

# Goldendale Observatory State Park Heritage Site



## International Dark Sky Park Revised Annual Report

Prepared by Ryan Karlson  
Interpretive Program Manager  
May 31, 2017





Don Hoch  
Director

STATE OF WASHINGTON  
**WASHINGTON STATE PARKS AND RECREATION COMMISSION**

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May 31, 2017

To: John C. Barentine  
Program Manager  
International Dark Sky Association

Fm: Ryan Karlson  
Interpretive Program Manager

RE: Goldendale Observatory - Revised International Dark Sky Park Annual Report

Dear John:

Thank you for this opportunity to re-submit our annual report to the International Dark-Sky Association Board of Directors. It is our hope that this more comprehensive report demonstrates our capacity and desire to maintain our Silver-Tier International Dark Sky Park status for the Goldendale Observatory State Park Heritage Site. We look forward to building a stronger partnership with the International Dark-Sky Association as we work together to promote the value of preserving our dark skies and support educational outreach to reduce the impacts of light pollution and other threats to this vulnerable natural resource.

Sincerely,

A handwritten signature in blue ink that reads "Ryan C. Karlson".

Ryan Karlson

cc: Don Hoch, Director, WSPRC  
J. Scott Feierabend, Executive Director, IDA  
Daniel Farber, Policy & Governmental Affairs Director, WSPRC  
Mike Sternback, Assistant Director, Operations, WSPRC  
Peter Herzog, Assistant Director, Parks Development, WSPRC  
Scott Griffith, Region Manager, WSPRC  
Lem Pratt, Goldendale Area Manager, WSPRC  
Steve Brand, Partnership and Planning Manager, WSPRC

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## Introduction

Since the inception of the Goldendale Observatory (Observatory) in 1973, this unique facility has provided hundreds of thousands of visitors the opportunity to experience the dark sky. In December of 1980, this facility became a Washington State Park as part of an acquisition from the City of Goldendale. This transfer of ownership firmly established the site as a “public observatory,” a place where all walks of life have access to the dark sky. Since 1980, the Observatory has operated continuously through a wide range of public funding challenges.

In 2010, the Observatory was designated a Silver-Tier International Dark Sky Park. As the only state park in the Pacific Northwest with this designation, the Washington State Parks and Recreation Commission (Commission) is honored to be a part of the International Dark Sky Park (IDSP) community, and certainly values this designation.

In the fall of 2013, we experienced a notable change in guard at the Observatory with the retirement of 33-year employee Steven Stout; who, along with support from the community and park friends group, championed the application process for this designation. In November of 2016, the Commission was presented with a challenge by the International Dark-Sky Association (IDA) to demonstrate our capacity and desire to be an active IDSP or lose our international designation.

The purpose of this report is to, 1) provide a comprehensive revision to our annual report submitted in October of 2016; and 2) demonstrate our capacity and desire to maintain our Silver-Tier status as a member of the IDSP community.

This report is organized by topics identified by the IDA in their annual report guidelines. Throughout this document the reader will find references to appendices (**highlighted in red font**). This information is provided specifically to address the areas identified by IDA program staff as in need of revision.

## General Information

### ***Current contact information:***

#### Agency Program Management:

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#### Site Programming and Operations

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### ***Does the site currently have a Provisional status? If so, what work has been done in the past year to resolve concerns that resulted in the Provisional designation?***

In 2010, Goldendale Observatory received a Silver-Tier International Dark Sky Park designation. On November 16, 2016, this status was suspended pending further review by the International Dark-Sky Association Board of Directors. This revised report is submitted in an effort to demonstrate our capacity and desire to maintain our Silver-Tier status.

### ***Does the site plan to apply for a tier status upgrade in the future? If so, what work has been done in the past year furthering the application?***

Our near-term focus is to regain our Silver-Tier International Dark Sky Park status.

***Estimate number of site visitors in the last year. Of those, how many participated in dark-skies programming?***

Based on our internal Trafx counting system, the estimated annual visitation to the Goldendale Observatory in 2016 was 40,012 (based on vehicle count of 11,432 x 3.5 visitors/per vehicle multiplier).

Following is a breakdown of reported interpretive program attendance for 2016.

<i>Program Type</i>	<i>Total Number of Programs</i>	<i>Total Number of Visitors</i>	<i>Average Per Program</i>
Scheduled Programs	187	7,660	41
Other Programs (roving, tours, etc.)	397	3,722	9
<b>Reported Total for 2016</b>	<b>584</b>	<b>11,382</b>	<b>20</b>

Using this dataset, it is difficult to determine precisely how many visitors participated in dark-skies programming in 2016. It should be noted that (up until our status suspension) at least once per scheduled program, the Silver Tier International Dark Sky Park status was referenced and questions answered when asked regarding this designation and other dark-skies preservation and light pollution related topics. Thus, educational messages related to, or specifically targeted at, the value of dark skies and the impacts of light pollution have occurred during on-site programming. While we provide a range of educational programming, we just did not have a system in place to track this specific information request.

However, we now recognize through dialog with IDA program staff that this is one area of activity that was found to be unsatisfactory in our report submitted in October of 2016. Thus, we are proposing to modify our attendance reporting process to provide information specific to dark-skies programming in future reports. **Furthermore, we have provided in Appendix 1 a sample interpretive program outline developed from existing programming themes to demonstrate our capacity to develop and delivery dark-skies preservation and light pollution messages.**

Additionally, we would like to partner with the IDA in the future development of educational outreach materials that can be tailored to the site. This could be part of our self-guided exhibit design and development process currently underway.

## Lighting

### ***Were any new lighting projects completed this year? If so, describe.***

No new lighting projects were completed in 2016. However, we are currently in the final stages of architectural and engineering (A&E) design for a new facility. To date, our facility design team has consulted directly with the IDA's technical director Peter Strasser regarding the development and review of outdoor lighting plans. It is anticipated that these designs will be implemented as part of new construction, which is currently scheduled for completion in 2018.

Specifically, our current lighting design calls for all outdoor lighting fixtures to be fully-shielded. Additionally, we plan all outdoor lighting systems to be dimmable, amber LEDs that will be timer or motion controlled based on location.

We are excited for this outdoor lighting investment to be realized as it will serve as a great model for our visitors as we can demonstrate "best management practices" that intentionally manage light pollution through thoughtful design.

### ***Is any lighting within the Park/Reserve non-compliant with the LMP (as permitted at the time of IDA designation)? If so, what is the plan to bring the remainder into compliance within the allowed window of time?***

In October of 2016, we reported the "possible non-compliant flag light" located at the site of the Observatory. This light has been removed.

**See Appendix 2 for photo of existing flag pole base without light.**

At this time, the flag pole is currently not in use as the facility is preparing to be demolished (pending public bid process). Agency leadership is currently reviewing the flag lighting procedure for the site as it relates to U.S. Code Section 174: Time and occasions for display; hoisting and lowering:

- a. It is the universal custom to display the flag only from sunrise to sunset on buildings and on stationary flag staffs in the open. However, when a patriotic effect is desired, the flag may be displayed twenty-four hours a day if properly illuminated during the hours of darkness.

A notable management challenge for the Commission is the lack of staff at the site during sunrise or early morning hours. Unlike all other state park facilities, the Observatory is a public facility operated purposely during night time hours. Thus, the facility is typically staffed from

11am to 11:30pm. We plan to work with the IDA to resolve this issue by either displaying the flag using a new light fixture design that meets IDA standards or a modified flag display policy.

***Was any new territory added to the Park/Reserve? If so, does any lighting on it comply with the LMP? If lighting on new territory doesn't comply, is there a plan to bring it into compliance?***

No. The state park property remains at 5 acres in size.

## **Sky Quality**

***Were sky quality data taken in the past year? If possible, include a table or figure showing the information.***

Yes. At the time of our October 2016 report this data was not being collected and recorded routinely by staff. Based on recommendations from IDA staff a Unihedron Sky Quality Meter with lens has been purchased. This information is now being recorded by staff. In the past 30 days we can report the following readings:

- 19.54
- 19.65
- 20.26

More comprehensive reporting of sky quality meter readings will be provided in future IDA reports. We have developed a procedure to include this data along with our monthly interpretive program attendance.

See Appendix 3 for image with display of reading of 19.54 from May 2017.

***Did sky brightness increase over the previous year? Decrease?***

Staff reported in October “no change” in sky brightness. With the establishment of new baseline data we will be able to provide data-driven responses in future reporting.

***Is a permanently mounted sky monitor installed, or are there plans to install one?***

The sky quality meter currently in use is hand held. We feel this mobile device is an effective means to include the visiting public in our sky quality monitoring efforts by making this technology available for them to see and use (i.e. asking a volunteer to take the reading).

State Parks would be willing to explore a more permanently mounted monitoring system within the development of our new facility. However, we do not have plans to install one at this time.

## **Conservation and Research**

### ***Any ongoing conservation and/or research programs at the site?***

#### ***If so, who runs them, and what are the goals?***

There are no known ongoing conservation and/or research projects currently at the site. There are several college-level classes that do visit the site, yet none of this activity is known to result in coordinated research at this time. As reported in October of 2016, there is potential for the Washington State Department of Transportation to conduct a before/after light pollution study at the Observatory as part of their LED conversion project. Future coordination is necessary prior to promoting this as an actual research program.

State Parks would like to learn more about opportunities to partner with entities who may be interested in researching dark sky conservation at the Observatory, and perhaps other suitable locations within the Washington state park system.

### ***Are there any new research results to report?***

#### ***Have any been published this year?***

Not at this time. Is it possible for the IDA to provide the Commission with access to published studies from other International Dark Sky Parks? We would be interested in learning what type of research questions and methodologies are being considered at other sites worldwide.

## **Funding**

### ***Currently administering any grants related to dark-skies programming?***

#### ***If so, describe.***

No grants are being directly administered related to dark-sky programming at this time.

### ***Were any new grants won this year?***

No new grant awards. However, it is worth noting that the Observatory has received capital-bond funding from the Washington State Legislature to implement a major interpretive facility redevelopment. In the 2013-2015 and current 2015-17 biennia (2-year budget cycle) we received \$437,000 and \$2,649,000, respectively. We are currently awaiting the outcome of a \$3,020,000 request for the upcoming 2017-2019 biennium. With over \$3 million in public investment to date, we feel fortunate to be able to provide an expanded level of service to visitors seeking a unique dark sky experience at this International Dark Sky Park.

### ***Are there plans to apply for any future grants?***

Yes. As noted above regarding research potential, we would like to learn more about what grant funding sources may exist. Is it possible to gain access to what grants have been awarded to other International Dark Sky Parks? And what types of organizations provide these opportunities, and where these RFPs are distributed? We have been part of a Google community grant that sponsored much of the Dark Sky Symposium that was partially implemented at the Observatory in August of 2016.

## **Arts and Culture**

### ***Is any programming ongoing or planned blending the arts/culture with dark skies? If so, describe***

Currently, night sky time-lapse photography, captured on-site, is routinely displayed for decorative and educational purposes at the Observatory and partnership website. These media opportunities are very popular with the visiting public. There is potential to partner with local/regional arts and culture institutions to promote dark skies programming. Our largest challenge is the lack of staff capacity to develop effective outreach relationships with potential partners. We would be interested in learning more about how other International Dark Sky Parks are blending arts and cultural programming into dark sky messages.

## **Outreach**

### ***Were any new programs begun this year?***

On August 18, 2016, the Observatory hosted a portion of the Gorge Night Sky Symposium, including key note speaker and author, Paul Bogart. See links to video of the program [here](#).

### ***If so, are they complete or ongoing?***

Funding for the symposium was provided through a Google community grant and is complete. We are hopeful this could become a reoccurring event, especially given our anticipated capacity to seat up to 150 participants in our expanded multi-purpose theater.

### ***Are statistics available (e.g., how many visitors served, donations, etc.)***

We feel one of the strongest attributes we bring to the network of International Dark Sky Parks is our accessibility as a regional gateway to the dark sky experience. We estimate 40,000 people visited the site in 2016. Nearly 11,400 visitors attended interpretive programming which provides viable outreach opportunity to expose visitors to the value of the dark sky experience.

## Signing

In dialog with the IDA staff regarding our October 2016 report it was brought to our attention that the Commission was not providing adequate recognition of the site as an IDSP. While we have provided IDSP signage within the entry window to the facility, we are willing to improve it. Thus, we are committed to ensuring that the IDA is recognized as a valued partner of the Commission. To this end, we were provided a sign graphic layout by the IDA that has been produced as a form of temporary signing. However, since much of the existing facility is scheduled for demolition in the next month to six weeks, we feel there is adequate time to improve on this sign as we develop a suitable and permanent location to recognize Goldendale Observatory State Park Heritage Site as an International Dark Sky Park.

See Appendix 4 for production proof of IDSP sign (Di-Bond fabrication).

## Community and Media Relations

**Any new media coverage you would like us to know about? May include e.g., PDFs as attachments**

As noted above, the Gorge Night Sky Symposium received regional newspaper and radio media attention. Following are links to a sample of media coverage:

- [Mid-Columbia Economic Development District webpage](#)
- [Seattle Astronomy](#)
- [Hood River News article](#)

Additionally, there were several news articles that covered the suspension of the International Dark Sky Park status from the Goldendale Observatory:

- [Yakima Herald](#)
- [U.S. \(AP\) News](#)
- [The Columbian](#)
- [Tri-City Herald](#)

***Any engagement with local governments, community organizations, or private landowners in the past year to report?***

Locally, there was been substantial community dialog regarding an update to the City of Goldendale's lighting ordinance.

See Appendix 5 for a 5/15/17 First Draft Reading of proposed revised lighting ordinance. It is our understanding that a second draft, with language modifications, is currently under review.

## Appendix 1

### Sample Dark-Skies Interpretive Program Outline

**Note to Reader:** This is a thematic outline for a formal presentation that can be presented at the Goldendale Observatory or other state park locations. It is organized by primary and secondary messages. Each secondary message can be expanded to be a standalone program.

**Primary Message:** The dark sky is a natural resource that is vulnerable to light pollution created by artificial (human-made light) sources.

**Introduction:** *There is beneficial light and there is harmful light.*

- The sun, which is the source of daylight, is necessary for life on earth; it provides energy and warmth that allows humans and most forms of plants and wildlife to exist. It is a beneficial source of light.
- The lack of sunlight, the dark sky, is also beneficial to humans and many forms of plants and wildlife. It is this balance between sunlight and dark sky that sets many patterns of life (sleep, hunting/forage activity [work], etc.).

**Transition:** *Today, we are going to focus on how too much light can be harmful to us, especially light produced artificially.*

**Secondary Message #1:** The dark sky is a natural resource that is often taken for granted.

- Over millennia, humans, plants and wildlife species have evolved with the natural rhythm of daylight and dark sky creating a dynamic system of diurnal (daylight-based), crepuscular (dawn and dusk-based), and nocturnal (dark sky-based) habitats/behaviors
- To engage the audience, ask what they typically do during these phases of a day (sunrise, day, sunset and nighttime)?
- Compare responses to what types of wildlife are most active during these same phases (who do we see at dusk, during the day, at sunset, and at night)?

**Transition:** *Prior to the invention of electricity in 1879, humans experienced dark skies that were much different than what most of us see today.*

- Use slide showing artificial versus natural brightness levels over time.

**Secondary Message #2:** The development of the lightbulb has drastically altered the human relationship between day and night, and has had a profound impact the quality of the dark sky.

- While light bulb technology has come with many great advances (can ask audience for examples) it has also created artificial light pollution (a point source form of pollution).
- Light pollution is a growing concern in many places worldwide, especially where human populations continue to grow. (use slide of Pacific Northwest light pollution)
- As an International Dark Sky Park, the Goldendale Observatory relies on naturally dark skies in order to provide the best possible experience of viewing the universe through

telescopes and the human eye. (Use multiple examples to demonstrate the impacts of light pollution on dark sky viewing. This tangible connection to the impact is important.)

**Transition:** *In order to preserve the dark sky experience for you and future generations we need your help.*

**Secondary Message #3:** Many sources of light pollution can be reduced or avoided with inexpensive, thoughtful design. Here are three things you can do to help us preserve the dark sky experience not just here, but where you live too.

- *Keep it Down:* Shield light from going places where it does more harm than good. (use slide with example of good versus poor light shielding)
- *Only you can prevent over-lighting:* Consider what type of light is really needed for the job. The type of lighting matters, explore low temperature lighting options, such as amber lighting outside your home). Good opportunity to point out lighting systems on site.
- *Leverage Technology:* Use timers and motion sensors to reduce light pollution to times when you really need it. This will help lower your power bill as well.

**Transition:** *Reducing light pollution is similar to recycling and other natural resource preservation actions, you can start in your own backyard. You will literally see the difference.*

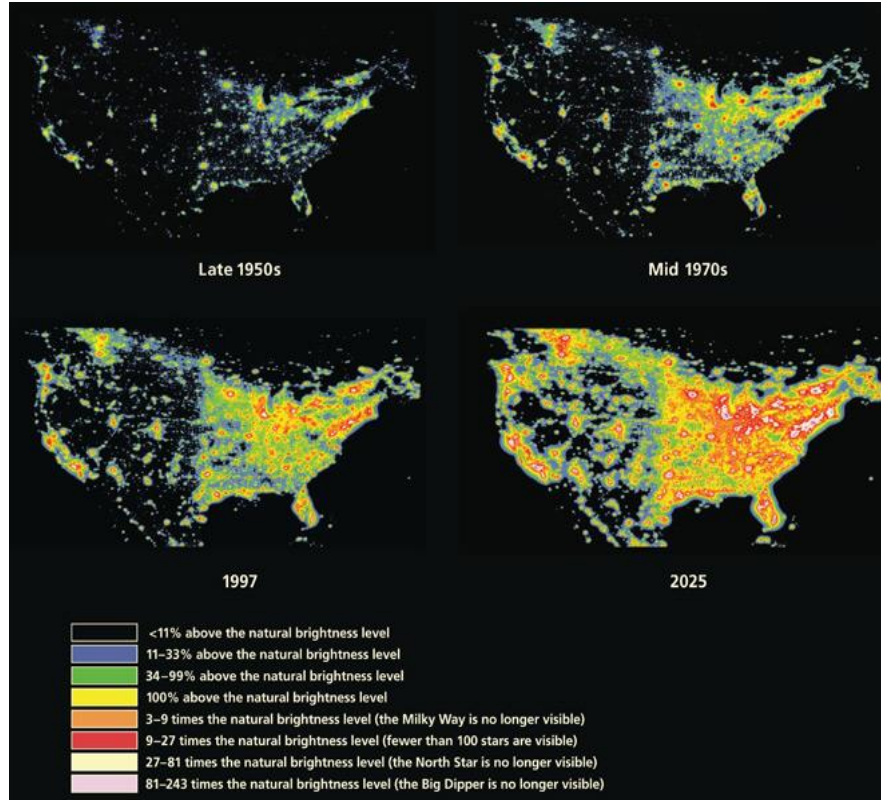
**Conclusion:** Hopefully now you have a better understanding of how the dark sky that surrounds us is a natural resource that is vulnerable to light pollution created by artificial sources.

- How there are beneficial and harmful sources of light—and that the dark sky is a scarce natural resource.
- How the light bulb has generated a world with light pollution, and
- How many sources of light pollution can be reduced or avoided with thoughtful design

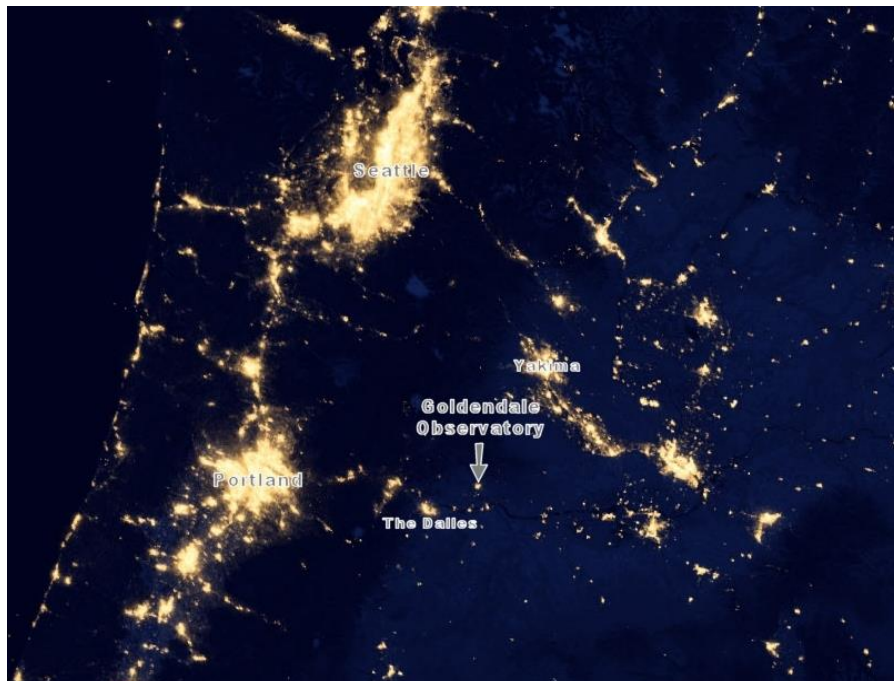
With your help we can reduce light pollution and preserve the dark sky experience for you and future generations.

Thank you for visiting, we hope you will return.

## Example Slide Showing Artificial versus Natural Brightness Levels Over Time



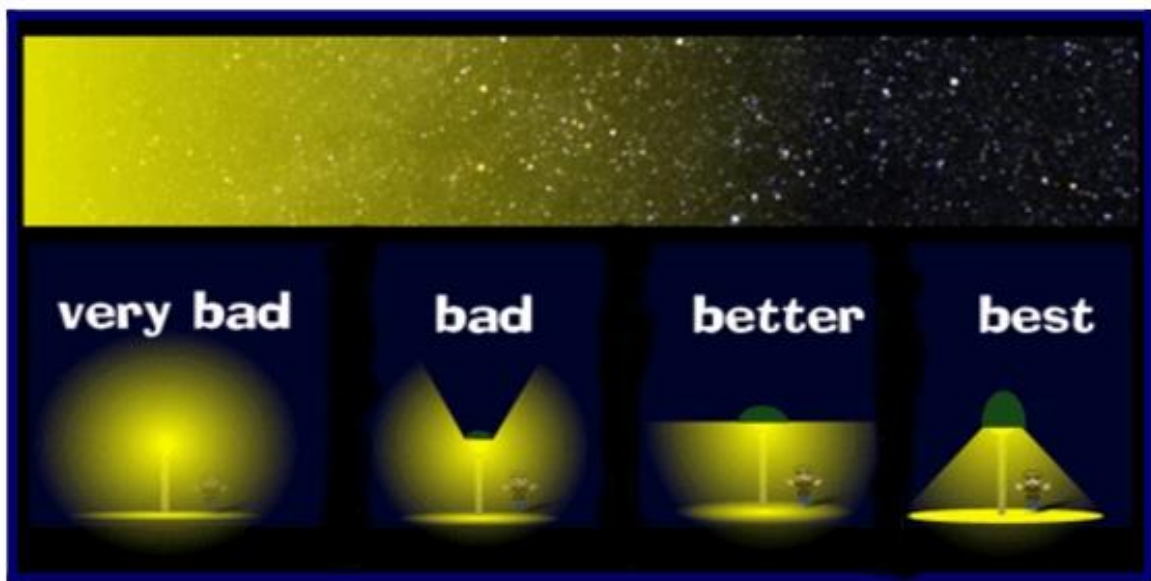
## Example Slide of Pacific Northwest Light Pollution



**Example Slide Demonstrating the Visual Impact of Light Pollution on Sky Viewing**



**Example Slide Showing Range of Light Shielding Designs**



**Appendix 2**  
**Photo of Light Removal from Flag Pole**



**Appendix 3**  
**May 2017 Reading from Sky Quality Meter**



**Appendix 4**

**Production Proof of Goldendale Observatory International Dark Sky Park Sign  
(Di-Bond Fabrication)**



**Appendix 5**

**First Draft Reading (05/15/17) of Proposed City of Goldendale Light Ordinance**

**CITY OF GOLDENDALE  
GOLDENDALE, WASHINGTON  
ORDINANCE NO. 1470**

**AN ORDINANCE OF THE CITY OF GOLDENDALE, WASHINGTON, AMENDING THE  
CURRENT GOLDENDALE MUNICIPAL CODE CHAPTER 15.52**

**WHEREAS**, the City of Goldendale City Council wishes to amend Chapter 15.52 of the Goldendale Municipal Code,

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF GOLDENDALE DOES  
ORDAIN AS FOLLOWS:**

**Section 1:** The current Goldendale Municipal Code 15.52 Outdoor Lighting Fixtures is amended to read as follows:

**Chapter 15.52  
OUTDOOR LIGHTING FIXTURES**

Sections:

- 15.52.010 Intent and Purpose
- 15.52.020 Definitions
- 15.52.030 General Requirements
- 15.52.040 Procedures
- 15.52.050 Acts declared unlawful
- 15.52.060 Conditional Exemptions
- 15.52.070 Non-conforming Outdoor Lighting
- 15.52.080 Enforcement
- 15.52.090 Violation – Penalty

**15.52.010 Intent and Purpose.**

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The purpose and intent of this chapter is:

1. To protect a dark nighttime sky and visual environment near the Goldendale Observatory.

2. To prevent excessive illumination, glare, and reflection;
3. To provide safe lighting where needed for safety and security;
4. To allow for flexibility in the style of lighting fixtures; and
5. To provide assistance to property owners in reducing nighttime light pollution, light trespass, glare and skyglow by bringing nonconforming lighting into conformance with this chapter.

#### **15.52.020 Definitions.**

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“Outdoor lighting means any lighting not within a completely enclosed building.

“Full cut-off fixture” means a fixture designed and installed where no light is emitted, refracted or reflected at or above a horizontal plane running through the lowest point on the fixture.

“Glare” means the lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

“Lumens’ (LM) means a rated output by an industry recognized listing agency.

#### **15.52.030 General requirements.**

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A. Shielding. All outdoor light fixtures shall be designed, located and lamped with full cut off fixtures to prevent glare.

B. Types of Fixtures. All outdoor lighting shall use full cut-off fixtures with the light source downcast and fully shielded, with the following exceptions:

1. One fixture that has a maximum output of one thousand (1000) LM, regardless of the number of illumination elements (equal to or about one sixty watt incandescent light), may be left partially shielded provided the fixture has an opaque top or is under an opaque structure.

2. Sensor activated fixtures that are set to only go on when activated and to go off within five minutes after activation has ceased;

3. Private and commercial holiday lighting.

4. Sign Lighting wholly enclosed from the inside.

5. Lighting of radio, communication and navigation towers where the Federal Aviation Administration (FAA) has required a light that does not meet the requirements of this chapter.

C. Lighting Replacement. All replacements of existing mercury vapor lamps or other existing outdoor lighting fixtures shall meet the requirements of this section.

**15.52.040 Procedures.** All permit or development applications that require land use review shall include outdoor lighting plans showing location, type of all proposed outdoor lighting in sufficient detail to demonstrate compliance with the provisions of this chapter.

**15.52.050 Acts declared unlawful.**

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It is unlawful for any individual to engage in the following activities:

A. The operation of a searchlight for advertising purposes between 11 pm and sunrise;

B. The illumination after 11 pm of an outdoor public recreation facility, unless a specific recreational activity is already in progress;

C. The use of quartz or metal halide lamps for outdoor illumination.

**15.52.060 Conditional exemptions.**

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A. Any individual as defined in this section may submit a written request to the board of adjustment for an exemption to the requirements of this chapter. The request for the exemption shall contain as a minimum the following information:

1. Type and use of outdoor light fixture involved;
2. Specific exemption requested;
3. Total wattage of lamp or lamps;
4. Proposed location of outdoor light; and

5. Duration of use of outdoor lighting exemption.

B. In addition to the above data, the board of adjustment may request any additional information which would enable the board to make a reasonable evaluation of the request for exemption.

**15.52.070 Non-Conforming Outdoor Lighting**

All non-conforming outdoor lighting fixtures installed prior to and operable after the effective date of this revised and amended ordinance shall be removed or converted to a conforming use within seven (7) years.

**15.52.080 Enforcement.**

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The building official or his duly appointed alternate is authorized and directed to perform all acts necessary and appropriate to enforce and to give effect to this chapter.

**15.52.090 Violation—Penalty.**

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Any person, firm or corporation that fails to comply with, or violates any of the provisions of this chapter, is guilty of a misdemeanor and upon conviction thereof shall be punished as provided in Section 1.20.010 of this code.

**Section 2:** This Ordinance shall become effective 5 days after passage and publication as provided for by law.

**PASSED AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF GOLDENDALE,  
WASHINGTON, THIS \_\_\_\_ DAY OF \_\_\_\_\_, 2017**

APPROVED:

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MICHAEL A CANON, MAYOR

ATTEST:

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CONNIE BYERS, CLERK-TREASURER