding the scope of housing in all three Light Industrial zones. The intent was to allow housing for long term residents active in the workforce to be constructed in the LI zones. The regulations adopted in this 1991 ordinance are mainstays that have largely been in place ever since. Regulatory highlights of Ord. 556 include:

- Expanded residential uses allowed in through CUP beyond housing for security personnel
- No dwellings permitted on the first floor
- Up to 50% of building may be devoted to dwelling units
- Units shall be 400-800 square feet
- Units shall not have more than 2 bedrooms
- 1 parking space per bedroom required on site
- Units must either be owner occupied or used for long term occupancy (90 days+)
- Dwellings shall not be separated for sale
- CUPs to be recorded with County
- Residential uses shall be subordinate to other permitted Light Industrial uses

**1999 – Ord 801**

- Increased permitted square footage of residential units to 1000 sf

**2005 – Ord. 954**

With this ordinance housing regulations for the Light Industrial – 3 district diverged from the regulations for LI-1 and LI-2. This ordinance facilitated development of the Scott building.

- Differentiated between deed restricted units and units for owner occupation
- Conditional Use Permit still required
- Allowed up to 66% of a building to be housing provided all other standards were met
- The area designated as non-residential use shall be a minimum of 24% of the total floor area; this floor area can't include areas for personal storage for dwelling occupants
- 1/3 of the total housing square footage shall be deed restricted Community Housing units
- Dwellings up to 1400 sq ft permitted
- Three-bedroom units permitted
- No dwelling units on the ground floor

**2016 – Ord 1150**

This ordinance was the result of a zoning code text amendment initiated by the Community School.

- Added “School Residential Campus” as a use
- Added provision for dormitory rooms
- Added provision allowing dwelling units for school employees to be located on the ground floor





NEIGHBORHOODS

# Williamsburg's Industrial Businesses Are Fleeing

*While City Hall works on a plan to preserve manufacturing in East Williamsburg, the gentrification buzzsaw is already taking its toll*

by GWYNNE HOGAN

NOVEMBER 30, 2017





**Workers at Joyva's confectionary plant in East Williamsburg, which may relocate after 99 years to take advantage of soaring real estate values.** GWYNNE HOGAN

The Radutzky family has been making halvah, tahini, and jelly rings at their factory in East Williamsburg since 1918. But rising utility and property tax costs, combined with the soaring value of their property — a full three city blocks in the designated industrial zone that sits on the eastern edge of Williamsburg and Greenpoint — are making the family consider leaving Brooklyn behind for the first time in the company's nearly 100 years.

“We’re not in the real estate [game]. We make candy,” says Richard Raduzky, grandson of Joyva’s founder, on a recent tour of the impressive factory, which is equipped with much of the same machinery they’ve used for decades, including a massive underground tunnel system that funnels tahini between buildings. His small office inside the sweet-smelling brick building is decorated with decades-old wooden boxes in which the company once delivered candy bars.

At the same time, “we’ve been approached about our real estate — the market has come to us,” says Raduzky. “It’s on the table because it never was before.”

The North Brooklyn Industrial Business Zone, a 721-acre swath of land stretching from Newtown Creek to the northern edge of Bushwick, was established in 2013 (as an expansion of the East Williamsburg Industrial Park that had been in place since 1982) to help protect what remained of what had once been a hub for breweries and other industrial uses. Like other manufacturing zones across the city, its zoning designation allowed for a broad array of uses that includes not only light and heavy industry, but also hotels, department stores, and office buildings, though for many years the area remained predominantly industrial.

As of 2015, according to the Department of City Planning’s analysis of state labor data, the district was home to around 20,000 jobs, 15,000 of them industrial, including jobs in manufacturing, transportation, and warehousing.

While North Brooklyn has been bleeding industrial jobs for decades, a transition which sped up along the waterfront following Mayor Michael Bloomberg's 2005 residential rezoning of Williamsburg and Greenpoint, it's just begun to kick into high gear as East Williamsburg and Bushwick have grown increasingly attractive to residents and businesses alike. East Williamsburg's first new office building opened up on Bogart Street in August, and a handful more are in the pipeline. Three massive music venues — Elsewhere, Brooklyn Steel, and Avant Gardner – have opened this year, all on former industrial land.



**Tahini pours into tins stamped with Joyva's signature sultan logo.** GWYNNE HOGAN

The renewed interest in East Williamsburg has actually led to a slight uptick in industrial jobs, which rose 15 percent between 2010 and 2015, the first increase in the area in decades that included spikes in jobs in the wholesale trade, waste management, construction. But jobs in offices, as well as in retail, entertainment, and

hospitality, have increased at a far greater clip — up 27 percent and 58 percent respectively, according to the Department of City Planning.

Leah Archibald, head of Evergreen Exchange, an advocacy group for the area's industrial businesses, says that since 2015, the transition from industrial to other uses has kicked into high gear. She cites several office buildings under construction, as well as the departure of a handful of industrial businesses in the last two years, including printing company Alvin J. Bart and Sons and food packers Trans-Packers, which is leaving East Williamsburg at the end of the year.



“If the city does nothing, the entire East Williamsburg industrial area will no doubt turn into an attractively distressed office park, replete with reused timber and Edison light bulbs,” warns Archibald. “Is that what we want?”

The city has acknowledged these concerns, and says it plans to address them. In 2015, Mayor Bill de Blasio made a commitment to bolster jobs in the industrial sector, and the Department of City Planning began a study of the North Brooklyn Industrial Business Zone, with the goal of finding ways of “preserving and growing industrial jobs, as well as other compatible jobs in the creative and innovative sectors.”

But a year has passed since the final study was supposed to be released, with the Department of City Planning now saying it expected to have the report out by the end of the year.

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by TATIANA CRAINE

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Advocates like Archibald, who suspect the delay is related more to slow-moving bureaucracy than to intentional ill will, are hoping that the city’s recommendations will include a zoning mechanism to slow non-industrial development. “Things that are not compatible should have some sort of speed bump to slow their development like hotels or very large venues or homeless shelters,” she says. “We’re not even saying they should be forbidden. Just put in some sort of public review process.”

A draft of the report released this summer proposed splitting the industrial zone by transit access, restricting use of the land farther away from L train stops to heavy industrial use, while creating higher density for mixed office and industrial use closer to the train stops. Once the official recommendations come out, they’ll have to go

through a formal land use rezoning process, which will take months; during that time, there's the risk that pressures from the real estate industry could alter or impede them from being implemented.

Real estate mogul Jamie Wiseman of Cayuga Capital, which has redeveloped a handful of plots of industrial land into commercial and residential buildings across Williamsburg and Bushwick — including 321 Starr Street, on track to becoming a climbing gym — argues that the trend toward offices and nightlife venues isn't some nefarious land grab by developers. Rather, he says, industrial business owners are making a calculation to cash in on the value of the land they own and relocating to areas where it's cheaper for them to operate.

“Industrial businesses need to go where their labor is cheap and their power is cheap and their space is cheap,” says Wiseman. “And unfortunately in New York, none of those things is true.” Of Evergreen Exchange's opposition to redevelopment, he says, “Leah Archibald is putting up the good fight, but she's kind of fighting gravity.”



**Richard Radutzky, co-owner of Joyva in East Williamsburg.** GWYNNE HOGAN

While the area's new uses may not be industrial, says Wiseman, "at least these businesses are growing and employing a lot of people." Though, he adds: "It may not be the same people."



Indeed, the majority of the new jobs created in offices and nightlife cater to younger, tech-savvier millennials. The area's industrial businesses have offered a foot in the economic door for many first-generation immigrants, who may not have higher education or English language skills, but who do have craftsmanship. About half of the workers in the North Brooklyn industrial area come from the surrounding neighborhoods of Bushwick, Williamsburg, Maspeth, Ridgewood, and Middle Village, according to an unscientific survey of local businesses, says Archibald.

Some property owners are listening to the concerns of the community and are undertaking creative solutions on their own to bridge the gap.

The owners of a plot of land at 79 Bogart Street say they plan to set aside part of their forthcoming office building for manufacturing businesses at below market rate, similar to a model put forth by Williamsburg developer Toby Moskovits, whose 25 Kent Ave. building near the waterfront is under construction.

But relying on the goodwill of individual property and business won't be enough, says Tod Greenfield, second-generation owner of Martin Greenfield Clothiers, a hand-tailored suit factory that's been located in East Williamsburg since 1917. Standing on the roof of his Varet Street factory, Greenfield gestures to massive apartment complexes and hotels under construction all around. "It's under attack from all angles," he says.

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by SARAH AZIZA

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Back on the factory floor, amid the whir of Singer sewing machines, Greenfield points to employees who hail from nations including Poland, Haiti, Italy, the Dominican Republic, and Ecuador.

Ana Sanchez, 61, moved to the city from El Salvador in the 1980s. A few days later she found a job at a women's clothing factory in Long Island City. While her English was shaky, she was an expert seamstress, having perfected her craft designing and hand-sewing dresses for her friends in El Salvador. When the factory she worked for closed in 2001, she ended up at Martin Greenfield Clothiers a few months later.

Sanchez didn't like the work at first, she says. Menswear was much simpler than the ornate and intricate women's clothing she was used to sewing, but she got used to it, she says, and was able to raise three kids on her earnings.

“I never asked for help from the government, even now,” she says in Spanish, looking up from the hem of a woolen pant leg. “Here, I survived.”

While Sanchez isn't at risk of losing her job, and the Greenfields are determined to stay put and continue operations in the building they own, Greenfield worries that the more time passes, the less there will be left to fight for.

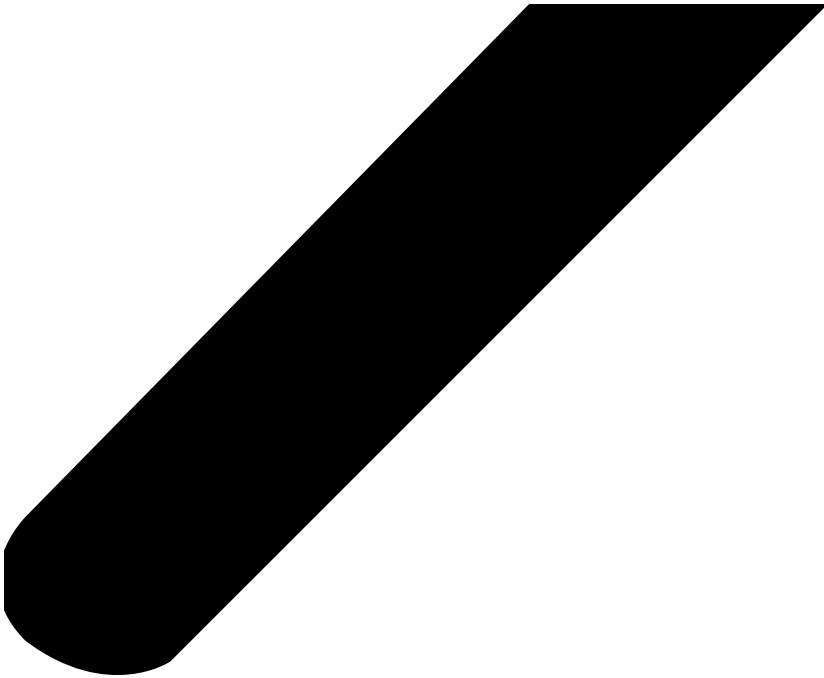
“People need freshly baked bread; school buses need a place to park,” he says. “The city could die if it doesn't have these areas protected.”

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# Williamsburg Warns East New York About Industrial-Strength Gentrification

by [Nathan Tempey](#) in [News](#) on Mar 8, 2016 9:44 am

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*Nominal efforts to protect industry in rezoned Williamsburg and Greenpoint failed. ([Runs With Scissors/Flickr](#))*

The City Council hearing yesterday ran long, so long that it had to relocate from the Council chambers across Broadway to a fluorescent-lit room in a tertiary city office building because someone needed to use the space. It was not a typical meeting for the zoning subcommittee of the Council's Land Use Committee. The subject was the [planned rezoning](#) of [part of East New York](#) to allow taller residential buildings and stack 6,500 new apartments on top of the neighborhood. Lined up to voice their opposition were dozens of neighborhood residents and advocates. Their testimony carried the hearing nearly to the eight-hour mark.

The thrust of the opposition to the rezoning, familiar by now, conveyed in English and Spanish, through tears and research citations, was that the rezoning would create too few below-market rate apartments (half of a planned 7,000), and too few of those would be affordable to current residents (East New York's median income is \$35,000 and just a quarter of the planned apartments would be available to people making \$31,000 or less), while opening up the floodgates to luxury development that will drive up rents and send low-income residents packing.

Speakers on all sides of the issue emphasized that the specter of speculative real estate has already arrived in the form of tenant harassment, [incessant home-buying offers](#), and rising rents.

"Neighbors on my street are already jacking up the rents to \$1,800," East New York Councilman Rafael Espinal said.

During hours in the hot seat, Department of Housing Preservation and Development Commissioner Vicki Been disputed an often-cited Comptroller's Office analysis saying that the rezoning puts 50,000 people at risk of displacement. Been argued that 50,000 are already at risk of displacement, given that there are 24,000

non-rent-regulated apartments in the neighborhood. (A spokesman for the Comptroller's Office indicated that those ideas [aren't mutually exclusive](#).)

"If you did nothing gentrification would actually accelerate in East New York," said Meredith Marshall, co-founder of the development firm BRP Companies, and along with other affordable housing developers who spoke, the only private citizens who expressed full support of the plan. "Where you have transportation you have movement eastward in Brooklyn, and people are gravitating to those sites and those neighborhoods."

Legal Services NYC deputy housing director Luis Henriquez, who oversees tenant lawyers, many of them newly hired as part of [de Blasio's anti-harassment push](#), spoke in opposition, but said his office is already seeing decades-long tenants being taken to housing court for the first-time as landlords aggressively offer buyouts and real estate LLCs proliferate.

"We have spoken about gentrification in East New York as a future thing, but it's something we are seeing now as housing lawyers," Henriquez said.

East New York is the first of 15 neighborhoods up for rezoning under Mayor de Blasio's contentious [affordable housing plan](#), but it also follows a long line of neighborhoods rezoned by former mayor Michael Bloomberg. On hand at the hearing were veterans of the 2005 Williamsburg-Greenpoint waterfront rezoning, who argued the obvious: that luxury towers sprouted like mushrooms across the neighborhoods while barely any affordable housing got built (just 2 percent of promised units [by 2013](#), while only two years of financing for 1,200 affordable units have been lined up for East New York). They also warned that the rezoning delivered a crippling blow to the area's warehouses and small factories.

The East New York rezoning plan nominally relies on two mechanisms to keep industrial small businesses around: MX zoning, which allows for both residential and light industrial uses, and industrial business zones, designated manufacturing areas where companies moving in are eligible for tax credits and business owners are supposed to have access to services. A recent Pratt Center for Community Development [report \[PDF\]](#) found that both mechanisms failed to keep speculative real estate out of Williamsburg and Greenpoint's factory areas.





*East New York's industrial business zone is mostly left out of the rezoned area, but it could still be seriously affected. (Nathan Tempey/Gothamist)*

In the MX-zoned areas along the East River, near the Brooklyn Navy Yard and Bushwick Inlet, industrial square footage decreased by over 60 percent over the decade since the rezoning.

"Where in the city has MX ever led to industrial or commercial preservation?" Williamsburg Councilman Antonio Reynoso demanded of de Blasio administration officials during a testy exchange.

According to the report, there has only been one MX-zoned area where industrial growth has taken place since the designation was created in 1997, in West Harlem. Other researchers found that of 32 manufacturing businesses in an area rezoned MX in Greenpoint and Williamsburg, only 8 remain today.

Department of City Planning executive director Purnima Kapur explained that the MX rezoning of Ocean Hill, just west of Broadway Junction, is meant to reflect a mix of light industry and single family homes that has existed since the mid-20th century. City Planning Commission chairman Carl Weisbrod offered, "We're protecting the homeowners that are there, and we're also protecting the jobs."

But Reynoso questioned the effectiveness of the rezoning's ability to protect jobs in industrial areas once those areas can profitably become residential. "Given the choice, developers are always going to convert to residential," Reynoso said. "You're giving away [industrial] land for pennies on the dollar for residential."

Kapur and Weisbrod offered that the nearby IBZ, south of Broadway Junction, had been left out of the rezoning entirely to keep businesses. Williamsburg and Greenpoint's experience is instructive here, too.

A representative from the Evergreen Exchange, a membership organization serving industrial companies in Williamsburg and Greenpoint, recounted how since rezoning, the number of businesses it serves has dropped from 300 to 66, and that though there are pockets where industry still predominates, in the Williamsburg-Greenpoint IBZ, the "majority of the zone is now populated by hotels, nightclubs, and large-scale amusements."

The Pratt report backs this up most of the way, saying, "The proliferation of non-industrial uses has fueled speculation and commercial gentrification, even within the IBZs." Though they "remained zoned for manufacturing, the penetrable character of manufacturing zoning combined with the real estate pressure stemming from adjacent areas that had been rezoned for market-rate residential development led to substantial encroachment by as-of-right, non-industrial uses. In 2004, the year before the rezoning was approved, 87% of the lot square footage in the IBZ was occupied by 'Industrial and Manufacturing' uses; there were no 'Commercial and Office' uses. By 2014, 'Industrial and Manufacturing Uses' decreased by over 378,000 square feet and now only comprise 65% of the lot square footage. In contrast, commercial uses have increased by 236,000 square feet and now constitute 14% of all lot square footage." Exhibit D.3

East Brooklyn Business Improvement District manager Bill Wilkins represents 95 East New York businesses, including metal fabricators, bakeries, and sign makers. He testified that the rezoning, particularly the use of MX zoning, which also extends to parts of Liberty and Altantic avenues, spells certain displacement of businesses that have served as life rafts in the red-lined, poverty- and crime-stricken neighborhood.

"We are very concerned about the manufacturing sector in our community, which has long been the backbone of an otherwise bleak economy," Wilkins said, noting that member businesses pay an average salary of \$50,000.

Real estate and resources are already tight, he said:

"We don't have inventory available for businesses to expand, grow and relocate. If you do approve this plan, we are in need of funding for industrial relocation grants."

Espinal said he expects the rezoning to go up for a vote in 40 days. He must sign off on the plan first.

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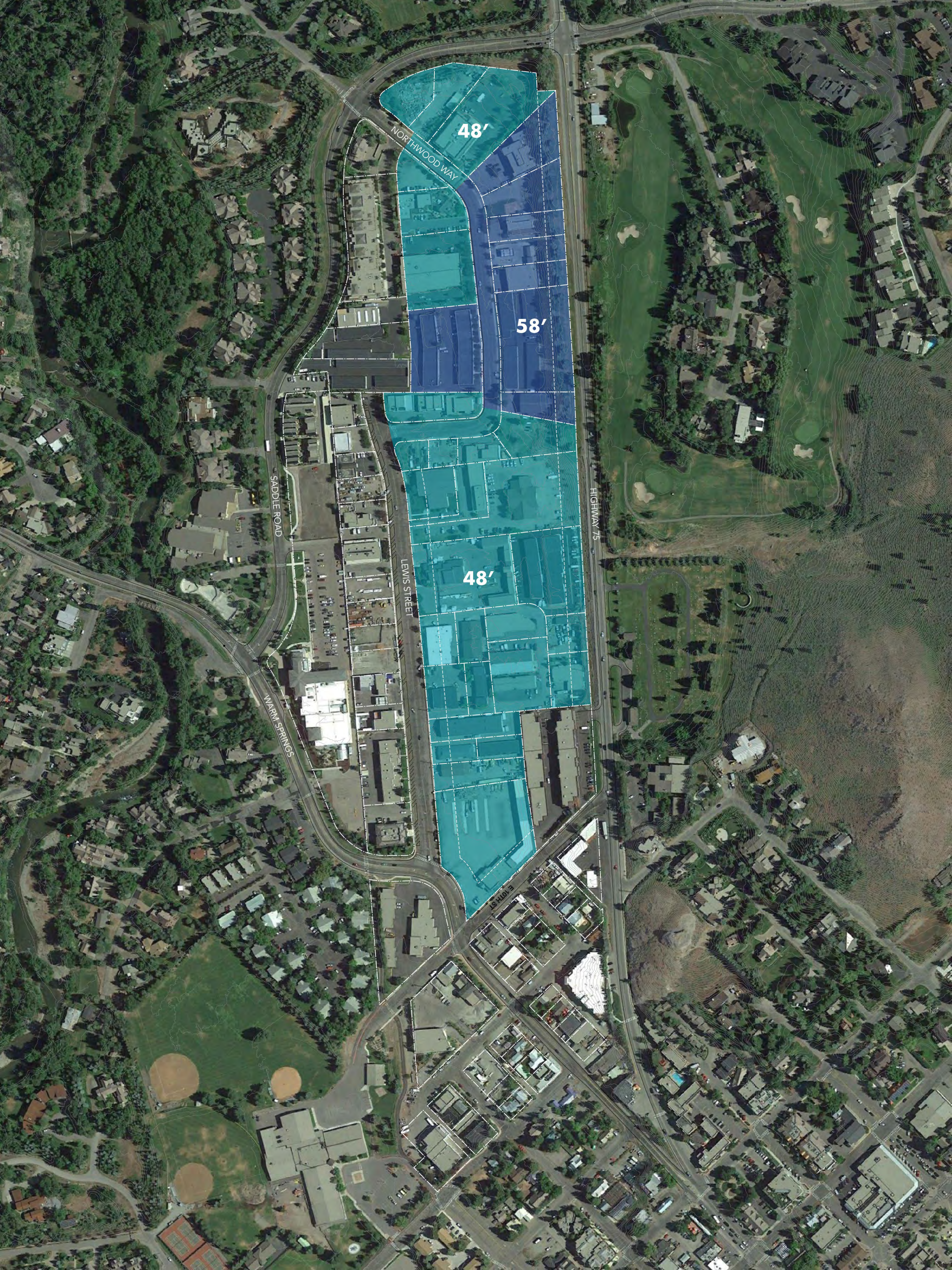
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**Exhibit E.**

Light Industrial Districts Height Modeling





48'

58'

48'

NORTHWOOD WAY

SADDLE ROAD

WARM SPRINGS

LEWIS STREET

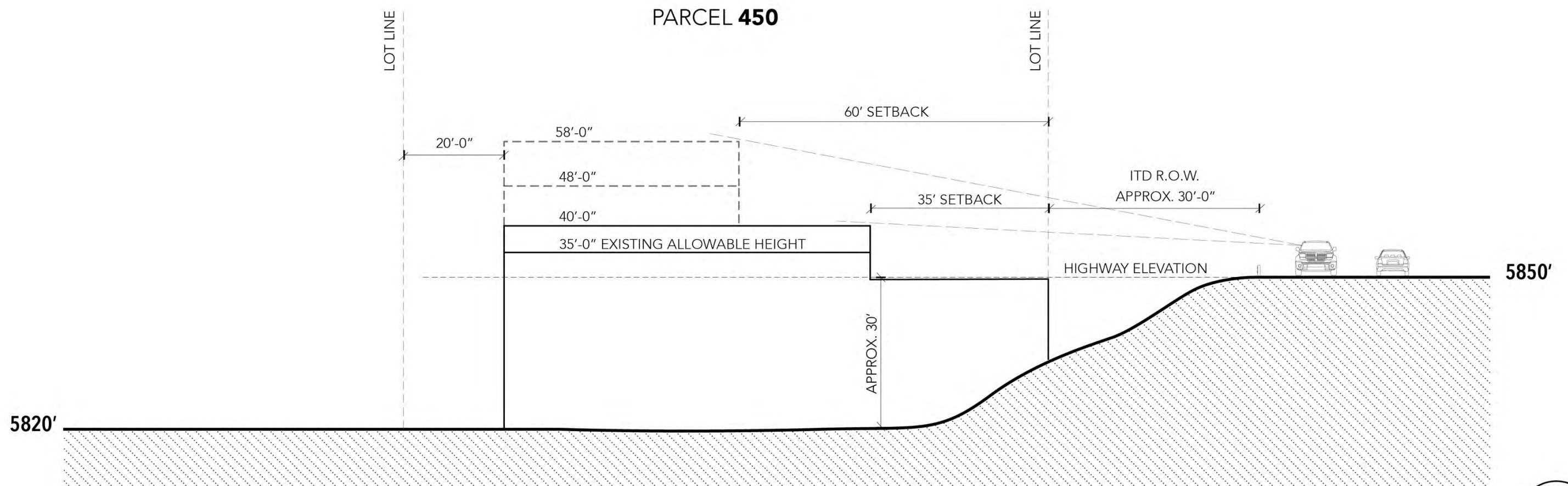
HIGHWAY 75

E 10TH ST





**VIEW KEY**



**HIGHWAY 75 - SECTION**





VIEW 03 // EXISTING





VIEW 03 // 35'





VIEW 03 // 40'





VIEW 03 // 48' GABLED





VIEW 03 // 48' SQUARE



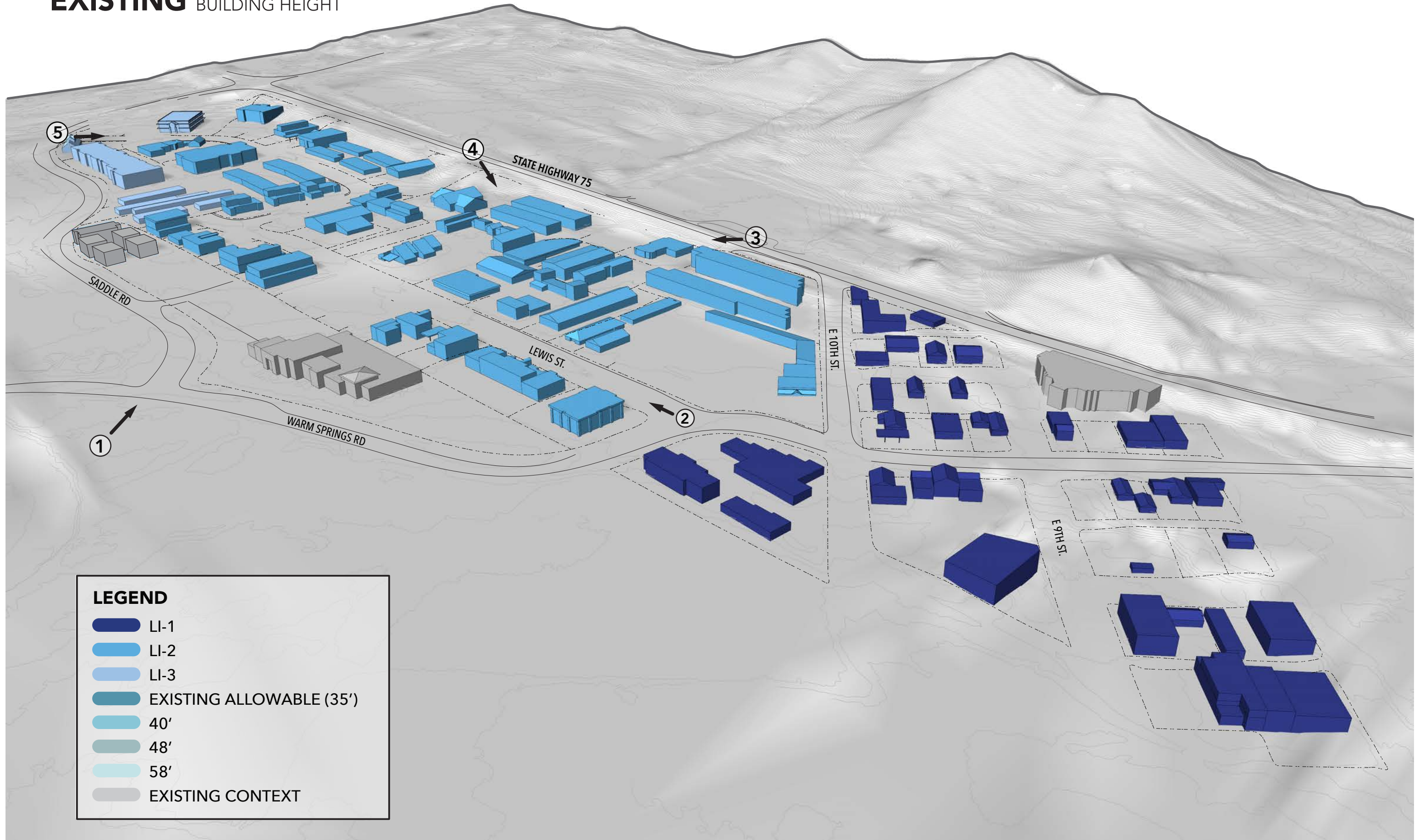


VIEW 03 // 58'



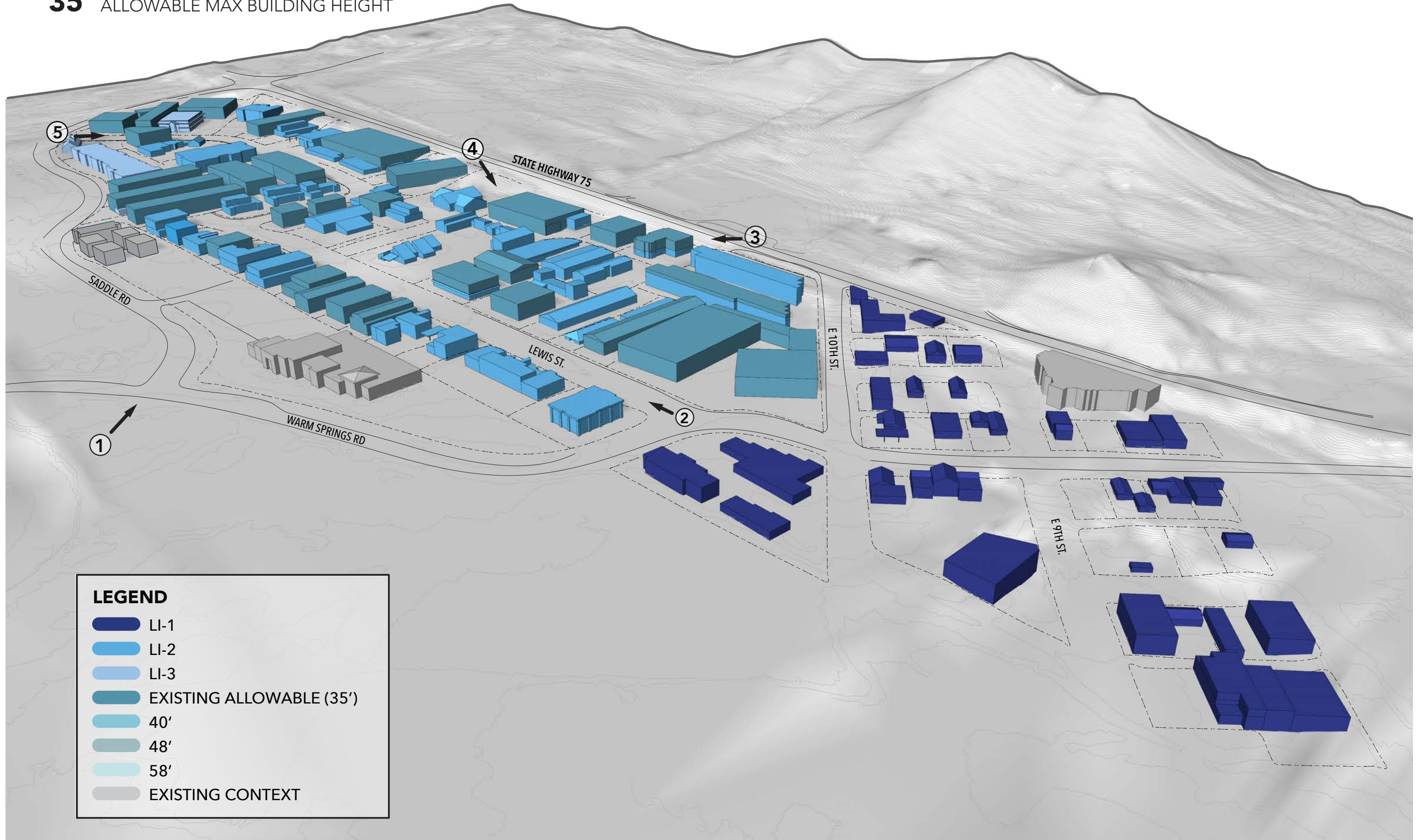


# EXISTING BUILDING HEIGHT





# 35' ALLOWABLE MAX BUILDING HEIGHT

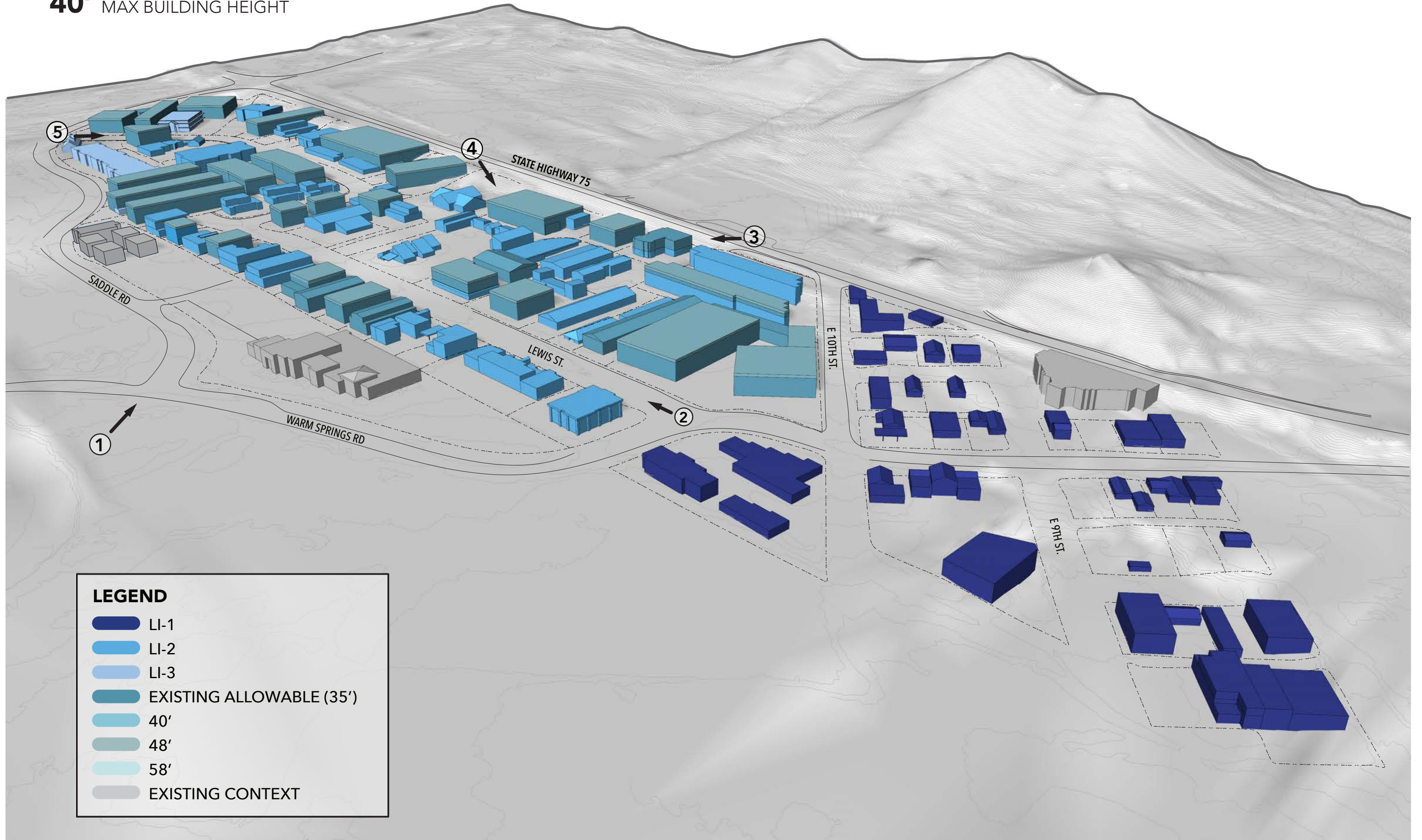


## LEGEND

- LI-1
- LI-2
- LI-3
- EXISTING ALLOWABLE (35')
- 40'
- 48'
- 58'
- EXISTING CONTEXT

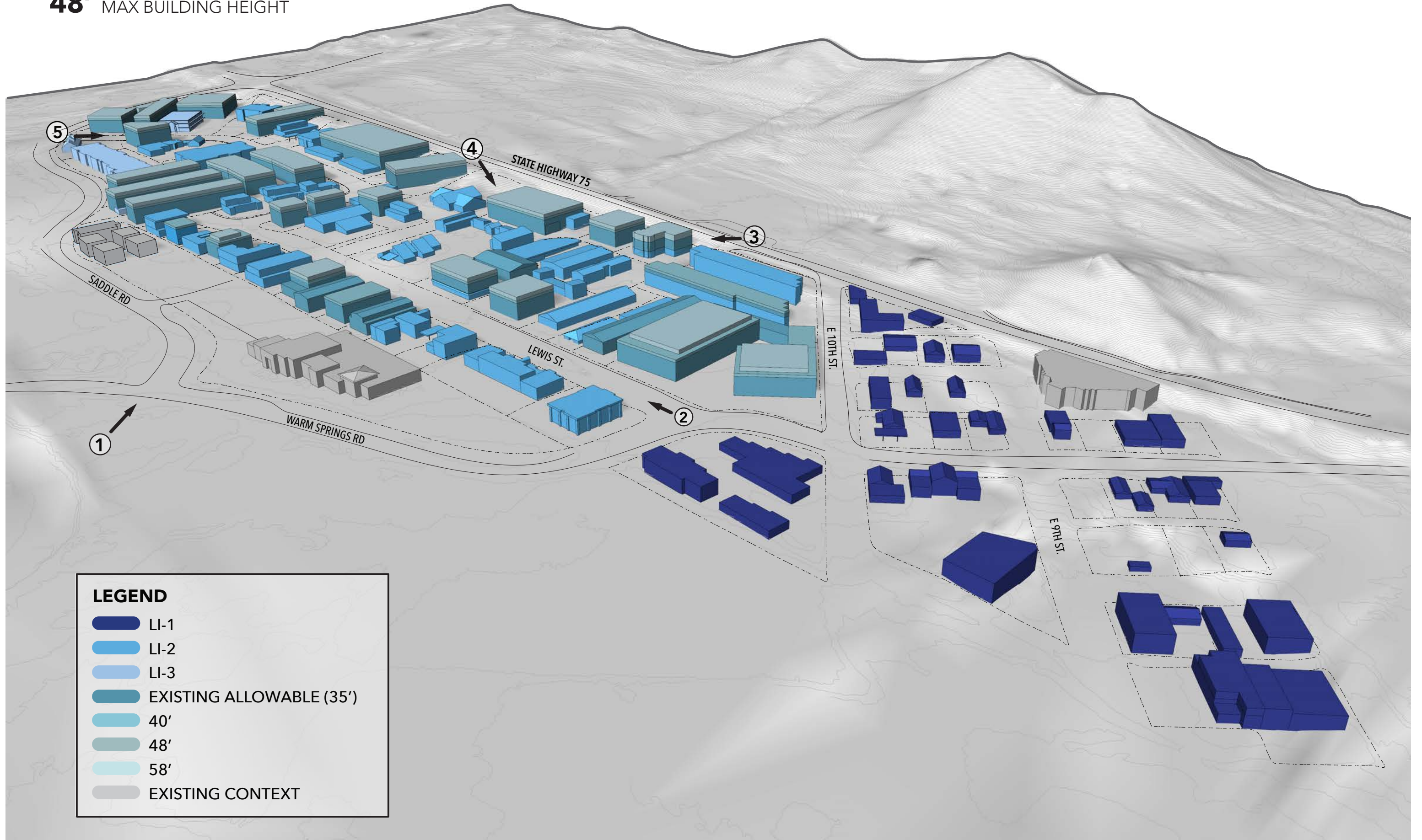


# 40' MAX BUILDING HEIGHT





# 48' MAX BUILDING HEIGHT

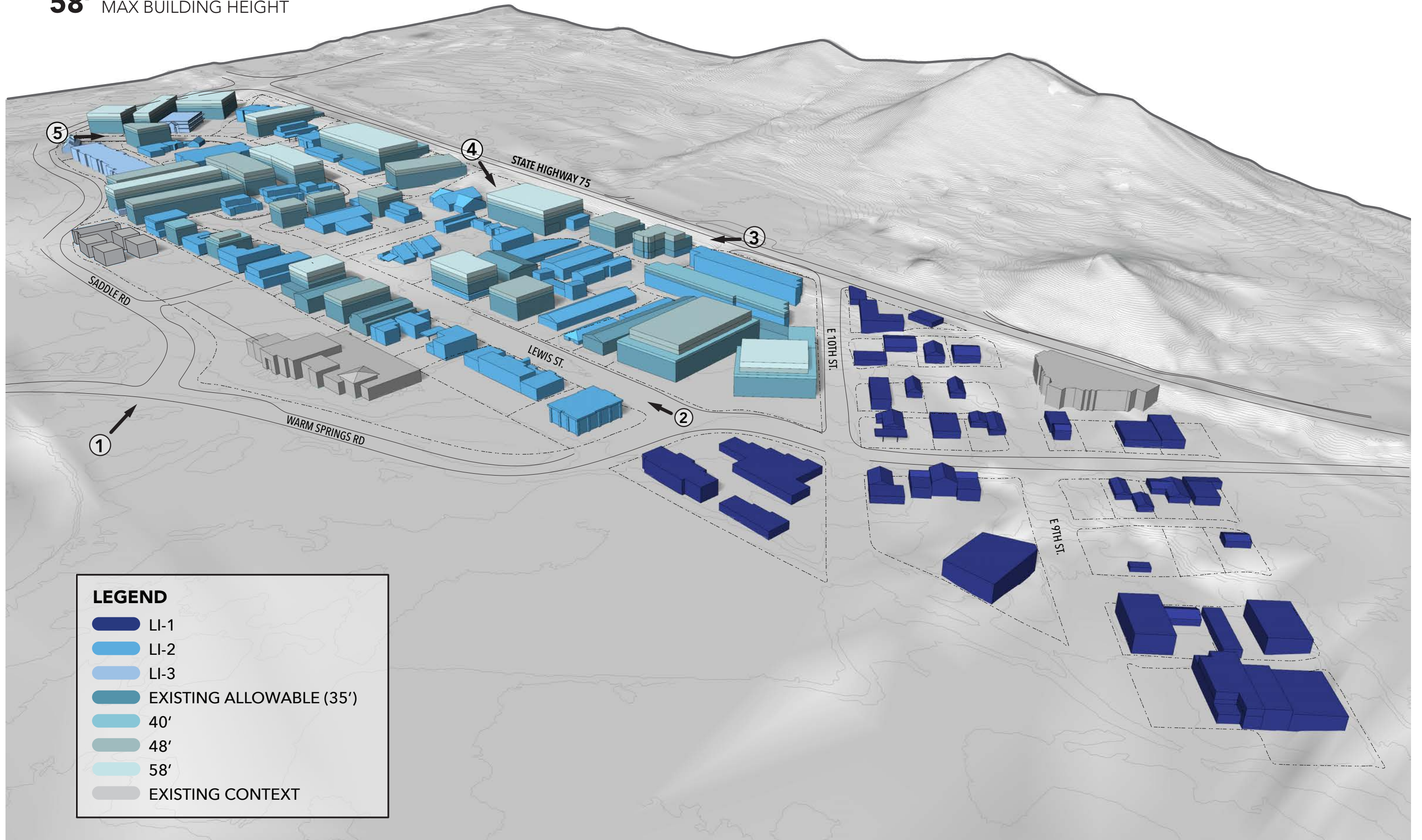


## LEGEND

- LI-1
- LI-2
- LI-3
- EXISTING ALLOWABLE (35')
- 40'
- 48'
- 58'
- EXISTING CONTEXT



# 58' MAX BUILDING HEIGHT





**VIEW 01 EXISTING**





VIEW 01 // 35'





VIEW 01 // 40'





VIEW 01 // 48'





VIEW 01 // 58'





**VIEW 02 // EXISTING**





VIEW 02 // 35'





VIEW 02 // 40'





VIEW 02 // 48'





VIEW 02 // 58'





VIEW 03 // EXISTING





VIEW 03 // 35'





VIEW 03 // 40'





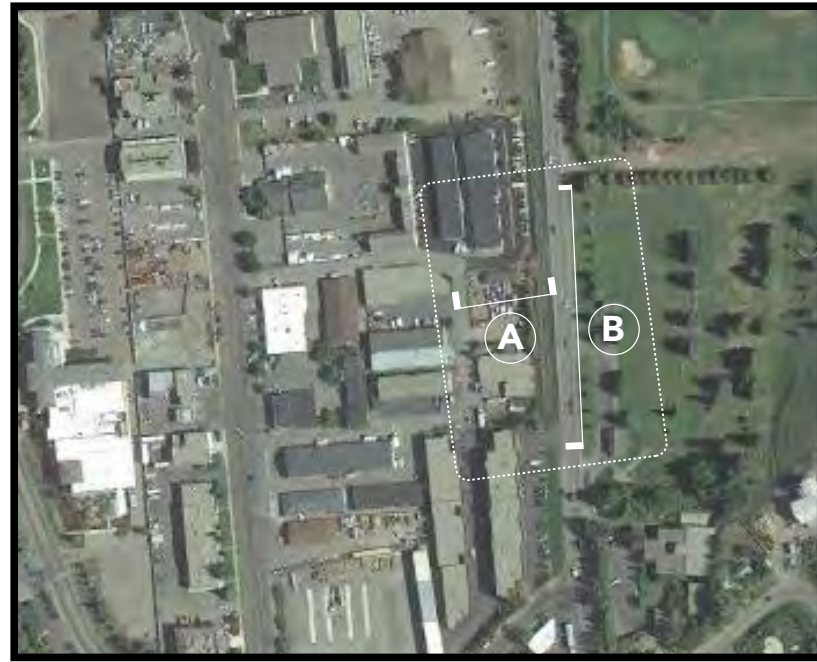
VIEW 03 // 48'



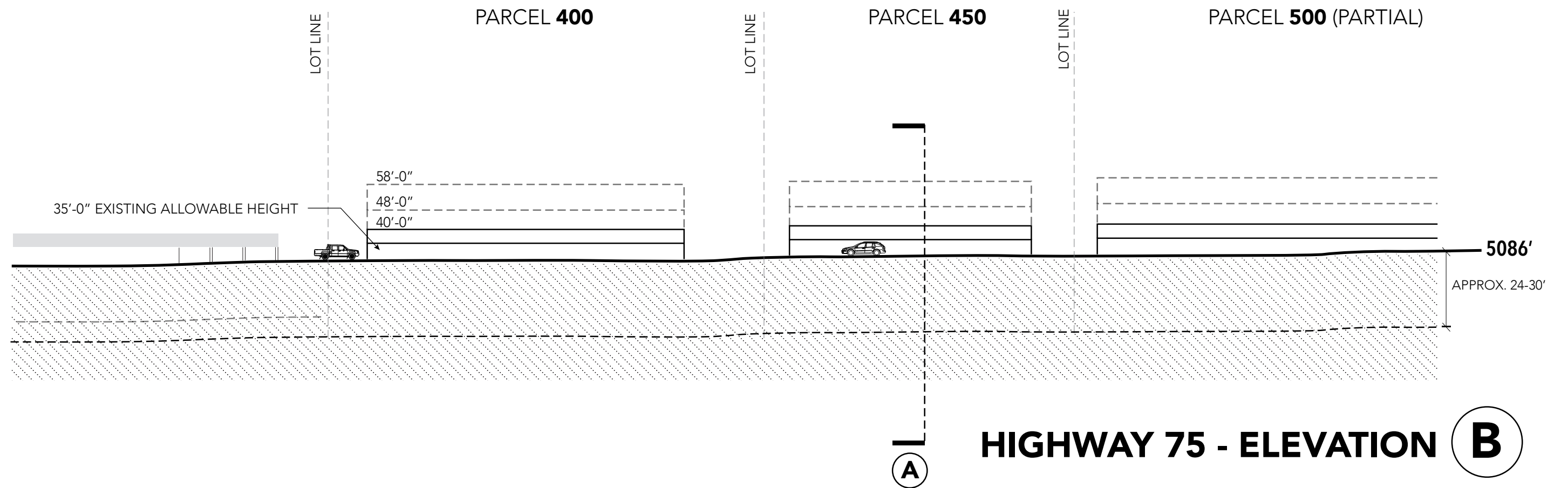


VIEW 03 // 58'





**VIEW KEY**





**VIEW 04 // EXISTING**





**VIEW 04 // 35'**





**VIEW 04 // 40'**





**VIEW 04 // 48'**





**VIEW 04 // 58'**





**VIEW 05 // EXISTING**





VIEW 05 // 35'





VIEW 05 // 40'





VIEW 05 // 48'





VIEW 05 // 58'





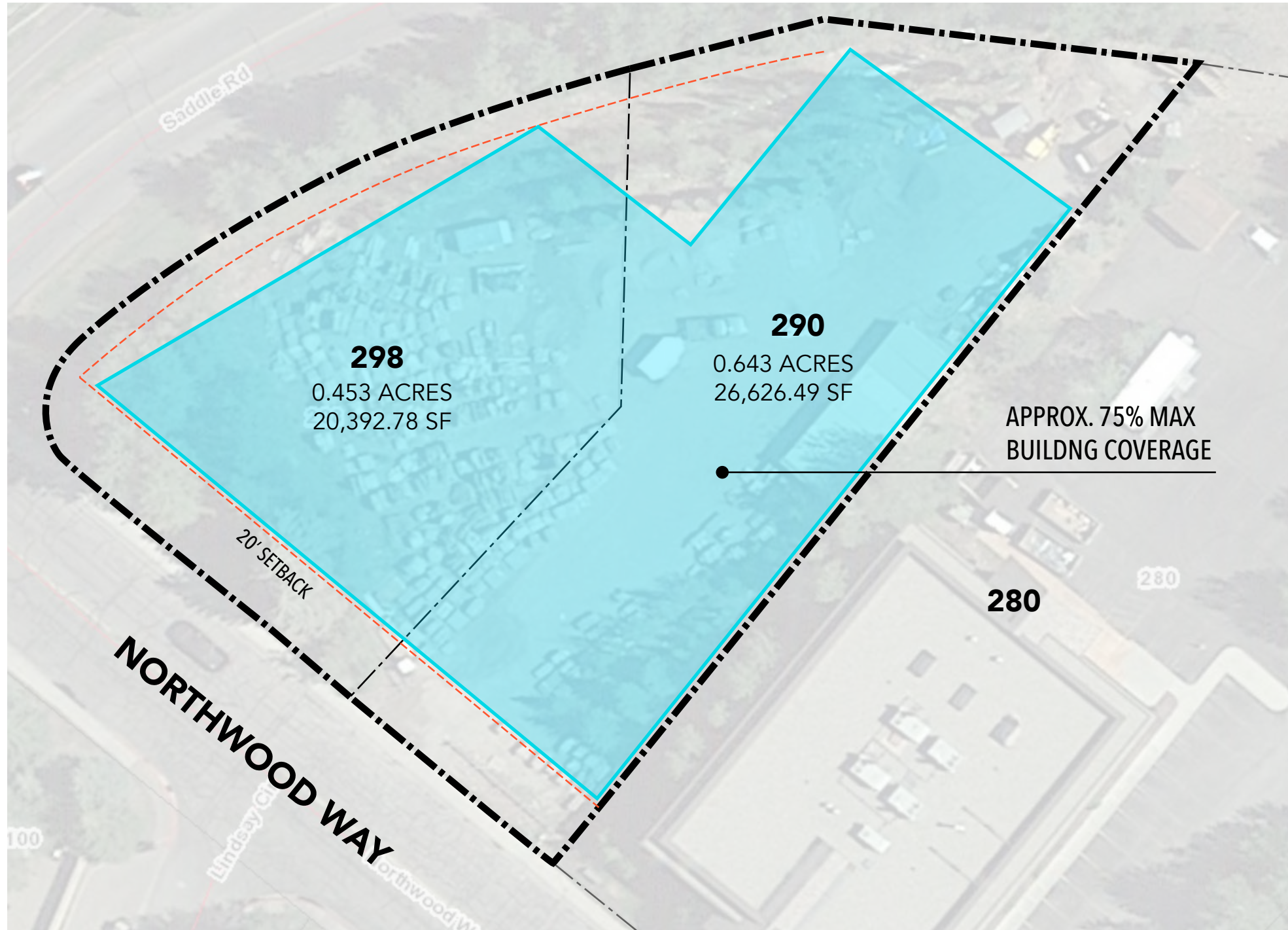


**VIEW KEY**

**AREA TAKEOFF**

- COMBINED LOT SF = **23,958.54 SF**
- COMBINED LOT ACRES = **.552**
- POTENTIAL BUILDING FOOTPRINT = **17,968 SF**
- + LEVEL 02 = **35,936 SF**
- + LEVEL 03 = **53,904 SF**
- + LEVEL 04 = **71,872 SF**
- + LEVEL 05 = **89,840 SF**





### VIEW KEY

### AREA TAKEOFF

- COMBINED LOT SF = **47,019.27 SF**
- COMBINED LOT ACRES = **1.096**
- POTENTIAL BUILDING FOOTPRINT = **35,264.25 SF**
- + LEVEL 02 = **70,528.5 SF**
- + LEVEL 03 = **105,792.75 SF**
- + LEVEL 04 = **141,057 SF**
- + LEVEL 05 = **176,321.25 SF**

**Exhibit F.**

Draft Light Industrial Ordinance #1192



**ORDINANCE NO. 1192**

**AN ORDINANCE OF THE CITY OF KETCHUM, BLAINE COUNTY, IDAHO, AMENDING TITLE 17, THE ZONING ORDINANCE, OF THE KETCHUM MUNICIPAL CODE BY AMENDING: SECTION 17.08.020: TERMS DEFINED; SECTION 17.18.140 THROUGH 17.18.160: PURPOSE OF THE LIGHT INDUSTRIAL DISTRICTS NUMBER 1, 2, AND 3; SECTION 17.12.010: ZONING AND OVERLAY DISTRICTS AND MAP; SECTION 17.12.020: DISTRICT USE MATRIX; SECTION 17.12.030: DIMENSIONAL STANDARDS, DISTRICTS MATRIX; SECTION 17.12.050: LI-1, LI-2, AND LI-3 DIMENSIONAL STANDARDS, DISTRICT MATRIX; SECTION 17.124.090: RESIDENTIAL: LIGHT INDUSTRIAL DISTRICTS; SECTION 17.124.130: FENCES, HEDGES AND WALLS; PROVIDING A REPEALER CLAUSE; PROVIDING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR PUBLICATION BY SUMMARY; AND PROVIDING AN EFFECTIVE DATE.**

WHEREAS, the City of Ketchum is authorized to amend the city zoning ordinance pursuant to Idaho Code § 67-6511; and

.....

**NOW, THEREFORE, BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF KETCHUM**

**Section 1: AMENDMENTS TO SECTION 17.08.020, TERMS DEFINED.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 2: AMENDMENTS TO SECTION 17.18.140 THROUGH 17.18.160, PURPOSE OF THE LIGHT INDUSTRIAL DISTRICTS NUMBER 1, 2, AND 3.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 3: AMENDMENTS TO SECTION 17.12.010, ZONING AND OVERLAY DISTRICTS AND MAP.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 4: AMENDMENTS TO SECTION 17.12.020, DISTRICT USE MATRIX.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 5: AMENDMENTS TO SECTION 17.12.030, DIMENSIONAL STANDARDS, DISTRICTS MATRIX.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 6: AMENDMENTS TO SECTION 17.12.050: LI-1, LI-2, AND LI-3 DIMENSIONAL STANDARDS, DISTRICT MATRIX.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 7: AMENDMENTS TO SECTION 17.124.090: RESIDENTIAL: LIGHT INDUSTRIAL DISTRICTS.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 8: AMENDMENTS TO SECTION 17.124.130: FENCES, HEDGES AND WALLS.**  
That Title 17 of the Ketchum Municipal Code be amended to

**Section 9: AMENDMENTS TO SECTION 17.18.140 THROUGH 17.18.160, PURPOSE OF THE LIGHT INDUSTRIAL DISTRICTS NUMBER 1, 2, AND 3.** That Title 17 of the Ketchum Municipal Code be amended to

**Section 10: SAVINGS AND SEVERABILITY CLAUSE.** It is hereby declared to be the legislative intent that the provisions and parts of this Ordinance shall be severable. If any paragraph, part, section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be invalid for any reason by a Court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance.

**Section 11: REPEALER CLAUSE.** All City of Ketchum Ordinances or parts thereof which are in conflict herewith are hereby repealed.

**Section 12: PUBLICATION.** This Ordinance, or a summary thereof in compliance with Section 50-901A, Idaho Code, substantially in the form annexed hereto as Exhibit C, shall be published once in the official newspaper of the City, and shall take effect immediately upon its passage, approval, and publication.

**Section 13: EFFECTIVE DATE.** This Ordinance shall be in full force and effect after its passage, approval and publication, according to law.

PASSED BY the CITY COUNCIL and APPROVED by the MAYOR of Ketchum, Idaho, on this \_\_\_\_\_ day of \_\_\_\_\_ 2018.

APPROVED BY the Mayor of the City of Ketchum, Idaho, this \_\_\_\_\_ day of \_\_\_\_\_ 2018.

APPROVED:

\_\_\_\_\_  
Neil Bradshaw, Mayor

ATTEST:

\_\_\_\_\_  
Robin Crotty, City Clerk



## **SECTION 1 – Definitions**

Proposed amendments to the Definitions (§17.08.020) of Title 17 of the KMC follow. All new text proposed to be added are underlined. Text that is proposed to be repealed is ~~stricken~~.

### **17.08.020 DEFINITIONS:**

**BUSINESS SUPPORT SERVICE:** The use of land for the sale, rental, or repair of office equipment, supplies, and materials, or the provision of services used by office and service establishments. Uses include: ~~Typical uses include, but are not limited to,~~ office equipment and supply firms, small business machine repair shops, convenience printing and copying establishments, or information technology support services.

**CONSTRUCTION MATERIAL LAYDOWN YARD:** A site identified and approved as part of a Construction Activity Plan or other city-issued permit for a specific construction project. Construction material laydown yards are intended to be used on an intermittent basis in association with a singular, permitted development project.

**CRAFT/COTTAGE INDUSTRY:** A facility devoted solely to the arts and crafts that produces or makes items that by their nature, are designed or made by an artist or craftsman by using hand skills.

**DAYCARE, ONSITE EMPLOYEE:** Child care programs that occur in facilities where parents are on the premises.

**HEALTH AND FITNESS FACILITY – WELLNESS FOCUS:** HEALTH AND FITNESS FACILITY: A business or membership organization providing exercise facilities and/or nonmedical personal services to patrons, with a focus on wellness and characterized by low-impact movements and/or lack of mechanized equipment, including, but not limited to, yoga and Pilates studios, dance studios, gymnasiums, personal training studios, private clubs (athletic, health, or recreational), tanning salons, and weight control establishments.

**HEIGHT OF BUILDING/LIGHT INDUSTRIAL DISTRICTS:** The greatest vertical distance measured at any point from natural, existing, or finished grade, whichever is lowest, to the highest point of the roof, except where expressly exempted by 17.12.050. No facade shall be greater than the maximum height permitted in the zoning district. Building heights in light industrial districts are subject to the qualifying ground floor heights and residential standards contained in 17.124.090.

**INDUSTRIAL DESIGN:** The professional service of creating and developing concepts and specifications that optimize the function, value and aesthetics of products and systems for the mutual benefit of both user and manufacturer, often employing design thinking strategies. Typically, industrial design is intended to result in tangible goods that can be mass produced. Industrial design businesses may include on-site prototyping, fabrication, and manufacturing.

**INSTRUCTIONAL SERVICE:** The use of land for the provision of ~~informational,~~ instructional and similar services for personal improvement other than physical improvement. ~~Typical uses~~ Uses include, but are not limited to, ~~health or physical fitness studios facilities, dance,~~ music, painting, ceramics, arts or photography studios, fiber arts, educational tutoring facilities, handicraft or hobby instruction.

**OFFICE, CONTRACTOR-RELATED BUSINESS:** An establishment wherein the primary use is the conduct of a business or profession specifically related to building contracting including, design services, engineering, construction and property.

**PRODUCT DESIGN:** See Industrial Design.

**PROFESSIONAL RESEARCH SERVICES:** An establishment that specializes in ~~performing~~ professional, scientific, and technical research services and is may inclusive of light manufacturing as an accessory use. Uses are limited to: ~~Typical uses include, but are not limited to, construction contractors,~~ physical distribution and logistics, engineering and specialized design services, electronic and computer services, ~~photographic services,~~ research, development and scientific services, ~~and internet or remote sales and marketing.~~ This definition does not include uses which create vibration outside the exterior building walls, or uses that would diminish the quality of air and water in the city.

PUBLIC UTILITY: An organization that maintains the infrastructure for a public service, which often also provides a service using that infrastructure.

QUALIFYING GROUND FLOOR: A ground floor of a building, where the start of the second story is 18 feet or more above the level of the finished floor. In the LI zoning districts, buildings where not less than seventy percent (70%) of the structure has a Qualifying Ground Floor are permitted a higher overall height.

RECREATION FACILITY, HIGH INTENSITY: A recreation facility that, due to the nature of the use, requires floor area or mass and volume, or generates higher decibel levels, that are more appropriately accommodated in the light industrial area or are buffered from residential or pedestrian-oriented commercial activity on a large recreational use zoned parcel district than in the Community Core or a Tourist zone. Uses include indoor shooting range, dryland hockey training facility, gymnastics/tumbling gym, and instructional or personal training facilities wherein the instruction involves throwing, dragging, or launching heavy equipment.

RESTRICTIVE COVENANTS: A restrictive covenant runs with the land and, thereby, binds present and future owners of the property. Restrictive covenants are used to implement the conditions of a land use approval or ensure implementation of project mitigations and components.

STORAGE YARD: Storage of large equipment, operable vehicles and construction/property maintenance materials on an ongoing or permanent basis. This shall not include junkyards or wrecking yards.

TV AND RADIO BROADCASTING: An installation consisting of one or more transmitters or receivers used for radio, television or cable communications or broadcasting.

WORK-LIVE UNITS: Work-Live units incorporate residential living space in a non-residential building. Joint work-live units are held in common ownership and cannot be sold or platted as separate condominiums, as documented with a city-approved restrictive covenant recorded against the property.



## **SECTION 2 – Light Industrial Area Purposes.**

All new text proposed to be added to the LI purpose section is underlined. Text that is proposed to be repealed is ~~stricken~~.

### **17.18.140: LIGHT INDUSTRIAL DISTRICT NUMBER 1 (LI-1)**

- A. Purpose: The LI-1 light industrial district number 1 is established as a transition area ~~providing limited commercial service industries, limited retail, small light manufacturing, research and development, and offices related to building, maintenance and construction and which generate little traffic from tourists and the general public~~ between the Community Core and the LI-2 district. The LI-1 district provides suitable locations and environs for (1) limited business and personal services; (2) small light manufacturing; (3) research and development; (4) offices related to building, maintenance and construction; (5) limited retail; and, (6) multiple-family dwellings, constructed to be secondary and subordinate to the primary light industrial purpose of the LI-1. Traffic to the LI-1 district is intended to be generated primarily by uses related to the industrial trades and secondarily by other permitted uses that, due to the natures of the uses, are not reliant on pedestrian traffic or high visibility, and/or are not permitted in other zoning districts, and/or are characterized by sale, rental, or service of large, bulky equipment or materials, necessitating location of such use in a light industrial zone.

### **17.18.150: LIGHT INDUSTRIAL DISTRICT NUMBER 2 (LI-2)**

- A. Purpose: The LI-2 light industrial district number 2 is the city's primary light industrial area and is established ~~to provide for a permanent year round employment base and the location of light manufacturing, wholesale trade and distribution, research and development, service industries, limited related, bulk retail and offices related to building, maintenance and construction and which generate little traffic from tourists and the general public.~~ with the foremost purpose of providing suitable land and environs for uses that are not appropriate in other commercial zones due to their light industrial nature, but which provide an essential or unique service to support the local economy and permanent year-round employment base. Uses include: (1) light manufacturing; (2) wholesale trade and distribution; (3) research and development; (4) service industries; (5) limited bulk retail and; (6) offices related to building, maintenance and construction. A secondary purpose of the LI-2 is to provide multiple-family dwellings, constructed to be secondary and subordinate to the primary light industrial purpose of the LI-2. Uses in the LI-2 are intended to generate traffic primarily from the industrial trades and secondarily by other permitted uses that, due to the natures of the uses, are not reliant on pedestrian traffic or high visibility, and/or are not permitted in other zoning districts, and/or are characterized by sale, rental, or service of large, bulky equipment or materials, necessitating location of such use in a light industrial zone.

### **17.18.160: LIGHT INDUSTRIAL DISTRICT NUMBER 3 (LI-3)**

- A. Purpose: The LI-3 light industrial district number 3 is established as a transition area ~~providing for a permanent year round employment base and the location of research and development, wholesale trade and distribution and high technology industries along with offices related to building, maintenance and construction and which generate little traffic from tourists and the general public and providing a mix of deed restricted and market rate housing.~~ between the LI-2 zoning district and the residential LR and GR-L districts. The LI-3 district provides suitable locations and environs for a permanent year-round employment base comprised of (1) research and development; (2) wholesale trade and distribution; (3) technology industries; and (4) offices related to building, maintenance and construction uses; and, (5) deed restricted and market rate multi-family dwellings located within mixed-use buildings. Uses in the LI-3 are intended to generate traffic primarily from the employers and employees of permitted uses and secondarily from deed restricted and market rate housing units.

### **SECTION 3 – NEW MAP AND SUB-DISTRICTS ... 17.12.010**

Proposed amendments to the zoning districts and overlay districts and the official zoning map of the city (§17.12.010) of Title 17 of the KMC follow. All new text proposed to be added to the LI purpose section is underlined. Text that is proposed to be repealed is ~~stricken~~.



17.12.010: Zoning Map Districts

A. Establishment of Districts: In order to carry out the provisions of this title, the City of Ketchum, Idaho is divided into the following zoning districts and overlay districts:

<b><u>Zoning Districts</u></b>	
LR	Limited residential district
LR-1	Limited residential - one acre district
LR-2	Limited residential - two acre district
GR-L	General residential - low density district
GR-H	General residential - high density district
STO-.4	Short term occupancy - .4 acre district
STO-1	Short term occupancy - one acre district
STO-H	Short term occupancy - high density district
T	Tourist district
T-3000	Tourist - 3000 district
T-4000	Tourist - 4000 district
CC	Community core district
<u>CC-1</u>	<u>Community Core Subdistrict 1 - Retail Core</u>
<u>CC-2</u>	<u>Community Core Subdistrict 2 - Mixed Use</u>
LI-1	Light industrial district number 1
LI-2	Light industrial district number 2
LI-3	Light industrial district number 3
RU	Recreation use district
AF	Agricultural and forestry district

<b><u>Overlay Districts</u></b>	
FP	Floodplain management overlay zoning district
A	Avalanche zone <u>overlay</u> district
WSBA	Warm Springs base area overlay district
WSBA-1	Warm Springs base area overlay district-1
MO	Mountain overlay zoning district
<u>48'</u>	<u>Light industrial 48' height overlay district</u>
<u>58'</u>	<u>Light industrial 58' height overlay district</u>





48'

58'

48'

NORTHWOOD WAY

SADDLE ROAD

WARM SPRINGS

LEWIS STREET

HIGHWAY 75

LEWIS ST



## **SECTION 4 – LI-1, LI-2, and LI-3 Land Use Matrix ... 17.12.020**

Title 17 of the KMC sets forth a series of regulated uses by district.

In the LI-1, LI-2, and LI-3 the following uses, as defined in §17.08.020, are either Permitted (P), Conditional (C), or Accessory (A).

Proposed amendments to the District Use Matrix (§17.12.020) and Definitions (§17.08.020) are as follows. All new text proposed to be added to the land use matrix and/or definitions section of Title 17 are underlined. Text that is proposed to be repealed is ~~stricken~~.

=

17.12.020: DISTRICT USE MATRIX:

"P" = PERMITTED "C" = CONDITIONAL "A" = ACCESSORY

DISTRICT USE MATRIX

DISTRICT USES	L	L	L	G	G	S	S	S	T	T	T	C	C	L	L	L	R	A
	R	R	R	R	R	O	O	O	O	3000	4000	SD	SD	I	I	I	U	F
RES. Dwelling, Multi-family				p <sup>2</sup>	P		P	P	P	P	P	p <sup>25</sup>	P	C <sup>14</sup>	C <sup>14</sup>	C <sup>14</sup>	C <sup>19</sup>	
Dwelling, One-Family	P	P	P	p <sup>2</sup>	P	P	P	P	P	P	P	See Note 28	See Note 28				C <sup>19</sup>	P
Residential Care Facility	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>25</sup>	P					
Short-term Rental	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	p <sup>33</sup>	P	P	P	P	P	p <sup>33</sup>	p <sup>33</sup>
Work-Live Unit														C <sup>14</sup>	C <sup>14</sup>	C <sup>14</sup>		
COMMERCIAL Agriculture, Commercial																		P
Adult Only Business																PC		
Business Support Service												P	P	P	P			
Commercial Off-site Snow Storage									P/C <sup>32</sup>			P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>		
Construction Material Laydown Yard														P	P	P		
Convenience Store									P			P	P	p <sup>12</sup>	p <sup>16</sup>			
Craft/Cottage Industry														P	P	P		
Daycare Center				C <sup>4</sup>	C <sup>4</sup>				p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	P	P	C <sup>17</sup>		C <sup>17</sup>		
Daycare Facility				C <sup>4</sup>	P <sup>4</sup>			C <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	p <sup>4</sup>	P	P	C <sup>17</sup>		C <sup>17</sup>	p <sup>4</sup>	
Drive-Through Facility												p <sup>9</sup>	p <sup>9</sup>					
Equestrian Facility																		C
Food Service									P	p <sup>6</sup>	p <sup>6</sup>	P	P	pC <sup>15</sup>	pC <sup>15</sup>			C <sup>29</sup>
Golf Course	P	P	P	P	P	P	P	P	P	P	P							C
Grocery Store												P	P					
Health and Fitness Facility - wellness focus									P			P	P	p <sup>37</sup>	p <sup>37</sup>			
Hotel									p <sup>25</sup>	p <sup>25</sup>	p <sup>25</sup>	p <sup>25</sup>	p <sup>25</sup>					
Hybrid Production Facility												P	P	P	P			
Industrial Design														P	P	P		
Instructional Service												P	P	C <sup>37</sup>	C <sup>37</sup>			
Kennel, Boarding														P	P			
Laundry, Industrial														P	P			
Lodging Establishment									P	P	P	P	P					
Maintenance Service Facility														P	P			C
Manufacturing														P	P			
Mortuary												C	C					
Motor Vehicle Fueling Station														C <sup>30</sup>	C <sup>30</sup>			
Motor Vehicle Sales														C	C			
Motor Vehicle Service														P	P			
Neighborhood Off-site Snow Storage	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>	P/C <sup>32</sup>				P/C <sup>32</sup>	P/C <sup>32</sup>					
Office, Business									C			p <sup>10</sup>	P				P	
Office, Contractor-related business									C			p <sup>10</sup>	P	P	P	P		
Outdoor Entertainment									P	P	P	P	P					
Personal Service									P	p <sup>6</sup>	p <sup>6</sup>	P	P	p <sup>13</sup>				

Work-Live units incorporate residential living space in a non-residential building. Joint live-work units are held in common ownership and cannot be sold or platted as separate condominiums, as documented with a city-approved restrictive covenant recorded against the property.

BUSINESS SUPPORT SERVICE: The use of land for the sale, rental, or repair of office equipment, supplies, and materials, or the provision of services used by office and service establishments. Uses include: Typical uses include, but are not limited to, office equipment and supply firms, small business machine repair shops, convenience printing and copying establishments, or information technology support services.

CONSTRUCTION MATERIAL LAYDOWN YARD: A site identified and approved as part of a Construction Activity Plan or other city-issued permit for a specific construction project. Construction material laydown yards are intended to be used on an intermittent basis in association with a singular, permitted development project.

CRAFT/COTTAGE INDUSTRY: A facility devoted solely to the arts and crafts that produces or makes items that by their nature, are designed or made by an artist or craftsman by using hand skills.

HEALTH AND FITNESS FACILITY: A business or membership organization providing exercise facilities and/or nonmedical personal services to patrons, with a focus on wellness and characterized by low-impact movements and/or lack of mechanized equipment, including, but not limited to, yoga and Pilates studios, dance studios, gymnasiums, personal training studios, private clubs (athletic, health, or recreational), tanning salons, and weight control establishments.

37. In new buildings permitted after [date of ordinance adoption], use is permitted on the second floor and above only. For single-story buildings in existence on [date of ordinance adoption] this use is permitted on the ground floor.

INDUSTRIAL DESIGN: The professional service of creating and developing concepts and specifications that optimize the function, value and aesthetics of products and systems for the mutual benefit of both user and manufacturer, often employing design thinking strategies. Typically, industrial design is intended to result in tangible goods that can be mass produced. Industrial design businesses may include on-site prototyping, fabrication, and manufacturing.

INSTRUCTIONAL SERVICE: The use of land for the provision of informational, instructional and similar services for personal improvement other than physical improvement. Typical uses include, but are not limited to, health or physical fitness studios, dance, music, painting, ceramics, arts or photography studios, fiber arts, educational tutoring facilities, handicraft or hobby instruction.

37. In new buildings permitted after [date of adoption of ordinance], permitted on the second floor and above only. For single-story buildings in existence on [date of ordinance adoption] this use is permitted on the ground

OFFICE, CONTRACTOR-RELATED BUSINESS: An establishment wherein the primary use is the conduct of a business or profession specifically related to building contracting including, design services, engineering, construction and property management.



DISTRICT USES	L	L	L	G	G	S	S	S	T	T	C	C	L	L	L	R	A	
	R	1	2	R	H	T	O	O	O	T	3000	4000	SD	SD	I	I	I	U
Professional Research Service														P	P	P		
Recreation Facility, Commercial									C	C	C	p <sup>20</sup>	p <sup>20</sup>				C	
Repair Shop									P	p <sup>5</sup>	p <sup>6</sup>	P	P	P	P			
Retail Trade									p <sup>5</sup>			p <sup>34</sup>	p <sup>34</sup>	p <sup>12</sup>	p <sup>16</sup>		C <sup>29</sup>	
Self-Service Storage Facility														P	P			
Ski Facility									C	C	C						C	C
Storage Yard														P	P	P		
Studio, Commercial												P	P	p <sup>35</sup>	p <sup>35</sup>	p <sup>35</sup>		
Tourist House									P	P	P	p <sup>11</sup>	p <sup>11</sup>					
Tourist Housing Accommodation						P	P	P	P	P	P							
Truck Terminal														P	P			
TV and Radio Broadcasting Station														P	P	P		
Veterinary Service Establishment														P	P		C <sup>21</sup>	
Warehouse														P	P	P		
Wholesale														P	P			
Wireless Communication Facility	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>	C <sup>23</sup>
Assembly, Place of				C <sup>3</sup>	C <sup>3</sup>							C	C					
Cemetery																	C	C
Cultural Facility												P	P				C	
Geothermal Utility											C <sup>7</sup>							
Hospital												C	C					
Medical Care Facility					C				P			P	P					
Nature Preserve	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Parking Facility, Off-Site									C	C	C	C	C					
Parking, Shared									C <sup>8</sup>	C <sup>8</sup>	C <sup>8</sup>	p <sup>8</sup>	p <sup>8</sup>	C <sup>8</sup>	C <sup>8</sup>	C <sup>8</sup>		
Performing Arts Production												P	P				C	
Public Use	C	C	C	C	C	C	C	C	C	C	C	C	P	P	C	C	C	C
Public Utility	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Recreation Facility, Public	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Recreation Facility, high intensity														P	P			
Recycling Center																PC		
School residential campus																	p <sup>30</sup>	
Semi-Public Use					C				C	C	C	P	P				C	C
Agriculture, Urban	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>	A <sup>22</sup>
Avalanche Protective, Deflective, or Preventative Structure/Earthwork	C	C	C	C	C	C	C	C	C	C	C						C	C
Daycare Home	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>	A <sup>4</sup>			C <sup>4</sup>			A <sup>4</sup>	
Daycare, Onsite Employees														A	A	A		
Dwelling Unit, Accessory	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>	A <sup>18</sup>					A <sup>18</sup>
Electric Vehicle Charging Station	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Energy System, Solar	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Energy System, Wind	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Fallout Shelter	A	A	A	A	A	A	A	A	A	A	A	A	A					A
Guesthouse	A	A	A	A	A	A	A	A	A	A	A	A	A					A
Home Occupation	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Recreation Facility, Residential	A	A	A	A	A	A	A	A	A	A	A	A	A	A <sup>36</sup>	A <sup>36</sup>	A <sup>36</sup>		
Equestrian Facility, Residential	A	A	A	A	A	A	A	A	A	A	A							A
Sawmill, Temporary																		C

**PROFESSIONAL RESEARCH SERVICES:** An establishment that specializes in performing professional, scientific, and technical research services and may include light manufacturing as an accessory use. Uses are limited to: Typical uses include, but are not limited to, construction contractors, physical distribution and logistics, engineering and specialized design services, electronic and computer services, photographic services, research, development and scientific services, and internet or remote sales and marketing. This definition does not include uses which create vibration outside the exterior building walls, or uses that would diminish the quality of air and water in the city.

35. Commercial studios in the Light Industrial Districts are subject to the standards of section 17.124.150 of this title.

**TV AND RADIO BROADCASTING:** An installation consisting of one or more transmitters or receivers used for radio, television or cable communications or broadcasting.

**PUBLIC UTILITY:** An organization that maintains the infrastructure for a public service, which often also provides a service using that infrastructure.

**RECREATION FACILITY, HIGH INTENSITY:** A recreation facility that, due to the nature of the use, requires floor area or mass and volume, or generates higher decibel levels, that are more appropriately accommodated in the light industrial area or are buffered from residential or pedestrian-oriented commercial activity on a large recreational use zoned parcel district than in the Community Core or a Tourist zone. Uses include indoor shooting range, dryland hockey training facility, gymnastics/tumbling gym, and instructional or personal training facilities wherein the instruction involves throwing, dragging, or launching heavy equipment.

**DAYCARE, ONSITE EMPLOYEE:** Child care programs that occur in facilities where parents are on the premises.

36. Residential recreation facilities in the Light Industrial Districts are not allowed except for residents and guests of a particular residential development.

1. A multi-family development containing up to two (2) dwelling units is permitted.
2. Two (2) one-family dwellings are permitted.
3. Religious institutions are allowed through the provision of a conditional use permit. No other assembly uses as defined in Chapter 17.08 are permitted.
4. Use is not permitted in the Avalanche Zone. Reference Zoning Map.
5. Retail trade is permitted but must not exceed 2,500 square feet.
6. Uses must be subordinate to and operated within tourist housing and not to exceed ten percent (10%) of the gross floor area of the tourist housing facility.
7. Utility for offsite use.
8. See section 17.125.070 17.125.080 for shared parking standards.
9. Drive-throughs are not allowed in association with food service establishments.
10. This is a permitted use, however offices and professional services on the ground floor with street frontage require a conditional use permit.
11. Tourist houses shall only be located in existing one-family dwellings. Additions to the home shall not exceed 20 percent (20%) of the existing square footage.

DISTRICT USES	L	L	L	G	G	S	S	S		T	T	C	C	L	L	L	R	A
	R	R	R	R	R	O	O	O	T	3000	4000	SD	SD	I	I	I	U	F

12. The following forms of retail trade are permitted: (a) Equipment rental, including sporting equipment and entertainment equipment, (b) Building, construction and landscaping materials; small engines with associated sales (c) Retail in conjunction with manufacturing, warehousing or wholesaling not to exceed 30% gross floor area or 800 square feet, whichever is less; no advertising is displayed from windows or building facades; and no access onto a major arterial is allowed if an alternative access is available.
13. Personal service is not allowed except for laundromats and dry cleaning establishments.
14. See section 17.124.090 of this title for industrial districts residential development standards.
15. Catering and food preparation is permitted. Restaurants require a conditional use permit and shall not exceed 1,000 square feet and serve no later than 9:00 P.M. unless expressly permitted through approval of the conditional use permit.
16. The following forms of retail trade are permitted: (a) Equipment rental, including sporting equipment and entertainment equipment (b) Building, construction and landscaping materials; small engines with associated sales (c) Furniture and appliances in conjunction with warehousing not to exceed 18% gross floor area or 900 square feet, whichever is less; (d) Other retail in conjunction with manufacturing, warehousing or wholesaling; it is limited to 10% gross floor area or 500 square feet, whichever is less. ---- Retail uses (c) & (d) shall have no advertising displayed from windows or building facades; and no access will be permitted onto a major arterial if an alternative access is available.
17. See section 17.124.120.C of this title for industrial districts daycare development standards.
18. See section 17.124.070 of this title for accessory dwelling unit development standards.
19. A maximum of five (5) dwelling units are allowed through a conditional use permit and shall be a minimum of 400 square feet and not exceed 1,200 square feet in size.
20. Indoor only.
21. Only allowed in conjunction with an equestrian facility.
22. See section 17.124.080 of this title for urban agriculture development standards.
23. See chapter 17.140 for wireless communications facility provisions.
24. Allowed on the ground floor only.
25. See section 17.124.050 of this title for hotel development standards.
26. Ground floor street frontage uses are limited to retail and/or office uses. In subdistrict A1 office uses require a conditional use permit.
27. Ground floor only.
28. Through the provision of a conditional use permit, the planning and zoning commission may approve a 20% increase to the total existing square footage of an existing nonconforming one-family dwelling.
29. Use is allowed as an accessory use through the provision of a conditional use permit.
30. Development agreement and compliance with §17.124.090.C required.
31. Vehicular access from Highway 75 to motor vehicle fueling stations is prohibited.
32. All commercial and neighborhood off-site snow storage uses are subject to the standards set forth in section 17.124.160 of this title. Conditional Use Permits are required of all off-site snow storage operations when the project: (a) affects greater than one-half acre; or, (b) has, at the discretion of the Administrator, the potential to negatively impact neighboring uses within 300' of the proposed neighborhood or commercial off-site snow storage operation.
33. Short Term Rental in the Avalanche Overlay zone is permitted subject to the regulations found in Chapter 17.92, Avalanche Overlay District.
34. Gross floor area for individual retail trade is limited to 36,000 gross square feet and net leasable floor area for grouped retail trade is limited to 55,000 net leasable square feet.
35. Commercial studios in the Light Industrial Districts are subject to the standards of section 17.124.150 of this title.
36. Residential recreation facilities in the Light Industrial Districts are not allowed except for residents and guests of a particular residential development.



## **SECTION 5 – LI-1, LI-2, and LI-3 Dimensional Standards, District Matrix**

All new text proposed to be added to the LI purpose section is underlined. Text that is proposed to be repealed is ~~stricken~~.

### **17.12.030: DIMENSIONAL STANDARDS, DISTRICTS MATRIX:**

- A. Unless otherwise specified, development in the city shall comply with the standards set forth in the dimensional standards, districts matrix. All community core district dimensional standards are listed in section 17.12.040 of this chapter.
- B. The minimum lot size listed in the dimensional standards, districts matrix applies unless the health district determines that additional area is required to meet minimum health standards.
- C. In addition to the requirements of the dimensional standards, districts matrix, the regulations of chapter 17.128, "Supplementary Location And Bulk Regulations", of this title apply.

#### **DIMENSIONAL STANDARDS, DISTRICTS MATRIX**

See section 17.12.040 of this chapter for community core dimensional standards.

See section 17.12.050 of this chapter for light industrial dimensional standards.

District	Minimum Lot Area	Minimum Lot Area with PUD	Minimum Lot Area, Townhouse Sublot	Lot Width	Building Height	Maximum Building Coverage/FAR	Minimum Open Space	Front Setback	Side Setback	Rear Setback	Lot Lines Created by Townhouse Sublots	Setbacks From Hwy 75	Setback on Warm Springs Rd.	Setbacks Along 200' Former RR ROW
LR	9,000 sf	n/a	n/a	80' avg	35'	35%	n/a	15'	The greater of 1' for every 2' in building height, or 10'	20'	n/a	25'/32' <sup>7</sup>	30'	3'
LR-1	1 acre	n/a	n/a	100' avg	35'	25%	n/a	15'		20'	n/a	80'	30'	n/a
LR-2	2 acres	n/a	n/a	100' avg	35'	25%	n/a	15'		20'	n/a	400' <sup>6</sup>	30'	n/a
GR-L	8,000 sf	8,000 sf plus 4,000 for every unit over 2	Equal to that of the perimeter of the townhouse unit	80' avg	35'	35%	n/a	15'	The greater of 1' for every 3' in building height, or 5' <sup>1</sup>	The greater of 1' for every 3' in building height, or 15' <sup>1</sup>	0'	25'/32' <sup>7</sup>	30'	n/a
GR-H	8,000 sf	n/a		80' avg	35' <sup>2</sup>	See FAR requirements in section 17.124.040 of this title	35% <sup>5</sup>	15'	The greater of 1' for every 3' in building height, or 5'. One-family dwellings must maintain at least		0'	25'/32' <sup>7</sup>	30'	5', however 3' required for one-/ two-family dwelling units
STO-4	0.4 acres	n/a	n/a	80' avg	35'	25%	n/a	15'	The greater of 1' for every 2' in building height, or 10'	The greater of 1' for every 2' in building height, or 20'	n/a	400'	30'	n/a
STO-1	1 acre	n/a	n/a	100' avg	35'	25%	n/a	15'			n/a	400'	30'	n/a
STO-H	9,000 sf (min of 3,000 sf/unit)	n/a	Equal to that of the perimeter of the townhouse unit	100' avg	35'	35% building coverage, and 75% covered by buildings, parking areas and accessory buildings	n/a	15'	The greater of 1' for every 3' in building height, or 5' <sup>1</sup>	The greater of 1' for every 3' in building height, or 15" <sup>(1)</sup>	0'	400'	30'	n/a
T	8,000 sf	n/a		80' avg	35' <sup>2</sup>	See FAR requirements in section 17.124.040 of this title	35% <sup>5</sup>	15'	The greater of 1' for every 3' in building height, or 5'. At least 10' for one-family dwellings <sup>1</sup>		The greater of 1' for every 3' in building height, or 10'. At least 15' for one-family dwellings <sup>1,2</sup>	0'	25'/32' <sup>7</sup>	30'
T-3000	8,000 sf	n/a	80' avg	35' <sup>2</sup>		35% <sup>5</sup>	15'			0'	n/a	30'	n/a	
T-4000	8,000 sf	n/a	80' avg	35' <sup>2</sup>		35% <sup>5</sup>	15'			0'	n/a	30'	n/a	
<del>LI-1</del>	<del>8,000 sf</del>	<del>n/a</del>	<del>n/a</del>	<del>80' min</del>	<del>35'</del>	<del>75%</del>	<del>n/a</del>	<del>20'</del>	<del>0'<sup>3</sup> for internal side yards and a minimum</del>	<del>0' 1'</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>
<del>LI-2</del>	<del>8,000 sf</del>	<del>n/a</del>	<del>n/a</del>	<del>80' min</del>	<del>35'</del>	<del>75%</del>	<del>n/a</del>	<del>20'</del>	<del>of 10' for street side yards</del>	<del>0' 1'</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>
<del>LI-3</del>	<del>8,000 sf</del>	<del>n/a</del>	<del>n/a</del>	<del>80' min</del>	<del>35'<sup>2</sup></del>	<del>75%</del>	<del>n/a</del>	<del>20'</del>		<del>0' 1'</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>	<del>n/a</del>
RU	9,000 sf	n/a	Equal to that of the perimeter of the townhouse unit	n/a	35'	25%	n/a	30' <sup>4</sup>	15' <sup>4</sup>	15' <sup>4</sup>	0'	n/a	n/a	n/a
AF	10 acres	n/a	n/a	n/a	35'	10% (includes pools)	n/a	25'	25'	25'	n/a	n/a	n/a	n/a

\* See title 16 of this code.

Notes:

1. If the lot adjoins a more restrictive district on the side or rear, the more restrictive setbacks of that district shall apply.
2. For building with a roof pitch greater than 5:12 the maximum height to the mean point of the ridge or ridges measured from eaves line to the ridge top shall be 35 feet. Roof ridges above the mean point may extend up to a height of 44 feet.
- ~~3. For buildings with a minimum roof pitch of 4:12 may go to 40 feet.~~
4. The placement of all structures for conditional uses shall be subject to approval of the planning and zoning commission.
5. A maximum of 5 percent open site area may be used for private decks or patios and walkways subject to design review approval.
6. 100 foot setback from Highway 75 is required for lots platted prior to 1979.
7. Minimum setbacks along Highway 75: where the street width is 80 feet, all buildings shall be set back a minimum of 25 feet, and where the street width is 66 feet, all buildings shall be set back a minimum of 32 feet.



**SECTION 6 – LI-1, LI-2, and LI-3 Dimensional Standards, District Matrix ... 17.12.050**

All new text proposed to be added to the LI District Residential standards section is underlined. Text that is proposed to be repealed is ~~stricken~~.

**17.12.050: Dimensional Standards, Light Industrial Districts Matrix**

A. Development in the light industrial zoning districts shall comply with the standards set forth in the dimensional standards, light industrial districts matrix. Dimensional standards for all other districts, unless otherwise specified, shall be found in section 17.12.030 of this chapter.

B. In addition to the requirements of the dimensional standards, light industrial districts matrix, the regulations of chapter 17.128, "Supplementary Location And Bulk Regulations", of this title apply.

C. To reduce the perceived bulk and lessen view blockage of four-story and five-story buildings, the Administrator may require alternative building concept options to be presented for review by the Commission as part of Design Review process set forth in Section 17.96.

**D. Light Industrial Zoning Districts Dimensional Standards Matrix**

	<u>LI-1</u>	<u>LI-2</u>	<u>LI-3</u>
<b>Dimensional Standards</b>			
<u>Minimum Lot Area</u>	<u>8,000 Square Feet</u>		
<u>Minimum Lot Width</u>	<u>80'</u>		
<u>Maximum Building Coverage</u>	<u>75%</u>		
<b>Minimum Building Setbacks</b>			
<u>Front</u>	<u>20'</u>		
<u>Side</u>	<u>0'<sup>1</sup> for internal side yards and a minimum of 10' for street side yards</u>		
<u>Rear</u>	<u>0'<sup>1</sup></u>		
<u>Cantilevered decks and overhangs</u>	<u>0'</u>		
<u>Warm Springs Road / 10th Street / Lewist Street - Setback for fourth or fifth floors, if permitted, from property line(s) adjacent to Warm Springs Road, 10th Street, and Lewis Street</u>	<u>60'</u>		
<u>State Highway 75 - For buildings within the 48' or 58' overlay district that are adjacent to the State Highway 75 right-of-way</u>	<u>NA</u>	<u>Below an elevation of 5,850' or the grade of State Highway 75 pavement adjacent to the property, whichever is greater: 0'</u>	
	<u>NA</u>	<u>Portion of building above highway grade up to 40' in height: 35'</u>	
	<u>NA</u>	<u>Fourth and fifth stories: 60'</u>	
<b>Maximum Building Height</b>			
<u>Building Height</u>	<u>35'</u>		<u>35'<sup>2</sup></u>
<u>Building Height with Qualifying Ground Floor</u>			
<u>Two Story</u>	<u>35'</u>		<u>35'<sup>2</sup></u>
<u>Three Story</u>		<u>40'</u>	
<u>Four Story<sup>3</sup></u>	<u>not permitted</u>	<u>48'<sup>3,4</sup></u>	<u>48'<sup>3,4</sup></u>
<u>Five Story<sup>3</sup></u>	<u>not permitted</u>	<u>58'<sup>3,5</sup></u>	<u>58'<sup>3,5</sup></u>
<u>Nonhabitable structures located on building rooftops</u>	<u>6'</u>		
<u>Parapets and rooftop walls screening/enclosing mechanical equipment</u>	<u>4' above roof surface height.</u>		
<u>Perimeter walls enclosing rooftop deck</u>	<u>4' above roof surface height. Perimeter rooftop walls enclosing rooftop decks are required to be at least 75% transparent.</u>		
<u>Rooftop solar and mechanical equipment above roof surface</u>	<u>5'</u>		

**Footnotes:**

1. If the lot adjoins a more restrictive residential district on the side or rear, the more restrictive setbacks of that district shall apply.
2. Buildings with a minimum roof pitch of 4:12 may be 40' in height.
3. Only buildings with deed restricted community housing units consistent with 17.124.090 are permitted to have a fourth or fifth floor.
4. Portions of buildings with roofs that have a minimum roof pitch of 4:12 may be 53' in height subject to Design Review approval by the Planning and Zoning Commission.
5. Portions of buildings with roofs that have a minimum roof pitch of 4:12 may be 63' in height subject to Design Review approval by the Planning and Zoning Commission.



## **SECTION 7 – Light Industrial District Residential Standards.**

All new text proposed to be added to the LI District Residential standards section is underlined. Text that is proposed to be repealed is ~~stricken~~.

### **17.124.090: RESIDENTIAL, LIGHT INDUSTRIAL DISTRICTS:**

A. Residential units in the light industrial districts shall comply with the following minimum criteria:

1. Dwelling units shall not occupy the ground floor.
2. Design review under chapter 17.96 of this title shall be required, whether new building, addition to existing building, or remodel of existing building.
3. ~~Unless otherwise specified in this section, up to fifty percent (50%) of any light industrial building may be devoted to dwelling units, unless otherwise specified in the section.~~ Up to fifty percent (50%) of any light industrial building may be devoted to dwelling units, and up to fifty percent (50%) of a work/live units gross residential floor area may be devoted to a work/live unit.
4. ~~Except as set forth herein, Dwelling units shall not be separated in any manner for sale as individual units and may only be leased or rented. Instances where dwelling units may be sold are limited to:~~
  - a. City approved work/live units, as defined in Sections 17.08 and 17.124.090.A.5;
  - b. Three-story projects in the LI-3 where not less one-third ( $\frac{1}{3}$ ) of the total square footage of housing units includes deed restricted community housing that are for sale consistent with section 17.124.090.B;
  - c. Four-story and five-story projects in LI-2 and LI-3 where not less than two-third ( $\frac{2}{3}$ ) of the total square footage of housing units includes deed restricted community housing units that are for sale consistent with section 17.124.090.A.7;
5. In the approval of work/live units, the city shall also find that:
  - a. The work portion of the unit meets the definition of work/unit set forth in Section 17.08.020, including that the Project is subject to Council approval of a restrictive covenant;
  - b. The work unit is:
    - (1) suitable for on-site employees, foot traffic/customers, and meets applicable building and fire codes;
    - (2) signed and posted with regular hours of operation;
    - (3) served by the prominent means of access for the work/live unit; and,
    - (4) associated with a business license for a use allowed (either conditionally or permitted) in the district.
  - c. The residential portion of the living space is secondary to the primary use as a place of work. A finding that the residential space is secondary to the work space shall be based on measurable findings, including but not limited to:

- (1) the size of the live portion of the work/live unit is both smaller than the work portion of the unit and, further, the live portion of the work/live unit does not exceed one thousand (1,000) gross square feet;
- (2) means of access to the residential portion of the unit is not prominent and, preferably, is located to the side or rear of the property; and
- (3) suitable residential parking that does not interfere with snow removal or the operation of proximate LI uses and, further, is in accordance with the parking and loading requirements set forth in Section 17.125.

~~56.~~ Dwelling units in the Light Industrial District shall be a minimum of four hundred (400) square feet. In the LI-1 and LI-2 dwelling units ~~and~~ shall not exceed one thousand (1,000) square feet total and shall contain not more than two (2) bedrooms, ~~unless otherwise specified in this section.~~

7. Multi-family dwelling units proposing a fourth or fifth floor with a qualifying ground floor consistent with Section 17.12.050 shall comply with the following minimum criteria:

- a. If dwelling units are to be sold, a minimum of two-third (2/3) of the total square footage of housing units shall be for deed restricted community housing units that are for sale and the deed restricted community housing units shall be designed and administered in accordance with the Blaine-Ketchum housing authority guidelines;
- b. If dwelling units are to be rented or leased, the entirety of the total square footage of housing units shall not be leased, rented, or sublet as a Tourist Housing Accommodation or a Short Term Rental, but used for long-term rentals;
- c. The area designated as light industrial shall be as follows:
  - (1) The area designated as light industrial shall be a minimum of fifty percent (50%) of the gross floor area in four story buildings.
  - (2) The area designated as light industrial shall be a minimum of forty percent (40%) of the gross floor area in five story buildings.
  - (3) Subject light industrial use shall not be for personal storage by dwelling occupants;
- d. Up to fifty percent (50%) of the gross square footage of any four story building and up to sixty percent (60%) of the gross square footage of a five story building may be devoted to dwelling units; and
- e. Unless otherwise deemed appropriate by the Administrator, common area allocation shall be assessed at a LI to residential ratio of 1:1 for four story buildings and 2:3 for five story buildings.

~~68.~~ Anti-nuisance and Notice Provisions.

- a. The applicant is aware the mixed use of the property can result in conflict, that the light industrial use may on occasion or in certain respects be incompatible with the quiet enjoyment of the dwelling units, that due to the subordinate and junior nature of the residential use to the light industrial use, the city will not condition, limit, restrict or otherwise interfere with any lawful light industrial use solely because it interferes with a residential use.
- b. ~~7.~~ All persons who rent or sublet any residential living unit within the light industrial zones shall provide the tenant, lessee or subtenant with written notice that such unit is located within the light industrial zone and, as such, is junior and, therefore, subordinate in nature to all legal light industrial activities.



- c. ~~8.~~ Each and every real estate agent, sales person and broker and each and every private party who offers for rent or shows a parcel of real property and/or structure for lease or rent within such light industrial zones shall, upon first inquiry, provide the prospective lessee or tenant, prior to viewing such real property, with written notice that such real property and/or structure is located within such light industrial zone.
- d. ~~9.~~ All brochures and other printed materials advertising rental or lease of a living unit within the light industrial zones shall contain a provision designating that such unit or units are located within the light industrial zone and are within a mixed use area. Lessees and tenants shall be notified that the residential uses within the light industrial zone are subordinate and, therefore, junior in nature to the legal light industrial activities within the zone.

9. Compliance with all applicable code sections, including among others, the city's parking and loading standards as set forth in Section 17.125.

10. Conditions including, but not limited to, the following may be attached to the conditional use permit approval:

- a. Access to the ~~apartments~~ residential units relative to design and relationship to light industrial uses, including suitable access consistent with adopted city standards;
- b. ~~Location~~ Separation of residential and light industrial parking on the site to minimize conflicts;
- c. Restrictions on exterior storage of personal property of tenants;
- d. Certificate of occupancy required prior to occupancy of units;
- e. Ketchum fire department and Ketchum building department requirements shall be met prior to occupancy;
- f. Snow removal required to ensure utility of residential spaces and non-interference with continuous LI operations;
- g. Any portion or all waived fees become due and payable upon conversion of resident housing unit(s) to light industrial uses; ~~and/or~~
- h. Construction techniques that aid sound proofing and limit externalities of LI noise and use impacts on residences is encouraged;
- i. Provision for and reasonable extension of sidewalks to assure safe pedestrian access; and/or,
- j. Any other condition deemed to enhance the purposes under this use, or to establish or promote the criteria referenced in subsections A1 through A10 of this section.

~~11. The city council, after receiving a recommendation from the commission, may waive fees otherwise required in connection with development of such rental housing. The following findings shall be made to waive any such fees:~~

- ~~a. There is a need for rental housing stock in Ketchum;~~
- ~~b. The proposal meets the criteria contained in this subsection;~~
- ~~c. The housing proposed is an integral part of the project; and/or~~
- ~~d. Ketchum is in an acceptable financial position to waive such fees.~~

## **SECTION 8 – FENCES, HEDGES AND WALLS.**

All new text proposed to be added to the Fences, Hedges and Walls standards section is underlined. Text that is proposed to be repealed is ~~stricken~~.

### **17.124.130: FENCES, HEDGES AND WALLS:**

Fences, hedges and walls may be permitted in the various districts as accessory uses in accordance with the following limitations:

- A. In the LR, LR-2, GR-L and GR-H districts, fences, hedges and walls shall not exceed four feet (4') in height when located less than thirty feet (30') from the front lot line;
- B. In the LR, LR-2, GR-L and GR-H districts, fences, hedges and walls shall not exceed six feet (6') in height when located more than thirty feet (30') from the front lot line;
- C. In all other districts, except the Light Industrial District, fences, hedges and walls shall not exceed four feet (4') in height when located less than thirty feet (30') from the front lot line and shall not exceed six feet (6') in height when located more than thirty feet (30') from the front lot line;
- D. In the LI-1, LI-2, LI-3 districts fences shall not exceed seven feet (7') in height;
- ~~E.~~ In all districts, fences, hedges and walls, or any other obstruction to clear vision, shall not be located within seventy five feet (75') of the centerline intersection of two (2) streets unless determined otherwise by the city engineer; and
- ~~F.~~ No barbed wire or other sharp pointed metal fence and no electrically charged fence shall be permitted in any district.





City of Ketchum  
Planning & Building

**STAFF REPORT**  
**KETCHUM PLANNING AND ZONING COMMISSION**  
**REGULAR MEETING OF OCTOBER 8, 2018**

**PROJECT:** 420 Sage Road Solar

**FILE NUMBER:** P18-091

**REPRESENTATIVE:** Alex McKinley, Empowered Solar & Peter Chaffey and Billy Mann, Altenergy Solar

**OWNER:** Mitch Long & Margit Donhowe

**REQUEST:** Mountain Overlay Design Review

**LOCATION:** 420 Sage Road 2 (Winter Sun Condominium: Lot 25: Unit 2)

**ZONING:** General Residential Low Density District (GR-L)

**OVERLAY:** Mountain Overlay (MO) & Avalanche Overlay (A)

**NOTICE:** Notice was mailed to adjacent property owners on August 3<sup>rd</sup>, 2018. The public hearing has been continued from the Planning & Zoning Commission meetings of August 13<sup>th</sup>, 2108 and September 10<sup>th</sup>, 2018.

**REVIEWER:** Abby Rivin, Associate Planner

**BACKGROUND**

The subject Mountain Overlay (MO) Design Review request is for the installation of a 598 sq ft ground mounted solar array and a 200 sq ft roof mounted solar thermal water heating system located at 420 Sage Road. Both the ground and roof mounted arrays will be sited within Winter Sun Condominium common area on Lot 25. Existing development on the subject lot consists of two (2) attached condominium units. The site is located in the General Residential Low Density (GR-L) Zoning District and also within both the Mountain Overlay and Avalanche Overlay. Solar energy systems are permitted as an accessory use in the GR-L Zone. Ketchum Municipal Code (KMC) §17.104.050.A requires Design Review approval for the placement of structures within the Mountain Overlay (MO) prior to issuance of a Building Permit.

The Planning & Zoning Commission conducted a site visit and considered the solar energy project on August 13<sup>th</sup>, 2018 and requested additional information from the applicant to support the project's compliance with Mountain Overlay standards. Additional materials submitted by the applicant include a construction management plan with the associated limits of disturbance, a topographical site survey indicating slopes in excess of 25%, an anti-reflective coating mitigation strategy to reduce the degree of reflectivity and glare associated with the system, and a rendering representing the array on the hillside.

**ANALYSIS**

The City of Ketchum values and encourages solar projects, but also has a longstanding community value of prohibiting development on hillsides in order to enhance the views of the surrounding mountains and preserve

existing topography and ridgelines. Unlike most applications in the Mountain Overlay where competing values of development and hillside preservation must be reconciled, the subject solar energy system project tasks the Commission to balance two values that stem from an ethic of environmental stewardship—renewable energy and hillside preservation. When the Mountain Overlay Zoning District and associated standards were first adopted in 1989, solar energy system technology had not yet evolved to be considered as a potential development impact to hillsides. This application has triggered consideration of the appropriateness of solar energy systems within the Mountain Overlay.

Certain MO Design Review criteria are not applicable to the subject solar power project as the installation of both the roof and ground mounted arrays involves minimal excavation, fill, or vegetation disturbance to the adjacent hillside. The ground mounted solar power system is 598 sq ft and covers less than 1% of subject Lot 25. A pertinent standard in the evaluation of the subject MO Design Review application is the assessment of both solar arrays' visual impact on the hillside. The applicant has chosen the most appropriate location on the site for the solar energy system in order to both minimize hillside visibility and enhance solar exposure to the system.

Subject Lot 25 of Winter Sun Condominium Subdivision is located in the City's Avalanche Overlay District as indicated in 1977 Wilson Avalanche Study. The northwest portion of Lot 25 contains blue (moderate) avalanche zone. The 1978 Wilson Study does not designate the site within the avalanche zone.

**Exhibit A: Lot 25 of Winter Sun Condominium Subdivision Blue Avalanche Zone**



Neither of the proposed solar arrays are proposed to be sited within the blue avalanche zone. The applicant has submitted a structural analysis stamped by a professional engineer licensed in the state of Idaho verifying that the ground mounted array will support the associated snow loads (KMC §17.92.010.D.3), which has been included as Attachment E to the Staff Report. The applicant has not provided a structural analysis for the roof mounted system. Staff has added a recommended condition of approval that the applicant submit a structural analysis stamped by an Idaho licensed engineer or a site specific study from a professional land surveyor



certifying the roof mounted energy system will withstand the avalanche forces on the site for the roof mounted solar thermal system prior to issuance of a Building Permit for the project.

Both the ground and roof mounted arrays will be sited within common area of Winter Sun Condominium Subdivision. The HOA for the subdivision disbanded and is no longer active. The applicant has included emails from the adjacent neighbors within the subdivision approving the solar project, which has been included as Attachment F to the Staff Report. All adjacent property owners indicated their approval for the project. One neighbor requested that any associated vegetative screening utilize native plantings.

Per Ketchum Municipal Code §17.08.020, roof mounted systems may extend an additional two (2) feet beyond the maximum height allowance of the zoning district in which they are located. The applicant must provide the maximum height of the single-family residence with the addition of the roof mounted solar array. This height verification shall be reviewed and approved by the Planning & Building Department prior to issuance of a Building Permit for the project and has been included as recommended condition of approval.

Staff recommends that the Commission consider the analysis contained in the Staff Report, the applicant’s presentation, and any public comment received, deliberate, and move to approve the Mountain Overlay (MO) Design Review application for the proposed roof and ground mounted solar energy systems located at 420 Sage Road. A full analysis of this recommendation is detailed within the Staff Report.

**COMPREHENSIVE PLAN ANALYSIS**

The proposed solar energy system project interfaces with three of the Core Community Values contained in the 2014 Comprehensive Plan—Environmental Quality and Scenic Beauty, Community Character, and A “Greener” Community. The City of Ketchum values protecting the visual character of the community through undeveloped hillsides, but also supports energy conservation and renewable energy use. The proposed solar energy system project is consistent with the uses, goals, and policies listed below as specified within the 2014 Comprehensive Plan.

**Table 1: Comprehensive Plan Compliance Analysis**

SUPPORTING SECTION	SUMMARY OF COMPLIANCE WITH THE 2014 COMPREHENSIVE PLAN
<b>Future Land Use</b>	
<b>Low Density Residential</b>	<p><b>Primary Uses:</b> Single-family and duplex residences and accessory units.</p> <p><b>Secondary Uses:</b> Supporting and complementary uses, including open space and recreation, agriculture/gardens, schools, places of worship, and other public uses. Senior housing facilities are also appropriate if compatible with the surrounding areas.</p> <p>The intent is for the average density of a residential area in this category is not to exceed about five units per acre.</p> <p><b>Characteristics and Location:</b> New residences should be within neighborhoods that have pedestrian-oriented, connected local streets and sidewalks. New housing should also have access to parks, open space, schools, and other civic activities. Neighborhoods within this category should be accessible via local streets with access to collector streets for circulation.</p>
<b>Housing</b>	

<b>Policy H.3.4 Efficient Energy Use in New and Retrofitted Residential Construction</b>	New housing will be energy-efficient, emphasize the use of durable and environmentally responsible materials, and implement best practices in site design and construction.
<b>Community Design and Neighborhoods</b>	
<b>Policy CD-2.5 Energy and Water Efficiency in New Development</b>	The community should promote the siting and use of renewable energy, water conservation, and the use of compatible native or xeric landscape planting.
<b>Natural Resource Stewardship</b>	
<b>Goal NR6</b>	Promote and support energy conservation and reduction of greenhouse gases.
<b>Policy NR6.2 Energy Alternatives</b>	The City should implement policies and programs that enhance opportunities for individuals, businesses, and public organizations to conserve energy and convert to renewable resources. The City should support energy conservation in City buildings, vehicles, operations and processes through its own policies, and provide information about techniques for energy efficiency.
<b>Policy NR6.3 Energy-efficient Land Use</b>	The City will encourage energy conservation of energy and GHG reductions through land-use policies and regulations governing placement, orientation, design, and clustering of development.
<b>Public Safety and Utilities</b>	
<b>Policy PSU -2.2 Electric Service &amp; Generation for Redundant Electric Source</b>	The City will work to explore options for primary and back-up electrical generation and service options serving Ketchum. It will evaluate the use of renewable energy options to diversify energy sources, reduce greenhouse gases, and preserve visual aesthetics.
<b>Community Health and Wellness</b>	
<b>Goal CHW-6 Reduce generation of air pollutants and noise</b>	The City will promote reductions in air pollution to minimize impact to human health, sustain or improve the local economy, improve air quality, and reduce the impact of greenhouse gases.

Through the evaluation of the Mountain Overlay Design Review standards, the Commission must consider whether the installation of the solar energy system project conflicts with Comprehensive Plan goals and policies pertaining to hillside and open space preservation listed below. Staff finds that both the siting and size of the ground mounted solar array minimizes impact to the adjacent hillside.

**Table 2: Comprehensive Plan Analysis & Hillside Preservation**

SECTION	SUMMARY OF 2014 COMPREHENSIVE PLAN GOAL/POLICY
<b>Community Design and Neighborhoods</b>	
<b>Policy CD-2.1 Visually Obstructing Overhead Features</b>	Protect and enhance the views of the surrounding mountains by reducing, removing, or undergrounding visual obstacles such as utility lines and equipment.
<b>Goal CD-2 Protect and enhance views of the surrounding</b>	Policy CD-2.2 - Mountain Overlay Zone Continue to protect hillsides within the City and the Area of City Impact from further development. Enforce and encourage strengthening of the Mountain Overlay standards of the City and County, by using a variety of techniques; such as clustering



<b>mountains and natural features.</b>	at lower elevations, creating conservation easements, or purchasing private property on hillsides.
<b>Policy CD-2.4 Development Designed for Natural Feature Preservation</b>	Protect and incorporate natural features into newly developing areas. Conserve the natural patterns of streams, ridgelines, topography, riparian areas, and wildlife habitat areas.
<b>Natural Resource Stewardship</b>	
<b>Policy NR-1.1 Ecosystem Connections and Buffers</b>	The City recognizes the biological importance of preserving natural habitat. The City will work with the County and managers of surrounding private and public lands to preserve, enhance, and restore undeveloped lands critical for providing ecosystem connections and buffers for adjoining ecosystems. These areas are important for sustaining biological diversity and viable habitats for native species and for minimizing impacts from developed lands.
<b>Parks, Recreation, and Open Space</b>	
<b>Goal OS-3</b>	Preserve the natural and cultural resources of the Ketchum area to help maintain the City's identity; provide connections to usable open space areas; provide low-impact, passive recreation; and enhance scenic entryway corridors to the City.
<b>Policy OS-3.1 Resources Protected Through Open Space</b>	Use open space to preserve the natural and cultural resources of the Ketchum area.
<b>Policy OS-3.2 Open Space Community Separators</b>	Establish and maintain open space buffers in important scenic areas to maintain the community's separate identity from surrounding communities and to protect views and open space.

**Table 3: Requirements for All Applications**

City Department Comments				
Compliant				
Yes	No	N/A	City Code	City Standards and <i>Staff Comments</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104 & 17.96	Complete Application
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Fire Department:</b> <i>See Attachment D.</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Building:</b> <i>The solar energy systems must meet the 2012 International Building Code and the 2012 International Residential Code.</i> <i>All drawings and manufacture installation instructions must be on site for all inspections.</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Planning and Zoning:</b> <i>Comments are denoted throughout the Staff Report.</i>	

**Table 4: Zoning Standards Analysis**

Compliance with Zoning Standards				
Compliant			Standards and <i>Staff Comments</i>	
Yes	No	N/A	Guideline	City Standards and <i>Staff Comments</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.12.040	<b>Minimum Lot Area</b>
			<i>Staff Comment</i>	<b>Required:</b> 8,000 square feet minimum. <b>Existing (Lot 25):</b> 109,336 sq ft
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.12.040	<b>Building Coverage</b>
			<i>Staff Comment</i>	<b>Permitted:</b> 35%

				<p><b>Proposed:</b> Utilizing residential characteristic data from the Blaine County Assessor's Office, Staff estimates that existing building coverage on the subject site is 3% (2,952 square feet/109,336 sq ft lot area). With the addition of the proposed 598 sq ft solar array, the building coverage will remain 3%.</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.12.040	<p><b>Minimum Building Setbacks</b></p> <p><i>Staff Comment</i></p> <p><b>Minimum:</b> Front: 15' Side: &gt; of 1' for every 3' in building height, or 5' Rear: &gt; of 1' for every 3' in building height, or 15'</p> <p><b>Proposed:</b> The ground mounted solar array meets the required front, side, and rear setbacks.</p>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17.12.040	<p><b>Building Height</b></p> <p><i>Staff Comment</i></p> <p><b>Maximum Permitted: 35'</b> Per Ketchum Municipal Code §17.08.020, roof mounted systems may extend an additional two (2) feet beyond the maximum height allowance of the zoning district in which they are located.</p> <p><b>Proposed:</b> The maximum height of the ground mounted solar energy system is 4 ft.</p> <p><i>The applicant shall provide the maximum height of the single-family residence with the addition of the roof mounted solar array.</i></p>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.125.030.H	<p><b>Curb Cut</b></p> <p><i>Staff Comment</i></p> <p><b>Permitted:</b> A total of 35% of the linear footage of any street frontage can be devoted to access off street parking. <b>Proposed:</b> No Change</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.125.040.B	<p><b>Parking Spaces</b></p> <p><i>Staff Comment</i></p> <p>Off-street parking standards of this chapter apply to any new development and to any new established uses. <b>Required:</b> Residential multiple-family dwelling in all districts except CC, T, T-3000, T-4000, and LI-1, LI-2, and LI-3: Units 0 to 2,000 sq ft: 1 parking space <b>Proposed:</b> No Change</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.18.050 & 17.08.020	<p><b>Zoning Districts &amp; Definitions</b></p> <p><i>Staff Comment</i></p> <p><b>17.18.050: General Residential - Low Density District (GR-L):</b> The purpose of the GR-L General Residential - Low Density District is to provide areas where low and medium density uses can be properly developed in proximity to each other while still maintaining neighborhood amenities and favorable aesthetic surroundings. The intent of the general residential - low density district is to permit a reasonable amount of flexibility in both land use and development in residential development areas.</p> <p><b>17.08.020 – Definitions</b> <b>Dwelling, Multiple-Family:</b> A building, under single or multiple ownership, containing two (2) or more dwelling units used for residential occupancy.</p> <p><b>Energy System, Solar:</b> Any solar collector panel(s), film(s), shingle(s), or other solar energy device(s), or solar structural component(s), mounted on a building or on the ground and including other appurtenant structures and facilities, whose primary purpose is to provide for the on site collection, storage, and distribution of solar, or radiant, energy received from the sun and used for heating or cooling, for water</p>



				heating, and/or for generation of electricity. A solar energy system may be ground mounted (i.e., placed on top of the ground surface) or roof mounted (i.e., placed on or as an integral part of a building). Roof mounted systems may extend an additional two feet (2') beyond the maximum height allowance of the zoning district in which they are located. Ground mounted systems shall meet all required dimensional standards for accessory structures.
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**Table 5: Mountain Overlay Design Review Standards**

<b>IMPROVEMENTS AND STANDARDS: 17.104.070 – Mountain Overlay Design Review:</b>				
The following list of criteria and those contained in section 17.96.080 of this title must be considered and addressed by each applicant seeking design review approval.				
Yes	No	N/A	City Code	City Standards and Staff Comments
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (1)	<b>There shall be no building on ridges or knolls which would have a material visual impact on a significant skyline visible from a public vantage point entering the city or within the city. "Material", as the term is used herein, shall be construed in light of the magnitude of the negative impact on the objectives of this section.</b>
			<i>Staff Comment</i>	<i>The applicant has sited the ground mounted solar array in order to minimize the system's visibility. The system will be located behind the existing attached condominiums to the east on the hillside. The applicant sited the panels in the subject location so that existing trees would not impact the solar exposure. The topography of the lot as well as the existing development and vegetation adequately screen the solar panels from Sage Road. The system will also incorporate anti-reflective coating to mitigate any associated glare. The solar panels may be visible from the Warm Springs side of Bald Mountain especially during fall and winter with less vegetative screening.</i>  <i>The roof mounted array will not significantly increase the visibility of the existing attached condominium units.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (2)	<b>Building, excavating, filling and vegetation disturbance on hillsides which would have a material visual impact visible from a public vantage point entering the city or within the city shall be minimized. "Material", as the term is used herein, shall be construed in light of the magnitude of the negative impact on the objectives of this section.</b>
			<i>Staff Comment</i>	<i>The ground mounted solar energy system will be mounted onto two (2) concrete piers. Disturbance to the hillside has been minimized with this proposal. The ground mounted solar power system is 598 sq ft and covers less than 1% of subject Lot 25.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.104.070 A (3)	<b>Driveway standards as well as other applicable standards contained in chapter 12.04 of this code shall be met.</b>
			<i>Staff Comment</i>	<i>N/A as the driveway is existing.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.104.070 A (4)	<b>All development shall have access for fire and other emergency vehicles to within one hundred fifty feet (150') of the furthest exterior wall of any building.</b>
			<i>Staff Comment</i>	<i>N/A as access for fire and other emergency vehicles remains unchanged with this proposal.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (5)	<b>Significant rock outcroppings shall not be disturbed.</b>
			<i>Staff Comment</i>	<i>The limit of disturbance does not extend into an existing, significant rock outcropping on the site. Sheet PV8 of the MO Design Review submittal indicates that no significant rock outcroppings are present on the site.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (6)	<b>International building code (IBC) and international fire code (IFC) and Ketchum fire department requirements shall be met.</b>
			<i>Staff Comment</i>	<i>The project must comply with the 2012 International Building Code, the 2012 International Fire Code and Ketchum Fire Department requirements, as well as Title 15 of Ketchum Municipal Code. See Attachment D for Staff comment from Fire Department. All IBC, IFC, and Ketchum Fire Department requirements shall be verified and met prior to the issuance of a Building Permit for the project.</i>

<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.104.070 A (7)	<b>Public water and sewer service shall comply with the requirements of the city.</b>
			<i>Staff Comment</i>	<i>N/A. Water and sewer service is existing on the site.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (8)	<b>Drainage shall be controlled and maintained to not adversely affect other properties.</b>
			<i>Staff Comment</i>	<i>Drainage on the subject site is existing. The applicant shall ensure that the solar energy system and the 3 ft access pathway does not have a significant impact on drainage or adversely affect other properties.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (9)	<b>Cuts and fills allowed for roadways shall be minimized; lengths of driveways allowed shall be minimized; all cuts and fills shall be concealed with landscaping, revegetation and/or natural stone materials. Revegetation on hillsides with a clear zone of thirty feet (30') around all structures is recommended. Said clear zone shall include low combustible irrigated vegetation with appropriate species, on file with the Ketchum planning department. Revegetation outside of this clear zone should be harmonious with the surrounding hillsides.</b>
			<i>Staff Comment</i>	<i>Disturbance as required for construction will be revegetated with native material consistent with adjacent hillside. No roadways or driveways are proposed with this project. Sheet PV7 indicates that the applicant will install native vegetation to match the existing hillside plants adjacent to the perimeter of the array.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (10)	<b>No other sites on the parcel are more suitable for the proposed development in order to carry out the purposes of this section.</b>
			<i>Staff Comment</i>	<i>Due to the topography and existing development on the site, the applicant has chosen the most suitable area for the proposed solar energy system in order to minimize hillside visibility and enhance solar exposure.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (11)	<b>Access traversing twenty five percent (25%) or greater slopes does not have significant impact on drainage, snow and earthslide potential and erosion as it relates to the subject property and to adjacent properties.</b>
			<i>Staff Comment</i>	<i>The applicant 3 ft access pathway to the ground mounted solar system does not have a significant impact on drainage or adversely affect other properties. The driveway is existing.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (12)	<b>Utilities shall be underground.</b>
			<i>Staff Comment</i>	<i>The solar energy system must be installed aboveground for solar exposure. The associated electrical cabling will be buried underneath the pathway.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (13)	<b>Limits of disturbance shall be established on the plans and protected by fencing on the site for the duration of construction.</b>
			<i>Staff Comment</i>	<i>The applicant has indicated the limits of hillside disturbance on Sheet PV7 of the MO Design Review submittal. The applicant shall fence the subject area for the duration of construction.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.104.070 A (14)	<b>Excavations, fills and vegetation disturbance on hillsides not associated with the building construction shall be minimized.</b>
			<i>Staff Comment</i>	<i>The ground mounted solar power system is mounted onto two (2) concrete support piers. Hillside disturbance is minimized with this proposal due to the limited construction including excavation associated with the installation of the solar power system.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.104.070 A (15)	<b>Preservation of significant landmarks shall be encouraged and protected, where applicable. A significant landmark is one which gives historical and/or cultural importance to the neighborhood and/or community.</b>
			<i>Staff Comment</i>	<i>No significant landmarks have been identified on-site.</i>

**Table 6: Design Review Standards for all projects**

Design Review Requirements				
IMPROVEMENTS AND STANDARDS: 17.96.060				
Yes	No	N/A	City Code	City Standards and <i>Staff Comments</i>



<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(A)(1) Streets	The applicant shall be responsible for all costs associated with providing a connection from an existing city street to their development.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(A)(2) Streets	All street designs shall be approved by the City Engineer.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(B)(1)	All projects under 17.96.010(A) that qualify as a "Substantial Improvement" shall install sidewalks as required by the Public Works Department.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060 (B)(2)c	Sidewalk width shall conform to the City's right-of-way standards, however the City Engineer may reduce or increase the sidewalk width and design standard requirements at their discretion.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060 (B)(3)	Sidewalks may be waived if one of the following criteria is met: a. The project comprises an addition of less than 250 square feet of conditioned space. b. The City Engineer finds that sidewalks are not necessary because of existing geographic limitations, pedestrian traffic on the street does not warrant a sidewalk, or if a sidewalk would not be beneficial to the general welfare and safety of the public.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060 (B)(4)	The length of sidewalk improvements constructed shall be equal to the length of the subject property line(s) adjacent to any public street or private street.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060 (B)(5)	New sidewalks shall be planned to provide pedestrian connections to any existing or future sidewalks adjacent to the site. In addition, sidewalks shall be constructed to provide safe pedestrian access to and around a building.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060 (B)(6)	The City may approve and accept voluntary cash contributions in-lieu of the above described improvements, which contributions must be segregated by the City and not used for any purpose other than the provision of these improvements. The contribution amount shall be one hundred ten percent (110%) of the estimated costs of concrete sidewalk and drainage improvements provided by a qualified contractor, plus associated engineering costs, as approved by the City Engineer. Any approved in-lieu contribution shall be paid before the City issues a certificate of occupancy.
			Staff Comments	N/A.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.96.060(C)(1)	All storm water shall be retained on site.
			Staff Comments	All storm water shall be retained on site.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(C)(2)	Drainage improvements constructed shall be equal to the length of the subject property lines adjacent to any public street or private street.
			Staff Comments	N/A as the drainage system on subject Lot 25 is existing.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(C)(3)	The City Engineer may require additional drainage improvements as necessary, depending on the unique characteristics of a site.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(C)(4)	Drainage facilities shall be constructed per City standards.
			Staff Comments	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(D)(1)	All utilities necessary for the development shall be improved and installed at the sole expense of the applicant.
			Staff Comments	N/A as existing utilities serve the site.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(D)(2)	Utilities shall be located underground and utility, power, and communication lines within the development site shall be concealed from public view.
			Staff Comments	N/A.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(D)(3)	When extension of utilities is necessary all developers will be required to pay for and install two (2") inch SDR11 fiber optical conduit. The placement and construction of the fiber optical conduit shall be done in accordance with city of Ketchum standards and at the discretion of the City Engineer.

			<i>Staff Comments</i>	<i>N/A.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.96.060(E)(1)	<b>The project's materials, colors and signing shall be complementary with the townscape, surrounding neighborhoods and adjoining structures.</b>
			<i>Staff Comments</i>	<i>The solar panels are sited to minimize visibility and are similar to other solar panels installed in surrounding neighborhoods within the City of Ketchum.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(E)(2)	<b>Preservation of significant landmarks shall be encouraged and protected, where applicable. A significant landmark is one which gives historical and/or cultural importance to the neighborhood and/or community.</b>
			<i>Staff Comments</i>	<i>N/A. There are no identified landmarks on the property.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(E)(3)	<b>Additions to existing buildings, built prior to 1940, shall be complementary in design and use similar material and finishes of the building being added to.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(F)(1)	<b>Building(s) shall provide unobstructed pedestrian access to the nearest sidewalk and the entryway shall be clearly defined.</b>
			<i>Staff Comments</i>	<i>N/A</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(F)(2)	<b>The building character shall be clearly defined by use of architectural features.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.96.060(F)(3)	<b>There shall be continuity of materials, colors and signing within the project.</b>
			<i>Staff Comments</i>	<i>The proposed materials of the ground mounted and roof mounted solar energy systems complement each other and have been sited to reduce visibility.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.96.060(F)(4)	<b>Accessory structures, fences, walls and landscape features within the project shall match or complement the principal building.</b>
			<i>Staff Comments</i>	<i>The solar energy system is designed to complement the principal building on the site by providing a renewable source of energy.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(F)(5)	<b>Building walls shall provide undulation/relief, thus reducing the appearance of bulk and flatness.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(F)(6)	<b>Building(s) shall orient towards their primary street frontage.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(F)(7)	<b>Garbage storage areas and satellite receivers shall be screened from public view and located off alleys.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(F)(8)	<b>Building design shall include weather protection which prevents water to drip or snow to slide on areas where pedestrians gather and circulate or onto adjacent properties.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(G)(1)	<b>Pedestrian, equestrian and bicycle access shall be located to connect with existing and anticipated easements and pathways.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(G)(2)	<b>Awnings extending over public sidewalks shall extend five (5') feet or more across the public sidewalk but shall not extend within two (2') feet of parking or travel lanes within the right of way.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(G)(3)	<b>Traffic shall flow safely within the project and onto adjacent streets. Traffic includes vehicle, bicycle, pedestrian and equestrian use. Consideration shall be given to adequate sight distances and proper signage.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(G)(4)	<b>Curb cuts and driveway entrances shall be no closer than twenty (20') feet to the nearest intersection of two or more streets, as measured along the property line adjacent to the right of way. Due to site conditions or current/projected traffic levels or speed, the City Engineer may increase the minimum distance requirements.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(G)(5)	<b>Unobstructed access shall be provided for emergency vehicles, snowplows, garbage trucks and similar service vehicles to all necessary locations within the proposed project.</b>



			<i>Staff Comments</i>	<i>N/A as access for emergency vehicles, snowplows, and garbage trucks remains unchanged with this proposal.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(H)(1)	<b>Snow storage areas shall not be less than thirty percent (30%) of the improved parking and pedestrian circulation areas.</b>
			<i>Staff Comments</i>	<i>N/A as no change to existing snow storage is proposed.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(H)(2)	<b>Snow storage areas shall be provided on-site.</b>
			<i>Staff Comments</i>	<i>See above Staff comment for Ketchum Municipal Code §17.96.060(H)(1).</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(H)(3)	<b>A designated snow storage area shall not have any dimension less than five (5') feet and shall be a minimum of twenty five (25) square feet.</b>
			<i>Staff Comments</i>	<i>See above Staff comment for Ketchum Municipal Code §17.96.060(H)(1).</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(H)(4)	<b>In lieu of providing snow storage areas, snow melt and hauling of snow may be allowed.</b>
			<i>Staff Comments</i>	<i>N/A.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(I)(1)	<b>Landscaping is required for all projects.</b>
			<i>Staff Comments</i>	<i>N/A as landscaping is existing on the development site.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(I)(2)	<b>Landscape materials and vegetation types specified shall be readily adaptable to a site's microclimate, soil conditions, orientation and aspect, and shall serve to enhance and complement the neighborhood and townscape.</b>
			<i>Staff Comments</i>	<i>See above Staff comment for Ketchum Municipal Code §17.96.060(I)(1).</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(I)(3)	<b>All trees, shrubs, grasses and perennials shall be drought tolerant. Native species are recommended but not required.</b>
			<i>Staff Comments</i>	<i>See above Staff comment for Ketchum Municipal Code §17.96.060(I)(1).</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(I)(4)	<b>Landscaping shall provide a substantial buffer between land uses, including, but not limited to, structures, streets and parking lots. The development of landscaped public courtyards, including trees and shrubs where appropriate, shall be encouraged.</b>
			<i>Staff Comments</i>	<i>See above Staff comment for Ketchum Municipal Code §17.96.060(I)(1).</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	17.96.060(J)(1)	<b>Where sidewalks are required, pedestrian amenities shall be installed. Amenities may include, but are not limited to, benches and other seating, kiosks, bus shelters, trash receptacles, restrooms, fountains, art, etc. All public amenities shall receive approval from the Public Works Department prior to design review approval from the Commission.</b>
			<i>Staff Comments</i>	<i>N/A.</i>

**STAFF RECOMMENDATION:**

Staff recommends approval of the 420 Sage Road solar energy project MO Design Review application, subject to conditions 1-9 listed below.

**COMMISSION OPTIONS:**

- Bifurcate the ground mounted and roof mounted components of the solar energy system project and move to approve one system or the other.
- Move to table consideration of the application pending an analysis of the appropriateness of siting solar energy systems within the Mountain Overlay.
- Move to continue the MO Design Review for the 420 Sage Road solar energy project to a date certain.
- Move to deny the MO Design Review for the 420 Sage Road solar energy project and draft findings supporting denial.

**RECOMMENDED CONDITIONS**

1. All departmental conditions as described in Tables 2, 3, 4, and 5;
2. The applicant shall provide the maximum height of the single-family residence with the addition of the roof mounted solar array. This height verification shall be reviewed and approved by the Planning & Building Department prior to issuance of a Building Permit for the project.

3. The applicant shall submit a structural analysis stamped by an Idaho licensed engineer or a site specific study from a professional land surveyor certifying the roof mounted energy system will withstand the avalanche forces on the site for the roof mounted solar thermal system prior to issuance of a Building Permit for the project.
4. This Design Review approval is based on the plans and information presented and approved at the meeting on the date noted herein. Building Permit plans must conform to the approved Design Review plans unless otherwise approved in writing by the Planning and Zoning Commission or Administrator. Any building or site discrepancies which do not conform to the approved plans will be subject to removal;
5. All building and fire code requirements as dictated by 2012 family of international codes and Title 15 of Ketchum Municipal shall apply to all construction onsite;
6. Per Title 17, Section 17.96.090: TERM OF APPROVAL: The term of design review approval shall be twelve (12) months from the date that findings of fact, conclusions of law and decision are adopted by the Commission or upon appeal, the date the approval is granted by the Council subject to changes in zoning regulations;
7. All Design Review elements shall be completed prior to final inspection;
8. All existing and new exterior lighting on the property shall be in compliance with Ketchum Municipal Code, Chapter 17.132, Dark Skies, and approved prior the issuance of a Certificate of Completion;
9. In addition to the requirements set forth in this Design Review approval, this project shall comply with all applicable local, state, and federal laws.

**ATTACHMENTS:**

- A. Application
- B. Ground Mounted Solar Energy System Plans
- C. Roof Mounted Solar Energy System Plans
- D. Fire Department Comments
- E. Ground Mounted Solar Energy System Structural Analysis
- F. Winter Sun Condominium Subdivision Property Owner Approvals
- G. Public Comment



# ATTACHMENT A. APPLICATION



City of Ketchum  
Planning & Building

OFFICIAL USE ONLY	
File #	P18-091
Date	7-19-18
By	ML
Fee Paid	250 <sup>-</sup>
Approved Date:	
Denied Date:	
By:	

### Mountain Overlay Design Review Application

OWNER INFORMATION			
Project Name: Sage Rd. Solar			
Owner Name: Mitch Long, Margit Donhowe			
Mailing Address: 2463 EASTDALE DR BOISE ID 83712			
Phone: 208-484-6866			
Email: m.long.boise@gmail.com			
PROJECT INFORMATION			
Architect/Representative: Alex McKinley (Empowered Solar)			
Phone: 208-901-5167			
Mailing Address: 1407 E. Jefferson, Boise ID 83712			
Email: alex@empowered.solar			
Engineer of Record:			
Engineer Email:			
Legal Land Description:			
Project Address: 420 Sage Rd. Ketchum, ID 83340			
Lot Area:			
Zoning District:			
Anticipated Use:			
Number of Residential Units:			
TYPE OF CONSTRUCTION			
<input type="checkbox"/> New	<input type="checkbox"/> Remodel	<input type="checkbox"/> Addition	<input checked="" type="checkbox"/> Other, please explain: Solar array
TOTAL FLOOR AREA <sup>na</sup>			
Proposed		Existing	
Basement:			
1 <sup>st</sup> Floor:			
2 <sup>nd</sup> Floor:			
3 <sup>rd</sup> Floor:			
Decks:			
Mezzanine:			
Total:			
Building Coverage:	SF	%	Curb Cut: SF %
PROPOSED SETBACKS			
Front:	Side:	Side:	Rear:
ADDITIONAL INFORMATION			
Building Height:		Parking Spaces Provided:	
Will Fill or Excavation Be Required?	Yes	No	no
If Yes, Amount in Cubic Yards	Fill:	Excavation:	
Will Existing Trees or Vegetation Be Removed?	Yes	No	no

Applicant agrees in the event of a dispute concerning the interpretation or enforcement of the Floodplain Management Overlay Application, in which the City of Ketchum is the prevailing party, to pay reasonable attorney fees, including attorney fees on appeal, and expenses of the City of Ketchum. I, the undersigned, certify that all information submitted with and upon this application form is true and accurate to the best of my knowledge and belief.

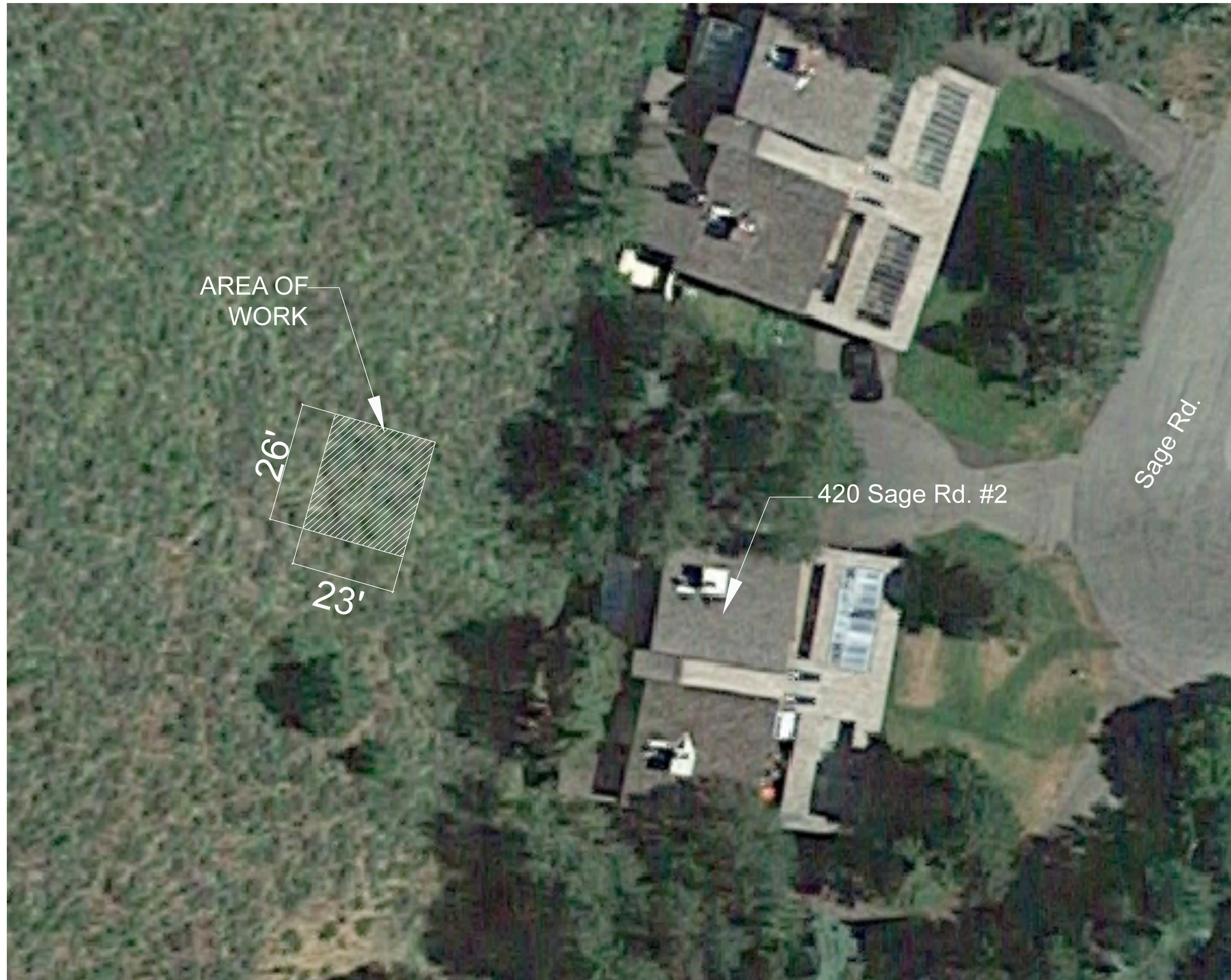
*Mitchell Long*  
Signature of Owner/Representative

7/13/2018  
Date



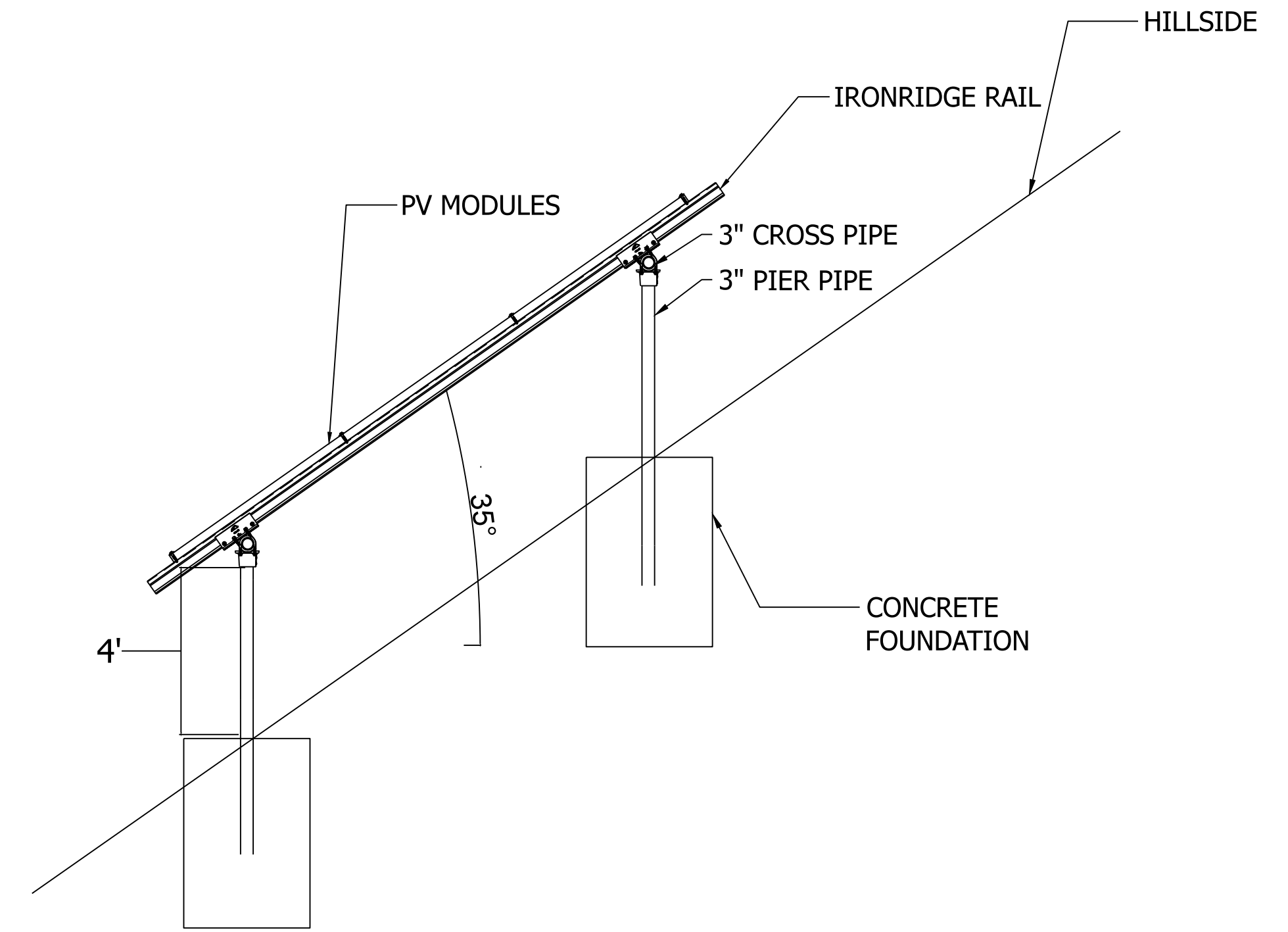
ATTACHMENT B.  
GROUND MOUNTED SOLAR ENERGY SYSTEM PLANS





1 SITE PLAN  
 PV1 1/16"=1'-0"

MAIN COMPONENTS		
EQUIPMENT	DESCRIPTION	QUANTITY
SOLAR PANEL	MISSION SOLAR ENERGY MSE320	28
INVERTER	ENPHASE IQ6+	28
MOUNTING SYSTEM	IRONRIDGE GROUND MOUNT SYSTEM	7 ROWS 4 COLUMNS



2 MAIN COMPONENTS AND SIDE VIEW  
 PV1

REVISIONS:



SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY  
 420 SAGE RD. - KETCHUM, IDAHO 83340

PRELIMINARY DRAWINGS  
 - NOT FOR CONSTRUCTION

**PROJECT DESCRIPTION**

CONSTRUCTION OF 8960W, NET METERED, GROUND MOUNTED PHOTOVOLTAIC ARRAY.

**CONTRACTOR CONTACT**

ALEX MCKINLEY  
 208.901.5167  
 ALEX@EMPOWERED.SOLAR

DRAWN BY: ARM  
 CHECKED BY:  
 DATE: 02-24-2018

SHEET  
**PV1**



REVISIONS:



SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY  
 420 SAGE RD. - KETCHUM, IDAHO 83340

PRELIMINARY DRAWINGS  
 - NOT FOR CONSTRUCTION

6/16/2018

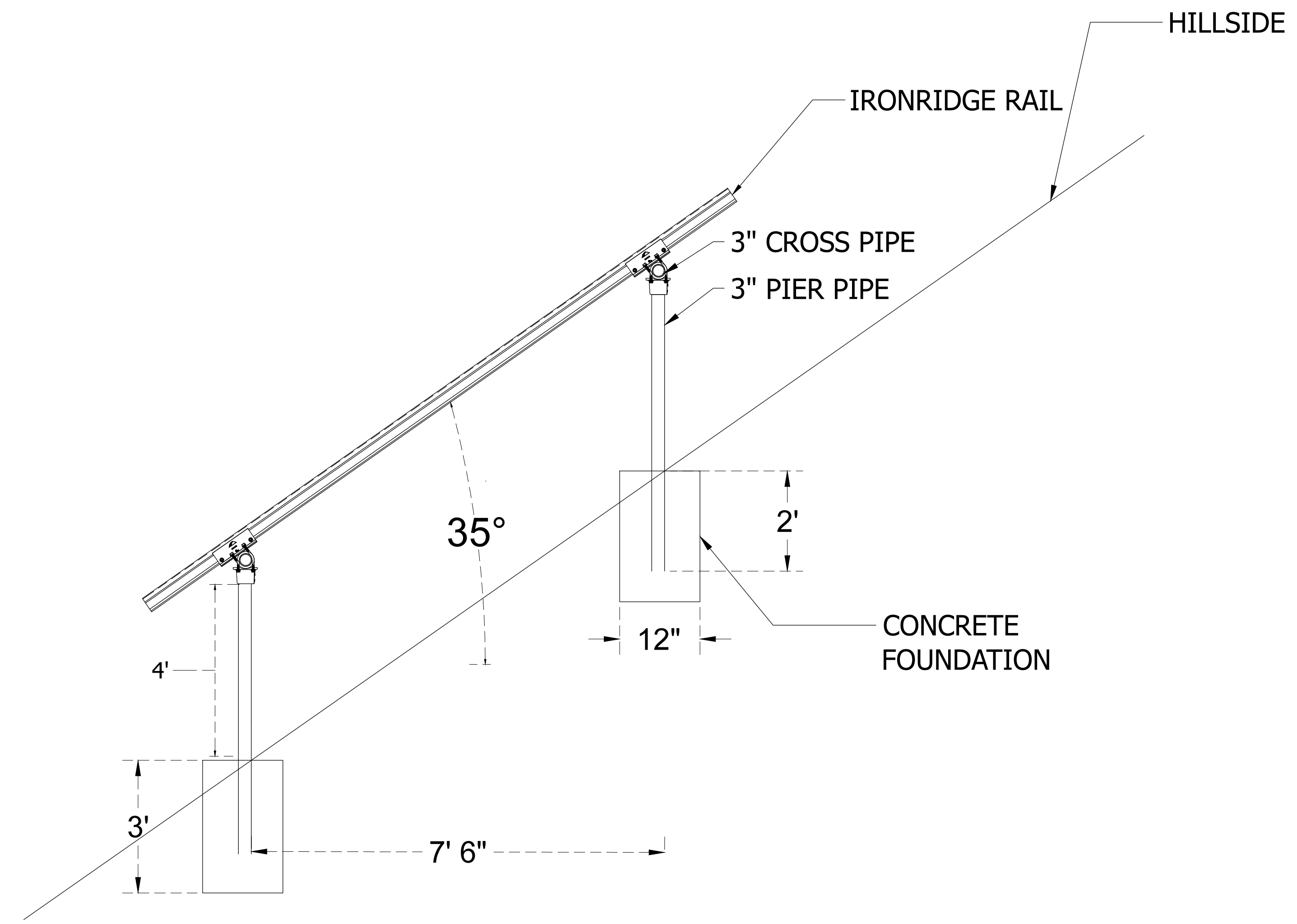
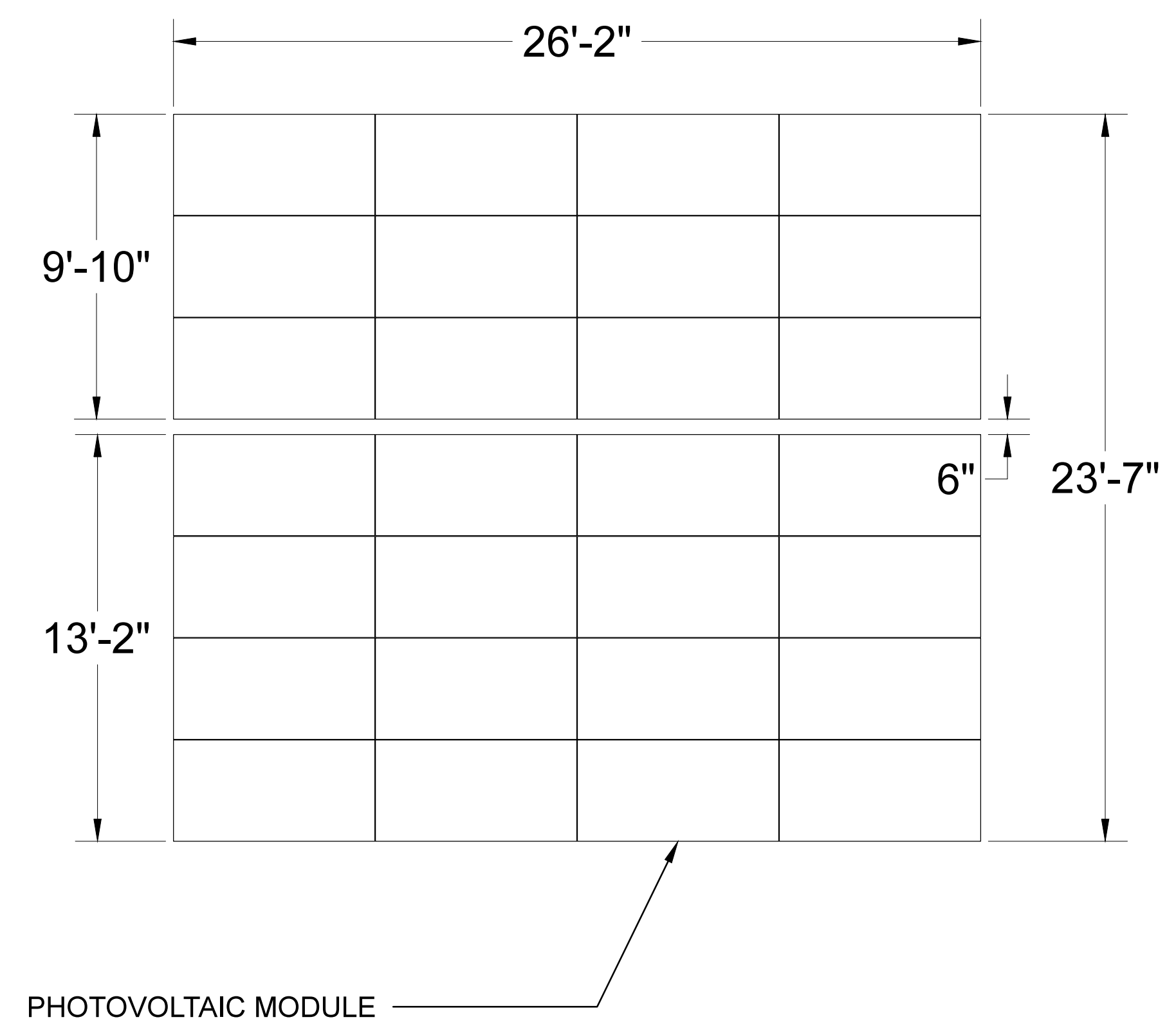
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 CHECKED BY: \_\_\_\_\_  
 DATE: 06-24-2018

SHEET  
**PV2**

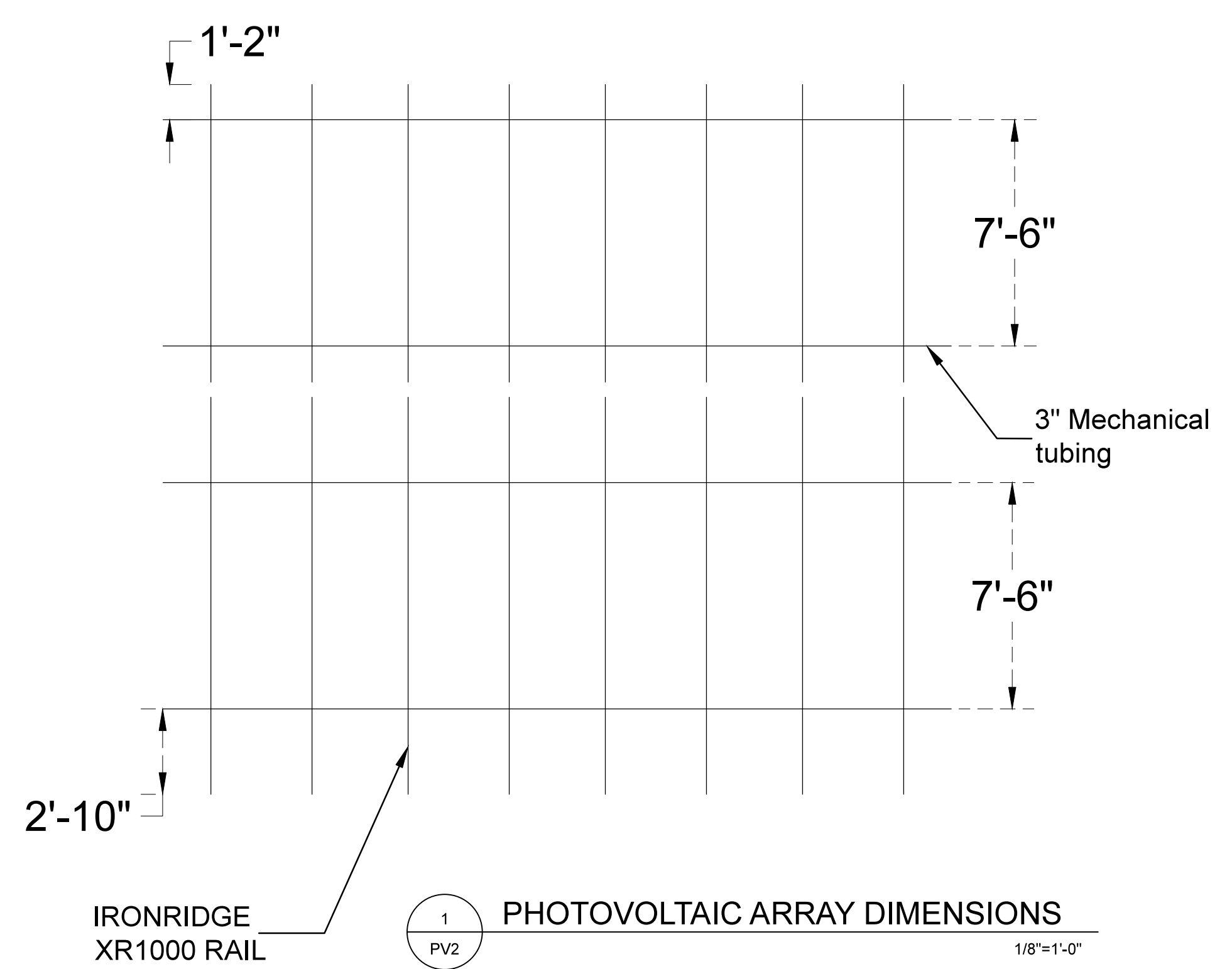
**GENERAL NOTES**

A. TWO ARRAY SECTIONS. BOTH HAVE SAME DIMENSIONS FOR FOUNDATION ARRANGEMENT

B. REFER TO MOUNTING SYSTEM MANUFACTURER'S SPECIFICATIONS FOR ADDITIONAL STRUCTURAL INFORMATION.



2 RACKING ARRANGEMENT  
 1/8"=1'-0"



1 PHOTOVOLTAIC ARRAY DIMENSIONS  
 1/8"=1'-0"

REVISIONS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



SINGLE FAMILY RESIDENCE  
PHOTOVOLTAIC ARRAY  
420 SAGE RD. - KETCHUM, IDAHO 83340

PRELIMINARY DRAWINGS  
- NOT FOR CONSTRUCTION

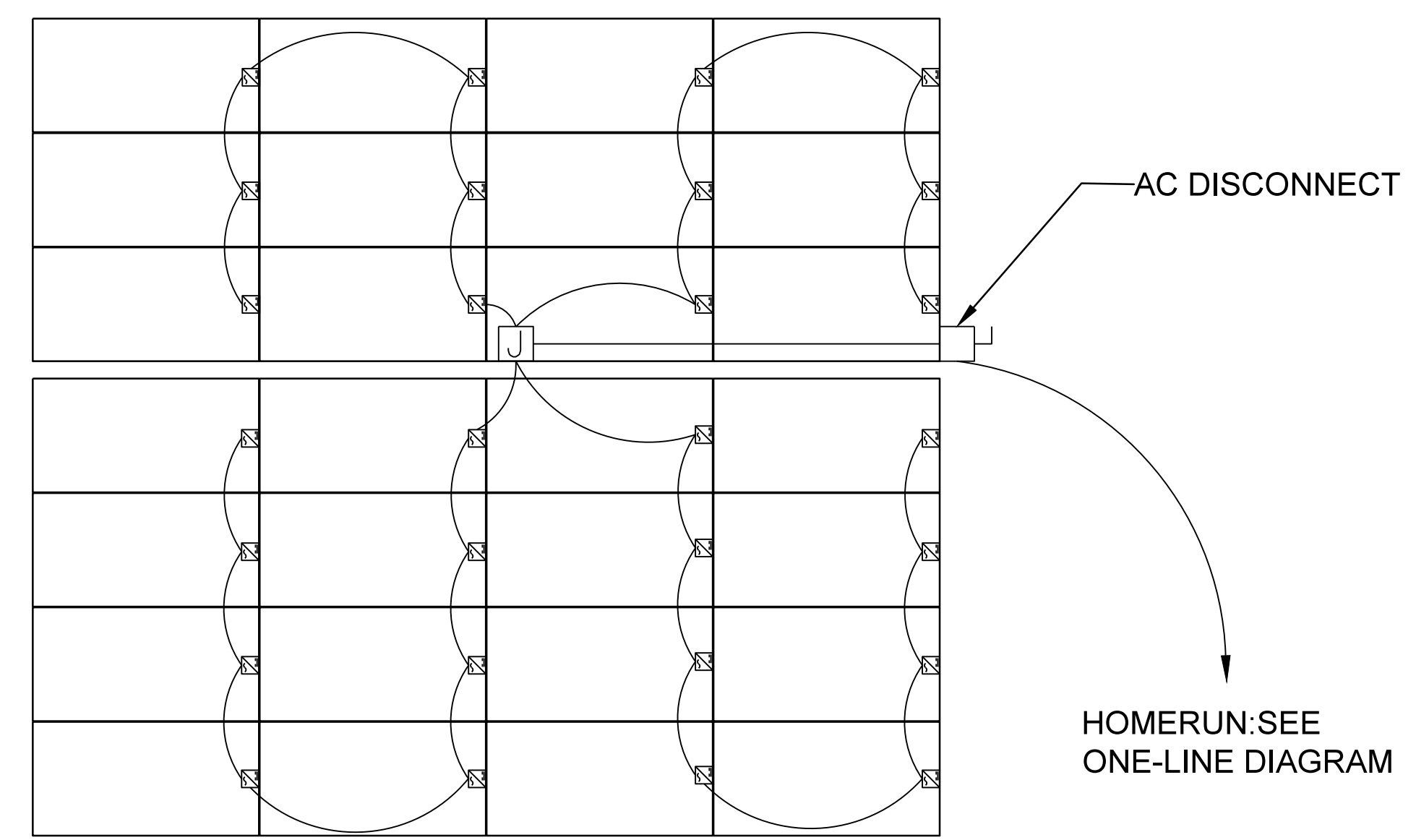
6/16/2018

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CHECKED BY: \_\_\_\_\_  
DATE: 06-24-2018

SHEET  
**PV3**

### GENERAL NOTES

- A. MAIN PANEL LOCATED INSIDE HOME
- B. DISCONNECT SWITCH TO BE LOCATED ON ARRAY
- C. MAP SHOWING DISCONNECT LOCATION TO BE PLACED AT METER



1  
PV3

**ELECTRICAL PLAN**

1/4"=1'-0"







REVISIONS:  
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SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY  
 420 SAGE RD. - KETCHUM, IDAHO 83340

CONSTRUCTION  
 DOCUMENTS

DRAWN BY: ARM  
 CHECKED BY: TBV  
 DATE: 09-03-2018

SHEET  
**PV5**

SETBACK DIMENSIONS		
ITEM	DESCRIPTION	DIMENSION
SOLAR ARRAY	EASTERN SIDE OF ARRAY TO NEAREST BOUNDARY	138'
SOLAR ARRAY	SOUTHERN SIDE OF ARRAY TO NEAREST BOUNDARY	25'
SOLAR ARRAY	NORTHERN SIDE OF ARRAY TO NEAREST BOUNDARY	151'
SOLAR ARRAY	WESTERN SIDE OF ARRAY TO NEAREST BOUNDARY	772'

NOTE: BOUNDARY LOCATIONS TAKEN FROM BLAINE COUNTY GIS

2 SOLAR ARRAY SETBACKS  
 PV5



1 PROPERTY BOUNDARY SETBACKS  
 1/8"=1'-0"  
 PV5



REVISIONS:




SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY  
 420 SAGE RD. - KETCHUM, IDAHO 83340

CONSTRUCTION  
 DOCUMENTS

DRAWN BY: \_\_\_\_\_ ARM  
 CHECKED BY: \_\_\_\_\_ TBV  
 DATE: 09-03-2018

SHEET  
**PV6**

MAIN COMPONENTS		
ITEM	DESCRIPTION	DIMENSION
SOLAR ARRAY	LENGTH	26' 2"
SOLAR ARRAY	WIDTH	23' 7"
SOLAR ARRAY	HEIGHT	4' ABOVE HILLSIDE
SOLAR ARRAY	SLOPE OF ARRAY MATCHES HILLSIDE	35°
PATH	LENGTH	54'
PATH	WIDTH	3'

2 DIMENSIONS  
 PV6



1 SITE PLAN  
 PV6 1/8"=1'-0"



REVISIONS:  
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**SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY**  
 420 SAGE RD. - KETCHUM, IDAHO 83340

**CONSTRUCTION  
 DOCUMENTS**

DRAWN BY: \_\_\_\_\_ ARM  
 CHECKED BY: \_\_\_\_\_ TBV  
 DATE: \_\_\_\_\_ 09-03-2018

SHEET  
**PV7**

HILLSIDE DISTURBANCE NOTES		
ITEM	DESCRIPTION	DIMENSION
PATHWAY	CREATION OF A PATHWAY FOR MOVING EQUIPMENT FROM DRIVEWAY TO ARRAY LOCATION, NO TREES TO BE REMOVED, ELECTRICAL CABLING TO BE BURIED UNDER PATHWAY LOCATION, PATHWAY LEFT FOR MAINTENANCE	WIDTH: 3'
SOLAR ARRAY (PERIMETER)	ADDITION OF NATIVE VEGETATION MATCHING CURRENT HILLSIDE PLANTS AROUND PERIMETER OF ARRAY TO LIMIT VISUAL IMPACT OF ARRAY AND PROVIDE FOR RE-VEGETATION OF DISTURBED AREAS AT EDGE OF ARRAY	HEIGHT: 4' ABOVE HILLSIDE (TO MATCH ARRAY HEIGHT, SIMILAR TO EXISTING BUSHES)
SOLAR ARRAY (CONSTRUCTION AREA)	DISTURBANCE OF VEGETATION UNDER ARRAY LIMITED TO REMOVAL NECESSARY FOR PLACEMENT OF SUPPORT PILLARS, OTHER VEGETATION CROPPED TO LEVEL LOWER THAN ARRAY AND LEFT IN PLACE	NA
WORK SITE MANAGEMENT: EQUIPMENT AND MATERIALS TO BE STORED OFFSITE EACH NIGHT,		
REMOVED DIRT AND VEGETATION: DIRT AND VEGETATION REMOVED WILL BE TAKEN OFFSITE EACH NIGHT		
MATERIAL STAGING: MATERIALS TO BE STAGED IN HOMEOWNER'S PORTION OF DRIVEWAY DURING WORKING HOURS		

2 PATHWAY AND SITE DISTURBANCE INFORMATION  
 PV7



1 LOCATION OF ADDITIONAL VEGETATION  
 PV7





1 HILLSIDE ELEVATION  
 PV8 1/8"=1'-0"

HILLSIDE INFORMATION		
LOCATION	MEASURE	VALUE
SOLAR ARRAY AREA	SLOPE	30°-35°
UPHILL FROM ARRAY	SLOPE	25°
ROCK OUTCROPPINGS IN AREA	NUMBER	0
TREES IN AREA	NUMBER	2
OTHER MAJOR OBJECTS IN AREA	NUMBER	0

2 HILLSIDE OBJECTS AND SLOPE  
 PV8

REVISIONS:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
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SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY  
 420 SAGE RD. - KETCHUM, IDAHO 83340

CONSTRUCTION  
 DOCUMENTS

DRAWN BY: ARM  
 CHECKED BY: TBV  
 DATE: 09-03-2018

SHEET  
**PV8**





Array and surrounding area

**NOTES**  
 ARRAY PLACED ON HILLSIDE BEHIND TREES TO LIMIT VISIBILITY, MULTIPLE LEVELS OF LIMBS AND TYPES OF TREES PROVIDE FOR VISUAL COVER THROUGHOUT THE YEAR

REVISIONS:  
 \_\_\_\_\_  
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SINGLE FAMILY RESIDENCE  
 PHOTOVOLTAIC ARRAY  
 420 SAGE RD. - KETCHUM, IDAHO 83340

CONSTRUCTION  
 DOCUMENTS

1  
 PV9  
 ARRAY LOCATION IMAGERY

DRAWN BY: \_\_\_\_\_ ARM  
 CHECKED BY: \_\_\_\_\_ TBV  
 DATE: 09-03-2018

SHEET  
**PV9**



# MSE Multi 72

320-330Wp P-Type Multi-crystalline Modules



Advanced P-Type multi-crystalline cell technology



Power Output:  
Up to 330W power



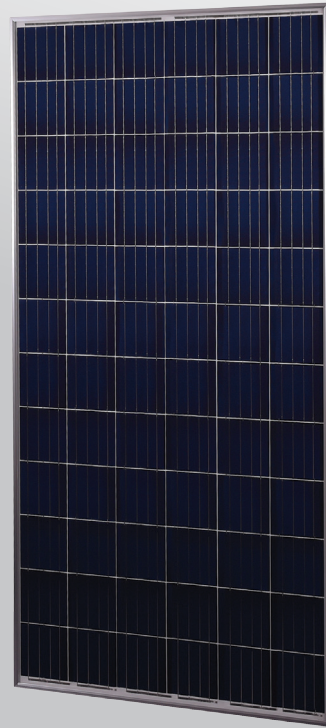
Certified Reliability



5600 Pa snow load *New!*  
175 mph wind rating



Buy American Act



## Proudly assembled in the USA

Mission Solar Energy is headquartered in San Antonio, TX with module facilities onsite. Our hardworking team calls Texas home and is devoted to producing high quality solar products and services. Our supply chain includes local and domestic vendors increasing our impact to the U.S. economy.



Assembled  
in the USA

## CERTIFICATIONS

IEC 61215/ IEC 61730/ IEC 61701  
UL 1703



\*As there are different certification requirements in different markets, please contact your local Mission Solar Energy sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

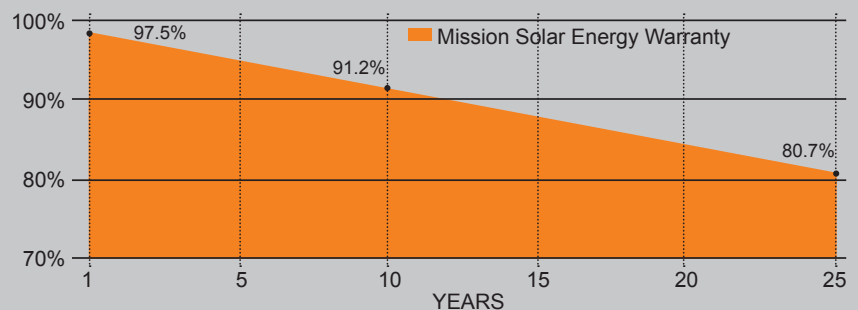
## Proven reliability and bankability

Mission Solar Energy panels have been tested by independent testing centers to meet and exceed IEC standards. Its panels are already deployed in multiple installations.

## Best in class quality

Mission Solar Energy production lines are fully automated and include multiple quality checks throughout the production process.

## 25-year linear warranty backed by Powerguard



## ELECTRICAL SPECIFICATIONS

Electrical parameters at Standard Test Condition (STC)

Module Type			MSE320MM6J	MSE325MM6J	MSE330MM6J
Power Output	P <sub>max</sub>	W <sub>p</sub>	320	325	330
Module Efficiency		%	16.13	16.40	16.64
Tolerance			0~+3%		
Short-Circuit Current	I <sub>sc</sub>	A	9.24	9.26	9.33
Open Circuit Voltage	V <sub>oc</sub>	V	45.18	45.80	46.01
Rated Current	I <sub>mp</sub>	A	8.69	8.72	8.81
Rated Voltage	V <sub>mp</sub>	V	36.88	37.34	37.50

STC: Irradiance 1000 W/m<sup>2</sup>, Cell temperature of 25°C, AM 1.5

## TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44°C (±2°C)
Temperature Coefficient of P <sub>max</sub>	-0.392%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.312%/°C
Temperature Coefficient of I <sub>mp</sub>	0.053%/°C

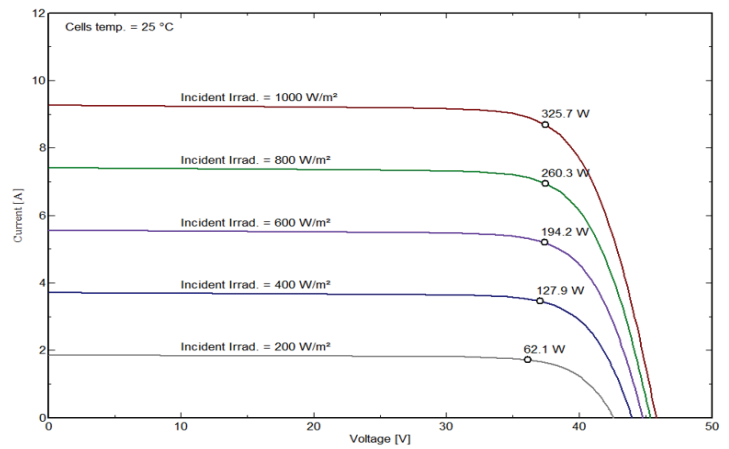
## OPERATING CONDITIONS

Maximum System Voltage	1,000VDC
Operating Temperature Range	-40°C (-40°F) to +90°C (194°F)
Maximum Series Fuse Rating	15A
Fire Safety Classification	Type 1, Class C
Front & Back Load (UL standard)	5600 Pa (117 psf) <b>New!</b>
Hail Safety Impact Velocity	25mm at 23 m/s

## MECHANICAL DATA

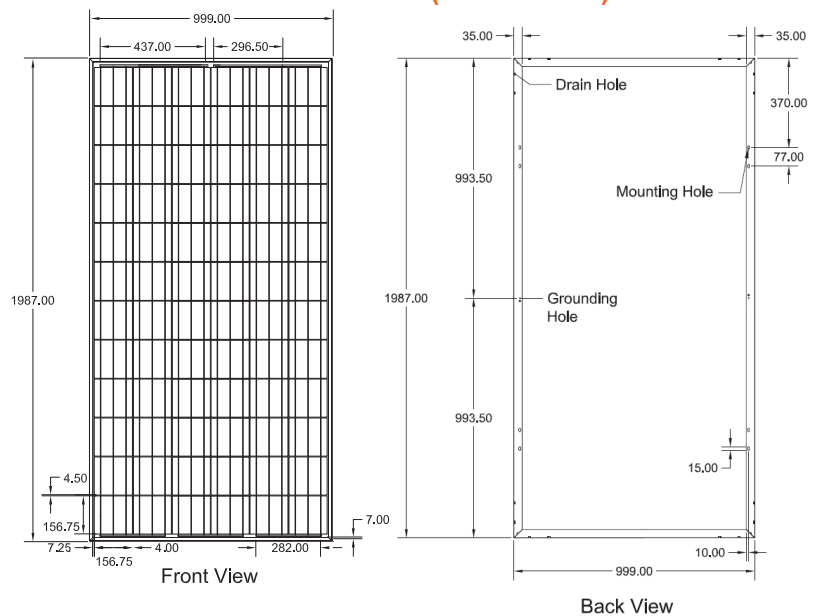
Solar Cells	P-type Multi-Crystalline Silicon (156.75mm)
Cell orientation	72 cells (6x12), 4 busbar
Module dimension	1987mm x 999mm x 40mm (78.23 in. x 39.33 in. x 1.57 in.)
Weight	21.6 kg (47.6 lb)
Front Glass	3.2mm (0.126 in.) tempered, Low-iron, <b>Anti-reflective coating</b>
Frame	Anodized aluminum alloy
Encapsulant	Ethylene vinyl acetate (EVA)
J-Box	Protection class IP67 with bypass-diode
Cables	PV wire, 1.2m (47.2 in.), 4mm <sup>2</sup> / 12 AWG
Connector	MC4 or compatible

## MSE325MM6J: 325WP, 72CELL SOLAR MODULE CURRENT-VOLTAGE CURVE



Current-voltage characteristics with dependence on irradiance and module temperature

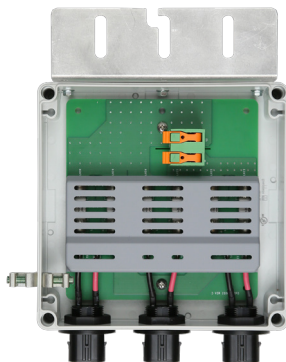
## BASIC DESIGN (UNITS: mm)





## Enphase Q Aggregator and Q Cable Accessories

The **Enphase Q Aggregator™** and **Enphase Q Cable™** are part of the sixth generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.



### Enphase Q Aggregator

- Reduces electrical labor and eliminates wire nuts for safer, faster installations
- Aggregates up to three fully populated 20A branch circuits
- Supports solar arrays of up to 11.5 kW with a single rooftop aggregator



### Enphase Q Cable

- Two-wire Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste



### Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types



# Enphase Q Cable Accessories

## Q AGGREGATOR SPECIFICATIONS

Model number	Q-BA-3-1P-60
Dimensions	190 mm (W) x 227 mm (D) x 80 mm (H) (7.5 in (W) x 9 in (D) x 3.2 in (H))
Enclosure rating	NEMA3 (up to 45° from horizontal)
Temperature range	-40° C to +55° C (-40° F to +122° F)
Compliance	UL1703, EN62109, UL6703A

## Q CABLE SPECIFICATIONS

Voltage rating	600V (connector rating 250 V)
Cable temperature rating	90° C (194° F)
Certification	UL3003, DG cable
Flame test rating	FT4
Compliance	RoHS, OIL RES I, CE, UV resistant, combined UL for Canada and United States
Cable insulator rating	THHN/THWN-2 dry/wet

## Q CABLE TYPES / ORDERING OPTIONS

Model Number	Voltage	Connector Spacing	PV Module Orientation	Connector Count per Box
Q-12-10-240	240 (max rating 250 VAC)	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	240 (max rating 250 VAC)	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	240 (max rating 250 VAC)	2.3 m (7.5 ft)	Landscape (72-cell)	200

## ENPHASE Q CABLE ACCESSORIES

Name	Model Number	Description
Enphase Q Aggregator	Q-BA-3-1P-60	Combines up to three microinverter branches into one home run.
Field-wireable connector (male)	Q-CONN-10M	Make connections from any Q Aggregator open connector
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector
Cable clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount
Q Aggregator sealing caps (male)	Q-BA-CAP-10	Sealing cap for unused aggregator connections
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling
Terminator	Q-TERM-10	Terminator cap for unused cable ends
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)



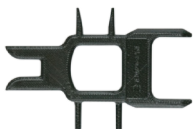
### TERMINATOR

Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)



### SEALING CAPS

Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)



### DISCONNECT TOOL

Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)



### CABLE CLIP

Used to fasten cabling to the racking or to secure looped cabling, sold in packs of ten (Q-CLIP-100)

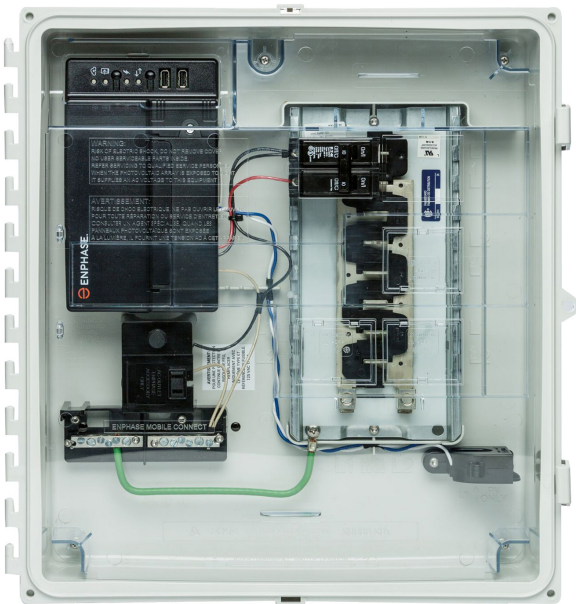
To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)



## Enphase IQ Combiner+

(X-IQ-AM1-240-2)

The **Enphase IQ Combiner+**™ with Enphase IQ Envoy™ consolidates interconnection equipment into a single enclosure and streamlines PV and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.



### Smart

- Includes IQ Envoy for communication and control
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Provides production metering and optional consumption monitoring
- Supports installation of the Enphase Q Aggregator™

### Simple

- Eaton BR series panelboard interior
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80 A total PV or storage branch circuits

### Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year warranty
- UL listed



LISTED

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

# Enphase IQ Combiner+

## MODEL NUMBER

IQ Combiner+ X-IQ-AM1-240-2	IQ Combiner+ with Enphase IQ Envoy™ for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and optional* consumption monitoring (+/- 2.5%).
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## ACCESSORIES (order separately)

Enphase Mobile Connect™ CELLMODEM-03 (4G / 12-year data plan) CELLMODEM-01 (3G / 5-year data plan)	Plug and play industrial grade cellular modem with data plan for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.)
Consumption Monitoring CT CT-200-SPLIT	Split core current transformers enable whole home consumption metering* (+/- 2.5%).

## ELECTRICAL SPECIFICATIONS

Rating	Continuous duty
System voltage	240 VAC, 60 HZ
Eaton BR series busbar rating	125 A
Max. continuous current rating (output to grid)	65 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. continuous current rating (input from PV)	64 A
Max. total branch circuit breaker rating (input)	80 A (any combination)
Production Metering CT	200 A solid core pre-installed and wired to IQ Envoy

## MECHANICAL DATA

Dimensions (WxHxD)	49.3 x 46.5 x 16.0 cm (19.4" x 18.3" x 6.3")
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	<ul style="list-style-type: none"><li>• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors</li><li>• 60 A breaker branch input: 8 to 1/0 AWG copper conductors</li><li>• Main lug combined output: 6 to 2/0 AWG copper conductors</li><li>• Neutral and ground: 14 to 1/0 copper conductors</li></ul> Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)

## INTERNET CONNECTION OPTIONS

Integrated Wi-Fi	802.11b/g/n
Ethernet	802.3, Cat5E (or Cat 6) UTP Ethernet cable - not included
Cellular	Optional, CELLMODEM-01 (3G) or CELLMODEM-03 (4G) (not included)

## COMPLIANCE

Compliance, Combiner	UL 1741 CAN/CSA C22.2 No. 107.1 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production)
Compliance, IQ Envoy	UL 916 CAN/CSA C22.2 No. 61010-1

\* Consumption monitoring is required for Enphase Storage Systems.

To learn more about Enphase offerings, visit [enphase.com](http://enphase.com)



# Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate seamlessly with the Enphase IQ Envoy™, Enphase Q Aggregator™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



## Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

## Productive and Reliable

- Optimized for high powered 60-cell and 72-cell\* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

## Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

\* The IQ 7+ Micro is required to support 72-cell modules.



# Enphase IQ 7 and IQ 7+ Microinverters

<b>INPUT DATA (DC)</b>	<b>IQ7-60-2-US</b>		<b>IQ7PLUS-72-2-US</b>	
Commonly used module pairings <sup>1</sup>	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module I <sub>sc</sub> )	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
<b>OUTPUT DATA (AC)</b>	<b>IQ 7 Microinverter</b>		<b>IQ 7+ Microinverter</b>	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range <sup>2</sup>	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A	1.15 A	1.21 A	1.39 A
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit <sup>3</sup>	16 (240 VAC) 13 (208 VAC)		13 (240 VAC) 11 (208 VAC)	
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
<b>EFFICIENCY</b>	<b>@240 V</b>	<b>@208 V</b>	<b>@240 V</b>	<b>@208 V</b>
Peak CEC efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
<b>MECHANICAL DATA</b>	<b>IQ 7 Microinverter</b>			
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
<b>FEATURES</b>				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.

2. Nominal voltage range can be extended beyond nominal if required by the utility.

3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)







### Mount on all terrains, in no time.

The IronRidge Ground Mount System combines our XR1000 rails with locally-sourced steel pipes or mechanical tubing, to create a cost-effective structure capable of handling any site or terrain challenge.

Installation is simple with only a few structural components and no drilling, welding, or heavy machinery required. In addition, the system works with a variety of foundation options, including concrete piers and driven piles.



#### **Rugged Construction**

Engineered steel and aluminum components ensure durability.



#### **PE Certified**

Pre-stamped engineering letters available in most states.



#### **UL 2703 Listed System**

Meets newest effective UL 2703 standard.



#### **Design Software**

Online tool generates engineering values and bill of materials.



#### **Flexible Architecture**

Multiple foundation and array configuration options.



#### **25-Year Warranty**

Products guaranteed to be free of impairing defects.



360° Product Tour  
Visit [ironridge.com](http://ironridge.com)

## Substructure

### Top Caps



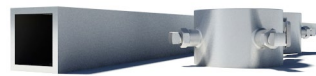
Connect vertical and cross pipes.

### Bonded Rail Connectors



Attach and bond Rail Assembly to cross pipes.

### Diagonal Braces



Optional Brace provides additional support.

### Cross Pipe & Piers



Steel pipes or mechanical tubing for substructure.

## Rail Assembly

### XR1000 Rails



Curved rails increase spanning capabilities.

### UFOs



Universal Fastening Objects bond modules to rails.

### Stopper Sleeves



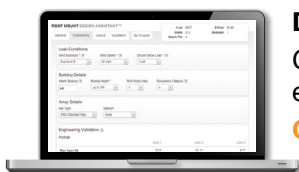
Snap onto the UFO to turn into a bonded end clamp.

### Accessories



Wire Clips and End Caps provide a finished look.

## Resources



### Design Assistant

Go from rough layout to fully engineered system. For free.

Go to [ironridge.com/design](http://ironridge.com/design)



### NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

Go to [ironridge.com/training](http://ironridge.com/training)



## Strength Meets Flexibility

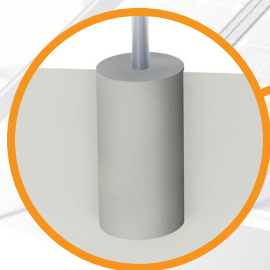
The IronRidge Ground Mount System supports a wide adjustment of tilt angle, foundation size and depth, and module size. These variables can be quickly optimized for cost and performance using the online Design Assistant tool.

One of the most critical engineering variables is the array size. For example, using 5-high columns in landscape significantly increases the number of modules per pier compared to 4-high columns, saving on pipe or mechanical tubing, and concrete.



### XR1000 Rail

The curved shape of XR1000 increases vertical and lateral strength, while also resisting bending and twisting. Modules are attached using familiar top-down clamps or under clamps.



### Concrete Foundations

Concrete foundations allow for the largest possible spans and highest lateral force bearing, which eliminates the need for cross bracing.



### Steel Substructure

Multiple pipe and mechanical tubing size options help to optimize cost. The 3" option can increase East-West spans up to 18 feet, greatly reducing the number of piers and material required.

### Compatible with Soil Classes 2-4



The size of Ground Mount foundations depends on a number of factors, including column height and site loading conditions. Stronger and sturdier soil classes (Class 2 and Class 3) allow for reduced foundation depth, saving on materials and labor.

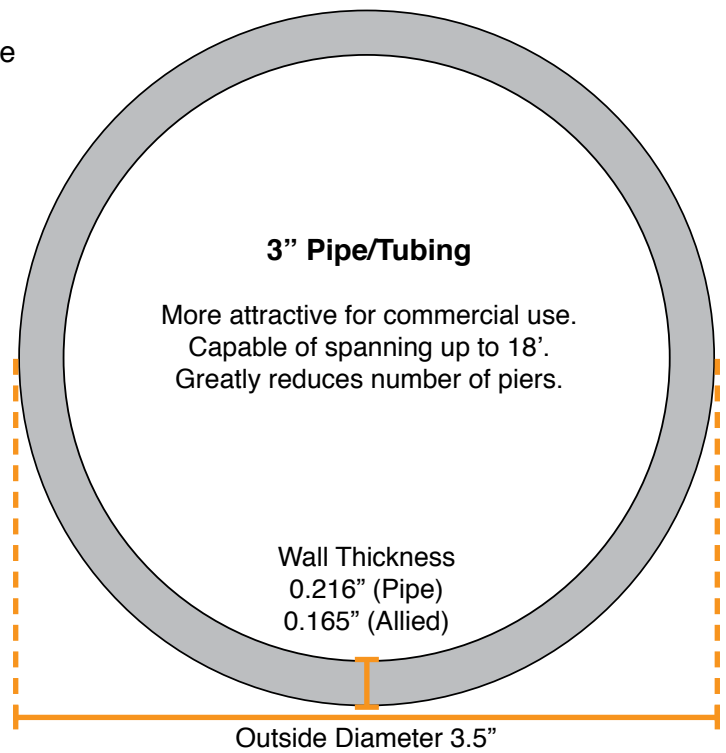
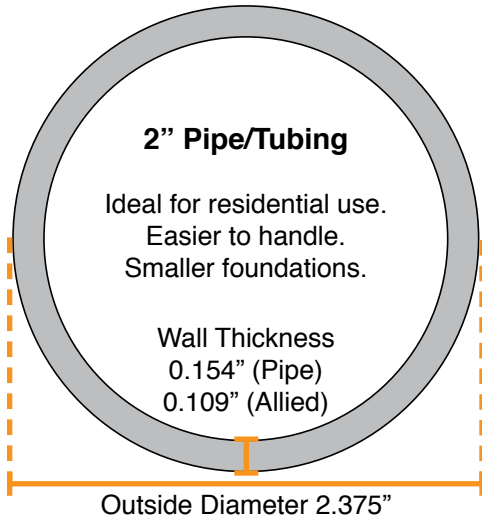
### Wide Tilt Angle Range (0-45 Degrees)



Lower tilt angles are an effective way of reducing wind loads on ground mount structures, resulting in increased East-West pipe spans and reduced number of foundations. Refer to table on backside to see how tilt angle affects spans.

## Substructure Selection

Ground Mount uses locally-sourced galvanized schedule 40 steel pipe (ASTM A53 Grade B, 35 ksi) or Allied mechanical tubing (2" – 50 ksi, 3" – 45 ksi) to reduce shipping costs. Mechanical tubing is lighter and can be easier to couple when building the substructure.



Refer to the following table to see how size impacts the East-West span between foundations. The table complies with ASCE 7-10 structural code. Values are based on 72-cell modules in Wind Exposure Category B.

Conditions				E-W Span									
Snow	Height	Tilt	Wind (MPH)	4'	6'	8'	10'	12'	14'	16'	18'		
0 PSF	4-High	10°	100	2" Pipe/Tubing									
			120										
			140										
		30°	100	*	*	3" Pipe/Tubing							
			120	*	*								
			140	*	*								
	5-High	10°	100	2" Pipe/Tubing									
			120										
			140										
		30°	100	*	*	3" Pipe/Tubing							
			120	*	*								
			140	*	*								
30 PSF	4-High	10°	100	2" Pipe/Tubing									
			120										
			140										
		30°	100	*	*	3" Pipe/Tubing							
			120	*	*								
			140	*	*								
	5-High	10°	100	2" Pipe/Tubing									
			120										
			140										
		30°	100	*	*	3" Pipe/Tubing							
			120	*	*								
			140	*	*								

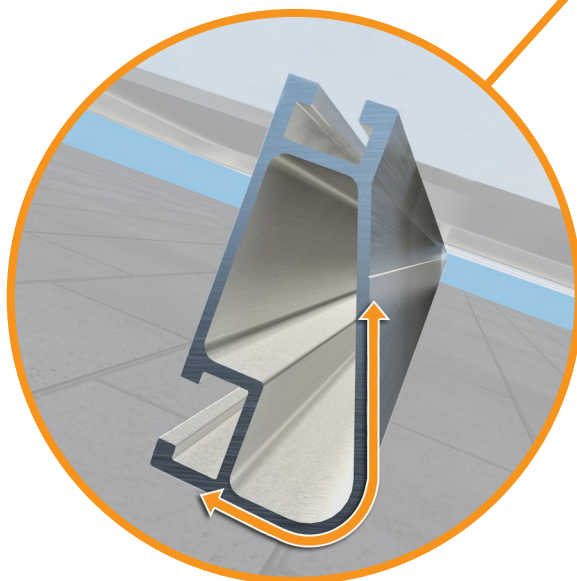
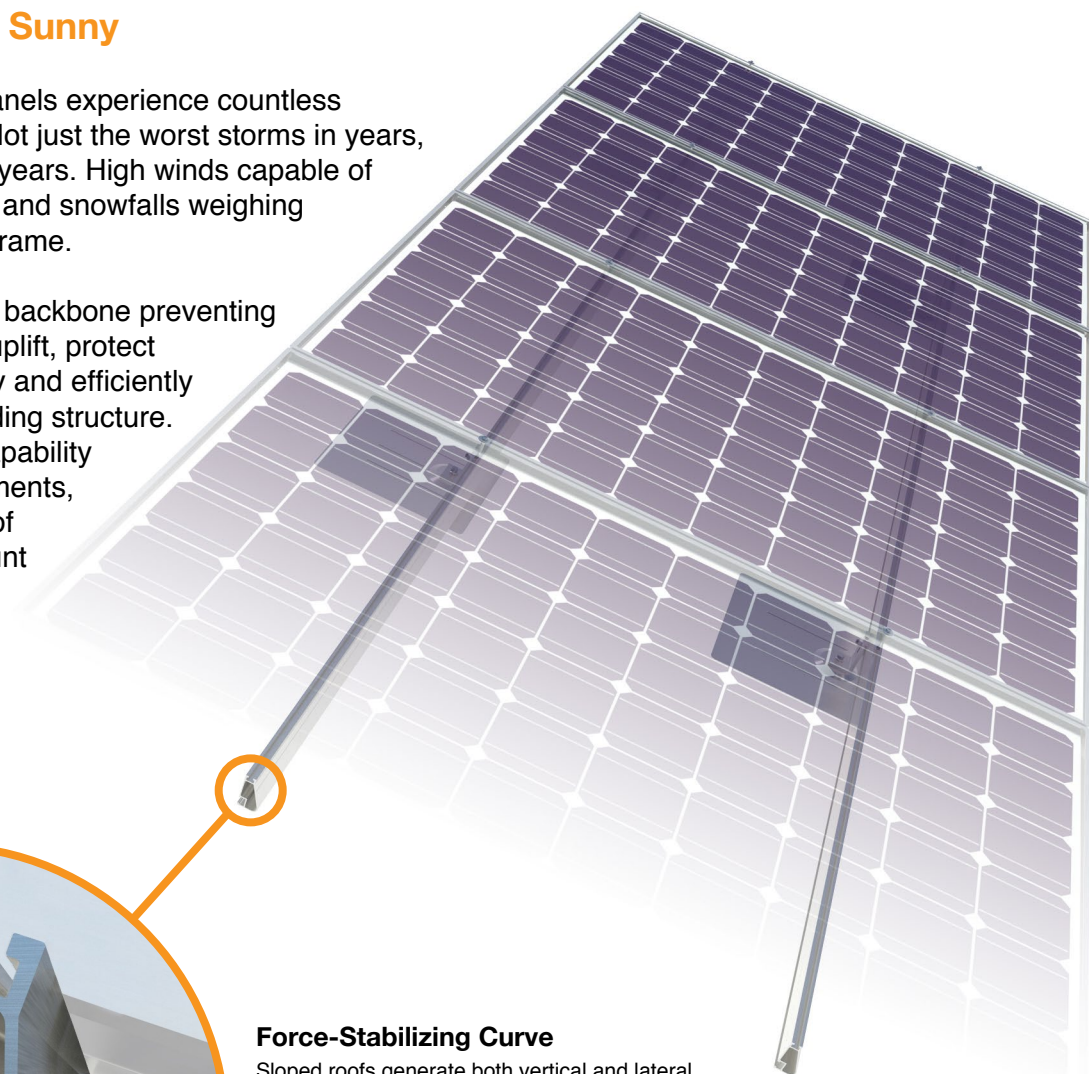
\*Requires Diagonal Bracing



## Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



### Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

### Compatible with Flat & Pitched Roofs



XR Rails are compatible with FlashFoot and other pitched roof attachments.



IronRidge offers a range of tilt leg options for flat roof mounting applications.

### Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.



## XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.



### XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

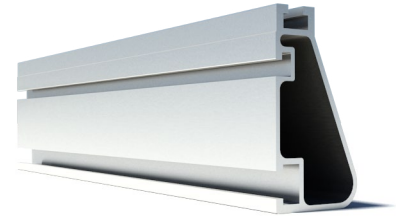
- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available



### XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



### XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

## Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit [IronRidge.com](http://IronRidge.com) for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10		XR100		XR1000	
	120						
	140						
	160						
10-20	100			XR1000			
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						



# MSE Multi 72

320-330Wp P-Type Multi-crystalline Modules



Advanced P-Type multi-crystalline cell technology



Power Output:  
Up to 330W power



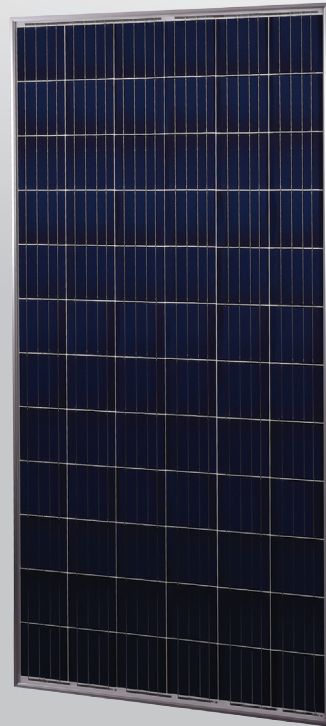
Certified Reliability



5600 Pa snow load *New!*  
175 mph wind rating



Buy American Act



## Proudly assembled in the USA

Mission Solar Energy is headquartered in San Antonio, TX with module facilities onsite. Our hardworking team calls Texas home and is devoted to producing high quality solar products and services. Our supply chain includes local and domestic vendors increasing our impact to the U.S. economy.



Assembled  
in the USA

## CERTIFICATIONS

IEC 61215/ IEC 61730/ IEC 61701  
UL 1703



\*As there are different certification requirements in different markets, please contact your local Mission Solar Energy sales representative for the specific certificates applicable to the products in the region in which the products are to be used.

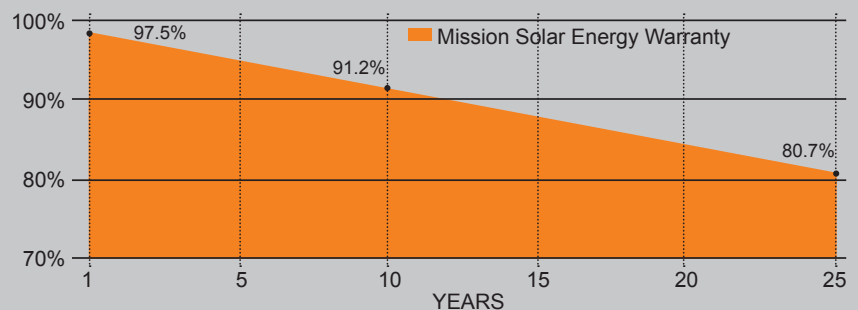
## Proven reliability and bankability

Mission Solar Energy panels have been tested by independent testing centers to meet and exceed IEC standards. Its panels are already deployed in multiple installations.

## Best in class quality

Mission Solar Energy production lines are fully automated and include multiple quality checks throughout the production process.

## 25-year linear warranty backed by Powerguard



## ELECTRICAL SPECIFICATIONS

Electrical parameters at Standard Test Condition (STC)

Module Type			MSE320MM6J	MSE325MM6J	MSE330MM6J
Power Output	P <sub>max</sub>	W <sub>p</sub>	320	325	330
Module Efficiency		%	16.13	16.40	16.64
Tolerance			0~+3%		
Short-Circuit Current	I <sub>sc</sub>	A	9.24	9.26	9.33
Open Circuit Voltage	V <sub>oc</sub>	V	45.18	45.80	46.01
Rated Current	I <sub>mp</sub>	A	8.69	8.72	8.81
Rated Voltage	V <sub>mp</sub>	V	36.88	37.34	37.50

STC: Irradiance 1000 W/m<sup>2</sup>, Cell temperature of 25°C, AM 1.5

## TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44°C (±2°C)
Temperature Coefficient of P <sub>max</sub>	-0.392%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.312%/°C
Temperature Coefficient of I <sub>mp</sub>	0.053%/°C

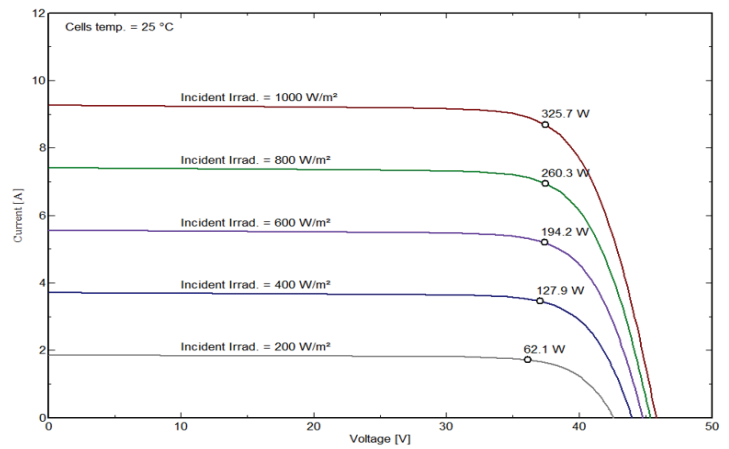
## OPERATING CONDITIONS

Maximum System Voltage	1,000VDC
Operating Temperature Range	-40°C (-40°F) to +90°C (194°F)
Maximum Series Fuse Rating	15A
Fire Safety Classification	Type 1, Class C
Front & Back Load (UL standard)	5600 Pa (117 psf) <b>New!</b>
Hail Safety Impact Velocity	25mm at 23 m/s

## MECHANICAL DATA

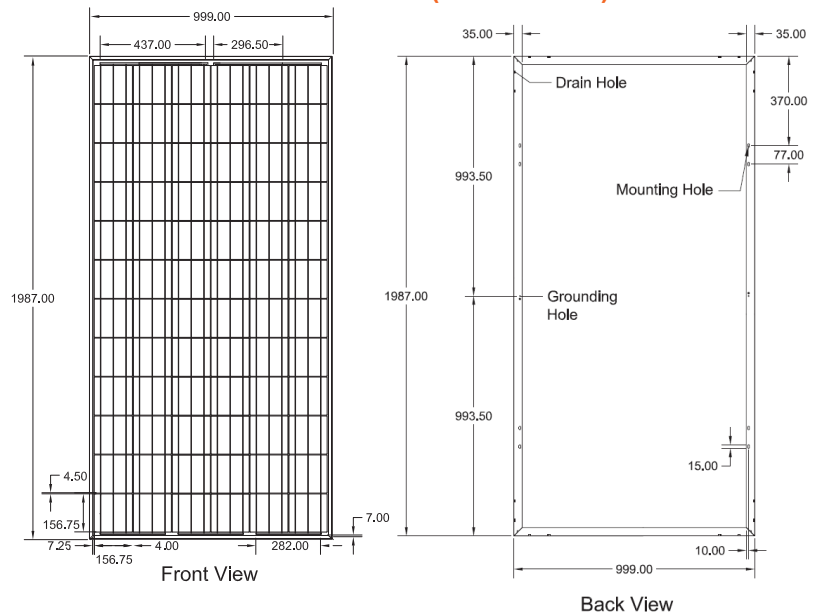
Solar Cells	P-type Multi-Crystalline Silicon (156.75mm)
Cell orientation	72 cells (6x12), 4 busbar
Module dimension	1987mm x 999mm x 40mm (78.23 in. x 39.33 in. x 1.57 in.)
Weight	21.6 kg (47.6 lb)
Front Glass	3.2mm (0.126 in.) tempered, Low-iron, Anti-reflective coating
Frame	Anodized aluminum alloy
Encapsulant	Ethylene vinyl acetate (EVA)
J-Box	Protection class IP67 with bypass-diode
Cables	PV wire, 1.2m (47.2 in.), 4mm <sup>2</sup> / 12 AWG
Connector	MC4 or compatible

## MSE325MM6J: 325WP, 72CELL SOLAR MODULE CURRENT-VOLTAGE CURVE



Current-voltage characteristics with dependence on irradiance and module temperature

## BASIC DESIGN (UNITS: mm)

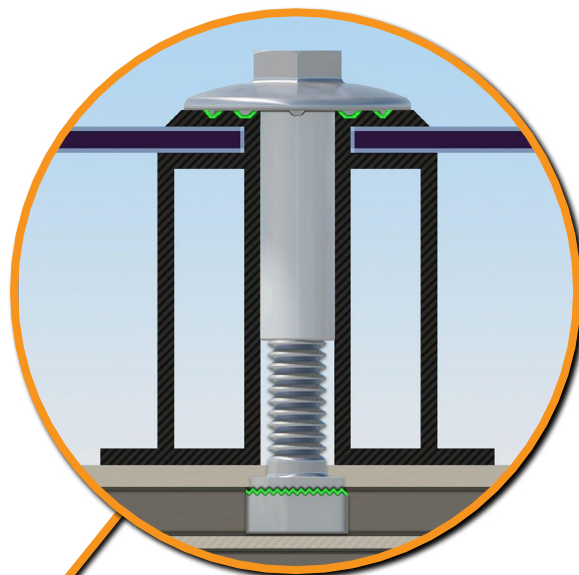




## Simplified Grounding for Every Application

The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



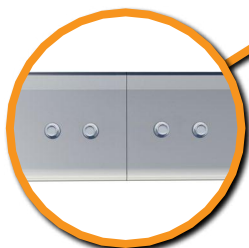
### Universal Fastening Object (UFO)

The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.



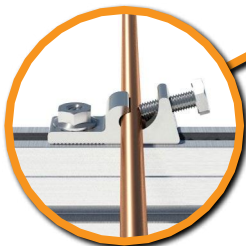
### Stopper Sleeve

The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.



### Bonded Splice

Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.



### Grounding Lug

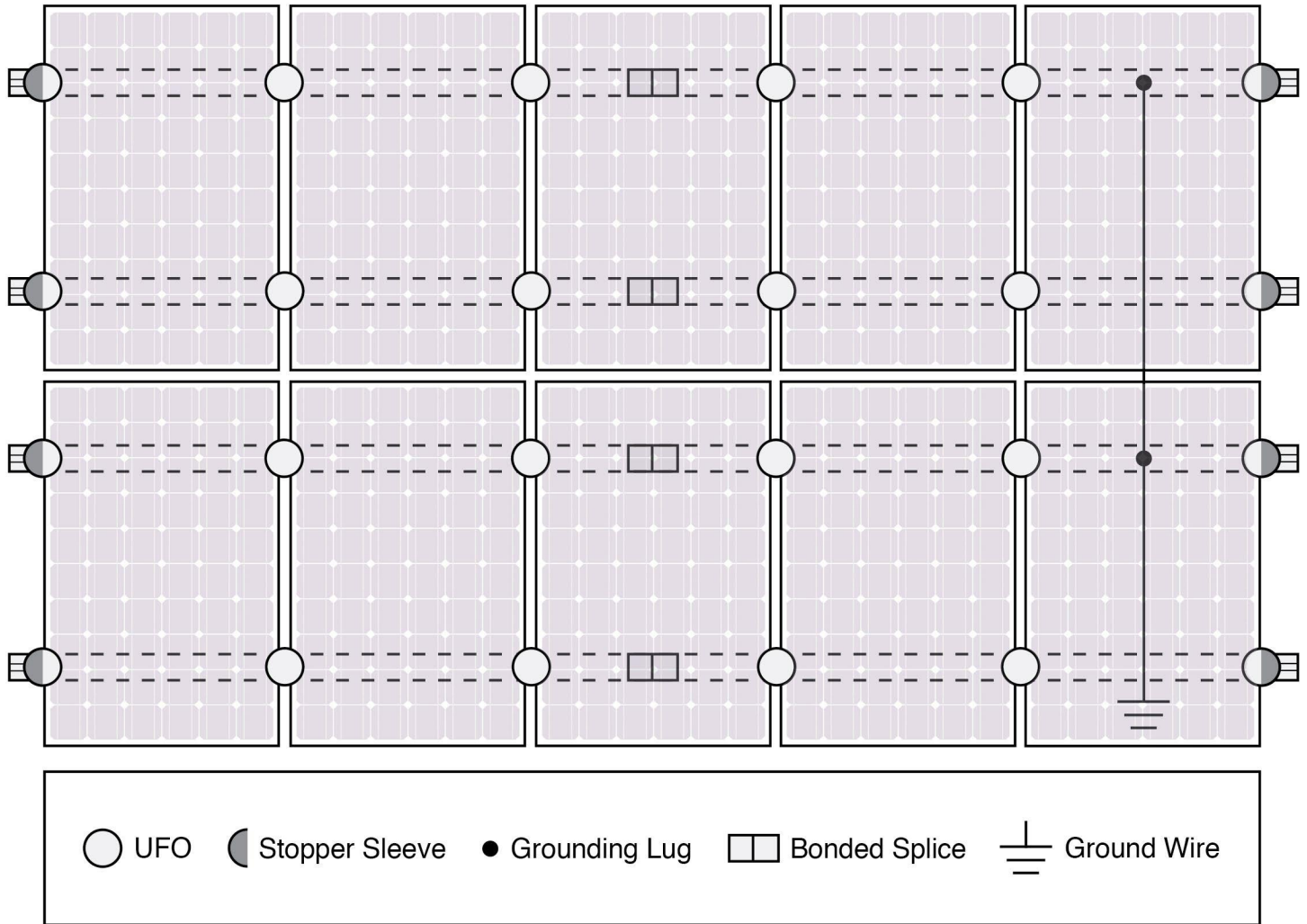
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



### Bonded Attachments

The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

## System Diagram



⚡ Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

## UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

 [Go to IronRidge.com/UFO](https://www.ironridge.com/UFO)

Cross-System Compatibility			
Feature	Flush Mount	Tilt Mount	Ground Mount
<b>XR Rails</b>	✓	✓	XR1000 Only
<b>UFO/Stopper</b>	✓	✓	✓
<b>Bonded Splice</b>	✓	✓	N/A
<b>Grounding Lugs</b>	1 per Row	1 per Row	1 per Array
<b>Microinverters &amp; Power Optimizers</b>	Enphase - M250-72, M250-60, M215-60, C250-72 Darfon - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
<b>Fire Rating</b>	Class A	Class A	N/A
<b>Modules</b>	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		



ATTACHMENT C.  
ROOF MOUNTED SOLAR ENERGY SYSTEM PLANS

**Customer Information:**

**Date:** 6/13/18  
**Project Name:** Long Thermal  
**Client:** Long  
**Address:** 420 Sage Rd, Ketchum Idaho  
**Phone:**  
**Email:**

**Project Details:**

**AHJ:** City of Ketchum County  
**Design Loads:** 120 mph wind per ASCE 7-10 ; 120 psf ground snow  
**Thermal Modules:** (4) Apricus AP30  
**Module Tilt:** 60°  
**Module Azimuth:** 188°  
**Tank:** (1) Hydroflex  
**Racking Type:** Apricus shingle attachments  
**Attachment Type:** Apricus tilt Rack

**Altenergy Incorporated**  
202 W 38th St.  
Garden City, ID 83714  
208-991-3822



**Solar Energy Solutions**  
www.altenergyincorporated.com  
208-991-3822



**ISSUE**  
6/13/18

**PROJECT NAME**  
Long  
**Project Address**  
420 Sage Rd  
Ketchum Idaho

**DRAWN BY:** BN  
**DESCRIPTION**  
Long  
Thermal





1

A

**DRAWN BY:** BN

**DESCRIPTION**  
Site Plan

**PROJECT NAME**  
Long  
**Project Address**  
420 Sage Rd  
Ketchum Idaho

**ISSUE**  
6/13/18



**Altenergy Incorporated**  
202 W 38th St.  
Garden City, ID 83714  
208-991-3822



2

A

**DRAWN BY:** BN

**DESCRIPTION**  
Roof Array  
Dimensions

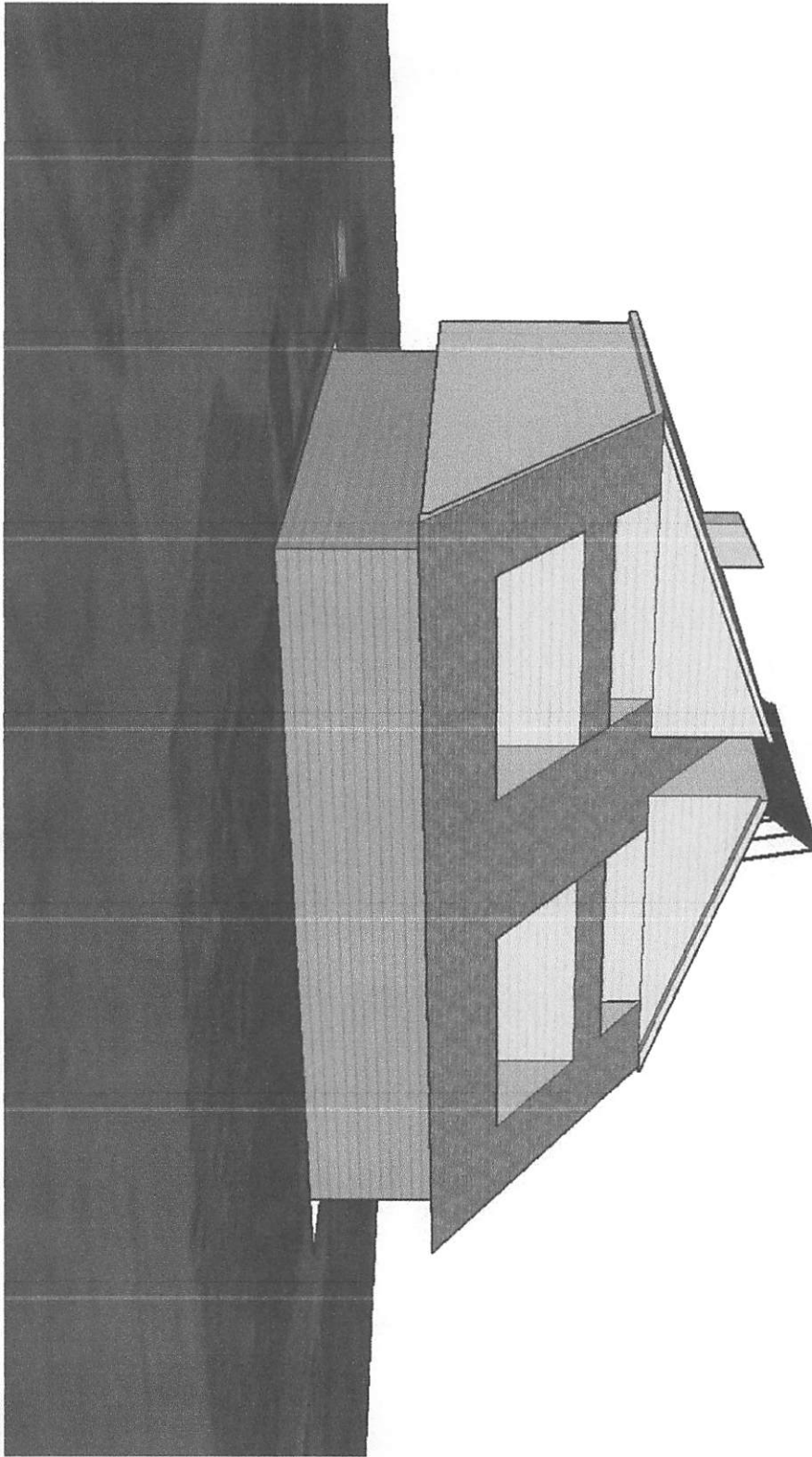
**PROJECT NAME**  
Long  
**Project Address**  
420 Sage Rd  
Ketchum Idaho

**ISSUE**  
6/13/18



**Altenegy Incorporated**  
202 W 38th St.  
Garden City, ID 83714  
208-991-3822





**DRAWN BY:** BN

**PROJECT NAME**  
Long  
**Project Address**  
420 Sage Rd  
Ketchum Idaho

**ISSUE**  
6/13/18



**Altenergy Incorporated**  
202 W 38th St.  
Garden City, ID 83714  
208-991-3822



# Submittal Data Information

## ETC-30 Solar Collector

USA Version  
A11-01.2.1.3-PB-V3 - June 2015

Job: \_\_\_\_\_ Engineer: \_\_\_\_\_ Contractor: \_\_\_\_\_ Rep: \_\_\_\_\_

### Part Codes

ETC-30 Solar Collector Complete is comprised of:  
 1 x ETC-30-KIT (Manifold and standard frame)  
 3 x BOX-ET/HP-10/10 (Tubes and heat pipes)

### Applications

The Apricus ETC-30 collector is designed to be used in a wide variety of solar thermal (heat) applications in almost any climate. The evacuated tube and heat pipe technology provides very efficient and reliable solar thermal production in a simple to install design.

### Materials of Construction

Evacuated Tubes:	Borosilicate 3.3 Glass
Absorber:	Cu-AL/N-SS
Heat Pipes:	High purity copper
Rubber Components:	HTV Silicone Rubber
Mounting Frame:	6005-T5 Anodized Aluminum
	316 SS Fasteners
Manifold Casing:	3003 AL. PVDF coating

### Flow Guidelines

Recommended Flow Rate:	0.5 gpm
Max Flow Rate:	4 gpm
Heat Transfer Liquid:	Water or 50% Glycol/water

### Physical Specifications

Dimensions (WxHxD):	78.9" x 86.4" x 5.35"
Aperture Area:	30.77 ft <sup>2</sup>
Gross Area:	47.33 ft <sup>2</sup>
Gross Dry Weight:	209 lbs
Fluid Capacity:	0.2 gal
Max Operating Pressure:	116 psi
Stagnation Temperature:	442°F

### Warranty

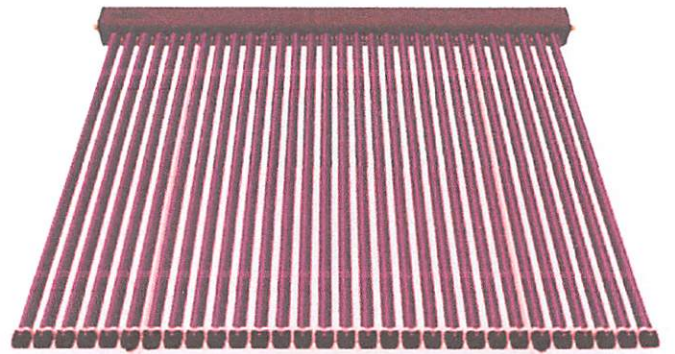
- 10 year limited warranty on tubes and heat pipes
- 15 year limited warranty on copper header and mounting frame

### Certifications

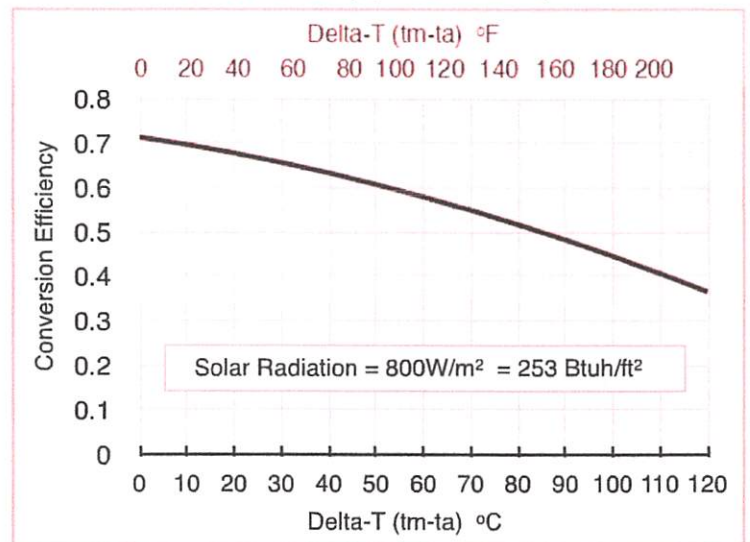
SRCC OG-100:	10001909
USEC:	S-5995
NSF-61 Tested:	17248

### OG-100 Performance Ratings

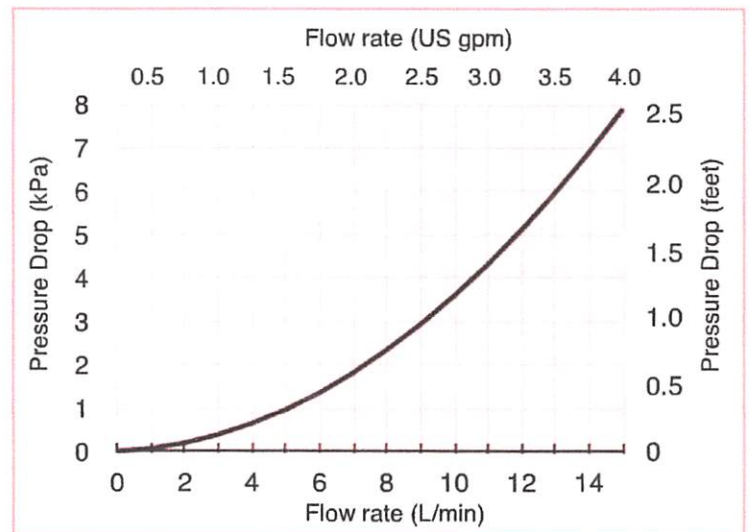
Climate Category (Ti-Ta)	High Radiation (2000 Btu/ft <sup>2</sup> /day)	Medium Radiation (1500 Btu/ft <sup>2</sup> /day)
A (-9°F)	45.3	34.2
B (9°F)	43.7	32.6
C (36°F)	40.9	29.8
D (90°F)	34.4	23.5
E (144°F)	26.7	15.8



### Collector Performance (aperture area)



### Pressure Drop





ATTACHMENT D.  
FIRE DEPARTMENT COMMENTS

# **Ketchum Fire Department** M E M O R A N D U M

To: Altenergy, INC.  
CC: Jim Lynch, Building Official  
From: Tom Ancona, Fire Marshal   
Date: August 9, 2018  
Subject: Single Family Residence Photovoltaic Array, 420 Sage Road

**The submitted plans for the above project are approved by the Fire District provided all of the following conditions are met and maintained as required:**

**Solar photovoltaic power systems.**

**Solar photovoltaic power systems shall be installed in accordance with the International Fire Code, International Building Code and NFPA 70.**

The above project shall meet all 2012 International Fire Code requirements in addition to specific City Building and Fire Ordinances.

Vehicle parking and material storage during construction shall not restrict or obstruct public streets or access to any building. A minimum twenty-foot travel lane for emergency vehicle access shall be maintained clear and unobstructed at all times. All required Fire Lanes, including within 15 feet of fire hydrants, shall be maintained clear and unobstructed at all times.

Fire extinguishers shall be maintained per 2012 IFC Section 906 during construction.

Marking is required on interior and exterior direct-current (DC) conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes and disconnects. The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required in Sections 605.11.1.2 through 605.11.1.4 shall have all letters capitalized with a minimum height of 3/8 inch (9.5 mm) white on red background.

The marking shall contain the words "WARNING: PHOTOVOLTAIC POWER SOURCE."


The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.

Marking shall be placed on interior and exterior DC conduit, raceways, enclosures and cable assemblies every 10 feet (3048 mm), within 1 foot (305 mm) of turns or bends and within 1 foot (305 mm) above and below penetrations of roof/ceiling assemblies, walls or barriers.

**Final inspections of all Fire District required installations by the Fire Chief or an appointee are required and must be scheduled at least 48 hours in advance.**



## **Ketchum Fire Department** M E M O R A N D U M

**To:** Altenergy, INC.  
**CC:** Jim Lynch, Building Official  
**From:** Tom Ancona, Fire Marshal   
**Date:** August 9, 2018  
**Subject:** Long Thermal, 420 Sage Road

**The submitted plans for the above project are approved by the Fire District provided all of the following conditions are met and maintained as required:**

The above project shall meet all 2012 International Fire Code requirements in addition to specific City Building and Fire Ordinances.

Vehicle parking and material storage during construction shall not restrict or obstruct public streets or access to any building. A **minimum** twenty-foot travel lane for emergency vehicle access shall be maintained clear and unobstructed at all times. All required Fire Lanes, including within 15 feet of fire hydrants, shall be maintained clear and unobstructed at all times.

Fire extinguishers shall be maintained per 2012 IFC Section 906 both during construction on the building.

Panels/modules installed on residential buildings with a single ridge shall be located in a manner that provides two, 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels/modules are located.

Panels/modules installed on residential buildings shall be located no higher than 3 feet (914 mm) below the ridge in order to allow for fire department smoke ventilation operations.

**Final inspections of all Fire District required installations by the Fire Chief or an appointee are required and must be scheduled at least 48 hours in advance.**

ATTACHMENT E.  
GROUND MOUNTED SOLAR ENERGY SYSTEM  
STRUCTURAL ANALYSIS





# Starling Madison Lofquist, Inc.

*Consulting Structural and Forensic Engineers*

5224 South 39<sup>th</sup> Street, Phoenix, Arizona 85040  
tel: (602) 438-2500 fax: (602) 438-2505 ROC#291316 www.smleng.com

IronRidge  
1495 Zephyr Ave  
Hayward, CA 94544

February 17, 2017  
Page 1 of 20

Attn: Mr. David F. Taggart, Vice President Products

Subject: IronRidge XR1000 Rail, Roof Flush Mounting System – Structural Analysis

Dear Sir:

We have analyzed the IronRidge XR1000 Rail for the subject solar module support system and determined that, for the configurations and criteria described below, it is in compliance with the applicable sections of the following Reference Documents:

Codes: ASCE/SEI 7-10 Min. Design Loads for Buildings & Other Structures  
International Building Code 2015 Edition

Other: AC428, Acceptance Criteria for Modular Framing Systems Used to Support PV  
Modules, dated Effective November 1, 2012 by ICC-ES  
Aluminum Design Manual, 2015 Edition

The IronRidge XR1000 Rail is an extruded aluminum section with an overall depth of 3.00 in. and a net area of 0.807 sq.in. The rails are used to support solar modules, typically, on the roof of a building. See Exhibit 0012 – attached. The modules are clamped to the rails by the IronRidge Module Mounting Clamps as shown in the attached Exhibit. The rails are attached to aluminum angle brackets that are either attached directly to the roof framing or attached to a stand that is screwed to the roof framing. The rails are mounted across the slope with a small clearance (flush mounting) to the underlying roof structure. The installed solar modules are at the same slope as the underlying roof structure.

All loads are transferred to the roof framing through the angle brackets by simple bi-axial flexure of the rails. The maximum span of the rails is governed by either the mid-span flexural stresses or the deflection requirement that the rail not come into contact with the roof.

The effect of seismic loads (for all design categories A-F) have been determined to be less than the effect due to wind loads in all load conditions and combinations. Therefore, the maximum allowable spans for common load cases are shown in the tables below. Tables 1A-9A are for modules with a maximum long dimension of 67.5 inches and Tables 1B-9B are for modules with a maximum long dimension of 78.5 inches.

<b>Table 1A - MAXIMUM SPANS (in) - Roof Slope 0° to 6° - Wind Zone 1 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	163	138	116	109	97	88	80	75	70	66
	105	163	138	116	109	97	88	80	75	70	66
	110	163	138	116	109	97	88	80	75	70	66
	120	161	138	116	109	97	88	80	75	70	66
	130	148	138	116	109	97	88	80	75	70	66
	140	137	137	116	109	97	88	80	75	70	66
	150	128	128	116	109	97	88	80	75	70	66
	160	120	120	116	109	97	88	80	75	70	66
Category C	170	113	113	113	109	97	88	80	75	70	66
	100	163	138	116	109	97	88	80	75	70	66
	105	155	138	116	109	97	88	80	75	70	66
	110	148	138	116	109	97	88	80	75	70	66
	120	135	135	116	109	97	88	80	75	70	66
	130	125	125	116	109	97	88	80	75	70	66
	140	116	116	116	109	97	88	80	75	70	66
	150	108	108	108	108	97	88	80	75	70	66
Category D	160	101	101	101	101	97	88	80	75	70	66
	170	95	95	95	95	95	88	80	75	70	66
	100	149	138	116	109	97	88	80	75	70	66
	105	142	138	116	109	97	88	80	75	70	66
	110	135	135	116	109	97	88	80	75	70	66
	120	124	124	116	109	97	88	80	75	70	66
	130	114	114	114	109	97	88	80	75	70	66
	140	106	106	106	106	97	88	80	75	70	66
Category D	150	99	99	99	99	97	88	80	75	70	66
	160	93	93	93	93	93	88	80	75	70	66
	170	88	88	88	88	88	88	80	75	70	66

Notes – see page 20



<b>Table 2A - MAXIMUM SPANS (in) - Roof Slope 0° to 6° - Wind Zone 2 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	143	138	116	109	97	88	80	75	70	66
	105	136	136	116	109	97	88	80	75	70	66
	110	130	130	116	109	97	88	80	75	70	66
	120	119	119	116	109	97	88	80	75	70	66
	130	110	110	110	109	97	88	80	75	70	66
	140	102	102	102	102	97	88	80	75	70	66
	150	95	95	95	95	95	88	80	75	70	66
	160	89	89	89	89	89	88	80	75	70	66
170	84	84	84	84	84	84	80	75	70	66	
Category C	100	121	121	116	109	97	88	80	75	70	66
	105	115	115	115	109	97	88	80	75	70	66
	110	110	110	110	109	97	88	80	75	70	66
	120	101	101	101	101	97	88	80	75	70	66
	130	93	93	93	93	93	88	80	75	70	66
	140	86	86	86	86	86	86	80	75	70	66
	150	81	81	81	81	81	81	80	75	70	66
	160	76	76	76	76	76	76	76	75	70	66
170	71	71	71	71	71	71	71	71	70	66	
Category D	100	111	111	111	109	97	88	80	75	70	66
	105	106	106	106	106	97	88	80	75	70	66
	110	101	101	101	101	97	88	80	75	70	66
	120	92	92	92	92	92	88	80	75	70	66
	130	85	85	85	85	85	85	80	75	70	66
	140	79	79	79	79	79	79	79	75	70	66
	150	74	74	74	74	74	74	74	74	70	66
	160	70	70	70	70	70	70	70	70	70	66
170	65	65	65	65	65	65	65	65	65	65	

Notes – see page 20

<b>Table 3A - MAXIMUM SPANS (in) - Roof Slope 0° to 6° - Wind Zone 3 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	Ground Snow Load									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	115	115	115	109	97	88	80	75	70	66
	105	109	109	109	109	97	88	80	75	70	66
	110	104	104	104	104	97	88	80	75	70	66
	120	95	95	95	95	95	88	80	75	70	66
	130	88	88	88	88	88	88	80	75	70	66
	140	82	82	82	82	82	82	80	75	70	66
	150	77	77	77	77	77	77	77	75	70	66
	160	72	72	72	72	72	72	72	72	70	66
Category C	170	68	68	68	68	68	68	68	68	68	66
	100	97	97	97	97	97	88	80	75	70	66
	105	92	92	92	92	92	88	80	75	70	66
	110	88	88	88	88	88	88	80	75	70	66
	120	81	81	81	81	81	81	80	75	70	66
	130	75	75	75	75	75	75	75	75	70	66
	140	69	69	69	69	69	69	69	69	69	66
	150	65	65	65	65	65	65	65	65	65	65
Category D	160	61	61	61	61	61	61	61	61	61	61
	170	57	57	57	57	57	57	57	57	57	57
	100	89	89	89	89	89	88	80	75	70	66
	105	85	85	85	85	85	85	80	75	70	66
	110	81	81	81	81	81	81	80	75	70	66
	120	74	74	74	74	74	74	74	74	70	66
	130	69	69	69	69	69	69	69	69	69	66
	140	64	64	64	64	64	64	64	64	64	64
Category D	150	60	60	60	60	60	60	60	60	60	60
	160	56	56	56	56	56	56	56	56	56	56
	170	53	53	53	53	53	53	53	53	53	53

Notes – see page 20



<b>Table 4A - MAXIMUM SPANS (in) - Roof Slope 7° to 27° - Wind Zone 1 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	148	128	109	94	83	75	69	64	60	57
	105	148	128	109	94	83	75	69	64	60	57
	110	148	128	109	94	83	75	69	64	60	57
	120	148	128	109	94	83	75	69	64	60	57
	130	147	128	109	94	83	75	69	64	60	57
	140	137	128	109	94	83	75	69	64	60	57
	150	129	126	108	94	83	75	69	64	60	57
	160	121	121	106	94	83	75	69	64	60	57
Category C	170	115	115	104	93	83	75	69	64	60	57
	100	148	128	109	94	83	75	69	64	60	57
	105	148	128	109	94	83	75	69	64	60	57
	110	147	128	109	94	83	75	69	64	60	57
	120	136	128	109	94	83	75	69	64	60	57
	130	126	125	107	94	83	75	69	64	60	57
	140	117	117	105	93	83	75	69	64	60	57
	150	110	110	103	92	83	75	69	64	60	57
Category D	160	104	104	100	90	82	75	69	64	60	57
	170	98	98	98	88	81	75	69	64	60	57
	100	148	128	109	94	83	75	69	64	60	57
	105	142	128	109	94	83	75	69	64	60	57
	110	136	128	109	94	83	75	69	64	60	57
	120	125	125	107	94	83	75	69	64	60	57
	130	116	116	104	93	83	75	69	64	60	57
	140	109	109	102	91	83	75	69	64	60	57
Category D	150	102	102	100	89	82	75	69	64	60	57
	160	96	96	96	88	80	75	69	64	60	57
	170	90	90	90	86	79	74	69	64	60	57

Notes – see page 20

<b>Table 5A - MAXIMUM SPANS (in) - Roof Slope 7° to 27° - Wind Zone 2 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	140	128	109	94	83	75	69	64	60	57
	105	134	128	109	94	83	75	69	64	60	57
	110	128	128	109	94	83	75	69	64	60	57
	120	118	118	109	94	83	75	69	64	60	57
	130	109	109	109	94	83	75	69	64	60	57
	140	102	102	102	94	83	75	69	64	60	57
	150	96	96	96	94	83	75	69	64	60	57
	160	90	90	90	90	83	75	69	64	60	57
Category C	170	85	85	85	85	83	75	69	64	60	57
	100	120	120	109	94	83	75	69	64	60	57
	105	114	114	109	94	83	75	69	64	60	57
	110	109	109	109	94	83	75	69	64	60	57
	120	101	101	101	94	83	75	69	64	60	57
	130	93	93	93	93	83	75	69	64	60	57
	140	87	87	87	87	83	75	69	64	60	57
	150	81	81	81	81	81	75	69	64	60	57
Category D	160	77	77	77	77	77	75	69	64	60	57
	170	72	72	72	72	72	72	69	64	60	57
	100	110	110	109	94	83	75	69	64	60	57
	105	105	105	105	94	83	75	69	64	60	57
	110	101	101	101	94	83	75	69	64	60	57
	120	93	93	93	93	83	75	69	64	60	57
	130	86	86	86	86	83	75	69	64	60	57
	140	80	80	80	80	80	75	69	64	60	57
150	75	75	75	75	75	75	69	64	60	57	
160	71	71	71	71	71	71	69	64	60	57	
170	67	67	67	67	67	67	67	64	60	57	

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<b>Table 6A - MAXIMUM SPANS (in) - Roof Slope 7° to 27° - Wind Zone 3 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	Ground Snow Load									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	115	115	109	94	83	75	69	64	60	57
	105	110	110	109	94	83	75	69	64	60	57
	110	105	105	105	94	83	75	69	64	60	57
	120	97	97	97	94	83	75	69	64	60	57
	130	90	90	90	90	83	75	69	64	60	57
	140	83	83	83	83	83	75	69	64	60	57
	150	78	78	78	78	78	75	69	64	60	57
	160	73	73	73	73	73	73	69	64	60	57
Category C	100	98	98	98	94	83	75	69	64	60	57
	105	93	93	93	93	83	75	69	64	60	57
	110	89	89	89	89	83	75	69	64	60	57
	120	82	82	82	82	82	75	69	64	60	57
	130	76	76	76	76	76	75	69	64	60	57
	140	71	71	71	71	71	71	69	64	60	57
	150	66	66	66	66	66	66	66	64	60	57
	160	62	62	62	62	62	62	62	62	60	57
Category D	100	90	90	90	90	83	75	69	64	60	57
	105	86	86	86	86	83	75	69	64	60	57
	110	82	82	82	82	82	75	69	64	60	57
	120	76	76	76	76	76	75	69	64	60	57
	130	70	70	70	70	70	70	69	64	60	57
	140	65	65	65	65	65	65	65	64	60	57
	150	61	61	61	61	61	61	61	61	60	57
	160	57	57	57	57	57	57	57	57	57	57
170	54	54	54	54	54	54	54	54	54	54	

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<b>Table 7A - MAXIMUM SPANS (in) - Roof Slope 28° to 45° - Wind Zone 1 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	140	128	110	98	87	79	72	67	63	60
	105	140	128	110	98	87	79	72	67	63	60
	110	139	127	110	98	87	79	72	67	63	60
	120	132	123	107	96	87	79	72	67	63	60
	130	126	119	104	94	86	79	72	67	63	60
	140	120	115	102	92	85	79	72	67	63	60
	150	114	111	99	90	83	78	72	67	63	60
	160	109	108	97	88	82	76	72	67	63	60
Category C	100	133	124	107	96	87	79	72	67	63	60
	105	129	121	106	95	87	79	72	67	63	60
	110	126	119	104	94	86	79	72	67	63	60
	120	119	114	101	92	84	79	72	67	63	60
	130	112	110	98	89	83	77	72	67	63	60
	140	107	106	95	87	81	76	71	67	63	60
	150	101	101	92	85	79	74	70	67	63	60
	160	96	96	89	82	77	72	69	65	63	60
Category D	100	127	120	105	94	86	79	72	67	63	60
	105	123	117	103	93	85	79	72	67	63	60
	110	119	115	101	92	84	79	72	67	63	60
	120	112	110	98	89	82	77	72	67	63	60
	130	106	105	95	87	80	75	71	67	63	60
	140	100	100	91	84	78	74	70	66	63	60
	150	95	95	88	82	76	72	68	65	62	60
	160	89	89	85	79	74	70	67	64	61	59
170	84	84	82	77	72	69	65	63	60	58	

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<b>Table 8A - MAXIMUM SPANS (in) - Roof Slope 28° to 45° - Wind Zone 2 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	140	128	110	98	87	79	72	67	63	60
	105	140	128	110	98	87	79	72	67	63	60
	110	139	127	110	98	87	79	72	67	63	60
	120	132	123	107	96	87	79	72	67	63	60
	130	124	119	104	94	86	79	72	67	63	60
	140	116	115	102	92	85	79	72	67	63	60
	150	109	109	99	90	83	78	72	67	63	60
	160	103	103	97	88	82	76	72	67	63	60
Category C	170	98	98	94	86	80	75	71	67	63	60
	100	133	124	107	96	87	79	72	67	63	60
	105	129	121	106	95	87	79	72	67	63	60
	110	124	119	104	94	86	79	72	67	63	60
	120	115	114	101	92	84	79	72	67	63	60
	130	107	107	98	89	83	77	72	67	63	60
	140	100	100	95	87	81	76	71	67	63	60
	150	94	94	92	85	79	74	70	67	63	60
Category D	160	89	89	89	82	77	72	69	65	63	60
	170	84	84	84	80	75	71	67	64	62	59
	100	125	120	105	94	86	79	72	67	63	60
	105	120	117	103	93	85	79	72	67	63	60
	110	115	115	101	92	84	79	72	67	63	60
	120	106	106	98	89	82	77	72	67	63	60
	130	99	99	95	87	80	75	71	67	63	60
	140	93	93	91	84	78	74	70	66	63	60
Category D	150	87	87	87	82	76	72	68	65	62	60
	160	82	82	82	79	74	70	67	64	61	59
	170	78	78	78	77	72	69	65	63	60	58

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<b>Table 9A - MAXIMUM SPANS (in) - Roof Slope 28° to 45° - Wind Zone 3 (67.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	Ground Snow Load									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	140	128	110	98	87	79	72	67	63	60
	105	140	128	110	98	87	79	72	67	63	60
	110	139	127	110	98	87	79	72	67	63	60
	120	132	123	107	96	87	79	72	67	63	60
	130	124	119	104	94	86	79	72	67	63	60
	140	116	115	102	92	85	79	72	67	63	60
	150	109	109	99	90	83	78	72	67	63	60
	160	103	103	97	88	82	76	72	67	63	60
Category C	170	98	98	94	86	80	75	71	67	63	60
	100	133	124	107	96	87	79	72	67	63	60
	105	129	121	106	95	87	79	72	67	63	60
	110	124	119	104	94	86	79	72	67	63	60
	120	115	114	101	92	84	79	72	67	63	60
	130	107	107	98	89	83	77	72	67	63	60
	140	100	100	95	87	81	76	71	67	63	60
	150	94	94	92	85	79	74	70	67	63	60
Category D	160	89	89	89	82	77	72	69	65	63	60
	170	84	84	84	80	75	71	67	64	62	59
	100	125	120	105	94	86	79	72	67	63	60
	105	120	117	103	93	85	79	72	67	63	60
	110	115	115	101	92	84	79	72	67	63	60
	120	106	106	98	89	82	77	72	67	63	60
	130	99	99	95	87	80	75	71	67	63	60
	140	93	93	91	84	78	74	70	66	63	60
Category D	150	87	87	87	82	76	72	68	65	62	60
	160	82	82	82	79	74	70	67	64	61	59
	170	78	78	78	77	72	69	65	63	60	58

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<b>Table 1B - MAXIMUM SPANS (in) - Roof Slope 0° to 6° - Wind Zone 1 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	151	129	108	101	90	81	75	69	65	61
	105	151	129	108	101	90	81	75	69	65	61
	110	151	129	108	101	90	81	75	69	65	61
	120	150	129	108	101	90	81	75	69	65	61
	130	138	129	108	101	90	81	75	69	65	61
	140	128	128	108	101	90	81	75	69	65	61
	150	119	119	108	101	90	81	75	69	65	61
	160	112	112	108	101	90	81	75	69	65	61
Category C	170	105	105	105	101	90	81	75	69	65	61
	100	151	129	108	101	90	81	75	69	65	61
	105	145	129	108	101	90	81	75	69	65	61
	110	138	129	108	101	90	81	75	69	65	61
	120	126	126	108	101	90	81	75	69	65	61
	130	116	116	108	101	90	81	75	69	65	61
	140	108	108	108	101	90	81	75	69	65	61
	150	101	101	101	101	90	81	75	69	65	61
Category D	160	94	94	94	94	90	81	75	69	65	61
	170	89	89	89	89	89	81	75	69	65	61
	100	140	129	108	101	90	81	75	69	65	61
	105	133	129	108	101	90	81	75	69	65	61
	110	127	127	108	101	90	81	75	69	65	61
	120	116	116	108	101	90	81	75	69	65	61
	130	107	107	107	101	90	81	75	69	65	61
	140	99	99	99	99	90	81	75	69	65	61
Category D	150	93	93	93	93	90	81	75	69	65	61
	160	87	87	87	87	87	81	75	69	65	61
	170	82	82	82	82	82	81	75	69	65	61
	170	82	82	82	82	82	81	75	69	65	61

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<b>Table 2B - MAXIMUM SPANS (in) - Roof Slope 0° to 6° - Wind Zone 2 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	134	129	108	101	90	81	75	69	65	61
	105	127	127	108	101	90	81	75	69	65	61
	110	121	121	108	101	90	81	75	69	65	61
	120	111	111	108	101	90	81	75	69	65	61
	130	103	103	103	101	90	81	75	69	65	61
	140	95	95	95	95	90	81	75	69	65	61
	150	89	89	89	89	89	81	75	69	65	61
	160	83	83	83	83	83	81	75	69	65	61
Category C	170	78	78	78	78	78	78	75	69	65	61
	100	113	113	108	101	90	81	75	69	65	61
	105	107	107	107	101	90	81	75	69	65	61
	110	102	102	102	101	90	81	75	69	65	61
	120	94	94	94	94	90	81	75	69	65	61
	130	87	87	87	87	87	81	75	69	65	61
	140	80	80	80	80	80	80	75	69	65	61
	150	75	75	75	75	75	75	75	69	65	61
Category D	160	70	70	70	70	70	70	70	69	65	61
	170	66	66	66	66	66	66	66	66	65	61
	100	104	104	104	101	90	81	75	69	65	61
	105	99	99	99	99	90	81	75	69	65	61
	110	94	94	94	94	90	81	75	69	65	61
	120	86	86	86	86	86	81	75	69	65	61
	130	80	80	80	80	80	80	75	69	65	61
	140	74	74	74	74	74	74	74	69	65	61
150	69	69	69	69	69	69	69	69	65	61	
160	65	65	65	65	65	65	65	65	65	61	
170	61	61	61	61	61	61	61	61	61	61	

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<b>Table 3B - MAXIMUM SPANS (in) - Roof Slope 0° to 6° - Wind Zone 3 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	Ground Snow Load									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	107	107	107	101	90	81	75	69	65	61
	105	102	102	102	101	90	81	75	69	65	61
	110	97	97	97	97	90	81	75	69	65	61
	120	89	89	89	89	89	81	75	69	65	61
	130	82	82	82	82	82	81	75	69	65	61
	140	76	76	76	76	76	76	75	69	65	61
	150	71	71	71	71	71	71	71	69	65	61
	170	63	63	63	63	63	63	63	63	63	63
Category C	100	90	90	90	90	90	81	75	69	65	61
	105	86	86	86	86	86	81	75	69	65	61
	110	82	82	82	82	82	81	75	69	65	61
	120	75	75	75	75	75	75	75	69	65	61
	130	70	70	70	70	70	70	70	69	65	61
	140	65	65	65	65	65	65	65	65	65	61
	150	60	60	60	60	60	60	60	60	60	60
	170*	53	53	53	53	53	53	53	53	53	53
Category D	100	83	83	83	83	83	81	75	69	65	49
	105	79	79	79	79	79	79	75	69	65	61
	110	76	76	76	76	76	76	75	69	65	61
	120	69	69	69	69	69	69	69	69	65	61
	130	64	64	64	64	64	64	64	64	64	61
	140	59	59	59	59	59	59	59	59	59	59
	150*	55	55	55	55	55	55	55	55	55	55
	170*	49	49	49	49	49	49	49	49	49	49

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<b>Table 4B - MAXIMUM SPANS (in) - Roof Slope 7° to 27° - Wind Zone 1 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	138	119	101	88	77	70	64	60	56	53
	105	138	119	101	88	77	70	64	60	56	53
	110	138	119	101	88	77	70	64	60	56	53
	120	138	119	101	88	77	70	64	60	56	53
	130	138	119	101	88	77	70	64	60	56	53
	140	128	119	101	88	77	70	64	60	56	53
	150	120	117	100	88	77	70	64	60	56	53
	160	113	113	98	87	77	70	64	60	56	53
	170	107	107	97	86	77	70	64	60	56	53
Category C	100	138	119	101	88	77	70	64	60	56	53
	105	138	119	101	88	77	70	64	60	56	53
	110	137	119	101	88	77	70	64	60	56	53
	120	127	119	101	88	77	70	64	60	56	53
	130	118	116	99	88	77	70	64	60	56	53
	140	110	110	97	87	77	70	64	60	56	53
	150	103	103	95	85	77	70	64	60	56	53
	160	97	97	93	84	76	70	64	60	56	53
	170	91	91	91	82	75	70	64	60	56	53
Category D	100	138	119	101	88	77	70	64	60	56	53
	105	133	119	101	88	77	70	64	60	56	53
	110	127	119	101	88	77	70	64	60	56	53
	120	117	116	99	88	77	70	64	60	56	53
	130	109	109	97	86	77	70	64	60	56	53
	140	101	101	95	85	77	70	64	60	56	53
	150	95	95	93	83	76	70	64	60	56	53
	160	89	89	89	81	75	69	64	60	56	53
	170	84	84	84	80	73	68	64	60	56	53

Notes – see page 20



<b>Table 5B - MAXIMUM SPANS (in) - Roof Slope 7° to 27° - Wind Zone 2 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	<b>Ground Snow Load</b>									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	131	119	101	88	77	70	64	60	56	53
	105	125	119	101	88	77	70	64	60	56	53
	110	120	119	101	88	77	70	64	60	56	53
	120	110	110	101	88	77	70	64	60	56	53
	130	102	102	101	88	77	70	64	60	56	53
	140	95	95	95	88	77	70	64	60	56	53
	150	89	89	89	88	77	70	64	60	56	53
	160	84	84	84	84	77	70	64	60	56	53
	170	79	79	79	79	77	70	64	60	56	53
Category C	100	112	112	101	88	77	70	64	60	56	53
	105	107	107	101	88	77	70	64	60	56	53
	110	102	102	101	88	77	70	64	60	56	53
	120	94	94	94	88	77	70	64	60	56	53
	130	87	87	87	87	77	70	64	60	56	53
	140	81	81	81	81	77	70	64	60	56	53
	150	76	76	76	76	76	70	64	60	56	53
	160	71	71	71	71	71	70	64	60	56	53
	170	67	67	67	67	67	67	64	60	56	53
Category D	100	103	103	101	88	77	70	64	60	56	53
	105	98	98	98	88	77	70	64	60	56	53
	110	94	94	94	88	77	70	64	60	56	53
	120	87	87	87	87	77	70	64	60	56	53
	130	80	80	80	80	77	70	64	60	56	53
	140	75	75	75	75	75	70	64	60	56	53
	150	70	70	70	70	70	70	64	60	56	53
	160	66	66	66	66	66	66	64	60	56	53
	170	62	62	62	62	62	62	62	60	56	53

Notes – see page 20

<b>Table 6B - MAXIMUM SPANS (in) - Roof Slope 7° to 27° - Wind Zone 3 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	Ground Snow Load									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	107	107	101	88	77	70	64	60	56	53
	105	102	102	101	88	77	70	64	60	56	53
	110	98	98	98	88	77	70	64	60	56	53
	120	90	90	90	88	77	70	64	60	56	53
	130	84	84	84	84	77	70	64	60	56	53
	140	78	78	78	78	77	70	64	60	56	53
	150	73	73	73	73	73	70	64	60	56	53
	160	68	68	68	68	68	68	64	60	56	53
	170	65	65	65	65	65	65	64	60	56	53
Category C	100	91	91	91	88	77	70	64	60	56	53
	105	87	87	87	87	77	70	64	60	56	53
	110	83	83	83	83	77	70	64	60	56	53
	120	77	77	77	77	77	70	64	60	56	53
	130	71	71	71	71	71	70	64	60	56	53
	140	66	66	66	66	66	66	64	60	56	53
	150	62	62	62	62	62	62	62	60	56	53
	160	58	58	58	58	58	58	58	58	56	53
	170*	55	55	55	55	55	55	55	55	55	53
Category D	100	84	84	84	84	77	70	64	60	56	53
	105	80	80	80	80	77	70	64	60	56	53
	110	77	77	77	77	77	70	64	60	56	53
	120	71	71	71	71	71	70	64	60	56	53
	130	65	65	65	65	65	65	64	60	56	53
	140	61	61	61	61	61	61	61	60	56	53
	150	57	57	57	57	57	57	57	57	56	53
	160*	53	53	53	53	53	53	53	53	53	53
	170*	50	50	50	50	50	50	50	50	50	50

Notes – see page 20



<b>Table 7B - MAXIMUM SPANS (in) - Roof Slope 28° to 45° - Wind Zone 1 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	130	119	102	91	81	73	67	63	59	56
	105	130	119	102	91	81	73	67	63	59	56
	110	129	118	102	91	81	73	67	63	59	56
	120	123	114	99	89	81	73	67	63	59	56
	130	117	111	97	87	80	73	67	63	59	56
	140	111	107	95	86	79	73	67	63	59	56
	150	106	104	92	84	77	72	67	63	59	56
	160	102	100	90	82	76	71	67	63	59	56
Category C	170	97	97	87	80	74	70	66	62	59	56
	100	124	115	100	89	81	73	67	63	59	56
	105	120	113	98	88	81	73	67	63	59	56
	110	117	111	97	87	80	73	67	63	59	56
	120	110	106	94	85	78	73	67	63	59	56
	130	104	102	91	83	77	72	67	63	59	56
	140	99	98	88	81	75	70	66	63	59	56
	150	94	94	86	79	73	69	65	62	59	56
Category D	160	89	89	83	77	72	67	64	61	58	56
	170	85	85	80	75	70	66	63	60	57	55
	100	118	111	97	88	80	73	67	63	59	56
	105	114	109	96	86	79	73	67	63	59	56
	110	111	107	94	85	78	73	67	63	59	56
	120	104	102	91	83	77	72	67	63	59	56
	130	98	98	88	81	75	70	66	63	59	56
	140	93	93	85	78	73	68	65	62	59	56
Category D	150	88	88	82	76	71	67	63	60	58	55
	160	83	83	79	74	69	65	62	59	57	55
	170	79	79	77	72	67	64	61	58	56	54

Notes – see page 20

<b>Table 8B - MAXIMUM SPANS (in) - Roof Slope 28° to 45° - Wind Zone 2 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	<b>Wind Speed</b>	<b>Ground Snow Load</b>									
<b>Exposure</b>	<b>mph</b>	<b>0 psf</b>	<b>10 psf</b>	<b>20 psf</b>	<b>30 psf</b>	<b>40 psf</b>	<b>50 psf</b>	<b>60 psf</b>	<b>70 psf</b>	<b>80 psf</b>	<b>90 psf</b>
Category B	100	130	119	102	91	81	73	67	63	59	56
	105	130	119	102	91	81	73	67	63	59	56
	110	129	118	102	91	81	73	67	63	59	56
	120	123	114	99	89	81	73	67	63	59	56
	130	116	111	97	87	80	73	67	63	59	56
	140	108	107	95	86	79	73	67	63	59	56
	150	102	102	92	84	77	72	67	63	59	56
	160	96	96	90	82	76	71	67	63	59	56
Category C	170	91	91	87	80	74	70	66	62	59	56
	100	124	115	100	89	81	73	67	63	59	56
	105	120	113	98	88	81	73	67	63	59	56
	110	115	111	97	87	80	73	67	63	59	56
	120	107	106	94	85	78	73	67	63	59	56
	130	100	100	91	83	77	72	67	63	59	56
	140	93	93	88	81	75	70	66	63	59	56
	150	88	88	86	79	73	69	65	62	59	56
Category D	160	83	83	83	77	72	67	64	61	58	56
	170	78	78	78	75	70	66	63	60	57	55
	100	116	111	97	88	80	73	67	63	59	56
	105	112	109	96	86	79	73	67	63	59	56
	110	107	107	94	85	78	73	67	63	59	56
	120	99	99	91	83	77	72	67	63	59	56
	130	92	92	88	81	75	70	66	63	59	56
	140	86	86	85	78	73	68	65	62	59	56
Category D	150	81	81	81	76	71	67	63	60	58	55
	160	76	76	76	74	69	65	62	59	57	55
	170	72	72	72	72	67	64	61	58	56	54

Notes – see page 20



<b>Table 9B - MAXIMUM SPANS (in) - Roof Slope 28° to 45° - Wind Zone 3 (78.5" Max Module Length)</b>											
<b>XR1000 Rail</b>	Wind Speed	Ground Snow Load									
Exposure	mph	0 psf	10 psf	20 psf	30 psf	40 psf	50 psf	60 psf	70 psf	80 psf	90 psf
Category B	100	130	119	102	91	81	73	67	63	59	56
	105	130	119	102	91	81	73	67	63	59	56
	110	129	118	102	91	81	73	67	63	59	56
	120	123	114	99	89	81	73	67	63	59	56
	130	116	111	97	87	80	73	67	63	59	56
	140	108	107	95	86	79	73	67	63	59	56
	150	102	102	92	84	77	72	67	63	59	56
	160	96	96	90	82	76	71	67	63	59	56
Category C	100	124	115	100	89	81	73	67	63	59	56
	105	120	113	98	88	81	73	67	63	59	56
	110	115	111	97	87	80	73	67	63	59	56
	120	107	106	94	85	78	73	67	63	59	56
	130	100	100	91	83	77	72	67	63	59	56
	140	93	93	88	81	75	70	66	63	59	56
	150	88	88	86	79	73	69	65	62	59	56
	160	83	83	83	77	72	67	64	61	58	56
Category D	100	116	111	97	88	80	73	67	63	59	56
	105	112	109	96	86	79	73	67	63	59	56
	110	107	107	94	85	78	73	67	63	59	56
	120	99	99	91	83	77	72	67	63	59	56
	130	92	92	88	81	75	70	66	63	59	56
	140	86	86	85	78	73	68	65	62	59	56
	150	81	81	81	76	71	67	63	60	58	55
	160	76	76	76	74	69	65	62	59	57	55
170	72	72	72	72	67	64	61	58	56	54	

Notes – see page 20

Notes – Tabulated values are based on the following criteria:

1. Building mean roof height = 30 ft
2. Risk Category I
3. Solar maximum module long dimension is 67.5 inches for Tables 1A-9A and 78.5 inches for Tables 1B-9B.
4. Provide 2 in. clear between roof and rail
5. End cantilever span (max) =  $0.40 \times$  maximum span ( $L_{max}$ ) from above tables. See Figure A
6. No rail splices in outer  $2/3$  of end spans, or the middle  $1/3$  of interior spans based on the installed attachment spacing ( $L_{install}$ ). See Figure A
7. Single simple span(s). Spans listed in the tables above may be multiplied by 1.08 for continuous rails of 3 or more spans.
8. Module Mounting Mid Clamps shall not be installed less than 20 inches from Roof Zone 3 where wind speeds are marked with an \* in Tables 3B and 6B.
9. Connection of the rail to the roof structure is the responsibility of the end user of this letter. SML takes no liability for connections of the rail to the roof by others.

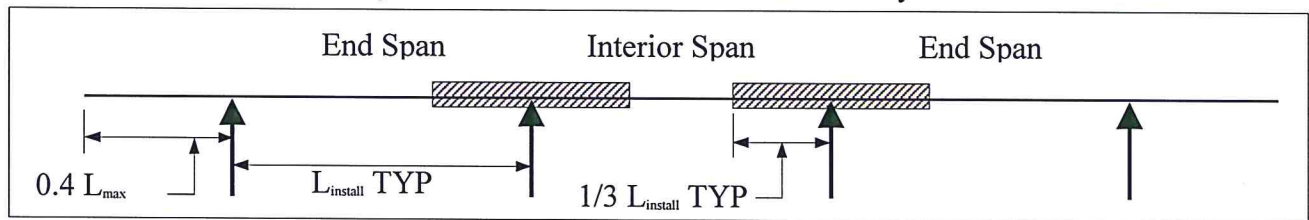



Figure A

$L_{max}$  = Maximum attachment spacing provided in the tables above for the project design criteria

$L_{install}$  = Actual installed attachment spacing

 = Indicates region of the rail where splice may be installed

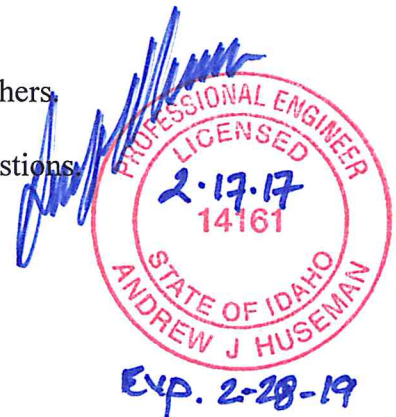
Our analysis assumes that the rails, including the connections and associated hardware, are installed in a workmanlike manner in accordance with the “IronRidge Flush Mount Installation Manual” by IronRidge and generally accepted standards of construction practice. Additional information is available at the IronRidge web site, IronRidge.com. Verification of PV Module capacity to support the loads associated with the given array shall be the responsibility of the Contractor or Owner and not IronRidge or Starling Madison Lofquist.

The adequacy of the supporting roof framing is to be determined by others.

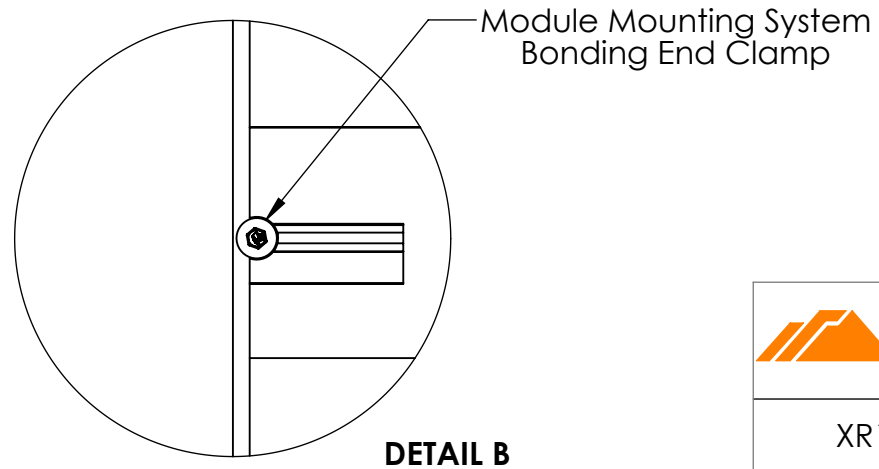
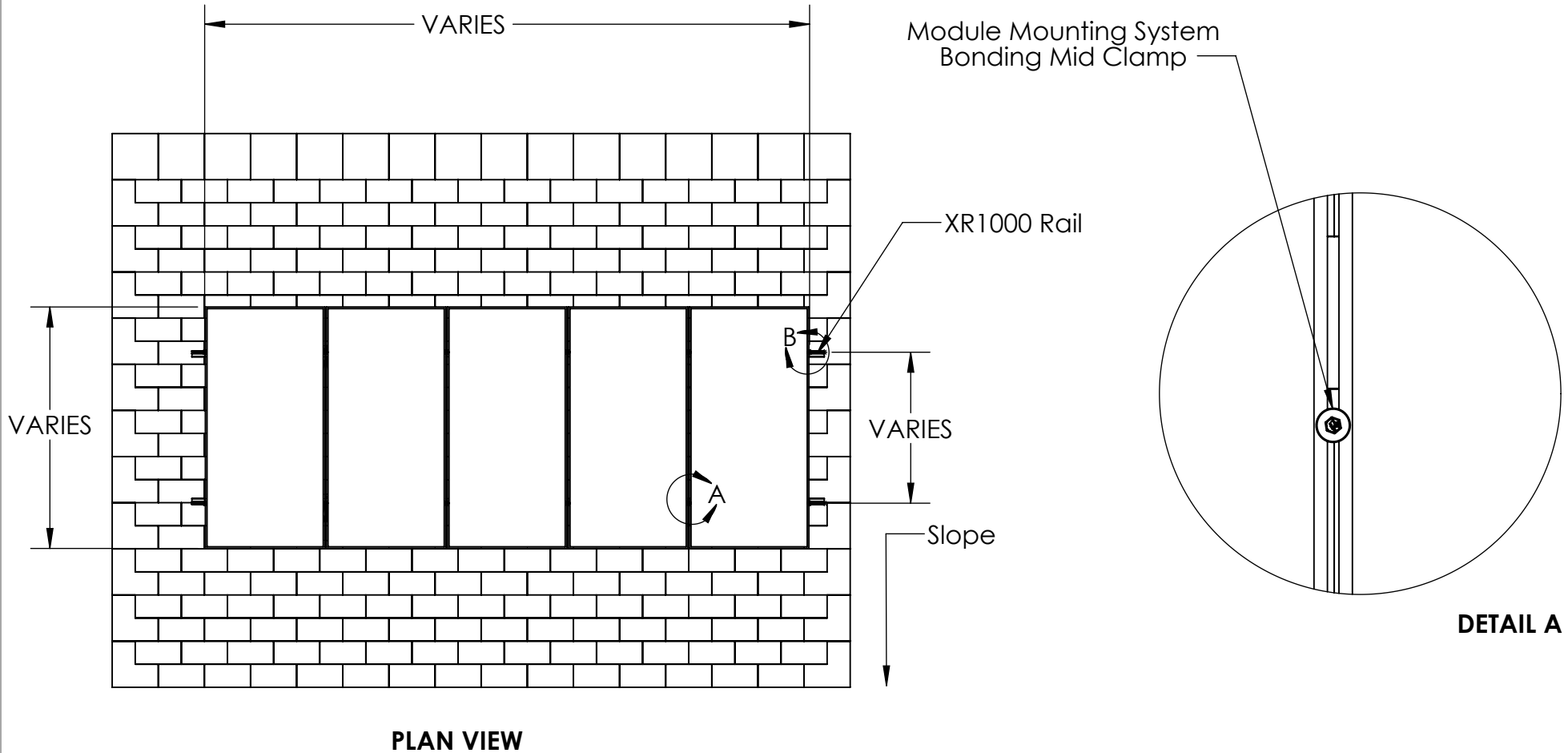
Please feel free to contact me at your convenience if you have any questions.

Respectfully yours,

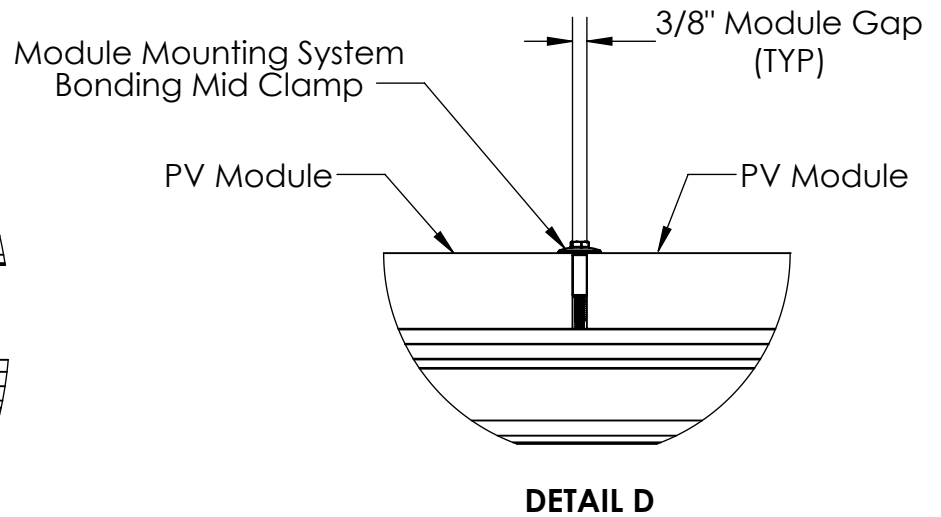
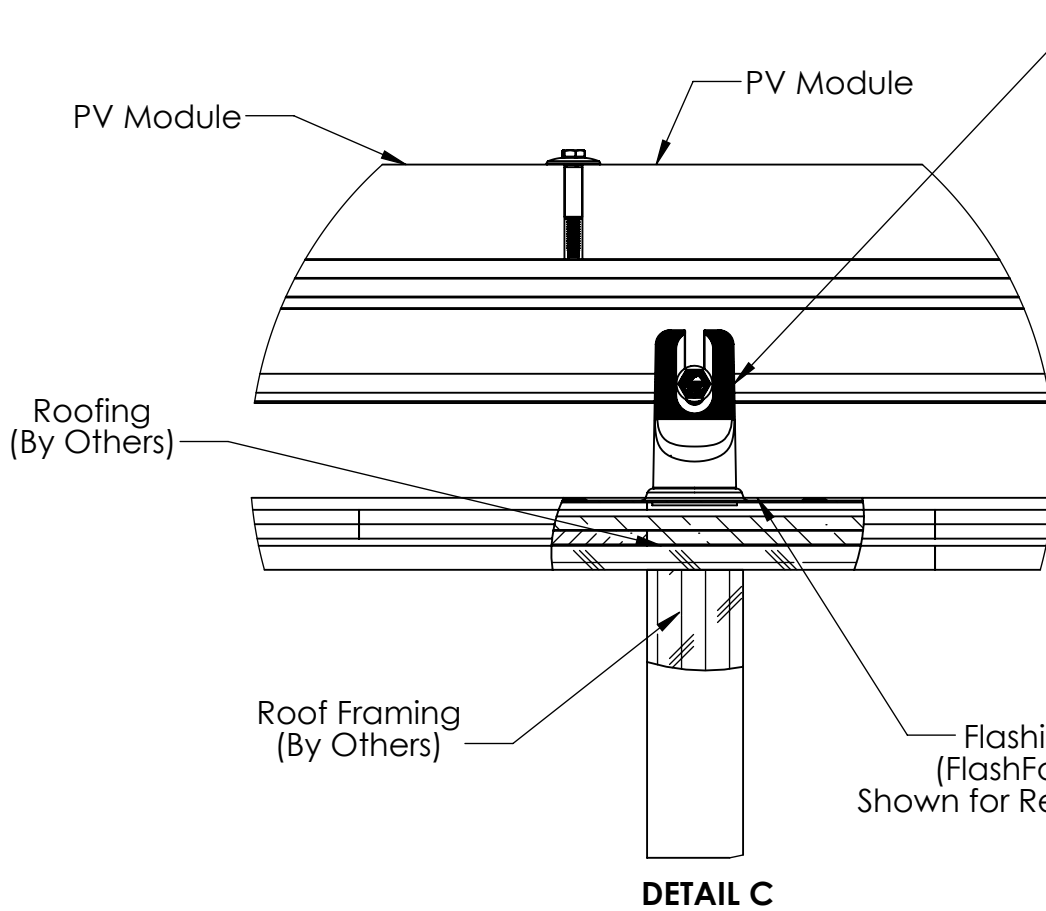
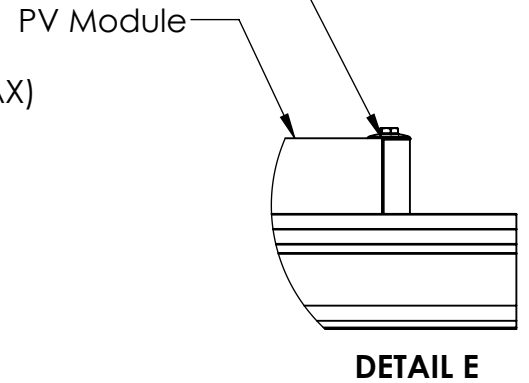
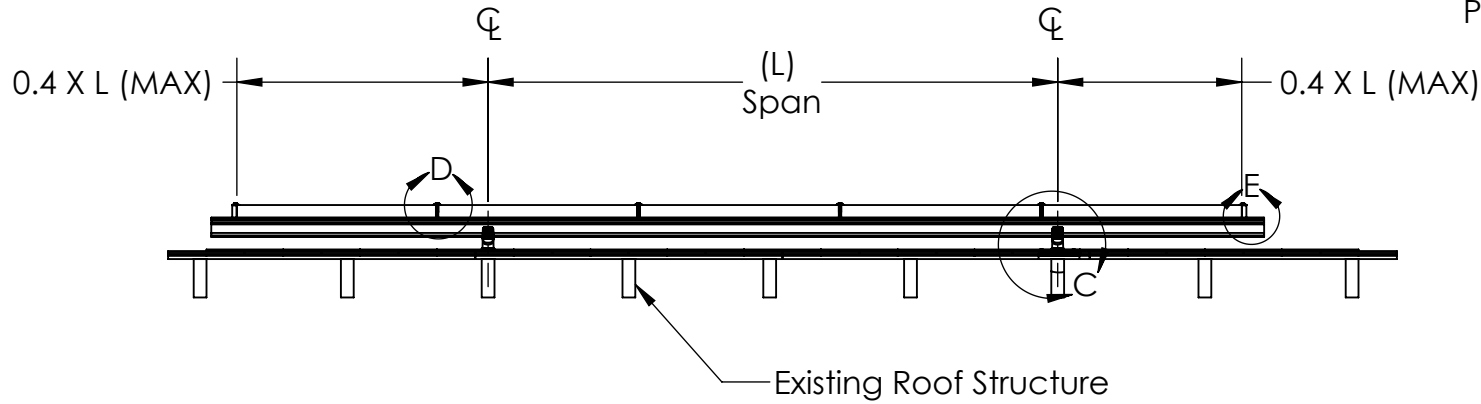
Andrew J. Huseman, P.E.  
 Licensed Professional Engineer







XR1000 FLUSH MOUNT		
SIZE	DWG. NO.	EX-0012
--		
SCALE: NTS	WEIGHT: N/A	SHEET 1 OF 3

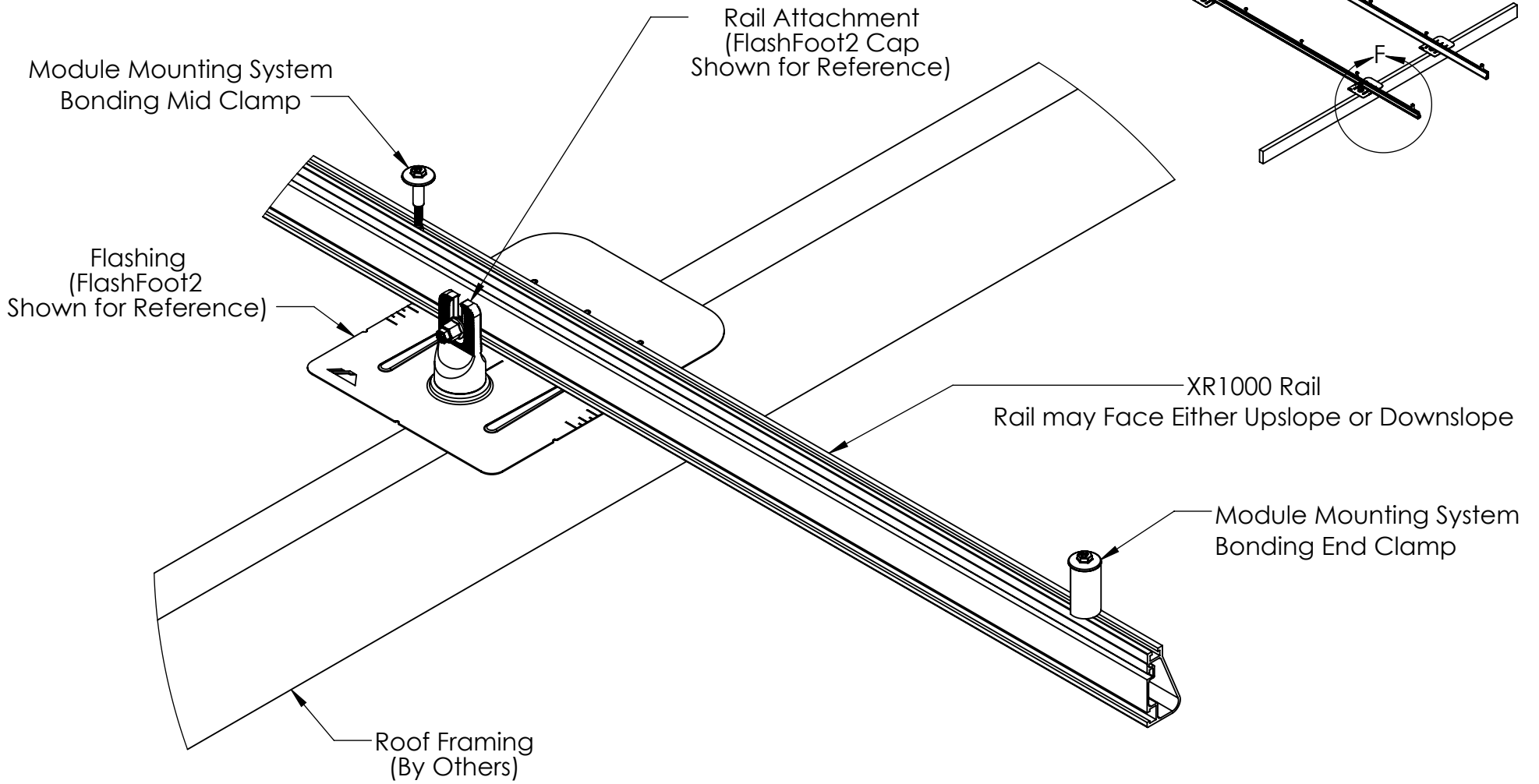


**IRONRIDGE**

XR1000 FLUSH MOUNT

SIZE	DWG. NO.	EX-0012
---		
SCALE: NTS	WEIGHT: N/A	SHEET 2 OF 3





DETAIL F

**IRONRIDGE**

XR1000 FLUSH MOUNT

SIZE	DWG. NO.	
--	EX-0012	
SCALE: NTS	WEIGHT: N/A	SHEET 3 OF 3



**Starling Madison Lofquist, Inc.**  
*Consulting Structural and Forensic Engineers*

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IronRidge  
1495 Zephyr Ave  
Hayward, CA 94544

June 3, 2016  
Page 1 of 51

Attn: Mr. David F. Taggart, Vice President Products

Subject: Ground Mounting System – Structural Analysis – 4 Module

Dear Sir:

We have analyzed the subject ground mounted structure and determined that it is in compliance with the applicable sections of the following Reference Documents:

Codes: ASCE/SEI 7-10 Min. Design Loads for Buildings & Other Structures  
International Building Code, 2012 Edition

Other: AC428, Acceptance Criteria for Modular Framing Systems Used to Support PV  
Modules, dated Effective November 1, 2012 by ICC-ES  
Aluminum Design Manual, 2010 Edition  
IronRidge Exhibit EX-0001

The structure is a simple column (pier) and beam (cross pipe) system. The piers & cross pipes are ASTM A53 Grade B standard weight (schedule 40) steel pipes or Allied Mechanical Tubing. Please refer to Exhibit EX-0001 for approved pipe geometry and material properties. The tops of the piers are connected in the E-W direction by the cross pipes which cantilever over and extend past the end piers. The cross pipes are connected by proprietary IronRidge XR1000 Rails spanning up and down the slope which cantilever over and extend past the top and bottom cross pipes. There are typically two rails per column of modules. The modules are clamped to the rails by the IronRidge Module Mounting Clamps as shown in the attached Exhibit.

Gravity loads are transferred to the piers and foundations by the rails and cross pipes acting as simple beams. For lateral loads the system is either a cantilever structure or, when diagonal braces are provided, a braced frame. The effect of seismic loads (for all design categories A-F) have been determined to be less than the effect due to wind loads in all load conditions and combinations.

The pier spacing in the N-S direction is 7'-6". The pier spacing in the E-W direction is selected from load tables determined by the structural design for the specified slope, wind load, and snow load. The governing criteria for the pier spacing is either the spanning capacity of the cross pipes or the cantilever capacity of the pier. Simplified Load Tables 1A-F & 2A-F are included herein for reference.

More comprehensive information covering all load combinations is available at the IronRidge website, IronRidge.com.



<b>Table 1A - MAXIMUM PIER SPACING (in)</b>											
<b>2" Unbraced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure B	0	128	128	125	122	116	92	68	57	49	41
	10	113	113	112	110	109	92	68	57	49	41
	20	96	96	96	95	96	92	68	57	49	41
	30	90	90	90	90	91	92	68	57	49	41
	40	82	82	82	82	84	86	68	57	49	41
	50	75	75	75	76	78	81	68	57	49	41
105 mph Exposure B	0	128	128	120	117	111	84	61	52	44	38
	10	113	113	109	108	106	84	61	52	44	38
	20	96	96	94	94	94	84	61	52	44	38
	30	90	90	88	88	89	84	61	52	44	38
	40	82	82	81	81	83	84	61	52	44	38
	50	75	75	75	75	77	80	61	52	44	38
110 mph Exposure B	0	128	128	116	113	107	76	56	47	40	34
	10	113	113	107	105	103	76	56	47	40	34
	20	96	96	93	92	92	76	56	47	40	34
	30	90	90	87	87	87	76	56	47	40	34
	40	82	82	80	80	81	76	56	47	40	34
	50	75	75	75	74	76	76	56	47	40	34
120 mph Exposure B	0	123	126	108	105	92	64	47	40	34	29
	10	110	112	102	100	92	64	47	40	34	29
	20	95	96	89	89	88	64	47	40	34	29
	30	89	90	84	84	84	64	47	40	34	29
	40	81	82	78	78	79	64	47	40	34	29
	50	75	75	73	73	74	64	47	40	34	29
130 mph Exposure B	0	115	118	101	98	79	55	40	34	29	25
	10	106	108	97	95	79	55	40	34	29	25
	20	92	93	86	85	79	55	40	34	29	25
	30	86	88	82	81	79	55	40	34	29	25
	40	80	80	76	75	76	55	40	34	29	25
	50	74	75	71	71	72	55	40	34	29	25
140 mph Exposure B	0	108	111	95	92	68	47	35	29	25	21
	10	102	104	93	91	68	47	35	29	25	21
	20	89	90	83	82	68	47	35	29	25	21
	30	84	85	79	78	68	47	35	29	25	21
	40	78	79	74	73	68	47	35	29	25	21
	50	73	73	69	69	68	47	35	29	25	21
150 mph Exposure B	0	102	105	89	86	59	41	30	25	22	18
	10	98	100	89	86	59	41	30	25	22	18
	20	87	88	80	79	59	41	30	25	22	18
	30	82	83	77	76	59	41	30	25	22	18
	40	76	77	72	71	59	41	30	25	22	18
	50	71	72	68	68	59	41	30	25	22	18
160 mph Exposure B	0	97	100	84	81	52	36	26	22	19	16
	10	94	96	84	81	52	36	26	22	19	16
	20	84	85	77	76	52	36	26	22	19	16
	30	80	81	74	73	52	36	26	22	19	16
	40	74	75	70	69	52	36	26	22	19	16
	50	70	71	67	67	52	36	26	22	19	16

Notes: see page 14

<b>Table 1B - MAXIMUM PIER SPACING (in)</b>											
<b>2" Unbraced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure C	0	121	124	106	103	89	62	45	38	33	28
	10	109	111	101	99	89	62	45	38	33	28
	20	94	95	89	88	87	62	45	38	33	28
	30	88	89	84	83	84	62	45	38	33	28
	40	81	82	78	77	78	62	45	38	33	28
	50	75	75	72	72	74	62	45	38	33	28
105 mph Exposure C	0	116	120	102	99	81	56	41	35	30	25
	10	107	108	98	96	81	56	41	35	30	25
	20	92	94	87	86	81	56	41	35	30	25
	30	87	88	82	82	81	56	41	35	30	25
	40	80	81	76	76	76	56	41	35	30	25
	50	74	75	71	71	72	56	41	35	30	25
110 mph Exposure C	0	112	115	98	95	74	51	38	32	27	23
	10	104	106	95	94	74	51	38	32	27	23
	20	91	92	85	84	74	51	38	32	27	23
	30	86	87	81	80	74	51	38	32	27	23
	40	79	80	75	74	74	51	38	32	27	23
	50	73	74	70	70	71	51	38	32	27	23
120 mph Exposure C	0	104	107	91	88	62	43	32	27	23	19
	10	99	101	90	88	62	43	32	27	23	19
	20	87	89	81	80	62	43	32	27	23	19
	30	83	84	78	77	62	43	32	27	23	19
	40	77	78	72	72	62	43	32	27	23	19
	50	72	72	68	68	62	43	32	27	23	19
130 mph Exposure C	0	97	100	85	82	53	37	27	23	19	16
	10	95	97	85	82	53	37	27	23	19	16
	20	84	86	78	77	53	37	27	23	19	16
	30	80	81	74	73	53	37	27	23	19	16
	40	74	75	70	69	53	37	27	23	19	16
	50	70	71	66	66	53	37	27	23	19	16
140 mph Exposure C	0	91	94	79	72	46	32	23	20	17	14
	10	90	92	79	72	46	32	23	20	17	14
	20	81	83	74	72	46	32	23	20	17	14
	30	77	79	72	70	46	32	23	20	17	14
	40	72	73	68	67	46	32	23	20	17	14
	50	68	69	64	63	46	32	23	20	17	14
150 mph Exposure C	0	86	89	74	63	40	27	20	17	15	12
	10	86	88	74	63	40	27	20	17	15	12
	20	78	80	71	63	40	27	20	17	15	12
	30	75	76	69	63	40	27	20	17	15	12
	40	70	71	65	63	40	27	20	17	15	12
	50	68	69	64	63	40	27	20	17	15	12
160 mph Exposure C	0	81	84	70	55	35	24	18	15	13	11
	10	81	84	70	55	35	24	18	15	13	11
	20	75	77	68	55	35	24	18	15	13	11
	30	72	74	66	55	35	24	18	15	13	11
	40	68	69	63	55	35	24	18	15	13	11
	50	68	69	63	55	35	24	18	15	13	11

Notes: see page 14



<b>Table 1C - MAXIMUM PIER SPACING (in)</b>											
<b>2" Unbraced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure D	0	112	115	98	95	74	51	37	32	27	23
	10	104	106	95	94	74	51	37	32	27	23
	20	91	92	85	84	74	51	37	32	27	23
	30	85	87	81	80	74	51	37	32	27	23
	40	79	80	75	74	74	51	37	32	27	23
	50	73	74	70	70	71	51	37	32	27	23
105 mph Exposure D	0	108	111	94	91	67	46	34	29	24	21
	10	101	103	92	91	67	46	34	29	24	21
	20	89	90	83	82	67	46	34	29	24	21
	30	84	85	79	78	67	46	34	29	24	21
	40	78	78	74	73	67	46	34	29	24	21
	50	72	73	69	69	67	46	34	29	24	21
110 mph Exposure D	0	104	106	90	87	61	42	31	26	22	19
	10	99	101	90	87	61	42	31	26	22	19
	20	87	88	81	80	61	42	31	26	22	19
	30	82	84	77	76	61	42	31	26	22	19
	40	76	77	72	72	61	42	31	26	22	19
	50	71	72	68	68	61	42	31	26	22	19
120 mph Exposure D	0	96	99	83	81	51	35	26	22	19	16
	10	94	96	83	81	51	35	26	22	19	16
	20	84	85	77	76	51	35	26	22	19	16
	30	79	81	74	73	51	35	26	22	19	16
	40	74	75	69	69	51	35	26	22	19	16
	50	69	70	66	65	51	35	26	22	19	16
130 mph Exposure D	0	90	92	78	69	44	30	22	19	16	14
	10	89	91	78	69	44	30	22	19	16	14
	20	80	82	73	69	44	30	22	19	16	14
	30	77	78	71	69	44	30	22	19	16	14
	40	72	73	67	66	44	30	22	19	16	14
	50	67	68	63	63	44	30	22	19	16	14
140 mph Exposure D	0	84	86	72	60	38	26	19	16	14	12
	10	84	86	72	60	38	26	19	16	14	12
	20	77	79	70	60	38	26	19	16	14	12
	30	74	75	68	60	38	26	19	16	14	12
	40	69	70	64	60	38	26	19	16	14	12
	50	66	67	61	60	38	26	19	16	14	12
150 mph Exposure D	0	79	81	68	52	33	23	17	14	12	10
	10	79	81	68	52	33	23	17	14	12	10
	20	74	76	67	52	33	23	17	14	12	10
	30	71	72	65	52	33	23	17	14	12	10
	40	67	68	62	52	33	23	17	14	12	10
	50	66	67	61	60	38	26	19	16	14	12
160 mph Exposure D	0	74	77	64	46	29	20	15	12	11	9
	10	74	77	64	46	29	20	15	12	11	9
	20	71	73	64	46	29	20	15	12	11	9
	30	69	70	62	46	29	20	15	12	11	9
	40	65	66	59	46	29	20	15	12	11	9
	50	65	66	59	46	29	20	15	12	11	9

Notes: see page 14

<b>Table 1D - MAXIMUM PIER SPACING (in)</b>											
<b>2" Braced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure B	0	128	128	125	122	116	111	107	106	107	108
	10	113	113	112	110	109	108	107	106	107	108
	20	96	96	96	95	96	97	98	101	105	108
	30	90	90	90	90	91	92	94	98	102	107
	40	82	82	82	82	84	86	88	92	97	103
	50	75	75	75	76	78	81	84	88	93	99
105 mph Exposure B	0	128	128	120	117	111	106	102	102	103	103
	10	113	113	109	108	106	105	102	102	103	103
	20	96	96	94	94	94	95	95	98	102	103
	30	90	90	88	88	89	90	92	95	99	103
	40	82	82	81	81	83	84	86	90	95	100
	50	75	75	75	75	77	80	82	86	91	96
110 mph Exposure B	0	128	128	116	113	107	103	98	98	98	99
	10	113	113	107	105	103	102	98	98	98	99
	20	96	96	93	92	92	93	93	96	98	99
	30	90	90	87	87	87	88	90	93	97	99
	40	82	82	80	80	81	83	85	88	93	97
	50	75	75	75	74	76	78	80	84	89	94
120 mph Exposure B	0	123	126	108	105	99	95	91	90	91	92
	10	110	112	102	100	98	95	91	90	91	92
	20	95	96	89	89	88	88	88	90	91	92
	30	89	90	84	84	84	85	85	88	91	92
	40	81	82	78	78	79	80	81	84	88	92
	50	75	75	73	73	74	76	77	81	85	89
130 mph Exposure B	0	115	118	101	98	92	88	85	84	85	85
	10	106	108	97	95	92	88	85	84	85	85
	20	92	93	86	85	85	84	84	84	85	85
	30	86	88	82	81	81	81	81	84	85	85
	40	80	80	76	75	76	77	78	80	84	85
	50	74	75	71	71	72	73	74	77	81	85
140 mph Exposure B	0	108	111	95	92	87	83	79	79	79	79
	10	102	104	93	91	87	83	79	79	79	79
	20	89	90	83	82	81	80	79	79	79	79
	30	84	85	79	78	78	78	78	79	79	79
	40	78	79	74	73	73	74	74	77	79	79
	50	73	73	69	69	70	71	72	74	77	79
150 mph Exposure B	0	102	105	89	86	81	78	74	74	74	75
	10	98	100	89	86	81	78	74	74	74	75
	20	87	88	80	79	78	77	74	74	74	75
	30	82	83	77	76	75	75	74	74	74	75
	40	76	77	72	71	71	71	71	73	74	75
	50	73	73	69	69	70	71	72	74	77	79
160 mph Exposure B	0	97	100	84	81	77	73	70	69	70	70
	10	94	96	84	81	77	73	70	69	70	70
	20	84	85	77	76	75	73	70	69	70	70
	30	80	81	74	73	72	72	70	69	70	70
	40	74	75	70	69	69	69	68	69	70	70
	50	74	75	70	69	69	69	68	69	70	70

Notes: see page 14



<b>Table 1E - MAXIMUM PIER SPACING (in)</b>											
<b>2" Braced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure C	0	121	124	106	103	98	93	89	89	90	90
	10	109	111	101	99	97	93	89	89	90	90
	20	94	95	89	88	87	87	87	89	90	90
	30	88	89	84	83	84	84	84	87	90	90
	40	81	82	78	77	78	79	80	83	87	90
	50	75	75	72	72	74	75	77	80	84	88
105 mph Exposure C	0	116	120	102	99	94	89	86	85	86	86
	10	107	108	98	96	94	89	86	85	86	86
	20	92	94	87	86	85	85	85	85	86	86
	30	87	88	82	82	82	82	82	84	86	86
	40	80	81	76	76	76	77	78	81	84	86
	50	74	75	71	71	72	74	75	78	82	86
110 mph Exposure C	0	112	115	98	95	90	86	82	82	82	83
	10	104	106	95	94	90	86	82	82	82	83
	20	91	92	85	84	83	83	82	82	82	83
	30	86	87	81	80	80	80	80	82	82	83
	40	79	80	75	74	75	76	76	79	82	83
	50	73	74	70	70	71	72	73	76	79	83
120 mph Exposure C	0	104	107	91	88	83	79	76	75	76	76
	10	99	101	90	88	83	79	76	75	76	76
	20	87	89	81	80	79	78	76	75	76	76
	30	83	84	78	77	76	76	75	75	76	76
	40	77	78	72	72	72	72	72	74	76	76
	50	72	72	68	68	68	69	70	72	75	76
130 mph Exposure C	0	97	100	85	82	77	74	70	70	70	71
	10	95	97	85	82	77	74	70	70	70	71
	20	84	86	78	77	75	74	70	70	70	71
	30	80	81	74	73	73	72	70	70	70	71
	40	74	75	70	69	69	69	69	70	70	71
	50	70	71	66	66	66	66	66	68	70	71
140 mph Exposure C	0	91	94	79	77	72	69	66	65	66	66
	10	90	92	79	77	72	69	66	65	66	66
	20	81	83	74	73	72	69	66	65	66	66
	30	77	79	72	70	69	68	66	65	66	66
	40	72	73	68	67	66	66	65	65	66	66
	50	68	69	64	63	63	63	63	65	66	66
150 mph Exposure C	0	86	89	74	72	68	64	61	61	61	62
	10	86	88	74	72	68	64	61	61	61	62
	20	78	80	71	70	68	64	61	61	61	62
	30	75	76	69	68	66	64	61	61	61	62
	40	70	71	65	64	63	63	61	61	61	62
	50	68	69	63	62	61	60	58	57	58	58
160 mph Exposure C	0	81	84	70	68	64	61	58	57	58	58
	10	81	84	70	68	64	61	58	57	58	58
	20	75	77	68	67	64	61	58	57	58	58
	30	72	74	66	65	63	61	58	57	58	58
	40	68	69	63	62	61	60	58	57	58	58

Notes: see page 14

<b>Table 1F - MAXIMUM PIER SPACING (in)</b>												
<b>2" Braced Pipe Frame</b>	Snow	Slope (deg)										
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35	40
100 mph Exposure D	0	112	115	98	95	90	86	82	82	82	82	83
	10	104	106	95	94	90	86	82	82	82	82	83
	20	91	92	85	84	83	83	82	82	82	82	83
	30	85	87	81	80	80	80	80	80	82	82	83
	40	79	80	75	74	75	76	76	76	79	82	83
	50	73	74	70	70	71	72	73	73	76	79	83
105 mph Exposure D	0	108	111	94	91	86	82	78	78	79	79	79
	10	101	103	92	91	86	82	78	78	79	79	79
	20	89	90	83	82	81	80	78	78	78	79	79
	30	84	85	79	78	78	77	77	77	78	79	79
	40	78	78	74	73	73	74	74	74	76	79	79
	50	72	73	69	69	69	70	71	71	74	77	79
110 mph Exposure D	0	104	106	90	87	82	79	75	75	75	75	76
	10	99	101	90	87	82	79	75	75	75	75	76
	20	87	88	81	80	79	78	75	75	75	75	76
	30	82	84	77	76	76	75	75	75	75	75	76
	40	76	77	72	72	72	72	72	72	74	75	76
	50	71	72	68	68	68	69	69	69	72	75	76
120 mph Exposure D	0	96	99	83	81	76	72	69	69	69	69	70
	10	94	96	83	81	76	72	69	69	69	69	70
	20	84	85	77	76	74	72	69	69	69	69	70
	30	79	81	74	73	72	71	69	69	69	69	70
	40	74	75	69	69	68	68	68	68	69	69	70
	50	69	70	66	65	65	66	66	66	68	69	70
130 mph Exposure D	0	90	92	78	75	71	67	64	64	64	64	64
	10	89	91	78	75	71	67	64	64	64	64	64
	20	80	82	73	72	70	67	64	64	64	64	64
	30	77	78	71	70	68	67	64	64	64	64	64
	40	72	73	67	66	65	65	64	64	64	64	64
	50	67	68	63	63	63	63	63	63	64	64	64
140 mph Exposure D	0	84	86	72	70	66	63	60	60	60	60	60
	10	84	86	72	70	66	63	60	60	60	60	60
	20	77	79	70	69	66	63	60	60	60	60	60
	30	74	75	68	67	65	63	60	60	60	60	60
	40	69	70	64	63	62	62	60	60	60	60	60
	50	66	67	61	61	60	60	59	60	60	60	60
150 mph Exposure D	0	79	81	68	66	62	59	56	56	56	56	56
	10	79	81	68	66	62	59	56	56	56	56	56
	20	74	76	67	66	62	59	56	56	56	56	56
	30	71	72	65	64	62	59	56	56	56	56	56
	40	67	68	62	61	60	59	56	56	56	56	56
	50	66	67	61	61	60	60	59	60	60	60	60
160 mph Exposure D	0	74	77	64	62	58	55	53	52	53	53	53
	10	74	77	64	62	58	55	53	52	53	53	53
	20	71	73	64	62	58	55	53	52	53	53	53
	30	69	70	62	61	58	55	53	52	53	53	53
	40	65	66	59	58	57	55	53	52	53	53	53
	50	65	66	59	58	57	55	53	52	53	53	53

Notes: see page 14



<b>Table 2A - MAXIMUM PIER SPACING (in)</b>											
<b>3" Unbraced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure B	0	224	224	218	213	202	194	186	175	149	127
	10	197	197	195	193	191	190	186	175	149	127
	20	169	169	168	167	168	170	172	175	149	127
	30	158	158	157	157	159	162	164	171	149	127
	40	144	144	144	144	147	151	155	162	149	127
	50	131	131	132	133	137	141	146	154	149	127
105 mph Exposure B	0	224	224	210	205	194	186	179	159	135	115
	10	197	197	191	188	186	184	179	159	135	115
	20	169	169	165	164	165	166	167	159	135	115
	30	158	158	155	154	156	158	161	159	135	115
	40	144	144	142	142	145	148	151	158	135	115
	50	131	131	132	132	135	139	143	151	135	115
110 mph Exposure B	0	224	224	203	197	187	179	171	145	123	105
	10	197	197	186	184	181	179	171	145	123	105
	20	169	169	162	161	161	162	163	145	123	105
	30	158	158	153	152	153	155	157	145	123	105
	40	144	144	140	140	142	145	148	145	123	105
	50	131	131	131	130	133	137	141	145	123	105
120 mph Exposure B	0	215	220	189	183	174	166	144	122	104	88
	10	193	196	178	175	172	166	144	122	104	88
	20	166	168	156	155	155	155	144	122	104	88
	30	155	157	148	147	147	148	144	122	104	88
	40	142	144	137	136	138	140	142	122	104	88
	50	131	131	128	127	130	132	135	122	104	88
130 mph Exposure B	0	202	207	176	171	162	155	123	104	88	75
	10	185	188	170	167	162	155	123	104	88	75
	20	161	163	151	149	148	148	123	104	88	75
	30	151	153	143	142	142	142	123	104	88	75
	40	139	141	133	132	133	135	123	104	88	75
	50	130	131	125	124	126	128	123	104	88	75
140 mph Exposure B	0	190	195	165	160	152	144	106	89	76	65
	10	178	181	162	159	152	144	106	89	76	65
	20	156	158	146	144	142	141	106	89	76	65
	30	147	149	139	137	136	136	106	89	76	65
	40	136	138	129	128	129	129	106	89	76	65
	50	127	128	121	121	122	124	106	89	76	65
150 mph Exposure B	0	179	184	156	151	142	126	92	78	66	56
	10	171	175	155	151	142	126	92	78	66	56
	20	151	154	140	138	136	126	92	78	66	56
	30	143	146	134	133	131	126	92	78	66	56
	40	133	135	126	124	124	125	92	78	66	56
	50	127	128	121	121	122	124	106	89	76	65
160 mph Exposure B	0	169	174	147	142	134	110	81	68	58	50
	10	165	168	147	142	134	110	81	68	58	50
	20	147	149	135	133	131	110	81	68	58	50
	30	140	142	130	128	126	110	81	68	58	50
	40	130	132	122	121	120	110	81	68	58	50
	50	127	128	121	121	122	124	106	89	76	65

Notes: see page 14

<b>Table 2B - MAXIMUM PIER SPACING (in)</b>											
<b>3" Unbraced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure C	0	212	217	186	181	171	163	139	117	100	85
	10	191	194	176	174	170	163	139	117	100	85
	20	165	167	155	154	153	153	139	117	100	85
	30	155	156	147	146	146	147	139	117	100	85
	40	142	143	136	135	137	139	139	117	100	85
	50	131	131	127	127	129	131	134	117	100	85
105 mph Exposure C	0	204	178	162	148	137	134	126	107	91	77
	10	186	178	162	148	137	134	126	107	91	77
	20	162	164	152	148	137	134	126	107	91	77
	30	152	154	144	143	137	134	126	107	91	77
	40	140	141	134	133	134	134	126	107	91	77
	50	130	131	125	125	126	129	126	107	91	77
110 mph Exposure C	0	196	202	171	166	157	150	115	97	83	70
	10	182	185	167	164	157	150	115	97	83	70
	20	159	161	149	147	145	145	115	97	83	70
	30	150	152	141	140	139	140	115	97	83	70
	40	138	139	131	130	131	132	115	97	83	70
	50	128	130	123	123	124	126	115	97	83	70
120 mph Exposure C	0	183	188	159	154	145	132	97	82	69	59
	10	174	177	158	154	145	132	97	82	69	59
	20	153	155	142	140	138	132	97	82	69	59
	30	145	147	136	134	133	132	97	82	69	59
	40	134	136	127	126	126	126	97	82	69	59
	50	125	127	119	119	120	121	97	82	69	59
130 mph Exposure C	0	171	175	148	143	135	112	82	70	59	50
	10	166	169	148	143	135	112	82	70	59	50
	20	147	150	136	134	131	112	82	70	59	50
	30	140	142	130	129	127	112	82	70	59	50
	40	130	132	122	121	121	112	82	70	59	50
	50	122	124	116	115	115	112	82	70	59	50
140 mph Exposure C	0	160	165	138	134	126	97	71	60	51	43
	10	158	162	138	134	126	97	71	60	51	43
	20	142	145	130	128	125	97	71	60	51	43
	30	135	138	125	123	121	97	71	60	51	43
	40	127	128	118	117	116	97	71	60	51	43
	50	119	121	112	111	111	97	71	60	51	43
150 mph Exposure C	0	150	155	130	126	118	84	62	52	44	38
	10	150	154	130	126	118	84	62	52	44	38
	20	137	140	125	123	118	84	62	52	44	38
	30	131	133	120	118	116	84	62	52	44	38
	40	123	125	114	113	111	84	62	52	44	38
	50	119	121	110	108	107	74	54	46	39	33
160 mph Exposure C	0	142	146	122	118	107	74	54	46	39	33
	10	142	146	122	118	107	74	54	46	39	33
	20	132	135	120	117	107	74	54	46	39	33
	30	127	129	116	114	107	74	54	46	39	33
	40	119	121	110	108	107	74	54	46	39	33

Notes: see page 14



Ground Mounting System – Structural Analysis – 4 Module

<b>Table 2C - MAXIMUM PIER SPACING (in)</b>											
<b>3" Unbraced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure D	0	196	201	171	166	157	150	115	97	83	70
	10	182	185	167	164	157	150	115	97	83	70
	20	159	161	148	147	145	145	115	97	83	70
	30	150	152	141	140	139	139	115	97	83	70
	40	138	139	131	130	131	132	115	97	83	70
	50	128	130	123	123	124	126	115	97	83	70
105 mph Exposure D	0	188	194	164	159	150	142	104	88	75	64
	10	177	181	162	159	150	142	104	88	75	64
	20	156	158	145	143	141	140	104	88	75	64
	30	147	149	138	137	136	136	104	88	75	64
	40	136	137	129	128	128	129	104	88	75	64
	50	127	128	121	120	122	123	104	88	75	64
110 mph Exposure D	0	181	186	158	153	144	129	95	80	68	58
	10	173	176	157	153	144	129	95	80	68	58
	20	152	155	141	140	137	129	95	80	68	58
	30	144	146	135	134	132	129	95	80	68	58
	40	134	135	126	125	125	126	95	80	68	58
	50	125	126	119	118	119	120	95	80	68	58
120 mph Exposure D	0	168	173	146	141	133	109	80	67	57	49
	10	164	167	146	141	133	109	80	67	57	49
	20	146	149	135	133	130	109	80	67	57	49
	30	139	141	129	128	126	109	80	67	57	49
	40	129	131	122	120	120	109	80	67	57	49
	50	122	123	115	114	114	109	80	67	57	49
130 mph Exposure D	0	157	161	136	131	124	92	68	57	49	42
	10	156	159	136	131	124	92	68	57	49	42
	20	140	143	129	126	123	92	68	57	49	42
	30	134	136	124	122	120	92	68	57	49	42
	40	125	127	117	115	114	92	68	57	49	42
	50	118	120	111	110	110	92	68	57	49	42
140 mph Exposure D	0	147	151	127	123	115	80	59	49	42	36
	10	147	151	127	123	115	80	59	49	42	36
	20	135	137	123	120	115	80	59	49	42	36
	30	129	131	118	116	114	80	59	49	42	36
	40	121	123	112	111	109	80	59	49	42	36
	50	115	116	107	106	105	80	59	49	42	36
150 mph Exposure D	0	138	142	119	115	100	69	51	43	37	31
	10	138	142	119	115	100	69	51	43	37	31
	20	130	132	117	115	100	69	51	43	37	31
	30	124	127	113	111	100	69	51	43	37	31
	40	117	119	108	106	100	69	51	43	37	31
	160 mph Exposure D	0	130	134	112	108	88	61	45	38	32
10		130	134	112	108	88	61	45	38	32	27
20		124	127	112	108	88	61	45	38	32	27
30		120	122	109	107	88	61	45	38	32	27
40		114	116	104	102	88	61	45	38	32	27

Notes: see page 14

<b>Table 2D - MAXIMUM PIER SPACING (in)</b>											
<b>3" Braced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure B	0	224	224	218	213	202	194	186	186	187	188
	10	197	197	195	193	191	190	186	186	187	188
	20	169	169	168	167	168	170	172	177	184	188
	30	158	158	157	157	159	162	164	171	179	187
	40	144	144	144	144	147	151	155	162	170	180
	50	131	131	132	133	137	141	146	154	163	173
105 mph Exposure B	0	224	224	210	205	194	186	179	178	180	181
	10	197	197	191	188	186	184	179	178	180	181
	20	169	169	165	164	165	166	167	172	179	181
	30	158	158	155	154	156	158	161	166	174	181
	40	144	144	142	142	145	148	151	158	166	175
	50	131	131	132	132	135	139	143	151	159	169
110 mph Exposure B	0	224	224	203	197	187	179	172	171	172	173
	10	197	197	186	184	181	179	172	171	172	173
	20	169	169	162	161	161	162	163	168	172	173
	30	158	158	153	152	153	155	157	162	169	173
	40	144	144	140	140	142	145	148	154	162	170
	50	131	131	131	130	133	137	141	147	156	165
120 mph Exposure B	0	215	220	189	183	174	166	159	158	159	160
	10	193	196	178	175	172	166	159	158	159	160
	20	166	168	156	155	155	155	155	158	159	160
	30	155	157	148	147	147	148	149	154	159	160
	40	142	144	137	136	138	140	142	147	154	160
	50	131	131	128	127	130	132	135	141	149	156
130 mph Exposure B	0	202	207	176	171	162	155	148	147	148	149
	10	185	188	170	167	162	155	148	147	148	149
	20	161	163	151	149	148	148	147	147	148	149
	30	151	153	143	142	142	142	142	146	148	149
	40	139	141	133	132	133	135	136	141	146	149
	50	130	131	125	124	126	128	130	135	142	148
140 mph Exposure B	0	190	195	165	160	152	145	138	138	138	139
	10	178	181	162	159	152	145	138	138	138	139
	20	156	158	146	144	142	141	138	138	138	139
	30	147	149	139	137	136	136	136	138	138	139
	40	136	138	129	128	129	129	130	134	138	139
	50	127	128	121	121	122	124	125	130	135	139
150 mph Exposure B	0	179	184	156	151	142	136	130	129	130	130
	10	171	175	155	151	142	136	130	129	130	130
	20	151	154	140	138	136	135	130	129	130	130
	30	143	146	134	133	131	131	130	129	130	130
	40	133	135	126	124	124	125	125	128	130	130
	50	127	128	121	121	122	124	125	130	135	139
160 mph Exposure B	0	169	174	147	142	134	128	122	122	122	123
	10	165	168	147	142	134	128	122	122	122	123
	20	147	149	135	133	131	128	122	122	122	123
	30	140	142	130	128	126	125	122	122	122	123
	40	130	132	122	121	120	120	120	122	122	123
	50	127	128	121	121	122	124	125	130	135	139

Notes: see page 14



<b>Table 2E - MAXIMUM PIER SPACING (in)</b>											
<b>3" Braced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure C	0	212	217	186	181	171	163	157	156	157	158
	10	191	194	176	174	170	163	157	156	157	158
	20	165	167	155	154	153	153	153	156	157	158
	30	155	156	147	146	146	147	148	152	157	158
	40	142	143	136	135	137	139	141	146	152	158
	50	131	131	127	127	129	131	134	140	147	155
105 mph Exposure C	0	204	178	162	148	137	134	134	139	145	151
	10	186	178	162	148	137	134	134	139	145	151
	20	162	164	152	148	137	134	134	139	145	151
	30	152	154	144	143	137	134	134	139	145	151
	40	140	141	134	133	134	134	134	139	145	151
	50	130	131	125	125	126	129	131	136	143	150
110 mph Exposure C	0	196	202	171	166	157	150	144	143	144	145
	10	182	185	167	164	157	150	144	143	144	145
	20	159	161	149	147	145	145	144	143	144	145
	30	150	152	141	140	139	140	139	143	144	145
	40	138	139	131	130	131	132	133	138	143	145
	50	128	130	123	123	124	126	128	133	139	145
120 mph Exposure C	0	183	188	159	154	145	139	133	132	133	133
	10	174	177	158	154	145	139	133	132	133	133
	20	153	155	142	140	138	137	133	132	133	133
	30	145	147	136	134	133	132	132	132	133	133
	40	134	136	127	126	126	126	127	130	133	133
	50	125	127	119	119	120	121	122	126	131	133
130 mph Exposure C	0	171	175	148	143	135	129	123	122	123	124
	10	166	169	148	143	135	129	123	122	123	124
	20	147	150	136	134	131	129	123	122	123	124
	30	140	142	130	129	127	126	123	122	123	124
	40	130	132	122	121	121	121	120	122	123	124
	50	122	124	116	115	115	116	116	120	123	124
140 mph Exposure C	0	160	165	138	134	126	120	115	114	115	115
	10	158	162	138	134	126	120	115	114	115	115
	20	142	145	130	128	125	120	115	114	115	115
	30	135	138	125	123	121	120	115	114	115	115
	40	127	128	118	117	116	115	114	114	115	115
	50	119	121	112	111	111	111	111	114	115	115
150 mph Exposure C	0	150	155	130	126	118	113	107	107	107	108
	10	150	154	130	126	118	113	107	107	107	108
	20	137	140	125	123	118	113	107	107	107	108
	30	131	133	120	118	116	113	107	107	107	108
	40	123	125	114	113	111	110	107	107	107	108
	160 mph Exposure C	0	142	146	122	118	111	106	101	100	101
10		142	146	122	118	111	106	101	100	101	101
20		132	135	120	117	111	106	101	100	101	101
30		127	129	116	114	111	106	101	100	101	101
40		119	121	110	108	107	105	101	100	101	101

Notes: see page 14

<b>Table 2F - MAXIMUM PIER SPACING (in)</b>											
<b>3" Braced Pipe Frame</b>	Snow	Slope (deg)									
		Wind Speed & Exposure Category	psf	0	5	10	15	20	25	30	35
100 mph Exposure D	0	196	201	171	166	157	150	144	143	144	144
	10	182	185	167	164	157	150	144	143	144	144
	20	159	161	148	147	145	145	144	143	144	144
	30	150	152	141	140	139	139	139	143	144	144
	40	138	139	131	130	131	132	133	138	143	144
	50	128	130	123	123	124	126	128	133	139	144
105 mph Exposure D	0	188	194	164	159	150	143	137	137	137	138
	10	177	181	162	159	150	143	137	137	137	138
	20	156	158	145	143	141	140	137	137	137	138
	30	147	149	138	137	136	136	135	137	137	138
	40	136	137	129	128	128	129	130	133	137	138
	50	127	128	121	120	122	123	125	129	135	138
110 mph Exposure D	0	181	186	158	153	144	138	131	131	132	132
	10	173	176	157	153	144	138	131	131	132	132
	20	152	155	141	140	137	136	131	131	132	132
	30	144	146	135	134	132	132	131	131	132	132
	40	134	135	126	125	125	126	126	129	132	132
	50	125	126	119	118	119	120	121	125	131	132
120 mph Exposure D	0	168	173	146	141	133	127	121	121	121	122
	10	164	167	146	141	133	127	121	121	121	122
	20	146	149	135	133	130	127	121	121	121	122
	30	139	141	129	128	126	125	121	121	121	122
	40	129	131	122	120	120	119	119	121	121	122
	50	122	123	115	114	114	115	115	119	121	122
130 mph Exposure D	0	157	161	136	131	124	118	112	112	112	113
	10	156	159	136	131	124	118	112	112	112	113
	20	140	143	129	126	123	118	112	112	112	113
	30	134	136	124	122	120	118	112	112	112	113
	40	125	127	117	115	114	114	112	112	112	113
	50	118	120	111	110	110	110	109	112	112	113
140 mph Exposure D	0	147	151	127	123	115	110	105	104	105	105
	10	147	151	127	123	115	110	105	104	105	105
	20	135	137	123	120	115	110	105	104	105	105
	30	129	131	118	116	114	110	105	104	105	105
	40	121	123	112	111	109	108	105	104	105	105
	50	115	116	107	106	105	105	104	104	105	105
150 mph Exposure D	0	138	142	119	115	108	103	98	98	98	98
	10	138	142	119	115	108	103	98	98	98	98
	20	130	132	117	115	108	103	98	98	98	98
	30	124	127	113	111	108	103	98	98	98	98
	40	117	119	108	106	105	103	98	98	98	98
	160 mph Exposure D	0	130	134	112	108	102	97	92	92	92
10		130	134	112	108	102	97	92	92	92	92
20		124	127	112	108	102	97	92	92	92	92
30		120	122	109	107	102	97	92	92	92	92
40		114	116	104	102	100	97	92	92	92	92

Notes: see page 14



Notes for Tables 1 & 2:

1. Shaded region denotes special requirements for XR1000 rails – contact IronRidge
2. Cross pipe splices not permitted in outer 2/3 of end spans, or the middle 1/3 of interior spans based on the installed attachment spacing ( $L_{install}$ ). See Figure A
3. End cantilever span of pipe rails (max) =  $0.40 \times$  maximum span ( $L_{max}$ ) from above tables. See Figure A
4. When installations occur on a N-S grade, the design slope of the array shall be determined as the slope relative to level ground. Code required topographic effects have not been considered. Topographic (Wind) Factor = 1.0 (no topographic effects)
5. Dead Load (Weight) = 3 psf
6. Maximum PV Module Dimension = 78”

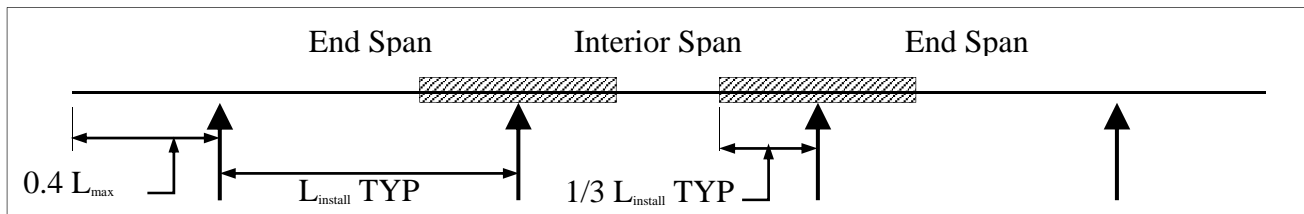


Figure A

$L_{max}$  = Maximum pier spacing provided in the tables above for the project design criteria

$L_{install}$  = Actual installed pier spacing

= Indicates region of the pipe rail where splice may be installed

To avoid potential problems from the effects of thermal expansion, a maximum total continuous cross pipe length of 100 ft is recommended.

Foundation Requirements

The foundation requirements for a cast-in-place drilled concrete pier system and for each soil class 2, 3, & 4 may be obtained from the tables below. The soil class is noted at the top of the tables. For each soil class Tables 3A-3F and 4A-4F are provided for the 2in and 3in systems respectively. These tables are based on the piers being installed at their maximum allowable spacing. For spacing values less than maximum and for loads cases with snow > 0 psf, the requirements can be determined by using the online Design Assistant at IronRidge.com.

<b>Soil Class 2</b>											
<b>Table 3A - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	36	36
	20	36	36	36	36	36	36	36	36	36	36
	24	36	36	36	36	36	36	36	36	36	*
105 mph Exposure B	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	36	36
	20	36	36	36	36	36	36	36	36	36	*
	24	36	36	36	36	36	36	36	36	*	*
110 mph Exposure B	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	36	36
	20	36	36	36	36	36	36	36	36	36	*
	24	36	36	36	36	36	36	36	*	*	*
120 mph Exposure B	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	36	*
	20	36	36	36	36	36	36	36	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
130 mph Exposure B	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	*	*
	20	36	36	36	36	36	36	36	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
140 mph Exposure B	12	36	36	36	36	36	36	36	36	36	*
	16	36	36	36	36	36	36	36	*	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
150 mph Exposure B	12	36	36	36	36	36	36	36	36	*	*
	16	36	36	36	36	36	36	*	*	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
160 mph Exposure B	12	36	36	36	36	36	36	36	*	*	*
	16	36	36	36	36	36	36	*	*	*	*
	20	36	36	36	36	36	*	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*

Notes: see page 51



<b>Soil Class 2</b>											
<b>Table 3B - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	36	*
	20	36	36	36	36	36	36	36	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
105 mph Exposure C	12	36	36	36	36	36	36	36	36	36	36
	16	36	36	36	36	36	36	36	36	*	*
	20	36	36	36	36	36	36	36	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
110 mph Exposure C	12	36	36	36	36	36	36	36	36	36	*
	16	36	36	36	36	36	36	36	*	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
120 mph Exposure C	12	36	36	36	36	36	36	36	36	*	*
	16	36	36	36	36	36	36	*	*	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
130 mph Exposure C	12	36	36	36	36	36	36	36	*	*	*
	16	36	36	36	36	36	36	*	*	*	*
	20	36	36	36	36	36	*	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
140 mph Exposure C	12	36	36	36	36	36	36	*	*	*	*
	16	36	36	36	36	36	*	*	*	*	*
	20	36	36	36	36	36	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
150 mph Exposure C	12	36	36	36	36	36	36	*	*	*	*
	16	36	36	36	36	36	*	*	*	*	*
	20	36	36	36	36	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
160 mph Exposure C	12	36	36	36	36	36	36	*	*	*	*
	16	36	36	36	36	36	*	*	*	*	*
	20	36	36	36	36	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*

Notes: see page 51

<b>Soil Class 2</b>											
<b>Table 3C - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	36	36	36	36	36	36	*
	16	36	36	36	36	36	36	36	36	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
105 mph Exposure D	12	36	36	36	36	36	36	36	36	36	*
	16	36	36	36	36	36	36	36	*	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
110 mph Exposure D	12	36	36	36	36	36	36	36	36	*	*
	16	36	36	36	36	36	36	*	*	*	*
	20	36	36	36	36	36	36	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
120 mph Exposure D	12	36	36	36	36	36	36	36	*	*	*
	16	36	36	36	36	36	36	*	*	*	*
	20	36	36	36	36	36	*	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
130 mph Exposure D	12	36	36	36	36	36	36	*	*	*	*
	16	36	36	36	36	36	*	*	*	*	*
	20	36	36	36	36	36	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
140 mph Exposure D	12	36	36	36	36	36	36	*	*	*	*
	16	36	36	36	36	36	*	*	*	*	*
	20	36	36	36	36	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
150 mph Exposure D	12	36	36	36	36	36	*	*	*	*	*
	16	36	36	36	36	36	*	*	*	*	*
	20	36	36	36	36	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
160 mph Exposure D	12	36	36	36	36	36	*	*	*	*	*
	16	36	36	36	36	*	*	*	*	*	*
	20	36	36	36	36	*	*	*	*	*	*
	24	36	36	36	*	*	*	*	*	*	*

Notes: see page 51



<b>Soil Class 2</b>											
<b>Table 3D - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	36	36	36	36	42	42	48
	16	36	36	36	36	36	36	36	36	36	42
	20	36	36	36	36	36	36	36	36	36	36
	24	36	36	36	36	36	36	36	36	36	36
105 mph Exposure B	12	36	36	36	36	36	36	42	42	42	48
	16	36	36	36	36	36	36	36	36	42	42
	20	36	36	36	36	36	36	36	36	36	36
	24	36	36	36	36	36	36	36	36	36	36
110 mph Exposure B	12	36	36	36	36	36	36	42	42	48	48
	16	36	36	36	36	36	36	36	36	42	42
	20	36	36	36	36	36	36	36	36	36	42
	24	36	36	36	36	36	36	36	36	36	36
120 mph Exposure B	12	36	36	36	36	36	36	42	42	48	54
	16	36	36	36	36	36	36	36	42	42	48
	20	36	36	36	36	36	36	36	36	36	42
	24	36	36	36	36	36	36	36	36	36	36
130 mph Exposure B	12	36	36	36	36	36	36	42	48	48	54
	16	36	36	36	36	36	36	36	42	42	48
	20	36	36	36	36	36	36	36	36	42	42
	24	36	36	36	36	36	36	36	36	36	42
140 mph Exposure B	12	36	36	36	36	36	42	42	48	54	54
	16	36	36	36	36	36	36	42	42	48	48
	20	36	36	36	36	36	36	36	36	42	42
	24	36	36	36	36	36	36	36	36	36	42
150 mph Exposure B	12	36	36	36	36	36	42	48	48	54	54
	16	36	36	36	36	36	36	42	42	48	48
	20	36	36	36	36	36	36	36	42	42	48
	24	36	36	36	36	36	36	36	36	42	42
160 mph Exposure B	12	36	36	36	36	42	42	48	54	54	60
	16	36	36	36	36	36	36	42	42	48	54
	20	36	36	36	36	36	36	36	42	42	48
	24	36	36	36	36	36	36	36	36	42	42

Notes: see page 51

<b>Soil Class 2</b>											
<b>Table 3E - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	36	36	36	42	42	48	54
	16	36	36	36	36	36	36	36	42	42	48
	20	36	36	36	36	36	36	36	36	36	42
	24	36	36	36	36	36	36	36	36	36	36
105 mph Exposure C	12	36	36	36	36	36	36	42	48	48	54
	16	36	36	36	36	36	36	36	42	42	48
	20	36	36	36	36	36	36	36	36	42	42
	24	36	36	36	36	36	36	36	36	36	36
110 mph Exposure C	12	36	36	36	36	36	42	42	48	48	54
	16	36	36	36	36	36	36	36	42	42	48
	20	36	36	36	36	36	36	36	36	42	42
	24	36	36	36	36	36	36	36	36	36	42
120 mph Exposure C	12	36	36	36	36	36	42	48	48	54	54
	16	36	36	36	36	36	36	42	42	48	48
	20	36	36	36	36	36	36	36	42	42	42
	24	36	36	36	36	36	36	36	36	36	42
130 mph Exposure C	12	36	36	36	36	42	42	48	48	54	60
	16	36	36	36	36	36	36	42	42	48	54
	20	36	36	36	36	36	36	36	42	42	48
	24	36	36	36	36	36	36	36	36	42	42
140 mph Exposure C	12	36	36	36	36	42	42	48	54	54	60
	16	36	36	36	36	36	42	42	48	48	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	36	42	42
150 mph Exposure C	12	36	36	36	42	42	48	48	54	60	60
	16	36	36	36	36	36	42	42	48	54	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	42	42	48
160 mph Exposure C	12	36	36	36	42	48	48	54	54	60	66
	16	36	36	36	36	36	42	48	48	54	54
	20	36	36	36	36	36	36	42	42	48	54
	24	36	36	36	36	36	36	36	42	42	48

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<b>Soil Class 2</b>											
<b>Table 3F - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	36	36	42	42	48	48	54
	16	36	36	36	36	36	36	36	42	42	48
	20	36	36	36	36	36	36	36	36	42	42
	24	36	36	36	36	36	36	36	36	36	42
105 mph Exposure D	12	36	36	36	36	36	42	48	48	54	54
	16	36	36	36	36	36	36	42	42	48	48
	20	36	36	36	36	36	36	36	36	42	42
	24	36	36	36	36	36	36	36	36	36	42
110 mph Exposure D	12	36	36	36	36	36	42	48	48	54	54
	16	36	36	36	36	36	36	42	42	48	48
	20	36	36	36	36	36	36	36	42	42	48
	24	36	36	36	36	36	36	36	36	36	42
120 mph Exposure D	12	36	36	36	36	42	42	48	54	54	60
	16	36	36	36	36	36	36	42	48	48	54
	20	36	36	36	36	36	36	36	42	42	48
	24	36	36	36	36	36	36	36	36	42	42
130 mph Exposure D	12	36	36	36	42	42	42	48	54	60	60
	16	36	36	36	36	36	42	42	48	48	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	42	42	42
140 mph Exposure D	12	36	36	36	42	42	48	54	54	60	66
	16	36	36	36	36	36	42	48	48	54	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	42	42	48
150 mph Exposure D	12	36	36	36	42	48	48	54	54	60	66
	16	36	36	36	36	36	42	48	48	54	60
	20	36	36	36	36	36	36	42	48	48	54
	24	36	36	36	36	36	36	42	42	42	48
160 mph Exposure D	12	36	42	36	48	48	54	54	60	60	66
	16	36	36	36	36	42	42	48	54	54	60
	20	36	36	36	36	36	42	42	48	48	54
	24	36	36	36	36	36	36	42	42	48	48

Notes: see page 51

<b>Soil Class 2</b>											
<b>Table 4A - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	36	42	48	54	60	60	60
	16	36	36	36	36	42	48	48	54	54	54
	20	36	36	36	36	36	42	48	48	48	48
	24	36	36	36	36	36	36	42	42	42	42
105 mph Exposure B	12	36	36	36	36	48	54	60	60	60	60
	16	36	36	36	36	42	48	54	54	54	54
	20	36	36	36	36	36	42	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
110 mph Exposure B	12	36	36	36	42	48	54	60	60	60	60
	16	36	36	36	36	42	48	54	54	54	54
	20	36	36	36	36	36	42	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
120 mph Exposure B	12	36	36	36	42	48	54	60	60	60	60
	16	36	36	36	36	42	48	54	54	54	54
	20	36	36	36	36	42	42	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
130 mph Exposure B	12	36	36	36	42	48	54	60	60	60	60
	16	36	36	36	36	42	48	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
140 mph Exposure B	12	36	36	42	42	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
150 mph Exposure B	12	36	42	42	48	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
160 mph Exposure B	12	36	42	42	48	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42

Notes: see page 51



<b>Soil Class 2</b>											
<b>Table 4B - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	42	48	54	60	60	60	60
	16	36	36	36	36	42	48	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
105 mph Exposure C	12	36	36	36	42	48	54	60	60	60	60
	16	36	36	36	36	42	48	54	54	54	54
	20	36	36	36	36	36	42	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
110 mph Exposure C	12	36	36	36	42	48	60	60	60	60	60
	16	36	36	36	36	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
120 mph Exposure C	12	36	42	42	48	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
130 mph Exposure C	12	36	42	42	48	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
140 mph Exposure C	12	42	48	48	54	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	42	48	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	*
150 mph Exposure C	12	42	48	48	54	60	60	60	60	60	60
	16	36	42	42	42	54	54	54	54	54	54
	20	36	36	36	42	48	48	48	48	48	*
	24	36	36	36	36	42	42	42	42	*	*
160 mph Exposure C	12	48	54	54	60	60	60	60	60	60	60
	16	36	42	42	48	54	54	54	54	54	54
	20	36	36	36	42	48	48	48	48	*	*
	24	36	36	36	36	42	42	42	*	*	*

Notes: see page 51

<b>Soil Class 2</b>											
<b>Table 4C - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	42	48	60	60	60	60	60
	16	36	36	36	36	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	36	42	42	42	42	42
105 mph Exposure D	12	36	36	42	42	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
110 mph Exposure D	12	36	42	42	48	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
120 mph Exposure D	12	36	42	42	48	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	42
130 mph Exposure D	12	42	48	48	54	54	60	60	60	60	60
	16	36	36	36	42	48	54	54	54	54	54
	20	36	36	36	42	48	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	*
140 mph Exposure D	12	42	48	48	54	60	60	60	60	60	60
	16	36	42	42	42	54	54	54	54	54	54
	20	36	36	36	42	48	48	48	48	48	*
	24	36	36	36	36	42	42	42	42	*	*
150 mph Exposure D	12	48	54	54	60	60	60	60	60	60	60
	16	36	42	42	48	54	54	54	54	54	*
	20	36	36	36	42	48	48	48	48	*	*
	24	36	36	36	42	42	42	42	*	*	*
160 mph Exposure D	12	48	54	54	60	60	60	60	60	60	60
	16	42	42	42	48	54	54	54	54	54	*
	20	36	36	36	42	48	48	48	*	*	*
	24	36	36	36	42	42	42	*	*	*	*

Notes: see page 51



<b>Soil Class 2</b>											
<b>Table 4D - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	36	36	42	48	54	54	60
	16	36	36	36	36	36	36	42	48	48	54
	20	36	36	36	36	36	36	36	42	42	48
	24	36	36	36	36	36	36	36	36	36	42
105 mph Exposure B	12	36	36	36	36	42	42	48	54	60	60
	16	36	36	36	36	36	42	42	48	48	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	36	42	42
110 mph Exposure B	12	36	36	36	36	42	48	54	54	60	66
	16	36	36	36	36	36	42	42	48	54	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	36	42	42
120 mph Exposure B	12	36	36	36	42	48	48	54	60	60	66
	16	36	36	36	36	36	42	48	48	54	60
	20	36	36	36	36	36	36	42	48	48	54
	24	36	36	36	36	36	36	42	42	42	48
130 mph Exposure B	12	36	36	36	42	48	48	54	60	66	66
	16	36	36	36	36	36	42	48	54	54	60
	20	36	36	36	36	36	42	42	48	48	54
	24	36	36	36	36	36	36	42	42	48	48
140 mph Exposure B	12	36	42	36	48	54	54	60	60	66	72
	16	36	36	36	36	42	48	48	54	60	60
	20	36	36	36	36	36	42	48	48	54	54
	24	36	36	36	36	36	36	42	48	48	54
150 mph Exposure B	12	36	42	36	48	54	60	60	66	66	72
	16	36	36	36	42	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	42	42	48	48	54
160 mph Exposure B	12	36	42	48	54	60	60	60	66	72	78
	16	36	36	36	42	48	48	54	60	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	48	48	54	54

Notes: see page 51

<b>Soil Class 2</b>											
<b>Table 4E - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	42	48	48	54	60	60	66
	16	36	36	36	36	36	42	48	48	54	60
	20	36	36	36	36	36	36	42	48	48	54
	24	36	36	36	36	36	36	42	42	48	48
105 mph Exposure C	12	36	36	36	42	42	48	54	60	60	66
	16	36	36	36	36	36	42	48	48	54	60
	20	36	36	36	36	36	36	42	48	48	54
	24	36	36	36	36	36	36	36	42	48	48
110 mph Exposure C	12	36	36	36	48	48	54	54	60	66	72
	16	36	36	36	36	42	42	48	54	54	60
	20	36	36	36	36	36	42	42	48	54	54
	24	36	36	36	36	36	36	42	42	48	48
120 mph Exposure C	12	36	42	36	48	54	54	60	60	66	72
	16	36	36	36	42	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	36	42	48	48	54
130 mph Exposure C	12	36	42	48	54	60	60	60	66	72	78
	16	36	36	36	42	48	48	54	60	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	42	48	54	54
140 mph Exposure C	12	42	48	48	54	60	66	66	66	72	78
	16	36	36	36	42	48	48	54	60	66	66
	20	36	36	36	36	42	48	48	54	60	60
	24	36	36	36	36	36	42	48	48	54	60
150 mph Exposure C	12	42	48	54	60	66	66	66	72	78	78
	16	36	42	36	48	54	54	60	60	66	72
	20	36	36	36	42	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60
160 mph Exposure C	12	48	54	54	66	72	72	72	72	78	84
	16	36	42	36	48	54	54	60	66	66	72
	20	36	36	36	42	48	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	54	60

Notes: see page 51



<b>Soil Class 2</b>											
<b>Table 4F - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	48	48	54	54	60	66	72
	16	36	36	36	36	42	42	48	54	54	60
	20	36	36	36	36	36	42	42	48	54	54
	24	36	36	36	36	36	36	42	42	48	48
105 mph Exposure D	12	36	42	36	48	54	54	60	60	66	72
	16	36	36	36	36	42	48	48	54	60	60
	20	36	36	36	36	36	42	48	48	54	54
	24	36	36	36	36	36	36	42	48	48	54
110 mph Exposure D	12	36	42	36	48	54	54	60	66	66	72
	16	36	36	36	42	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	42	42	48	48	54
120 mph Exposure D	12	36	48	48	54	60	60	60	66	72	78
	16	36	36	36	42	48	48	54	60	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	48	48	54	54
130 mph Exposure D	12	42	48	48	60	66	66	66	66	72	78
	16	36	36	36	48	48	54	54	60	66	72
	20	36	36	36	36	42	48	48	54	60	60
	24	36	36	36	36	36	42	48	48	54	60
140 mph Exposure D	12	42	54	54	60	66	72	72	72	78	84
	16	36	42	36	48	54	54	60	60	66	72
	20	36	36	36	42	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60
150 mph Exposure D	12	48	54	60	66	72	72	72	72	78	84
	16	36	42	36	54	54	60	60	66	72	72
	20	36	36	36	42	48	48	54	60	60	66
	24	36	36	36	36	42	48	48	54	60	60
160 mph Exposure D	12	48	60	60	72	78	78	78	78	84	90
	16	42	48	48	54	60	60	60	66	72	78
	20	36	36	36	42	48	48	54	60	66	72
	24	36	36	36	36	42	48	54	54	60	66

Notes: see page 51

<b>Soil Class 3</b>											
<b>Table 3A - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	42	48	48	48	48	48	48
	16	36	36	36	36	42	42	42	42	42	42
	20	36	36	36	36	36	42	42	42	42	42
	24	36	36	36	36	36	36	36	36	36	*
105 mph Exposure B	12	36	36	36	42	48	48	48	48	48	48
	16	36	36	36	36	42	42	42	42	42	42
	20	36	36	36	36	42	42	42	42	42	*
	24	36	36	36	36	36	36	36	36	*	*
110 mph Exposure B	12	36	36	36	42	48	48	48	48	48	48
	16	36	36	36	36	42	42	42	42	42	42
	20	36	36	36	36	42	42	42	42	42	*
	24	36	36	36	36	36	36	36	36	*	*
120 mph Exposure B	12	36	36	36	42	48	48	48	48	48	48
	16	36	36	36	36	42	42	42	42	42	*
	20	36	36	36	36	42	42	42	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
130 mph Exposure B	12	36	36	36	48	48	48	48	48	48	48
	16	36	36	36	42	42	42	42	42	*	*
	20	36	36	36	36	42	42	42	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
140 mph Exposure B	12	36	36	36	48	48	48	48	48	48	*
	16	36	36	36	42	42	42	42	*	*	*
	20	36	36	36	36	42	42	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
150 mph Exposure B	12	36	36	36	48	48	48	48	48	*	*
	16	36	36	36	42	42	42	*	*	*	*
	20	36	36	36	42	42	42	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
160 mph Exposure B	12	36	36	42	48	48	48	48	*	*	*
	16	36	36	36	42	42	42	*	*	*	*
	20	36	36	36	42	42	*	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*

Notes: see page 51



<b>Soil Class 3</b>											
<b>Table 3B - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	42	48	48	48	48	48	48
	16	36	36	36	42	42	42	42	42	42	*
	20	36	36	36	36	42	42	42	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
105 mph Exposure C	12	36	36	36	42	48	48	48	48	48	48
	16	36	36	36	42	42	42	42	42	*	*
	20	36	36	36	36	42	42	42	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
110 mph Exposure C	12	36	36	36	48	48	48	48	48	48	*
	16	36	36	36	42	42	42	42	*	*	*
	20	36	36	36	36	42	42	*	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
120 mph Exposure C	12	36	36	36	48	48	48	48	48	*	*
	16	36	36	36	42	42	42	*	*	*	*
	20	36	36	36	36	42	42	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
130 mph Exposure C	12	36	36	42	48	48	48	48	*	*	*
	16	36	36	36	42	42	42	*	*	*	*
	20	36	36	36	42	42	*	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
140 mph Exposure C	12	36	36	42	48	48	48	*	*	*	*
	16	36	36	36	42	42	*	*	*	*	*
	20	36	36	36	42	42	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
150 mph Exposure C	12	36	42	42	48	48	48	*	*	*	*
	16	36	36	36	42	42	*	*	*	*	*
	20	36	36	36	42	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
160 mph Exposure C	12	36	42	42	48	48	48	*	*	*	*
	16	36	36	36	42	42	*	*	*	*	*
	20	36	36	36	42	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*

Notes: see page 51

<b>Soil Class 3</b>											
<b>Table 3C - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	48	48	48	48	48	48	*
	16	36	36	36	42	42	42	42	*	*	*
	20	36	36	36	36	42	42	*	*	*	*
	24	36	36	36	36	36	36	*	*	*	*
105 mph Exposure D	12	36	36	36	48	48	48	48	48	48	*
	16	36	36	36	42	42	42	42	*	*	*
	20	36	36	36	36	42	42	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
110 mph Exposure D	12	36	36	36	48	48	48	48	48	*	*
	16	36	36	36	42	42	42	*	*	*	*
	20	36	36	36	42	42	42	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
120 mph Exposure D	12	36	36	42	48	48	48	48	*	*	*
	16	36	36	36	42	42	42	*	*	*	*
	20	36	36	36	42	42	*	*	*	*	*
	24	36	36	36	36	36	*	*	*	*	*
130 mph Exposure D	12	36	36	42	48	48	48	*	*	*	*
	16	36	36	36	42	42	*	*	*	*	*
	20	36	36	36	42	42	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
140 mph Exposure D	12	36	42	42	48	48	48	*	*	*	*
	16	36	36	36	42	42	*	*	*	*	*
	20	36	36	36	42	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
150 mph Exposure D	12	36	42	42	48	48	*	*	*	*	*
	16	36	36	36	42	42	*	*	*	*	*
	20	36	36	36	42	*	*	*	*	*	*
	24	36	36	36	36	*	*	*	*	*	*
160 mph Exposure D	12	42	48	48	48	48	*	*	*	*	*
	16	36	36	42	42	*	*	*	*	*	*
	20	36	36	36	42	*	*	*	*	*	*
	24	36	36	36	*	*	*	*	*	*	*

Notes: see page 51



<b>Soil Class 3</b>											
<b>Table 3D - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	36	42	48	54	54	60	66
	16	36	36	36	36	36	42	48	48	54	54
	20	36	36	36	36	36	36	42	42	48	48
	24	36	36	36	36	36	36	36	36	42	42
105 mph Exposure B	12	36	36	36	36	42	48	54	54	60	66
	16	36	36	36	36	36	42	48	48	54	60
	20	36	36	36	36	36	36	42	48	48	54
	24	36	36	36	36	36	36	36	42	42	48
110 mph Exposure B	12	36	36	36	36	42	48	54	60	60	66
	16	36	36	36	36	36	42	48	48	54	60
	20	36	36	36	36	36	36	36	42	48	54
	24	36	36	36	36	36	36	36	42	42	48
120 mph Exposure B	12	36	36	36	36	42	48	54	60	66	72
	16	36	36	36	36	42	42	48	54	60	60
	20	36	36	36	36	36	42	48	48	54	54
	24	36	36	36	36	36	36	36	42	42	48
130 mph Exposure B	12	36	36	36	42	48	54	60	66	66	72
	16	36	36	36	36	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	36	36	42	48	54
140 mph Exposure B	12	36	36	36	42	48	54	60	66	72	78
	16	36	36	36	36	42	48	54	60	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	42	48	54	54
150 mph Exposure B	12	36	36	36	42	48	54	66	66	72	78
	16	36	36	36	36	42	48	54	60	66	66
	20	36	36	36	36	42	48	48	54	60	60
	24	36	36	36	36	36	42	48	48	54	54
160 mph Exposure B	12	36	36	36	42	54	60	66	72	72	78
	16	36	36	36	36	48	54	60	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60

Notes: see page 51

<b>Soil Class 3</b>											
<b>Table 3E - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	36	48	54	60	60	66	72
	16	36	36	36	36	42	42	48	54	60	60
	20	36	36	36	36	36	42	48	48	54	54
	24	36	36	36	36	36	36	42	42	48	54
105 mph Exposure C	12	36	36	36	42	48	54	60	60	66	72
	16	36	36	36	36	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	36	42	48	48	54
110 mph Exposure C	12	36	36	36	42	48	54	60	66	66	72
	16	36	36	36	36	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	42	42	48	48	54
120 mph Exposure C	12	36	36	36	42	48	54	60	66	72	78
	16	36	36	36	36	42	48	54	60	66	66
	20	36	36	36	36	42	42	48	54	54	60
	24	36	36	36	36	36	42	48	48	54	54
130 mph Exposure C	12	36	36	36	42	54	60	66	72	72	78
	16	36	36	36	36	48	54	60	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	48	54	60
140 mph Exposure C	12	36	36	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	66	66	72
	20	36	36	36	36	42	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	54	60
150 mph Exposure C	12	36	42	36	48	54	60	72	72	78	84
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	66
	24	36	36	36	36	42	48	48	54	60	60
160 mph Exposure C	12	36	42	42	48	54	66	72	78	84	90
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	48	54	54	60	66	72
	24	36	36	36	36	42	48	54	54	60	66

Notes: see page 51



<b>Soil Class 3</b>											
<b>Table 3F - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	42	48	54	60	66	66	72
	16	36	36	36	36	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	42	42	48	48	54
105 mph Exposure D	12	36	36	36	42	48	54	60	66	72	78
	16	36	36	36	36	42	48	54	60	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	48	48	54	54
110 mph Exposure D	12	36	36	36	42	48	54	60	66	72	78
	16	36	36	36	36	42	48	54	60	66	66
	20	36	36	36	36	42	42	48	54	60	60
	24	36	36	36	36	36	42	48	48	54	54
120 mph Exposure D	12	36	36	36	42	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60
130 mph Exposure D	12	36	42	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	66	66	72
	20	36	36	36	36	42	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	60	60
140 mph Exposure D	12	36	42	36	48	54	66	72	78	84	90
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	66
	24	36	36	36	36	42	48	54	54	60	66
150 mph Exposure D	12	36	42	48	54	60	66	72	78	84	90
	16	36	36	36	42	48	60	66	66	72	78
	20	36	36	36	42	48	54	60	60	66	72
	24	36	36	36	36	42	48	54	54	60	66
160 mph Exposure D	12	42	48	48	54	60	66	78	78	84	96
	16	36	36	36	42	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	66	72
	24	36	36	36	36	42	48	54	60	60	66

Notes: see page 51

<b>Soil Class 3</b>											
<b>Table 4A - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	42	48	60	66	72	78	78	78
	16	36	36	36	42	54	60	66	66	66	66
	20	36	36	36	42	48	54	60	60	60	60
	24	36	36	36	36	42	48	54	60	60	60
105 mph Exposure B	12	36	36	42	48	60	66	78	78	78	78
	16	36	36	36	48	54	60	66	66	66	66
	20	36	36	36	42	48	54	60	60	60	60
	24	36	36	36	36	48	54	60	60	60	60
110 mph Exposure B	12	36	36	42	54	60	72	78	78	78	78
	16	36	36	36	48	54	60	66	66	66	66
	20	36	36	36	42	48	54	60	60	60	60
	24	36	36	36	42	48	54	60	60	60	60
120 mph Exposure B	12	36	36	42	54	66	72	78	78	78	78
	16	36	36	36	48	54	66	66	66	66	66
	20	36	36	36	42	54	60	60	60	60	60
	24	36	36	36	42	48	54	60	60	60	60
130 mph Exposure B	12	36	42	42	54	66	78	78	78	78	78
	16	36	36	42	48	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	42	48	54	60	60	60	60
140 mph Exposure B	12	42	48	48	60	66	78	78	78	78	78
	16	36	36	42	54	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	42	54	60	60	60	60	60
150 mph Exposure B	12	42	48	48	60	72	78	78	78	78	78
	16	36	36	42	54	60	66	66	66	66	66
	20	36	36	36	48	60	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	60
160 mph Exposure B	12	42	54	54	60	72	78	78	78	78	78
	16	36	42	42	54	66	66	66	66	66	66
	20	36	36	42	48	60	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	60

Notes: see page 51



<b>Soil Class 3</b>											
<b>Table 4B - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	42	42	54	66	72	78	78	78	78
	16	36	36	36	48	54	66	66	66	66	66
	20	36	36	36	42	54	60	60	60	60	60
	24	36	36	36	42	48	54	60	60	60	60
105 mph Exposure C	12	36	36	42	54	60	72	78	78	78	78
	16	36	36	36	48	54	60	66	66	66	66
	20	36	36	36	42	48	54	60	60	60	60
	24	36	36	36	42	48	54	60	60	60	60
110 mph Exposure C	12	36	42	48	54	66	78	78	78	78	78
	16	36	36	42	48	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	42	48	60	60	60	60	60
120 mph Exposure C	12	42	48	48	60	72	78	78	78	78	78
	16	36	36	42	54	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	60
130 mph Exposure C	12	42	54	54	60	72	78	78	78	78	78
	16	36	42	42	54	66	66	66	66	66	66
	20	36	36	42	48	60	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	60
140 mph Exposure C	12	48	54	54	66	72	78	78	78	78	78
	16	36	42	42	54	66	66	66	66	66	66
	20	36	36	42	54	60	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	*
150 mph Exposure C	12	48	60	60	66	78	78	78	78	78	78
	16	42	48	48	60	66	66	66	66	66	66
	20	36	36	42	54	60	60	60	60	60	*
	24	36	36	42	48	60	60	60	60	*	*
160 mph Exposure C	12	54	60	60	72	78	78	78	78	78	78
	16	42	48	48	60	66	66	66	66	66	66
	20	36	42	42	54	60	60	60	60	*	*
	24	36	36	42	48	60	60	60	*	*	*

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<b>Soil Class 3</b>											
<b>Table 4C - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	42	48	54	66	78	78	78	78	78
	16	36	36	42	48	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	42	48	60	60	60	60	60
105 mph Exposure D	12	42	48	48	60	66	78	78	78	78	78
	16	36	36	42	54	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	42	54	60	60	60	60	60
110 mph Exposure D	12	42	48	48	60	72	78	78	78	78	78
	16	36	36	42	54	60	66	66	66	66	66
	20	36	36	36	48	54	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	60
120 mph Exposure D	12	42	54	54	60	72	78	78	78	78	78
	16	36	42	42	54	66	66	66	66	66	66
	20	36	36	42	48	60	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	60
130 mph Exposure D	12	48	54	54	66	78	78	78	78	78	78
	16	36	42	48	54	66	66	66	66	66	66
	20	36	36	42	54	60	60	60	60	60	60
	24	36	36	36	48	54	60	60	60	60	*
140 mph Exposure D	12	54	60	60	66	78	78	78	78	78	78
	16	42	48	48	60	66	66	66	66	66	66
	20	36	36	42	54	60	60	60	60	60	*
	24	36	36	42	48	60	60	60	60	*	*
150 mph Exposure D	12	54	66	66	72	78	78	78	78	78	78
	16	42	48	48	60	66	66	66	66	66	*
	20	36	42	42	54	60	60	60	60	*	*
	24	36	36	42	54	60	60	60	*	*	*
160 mph Exposure D	12	60	66	66	78	78	78	78	78	78	78
	16	48	54	54	60	66	66	66	66	66	*
	20	36	42	48	54	60	60	60	*	*	*
	24	36	36	42	54	60	60	*	*	*	*

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<b>Soil Class 3</b>											
<b>Table 4D - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	42	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60
105 mph Exposure B	12	36	36	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	66	66	72
	20	36	36	36	36	42	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	60	60
110 mph Exposure B	12	36	36	36	48	54	60	72	72	78	84
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	66
	24	36	36	36	36	42	48	54	54	60	66
120 mph Exposure B	12	36	42	42	48	60	66	72	78	84	90
	16	36	36	36	42	48	60	66	66	72	78
	20	36	36	36	42	48	54	60	60	66	72
	24	36	36	36	36	42	48	54	60	60	66
130 mph Exposure B	12	36	42	48	54	60	66	78	84	90	96
	16	36	36	36	42	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	72
	24	36	36	36	36	42	48	54	60	66	66
140 mph Exposure B	12	42	48	48	60	60	72	78	84	90	96
	16	36	36	36	48	54	60	72	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	42	48	54	60	60	66	72
150 mph Exposure B	12	42	48	54	60	66	72	84	90	96	*
	16	36	42	36	48	54	66	72	78	84	90
	20	36	36	36	42	48	60	66	72	72	78
	24	36	36	36	42	48	54	60	66	66	72
160 mph Exposure B	12	42	54	54	66	72	78	84	90	96	*
	16	36	42	42	48	60	66	72	78	84	90
	20	36	36	36	42	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78

Notes: see page 51



<b>Soil Class 3</b>											
<b>Table 4E - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	42	42	48	60	66	72	78	84	90
	16	36	36	36	42	48	60	66	72	72	78
	20	36	36	36	42	48	54	60	60	66	72
	24	36	36	36	36	42	48	54	60	60	66
105 mph Exposure C	12	36	36	42	48	54	60	72	78	84	96
	16	36	36	36	42	48	54	66	66	72	84
	20	36	36	36	36	42	48	54	60	66	72
	24	36	36	36	36	42	48	54	60	60	66
110 mph Exposure C	12	36	48	48	54	60	72	78	84	90	96
	16	36	36	36	48	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	36	42	48	54	60	66	72
120 mph Exposure C	12	42	48	54	60	66	72	78	84	96	*
	16	36	36	36	48	54	66	72	78	84	90
	20	36	36	36	42	48	60	66	66	72	78
	24	36	36	36	42	48	54	60	60	66	72
130 mph Exposure C	12	42	54	54	66	72	78	84	90	96	*
	16	36	42	42	48	60	66	72	78	84	90
	20	36	36	36	42	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78
140 mph Exposure C	12	48	60	60	72	78	78	90	96	*	*
	16	36	42	48	54	60	66	78	84	90	96
	20	36	36	36	48	54	60	66	72	78	84
	24	36	36	36	42	48	54	66	66	72	78
150 mph Exposure C	12	48	60	66	72	84	84	90	96	*	*
	16	42	48	48	54	60	72	78	84	90	96
	20	36	42	36	48	54	66	72	78	84	90
	24	36	36	36	42	54	60	66	72	78	78
160 mph Exposure C	12	54	66	66	78	84	90	90	*	*	*
	16	42	48	54	60	66	72	84	90	96	*
	20	36	42	42	48	60	66	72	78	84	90
	24	36	36	36	48	54	60	66	72	78	84

Notes: see page 51

<b>Soil Class 3</b>											
<b>Table 4F - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	48	48	54	60	72	78	84	90	96
	16	36	36	36	48	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	36	42	48	54	60	66	72
105 mph Exposure D	12	42	48	48	60	66	72	78	84	90	96
	16	36	36	36	48	54	60	72	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	42	48	54	60	60	66	72
110 mph Exposure D	12	42	48	54	60	66	72	84	84	96	*
	16	36	42	36	48	54	66	72	78	84	90
	20	36	36	36	42	48	60	66	66	72	78
	24	36	36	36	42	48	54	60	66	66	72
120 mph Exposure D	12	42	54	54	66	72	78	84	90	96	*
	16	36	42	42	48	60	66	72	78	84	90
	20	36	36	36	48	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78
130 mph Exposure D	12	48	60	60	72	78	78	90	96	*	*
	16	36	48	48	54	60	72	78	84	90	96
	20	36	36	36	48	54	60	72	72	78	84
	24	36	36	36	42	48	60	66	66	72	78
140 mph Exposure D	12	54	60	66	78	84	84	90	96	*	*
	16	42	48	48	60	66	72	78	84	90	*
	20	36	42	42	48	54	66	72	78	84	90
	24	36	36	36	42	54	60	66	72	78	84
150 mph Exposure D	12	54	66	72	78	90	90	96	*	*	*
	16	42	54	54	60	66	72	84	90	96	*
	20	36	42	42	48	60	66	72	78	84	90
	24	36	36	36	48	54	60	66	72	78	84
160 mph Exposure D	12	60	72	72	84	96	96	96	*	*	*
	16	48	54	60	66	72	78	84	90	96	*
	20	36	48	48	54	60	66	78	84	90	96
	24	36	36	36	48	54	66	72	78	84	90

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 3A - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
100 mph Exposure B	12	36	36	36	42	54	54	54	54	54	54
	16	36	36	36	42	48	48	48	48	48	48
	20	36	36	36	36	42	48	48	48	48	48
	24	36	36	36	36	42	42	42	42	42	*
105 mph Exposure B	12	36	36	36	48	54	54	54	54	54	54
	16	36	36	36	42	48	48	48	48	48	48
	20	36	36	36	36	42	48	48	48	48	*
	24	36	36	36	36	42	42	42	42	*	*
110 mph Exposure B	12	36	36	36	48	54	54	54	54	54	54
	16	36	36	36	42	48	48	48	48	48	48
	20	36	36	36	36	42	48	48	48	48	*
	24	36	36	36	36	42	42	42	*	*	*
120 mph Exposure B	12	36	36	36	48	54	54	54	54	54	54
	16	36	36	36	42	48	48	48	48	48	*
	20	36	36	36	42	48	48	48	*	*	*
	24	36	36	36	36	42	42	*	*	*	*
130 mph Exposure B	12	36	36	42	48	54	54	54	54	54	54
	16	36	36	36	48	48	48	48	48	*	*
	20	36	36	36	42	48	48	48	*	*	*
	24	36	36	36	36	42	42	*	*	*	*
140 mph Exposure B	12	36	36	42	54	54	54	54	54	54	*
	16	36	36	36	48	48	48	48	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
150 mph Exposure B	12	36	42	42	54	54	54	54	54	*	*
	16	36	36	36	48	48	48	*	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
160 mph Exposure B	12	36	42	42	54	54	54	54	*	*	*
	16	36	36	42	48	48	48	*	*	*	*
	20	36	36	36	48	48	*	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*

Notes: see page 51



<b>Soil Class 4</b>											
<b>Table 3B - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	42	48	54	54	54	54	54	54
	16	36	36	36	42	48	48	48	48	48	*
	20	36	36	36	42	48	48	48	*	*	*
	24	36	36	36	36	42	42	*	*	*	*
105 mph Exposure C	12	36	36	42	48	54	54	54	54	54	54
	16	36	36	36	42	48	48	48	48	*	*
	20	36	36	36	42	48	48	48	*	*	*
	24	36	36	36	36	42	42	*	*	*	*
110 mph Exposure C	12	36	36	42	54	54	54	54	54	54	*
	16	36	36	36	48	48	48	48	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	42	*	*	*	*
120 mph Exposure C	12	36	42	42	54	54	54	54	54	*	*
	16	36	36	36	48	48	48	*	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
130 mph Exposure C	12	36	42	42	54	54	54	54	*	*	*
	16	36	36	42	48	48	48	*	*	*	*
	20	36	36	36	42	48	*	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
140 mph Exposure C	12	42	48	48	54	54	54	*	*	*	*
	16	36	36	42	48	48	*	*	*	*	*
	20	36	36	36	48	48	*	*	*	*	*
	24	36	36	36	42	*	*	*	*	*	*
150 mph Exposure C	12	42	48	48	54	54	54	*	*	*	*
	16	36	36	42	48	48	*	*	*	*	*
	20	36	36	36	48	*	*	*	*	*	*
	24	36	36	36	42	*	*	*	*	*	*
160 mph Exposure C	12	48	54	54	54	54	54	*	*	*	*
	16	36	42	42	48	48	*	*	*	*	*
	20	36	36	42	48	*	*	*	*	*	*
	24	36	36	36	42	*	*	*	*	*	*

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 3C - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	42	54	54	54	54	54	54	*
	16	36	36	36	48	48	48	48	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	42	*	*	*	*
105 mph Exposure D	12	36	36	42	54	54	54	54	54	54	*
	16	36	36	36	48	48	48	48	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
110 mph Exposure D	12	36	42	42	54	54	54	54	54	*	*
	16	36	36	36	48	48	48	*	*	*	*
	20	36	36	36	42	48	48	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
120 mph Exposure D	12	36	42	42	54	54	54	54	*	*	*
	16	36	36	42	48	48	48	*	*	*	*
	20	36	36	36	48	48	*	*	*	*	*
	24	36	36	36	42	42	*	*	*	*	*
130 mph Exposure D	12	42	48	48	54	54	54	*	*	*	*
	16	36	36	42	48	48	*	*	*	*	*
	20	36	36	36	48	48	*	*	*	*	*
	24	36	36	36	42	*	*	*	*	*	*
140 mph Exposure D	12	42	54	54	54	54	54	*	*	*	*
	16	36	42	42	48	48	*	*	*	*	*
	20	36	36	36	48	*	*	*	*	*	*
	24	36	36	36	42	*	*	*	*	*	*
150 mph Exposure D	12	48	54	54	54	54	*	*	*	*	*
	16	36	42	42	48	48	*	*	*	*	*
	20	36	36	42	48	*	*	*	*	*	*
	24	36	36	36	42	*	*	*	*	*	*
160 mph Exposure D	12	48	60	60	54	54	*	*	*	*	*
	16	36	42	42	48	*	*	*	*	*	*
	20	36	36	42	48	*	*	*	*	*	*
	24	36	36	36	*	*	*	*	*	*	*

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 3D - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	36	36	36	42	48	54	60	60	66	72
	16	36	36	36	36	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	48	54	60
	24	36	36	36	36	36	36	42	48	48	54
105 mph Exposure B	12	36	36	36	42	48	54	60	66	72	72
	16	36	36	36	36	42	48	54	54	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	42	48	48	54
110 mph Exposure B	12	36	36	36	42	48	54	60	66	72	78
	16	36	36	36	36	42	48	54	60	60	66
	20	36	36	36	36	36	42	48	54	54	60
	24	36	36	36	36	36	42	48	48	54	54
120 mph Exposure B	12	36	36	36	42	48	60	66	72	72	78
	16	36	36	36	36	42	48	54	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	48	54	60
130 mph Exposure B	12	36	36	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	66	66	72
	20	36	36	36	36	42	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	54	60
140 mph Exposure B	12	36	42	36	48	54	60	72	72	78	84
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	66
	24	36	36	36	36	42	48	48	54	60	60
150 mph Exposure B	12	36	42	42	54	54	66	72	78	84	90
	16	36	36	36	42	48	54	66	66	72	78
	20	36	36	36	36	48	54	60	60	66	72
	24	36	36	36	36	42	48	54	54	60	66
160 mph Exposure B	12	36	48	48	54	60	66	72	78	84	90
	16	36	36	36	42	54	60	66	72	72	78
	20	36	36	36	42	48	54	60	60	66	72
	24	36	36	36	36	42	48	54	60	60	66

Notes: see page 51



<b>Soil Class 4</b>											
<b>Table 3E - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	36	36	36	42	54	60	66	72	72	78
	16	36	36	36	36	48	54	60	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60
105 mph Exposure C	12	36	36	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	60	66	72
	20	36	36	36	36	42	48	54	54	60	66
	24	36	36	36	36	36	42	48	54	54	60
110 mph Exposure C	12	36	36	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	66	66	72
	20	36	36	36	36	42	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	60	60
120 mph Exposure C	12	36	42	36	48	54	66	72	78	84	90
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	72
	24	36	36	36	36	42	48	54	54	60	66
130 mph Exposure C	12	36	48	48	54	60	66	72	78	84	90
	16	36	36	36	42	54	60	66	72	72	78
	20	36	36	36	42	48	54	60	60	66	72
	24	36	36	36	36	42	48	54	60	60	66
140 mph Exposure C	12	42	48	48	60	66	66	78	84	90	96
	16	36	36	36	48	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	36	42	48	54	60	66	72
150 mph Exposure C	12	42	54	54	60	66	72	78	84	90	96
	16	36	42	36	48	54	60	72	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	42	48	54	60	60	66	72
160 mph Exposure C	12	48	54	60	66	72	72	84	90	96	*
	16	36	42	42	48	54	66	72	78	84	90
	20	36	36	36	42	54	60	66	72	72	78
	24	36	36	36	42	48	54	60	66	66	72

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 3F - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>2" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	36	36	36	48	54	60	66	72	78	84
	16	36	36	36	42	48	54	60	66	66	72
	20	36	36	36	36	42	48	54	60	60	66
	24	36	36	36	36	42	42	48	54	60	60
105 mph Exposure D	12	36	42	36	48	54	60	72	72	78	84
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	66
	24	36	36	36	36	42	48	54	54	60	60
110 mph Exposure D	12	36	42	42	48	54	66	72	78	84	90
	16	36	36	36	42	48	54	60	66	72	78
	20	36	36	36	36	42	48	54	60	66	72
	24	36	36	36	36	42	48	54	54	60	66
120 mph Exposure D	12	36	48	48	54	60	66	72	78	84	90
	16	36	36	36	42	54	60	66	72	78	78
	20	36	36	36	42	48	54	60	66	66	72
	24	36	36	36	36	42	48	54	60	60	66
130 mph Exposure D	12	42	48	54	60	66	72	78	84	90	96
	16	36	36	36	48	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	36	42	48	54	60	66	72
140 mph Exposure D	12	42	54	54	66	72	72	78	84	90	*
	16	36	42	36	48	54	66	72	78	78	90
	20	36	36	36	42	48	60	66	66	72	78
	24	36	36	36	42	48	54	60	60	66	72
150 mph Exposure D	12	48	54	60	66	72	78	84	90	96	*
	16	36	42	48	54	60	66	72	78	84	90
	20	36	36	36	42	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	72
160 mph Exposure D	12	48	60	60	72	78	84	84	90	96	*
	16	36	48	48	54	60	66	78	78	84	96
	20	36	36	36	48	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 4A - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	42	42	42	54	66	78	84	90	90	90
	16	36	36	42	48	60	66	72	78	78	78
	20	36	36	36	48	54	60	66	72	72	72
	24	36	36	36	42	48	54	60	66	66	66
105 mph Exposure B	12	42	42	48	54	66	78	84	90	90	90
	16	36	36	42	48	60	66	78	78	78	78
	20	36	36	36	48	54	60	72	72	72	72
	24	36	36	36	42	48	60	66	66	66	66
110 mph Exposure B	12	42	42	48	60	66	78	90	90	90	90
	16	36	36	42	54	60	72	78	78	78	78
	20	36	36	36	48	54	66	72	72	72	72
	24	36	36	36	42	54	60	66	66	66	66
120 mph Exposure B	12	42	48	48	60	72	84	90	90	90	90
	16	36	36	42	54	66	72	78	78	78	78
	20	36	36	42	48	60	66	72	72	72	72
	24	36	36	36	48	54	60	66	66	66	66
130 mph Exposure B	12	48	54	54	60	72	84	90	90	90	90
	16	36	42	42	54	66	78	78	78	78	78
	20	36	36	42	54	60	66	72	72	72	72
	24	36	36	36	48	54	66	66	66	66	66
140 mph Exposure B	12	48	60	60	66	78	90	90	90	90	90
	16	36	42	48	60	66	78	78	78	78	78
	20	36	36	42	54	60	72	72	72	72	72
	24	36	36	42	48	60	66	66	66	66	66
150 mph Exposure B	12	54	60	66	72	78	90	90	90	90	90
	16	42	48	48	60	72	78	78	78	78	78
	20	36	36	42	54	66	72	72	72	72	72
	24	36	36	42	48	60	66	66	66	66	66
160 mph Exposure B	12	60	66	66	78	84	90	90	90	90	90
	16	42	48	54	60	72	78	78	78	78	78
	20	36	42	42	54	66	72	72	72	72	72
	24	36	36	42	54	60	66	66	66	66	66

Notes: see page 51



<b>Soil Class 4</b>											
<b>Table 4B - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	42	48	54	60	72	84	90	90	90	90
	16	36	36	42	54	66	72	78	78	78	78
	20	36	36	42	48	60	66	72	72	72	72
	24	36	36	36	48	54	60	66	66	66	66
105 mph Exposure C	12	42	48	48	60	66	78	90	90	90	90
	16	36	36	42	54	60	72	78	78	78	78
	20	36	36	42	48	54	66	72	72	72	72
	24	36	36	36	42	54	60	66	66	66	66
110 mph Exposure C	12	48	54	54	66	78	84	90	90	90	90
	16	36	42	48	54	66	78	78	78	78	78
	20	36	36	42	54	60	72	72	72	72	72
	24	36	36	36	48	54	66	66	66	66	66
120 mph Exposure C	12	54	60	60	72	78	90	90	90	90	90
	16	42	48	48	60	72	78	78	78	78	78
	20	36	36	42	54	66	72	72	72	72	72
	24	36	36	42	48	60	66	66	66	66	66
130 mph Exposure C	12	54	66	66	78	84	90	90	90	90	90
	16	42	48	54	60	72	78	78	78	78	78
	20	36	42	42	54	66	72	72	72	72	72
	24	36	36	42	54	60	66	66	66	66	66
140 mph Exposure C	12	60	72	72	84	84	90	90	90	90	90
	16	48	54	54	66	72	78	78	78	78	78
	20	36	42	48	60	66	72	72	72	72	72
	24	36	36	42	54	66	66	66	66	66	*
150 mph Exposure C	12	66	78	78	90	90	90	90	90	90	90
	16	48	60	60	66	78	78	78	78	78	78
	20	42	48	48	60	72	72	72	72	72	*
	24	36	42	42	54	66	66	66	66	*	*
160 mph Exposure C	12	72	84	84	96	96	90	90	90	90	90
	16	54	60	60	72	78	78	78	78	78	78
	20	42	48	48	60	72	72	72	72	*	*
	24	36	42	48	54	66	66	66	*	*	*

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 4C - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Unbraced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	48	54	54	66	78	84	90	90	90	90
	16	36	42	48	54	66	78	78	78	78	78
	20	36	36	42	54	60	72	72	72	72	72
	24	36	36	36	48	54	66	66	66	66	66
105 mph Exposure D	12	48	60	60	66	78	90	90	90	90	90
	16	36	42	48	60	66	78	78	78	78	78
	20	36	36	42	54	60	72	72	72	72	72
	24	36	36	42	48	60	66	66	66	66	66
110 mph Exposure D	12	54	60	60	72	78	90	90	90	90	90
	16	42	48	48	60	72	78	78	78	78	78
	20	36	36	42	54	66	72	72	72	72	72
	24	36	36	42	48	60	66	66	66	66	66
120 mph Exposure D	12	60	66	66	78	84	90	90	90	90	90
	16	42	54	54	60	72	78	78	78	78	78
	20	36	42	42	54	66	72	72	72	72	72
	24	36	36	42	54	60	66	66	66	66	66
130 mph Exposure D	12	60	72	72	84	90	90	90	90	90	90
	16	48	54	54	66	78	78	78	78	78	78
	20	36	42	48	60	66	72	72	72	72	72
	24	36	36	42	54	66	66	66	66	66	*
140 mph Exposure D	12	66	78	78	90	96	90	90	90	90	90
	16	54	60	60	66	78	78	78	78	78	78
	20	42	48	48	60	72	72	72	72	72	*
	24	36	42	42	54	66	66	66	66	*	*
150 mph Exposure D	12	72	84	84	96	96	90	90	90	90	90
	16	54	66	66	72	78	78	78	78	78	*
	20	42	54	54	60	72	72	72	72	*	*
	24	36	42	48	60	66	66	66	*	*	*
160 mph Exposure D	12	78	90	90	*	96	90	90	90	90	90
	16	60	66	66	78	78	78	78	78	78	*
	20	48	54	54	66	72	72	72	*	*	*
	24	42	48	48	60	66	66	*	*	*	*

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 4D - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure B	12	42	42	42	54	60	66	78	84	90	96
	16	36	36	36	42	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	72
	24	36	36	36	36	42	48	54	60	66	66
105 mph Exposure B	12	42	42	48	54	60	72	78	84	90	96
	16	36	36	36	48	54	60	66	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	36	42	48	54	60	66	72
110 mph Exposure B	12	42	42	48	60	66	72	78	84	90	*
	16	36	36	36	48	54	60	72	72	78	84
	20	36	36	36	42	48	54	60	66	72	78
	24	36	36	36	42	48	54	60	60	66	72
120 mph Exposure B	12	42	48	54	66	72	72	84	90	96	*
	16	36	42	42	48	60	66	72	78	84	90
	20	36	36	36	42	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78
130 mph Exposure B	12	48	54	60	72	78	78	84	96	*	*
	16	36	42	48	54	60	66	78	84	90	96
	20	36	36	36	48	54	60	66	72	78	84
	24	36	36	36	42	48	54	66	66	72	78
140 mph Exposure B	12	48	60	66	72	84	84	90	96	*	*
	16	36	48	48	54	60	72	78	84	90	96
	20	36	36	36	48	54	66	72	78	84	90
	24	36	36	36	42	54	60	66	72	78	84
150 mph Exposure B	12	54	66	66	78	90	90	96	*	*	*
	16	42	48	54	60	66	72	84	90	96	*
	20	36	42	42	48	60	66	72	78	84	90
	24	36	36	36	48	54	60	66	72	78	84
160 mph Exposure B	12	60	72	72	84	96	96	96	*	*	*
	16	42	54	54	66	72	78	84	90	96	*
	20	36	42	42	54	60	66	78	84	90	96
	24	36	36	36	48	54	60	72	72	78	84

Notes: see page 51



<b>Soil Class 4</b>											
<b>Table 4E - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure C	12	42	54	54	66	72	78	84	90	96	*
	16	36	42	42	48	60	66	72	78	84	90
	20	36	36	36	42	54	60	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78
105 mph Exposure C	12	42	48	54	60	66	72	84	90	96	*
	16	36	36	42	48	54	60	72	78	84	96
	20	36	36	36	42	48	54	66	72	78	84
	24	36	36	36	42	48	54	60	66	72	78
110 mph Exposure C	12	48	60	60	72	78	84	90	96	*	*
	16	36	42	48	54	60	72	78	84	90	96
	20	36	36	36	48	54	60	72	72	78	84
	24	36	36	36	42	48	60	66	66	72	78
120 mph Exposure C	12	54	66	66	78	84	90	90	*	*	*
	16	42	48	54	60	66	72	78	84	96	*
	20	36	42	42	48	60	66	72	78	84	90
	24	36	36	36	48	54	60	66	72	78	84
130 mph Exposure C	12	54	72	72	84	96	96	96	*	*	*
	16	42	54	54	66	72	78	84	90	96	*
	20	36	42	42	54	60	66	78	84	90	96
	24	36	36	36	48	54	60	72	72	78	84
140 mph Exposure C	12	60	78	78	90	*	*	*	*	*	*
	16	48	54	60	66	78	78	90	96	*	*
	20	36	48	48	54	60	72	78	84	90	96
	24	36	36	42	48	54	66	72	78	84	90
150 mph Exposure C	12	66	78	84	96	*	*	*	*	*	*
	16	48	60	66	72	78	84	90	96	*	*
	20	42	48	48	60	66	72	84	90	96	*
	24	36	42	42	48	60	66	72	78	84	90
160 mph Exposure C	12	72	84	90	*	*	*	*	*	*	*
	16	54	66	66	78	84	90	96	*	*	*
	20	42	54	54	60	66	78	84	90	96	*
	24	36	42	42	54	60	72	78	84	90	96

Notes: see page 51

<b>Soil Class 4</b>											
<b>Table 4F - MINIMUM FOUNDATION DEPTHS (in)</b>											
<b>3" Pipe Frame Braced</b>	Pier Dia (in)	Slope (deg)									
		0	5	10	15	20	25	30	35	40	45
Wind Speed & Exposure Category											
100 mph Exposure D	12	48	60	60	72	78	84	90	96	*	*
	16	36	42	48	54	60	72	78	84	90	96
	20	36	36	36	48	54	60	72	72	78	84
	24	36	36	36	42	48	60	66	66	72	78
105 mph Exposure D	12	48	60	66	78	84	90	90	96	*	*
	16	36	48	48	54	60	72	78	84	90	96
	20	36	36	36	48	54	66	72	78	84	90
	24	36	36	36	42	54	60	66	72	78	84
110 mph Exposure D	12	54	66	66	78	90	90	90	*	*	*
	16	42	48	54	60	66	72	78	84	96	*
	20	36	42	42	48	60	66	72	78	84	90
	24	36	36	36	48	54	60	66	72	78	84
120 mph Exposure D	12	60	72	72	84	96	*	*	*	*	*
	16	42	54	54	66	72	78	84	90	96	*
	20	36	42	48	54	60	66	78	84	90	96
	24	36	36	36	48	54	60	72	78	78	90
130 mph Exposure D	12	60	78	78	96	*	*	*	*	*	*
	16	48	60	60	72	78	78	90	96	*	*
	20	36	48	48	54	60	72	78	84	90	96
	24	36	42	42	48	60	66	72	78	84	90
140 mph Exposure D	12	66	84	84	*	*	*	*	*	*	*
	16	54	60	66	78	84	84	90	96	*	*
	20	42	48	54	60	66	72	84	90	96	*
	24	36	42	42	54	60	66	78	78	90	96
150 mph Exposure D	12	72	90	96	*	*	*	*	*	*	*
	16	54	66	72	78	90	90	96	*	*	*
	20	42	54	54	66	72	78	84	90	96	*
	24	36	42	48	54	60	72	78	84	90	96
160 mph Exposure D	12	78	96	*	*	*	*	*	*	*	*
	16	60	72	72	84	96	96	96	*	*	*
	20	48	54	60	66	72	78	90	96	*	*
	24	42	48	48	54	66	72	78	84	90	*

Notes: see page 51

Notes for Tables 3 & 4:

1. Concrete Weight = 145 pcf /  $f'_c = 2500$  psi
2. Skin Friction per 2012 IBC 1810.3.3.1.4 & 5
3. Top 1'-0" of soil neglected for Skin Friction
4. Snow Load = 0 psf – tabulated values are conservative for Snow Loads > 0 psf
5. \* indicates special foundation required. Contact IronRidge
6. Resistance to corrosion and/or sulfate attack, along with possible adverse effects due to expansive soils has not been considered in these foundation recommendations. SML Engineers assumes no liability with regard to these items.
7. Soil classification is to be determined and verified by the end user of this certification letter.

The analysis assumes that the array, including the connections and associated hardware, are installed in a workmanlike manner in accordance with the IronRidge Ground Mount Installation Manual and generally accepted standards of construction practice. Verification of PV Module capacity to support the loads associated with the given array shall be the responsibility of the Contractor or Owner and not IronRidge or Starling Madison Lofquist.

Please feel free to contact me at your convenience if you have any questions.

Respectfully yours,

Andrew J. Huseman, P.E.  
Licensed Professional Engineer



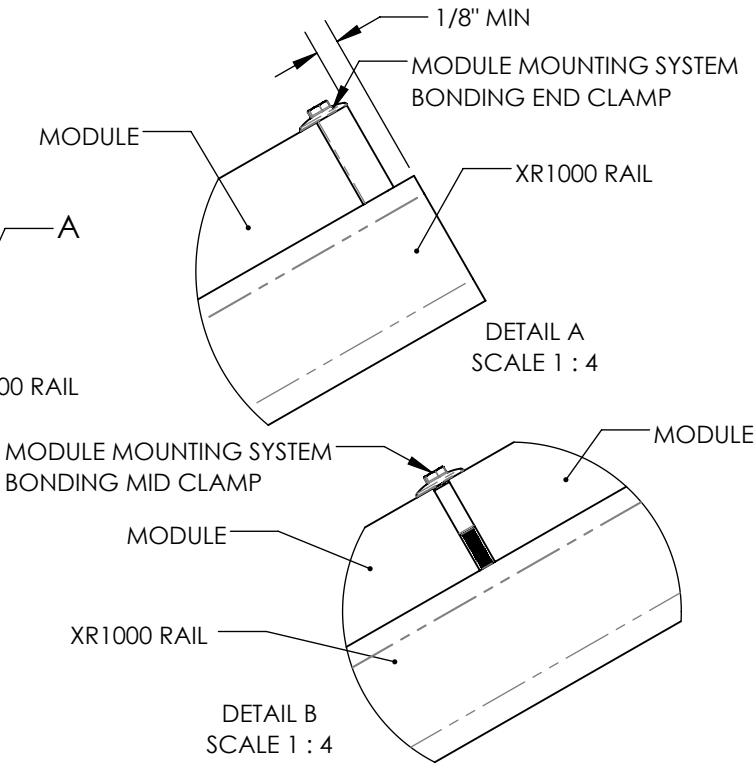
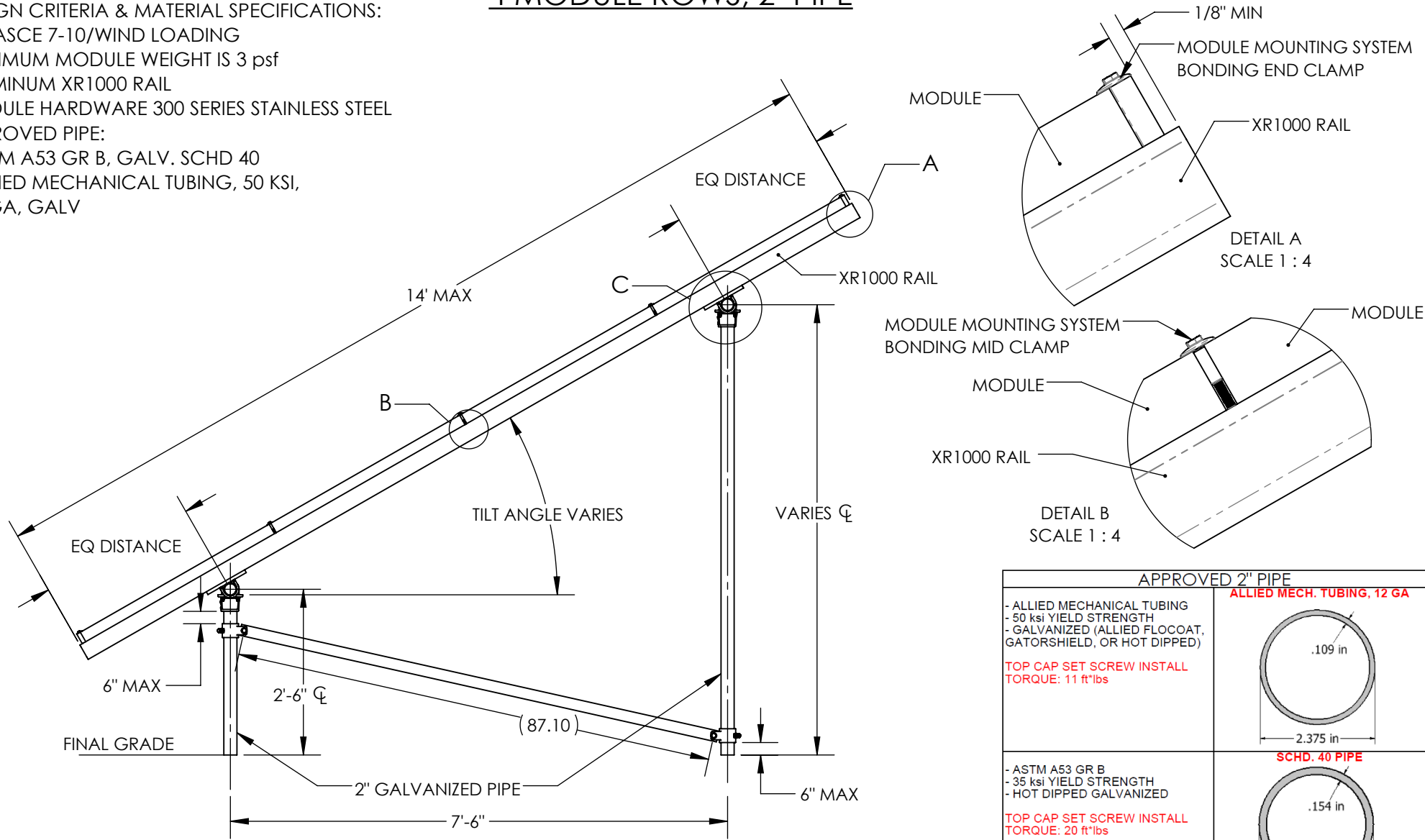


# EXHIBIT: EX-0001

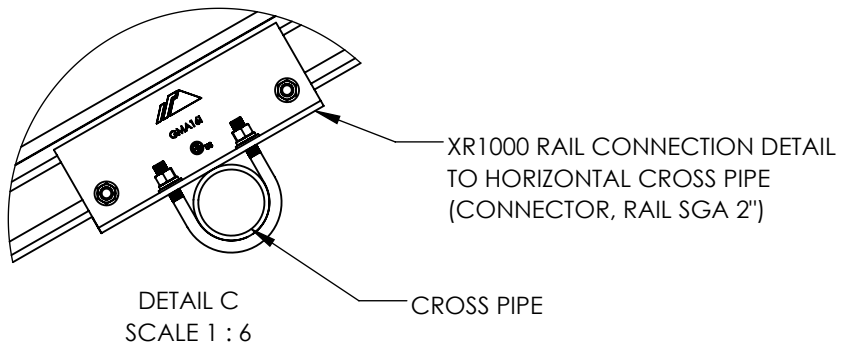
05/12/2016

DESIGN CRITERIA & MATERIAL SPECIFICATIONS:  
 PER ASCE 7-10/WIND LOADING  
 MAXIMUM MODULE WEIGHT IS 3 psf  
 ALUMINUM XR1000 RAIL  
 MODULE HARDWARE 300 SERIES STAINLESS STEEL  
 APPROVED PIPE:  
 - ASTM A53 GR B, GALV. SCHD 40  
 - ALLIED MECHANICAL TUBING, 50 KSI,  
 12 GA, GALV

## 4 MODULE ROWS, 2" PIPE



APPROVED 2" PIPE	
- ALLIED MECHANICAL TUBING - 50 ksi YIELD STRENGTH - GALVANIZED (ALLIED FLOCOAT, GATORSHIELD, OR HOT DIPPED)  TOP CAP SET SCREW INSTALL TORQUE: 11 ft*lbs	<b>ALLIED MECH. TUBING, 12 GA</b> 
- ASTM A53 GR B - 35 ksi YIELD STRENGTH - HOT DIPPED GALVANIZED  TOP CAP SET SCREW INSTALL TORQUE: 20 ft*lbs	<b>SCHD. 40 PIPE</b> 



THIRD ANGLE PROJECTION	DRAWN	SO	04/10/2015
	CHECKED	--	--
	ENG APPR.	--	--
	MFG APPR.	--	--
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**GROUND MOUNT SYSTEM 2" PIER, 4 SOLAR MODULE ROWS**

SIZE: **A** DWG. NO.: **EX-0001**

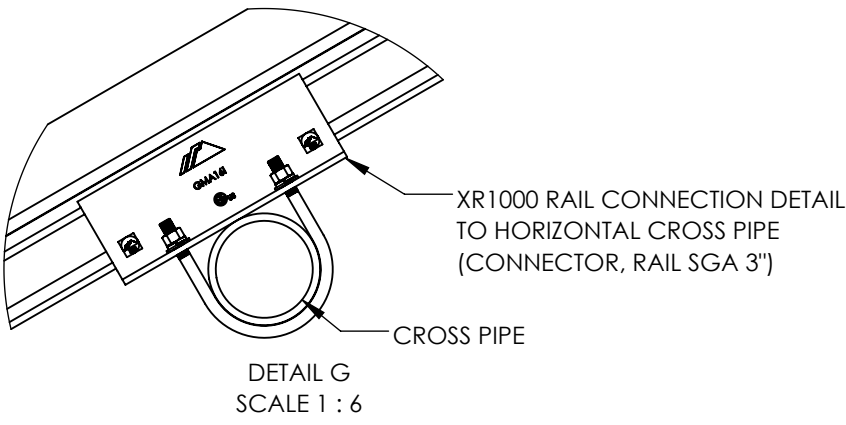
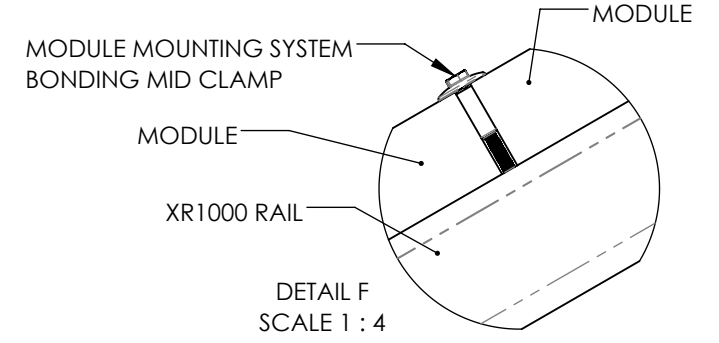
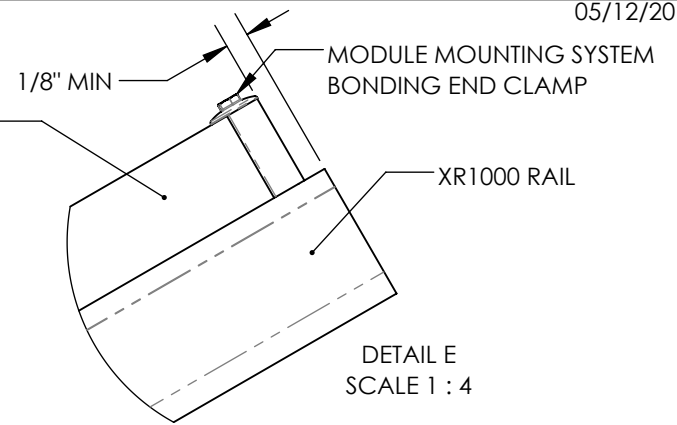
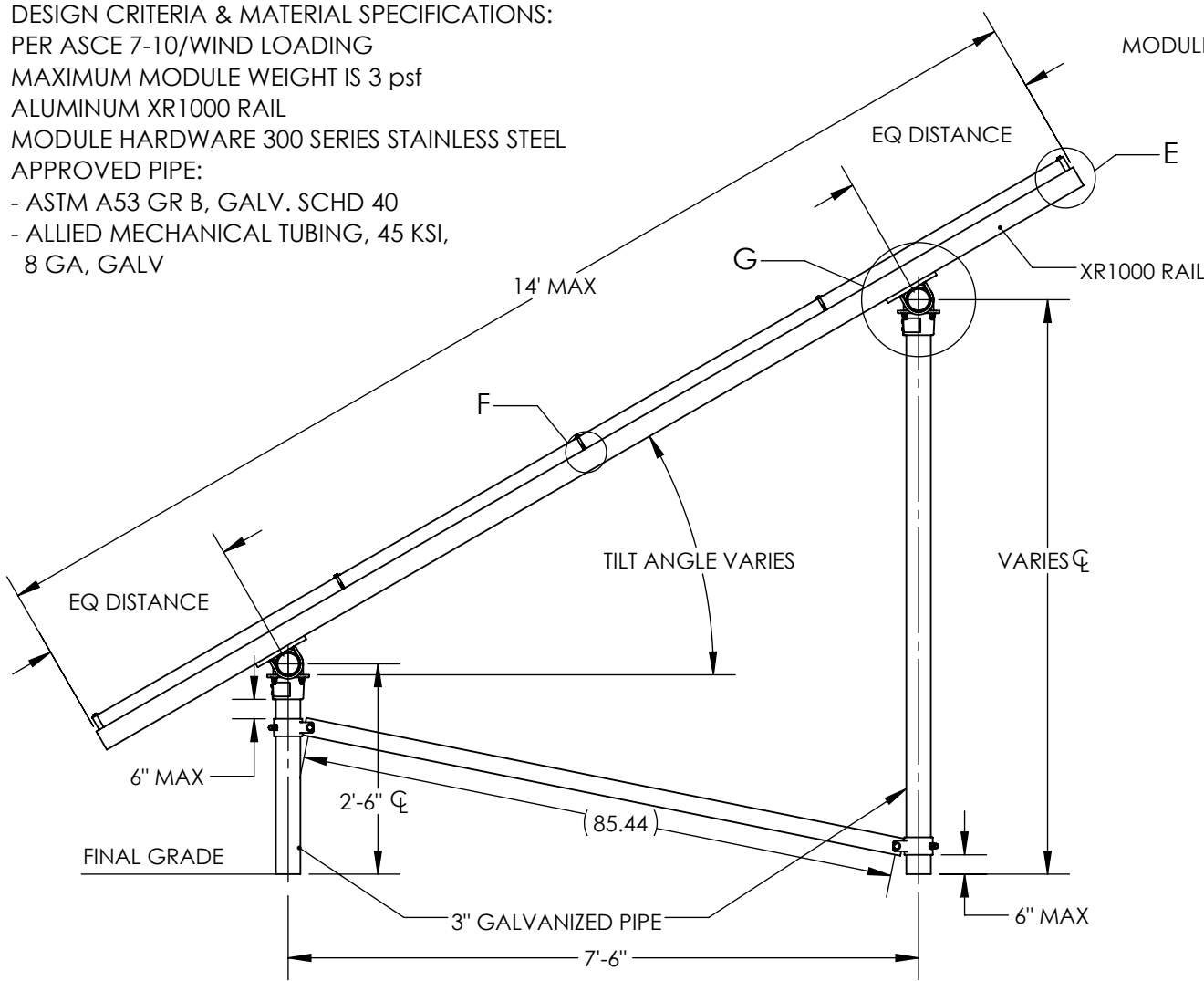
SCALE: 1:25 WEIGHT: SHEET 1 OF 5

**EXHIBIT: EX-0001**

**4 MODULE ROWS, 3" PIPE**

**DESIGN CRITERIA & MATERIAL SPECIFICATIONS:**

- PER ASCE 7-10/WIND LOADING
- MAXIMUM MODULE WEIGHT IS 3 psf
- ALUMINUM XR1000 RAIL
- MODULE HARDWARE 300 SERIES STAINLESS STEEL
- APPROVED PIPE:
- ASTM A53 GR B, GALV. SCHD 40
- ALLIED MECHANICAL TUBING, 45 KSI, 8 GA, GALV



APPROVED 3" PIPE	
<ul style="list-style-type: none"> <li>- ALLIED MECHANICAL TUBING</li> <li>- 45 ksi YIELD STRENGTH</li> <li>- GALVANIZED (ALLIED FLOCOAT, GATORSHIELD, OR HOT DIPPED)</li> </ul> <p><b>TOP CAP SET SCREW INSTALL TORQUE: 16 ft*lbs</b></p>	<p><b>ALLIED MECH. TUBING, 8 GA</b></p>
<ul style="list-style-type: none"> <li>- ASTM A53 GR B</li> <li>- 35 ksi YIELD STRENGTH</li> <li>- HOT DIPPED GALVANIZED</li> </ul> <p><b>TOP CAP SET SCREW INSTALL TORQUE: 20 ft*lbs</b></p>	<p><b>SCHD. 40 PIPE</b></p>

THIRD ANGLE PROJECTION

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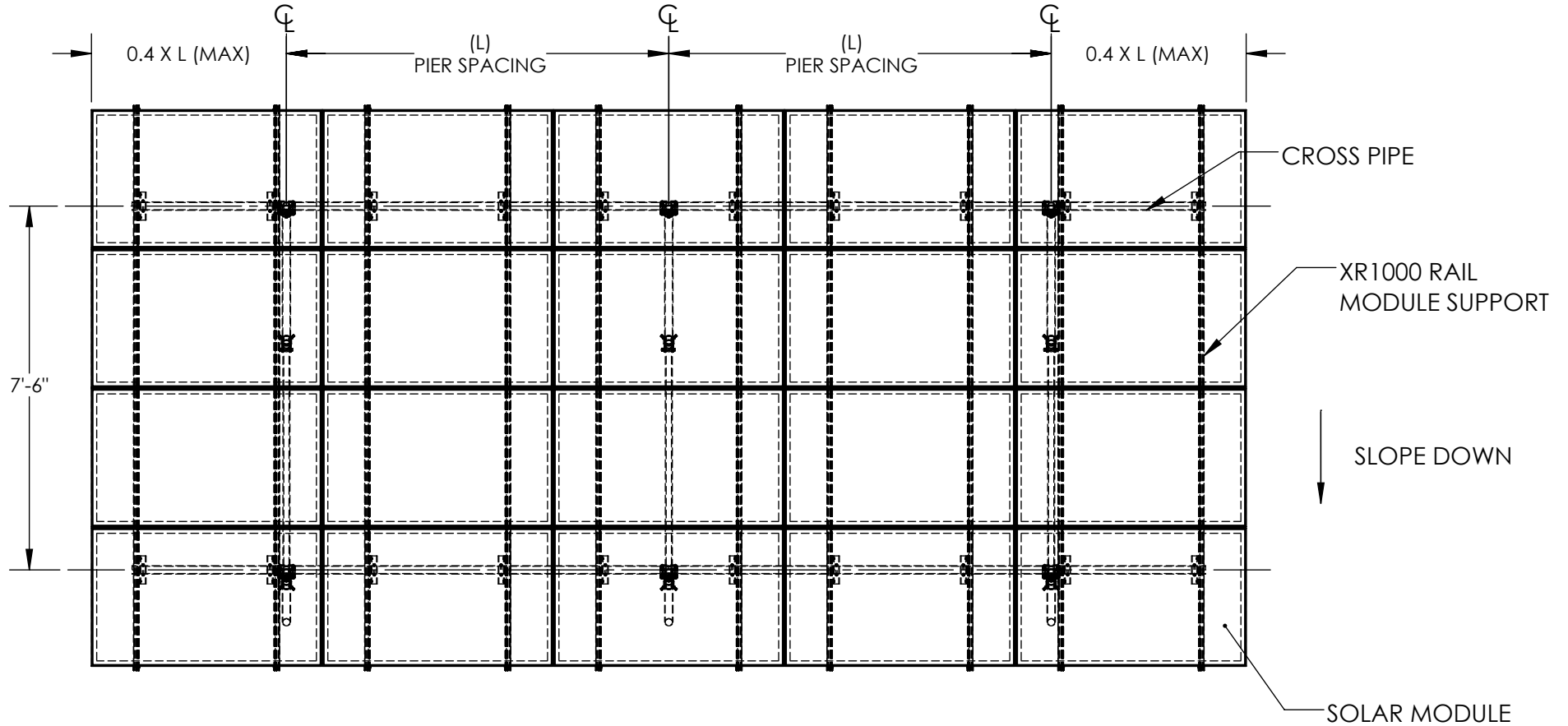
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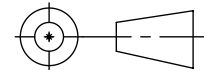
**GROUND MOUNT SYSTEM 3" PIER, 4 SOLAR MODULE ROWS**

SIZE	DWG. NO.
<b>A</b>	<b>EX-0001</b>
SCALE: 1:25	WEIGHT:
SHEET 2 OF 5	

# PLAN VIEW (6 PIER LAYOUT SHOWN)



THIRD ANGLE PROJECTION



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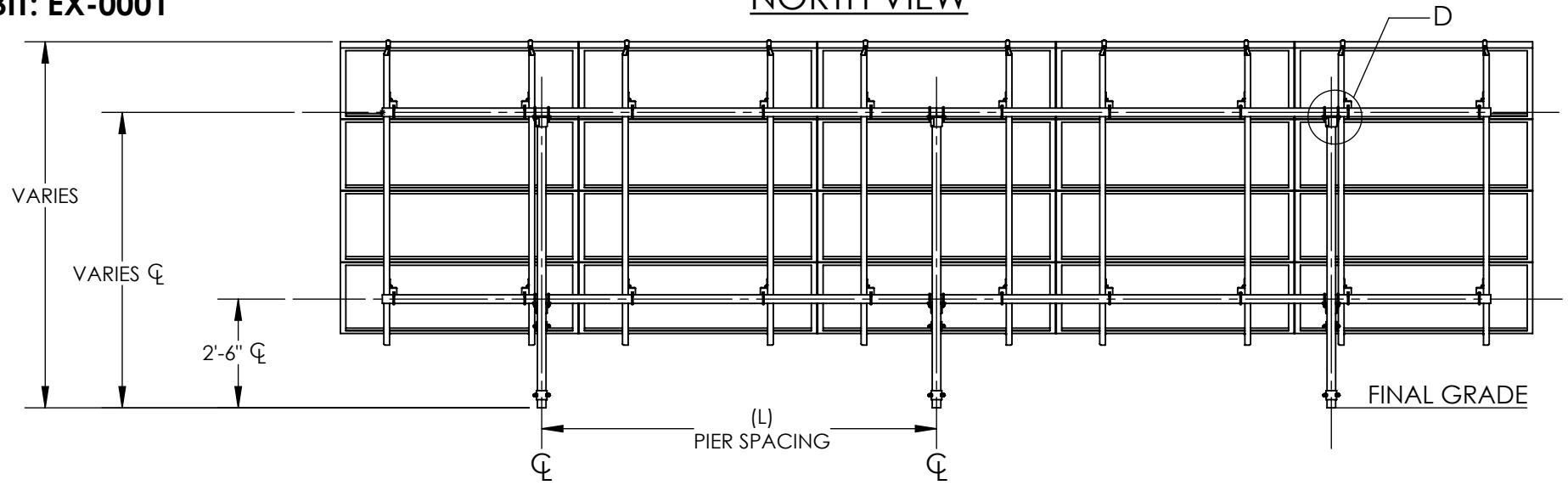
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GROUND MOUNT SYSTEM,  
 4 SOLAR MODULE ROWS

SIZE <b>A</b>	DWG. NO. <b>EX-0001</b>
SCALE: 1:25	WEIGHT:
SHEET 3 OF 5	

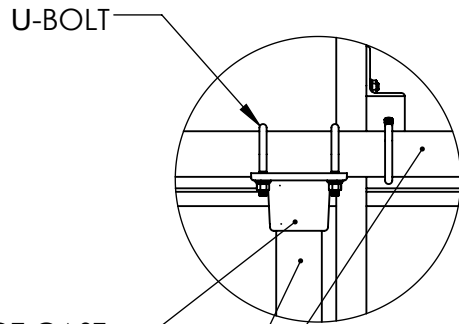
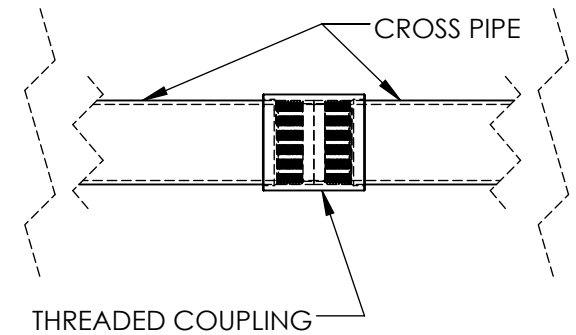
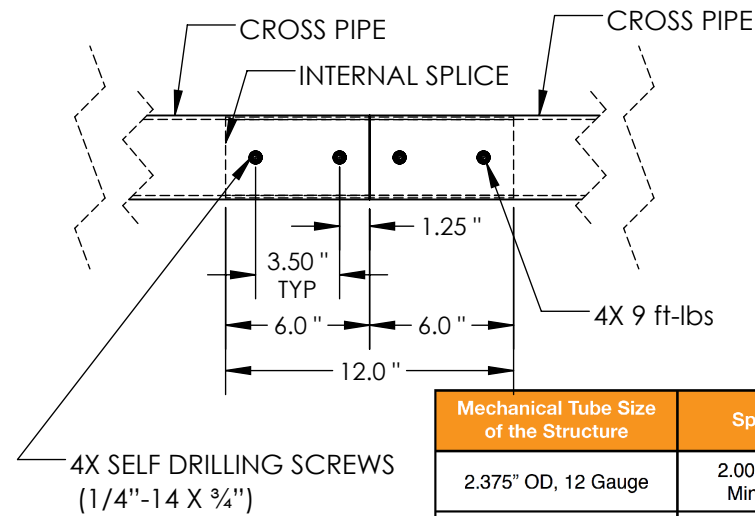




SPLICING CROSS PIPE

ALLIED MECHANICAL TUBING SPLICES

SCHD. 40 PIPE SPLICES



1 PIECE CAST ALUMINUM MOUNTING CAP

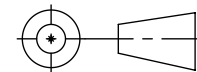
DETAIL D  
SCALE 1 : 10

GALVANIZED PIPE

CONNECTION BETWEEN VERTICAL PIER AND HORIZONTAL CROSS PIPE

Mechanical Tube Size of the Structure	Splice Tube Size
2.375" OD, 12 Gauge	2.000" OD, 9 Gauge, Minimum 12" Long
3.500" OD, 8 Gauge	3.000" OD, 12 Gauge, Minimum 12" Long

THIRD ANGLE PROJECTION



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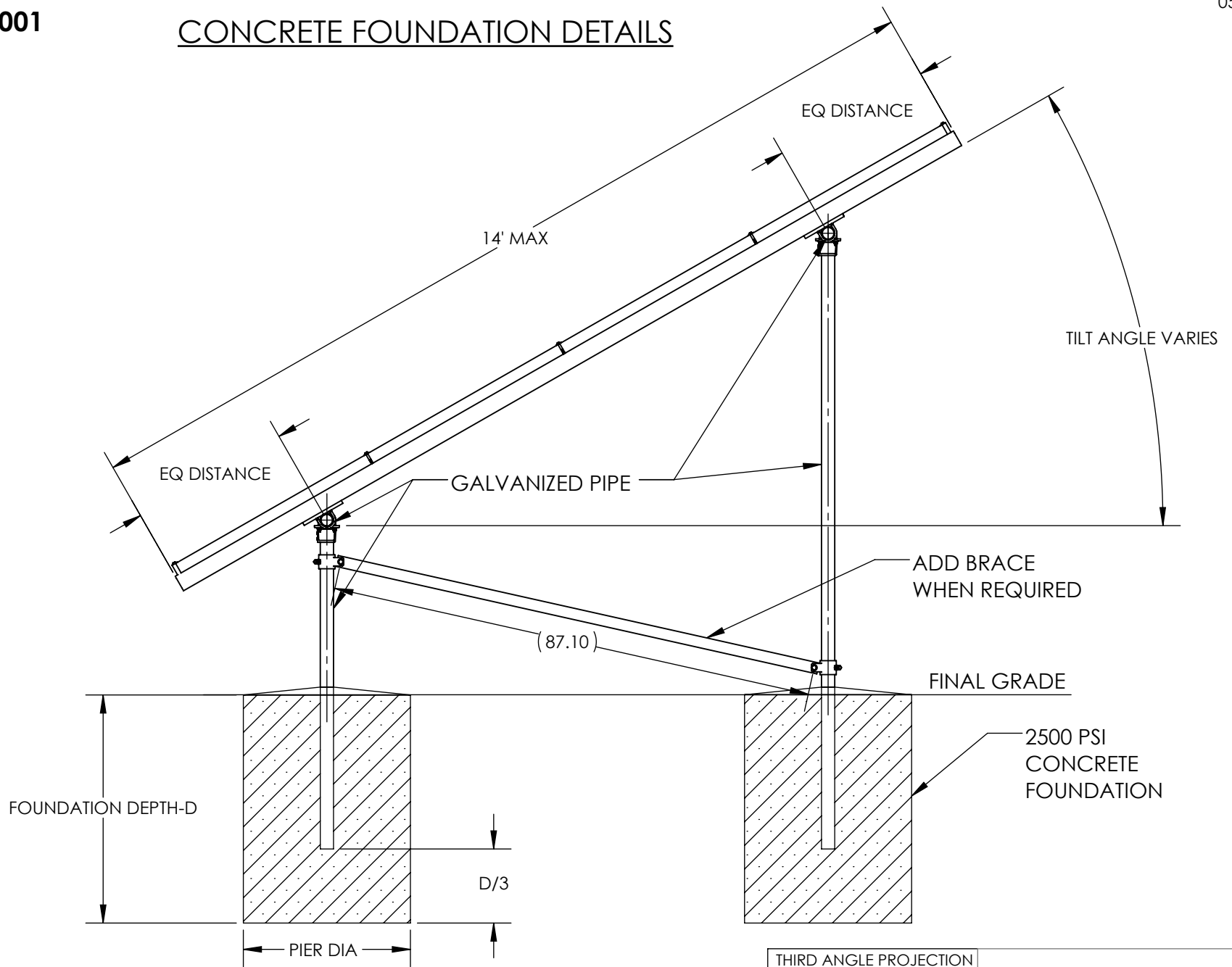
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GROUND MOUNT SYSTEM,  
4 SOLAR MODULE ROWS

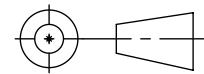
SIZE <b>A</b>	DWG. NO. <b>EX-0001</b>
SCALE: 1:25	WEIGHT:
SHEET 4 OF 5	

CONCRETE FOUNDATION DETAILS



NOTE:  
 THE ATTACHED SPAN TABLES ARE BASED ON USING DRILLED CAST-IN-PLACE CONCRETE PIER FOUNDATION SYSTEM. OTHER FOUNDATION SYSTEMS (EG. SCREW ANCHORS, DRIVEN PIERS) ARE PERMISSIBLE BUT MAY REQUIRE ADDITIONAL BRACING AND/OR REDUCED SPAN. PLEASE CONTACT IRONRIDGE FOR MORE INFORMATION.

THIRD ANGLE PROJECTION



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GROUND MOUNT SYSTEM,  
 4 SOLAR MODULE ROWS

SIZE <b>A</b>	DWG. NO. <b>EX-0001</b>
SCALE: 1:25	WEIGHT:
SHEET 5 OF 5	

ATTACHMENT F.  
WINTER SUN CONDOMINIUM SUBDIVISION  
PROPERTY OWNER APPROVALS



**From:** dewayne briscoe <[briskyd@earthlink.net](mailto:briskyd@earthlink.net)>

**Date:** November 30, 2017 at 5:18:45 PM MST

**To:** Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)>

**Subject: Re: Hello from 420A Sage Rd**

Hi, thanks for the opening conversation. I am out of state until mid Dec. At first glance I have no objection to the Solar panels. Our units are identical, do you have floor plans as I have none?

I would like to refinish my driveway to partial pavers like the sage terrace just did at the junction of sage and road from Warm Springs. My neighbor Marne who shares the driveway with you is interested. It would improve the appearance and needs replacement anyway.

Another concern is the front landscaping which should be improved and kept low to preserve our views. These two things would improve the appearance and value of all.

There is a problem with the water to the complex. When the sprinklers go on I have no water in summer.

I am pleased you want to upgrade the complex for livability and value. It is my primary residence also. Our previous owners [except Marne] had let the complex deteriorate. Let's meet when I return. DEWAYNE. 208 720 9546  
Sent from my iPad

On Nov 30, 2017, at 12:25 PM, Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)> wrote:  
Hi Dwayne,

Angela Hicks gave us your email address. Last April we bought the unit next door at 420A Sage Rd, and are planning to make it our primary residence beginning next fall. Currently we are doing a bunch of remodeling, and this upcoming spring we would like to put in a solar system on the hillside behind our place. Unfortunately, we cannot place it on the roof due to a wrong exposure for our side of the duplex. I understand the HOA for our little complex no longer exists, so I wanted to check with you to see if you have any concerns about our putting in such a system. I have checked with the city who has stated they would not have any concerns about the location. The PV system will probably be 28 panels; 4 rows of 7 panels, likely measuring about 23' X 22'. We would locate it on our side of an imaginary line heading up the hillside from the steps between our place and the building your unit is in, probably about 30-40' behind the trees at the back of the property where the mowing ends. (High enough so that trees would not shade the panels and low enough so that they could not be seen from the street). I don't think you would be able to see it from your place, though. Please let me know your thoughts about this. I would be happy to meet with you sometime if you would like to further explain it, or answer any other questions you might have via email.

Thanks.

Mitch Long and Margit Donhowe

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**From:** ppdean <[ppdean@cox.net](mailto:ppdean@cox.net)>

**Date:** April 17, 2018 at 1:34:26 PM MDT

**To:** Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)>

**Subject: Re: Proposed hillside solar project**

Yes! Nice meeting you as well. I talked to Ryan, and he said fine with the solar panels, not seeing the need for "checking out" the stakes. I will certainly let him know to contact you with any concerns.

Peggy

On Apr 17, 2018, at 10:20 AM, Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)> wrote:

Nice to meet you today! We're looking forward to meeting Ryan, as well. Let him know to contact either of us if he has any questions about this project, or anything else with the place.

By the way, I did move the stakes so that they will accurately reflect the size of the area involved.

Mitch

On Apr 17, 2018, at 8:05 AM, ppdean <[ppdean@cox.net](mailto:ppdean@cox.net)> wrote:

Hi Mitch,

I can't imagine this would be a problem, but since my son, Ryan, is the one who will be living there, I will check with him.

Also, I spoke with Steve of SV Roofing yesterday. He hopes to start on the project the first week of May. Ryan and I checked out the "Weathered Wood" shingles online. Those look fine. We'll hope for nice weather so the project doesn't get delayed.

Peggy

On Apr 16, 2018, at 5:12 PM, Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)> wrote:

Hi Peggy,

Last fall I had communicated with Karen M. about some solar panels we wanted to put on the hillside behind our place. Because our side of the roof faces north, we are not able to put solar panels on the roof, and instead would need to put them on the hillside. Karen had given her OK on the project, but with you taking ownership soon, I wanted to be sure you were OK with it, as well.

What we are proposing is to place 28 panels on the hillside in a configuration of 4 X 7. I thought that would work best to minimize their impact. That would occupy an area of 13 ft by slightly less than 13 ft. The idea is to place them behind the trees that sit at the bottom of the hillside between our place and the other Winter Sun

building. They would be on our side of an imaginary line that would extend up from the steps that go up the yard between the 2 buildings. They would need to be high enough up the hill so that the trees would not block the sun, and low enough that they could not be seen from the street. I don't think you would be able to see them from you unit except from your hot tub. I have placed 4 stakes on the hillside in the area approximately where I think it would work best.

We are hoping to start the project in the next month or two. Please let me know if the project is OK with you, and what concerns you may have about them.

Thanks.

Mitch and Margit

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**From:** Marnie Roozen <[marnieroozen@gmail.com](mailto:marnieroozen@gmail.com)>

**Date:** April 25, 2018 at 2:16:27 PM MDT

**To:** Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)>

**Subject: Re: Solar project**

Hi, sorry for the delay. I've been out of cell service up in the San Juan Islands for a week.

I don't have a problem with your solar panels. You mentioned you would plant something around the panels to hide them from view. My request would be the plants be something native that looks as natural as possible.

I won't be back there until late June at the earliest. Will you be around? I'd love to sit down and finally have a visit!

Thank you for reaching out. Apologies again for my slow response time. I'm usually pretty good. Just a lot going on as I get back in the swing of being in Washington!

Marnie

On Wed, Apr 25, 2018 at 8:25 AM Mitch Long <[m.long.boise@gmail.com](mailto:m.long.boise@gmail.com)> wrote:

Hi Marnie,

I was wondering if you have had a chance to look at those photos, and decide about the solar panel project on the hillside. I have approval from Duane and the Deans to go ahead with the project, but need your decision, as well, before we can apply for the permit and begin the project. The solar contractor would like to get started soon and has been asking me about whether I have approval yet.

If you have any concerns or questions that you would like to talk to me about, I can also be reached at 208-484-6866.

Thanks.

Mitch and Margit



ATTACHMENT G.  
PUBLIC COMMENT

**From:** [tapsv@aol.com](mailto:tapsv@aol.com) <[tapsv@aol.com](mailto:tapsv@aol.com)>  
**Sent:** Tuesday, August 07, 2018 12:23 PM  
**To:** Participate <[participate@ketchumidaho.org](mailto:participate@ketchumidaho.org)>  
**Subject:** 420 Sage Rd Solar

We applaud our neighbors' interest in renewable energy and, although it looks unsightly, we could probably live with the roof mounted solar thermal water heating system. The ground mounted solar array is a different kettle of fish entirely. Constructing this type of solar array on the hillside in the Mountain Overlay District would be completely inappropriate and, at the very least, would constitute a terrible precedent for further hillside development. Judging from the photograph, the roof is about the same size as the solar array and this is where it should be located.

Sincerely yours,

Tom and Jane Pittman

**From:** [tapsv@aol.com](mailto:tapsv@aol.com) <[tapsv@aol.com](mailto:tapsv@aol.com)>  
**Sent:** Sunday, September 16, 2018 12:11 PM  
**To:** Participate <[participate@ketchumidaho.org](mailto:participate@ketchumidaho.org)>  
**Subject:**

Dear Board Members,

This e-mail is in response to the Mitch Long and Magrit Donhowe's request to construct a large "ground" mounted solar system on the Sage Road hillside.

We have already voiced our main objections and would like you to consider three more: First, the preservation of this hillside in its natural habitat is paramount and another reason why so many come here to live. Second, these structures would impede animal migration and Third, these structures would interfere with fire prevention. During the Castle Rock fire the firemen forged a path across the Sage Road hillside and parallel to Sage Road (above 420 Sage Road) to combat the fire.

We implore the board to do its due diligence in keeping the hillside free of these structures.

Thank you. Sincerely,

Jane & Tom Pittman



Dear Commissioners,

I am writing regarding the 420 Sage Rd Solar project. I trust staff is looking beyond just this application as its approval will have a wide impact and set precedent.

I question whether the MOD, as currently drafted, is adequate to address this - as I am pretty certain a solar farm wasn't contemplated when the ordinance was written. The city should put this application on hold while it evaluates what it wants in the MOD (and AOD) - rather than trying to apply an ordinance that didn't contemplate the proposed use.

My second point is that once again P&Z is being asked to consider something on an ad hoc basis - rather than contemplating this as a fundamental change to the whole MOD. The city should consider hillside solar panels as they relate to the entire MOD and not simply with regard to a single application.

The August staff report states the MOD standard most applicable to the project is the assessment of the visual impact of the project. It goes on to say the visible impact will be minimized. I trust you were able to get a good handle on that from the site visit given the lack of renderings in the submittal. Other properties in the MOD, whose owners may want to install solar panels, may not lend themselves to the same degree of street screening.

However, a larger concern is that while shielded from street view, the proposed project will likely be totally visible from the ski hill. Can you only imagine looking from the top of Baldy and seeing solar panels the length of Sage Road? Finally, what would be the impact on the elk that winter on that very hill as more solar panels get installed?

A uniform policy to be consistently applied needs to be developed. The best way to achieve this is to have the *city* evaluate it across the entire MOD - not with regard to an isolated application.

Please consider delaying this application and ask staff to do a comprehensive analysis/review of what is desirable from a city-wide perspective.

Sincerely,



Erin P. Smith  
3215 Warm Springs Rd  
Ketchum, ID 83340

**From:** [Jeff Jensen](#)  
**To:** [Abby Rivin](#)  
**Subject:** Long Solar Energy Project- Sage Road  
**Date:** Saturday, August 18, 2018 1:01:35 PM

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I wish to comment on the Long Solar Energy Project on Sage Road.

I was unaware of this project until reading about it in the Mt Express, buried behind Commissioner Lamoureux's resignation announcement.

I am a resident living on Sage Road and am disappointed and surprised that the city is considering allowing solar panels on the hillsides above the allowed building envelopes.

I am open to the idea of solar panels on roof tops where they do not exceed the existing height restrictions. Personally, I think that they are unsightly but understand they have a place. I strongly disagree with allowing any development on the upper slopes. There are reasons that the Overlay zones were put in place and there already are enough problems with wildland fires, avalanches and erosion issues. Enough so that the P&Z is getting involved with restricting rental properties in the Avalanche Zones.

While the panels in this installation may be shielded from view by vegetation on the street level, they will be visible from the ski hill and neighboring homes. Once the precedent is set to allowing solar development in these zones, other applications will be impossible to deny.

Allowing solar development while disallowing other uses on the hillsides seems arbitrary and subject to what is fashionable in the current political scene.

We property owners (including the Long/Donhowe couple) purchased these properties with the knowledge that they were in the Mountain Overlay and Avalanche zones and that the upper slopes would be undevelopable and basically elk and deer pastures.

Please reconsider the permitting of solar panels in this zone.

Thank you for your consideration.

Sincerely,

Jeff Jensen  
216 Sage Road  
Ketchum, ID 83340

**From:** Sharon Twigg-Smith <[sharona.twiggsmith@gmail.com](mailto:sharona.twiggsmith@gmail.com)>

**Sent:** Thursday, August 16, 2018 1:58 PM

**To:** Participate <[participate@ketchumidaho.org](mailto:participate@ketchumidaho.org)>

**Cc:** Tom Pittman <[tapsv@aol.com](mailto:tapsv@aol.com)>

**Subject:** Solar Energy Structure above Eagle Ridge

Dear P&Z:

I have just heard that the property owners at 420 Sage Road are seeking your approval to erect a large solar energy structure on the hillside above "Eagle Ridge". I have been a property owner at 3216B Eagle Ridge since 1995 and vehemently am against the development of a structure behind us on the hillside. It sets a terrible precedent for unwanted hillside development and would ruin the ambiance and safety for those of us below.

I just spent 10 days at our place in Eagle Ridge, but I live in Honolulu, so I won't be able to be at the next meeting scheduled for September 10th, but please allow this correspondence to speak for me at the meeting.

Thank you!

Sharon Twigg-Smith

*Sharon Twigg-Smith  
888 Kapiolani Blvd., #4402  
Honolulu, HI 96813  
ph: 808-735-3883  
cell: 808-221-3385*



-----Original Message-----

From: Janet Williamson <[janetmmw@me.com](mailto:janetmmw@me.com)>

Sent: Wednesday, August 29, 2018 11:26 AM

To: Participate <[participate@ketchumidaho.org](mailto:participate@ketchumidaho.org)>

Cc: Tom Pittman <[tapsv@aol.com](mailto:tapsv@aol.com)>; john macomber <[jadminvest@me.com](mailto:jadminvest@me.com)>; Zabette Macomber <[zabmac@vashonlab.com](mailto:zabmac@vashonlab.com)>; Billy and Annie Macomber <[bill@fancyfilm.com](mailto:bill@fancyfilm.com)>

Subject: 420 Sage Road proposal

To Whom it may concern at P&Z,

As a homeowner in Warm Springs, and specifically in Eagle Ridge, I would like to express my strong concern about the possible development of a solar-energy project on the hill behind our house. As much as I support renewable energy, I do not want to set precedent for the panels to be scattered on the beautiful, open hillsides. I believe the town should develop a comprehensive plan in order to accommodate the future demands for this type of energy.

This seems like a huge project and I would like to register my disapproval as the proposal stands now. The hillside should remain free of development.

I cannot attend the meeting on Sept 10th but hope this email will be considered.

Thank you for your consideration,  
Janet Williamson and family



City of Ketchum  
Planning & Building

**STAFF REPORT**  
**KETCHUM PLANNING AND ZONING COMMISSION**  
**REGULAR MEETING OF OCTOBER 8, 2018**

**PROJECT:** 206 Skiway Drive Kingen Variance Request

**FILE NUMBER:** P18-103

**REPRESENTATIVE:** Jim Ruscitto, AIA, Ruscitto Latham Blanton Architectura P.A.

**OWNER:** Gerald & Kathryn Kingen

**REQUEST:** Variance request from Ketchum Municipal Code (KMC) §17.136.050 prohibiting additions to nonconforming buildings that increase the degree of nonconformity and the 15 ft front setback required in the T-3000 Zoning District (KMC §17.12.030.C) in order to construct an elevator addition.

**LOCATION:** 206 Skiway Drive (Warm Springs Village Subdivision: Block 2: Lot 2)

**ZONING:** Tourist-3000 District (T-3000)

**OVERLAY:** None

**NOTICE:** Notice was published in the September 19<sup>th</sup>, 2018 edition of the Idaho Mountain Express and mailed to property owners adjacent to the subject site on September 19<sup>th</sup>, 2018.

**REVIEWER:** Abby Rivin, Associate Planner

**BACKGROUND**

The applicant is requesting a variance from Ketchum Municipal Code (KMC) §17.136.050 prohibiting additions to nonconforming buildings that increase degree of nonconformity and the 15 ft front setback required in the Tourist 3000 (T-3000) Zoning District (KMC §17.12.030.C) in order to construct an elevator addition. The applicants, Gerald and Kathryn Kingen, purchased the home 34 years ago in 1984. The property owners would like to construct an elevator addition in order to comfortably access the second floor living area as the residents grow older.

**ANALYSIS**

Data from the Blaine County Assessor's Office indicates that the existing single-family residence was built in 1964. The applicant's narrative, included as Attachment B to the Staff Report, notes that the home was built 59 years ago in 1959. Built prior to the adoption of Ordinance No. 208, the City's first comprehensive zoning ordinance, in 1974, the existing single-family residence is nonconforming as the structure encroaches into the 15 ft front setback required in the Tourist-3000 (T-3000) Zone. The roof overhang of the attached garage and a portion of a deck encroach over the front property line.

As indicated on the First Floor Plan and included as Attachment B to the Staff Report, the proposed 85 sq ft elevator addition will be setback 2'-6" from the front property line. The residence's existing front setback is nonconforming—the garage extends to the front property line (0 ft setback) and the existing entryway is setback 4'-9" from the front property line. The applicant is seeking relief from two (2) provisions of Ketchum Municipal Code in order to construct the elevator addition—a retrofit that will allow the Kingen's to continue to comfortably access the upper level living area as they age, thereby allowing them to age in place. In order to construct the elevator in a convenient location adjacent to the garage and entryway, the applicant is requesting a variance from the 15 ft front setback required in the T-3000 Zone (KMC §17.12.030.C). As the existing structure is a nonconforming residence, the proposed elevator addition will also require relief from KMC §17.136.050, which prohibits additions to increase the degree of nonconformity and also requires additions to comply with the regulations of the underlying zoning district.

Per KMC §17.148.010, a variance shall not be considered a right or special privilege, but may be granted to an applicant only upon a showing of undue hardship because of unique characteristics of the site, and that the variance is not in conflict with the public interest. A variance may be granted by the Planning & Zoning Commission only if the applicant demonstrates compliance all of the variance criteria as outlined in KMC §17.148.010 and listed with associated Staff analysis below.

#### Variance Evaluation Standards Analysis

#### **A. The strict enforcement of the provisions of this title creates an undue hardship to the property owner; however, economic feasibility shall not be considered an undue hardship.**

The hardship associated with the subject variance request is lack of comfortable access to the second floor living area as the residents grow older. The 2014 Comprehensive Plan acknowledges the City of Ketchum lacks housing that allows citizens to age in place and outlines goals and policies that support retrofits, housing designs, and floor plans for an aging population (See Table 2 for Comprehensive Plan Analysis). The existing floor plans of the residence preclude comfortable access to the second floor living area as the residents grow older.

Recommendation: This standard has been met. Staff finds that the existing floor plans create an undue hardship to the property owners and their desire to comfortably age in place within the existing residence that has been their home for the past 34 years.

#### **B. The variance is necessary because of the unique size, shape, topography or location of the subject property.**

The subject property, Lot 2 of Warm Springs Village Subdivision Block 2, is compliant with the required dimensions and minimum area for lots within the T-3000 Zone. In the T-3000 Zoning District, the average required lot width is 80 ft and the minimum lot area is 8,000 sq ft (KMC §17.12.030). Subject Lot 2 has a width of 92 ft and an area of 10,050 sq ft, which exceed the minimum standards. The lot could be developed in conformance with the applicable dimensional standards and regulations of the T-3000 Zoning District.

While development would not necessitate a variance due to the size, shape, or topography of the lot, the existing single-family residence creates site constraints for the proposed elevator addition. The proposed siting of the elevator addition within the front setback is the most convenient location due to its proximity to the adjacent garage and entryway. For example, this location would allow the residents to more easily transport groceries from their car to the second floor kitchen.



Recommendation: The standard has **not** been met. The applicant has not provided sufficient support that an alternative design compliant with the dimensional standards required in the T-3000 Zone is unfeasible for the subject site.

**C. The subject property is deprived, by provision of this title, of rights and privileges enjoyed legally by other properties in the vicinity and under an identical zone.**

The subject property is not denied the same rights and privileges enjoyed legally by other properties in the vicinity and under the T-3000 Zone. No characteristics of the subject lot create site constraints that would preclude the development of a single-family residence compliant with the dimensional standards required in the T-3000 Zone. As sufficient undeveloped area is available within the required setbacks, the siting of the existing dwelling on the subject lot does not preclude an addition that complies with the zoning and dimensional standards contained within Title of 17 of Ketchum Municipal Code.

Recommendation: This standard has **not** been meet.

**D. The need for the variance is not the result of actions of the applicant or property owner.**

As the existing nonconforming residence was built prior to the adoption of the City's first comprehensive zoning ordinance, the need for the variance is not the result of the applicant's actions. The Kingen's purchased the property 34 years ago and an elevator addition in order to comfortably age in place is a reasonable request.

Recommendation: This standard has been met.

**E. The variance does not create health and safety hazards.**

The proposed design of the elevator addition project has been reviewed by the Fire, Building, and Streets departments (See Table 1 for City Department Comments). The variance does not create health or safety hazards.

Recommendation: This standard has been met.

**F. The variance does not relieve an applicant from any of the procedural provisions of this title.**

The variance request does not relieve the applicant from any of the procedural provisions of Title 17. All standard permitting processes would apply to any further construction at the site. If a variance is granted, the project would require a Building Permit. Excepting any regulations that may be relieved through the approval of the associated variance, the Planning & Building Department would ensure that the addition project comply with dimensional standards of the T-300 Zoning District as part of Building Permit application review. For this phase of review, the applicant would be required to submit the gross floor area of the existing single-family residence and proposed addition as well as the percent of open space on the subject site. The permitted Floor Area Ratio (FAR) is 0.5, but an increase to a 1.6 maximum FAR may be permitted with an associated community housing contribution (KMC §17.124.040). The minimum open space requirement on the subject site is 35% (KMC §17.12.030). The Streets Department would also review the existing condition of the right-of-way adjacent to the property and may require improvements as part of the Building Permit application review process.

Recommendation: This standard has been met.

**G. The variance does not relieve an applicant from any standard or provision that specifically states that no variance from such standard or provision is permitted.**

Ketchum Municipal Code defines a variance as:

*A modification of the requirements of this title as to lot size, lot coverage, width, depth, front yard, side yard, rear yard, setbacks, parking space, parking areas, height of buildings, or other title provisions affecting the size or shape of a structure or the placement of the structure upon lots, or the size of lots (KMC §17.08.020).*

The applicant's request for a variance is in accordance with the definition of variance as defined in Ketchum Municipal Code and with the procedural standards for processing variance requests as outlined in KMC §17.148.020. No request has been made from any standard that prohibits the option to request a variance.

Recommendation: This standard has been met.

**H. The variance does not relieve an applicant from conditions established during prior permit review.**

Three prior Building Permits have been issued for the subject property--an interior remodel in 1987 (Building Permit #87-116), an addition project in 1989 (Building Permit #89-109), and a fence installation. Staff has not found any associated conditions that would be relieved through the granting of the variance request.

An existing permanent right-of-way encroachment agreement (Resolution Number 88-363) exists to allow certain landscape and automatic irrigation improvements including the rock entry walls within the right-of-way. The agreement gives the City the discretion to remove the encroachments within the right-of-way.

*Owners agree upon written notification by Ketchum to remove said landscape and automatic irrigation improvements and other improvements described hereinabove and as shown on Exhibit A within ninety (90) days of receipt of such notice and if same is not so removed, Owners authorize Ketchum to cause the same to be removed at Owners' sole expense and to specially assess the costs thereof against the real property (See agreement included as Attachment C to the Staff Report).*

The Streets Department will reevaluate the existing conditions of the right-of-way adjacent to the property as part of review of any Building Permit application associated with the subject property.

Recommendation: This standard has been met.

**I. The variance does not allow establishment of a use that is not otherwise permitted in the zone in which the subject property is located.**

One-family dwelling uses are permitted within the T-3000 Zoning District (KMC §17.12.020).

Recommendation: This standard has been met.

**J. The variance is the minimum necessary to grant relief to the applicant.**

Staff lacks sufficient evidence and support from the applicant demonstrating that the requested variance is the minimum necessary to grant relief to the applicant. The site plan indicates that adequate undeveloped area within the required setbacks is available to construct an addition.

Recommendation: The standard has **not** been met. The applicant has not provided sufficient support that an alternative design compliant with the dimensional standards required in the T-3000 Zone is unfeasible for the subject site.

**Table 1. City Department Comments**

City Department Comments				
Compliant			City Code	City Standards and Staff Comments
Yes	No	N/A		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Fire Department:</b>	<i>The elevator addition project shall meet all 2012 International Fire Code requirements in addition to specific City Building and Fire Ordinances.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Streets Department:</b>	<i>An existing permanent right-of-way encroachment agreement (Resolution Number 88-363) exists to allow certain landscape and automatic irrigation improvements including the rock entry walls with the right-of-way. The agreement gives the City the discretion to remove the encroachments within the right-of-way. The Streets Department will reevaluate the existing conditions of the right-of-way adjacent to the property as part of review of any Building Permit application associated with the subject property.</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Building:</b>	<i>The building must meet 2012 International Building Code, the 2012 International Residential Code, and Title 15 of Ketchum Municipal Code.</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>Planning and Zoning:</b>	<i>Comments are denoted throughout the Staff Report.</i>

**COMPREHENSIVE PLAN ANALYSIS**

Providing housing options that address the needs of Ketchum’s aging population and permitting retrofits that allow residents to age in place is defined as a goal in the 2014 Comprehensive Plan. The elevator addition project is consistent with the uses, goals, and policies listed below as specified within the 2014 Comprehensive Plan. The project is an example of a retrofit that fulfill the City’s intention of encouraging housing designs for an aging population with mobility limitations.

**Table 2: Comprehensive Plan Analysis**

SUPPORTING SECTION	SUMMARY OF COMPLIANCE WITH THE 2014 COMPREHENSIVE PLAN
<b>Future Land Use</b>	
<b>Medium Density Residential</b>	<p><b>Primary Uses:</b> This type of residential use includes a broader variety of residential types, including single family residences, duplexes, and other attached-unit types.</p> <p><b>Secondary Uses:</b> Multi-family housing will be appropriate in many locations. Supporting and complementary uses, including accessory dwelling units, community gardens, open space and recreation, schools, places of worship, and other public uses are appropriate. Senior housing facilities are also appropriate in this category.</p> <p><b>Characteristics and Location:</b> This residential type characterizes the West Ketchum and Warm Springs neighborhoods.</p>
	<b>Housing</b>
<b>Policy H-3.2 Special Needs Populations</b>	The City should encourage development of housing for special needs populations, including facilities for the elderly, disabled, adaptive, and populations requiring special care or group housing. Such housing should be close to shopping, medical services, entertainment and public transportation. Efforts should be made to avoid concentrating these homes in one area.



<b>Policy H-3.3 Housing Designs and Floor Plans for an Aging and Special Needs Population</b>	The City should encourage new housing units and the retrofit of existing units, with basic accessibility features, such as zero-step entrances, doorways with wider clear passage, and first-floor bedrooms and bathrooms with maneuvering room for people with mobility limitations.
<b>Community Design and Neighborhoods</b>	
<b>Goal CD-1</b>	Our community will preserve its small-town character and the distinct image of neighborhoods and districts.
<b>Policy CD-1.2 Preservation of Historic Buildings and Sites.</b>	Individual buildings and sites of historical, architectural, archaeological, or cultural significance should be identified and considered for protection. The City should encourage the private sector to preserve and rehabilitate buildings and sites through local landmark designation, public improvements, guidelines, and other tools

**STAFF RECOMMENDATION:**

Staff recommends the Commission move to table consideration of the subject variance request and invite the applicant to apply for Zoning Code Revision to amend Title 17 to permit a degree of encroachment with required setbacks for retrofits that allow residents to age in place. Chapter 17.128 *Supplementary Location and Bulk Regulations* of Ketchum Municipal Code sets a precedent for this type of encroachment by allowing fire escapes to extend into required rear or side yards not more than 6 ft. The applicant also would have the option to submit a design alternative for the proposed elevator addition compliant with the dimensional standards of the T-3000 Zoning District. Staff has recommended that the Commission table the Variance request as KMC §17.148.030 would prohibit the applicant from resubmitting the variance request in either the same or substantially the same form in less than one year from the date of final action.

**COMMISSION OPTIONS:**

- Move to approve the variance request and draft findings demonstrating compliance with all variance criteria contained in KMC §17.1480.010.
- Move to deny the variance request for the proposed elevator addition project.

**ATTACHMENTS:**

- A. Application
- B. Variance Request Submittal Plans & Narrative
- C. Resolution Number 363 and ROW Encroachment Permit Agreement

ATTACHMENT A.  
APPLICATION



City of Ketchum  
Planning & Building

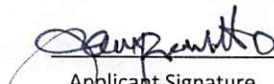
OFFICIAL USE ONLY	
Application Number:	P18-103
Date Received:	8-6-18
By:	mf
Fee Paid:	67500
Approved Date:	
By:	

### Variance Application

Submit completed application and payment to the Planning and Building Department, PO Box 2315, Ketchum, ID 83340 or hand deliver to Ketchum City Hall, 480 East Ave. N., Ketchum. If you have questions, please contact the Planning and Building Department at (208) 726-7801. To view the Development Standards, visit the City website at: [www.ketchumidaho.org](http://www.ketchumidaho.org) and click on Municipal Code.

OWNER/APPLICANT INFORMATION
Name: Gerald Kingen
Phone: 206 953 4706
Email: gerrykingen@comcast.net
Mailing Address: 1936 HARBOR AVE SW SEATTLE WA 98126-2031
Legal Description: WARM SPRINGS VILLAGE SUB LOT 2 BLK 2
Zoning District: T-3000
Overlay District: Avalanche
ADDITIONAL INFORMATION
Requirement(s) of the Zoning Code Title 17 to be Varied: The residence was built 59 years ago before there was the Warm Springs ski area and ski lifts. There was no building permit issued. The original owner/builder was not aware of codes, etc.
Please state the undue hardship you believe would result from the strict enforcement of this requirement: The owner bought the property 34 years ago and was not aware of the set-back. He is now retiring and needs an elevator to access the living areas on the second floor, therefore the entry and garage have been outside the set-back since the building was constructed 59 years ago.
Please state the unique characteristics of the site, i.e. unique size, shape, topography or location of the property: The existing building/residence was built 59 years ago which I believe was before city or avalanche zones were created on the property.
<b>Note:</b> The criteria for granting a variance are listed on the reverse side of this application form.

Applicant agrees in the event of a dispute concerning the interpretation or enforcement of the Subdivision Application in which the City of Ketchum is the prevailing party to pay reasonable attorney's fees and costs, including fees and costs of appeal for the City of Ketchum. Applicant agrees to observe all City ordinances, laws and conditions imposed. Applicant agrees to defend, hold harmless and indemnify the City of Ketchum, city officials, agents and employees from and for any and all losses, claims, actions, judgments for damages, or injury to persons or property, and losses and expenses caused or incurred by Applicant, its servants, agents, employees, guests and business invitees and not caused by or arising out of the tortuous conduct of city or its officials, agents or employees. Applicant certifies that s/he has read and examined this application and that all information contained herein is true and correct.

 Architect for Gerald Kingen, Owner  
 Applicant Signature \_\_\_\_\_ Date \_\_\_\_\_  
 JAMES RUSCITTO - ARCHITECT



## ATTACHMENT B.

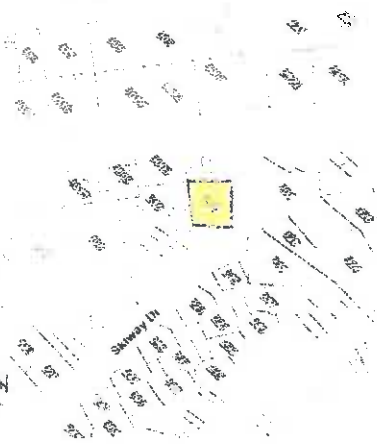
### Variance Request Submittal Plans & Narrative



NOTES:

- NEW FENCE TO MATCH EXISTING.
- DOOR PROTECT NEW AND EXISTING FENCES.
- LAWN TO BE IRRIGATED BY AUTOMATIC SPRINKLER SYSTEM.
- ELECTRICAL OUTLETS AND LANDSCAPE LIGHTS AS SHOWN BY EXISTING TRENCH VISIBLE LOCATIONS BY ARCHITECT.
- EXISTING BACKBOARD TO BE ADJUSTABLE, RAISE & LOWER.
- PROVIDE 12 WALKWAY ENDS OF ROAD PLANTERS OR CASSETS FOR DECK PLANTING.

KINGEN RESIDENCE  
 206 SKIMWAY KETCHUM  
 15' FRONT SETBACK  
 1' FOR EVERY 1' IN HEIGHT OF BLDG.  
 SIDE SET-BACK



NEW ENTRY INTO RESIDENCE

1/8"=1'-0" LOT 206 SKIMWAY DRIVE FEB. 5, 2018

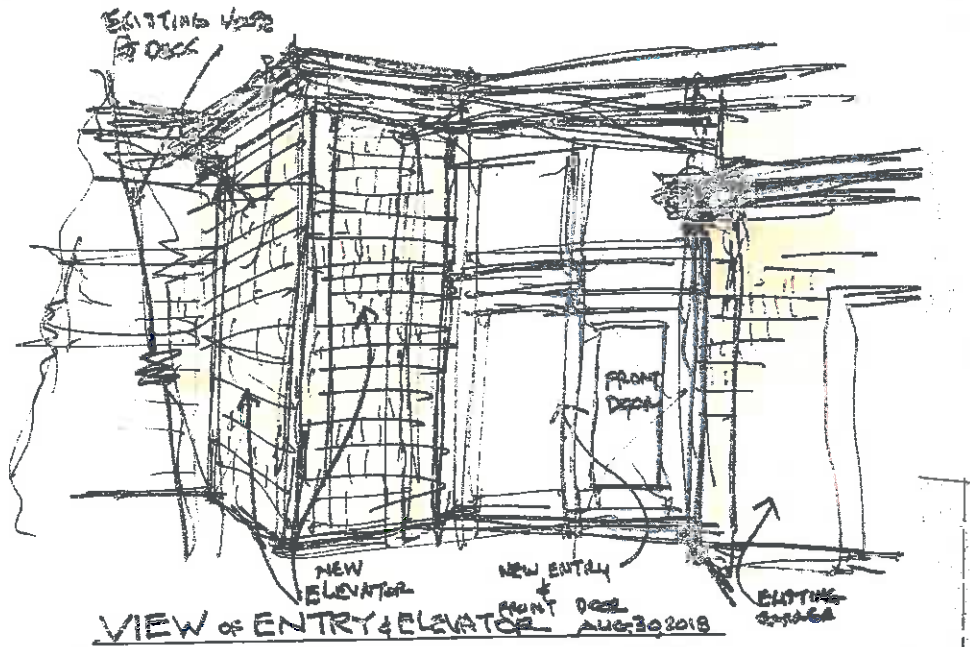
**RUSCETTO/LATHAM/BLANTON**

James Ruscolto, planning/design Nicholas Latham, architect Theda Blanton, architect  
 P.O. box 419 sun valley, Idaho 83353  
 208 726 5608  
 copyright ©

**MINIMUM FUNDING**

AUG. 30, 2018

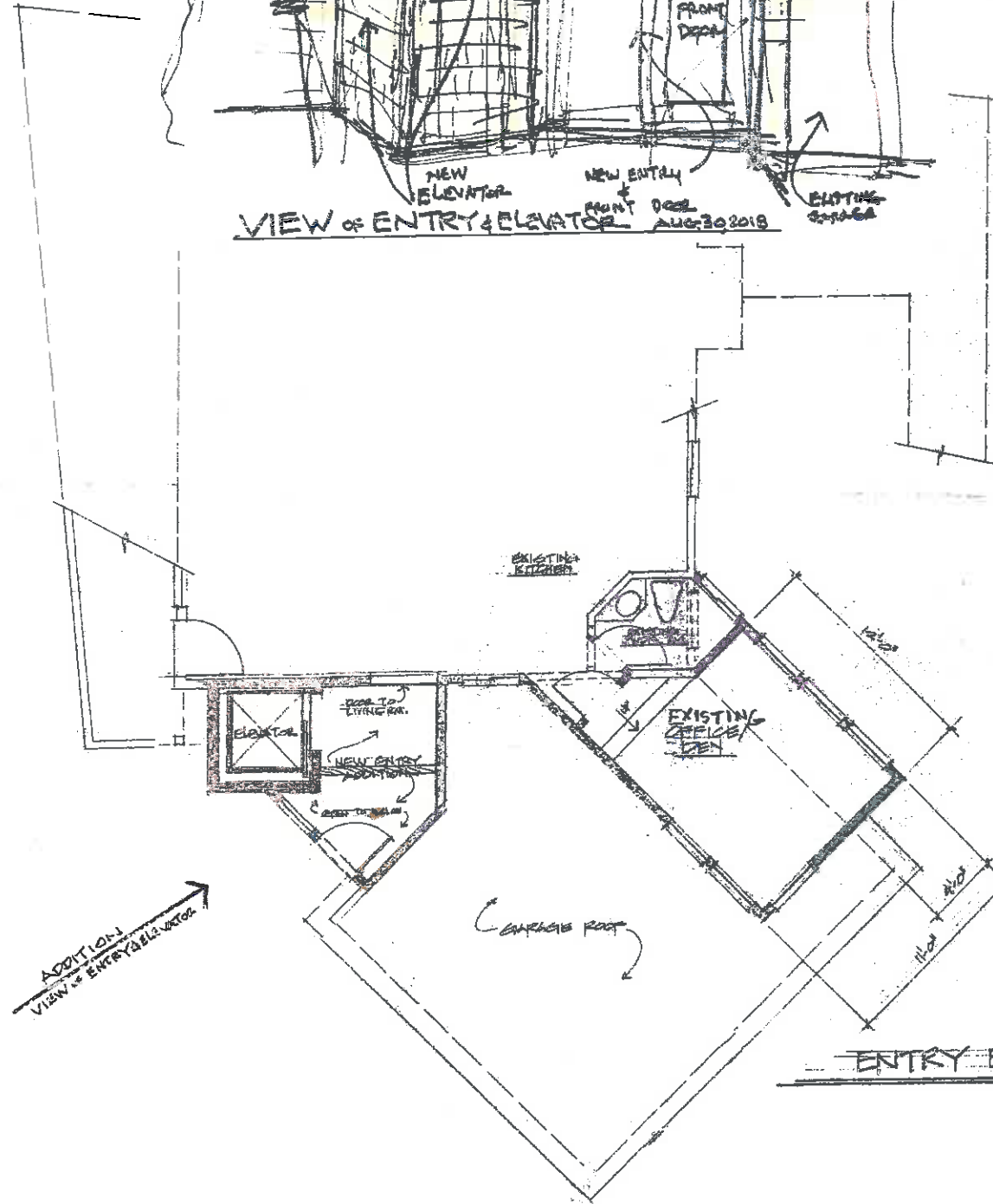




VIEW OF ENTRY & ELEVATOR  
AUG 30 2018

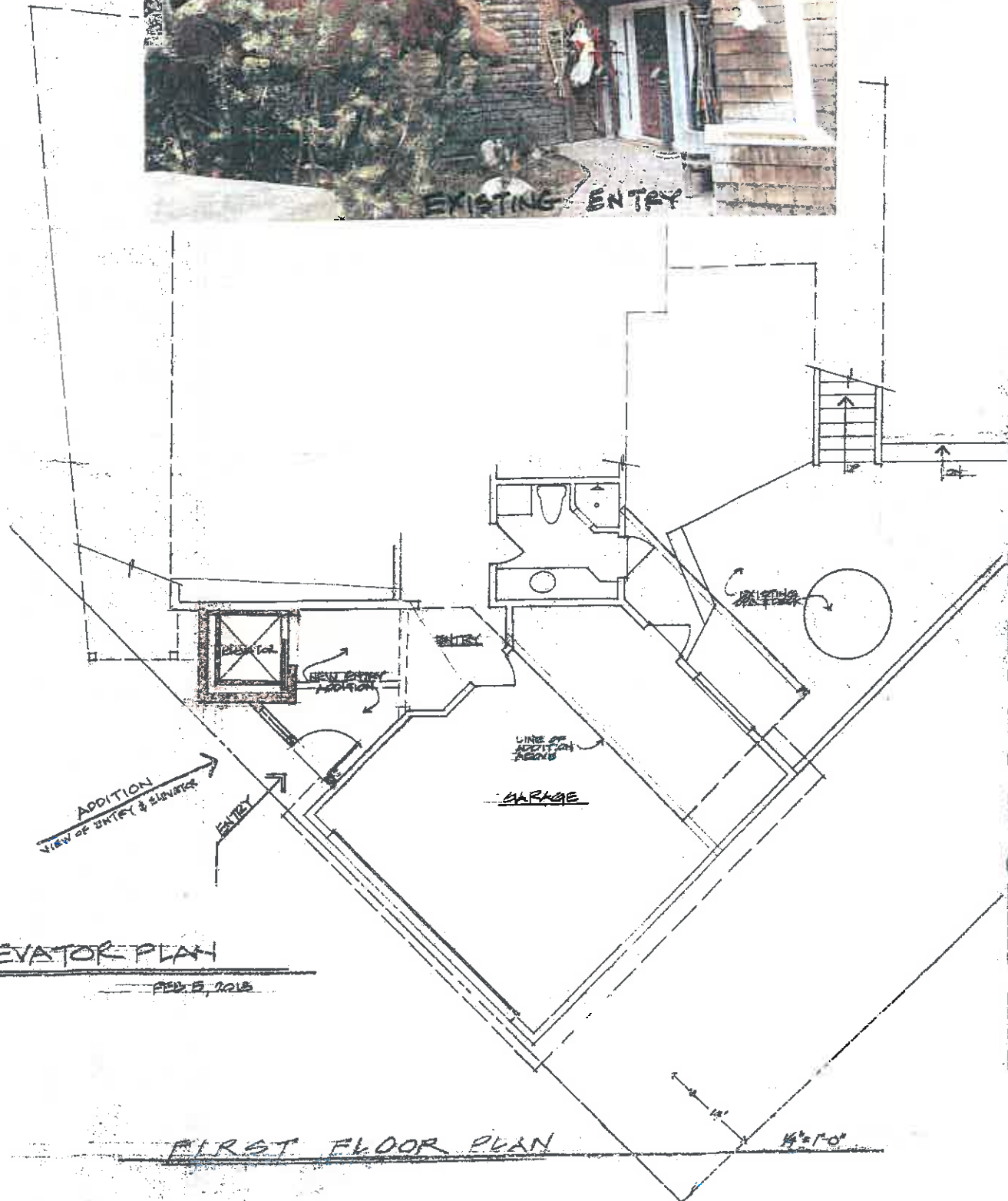


EXISTING ENTRY



SECOND FLOOR PLAN

1/4" = 1'-0"



FIRST FLOOR PLAN

1/4" = 1'-0"

**RUSCITTO/LATHAM/BLANTON**

James Ruscito, planning/design, Nicholas Latham, architect, Thadd Blanton, architect  
 P.O. box 419, Sun Valley, Idaho 83353

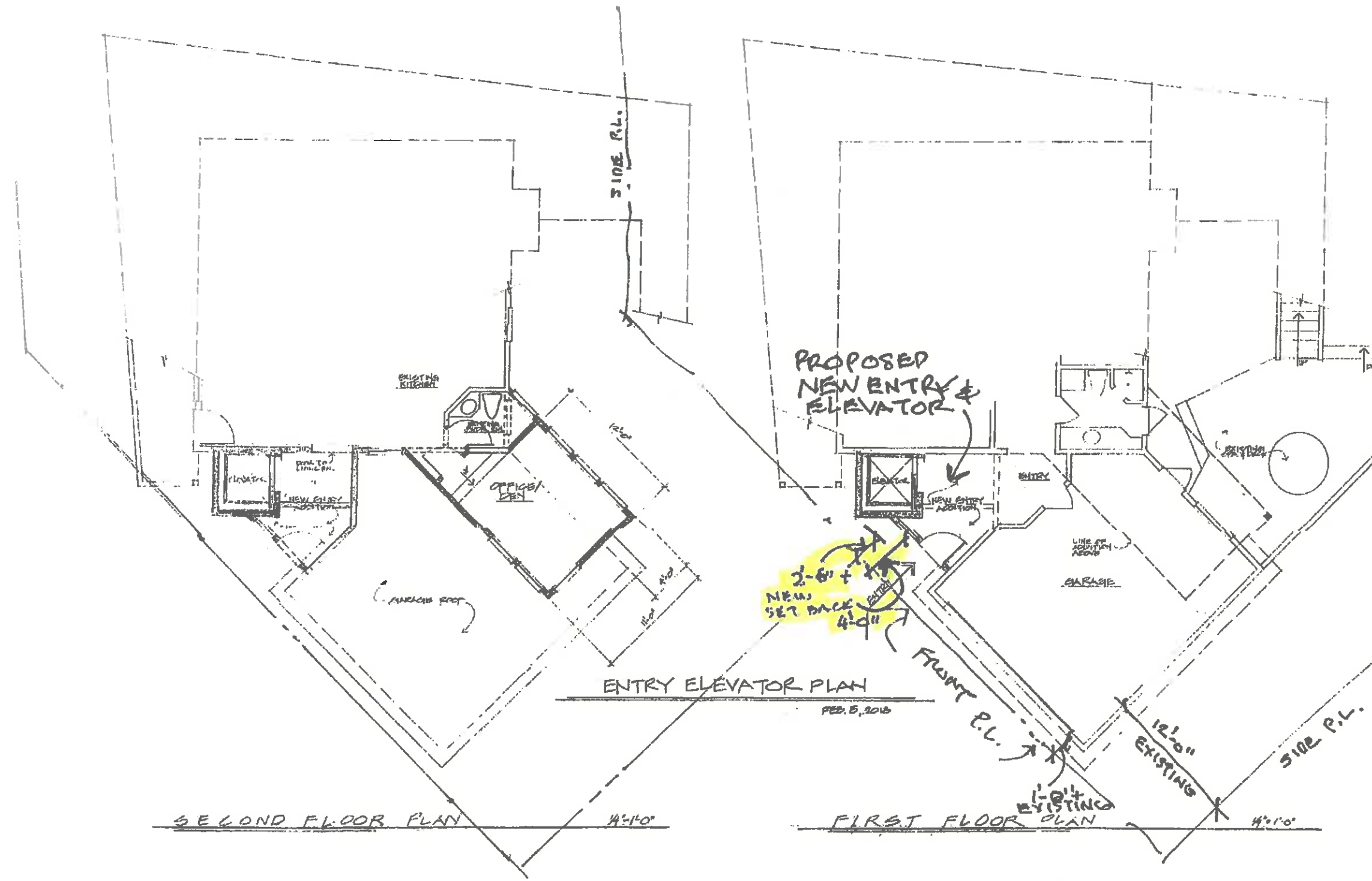
copyright ©

208 726 8885

AUG 30 2018

AN ADDITION TO THE  
 KUNGEN RESIDENCE  
 3000 SKYWAY DRIVE, KETCHIKAN





SECOND FLOOR PLAN 4'-11"0"

FIRST FLOOR PLAN 4'-0"0"

ENTRY ELEVATOR PLAN FEB. 5, 2016

**RUSCITTO/LATHAM/BLANTON**

James Ruscitto, planning/design Nicholas Latham, architect Thadd Blanton, architect  
 P.O. box 419 sun valley, MO 63353  
 208 726 6666 copyright ©

AN ADDITION TO THE 1  
**KINGEN RESIDENCE**

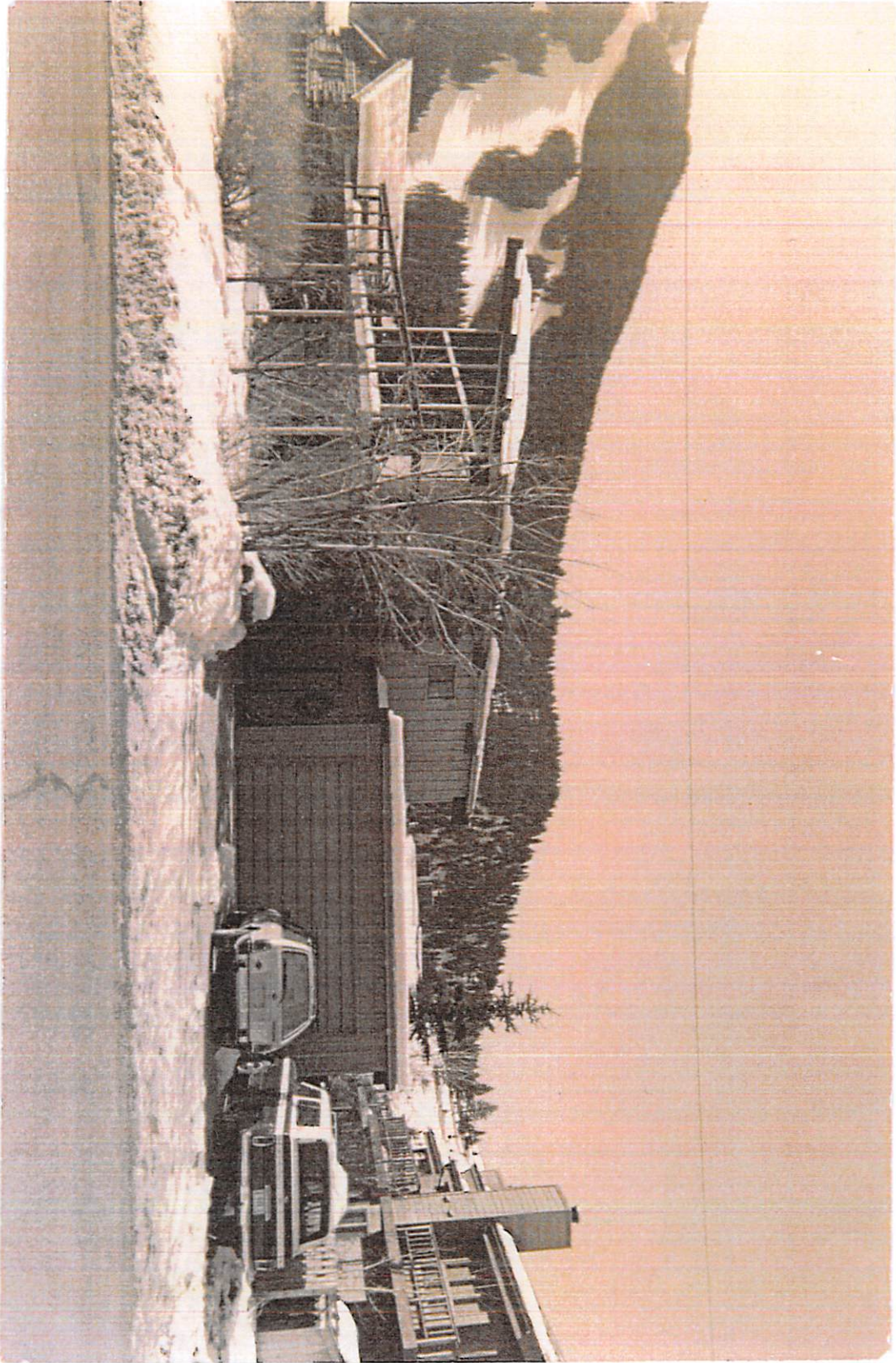












September 5, 2018

Gerald Kingen Residence - 206 Skiway Drive Elevator Addition Variance Request

The residence was built 59 years ago, before there was building codes for the area and before the Warm Springs ski area and lifts were built. There was no Building Permit issued. Therefore, the original owner/builder were not subject to building codes and set-backs that are currently required.

The current owner purchased the property and residence 34 years ago and was not aware of building codes or set-backs. Therefore, the entry to the residence and the garage are out of the current building code set-back. The current owner would like to build a new entry area into the residence with an elevator which would be outside of the current set-back requirements according to current code. The owner has asked for a variance for construction outside of the set-back to allow for the entry and elevator help facilitate access to the upper living areas for the elderly owner and his wife.

A variance is necessary due to the unique size, shape, topography, and location of the property. The variance will not create health and safety hazards. The variance does not allow establishment of uses that are not otherwise permitted in the zone in which the property is located. The approval of the variance is the minimum to grant relief to the client.



RUSCITTO LATHAM BLANTON  
ARCHITECTURA P.A.

208.726.5608  
www.rlb-sv.com  
p.o. box 419 83353  
sun valley, Idaho

ATTACHMENT C.

Resolution Number 363

&

ROW Encroachment Permit Agreement



RESOLUTION NUMBER   363  

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KETCHUM, IDAHO AUTHORIZING THE MAYOR TO EXECUTE AN AGREEMENT TO INSTALL AND MAINTAIN CERTAIN LANDSCAPE AND AUTOMATIC IRRIGATION AND OTHER IMPROVEMENTS IN THE PUBLIC RIGHT-OF-WAY WITH JERALD AND KATHRYN KINGEN.

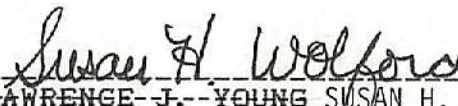
NOW, THEREFORE, BE IT RESOLVED by the Mayor and City Council of the City of Ketchum, Idaho:

1. That the City Council of the City of Ketchum hereby finds that under the terms and conditions of said Agreement said improvements will not impede the public use of Skiway Drive at this time; that said Agreement is in the best interests of said City and the inhabitants thereof in order to protect and promote the public health, safety and welfare; and, that said Agreement is in accordance with and authorized by the laws of the State of Idaho.


2. The City Council of the City of Ketchum, Idaho hereby authorizes and instructs the Mayor of said City to execute the Agreement to install and maintain certain landscape and automatic irrigation and other improvements in the public right-of-way with Gary Darman, for and on behalf of said City.

DATED this   18th   day of   April  , 1988.

CITY OF KETCHUM

  
\_\_\_\_\_  
~~LAWRENCE J. YOUNG~~ SUSAN H. WOLFORD  
Mayor - Acting

ATTEST:

  
\_\_\_\_\_  
Betty A. Coles  
City Clerk

AGREEMENT

THIS AGREEMENT, made and entered into this \_\_\_18th day of \_\_\_April\_\_\_, 1988, by and between JERALD AND KATHRYN KINGEN, husband and wife, owners of Lot 2, Block 2, Warm Springs Village Subdivision, (referred to herein as "Owners") and the CITY OF KETCHUM, IDAHO, a municipal corporation, (hereinafter referred to as "Ketchum").

W I T N E S S E T H:

WHEREAS, Owners wish to install certain landscape and automatic irrigation improvements and other improvements described hereinbelow in the public right-of-way of Skiway Drive as part of the improvements to be constructed in accordance with and shown on the Building Permit Number 87-116, and, as shown on Exhibit A attached hereto and made a part hereof; and,

WHEREAS, the City of Ketchum finds that said improvements will not impede the use of said street at this time subject to the terms and provisions of this Agreement.

NOW, THEREFORE, the parties hereto mutually covenant and agree as follows:

1. Ketchum shall permit Owners to construct and maintain certain landscaping and automatic irrigation improvements, lighted rock entry walls, and trash can storage container within the public right-of-way of Skiway Drive, as set forth on Exhibit A, until notified by Ketchum to remove the same provided that Owners maintain unobstructed the drainage ditch parallel and

adjacent to the asphalt paving in Skiway Drive; and provided that Owners place no boulders or other obstructions in or near said drainage ditch; and provided that Owners construct said rock entry walls and trash can container no further into the public right-of-way than approximately twenty (20) feet from the front of the existing garage. Owners agree upon written notification by Ketchum to remove said landscape and automatic irrigation improvements and other improvements described hereinabove and as shown on Exhibit A within ninety (90) days of receipt of such notice and if same is not so removed, Owners authorize Ketchum to cause the same to be removed at Owners' sole expense and to specially assess the costs thereof against said real property.

2. In consideration of Ketchum allowing Owners to install and maintain said landscaping and automatic irrigation improvements and other improvements described hereinabove and as shown on Exhibit A in the public right-of-way, Owners agree to defend and hold harmless the City of Ketchum from any and all claims, damages and causes of action arising out of or in any way related to said improvements maintained on the public right-of-way pursuant to this Agreement.

3. Owners understand and agree that by placing said improvements on the public right-of-way pursuant to this Agreement, Owners obtain no claim or interest in said real property which is adverse to that of the City of Ketchum.

4. This Agreement shall be a covenant running with the land more particularly described as Lot 2, Block 2, Warm Springs



Village Subdivision, according to the plat thereof on file in the Records of Blaine County, Idaho.

IN WITNESS WHEREOF, the parties hereto execute this Agreement the day and year first above written.

OWNERS:  
  
-----  
JERALD KINGEN

  
-----  
KATHRYN KINGEN

CITY OF KETCHUM

By   
-----  
Mayor - Acting

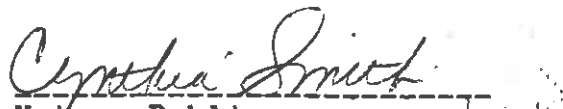
ATTEST:

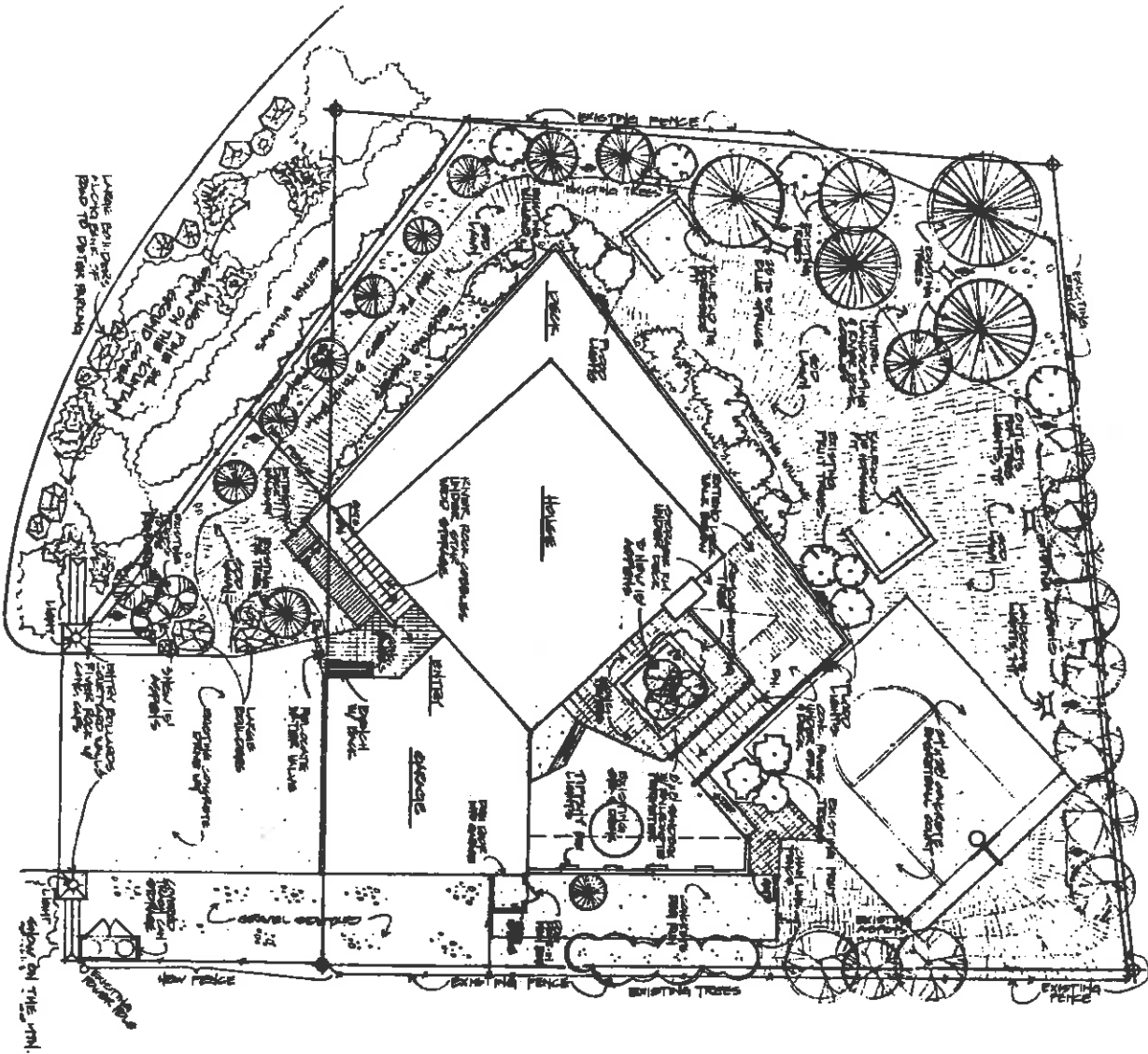
  
-----  
Betty M. Coles  
City Clerk

STATE OF IDAHO    )  
                          ) ss.  
County of Blaine )

On this 25<sup>th</sup> day of May, 1988, before me, a Notary Public in and for said State, personally appeared JERALD KINGEN AND KATHRYN KINGEN, husband and wife, known to me to be the persons whose names are subscribed to the within instrument, and acknowledged to me that they executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

  
-----  
Notary Public  
Residing at: King County  
Commission expires: 10-6-91

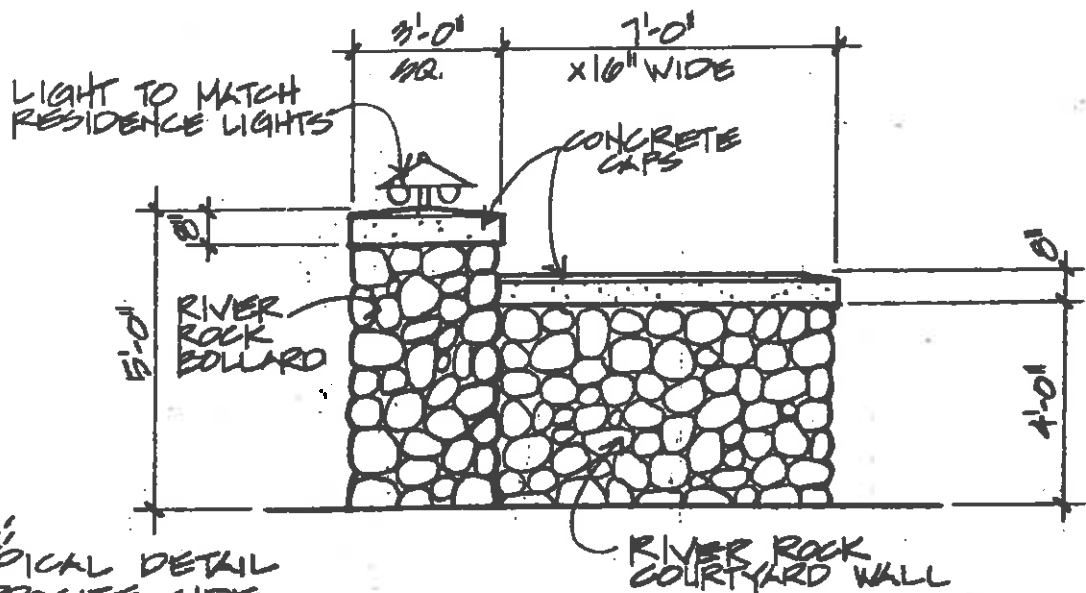


NOTES:

- How much to spend on this.
- Don't forget how to estimate prices.
- Land to be retained by architect.
- Substantial systems of landscape.
- Substantial, surrounded to be advanced.
- Prices (i.e. utility, water, or road).
- Features of concrete for each function.

**SCILLO/LACHAM/BLANTON**

EXHIBIT "A"

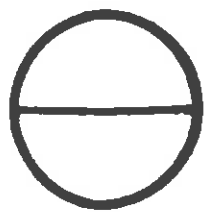


NOTE:  
TYPICAL DETAIL  
OPPOSITE SIDE  
OF DRIVEWAY

ENTRY WALL ELEVATION

1/4" = 1'-0"

<p><b>RUSGILLO/LACHAM/BLANTON</b></p>	<p><b>KINGEN RESIDENCE</b></p>
<p>P.O. Box 478 Sun Valley, Idaho 83353</p>	<p>3-31-88</p>







City of Ketchum  
Planning & Building

STAFF REPORT  
KETCHUM PLANNING AND ZONING COMMISSION  
REGULAR MEETING OF OCTOBER 8<sup>th</sup>, 2018

**PROJECT:** Northwest Institute of Energy Medicine CUP

**FILE NUMBER:** #18-119

**APPLICANT:** Isabella Cazamira

**REQUEST:** Conditional Use Permit application for a Health and Fitness Facility

**LOCATION:** 100 Bell Drive Unit B (Industrial Park Sub Lot 2, 14,450 SF)

**OWNER:** Loomis Inc.

**ZONING:** Light Industrial District No. 2 (LI-2)

**OVERLAY:** None

**NOTICE:** Notice was mailed to property owners within a 300-foot radius of the subject property and published in the Idaho Mountain Express on September 19<sup>th</sup>, 2018. Notice was published on the city website and physically posted on the subject property on October 1<sup>st</sup>, 2018.

**REVIEWER:** Brittany Skelton, Senior Planner

**ATTACHMENTS:**

- A. Application Form
- B. Narrative
- C. Brochure, Hocatt<sup>™</sup> Oxygen Device
- D. draft Findings of Fact and Conclusions of Law



and development, service industries, limited related, bulk retail and offices related to building, maintenance and construction and which generate little traffic from tourists and the general public.

Areas of alignment with the purpose include the proposed business serving as a year-round employment opportunity for the proprietor, and the portion of the business that includes small scale warehousing and distribution of craft probiotic beverages. Areas of divergence include the proposed business not relating to manufacturing or construction, which evoke the strongest images of what is light industrial, and perhaps traffic generation by the business, which could include members of the general public or tourists.

Three of the four components of the proposed use are permitted in the LI-2 zoning district by right. Details are provided in Table 1 located below.

**Table 1. Use Descriptions**

Use	Definition	District Use
Warehouse	A facility for the use of dry/cold storage, wholesale, and distribution of manufactured products, supplies, and equipment, excluding storage of materials that are inflammable or explosive or that present hazards or conditions commonly recognized as offensive.	Permitted
Wholesale	The sale of commodities in quantity for resale.	Permitted
Retail Trade	16. The following forms of retail trade are permitted:.....d) other retail in conjunction with manufacturing, warehousing or wholesaling; it is limited to 10 percent gross floor area or 500 square feet, whichever is less. Retail uses c) and d) of this note shall have no advertising displayed from windows or building facades; and no access will be permitted onto a major arterial if an alternative access is available.	Permitted subject to footnote 16
Health and Fitness Facility	A business or membership organization providing exercise facilities and/or nonmedical personal services to patrons, including, but not limited to, gymnasiums, private clubs (athletic, health, or recreational), tanning salons, and weight control establishments.	Conditionally Permitted

Of note is the qualifier that health and fitness facilities provide *nonmedical* personal services to patrons. The qualifier in this definition is intended to separate health and fitness facilities from clinics and doctor’s offices, which fall under the definition of “medical care facility” in the zoning code. Medical care facilities are not permitted in any of the Light Industrial zoning districts.

Although the name of the proposed business is the Northwest Institute for Energy Medicine, the use of the term medicine is not used in the clinical sense. Rather, the proposed business is intended to promote health and wellness in a holistic sense. Further, a disclaimer on the website for the Hocatt™ machine states that the product has not been evaluated or approved by the Federal Food & Drug Administration (FDA), the agency charged with overseeing medical devices.

The suite where the proposed business is to be located is approximately 800 square feet in size and consists of an entry way and three rooms. The area devoted to the health and fitness use is proposed to occupy one of the rooms. Other components of the business will occupy the remainder of the space.

**Department Comments**

Representatives from the Building, Streets, Fire, and Utilities departments expressed no concerns with the proposed conditional use.



**Table 2. Comprehensive Plan Analysis**

<p><b>Goal E-2 Ketchum will support and attract businesses and industries that diversify and sustain the local economy and level out seasonal fluctuations.</b></p> <p><i>Businesses have used local entrepreneurial talent to build on the outdoor recreation, biotechnology, computer, and web-based industries, including the financial sector. These businesses are models for the future “innovation economy” that our community seeks. The community also supports recruiting other small businesses, whether they are sole proprietorships or satellite offices of larger businesses. The key to our success is making Ketchum an attractive place to live and providing necessary infrastructure, affordable housing, transportation, good schools, medical services, and adequate land for businesses.</i></p>
<p>The proposed business provides a service that will diversify the economy, as Hocatt is not offered in the region. Additionally, the proposed business provides a year-round employment opportunity for the proprietor.</p>
<p><b>Policy E-2(a) Light Industrial Area as the Primary Location for New Traditional Light Industrial and Corporate Park Business Growth and Jobs</b></p> <p><i>New employment opportunities will focus primarily on clean industries within the City’s industrial areas which are evolving into vibrant, mixed-use business places. Traditional light industrial includes service, warehousing, manufacturing, wholesaling, autorelated businesses, rec-tech, biotechnology, and construction.</i></p>
<p>A component of the proposed business includes the traditional light industrial activities of warehousing and wholesaling, albeit at a much smaller scale than typically thought of for such uses. The conditional use component of the business does not fall into the categories of traditional light industrial and corporate park business growth that the Comprehensive Plan envisions for the light industrial zones.</p>
<p><b>Land Use Category:</b> <b>Mixed-Use Industrial</b></p> <p><b>PRIMARY USES</b> <i>Light manufacturing, wholesale, services, automotive, workshops, studios, research, storage, construction supply, distribution and offices make up the bulk of development within this district.</i></p> <p><b>SECONDARY USES</b> <i>A limited range of residential housing types, and supporting retail are provided for within this category. Uses should generate little traffic from tourists and the general public.</i></p> <p><b>CHARACTERISTICS AND LOCATION</b> <i>The Mixed-Use Industrial category is intended to provide critical lands for Ketchum’s economic growth and entrepreneurial opportunity within a vibrant business district where people can work and live in the same area.</i></p>
<p>The proposed business, and the conditional use component, align with the intended purpose of the Mixed-Use Industrial land use category to be a location for entrepreneurial opportunity. While components of the business are captured in described primary and secondary uses, the conditional use component of health and fitness facility is not mentioned as either a primary or secondary use.</p>
<p><b>Policy LU-2.1 Infill and Redevelopment</b></p> <p><i>Support intensification of land uses on appropriate infill and redevelopment sites in the following areas: · Downtown; · Industrial areas; · St. Luke’s Hospital/McHanville/Cold Springs Canyon · Warm Springs area; and · Existing neighborhoods with significant vacant parcels.</i></p>
<p>The proposed use does not represent intensification of land use. However, the proposed business would occupy a commercial rental suite within an existing building; because two multi-tenant buildings existing in the development intensification opportunities by a single business are limited relative to complete redevelopment of a site.</p>

## Conditional Use Permit Criteria

Conditional uses possess characteristics that require review and appraisal by the Planning and Zoning Commission to determine whether or not the use would cause any public health, safety, or welfare concerns. Additionally, evaluation criteria include an assessment of whether the conditional use conflicts with the Comprehensive Plan. Conditional uses may be granted by the Commission if the applicant demonstrates that the following evaluation criteria can be satisfied:

- A. The characteristics of the conditional use will not be unreasonably incompatible with the types of uses permitted in the applicable zoning district;
- B. The conditional use will not materially endanger the health, safety and welfare of the community;
- C. The conditional use is such that pedestrian and vehicular traffic associated with the use will not be hazardous or conflict with existing and anticipated traffic in the neighborhood;
- D. The conditional use will be supported by adequate public facilities or services and will not adversely affect public services to the surrounding area, or conditions can be established to mitigate adverse impacts; and
- E. The conditional use is not in conflict with the policies of the comprehensive plan or the basic purposes of the Zoning Ordinance.

**Table 3. Conditional Use Permit Requirements**

Conditional Use Requirements				
EVALUATION STANDARDS: 17.116.030 and § 67-6512 of Idaho Code				
A conditional use permit shall be granted by the commission only if the applicant demonstrates the following:				
Yes	No	N/A	Code	City Standards and <i>Staff Comments</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(A)	<p><b>The characteristics of the conditional use will not be unreasonably incompatible with the types of uses permitted in the applicable zoning district.</b></p> <p><i>Staff Comment</i> The LI-2 zoning district permits, or conditionally permits, a total of thirty-three (33) defined uses. Uses range from light-industrial in nature, such as maintenance service facility and manufacturing, to less impactful commercial uses, such as business support service and instructional service, and uses that fall in between in terms of intensity, such as a public recreation facility and boarding kennels.</p> <p>The Commission is currently engaged in comprehensive zoning amendments to all three light industrial zones. Existing permitted and conditional uses, as well as new uses, are being evaluated in terms of intensity of use and for compatibility with refined and newly proposed purposes for each of the light industrial districts. The proposed conditional use is not unreasonably incompatible with the types of uses permitted in the zoning district currently, or with the new uses and purpose sections under consideration by the Commission. However, because the proposed conditional use is relatively low intensity, the Commission has expressed the desire to see such uses located on the second floor and above of buildings that have more than one story.</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(B)	<p><b>The conditional use will not materially endanger the health, safety and welfare of the community.</b></p> <p><i>Staff Comment</i> The applicant has indicated the health and fitness facility component of the business will serve one client at a time, during a two-hour session. There is adequate on-site parking to accommodate the low volume of traffic and activity related to the use will occur within the interior of the premises. As such, the proposed use will not materially endanger the health, safety and welfare of the community.</p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(C)	<p><b>The conditional use is such that pedestrian and vehicular traffic associated with the use will not be hazardous or conflict with existing and anticipated traffic in the neighborhood.</b></p> <p><i>Staff Comment</i> As described in the preceding section, the proposed conditional use will generate an extremely low volume of client traffic.</p>

				<p><i>Additionally, the permitted components of the business will generate a low volume of traffic: delivery of the probiotic drinks for warehousing and distribution will occur once a week and will arrive by a standard UPS or FedEx vehicle, pick up of bulk orders of the beverages by local businesses will occur no more than once weekly per local business, and incidental retail sale of the beverages will most frequently occur to clients already visiting the business for health and fitness services.</i></p> <p><i>Considering traffic generated by the permitted and conditional components of the use together, whether vehicular or pedestrian, will not be hazardous or conflict with existing and anticipated traffic in the neighborhood.</i></p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>17.116.030(D)</b>	<p><b>The conditional use will be supported by adequate public facilities or services and will not adversely affect public services to the surrounding area or conditions can be established to mitigate adverse impacts.</b></p> <p><b>Staff Comment</b> <i>The proposed use will be located within an office suite located in two-story, multi-tenant commercial building that has existed in the subject location since 1975. The proposed conditional use component of the business can be supported by the same public facilities and services that have served prior occupants of the office suite and the use will not adversely affect delivery of public services to the surrounding area.</i></p>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>17.116.030(E)</b>	<p><b>The conditional use is not in conflict with the policies of the Comprehensive Plan or the basic purposes of this Section.</b></p> <p><b>Staff Comment</b> <i>A Comprehensive Plan analysis is detailed in Table 2. Aspects of goals and policies pertaining broadly to entrepreneurship and economic development are supported by the proposed conditional use. However, the conditional use component of the proposed multi-faceted business – health and fitness facility – does not represent traditional light industrial development, clean industry, or office park development articulated in the Comprehensive Plan as desired for the light industrial area. Nevertheless, the use is permitted conditionally and therefore deemed to be complementary to, rather than in conflict with, the policies of the Comprehensive Plan overall and the purpose of this section.</i></p>

The Planning and Zoning Commission may attach additional conditions to the application approval as it determines necessary in order to ensure the health and fitness facility use is compatible with the vicinity and adjoining uses, mitigate adverse impacts, and enhance public health, safety, and welfare. Such conditions may include, but are not limited to (Ketchum City Code §17.116.050):

- A. Minimizing adverse impact on other development;
- B. Controlling the sequence and timing of development;
- C. Controlling the duration of development;
- D. Assuring that development is maintained properly;
- E. Designating the exact location and nature of development;
- F. Requiring the provision for on site or off site public facilities or services;
- G. Requiring more restrictive standards than those generally required in an ordinance; and
- H. Requiring mitigation of effects of the proposed development upon service delivery by any political subdivision, including school districts, providing services within the city.

**STAFF RECOMMENDATION**

Staff recommends approval of the Northwest Institute of Energy Medicine CUP finding the application meets the standards for approval under Chapter 17.116, Conditional Uses of Ketchum Zoning Code.

Additionally, staff recommends adopting the Findings of Fact and Conclusions of Law approving the Conditional Use Permit during this meeting as drafted or with modifications recommended by the Commission.



### **COMMISSION OPTIONS**

- Move to approve the Northwest Institute of Energy Medicine CUP finding the application meets the standards for approval under Chapter 17.116, Conditional Uses of Ketchum Zoning Code.
  - Staff has drafted Findings of Fact and Conclusions of Law documenting approval of the Conditional Use Permit, which may also be approved, or approved with modifications, during this meeting.
- Direct staff to return with further research and move to continue the application to a date certain.
- Move to deny the proposed Northwest Institute of Energy Medicine CUP and draft findings supporting denials.

### **RECOMMENDED MOTIONS**

**“I MOVE to approve the Conditional Use Permit application by Isabella Cazamira for the health and fitness facility component of the Northwest Institute of Energy Medicine to be located at 100 Bell Drive, Suite B, in the LI-2 zoning district.”**

and

**“I MOVE to adopt the findings of fact and conclusions of law for the Conditional Use Permit application by Isabella Cazamira for the health and fitness facility component of the Northwest Institute of Energy Medicine to be located at 100 Bell Drive, Suite B, in the LI-2 zoning district.”**

**Attachment A.**

Application Form



City of Ketchum  
Planning & Building

OFFICIAL USE ONLY	
File #	218-119
Date Recd	9-14-18
By:	mp
Fee Paid:	1100-
Approved Date:	
Denied Date:	
By:	

Applicant/Representative: *Isabella cazamira*  
**Conditional Use Permit Application**

Submit completed application and payment to the Planning and Building Department, PO Box 2315, Ketchum, ID 83340 or hand deliver to Ketchum City Hall, 480 East Ave. N., Ketchum. If you have questions, please contact the Planning and Building Department at (208) 726-7801. To view the Development Standards, visit the City website at: [www.ketchumidaho.org](http://www.ketchumidaho.org) and click on Municipal Code.

OWNER INFORMATION	
Project Name: <i>Northwest Institute of Energy Medicine Inc</i>	
Name of Owner of Record: <i>LOOMIS INC c/o Amy Anderson</i>	
Physical Address: <i>100 Bell Drive Unit B</i>	
Property Legal Description: <i>Industrial Park Sub Lot 214, 450 SF</i>	
Property Zoning District: <i>LI-2</i>	
Contact Phone: <i>208-571-6004</i>	Contact Email: <i>isapellashands@gmail.com</i>
PROJECT INFORMATION	
Description of Proposed Conditional Use: <i>Please See Attached</i>	
Description of Proposed and Existing Exterior Lighting:	
ADDITIONAL COMMENTS	
<i>Please See attached</i>	
ACCOMPANYING SUPPORTING INFORMATION REQUIRED	
<ul style="list-style-type: none"> <li>Existing Site Plan</li> <li>Proposed Site Plan</li> <li>Landscape Plan</li> <li>Grading and Drainage Plan</li> <li>Exterior Lighting Plan and Specifications</li> <li>Other plans and studies related to the social, economic, fiscal, environmental, traffic, and other effects of the proposed conditional use, as required by the Administrator</li> </ul>	

Applicant agrees to observe all City ordinances, laws and conditions imposed. Applicant agrees to defend, hold harmless and indemnify the City of Ketchum, city officials, agents and employees from and for any and all losses, claims, actions, judgments for damages, or injury to persons or property, and losses and expenses caused or incurred by Applicant, its servants, agents, employees, guests and business invitees and not caused by or arising out of the tortious conduct of city or its officials, agents or employees. Applicant certifies that s/he has read and examined this application and that all information contained herein is true and correct.

Applicant Signature

Date

*9-13-18*



**Attachment B.**

Narrative

## **Application for Conditional Use Permit City of Ketchum**

Northwest Institute of Energy Medicine LLC  
100 Bell Drive Unit B  
Ketchum Idaho 83340

The following is a description of my proposed business outline, explanation and request for LI-2 zoning inclusion.

### **Wholesale- LaVie**

Use: Shipment receiving point for pre-bottled probiotic drinks.  
Distribution point for pre-bottled probiotic drinks.

### **Warehouse- LaVie**

Use: Shipment receiving point for pre-bottled probiotic drinks.  
Distribution point for pre-bottled probiotic drinks.

#### *Explanation of product and use:*

LaVie Probiotic Drinks are pre-bottle drinks that are shipped to facility.  
LaVie manufactures the product in their Santa Cruz California facility on Saturdays.  
Orders are placed on Mondays.  
Product ships on Tuesdays.  
Delivery is sent two day via Fed-ex.  
Product arrives Thursdays.  
Product is distributed to purchaser no later than Fridays.

### **Retail- LaVie Probiotic Drinks**

#### *Explanation of Product retail sale:*

LaVie Probiotic Drinks are available for single bottle sale.  
Product is stored in commercial refrigeration and held within IDAPA 16.02.19 Safety Code temperature of 35-40 degrees.  
Occasional on-site product tastings are planned to be offered.  
Retail space consists of less than 10% of overall space.

Under this category, it is my belief that this aspect of my business fits within the practices of existing business's holding city permits. In addition, the flow of intake and output of product delivery and distribution will be with the natural flow, without disruption, to other business's in the LI\_2 zone.

### **Health and Fitness Facility – Hocatt, Cell-Wellbeing**

#### *Explanation of product and use:*

Hocatt is a science based health modality designed to target individuals desiring to optimize their physical function and or athletic performance.  
Hocatt Ozone therapy chamber is a passive exercise with Oxygen breathing device.  
It increases strength and energy levels.  
Hocatt enables the body to work at peak performance while building endurance.  
Hocatt promotes and assists in weigh control.

While NOT a medical device, Hocatt Ozone can offer a pathway to a healthier lifestyle and better overall state of wellbeing.

A tandem program of carefully selected and instructed on-site exercise, stretching, yoga and nutrition by qualified instructors insures optimal results.

Cell-Wellbeing is a measurable, evidence base technology designed to test and report via hair strand analysis to the individual their nutritional health from a cellular level. Non invasive, computer generated reports help the client understand where improvements can be made empowering individuals with tools to reach their optimal wellness.

Under this category, it is my belief that this aspect of my business fits within the practices of existing fitness business's holding city permits in LI\_2 zone. In addition, the flow of clients for Hocatt and Cell-wellbeing will be limited to one person at a time. One parking space only will be needed at a time and is allowed in the buildings private lot per one-two hour appointment. This will fit gently and non intrusively within the natural flow of area traffic and without disruption, to other business's in the LI\_2 zone. Adequate facility, condition and aesthetic of facility contribute an exemplary standard to the LI\_2 zone. This business offers zero health hazards to the neighborhood.

Respectfully,

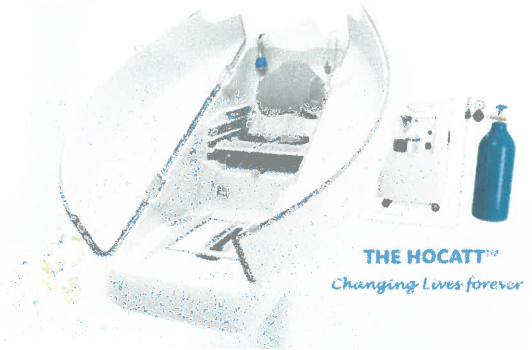
Isabella Cazamira  
Northwest Institute of Energy Medicine LLC  
100 Bell Drive Unit B  
PO Box 2777  
Ketchum, Idaho 83340  
208-571-6004



**Attachment C.**

Brochure, Hocatt™ Oxygen Device

FEEL GREAT, LOOK  
GREAT, BE GREAT,  
INSIDE AND OUT!



## TRANSDERMAL OZONE

The use of ozone in the HOCATT provides the many benefits, and works in concert with the other HOCATT modalities to facilitate the best strategy for optimal wellness and vitality. Ozone in the HOCATT can be both topical and systemic, and its uptake is enhanced by the Carbonic Acid and Hyperthermia. Experts say the HOCATT's combination provides the greatest, fastest and easiest form of detox available!

Ozone is known to:

- Inactivate Viruses, Bacteria, Yeast, Fungi, Parasites and Protozoa
- Stimulate the Immune System & Speed Healing
- Clean Arteries and Veins, Improving Circulation
- Oxidize Toxins, facilitating their Excretion
- Normalize Hormone and Enzyme Production
- Reduce Inflammation
- Reduce Pain, Calm nerves
- Improve Brain function and Memory
- Scavenge Free Radicals
- Dissolution of Malignant Tumors
- Activate the Immune System

## CO<sub>2</sub> / CARBONIC ACID

- Increases blood flow throughout the entire body
- Enhances oxygen delivery at cellular level Flushes the skin temporarily to a healthy pink color
- Stimulates warmth receptors in the skin, inhibits cold receptors
- Reconstructs functionally closed capillaries
- Decreases blood pressure
- Naturally sedates and calms the central nervous system
- Reduces stress, relaxes the muscles and the mind
- A natural anti-inflammatory compound
- A fat dissolving compound

## PASSIVE EXERCISE WITH OXYGEN BREATHING

- Enables the body to work at peak performance while building endurance and speed.
- Increased oxygen is the key to reducing the stress your body is under.
- An increase in oxygen slows the aging process.
- Building an oxygen rich environment wards off illness and disease.
- Enables people who have not been able to exercise at their desired performance to do so.
- Reduces pain
- Increased strength and Increase in energy levels
- Burn up to 30% more calories
- Restores lung function and O<sub>2</sub> absorption
- Improves focus and ocular issues
- Reduces Edema in capillary cells
- Improves circulation disorders, especially in the lower extremities
- Reduces Hypertension

## FAR INFRARED

- Increases blood circulation and oxygen supply to damaged tissues
- Carpal Tunnel Syndrome (CTS)
- Neutralizes blood toxicity and the walls of arteries, capillaries and veins smoothed.
- Hypertension, osteoporosis, headaches and digestive issues are all improved.
- Seven times more effective at detoxifying heavy metals, and even environmental toxins, as opposed to conventional heat or steam saunas.
- Improved symptoms for fibrocystic breast disease, attention deficit hyperactivity disorder, fibromyalgia, chronic fatigue syndrome, and much more.

[www.hocatt.com](http://www.hocatt.com) | [info@hocatt.com](mailto:info@hocatt.com) | 1-844-MY-OZONE (696-9663)



HOCATT™ USA | Product of Signature Health LTD

## WHOLE BODY HYPERTHERMIA

- Inhibits tumor growth.
- Increases the oxygen, nutrient, hormone and enzyme supply to the affected areas
- White blood cells increase in volume and activity, increasing the body's immune efficiency
- Everything in the body works faster when the body has a high body temperature, including producing more hormones and enzymes
- Elevated Mitochondrial Function
- Decreases muscular contracture and relieves tension and pain.
- Hyperthermia increases metabolism
- Hyperthermia speeds the disposal of lactic acid and facilitates faster recovery after exercise
- Improves mental clarity

## ESSENTIAL OIL INFUSIONS

- Improve the quality of life
- Help eliminate toxins
- Reduce stress, anxiety levels
- Increase quality of sleep
- Improve blood pressure
- Reduce pain
- Enhancement of energy
- Improve short-term memory
- Prevent hair loss
- Reduce eczema-induced itching

## LED LIGHT & COLORS

- Violet calms fears and anxiety; helps relieve insomnia; it has a sedation effect on the nervous system.
- Indigo has positive effects for the eyes, ears, nose Blue fights infection and inflammation. It is good for cuts and burns. It also benefits the throat.
- Green is for the relief of headaches, ulcers, colds and flu and heart ailments.
- Yellow enhances mental concentration. It aids in the relief of indigestion, heartburn, and constipation. It affects the liver and intestines.
- Orange is for asthma and bronchitis—the entire respiratory system.
- Red stimulates circulation of blood and flow of adrenaline. It increases energy. The blood and reproductive system react to red.

## FREQUENCY SPECIFIC MICROCURRENTS

- Analgesia
- Anti-inflammatory Influence on blood flow and lymph transport
- Edema reduction
- Acceleration of regeneration
- Activation of Metabolism through temporary cAMP formation

## ATHLETIC PERFORMANCE BENEFITS

- Enhances performance qualitative and quantitative
- Prolongs a career thru prevention and preservation
- Produces higher endurance and stamina
- Reduces physical and emotional stress
- Reduces muscle spasms and pain
- Strengthens and rebuilds musculoskeletal system
- Higher energy production
- Breaks down lactic acid in muscles, excess adrenaline in the muscles
- Protects the skin against the sun's impact and prevents skin cancer
- Enhances great skin tone and helps prevent stretch marks
- Prevents varicose veins in athletes
- Reduces swelling and inflammation in injuries
- Strengthen joints and muscles

## ANTI-AGING / DETOX / WELLNESS

- Improves chronic digestive issues
- Improves impaired liver function
- Improves chronic headaches
- Improves ongoing skin conditions
- Improves stiff, aching joints and muscles
- Improves respiratory difficulties
- Improves allergies
- Improves low energy and fatigue

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This device has been evaluated and awarded CE Certification. It has not been evaluated or approved by the FDA or NDF, and we do not claim its intended use to cure any disease or medical condition.



**Attachment D.**

Draft Findings of Fact and Conclusions of Law



**City of Ketchum  
Planning & Building**

IN RE: )  
)  
Northwest Institute of Energy Medicine CUP ) **KETCHUM PLANNING AND ZONING COMMISSION**  
Conditional Use Permit ) **FINDINGS OF FACT, CONCLUSIONS OF LAW, AND**  
Date: October 8, 2018 ) **DECISION**  
)  
File Number: 18-119 )

**PROJECT:** Northwest Institute of Energy Medicine CUP  
**FILE NUMBER:** #18-119  
**APPLICANT:** Isabella Cazamira  
**REQUEST:** Conditional Use Permit application for a Health and Fitness Facility  
**LOCATION:** 100 Bell Drive Unit B (Industrial Park Sub Lot 2, 14,450 SF)  
**OWNER:** Loomis Inc.  
**ZONING:** Light Industrial District No. 2 (LI-2)  
**OVERLAY:** None  
**NOTICE:** Notice was mailed to property owners within a 300-foot radius of the subject property and published in the Idaho Mountain Express on September 19<sup>th</sup>, 2018. Notice was published on the city website and physically posted on the subject property on October 1<sup>st</sup>, 2018.

**FINDINGS OF FACT**

1. On October 8<sup>th</sup> 2018, the Planning and Zoning Commission considered a Conditional Use Permit (CUP) application for a health and fitness facility to be located in Unit B of an existing building at 100 Bell Drive (Industrial Park Sub, Lot 2, 14,450 SF).
2. The subject property is located in the Light Industrial District No. 2 (LI-2) zoning district.
3. Health and fitness facilities are permitted conditionally in the LI-2 zoning district. As such, Conditional Use Permit approval by the Planning and Zoning Commission is required for operation of the health and fitness facility.

Conditional Use Requirements				
EVALUATION STANDARDS: 17.116.030 and § 67-6512 of Idaho Code				
A conditional use permit shall be granted by the commission only if the applicant demonstrates the following:				
Yes	No	N/A	Code	City Standards and Staff Comments
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(A)	<p><b>The characteristics of the conditional use will not be unreasonably incompatible with the types of uses permitted in the applicable zoning district.</b></p> <p><i>The LI-2 zoning district permits, or conditionally permits, a total of thirty-three (33) defined uses. Uses range from light-industrial in nature, such as maintenance service facility and manufacturing, to less impactful commercial uses, such as business support service and instructional service, and uses that fall in between in terms of intensity, such as a public recreation facility and boarding kennels.</i></p>
			<b>Staff Comment</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(B)	<p><b>The conditional use will not materially endanger the health, safety and welfare of the community.</b></p> <p><i>The applicant has indicated the health and fitness facility component of the business will serve one client at a time, during a two-hour session. There is adequate on-site parking to accommodate the low volume of traffic and activity related to the use will occur within the interior of the premises. As such, the proposed use will not materially endanger the health, safety and welfare of the community.</i></p>
			<b>Staff Comment</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(C)	<p><b>The conditional use is such that pedestrian and vehicular traffic associated with the use will not be hazardous or conflict with existing and anticipated traffic in the neighborhood.</b></p> <p><i>As described in the preceding section, the proposed conditional use will generate an extremely low volume of client traffic.</i></p> <p><i>Additionally, the permitted components of the business will generate a low volume of traffic: delivery of the probiotic drinks for warehousing and distribution will occur once a week and will arrive by a standard UPS or FedEx vehicle, pick up of bulk orders of the beverages by local businesses will occur no more than once weekly per local business, and incidental retail sale of the beverages will most frequently occur to clients already visiting the business for health and fitness services.</i></p> <p><i>Considering traffic generated by the permitted and conditional components of the use together, whether vehicular or pedestrian, will not be hazardous or conflict with existing and anticipated traffic in the neighborhood.</i></p>
			<b>Staff Comment</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(D)	<p><b>The conditional use will be supported by adequate public facilities or services and will not adversely affect public services to the surrounding area or conditions can be established to mitigate adverse impacts.</b></p> <p><i>The proposed use will be located within an office suite located in two-story, multi-tenant commercial building that has existed in the subject location since 1975. The proposed conditional use component of the business can be supported by the same public facilities and services that have served prior occupants of the office suite and the use will not adversely affect delivery of public services to the surrounding area.</i></p>
			<b>Staff Comment</b>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17.116.030(E)	<p><b>The conditional use is not in conflict with the policies of the Comprehensive Plan or the basic purposes of this Section.</b></p> <p><i>A Comprehensive Plan analysis is detailed in Table 2. Aspects of goals and policies pertaining broadly to entrepreneurship and economic development are supported by the proposed conditional use. However, the conditional use component of the proposed multi-faceted business – health and fitness facility – does not represent traditional light industrial development, clean industry, or office park development articulated in the Comprehensive Plan as desired for the light industrial area. Nevertheless, the use is permitted conditionally and therefore deemed to be complementary to, rather than in conflict with, the policies of the Comprehensive Plan overall and the purpose of this section.</i></p>
			<b>Staff Comment</b>	



## CONCLUSIONS OF LAW

1. The City of Ketchum is a municipal corporation organized under Article XII of the Idaho Constitution and the laws of the State of Idaho, Title 50, Idaho Code;
2. Under Chapter 65, Title 67 of the Idaho Code, the City has passed a land use and zoning ordinance, Title 17;
3. The Commission has the authority to hear the applicant's Conditional Use Permit Application pursuant Ketchum Municipal Code Title 17;
4. The Planning and Zoning Commission's October 8<sup>th</sup>, 2018 public hearings and consideration of the applicant's Conditional Use Permit application was properly noticed pursuant to the Local Land Use Planning Act, Idaho Code Section 67-6512;
5. The application meets the standards of approval under Chapter 17.116, Conditional Uses of Ketchum Zoning Code Title 17 and the 2014 Comprehensive Plan;

## DECISION

**THEREFORE**, the Ketchum Planning and Zoning Commission approves this Conditional Use Permit application allowing Northwest Institute of Energy Medicine to operate a health and fitness facility within Unit B of the existing building located at 100 Bell Drive this 8<sup>th</sup> day of October, 2018 subject to the following conditions:

1. The Conditional Use Permit is applicable for Northwest Institute of Energy Medicine only;
2. The Conditional Use Permit is non-transferable;
3. This Northwest Institute of Energy Medicine Conditional Use Permit is based on the application presented at the Planning and Zoning Commission meeting of October 8<sup>th</sup>, 2018.

Findings of Fact **adopted** this 8<sup>th</sup> day of October, 2018.

---

Jeff Lamoureux  
Chairman  
Planning and Zoning Commission



City of Ketchum

## MEMO

From: John Gaeddert  
TO: Ketchum Planning & Zoning Commission  
DATE: October 8, 2018

RE: Argyros Performing Arts Center Event Information Sign

The Argyros Performing Arts Center proposes a static poster-like sign with images, no video, in compliance with dark sky similar to the following:

[Click to Download](#)

Untitled.mov  
32.9 MB

(note: the video takes about a minute to download)

Our understanding is that the sign would be placed on one of the pillars (toward the NW corner of the building) that supports the cantilevered second floor. We are lacking a number of details that would allow us to write-up a detailed staff report and enable you to review against the standards.

As noted on your October 8<sup>th</sup> agenda, the Commission will conduct a site visit so you can view where the sign is proposed and it's scale. The hearing on this matter will be continued and no action will be taken on this item.