BLUE RIVER BOARD OF TRUSTEES JANUARY 31, 2023

January 31, 2023 at 5:00 PM
0110 Whispering Pines Circle, Blue River, CO

AGENDA

The public is welcome to attend the meeting either in person or via Zoom.

The Zoom link is available on the Town website:

https://townofblueriver.colorado.gov/board-of-trustees

Please note that seating at Town Hall is limited.

5:00 PM WORK SESSION:

Land Use Code Review: Chapter 16B Continued and Introduction to 16C

6:00 PM REGULAR MEETING:

I. CALL TO ORDER, ROLL CALL

II. APPROVAL OF CONSENT AGENDA

A. Minutes for December 20, 2022

B. Approval of Bills-$63,232.79

III. COMMUNICATIONS TO TRUSTEES

Citizen Comments (Non-Agenda Items Only- 3-minute limit please). Any written communications are included in the packet.

C. Communications to Trustees

IV. PUBLIC HEARING

D. Lot 1 Timber Creek Estates Subdivision

V. ORDINANCE CONSIDERATION FOR APPROVAL

VI. RESOLUTIONS

E. Resolution 2023-1 Notice of Meetings

VII. NEW BUSINESS

F. Spruce Creek Road Capital Project Review-Muller Engineering

G. Review of International Dark Skies Application & Information

VIII. CONTINUING BUSINESS

H. Open Space & Trails Report

IX. REPORTS

I. Mayor

J. Trustees

i. Citizen Advisory Committee - Trustee Finley

ii. Open Space and Trails Committee - Trustee Dixon

iii. Planning and Zoning - Trustee Hopkins

iv. Transit Authority - Trustee Pilling

v. Wildfire Council - Trustee Slaughter

vi. CDOT - Trustee Fossett

K. Attorney

L. Staff Reports

X. OTHER BUSINESS

XI. ADJOURN

NEXT MEETING -

Reports from the Town Manager, Mayor and Trustees; Scheduled Meetings and other matters are topics listed on the Regular Trustees Agenda. If time permits at the work session, the Mayor and Trustees may discuss these items. The Board of Trustees may make a Final Decision on any item listed on the agenda, regardless of whether it is listed as an action item.

TOWN OF BLUE RIVER, COLORADO

MEMORANDUM

TO: Mayor & Board of Trustees
THROUGH: Michelle Eddy, Town Manager
FROM: Bob Widner, Town Attorney
DATE: January 26, 2022

SUBJECTS: **CONTINUATION**
ARTICLE VII OF CHAPTER 16B - ACCESSORY IMPROVEMENTS

The Board of Trustees (BOT) was previously provided two different versions of the DRAFT proposed Land Use Code (LUC) for Blue River:

- Multi-colored Version of Chapters 16, 16A, 16B, 16C, and 17
- Clean Version of the Land Use Code

On September 20, the BOT review Chapter 16 - Land Use Code General Provisions
On October 18, the BOT reviewed Part 1 of Chapter 16A - Zoning
On November 15, the BOT reviewed **Part 2 and Part 3** of **Chapter 16A** and then moved onto **Chapter 16B** and proceeded through to **Article VI.**
On December 20, the BOT reviewed the first part of **Article VII** of Chapter 16B (Accessory Improvements) through Section 16B-7-60.

In the upcoming January 31 BOT meeting, the BOT will continue on with uncovered sections of Chapter 16B starting with Section 16B-7-70 as outlined in this Memorandum.

To assist in your review, please note the following:

You have two versions of the same draft LUC:

- A "**REDLINED**" version that contains many different colors and strikeouts. The coding for this version is as follows:
  - If the text is BLUE, it is either exact language from the current Blue River Municipal Code or the Architectural Guidelines or the language is very similar and revised to be clearer or more enforceable, so the concept is the same in the new code.
  - If the text is UNMARKED without color, it is new language.
  - If the text is YELLOW, it is merely a placeholder to remind me on final editing to ensure that the references are correct.
  - If the text is GREEN, it is either a question to be answered by the BOT (such as a distance or a height) OR it is a question for me to later determine if the green text is needed in the final.

- A largely **"CLEAN"** Version that might be easier to review. You will find both YELLOW and GREEN text that is merely for future drafting reference.

Review Outline for the CONTINUATION OF Chapter 16B of Article VII – ACCCESSORY IMPROVEMENTS

The following is intended to assist the BOT in reading additional sections of **Article VII** of **Chapter 16B** for the January 31 BOT meeting.

This Article is very important. It details with the regulation of ancillary or secondary uses of property which have impacts on neighbors and neighborhoods. Critically important is that nothing in Article VII is "written in stone." This means that the Board of Trustees may modify or delete any of the provisions that are merely suggested. Fair amounts of the material in Article VII are drawn from existing regulations in both the Municipal Code as well as the Blue River Architectural Guidelines.

Section 16 B-7-10. Generally.

An Accessory Improvement is a use of residential property that is ancillary or secondary to the "principal permitted use." This section provides a short framework for Article VII, and most importantly, an Accessory Improvement cannot be placed on property unless the property has a lawfully existing dwelling unit on the same lot. In other words, you cannot install a deck, shed, hot tub, fence, or any other Accessory Improvement on a vacant lot or parcel of land.

The most important parts of Article VII of Chapter 16 B pertain to the location of the common Accessory Improvements.

Section 16 B-7-20. Berms.

Section 16 B-7-30. Garages.

Section 16 B-7-40. Sheds.

Section 16 B-7-50. Driveways.

Section 16 B-7-60. Parking Areas.

These sections were reviewed by the BOT on December 20 and revisions were directed that will appear in redline/strikeover in the next version of the LUC.

Section 16 B-7-70. Walkways.

Although the current Blue River regulations recognize both major and minor paths and walkways, this section is rewritten to limit the application of the section to those primary walkways within the lot intended for access to the residential dwelling unit. The section is intended to ensure that the primary walkways are designed to be accessible to emergency service providers.

(1) This section imposes an obligation that the primary walkway (leading to the entrance of the residential dwelling unit) be surfaced with "flagstone, sandstone,

cobbles[1], gravel, concrete pavers, wood or wood substitute decking, asphalt, or exposed or colored concrete."

The BOT should consider whether these surface materials or appropriate or, possibly, that no surface treatment is required. If no surface treatment is to be required, this entire section can be deleted in individual owners can decide what form of walkway is desired for their residence.

Section 16 B-7-80 Reserved (for future use)

Section 16 B-7-90 Reserved (for future use)

Section 16 B-7-100. Decks.

The Board of Trustees should review this section as it is proposed. Some of the current requirements are retained in this proposed section. Decks are often an issue of conflict for property owners and municipalities because the decks may be designed and constructed in a manner that conflicts with adjacent properties.

- Any deck exceeding 18 inches in height above the finished grade may not be located within a setback.

- Decks that were built lawfully prior to the adoption of a new LUC shall be nonconforming and will be allowed to continue to exist until such time the deck is substantially rebuilt (not simply maintained).

Section 16 B-7-110. Gazebos, Pergolas, and Similar Structures.

Gazebos, pergolas, and other similar structures are oftentimes desired within residential properties. The current Blue River regulations do not specifically address in detail gazebos, pergolas, or other similar structures. The Board of Trustees should note:

- These structures may not be located within a setback.

- The structures should be designed to be compatible color and material with the primary residential dwelling unit.

Section 16 B-7-120. Hot Tubs and Saunas.

The current Blue River regulations require that hot tubs and swimming pools be located within the setback. This provision is an *evident misstatement* or error because restricting these uses to location within the setback makes no common sense.

- Hot tubs and saunas may not be located within a setback.

[1] Cobble when used as a building material is generally defined as a rock fragment between 64 and 256 millimeters in diameter, especially one that has been naturally rounded.

- Hot tubs and saunas may be covered by a trellis, pergola, or other structure if the structure meets the requirements of the LUC and the building code.

- If a deck is already located within the setback (i.e., nonconforming), a hot tub or sauna may not be located on the nonconforming deck (unless the hot tub or sauna is also a non-conforming accessory use.

Section 16 B-7-130. Recreational Accessory Improvements.

This section attempts to address swimming pools (currently addressed in the Blue River regulations) and other types of common recreational activity locations within residential property. The Board of Trustees should note:

- Permanent fire pits, outdoor fireplaces, outdoor cooking facilities, chimeneas, and playground equipment, must be located within the Buildable Area and may not be located within setbacks. The BOT should note that because the setback standards for Blue River are relatively short/small (e.g., 10-15 feet), allowing permanent recreational activities within setbacks may directly conflict with the quiet enjoyment of an adjacent property.

- Mobile, temporary, or impermanent fire pits, outdoor fireplaces, outdoor cooking facilities, chimeneas, and playground equipment (not affixed to ground) may be located within setbacks.

Section 16 B-7-140. Fences.

The current Blue River policies and regulations address fences. Because of the importance of the impact of fences upon the mountain and natural character of the Town, the Board of Trustees should review this section in detail to ensure that the section comports with your needs. Generally, the current regulations apparently attempt to limit fences to animal enclosures. However, I am aware that the town has approved fencing - as I recall a split rail fence - to allow an owner to prevent trespass and to mark the location of the boundary of his property. The Board of Trustees will need to decide the following should the Board decide to retain these current provisions:

- Dog runs and other similar small enclosure fence areas cannot be larger than **?** square feet in total area.

- If a fence is permitted as a demarcation of a lot or a lot area (i.e., the fence shall not exceed **?** in linear feet.

- Fences allowed in the current Blue River regulations are limited to five (5) feet in height. The Town Board is asked to confirm that it acceptable or to authorize a change.

Section 16 B-7-150. Retaining, Screening, and Landscape Walls.

Care was taken in this section to retain much of the requirements found in the current Architectural Design Guidelines. However, the section is rewritten in the proposed LUC to be more enforceable. The Board of Trustees should note:

There are three different types of walls referenced in the current regulations and these classifications are retained in the proposed LUC.:

(1) A *retaining wall* is intended to hold back a mass of soil, to restrain a vertical faced mass of earth, or to resist lateral pressure and prevent the advance of a mass of earth.

(2) A *screening* wall is intended to prevent or mitigate the view of items located on a lot such as service yards, utility tanks, trash containers, storage of patio furniture, and maintenance and recreational equipment.

(3) A *landscape wall* is intended to hold the vertical weight of architectural elements such as pillars, gazebos, pergolas, or other similar structures or intended to aesthetically divide areas of a lot such as garden beds, transitions between natural and landscape areas, or to designate walkways or other purposes of the lot.

- These three types of walls (retaining, screening, and landscape) should be designed to fit with the site contours and changes in topography for the lot.

- Neither a screening wall nor a landscape wall may be located along a lot line. Because these walls are largely if not entirely aesthetic in nature, limiting these walls immediately adjacent to other property is reasonable. Note that a *retaining* wall may be on the lot line as it may be necessary to ensure the buildable area for the lot.

- None of these three types of walls may be located within a setback except that a retaining wall may be allowed to provide for a reasonable *Building Area*.

- Consistent with the current Architectural Design Guidelines, these walls must meet design standards that will make them look natural or match with the principal structures on the property.

- Retaining walls should not normally exceed 4 feet in height. However, they may exceed this standard if necessary to address significant elevation change. But a retaining wall may not be greater than 8 feet in height.

- Screening walls may not exceed 6 feet in height.

- Landscape walls may not exceed 72 inches above finished grade or more than 32 linear feet in length.

Section 16 B-7-160. Flagpoles.

The Board of Trustees should note that this section is merely suggestive and can be deleted without problem. It is only offered because in some communities, flagpole regulations address the location of the pole to lessen impacts upon adjacent properties, and especially where noise from the chain on the metal flagpole disrupts adjacent properties.

There are t types of flagpoles commonly regulated in communities: (1) freestanding poles; and (2) poles attached to structures.

Poles attached to structures are commonplace in many communities. These are oftentimes short poles mounted on the building from which a flag is displayed.

Freestanding poles are often regulated in communities because they may be located in positions that cause impact to adjacent properties.

Four mountain communities, flagpoles when attached to trees.

Options for the BOT to address flagpoles may be:

A. Not regulate these types of improvements and allow residential property owners to install both freestanding and attached flagpoles wherever they deem desirable and in any number they deem appropriate.

B. Allow attached flagpoles but prohibit or otherwise regulate freestanding flagpoles. This regulation could be established in the proposed LUC with specific “hardwired” standards limiting or controlling location and design. Or, the regulations could make freestanding flagpoles a special or conditional use that requires the residential property owner to seek a permit so that the Town can establish reasonable locations for the flagpole.

Because the town, to my knowledge, has not experienced issues with regard to flagpoles, the BOT may wish to postpone regulations at this time. The BOT should be aware that once a flagpole is installed by a property owner, it will be difficult to remove or otherwise control the flagpole. Although unlikely, it is possible that a property could install a 30-foot-tall flagpole with a rather significantly sized flag in the absence of any regulations for this type of improvement.

Once the BOT has finished Article VII, I will introduce generally the remaining portions of Chapter 16B (Signs, Lighting, and Landscaping and others). The Signs and Lighting sections will take significant time to cover in the February BOT meeting.

Please contact me directly if you have any questions.

Minutes
Regular Meeting of the Board of Trustees
0110 Whispering Pines Circle, Blue River, CO
December 20, 2022
5:00 p.m. Work Session
6:00 p.m. Regular Meeting

5:00 p.m. WORK SESSION-Land Use Code Review – Chapter 16B

- Attorney Widner reviewed the first section of Chapter 16B with the Trustees for input. The section reviewed included site accessory improvements. These include berms, garages, car ports, sheds, parking, driveways, gazebos, fencing, and other accessory structures.
- Discussion to not have setbacks for berms and allow along the lot line for ease of enforcement. Discussion to include language not allowed within road easement.
- Discussion of garages, carports, etc. Staff recommended allowing carports and consideration of regulations on mobile structures. General discussion to allow carports with additional regulations for mobile structures for example temporary use. Discussion to not allow clear span. Discussion that carports would need to be attached to the primary structure or a garage. Potentially consider a six month allowance for a mobile structure. Ultimately decided not to allow mobile or clear span.
- Driveways to remain as existing regulations. Driveways with access to multiple properties must have permanent access. Discussion to allow for wider driveways with the area connecting to the road limited to 24' and becoming wider after 5' or after the ditch/culvert. Discussion that variances could be applied for in specific cases. Discussion that existing unimproved driveways would be allowed to exists.
- Parking areas discussion to leave as written.

6:00 p.m. REGULAR MEETING OF THE BOARD OF TRUSTEES

I. CALL TO ORDER, ROLL CALL

Mayor Babich called the regular meeting of the Board of Trustees to order at 6:07 p.m.
Roll Call

Mayor Toby Babich
Trustee Joel Dixon
Trustee Mark Fossett
Trustee Noah Hopkins
Trustee Ted Pilling
Trustee Ted Slaughter

Also present: Trustee Kelly Finley attended via Zoom at 6:16 p.m.. Town Manager Michelle Eddy; Town Attorney Bob Widner attended via Zoom; Chief David Close and Deputy Clerk John DeBee

II. APPROVAL OF CONSENT AGENDA

a. Minutes, November 15, 2022
b. Approval of Bills-$71,153.92

- Trustee Hopkins moved and Trustee Fossett seconded to approve the consent agenda. Motion passed unanimously.

III. COMMUNICATIONS TO TRUSTEES

a. Citizen Comments (Non-Agenda Items Only- 3-minute limit please). Any written communications are included in the packet.

- None received.

IV. NEW BUSINESS

a. Julie Sutor, Mountain Representative Congressman Neguse

- Julie Sutor, Mountain Representative for Congressman Joe Neguse's office was present to introduce herself to the Trustees and about Congressman Neguse's mountain office. She discussed one big priority for the Congressman is wildfire which is important to the Summit County area. The latest infrastructure bill will help assist in these efforts.
- Introductions were made and discussion of various challenges within Blue River.

b. Approval for the Town Manager to Record Building Envelope Change to Lot 3 McCullough Gulch Reserve

- Manager Eddy explained the purpose for the plat change to move the building envelope for Lot 3 McCullough Gulch Reserve.
- Trustee Slaughter moved and Trustee Fossett seconded to approve the Town Manager to record the building envelope change for Lot 3 McCullough Gulch Reserve. Motion passed unanimously.

c. Acceptance of Bid for Roadway Services

- Mayor Babich noted request for proposals was sent out and advertised for road maintenance services to replace Bob Wheeler who retired. With the acceptance of the bid, the Town Manager and Town Attorney will work together to develop a contract with G & G Services. Kacey Grosskreuz was present and introduced himself to the Trustees.
- Trustee Fossett moved and Trustee Slaughter seconded to accept the bid of G & G Services for On Call 2023 Roadway Services and instruct the Town Manager prepare any necessary contract for the Board of Trustees consideration Motion passed unanimously.

d. Acceptance of Bid for the Development of a Broadband Plan and Approval for Town Manager to Apply for Colorado Department of Local Affairs Grant

- Manager Eddy discussed the memo and bids received for the development of a broadband plan for the Town of Blue River. It was discussed at the Board retreat to make broadband a priority for the Town. There have been many discussions with Breckenridge and there is a need to first have a study and plan developed to determine the feasibility of bringing broadband to the Town. Manager Eddy recommended NEO Connect in the amount of $40,000 based on the proposals received. If approved, an agreement will be developed by the Town Attorney and a grant for funding assistance submitted to the Department of Local affairs.
- Discussion to ensure that the Town of Breckenridge and Summit County are including the Town of Blue River in the plans and discussions.

- Trustee Fossett moved and Trustee Hopkins seconded to move to accept the bid of $40,000 from NEO Connect for the development of a broadband plan and instruct the Town Manager prepare any necessary contract for the Board of Trustees consideration as well as to submit the necessary application to the Colorado Department of Local Affairs for funding assistance. Motion passed unanimously.

V. PUBLIC HEARING

a. Ordinance 2022-06 An Ordinance Amending the Blue River Municipal Code by Adoption Building Chapter 18

- Mayor Babich reviewed the ordinance presented in November to both the Planning & Zoning Commission and the Board of Trustees for consideration.
- Mayor Babich opened the public hearing at 6:42 p.m.
- Public Comments
  - No comments received.
- Mayor Babich closed the public hearing at 6:43 p.m.

VI. ORDINANCE CONSIDERATION FOR APPROVAL

a. Ordinance 2022-06 An Ordinance Amending the Blue River Municipal Code by Adoption Building Chapter 18

- Trustee Hopkins moved and Trustee Fossett seconded to approve Ordinance 2022-06 An Ordinance Amending the Blue River Municipal Code by Adoption Building Chapter 18. Motion passed unanimously.

b. Ordinance 2022-09 An Ordinance of the Board of Trustees of the Town of Blue River, Colorado, Amending Section 17-1-30.1 of the Municipal Code to Provide for an Exception to Allow Legally Recognized and Zoned Duplex Lots to Subdivide and Declaring an Emergency.

- Attorney Widner provided an explanation for the need to amend the current moratorium of the subdivision of lots with the Town of Blue River. The ordinance will allow for zoned duplex lots, primarily within the Timber Creek Estates Subdivision, to be legally subdivided as zoned.
- Trustee Fossett moved and Trustee Pilling seconded to approve Ordinance 2022-09 An Ordinance of the Board of Trustees of the Town of Blue River, Colorado, Amending Section 17-1-30.1 of the Municipal Code to Provide for an Exception to Allow Legally Recognized and Zoned Duplex Lots to Subdivide and Declaring an Emergency. Motion passed unanimously.

VII. RESOLUTIONS

a. Committee Appointments

- Manager Eddy provided a memo and walked the Trustees through the appointments for the individual committees.
- Planning & Zoning Commission
  - One vacancy is currently available.
  - Trustee Fossett moved and Trustee Hopkins seconded to appoint Gordon Manin to a term to the Planning & Zoning Commission expiring December 31, 2023. Motion passed unanimously.
- Open Space & Trails Advisory Committee

- One but up to three vacancies are available.
- Trustee Fossett moved, and Trustee Hopkins seconded to appoint Paul Semmer for a three-term expiring December 31, 2026 and Erin Kassel to a two-year term expiring December 31, 2025 to the Open Space & Trails Advisory Committee. Motion passed unanimously.

- Citizen Advisory Committee
  - Four seats are available.
  - Trustee Finley moved and Trustee Fossett seconded to appoint Bruce Queen and Zachary Austin McKnight both to a three-year term to the Citizen Advisory Committee. Motion passed unanimously.

VIII. OPEN SPACE & TRAILS ADVISORY COMMITTEE-45 minutes

a. The Board of Trustees received a draft implementation report from the Open Space & Trails Advisory Committee.
b. Mayor Babich noted he had emailed earlier in the day his comments to the Committee. Document included in final packet.
c. Discussion through each bullet for comments and questions.
   - Bullet 1:
     - Trustee Hopkins discussed that the Town needs to first have its own strategic plan and message before collaborating with others. Paul Semmer noted that it would be informational and introductory to start. Discussion in agreement to define town message first.
   - Bullet 2:
     - Trustee Hopkins and Mayor Babich asked what actions are needed. Examples were given on town owned easements. Discussion on how it will be resolved in future easements along platted subdivision pedestrian easements. This would be resolved as easements are sought with negotiations with landowners. Discussion that focuses need to be on easements dedicated to the town and not platted easements.
   - Bullet 3:
     - Mr. Semmer provided an explanation of the item. He noted that the USFS will be updating their master plan for this area in 2023 and an opportunity for town participation. Staff would watch and then bring to the committee for consideration.
   - Bullet 4:
     - Noted a more interactive detail map to be developed. Trustee Hopkins set it after next summer as a priority 2. Staff asked to approach Muller for cost and maintenance development.
   - Bullet 5:
     - Supportive.
   - Bullet 6:
     - Trustee Hopkins and Mayor questioned need. Mr. Semmer asked if it would be considered as the land use code is developed. Discussion of how

land owned by private entities must still follow town process for zoning. Mayor noted to have this as a future agenda item for additional discussion.

- Bullet 7:
    - Trustee Hopkins felt this was two items. Noted that the over passes and corridors were removed within town limits during the CDOT Access Plan development.
    - Trustee Hopkins asked about the outreach effort and how does that fit in current efforts. Mr. Semmer suggested another open house with assistance from Snow Engineering as well as individual conversations to get a feel for buy-in.
- Bullet 8:
    - Noted that it didn't fit the plan at this point. Discussion to be more aggressive at Town Park or town properties.
- Bullet 9:
    - Noted as a priority 2. Mr. Semmer stated there may be opportunities for the Town to work to maintain through a special use permit and control over the areas. Noted support to work on identifying and bringing to Trustees.
- Bullet 10:
    - Noted staff is working on this and needs to finish that work before moving forward.
- Bullet 11:
    - Trustee Hopkins asked for reason for it. Mr. Semmer referred to previous conversation and potential land use discussion. Noted it should be indicated on the map. Mayor asked about cost, benefit and purpose. Mr. Semmer noted to protect the environment and recreation experience. Discussion open to looking at it.
- Bullet 12:
    - Trustee Hopkins noted that it a later discussion and a priority 3. Mayor discussed the Trustees need to evaluate areas with recommendations to the committee. He noted this for a future discussion.
- Bullet 13:
    - Trustee Fossett noted that Summit County and Breckenridge are not pursuing due to costs. This has been evaluated and included in the CDOT Access Plan. Mr. Semmer noted it should be watched for the future. Discussion to remove from the list.
- Bullet 14:
    - Trustee Hopkins asked for need. Mr. Semmer stated it would be for more control different from a special use permit and establishing a relationship with USFS. This may be a future field trip or trail days project.
- Mayor Babich noted to have another joint session for the Planning 2 and Planning 3 area discussions in January.

IX. REPORTS

a. Mayor
- Finance Committee Report
  - Mayor Babich reported on the Town Manager review and Committee recommended compensation for 2023. He noted review forms were sent out to the Trustees and Staff for feedback. Overall feedback was good and recommended a 9% increase with goals to be established for a potential bonus at the end of 2023 for remaining 3%.

b. Trustees
- Citizen Advisory Committee-Trustee Finley
  - No report, the committee will meet in January.
- Open Space & Trails Committee-Trustee Dixon
  - Trustee Dixon covered in previous discussion.
- Planning & Zoning-Trustee Hopkins
  - Trustee Hopkins had no report they will meet in January. He clarified that the Planning & Zoning Commission recommended to apply for the dark skies.
- Transit Authority-Trustee Pilling
  - Trustee Pilling reported the towns have recommended the county consider conducting a study for micro transit system in the area.
- Wildfire Council-Trustee Slaughter
  - Trustee Slaughter reported the Wildfire Council reviewed current projects, and 2023 funding in addition to potential grant funds. He reviewed 2023 areas and community outreach.
- CDOT-Trustee Fossett
  - Trustee Fossett reported there has not been a meeting since October. He noted the town received notification there is no funding for the project for 2023. Discussion of general issues along Hwy 9.

c. Attorney's Report
- Attorney Widner wished everyone happy holidays.

X. OTHER BUSINESS
- Trustee Finley noted a number of RV's being parked in driveways. Suggested potential to review this. Discussion to adjust the ordinance to require vehicle parked must be registered to owner or leased tenant.
- Mayor Babich reported on the dark sky topic and will include as a topic on a future agenda for a review of the application for discussion.

There being no further business before the Board of Trustees, Trustee Hopkins moved and Trustee Finley seconded to adjourn the meeting at 8:47 p.m. Motion passed unanimously.

Next Meeting, Tuesday, January 17, 2023

Respectfully Submitted:
Michelle Eddy, MMC
Town Clerk

Town of Blue River

A/P Aging Summary

As of January 10, 2023

	CURRENT	1 - 30	31 - 60	61 - 90	91 AND OVER	TOTAL
Ace Sewer & Drain	149.00					$149.00
Baseline Surveys LLC	470.00					$470.00
CIRSA	5,722.00					$5,722.00
Fresh & Clean Ltd.	24.30					$24.30
Ryan's Recovery	239.00					$239.00
Summit County Animal Control	525.00					$525.00
Timber Creek Water District	200.00					$200.00
Valvoline	98.98					$98.98
Widner Juran LLP	9,573.00					$9,573.00
TOTAL	**$17,001.28**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$17,001.28**

Town of Blue River

A/P Aging Summary

As of January 29, 2023

	CURRENT	1 - 30	31 - 60	61 - 90	91 AND OVER	TOTAL
Blue Bird Electric Inc	1,233.25					$1,233.25
Charles Abbott Associates		810.00				$810.00
CivicPlus LLC	4,140.00					$4,140.00
Fortunato Properties, Inc	55.00					$55.00
International Association for Property and Evidence, Inc	395.00					$395.00
Ridge Street Kitchen	353.25					$353.25
TOTAL	**$6,176.50**	**$810.00**	**$0.00**	**$0.00**	**$0.00**	**$6,986.50**

Town of Blue River

A/P Aging Summary

As of January 17, 2023

	CURRENT	1 - 30	31 - 60	61 - 90	91 AND OVER	TOTAL
Betone LLC	528.50					$528.50
Breckenridge Building Center	15.68					$15.68
Highland Galloway Investments	36,767.33					$36,767.33
Marchetti & Weaver, LLC	608.00					$608.00
Muller Engineering Co	1,027.50					$1,027.50
Office Depot Business Account	130.00					$130.00
Upper Blue Sanitation District	168.00					$168.00
TOTAL	**$39,245.01**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$39,245.01**

info

From: Scott Jackman <sjackman4545@gmail.com>
Sent: Monday, January 30, 2023 6:35 PM
To: info
Subject: Spruce Creek Road discussion

Dear Board of Trustees,

We have reviewed the board packet for Tuesday's trustees meeting on the topic of Spruce Creek Road concerns. We believe that Option 1-No Change, is the best choice. We don't see any justifications explained for the major changes recommended in Options 2 and 3.

Thank you for your consideration.

Scott and Lara Jackman
26 Nugget Lane

info

From: dougnsue9@comcast.net
Sent: Wednesday, January 25, 2023 12:56 PM
To: info
Subject: Spruce Creek Capital Project Review Feedback for Consideration

Board of Trustees,We have reviewed the report from Muller about possible options being considered for road improvements in the Crown subdivision The overall feedback from neighbors so far is to leave the traffic patterns as is and increase maintenance and address Spruce Creek Rd and the Hwy 9/Spruce Creek entrance. Also look into more signage from CDOT on the hwy to slow down traffic. Here is a list of the homeowners that have agreed with this being the option we would like to look into. Thank You . Doug O'Brien

(Crown Dr)

Doug and Sue O'Brien 461 Crown Dr
Mike and Sasha Koons 462 Crown Dr
Adam and Jodie Willey 414 Crown D
Dick and Barbara Childs 389 Crown Dr
Brentt and Terry Johnson 164 Crown Dr

(Gold Nugget Dr)

Nathan and Michelle Ihrig 67 Gold Nugget Dr
Robert and Theresa Rust 251 Gold Nugget Dr
Mark and MJ Loufek 228 Gold Nugget Dr
Stace and Terry Green 266 Gold Nugget Dr

(Golden Crown)

Cody and Annie Graybill 61 Golden Crown
(Nugget Lane)
Scott and Lara Jackman 26 Nugget Lane
Mark and Gloria Thomas 48 Nugget Lane
(Spruce Creek Rd)
Kara Martella 143 Spruce Creek Rd

(Louise Placer)

Mark Orton 54 and 181 Louise Placer
James Wehrmacher 106 Louise Placer
Barbara Scheidegger 122 Louise Placer
Gretchen Parker 105 Louise Placer

(Miners Court)

Jerry and Donna Grant 14 Miners Ct.

info

From: Lauderrc <lauderrc@gmail.com>
Sent: Friday, January 27, 2023 4:25 PM
To: dougnsue9
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Doug,
Thanks for all this information. Carol and I would certainly not want to see additional traffic passing by our home at 219 Crown Dr. We are against the idea of making Spruce Creek Road a one-way street.
Recognizing that Spruce Creek Road from Highway 9 to Crown Dr is unsafe and usually in poor condition, maybe it would make sense to pave that part of Spruce Creek Road.
Thanks for all you hard work on this matter and let us know if we can be of any assistance.

Robert Lauder
C:(309)825-5880

> On Jan 25, 2023, at 8:46 AM, dougnsue9 <dougnsue9@comcast.net> wrote:
>
>
>> Hi, I think Jodie response to keep traffic patterns as is and
>> increase maintenance addressing the hwy9/Spruce Creek entrance.
>> Please address your responses to "Board of Trustees"I will forward
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>> On Jan 24, 2023 at 4:30 PM, dougnsue9 <dougnsue9@comcast.net> wrote:
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>> (970)485-3129 if you have any questions. Thank you,Doug O'Brien
>> ---------- Original Message ------
>> From: Jodie Willey <willeyjodie@gmail.com>
>> To: dougnsue9@comcast.net
>> Date: 01/24/2023 2:05 PM
>> Subject: Spruce Creek/Crown Drive/Gold Nugget
>>
>>
>> Doug,
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>> Attached is the portion of the Board packet regarding Spruce Creek Road, Crown Drive and possible changes to the roads. If anyone wants the whole packet and additional information, please click here for the full January 31st Board of Trustees packet.

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info

From: Amy Vail <vailja6@yahoo.com>
Sent: Friday, January 27, 2023 12:23 PM
To: dougnsue9@comcast.net; Jodie and Adam Willey
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget (Urgent)
Attachments: Spruce Creek and Crown Drive.pdf

Doug, please pass along below. Thanks, Jim and Amy Vail, 341 Gold Nugget Drive.

We are in favor of option one and opposed to the other options which involve rerouting spruce creek trail traffic onto the other residential streets. Rerouting the traffic seems more like shifting a problem than solving one. The problem is Spruce Creek road and repairing, regrading and paving that road should be the focus of your efforts.

Sent from my iPhone

On Jan 24, 2023, at 6:10 PM, dougnsue9@comcast.net wrote:

---------- Original Message ----------
From: dougnsue9@comcast.net
To: SUE OBRIEN <dougnsue9@comcast.net>, "dougobrien75@gmail.com" <dougobrien75@gmail.com>
Date: 01/24/2023 4:30 PM
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Attached is the info the Town Trustees will be discussing next Tuesday .There is a option to turn Hwy9 and Spruce Creek intersection into a one way road. Vehicles would only be able to travel up the hill exiting either Gold Nugget or Crown Dr. I feel this will have a negative impact on the Crown subdivision in general.This is just one of the different options being looked at but my most concerning. Please respond to me with your thoughts including your name and address so I can get this to the Trustees before the meeting scheduled for 6:00 pm Jan. 31st. You can also contact me at (970)485-3129 if you have any questions. Thank you,Doug O'Brien

---------- Original Message ------
From: Jodie Willey <willeyjodie@gmail.com>
To: dougnsue9@comcast.net
Date: 01/24/2023 2:05 PM
Subject: Spruce Creek/Crown Drive/Gold Nugget

Doug,

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The attachment goes over road pitch, issues, solutions and how many residents each option directly will be impacted by change.

They have 3 options:

1) Do nothing
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I am personally against any changes to the current traffic patterns and feel that any option other than continued maintenance would negatively impact everyone living in this neighborhood.

Please let me know if you have any questions.
Jodie

info

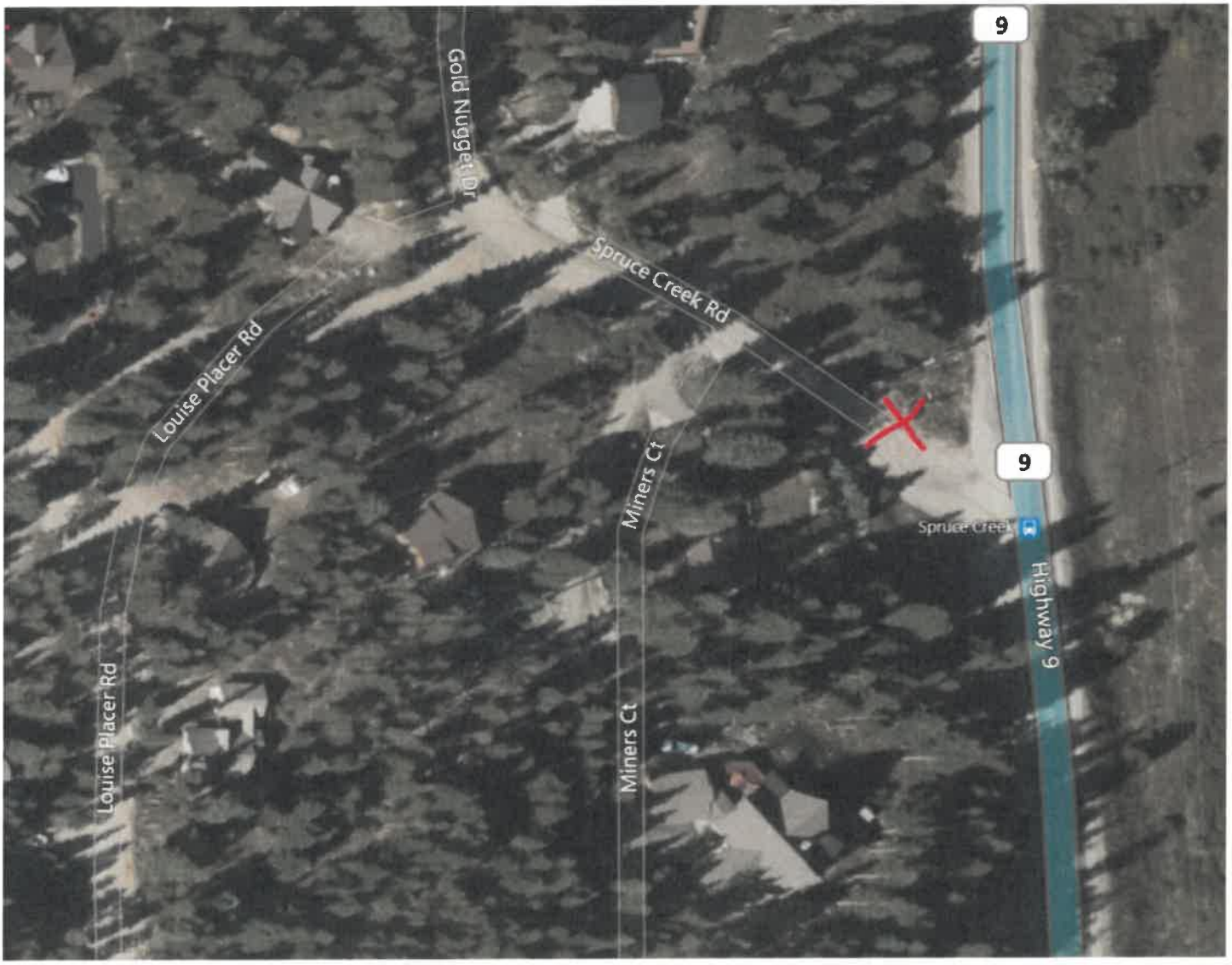
From: Gretchen Parker <giszard@LIVE.COM>
Sent: Friday, January 27, 2023 8:33 AM
To: dougnsue9@comcast.net
Subject: RE: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Hi Doug,

Thank you for sharing this information.

Name: Gretchen Iszard
105 Louise Placer

The only option that seems logical, reasonable and productive is option 1. Residents could also assist by spreading salt or something on the "steep" part of Spruce Creek. There used to be a barrel of sand about 10 or so feet above the Crown Sign on the Northside of Spruce Creek. Town could keep it filled and then cars would have better traction. I can't recall if that barrel is still there. Red X denotes where sand barrel once was or is I think.



I am not sure about the statement in Option 2 and 3 that these options will decrease burden to town to maintenance the intersection of HWY9 and Spruce Creek. The cost of the options will be more of a burden and Town already doesn't appear to attend to this intersection more than other roads in Blue River.

Option 4.. have recreation traffic access trails via 802 not Spruce Creek. Portion of Spruce Creek Road from Crown and 802 intersection is already dangerous and too narrow.

Also, Spruce Creek is the entrance to National Park and the Feds may be opposed to the options being proposed with the exception of Status Quo with increased maintenance.

From: dougnsue9@comcast.net <dougnsue9@comcast.net>
Sent: Tuesday, January 24, 2023 7:02 PM
To: giszard@live.com
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

---------- Original Message ----------
From: dougnsue9@comcast.net
To: SUE OBRIEN <dougnsue9@comcast.net>, "dougobrien75@gmail.com" <dougobrien75@gmail.com>
Date: 01/24/2023 4:30 PM
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

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I am personally against any changes to the current traffic patterns and feel that any option other than continued maintenance would negatively impact everyone living in this neighborhood.

Please let me know if you have any questions.
Jodie

info

From: Terri <terrijoho@comcast.net>
Sent: Wednesday, January 25, 2023 4:09 PM
To: dougnsue9
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Hi Doug. I think you talked to Brent on the phone so you know we are a NO vote. We want the traffic pattern to stay the same as it currently is.
Thanks!
Terri Johnson

Sent from my iPhone

> On Jan 25, 2023, at 6:46 AM, dougnsue9 <dougnsue9@comcast.net> wrote:
>
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>> From: Jodie Willey <willeyjodie@gmail.com>
>> To: dougnsue9@comcast.net
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info

From: nathan.ihrig@gmail.com
Sent: Wednesday, January 25, 2023 9:53 AM
To: willeyjodie@gmail.com
Cc: dougnsue9@comcast.net; dougobrien75@gmail.com; dougobrien75@gmail.com; mmihrig@gmail.com; vailja6@yahoo.com
Subject: FW: Spruce Creek/Crown Drive/Gold Nugget (Urgent)
Attachments: Spruce Creek and Crown Drive.pdf; Untitled attachment 06232.htm

Jodie,
My name is Nathan Ihrig and my wife Michelle, and I live at 67 Gold Nugget.
Thank you for sharing this information with us.
Our strong preference is OPTION 1, DO NOTHING to the traffic flow on Gold Nugget.
We would be in favor of any improvements to the road such as paving the road.
Pleas keep us in the loop and let me know if you have any questions or need anything from us.
Best regards,
Nathan Ihrig
903 714 2133

From: Michelle Ihrig <mmihrig@gmail.com>
Sent: Tuesday, January 24, 2023 7:53 PM
To: Nathan Ihrig <nathan.ihrig@gmail.com>
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Sent from my iPhone

Begin forwarded message:

> **From:** Amy Vail <vailja6@yahoo.com>
> **Date:** January 24, 2023 at 6:13:34 PM MST
> **To:** Amy Matteazzi <amaheazzi@att.net>, Michelle Ihrig Nathan <mmihrig@gmail.com>
> **Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)**
>
> Begin forwarded message:
>
> **From:** dougnsue9@comcast.net
> **Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)**
> **Date:** January 24, 2023 at 6:10:18 PM MST
> **To:** "vailja6@yahoo.com" <vailja6@yahoo.com>
>
> ---------- Original Message ----------
> From: dougnsue9@comcast.net

To: SUE OBRIEN <dougnsue9@comcast.net>,
"dougobrien75@gmail.com" <dougobrien75@gmail.com>
Date: 01/24/2023 4:30 PM
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

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---------- Original Message ------
From: Jodie Willey <willeyjodie@gmail.com>
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Date: 01/24/2023 2:05 PM
Subject: Spruce Creek/Crown Drive/Gold Nugget

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I am personally against any changes to the current traffic patterns and feel that any option other than continued maintenance would negatively impact everyone living in this neighborhood.

Please let me know if you have any questions.
Jodie

info

From: Michael Koons <mkoons@yahoo.com>
Sent: Wednesday, January 25, 2023 9:10 AM
To: dougnsue9@comcast.net
Subject: Fw: Spruce Creek/Crown Drive

Doug,

I am sending this email as a Crown resident as the Town of Blue River considers actions regarding traffic on Spruce Creek Road and potential impact to the entire Crown subdivision.

I understand that traffic is an issue for the few homes on Spruce Creek Road impacted by the Spruce Creek trailhead. I have read of potential "solutions" to this issue which are not solutions at all, just an exacerbation of the problem for the entire Crown subdivision. I am not in favor of any traffic pattern changes that would reroute traffic to Crown Drive or any other road in the neighborhood.

My suggestion is that the town, county and forest service look at the root cause of the problem and work to limit the total number of cars at the trailhead and on the roads. I suggest a similar solution as the Quandary Peak trailhead.

If anyone at the town wants to discuss this with us, feel free to forward our contact information.

Mike and Sasha Koons

info

From: Mark Orton <markgorton88@icloud.com>
Sent: Wednesday, January 25, 2023 7:34 AM
To: dougnsue9
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget

Hi Doug,

Thank you for this information, very helpful and Jean and I will plan to attend the meeting.
Are you okay if we send this on to other owners that we know on Louise Placer? I also have access to all the property owners that live on Lake Circle that is just outside the boundary of Blue River. All 30 of these property owners utilize Spruce creek to Hwy 9 daily and this would impact their daily drives as well. I'm just not sure if it's appropriate to have these folks at the meeting since they are NOT Blue River residence.

Thanks again for getting the word out here and gaining feedback and insights now will be helpful as we move forward with a solution.

Regards,

Mark

On Jan 25, 2023, at 6:15 AM, dougnsue9 <dougnsue9@comcast.net> wrote:

Begin forwarded message:

From: Jodie Willey <willeyjodie@gmail.com>
Date: Jan 24, 2023 at 2:05 PM
To: dougnsue9 <dougnsue9@comcast.net>
Subject: Spruce Creek/Crown Drive/Gold Nugget

Doug,

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Please let me know if you have any questions.
Jodie

<Spruce Creek and Crown Drive.pdf>

info

From: Emily Thompson <emilyjt@gmail.com>
Sent: Tuesday, January 24, 2023 7:07 PM
To: dougnsue9@comcast.net
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

A one way entrance would not be good at all. Walking down Gold Nugget is a pleasure because of the low traffic. We avoid walking on Spruce Creek due to the traffic. Especially in summer when cars are flying down from Spruce Creek. We bought our home on Gold Nugget for the lack of traffic.

Emily Thompson and Stefan Kienle
332 Gold Nugget Road
Blue River CO 80424
Emilyjt@gmail.com

Sent from my iPhone

On Jan 24, 2023, at 18:09, dougnsue9@comcast.net wrote:

---------- Original Message ----------
From: dougnsue9@comcast.net
To: SUE OBRIEN <dougnsue9@comcast.net>, "dougobrien75@gmail.com" <dougobrien75@gmail.com>
Date: 01/24/2023 4:30 PM
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

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From: Jodie Willey <willeyjodie@gmail.com>
To: dougnsue9@comcast.net
Date: 01/24/2023 2:05 PM
Subject: Spruce Creek/Crown Drive/Gold Nugget

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Jodie

<Spruce Creek and Crown Drive.pdf>

info

From: Kara Martella <kmartella8@gmail.com>
Sent: Tuesday, January 24, 2023 6:50 PM
To: Sue O'Brien
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)
Attachments: Spruce Creek and Crown Drive.pdf

Thanks for being involved and representing us Doug. I agree that the proposed changes to the current traffic pattern on Spruce Creek Road would negatively impact The Crown neighborhood.
~Kara Martella
143 Spruce Creek Road
281-799-2991

Sent from my iPhone

Begin forwarded message:

> **From:** Amy Vail <vailja6@yahoo.com>
> **Date:** January 24, 2023 at 6:18:32 PM MST
> **To:** Kara <kmartella8@gmail.com>
> **Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)**
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** dougnsue9@comcast.net
> > **Date:** January 24, 2023 at 6:10:42 PM MST
> > **To:** vailja6@yahoo.com
> > **Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)**
> >
> > ---------- Original Message ----------
> > From: dougnsue9@comcast.net
> > To: SUE OBRIEN <dougnsue9@comcast.net>,
> > "dougobrien75@gmail.com" <dougobrien75@gmail.com>
> > Date: 01/24/2023 4:30 PM
> > Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)
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Please let me know if you have any questions.
Jodie

info

From: Barbara Childs <bchildshome@gmail.com>
Sent: Tuesday, January 24, 2023 5:12 PM
To: dougnsue9@comcast.net
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Doug, our preference would be to do nothing. Number 3 on the list is better than 2. There is no reason to send traffic up and down the full length of Crown. Barbara

On Tue, Jan 24, 2023, 4:30 PM <dougnsue9@comcast.net> wrote:

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The attachment goes over road pitch, issues, solutions and how many residents each option directly will be impacted by change.

They have 3 options:

1) Do nothing
2) Crown Drive - making Spruce creek a one-way uphill to Crown Drive, route downhill traffic onto Crown Drive to Highway 9.
3) Gold Nugget becoming one way. Make Spruce Creek a one-way uphill from the highway and re-route all traffic onto Gold Nugget Drive to Crown Drive to Highway 9.

I highly suggest everyone look through the attachment and become familiar with what Muller Engineering Company is proposing. No decisions have been made, but in the packet Muller is recommending the Board of Trustees review the information. Muller's desired outcome at the Jan 31st meeting is for the Board to identify which traffic options the town would like Muller to continue to pursue.

I am personally against any changes to the current traffic patterns and feel that any option other than continued maintenance would negatively impact everyone living in this neighborhood.

Please let me know if you have any questions.
Jodie

info

From: Mark Thomas <mark.mt.thomas@gmail.com>
Sent: Tuesday, January 24, 2023 5:08 PM
To: dougnsue9@comcast.net
Subject: Re: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Thanks for bringing this to my attention, Doug. I feel for those few households between Crown Dr and Hwy 9 (a handful??) who must endure trailhead traffic, but it's obvious that the proposed "solutions" would have a profoundly negative impact on a significantly higher number of people and households than the current state The proposed solutions would fundamentally alter our neighborhood for the worse.

You may use my comments above or please advise if it would be more helpful to share with the Trustees directly and/or attend the meeting in person.

Many thanks,
Mark

Mark Thomas
48 Nugget Ln.
415-297-4422

On Jan 24, 2023, at 4:41 PM, dougnsue9@comcast.net wrote:

---------- Original Message ----------
From: dougnsue9@comcast.net
To: SUE OBRIEN <dougnsue9@comcast.net>, "dougobrien75@gmail.com" <dougobrien75@gmail.com>
Date: 01/24/2023 4:30 PM
Subject: Fwd: Spruce Creek/Crown Drive/Gold Nugget (Urgent)

Attached is the info the Town Trustees will be discussing next Tuesday .There is a option to turn Hwy9 and Spruce Creek intersection into a one way road. Vehicles would only be able to travel up the hill exiting either Gold Nugget or Crown Dr. I feel this will have a negative impact on the Crown subdivision in general.This is just one of the different options being looked at but my most concerning. Please respond to me with your thoughts including your name and address so I can get this to the Trustees before the meeting scheduled for 6:00 pm Jan. 31st. You can also contact me at (970)485-3129 if you have any questions. Thank you,Doug O'Brien

---------- Original Message ------
From: Jodie Willey <willeyjodie@gmail.com>
To: dougnsue9@comcast.net
Date: 01/24/2023 2:05 PM

Subject: Spruce Creek/Crown Drive/Gold Nugget

Doug,

Attached is the portion of the Board packet regarding Spruce Creek Road, Crown Drive and possible changes to the roads. If anyone wants the whole packet and additional information, please click here for the full January 31st Board of Trustees packet.

The attachment goes over road pitch, issues, solutions and how many residents each option directly will be impacted by change.

They have 3 options:

1) Do nothing
2) Crown Drive - making Spruce creek a one-way uphill to Crown Drive, route downhill traffic onto Crown Drive to Highway 9.
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I highly suggest everyone look through the attachment and become familiar with what Muller Engineering Company is proposing. No decisions have been made, but in the packet Muller is recommending the Board of Trustees review the information. Muller's desired outcome at the Jan 31st meeting is for the Board to identify which traffic options the town would like Muller to continue to pursue.

I am personally against any changes to the current traffic patterns and feel that any option other than continued maintenance would negatively impact everyone living in this neighborhood.

Please let me know if you have any questions.
Jodie

<Spruce Creek and Crown Drive.pdf>

Lot Subdivision Application-Minor

The Planning & Zoning Commission meets on the First Tuesday of the month. Applications must be received no later than Two (2) weeks prior to that date.

Lot Number: LOT 1 **Subdivision:** TIMBER CREEK ESTATES FILING 2
Blue River Physical Address: 160 WHISPERING PINES CIR. BLUE RIVER. CO.

Homeowner Information:
Name: PATRICK GLASCO
Mailing Address: 8734 LONGS PEAK CIR. WINDSOR CO. 80550
Phone: 970 405 8966
Email: FIRSTHOMETODREAMHOME@HOTMAIL.COM

Current Lot Size: 1.33 ACRE

Zoning of Lot to be subdivided: R-1

Proposed Lot Size: .685/.653 ACRE LOTS 1A/1B
**Lots applying for subdivision must meet minimum lot size requirements as outline in Chapter 16 of the Blue River Municipal Code.*

Below is a list of required documents. While comprehensive, it is necessary to review and follow Chapter 17 of the Blue River Municipal Code in its entirety including process standards for approval and fees. This application as well as the requirements and restrictions outlined in Chapter 17 of the Blue River Municipal Code adopted May 19, 2020 shall apply.

Signature: _____ **Date:** 11/21/22

Printed Name: PATRICK GLASCO

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Signature: _____ **Date:** _____

Printed Name: _____

1255230
1 Pages
04/09/2021
DF: $0.00
Kathleen Neel - Summit County Recorder

3) 13-

STATEMENT OF AUTHORITY

1. This **STATEMENT OF AUTHORITY** relates to entity named

   NEW EXPRESSION HOMES, LLC

   and is executed on behalf of the entity pursuant to the provisions of Section 38-30-172, C.R.S.

2. The type of entity is a : **limited liability company**

3. The entity is formed under the laws of the state of **Colorado**

4. The mailing address of the entity is:
   8734 Longs Peak Circle
   Windsor, CO 80550

5. The name and position of each person authorized to execute instruments conveying, encumbering, or otherwise affecting title to real property on behalf of the entity is/are:
   Patrick Glasco, President

6. The authority of each of the foregoing person(s) to bind the entity is
   ☑ not limited (*check one*)
   ☐ limited as follows:

7. Other matters concerning the manner in which the entity deals with interests in the property:

New Expression Homes, LLC

By: _____
Patrick Glasco, President

State of: Colorado
County of: Weld §

The foregoing instrument was acknowledged, subscribed and sworn to before me this 1st day of April, 2021 by **Patrick Glasco, President of New Expression Homes, LLC.**

My commission expires: 11/19/2021

Shannon Brockmeyer
Notary Public

SHANNON BROCKMEYER
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20094037829
MY COMMISSION EXPIRES NOVEMBER 19, 2021

1255229
2 Pages
04/09/2021
DF: $40.94
Kathleen Neel - Summit County Recorder

(2)

18-
$40.94

WARRANTY DEED

THIS DEED, made this 1st day of April, 2021, between

THE TRUST OF GREGORY J SAJDAK

whose address is PO Box 1849, Breckenridge, CO 80424, GRANTOR(S), and
NEW EXPRESSION HOMES, LLC

whose address is 8734 Longs Peak Circle, Windsor, CO 80550, GRANTEE(S):

WITNESS, that the grantor(s), for and in consideration of the sum of Four Hundred Nine Thousand Three Hundred Sixty Five and 00/100 Dollars ($409,365.00), the receipt and sufficiency of which is hereby acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell, convey and confirm unto the grantee(s), grantee's heirs and assigns forever, all the real property, together with improvements, if any, situate, lying and being in the County of Summit and State of Colorado, described as follows:

Lot 1, Timber Creek Estates, Filing No. 2, according to the Plat thereof filed September 25, 2000 at Reception No. 633445, County of Summit, State of Colorado.

also known by street and number as: **160 Whispering Pines Circle, Blue River, CO 80424**

TOGETHER with all and singular the hereditaments and appurtenances thereunto belonging, or in anywise appurtaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof, and all the estate, right, title, interest, claim and demand whatsoever of the grantor, either in law or equity, of, in and to the above bargained premises, with the hereditaments and appurtenances;

TO HAVE AND TO HOLD the said premises above bargained and described, with the appurtenances, unto the grantee, grantee's heirs and assigns forever.
The grantor(s), for the grantor, grantor's heirs, and personal representatives, does covenant, grant, bargain and agree to and with the grantee, grantee's heirs and assigns, that at the time of the ensealing and delivery of these presents, grantor is well seized of the premises above conveyed, has good, sure, perfect, absolute and indefeasible estate of inheritance, in law, in fee simple, and has good right, full power and lawful authority to grant, bargain, sell and convey the same in manner and form as aforesaid, and that the same are free and clear from all former and other grants, bargains, sales, liens, taxes, assessments, encumbrances and restrictions of whatever kind or nature soever, except for general taxes for the current year and subsequent years, and except easements, covenants, conditions, restrictions, reservations, and rights of way of record, if any; subject to Statutory Exceptions as defined in C.R.S. §38-30-113, Revised.

The grantor shall and will **WARRANT AND FOREVER DEFEND** the above-bargained premises in the quiet and peaceable possession of the grantees, grantee's heirs and assigns, against all and every person or persons lawfully claiming the whole or any part thereof.

The singular number shall include the plural, the plural the singular, and the use of any gender shall be applicable to all genders.

IN WITNESS WHEREOF, the grantor has executed this deed on the date set forth above.

The Trust of Gregory J. Sajdak

By: _____
Julie M. Jones, Trustee

STATE OF: Colorado
COUNTY OF: Summit

The foregoing instrument was subscribed, sworn to, and acknowledged before me this 1st day of April, 2021 by Julie M. Jones, Trustee of The Trust of Gregory J. Sajdak.

My Commission expires:

Witness my hand and official seal.

Notary Public

STEPHANIE HOWARD
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 20004018079
MY COMMISSION EXPIRES SEPT. 9, 2022

Schedule # 6507917

LOT 1 TIMBER CREEK ESTATES # 2	1619	2		0	0	1
0160 WHISPERING PINES CIR	2371-3030-15-033					
	5	Breck-Blue				
	20750	Blue River				
NEW EXPRESSION HOMES LLC,	61					7
	42170			73.842		77

			Document Type	
	1255230	4/1/2021	STM	0
	1255229	4/1/2021	WD	$409,365
8734 LONGS PEAK CIR	1255228	4/1/2021	STM	0
WINDSOR CO 805502647	1150534	8/31/2017	WD	$210,000
	1150533	8/31/2017	STM	0
	955783	12/30/2010	QCD	0
	955782	1/10/2011	QCD	0
	927426	12/1/2009	AGM	0
	927425	12/1/2009	QCD	0
	927424	12/1/2009	RES	0
	927243	11/30/2009	ODR	0
	801107	9/7/2005	WD	$170,000
	633472	9/20/2000	WD	$1,750,000
	633471	9/20/2000	WD	$1,750,000
	633470	9/20/2000	QCD	0
	633445	9/25/2000	PLT	0

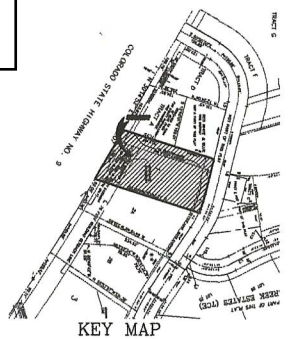
1115	DUPLEX-TRIPLEX LAND (UNPLATTED)	$350,300	100	RESIDENTIAL VACANT LAND	$291,300
1215	DUPLEX-TRIPLEX STRUCTURE	$269,850			
		$620,150			$291,300

	2792	0	8	2	Unp Duplex	Average
1	1455	2711	6.00	840	Inground	Average
2021	0	6958	16	4	Attached	Stone/Rock
2021	0	84	2	Radiant Ht		

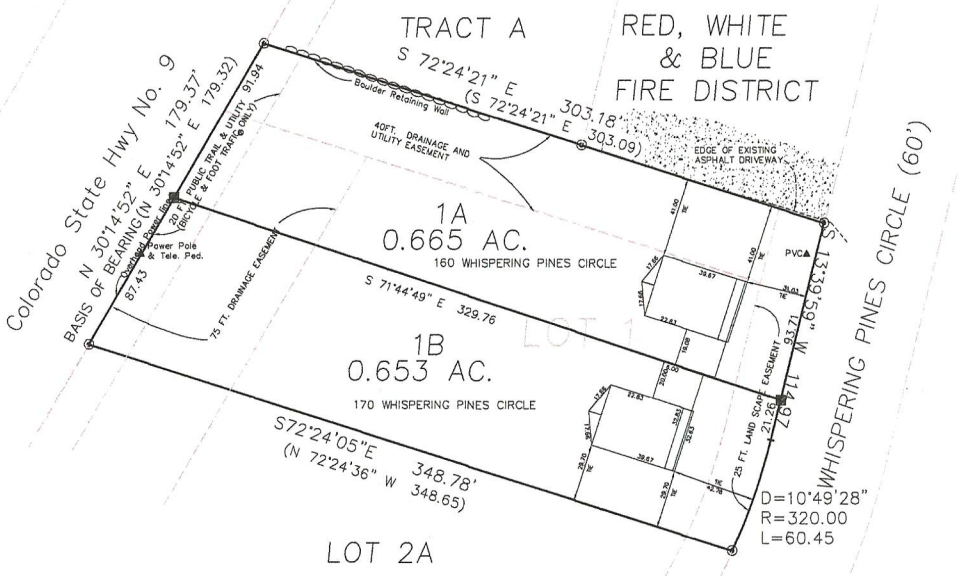
1.3186	Pub Paved	Sloping	Good	Minimal	
None	Public Swr	Public Wtr	Elec & Gas	ON HIGHWAY	

MINOR SUBDIVISION PLAT OF LOT 1, TIMBER CREEK ESTATES, FILING NO. 2

SECTION 30 & 31, TOWNSHIP 7 SOUTH, RANGE 77 WEST OF THE SIXTH P.M.
TOWN OF BLUE RIVER, SUMMIT COUNTY, COLORADO



KEY MAP



LEGEND

- ◉ INDICATES FOUND 1 1/2" ALUM. CAP LS 11944
- ■ INDICATES SET NO. 5 REBAR 18" LONG WITH 1 1/2" ALUM. CAP, LS 11944
- ( ) INDICATES FIELD MEASUREMENTS UNLESS OTHERWISE NOTED.

ALL TIES ARE PERPENDICULAR TO PROPERTY LINES

NOTES:

1) THE BASIS OF BEARING IS A CALCULATED BEARING BETWEEN THE SW COR. AND THE NW COR. OF LOT 1 AS BEING N30°14'52"E, WITH BOTH CORNERS BEING FOUND MONUMENTS AS SHOWN.

2) THE PURPOSE OF THIS SURVEY IS TO CREATE NEW LOTS 1A AND 2B.

3) MEASUREMENTS SHOWN IN PARENTHESIS ARE FIELD MEASUREMENTS, UNLESS OTHERWISE NOTED.

4) CERTIFICATION NOT VALID WITHOUT ORIGINAL SEAL AND SIGNATURE. THIS SURVEY AND ALL RELATED DOCUMENTS ARE FOR THE SOLE USE OF THE CLIENT AT THE DATE OF CERTIFICATION, AND DOES NOT EXTEND TO ANY UNNAMED PERSON OR ENTITY WITHOUT AN EXPRESSED RESTATEMENT BY THE SURVEYOR NAMING SAID PERSON OR ENTITY.

5) ANY PERSON WHO KNOWINGLY REMOVES, ALTERS, OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR BOUNDARY MONUMENT OR ACCESSORY, COMMITS A CLASS TWO (2) MISDEMEANOR PURSUANT TO STATE STATUTE 18-4-508, C.R.S.

LIMITATIONS OF ACTIONS AGAINST LAND SURVEYORS

ALL ACTIONS AGAINST ANY LAND SURVEYOR BROUGHT TO RECOVER DAMAGES RESULTING FROM ANY ALLEGED NEGLIGENT OR DEFECTIVE LAND SURVEY SHALL BE BROUGHT WITHIN THREE YEARS AFTER THE PERSON BRINGING THE ACTION EITHER DISCOVERED, OR IN THE EXERCISE OF REASONABLE DILIGENCE AND CONCERN, SHOULD HAVE DISCOVERED THE NEGLIGENCE OR DEFECT WHICH GAVE RISE TO SUCH ACTION, AND NOT THEREAFTER, BUT IN NO CASE SHALL SUCH AN ACTION BE BROUGHT MORE THAT TEN YEARS AFTER THE COMPLETION OF THE SURVEY UPON WHICH SUCH ACTION IS BASED.

N O T I C E : ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVERED SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BE COMMENCED MORE THAT TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

TITLE COMMITMENT NOTES:
THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE COMMITMENT, THE RECORD INFORMATION, WHICH IS REFERENCED HEREON, IS THE RESULT OF RESEARCH PERFORMED BY BURNETT LAND SURVEYING, INC., AND IS NOT NECESSARILY COMPLETE OR CONCLUSIVE.

CERTIFICATE OF TAXES PAID

I, the undersigned, do hereby certify that the entire amount of taxes due and payable as of the day of _____, 20____ upon all parcels of real estate described on this plat are paid in full.

Dated this day of (insert date here), 20____.

_____ Treasurer of Summit County

CERTIFICATION OF OWNERSHIP

KNOW ALL MEN BY THESE PRESENTS that being sole owner(s) in fee simple of all that real property situated in the Town of Blue River, Summit County, Colorado, described as follows: containing (insert number) acres, more or less: have by these presents laid out, platted and subdivided the same into lots and blocks as shown on this final plat under the name and style of a subdivision in the Town of Blue River, Summit County, Colorado; and does hereby accept the responsibility for the completion of required improvements.

Executed this day of _____, 20____.

Owner (if individual owner to sign): _____

Corporation name (if corporation to sign): _____

Address: _____

By (signature): _____
(type individual's name)

Title (if applicable): _____

BOARD OF TRUSTEES CERTIFICATE

This plat approved by the Board of Trustees of the Town of Blue River, Colorado this day of _____, 20____, for filing with the Clerk and Recorder of Summit County, Colorado and for the conveyance to and acceptance by the Town of Blue River of the public dedications shown hereon; subject to the provision that approval in no way obligates the Town of Blue River for maintenance of roads dedicated to the public until construction of improvements thereon shall have been completed in accordance with Town of Blue River specifications, and the Board of Trustees of the Town of Blue River has by a subsequent resolution agreed to undertake maintenance of the same. This approval does not guarantee that soil conditions, subsurface geology, ground water conditions, or flooding conditions of any lot shown hereon are such that a building permit or any other required permit will be issued. This approval is with the understanding that all expenses involving all improvements required shall be the responsibility of the subdivider and not the Town of Blue River.

Mayor, Town of Blue River

_____
(Print name here)

ATTEST:

_____
Town Clerk

SCALE

30 0 15 30 60

SCALE: 1"= 30'

CERTIFICATION OF DEDICATION AND OWNERSHIP KNOW ALL MEN BY THESE PRESENTS

that NEW EXPRESSION HOMES LLC, being sole owner(s) in fee simple of all that real property situated at LOT 1, TIMBER CREEK ESTATES, FILING NO. 2, in the Town of Blue River, Summit County, Colorado, described as follows: containing 1.318 acres, more or less: have by these presents laid out, platted and subdivided the same into 2 lots as shown on this final plat under the name and style of a subdivision in the Town of Blue River, Summit County, Colorado; and does hereby accept the responsibility for the completion of required improvements; and does hereby dedicate and set apart all of the public roads and other public improvements and places as shown on the accompanying plat to the use of the public forever; and does hereby dedicate those portions of said real property which are indicated as easement on the accompanying plat as easements for the purpose shown hereon; and does hereby grant the right to install and maintain necessary structures to the entity responsible for providing the services for which the easements are established.

Executed this day of _____ 20____.

Owner (if individual owner to sign): _____
Corporation name (if corporation to sign): _____

Address: _____

By (signature): _____ (type individual's name)

Title (if applicable): _____
[Insert Notary Certificate Here as Approved by Town]

CERTIFICATION OF DEDICATION FOR MORTGAGE HOLDER OR DEED OF TRUST HOLDER

KNOW ALL MEN BY THESE PRESENTS that being the holder of a mortgage or deed of trust on the real property situated at (insert property location) in the Town of Blue River, Summit County, Colorado, described as follows:
LOT 1, TIMBER CREEK ESTATES, FILING NO. 2
containing 1.318 acres, more or less; as shown on this final plat under the name and style of a subdivision in the Town of Blue River, Summit County, Colorado; agrees to the dedication and setting apart all of the public roads and other public improvements and places to the Town of Blue River as shown on the accompanying plat to the use of the public forever; and does hereby agree to the dedication of these portions of said real property which are indicated as easement on the accompanying plat as easements for the purpose shown hereon; and does hereby agree to the granting of the right to install and maintain necessary structures to the entity responsible for providing the services for which the easements are established.

Holder: (if individual owner to sign): _____

Corporation name (if corporation to sign): _____

Address: _____

By (signature): _____ (type individual's name)

Title (if applicable): _____
[Insert Notary Certificate Here as Approved by Town]

SURVEYOR'S CERTIFICATE

I do hereby certify that I am a registered Land Surveyor licensed under the laws of the State of Colorado, that this plat is true, correct and complete as laid out, platted, dedicated and shown hereon, that such plat was made from an accurate survey of said property by me and under my supervision and correctly shows the location and dimensions of the lots, easements and streets of said subdivision as the same are staked upon the ground in compliance with applicable regulations governing the subdivision of land.

In witness thereof I have set my hand and seal this day of _____ 20____.

Name: _____

COLORADO LAND SURVEYOR NO. PLS 11944

Corporation name: BURNETT LAND SURVEYING, INC.

Address: 351 HWY 285, FAIRPLAY, CO 80440

By (signature): _____ THOMAS L. BURNETT

Title: PRESIDENT

TITLE CERTIFICATE

_____ does hereby certify that the title to all lands shown upon this plat have been examined and is vested in and that title to such lands is free and clear of all liens and encumbrances, except as follows: (insert text here)

Dated this day of _____ 20____.

Title Company or Attorney's Name Address: _____

By: (Signature) _____
(printed name and title of officer or attorney)

CLERK AND RECORDER CERTIFICATE

This plat was filed for record in the office of the Clerk and Recorder on this day of (insert date), 20____ at _____ o'clock ___M.), Recorded under Reception No. _____ in Book _____ at Page _____.

Clerk and Recorder

Summit County, Colorado

By: (Signature) _____ (printed name)

Title (if applicable): _____

PLANNING AND ZONING COMMISSION CERTIFICATE

This plat was recommended for approval by the Town of Blue River Planning and Zoning Commission this day of _____ 20____.

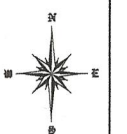
Chairperson

_____
[Print name here]

Blue River Planning & Zoning Commission

ATTEST:

_____
Town Clerk



MINOR SUBDIVISION PLAT	
LOT 1 , TIMBER CREEK ESTATES, FILING NO. 2	
TOWN OF BLUE RIVER, SUMMIT COUNTY, COLORADO	
SECTION 30&31 , T.7S., R.77W. OF THE 6TH P.M.	
BURNETT LAND SURVEYING, INC	DATE: NOV. 7, 2022
P.O. BOX 1953, 351 HWY 285, STE 104 FAIRPLAY, COLORADO 80440 (719) 836-1425	SCALE: 1"= 30'
	DRAWN BY: TLB
	JOB NO. 2022-332
PREPARED FOR: NEW EXPERSIONS HOMES LLC	

TOWN OF BLUE RIVER, COLORADO
RESOLUTION NO. 2023-01

A RESOLUTION DESIGNATING THE OFFICIAL POSTING LOCATION FOR NOTICES OF ALL PUBLIC MEETINGS PURSUANT TO C.R.S. § 24-6-402 (2)(C)(I).

BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF BLUE RIVER AS FOLLOWS:

Section 1. Pursuant to C.R.S. § 24-6-402(2)(I), the Town of Blue River designates the following as the public posting place for all notices of Town public meetings as defined by the Colorado Open Meetings Law:

Blue River Town Website at https://townofblueriver.colorado.gov

Section 2. Pursuant to C.R.S. § 24-6-402(2)(III), the Town of Blue River designates the following as the public posting place in the event that the Town is unable to post notice of a public meeting at the Town's Website in exigent or emergency circumstances such as power outage or the interruption of internet service that prevents the public from accessing the notice online:

Blue River Town Hall at 0110 Whispering Pines Circle, Blue River, Colorado.

Section 3. Nothing in this Resolution shall preclude the Town from posting notice at additional locations as a courtesy to the public.

Section 4. The Town Clerk is hereby directed to provide to the Department of Local Affairs the address of the Town's website as required by to C.R.S. §24-6-402(2)(c)(III) and C.R.S. §24-32-116.

ADOPTED the ____ day of January, 2023.

BOARD OF TRUSTEES

_____
Mayor

Attest:

_____
Town Clerk

MULLER ENGINEERING COMPANY

Memorandum

Project: Spruce Creek Road and Crown Drive

To: Michelle Eddy; Town of Blue River Trustees

From: Jeff Wulliman, PE
Steven Humphrey, PE

Date: January 17, 2023

Subject: Initial Opinion for Spruce Creek Road and Crown Drive

Attachment 1: Spruce Creek Road Preliminary Plan and Profile
Attachment 2: Crown Drive Profile and Cross Sections Exhibit
Attachment 3: Gold Nugget Drive Initial Profile Exhibit

This memorandum summarizes the background, initial analysis, and proposed recommended options to address observed issues at Spruce Creek Road and Crown Drive for consideration by the Town of Blue River Board Members. Attachments providing additional information regarding the existing conditions are included. The details of this memorandum and attachments will be a topic of discussion at the Board Meeting on January 31st, 2023, to discuss options the Town would like to explore. A supplementary scope of work and associated fee would then be developed to explore the shortlisted options and arrive at a final recommended design through engineering analysis, resident engagement, and stakeholder coordination.

Background:

Muller Engineering Company worked with the Town of Blue River and its residents to develop a Capital Improvement Plan in 2018 to help the Town identify, plan and program its future capital projects. Through input from the Town Residents from online surveys and public meetings, as well as through coordination with the Town Board and staff, Crown Drive and Spruce Creek Road were identified as potential projects to include in the Plan. The excerpts below are from public feedback received through the Capital Improvement Plan's development process:

- Spruce Creek Road:
    - *Much needed improvement from Crown Drive to the highway. There is nothing proposed about improving and stabilizing Spruce Creek Road upslope south to the Town limit. That section of roadway has been eroding for years and requires major work.*
    - *Spruce Creek Road Improvements - I think this is a very needed project on a heavily used portion of roadway.*

- Crown Drive:

- *Culvert needed Crown Drive and Golden Crown Lane. Run off leaves a very deep groove in the road. Been getting deeper and deeper each year. Crown subdivision should be paved. the dirt roads are extremely bumpy and dangerous. Culverts and potholes deteriorate quickly.*

In 2021, the Town selected Spruce Creek Road to be the first project to progress towards design out of the Capital Improvement Plan, with Crown Drive intended to be the next project in the following years. In December 2021, Muller Engineering Company was contracted to provide preliminary and final design, as well as utility, environmental, public, and stakeholder coordination for Spruce Creek Road.

Preliminary design for Spruce Creek Road was completed in February 2022 and reviewed with the Town Board in May 2022 following Trustee elections. The preliminary design, attached to this memo, recommended minor vertical alignment improvements, ditch grading and culverts, and minor intersection adjustments to Highway 9 and Spruce Creek Road. The preliminary design also recommended paving Spruce Creek Road. These minor adjustments were proposed to minimize impacts to adjacent residents without requiring more costly infrastructure such as wall treatments.

At the May 2022 Board Meeting, the Trustee's expressed their desire to further review the cost and impacts associated with more significant improvements at Spruce Creek Road to weigh them against the benefits of a more permanent solution. Additionally, at the meeting an idea was identified to review the implications of treating Spruce Creek Road as a One-Way access uphill (westbound), directing downhill (eastbound) traffic to access Highway 9 from Crown Drive. Following the meeting, the preliminary design was not further pursued as additional conceptual options were considered.

In July 2022, Muller Engineering Company met with Town Administrator Michelle Eddy to review potential options for Spruce Creek Road which included more significant profile adjustments, realigning Spruce Creek Road, and further pursuing the One-Way concept originally identified in May. Because potential options for Spruce Creek Road considered Crown Drive, and because Crown Drive is intended to be the subject of the Town's next project, the Town made the decision to obtain survey of Crown Drive and to combine them into one project with Spruce Creek Road. As overall access from Highway 9 to Crystal Peak Wilderness was under review, the decision was made to also obtain survey for Gold Nugget Drive.

In December 2022, Muller Engineering Company received the completed survey for Crown Drive and Gold Nugget Drive to begin reviewing existing conditions and determining available options to propose to the Town Board of Trustees.

Existing Conditions

This section summarizes the existing conditions of Spruce Creek Road, Crown Drive, and Gold Nugget Drive to provide a framework for the proposed options and issues below.

Figure 1 Vicinity Map

Spruce Creek Road from Crown Drive to Highway 9:

Roadway:

Spruce Creek Road has two steep pitches separated by a relatively flat landing near the intersection with Gold Nugget Drive. The average slope is just under 9%, though the maximum slope is over 13%. The road is narrow with steep embankment slopes on either side, including a steep slope adjacent to the property at 97 Spruce Creek Road. Key parameters are included in the table below:

Spruce Creek Road Key Roadway Parameters	
Length	800 feet
Surface Type	Gravel
Width	20+ feet, varies
Vertical Profile	9-13% with one 0.5% landing
Embankment Slopes	Steep (2:1 +)
Private accesses	Four (4)
Intersections	Highway 9 Miners Court Louis Placer Road Gold Nugget Drive Crown Drive

Highway 9 Intersection:

Spruce Creek Road's profile is over 12% leading up to its intersection with Highway 9. It connects to Highway 9 at a skew and in a location between two curves in the Highway with poor sight distance. An initial review of CDOT safety reports on Highway 9 indicate that there was one rear end crash (minor injury) at Spruce Creek Road over the last six years. Additional investigation would be required to obtain the narrative reports of the incident. CDOT safety reports do not capture unreported incidents or "near misses". There have been reports from Town staff and residents who have observed "near misses" at the intersection.

Drainage:

Runoff generally flows west to east, south to north in this location. Most runoff north of Spruce Creek Road drains away from the road. Runoff south of Spruce Creek Road is captured in an informal ditch or flows down the road. Drainage upstream of the access at 97 Spruce Creek Road flows into a pipe under the road and outfalls to a valley to the north. Further downstream, runoff flows down an informal ditch to a culvert under Highway 9, outfalling to the Tarn.

Access and Use:

Spruce Creek Road provides access to 15 properties; four on Spruce Creek Road, three through Miner Court, and eight through Louis Placer Road. Many on Crown Drive and Gold Nugget use Spruce Creek Road as access but it is not the only access.

Additionally, Spruce Creek Road provides access to popular recreation opportunities further south and experiences extremely heavy use during the summertime months. Winter recreation is growing in popularity as well.

Crown Drive from Spruce Creek Road to Highway 9:

Roadway:

From Spruce Creek Road, Crown Drive climbs to a peak at the property address 389 Crown Drive, then slopes downhill to the intersection with Highway 9. The average slope uphill is just under 9%, and the average slope from the peak to Highway 9 is also just under 9%. The maximum slope is over 13% near the property at 293 Crown Drive. The road is narrow with steep embankment slopes on either side, including a steep slope adjacent to the property at 97 Spruce Creek Road. Key parameters are included in the table below:

Crown Drive Key Roadway Parameters	
Length	2,800 feet
Surface Type	Gravel
Width	Narrow 18- 20 feet
Vertical Profile	6-13%, 0.5% at Hwy 9
Embankment Slopes	Steep (2:1 +)
Private accesses	Thirty (30)
Intersections	Highway 9 Gold Nugget Drive Golden Crown Lane Lodestone Trail Spruce Creek Road

Highway 9 Intersection:

Crown Drive's profile flattens to 0-0.5% leading up to its intersection with Highway 9. It connects to Highway 9 straight-on and in a location along a straighter section in the Highway with improved sight distance to Highway 9 and Spruce Creek Road. An initial review of CDOT safety reports on Highway 9 indicate that there was one embankment (run-off-road) and one rear end crash (both property damage only) at Crown Drive over the last six years. Additional investigation would be required to obtain the narrative reports of the incidents. CDOT safety reports do not capture unreported incidents or "near misses".

Drainage:

Runoff area contributing to Crown Drive is generally limited to the properties west of the roadway. There is a high point in Crown Drive approximately 800 lf north of the intersection with Spruce Creek Road. Runoff generally flows from the high point of Crown Drive and longitudinally down the roadway north or south. Runoff flowing south connects to Spruce Creek Road drainage. Runoff flowing north is captured in an informal ditch or flows down the road. Further north, runoff flows down an informal ditch to a culvert under Crown Drive, outfalling to the field just north of the intersection of Crown Drive and Highway 9.

It appears that larger offsite flows converge with Crown Drive approximately 200 feet southwest of the intersection with Highway 9. There are several driveways at this location. Significant improvements to Crown Drive may result in special attention to this location. Actual conditions would be verified with on-site investigation.

Access and Use:

Crown Drive provides access to approximately 37 properties; thirty on Crown Drive, and seven through Golden Crown Lane and Lodestone Trail.

Although it is not the primary recreational access, it does experience elevated traffic in the summer months as described above with Spruce Creek Road.

Gold Nugget Drive from Crown Drive to Spruce Creek Road:

Roadway:

Gold Nugget Drive's profile contains three vertical crests and two sag curves. From Spruce Creek Road, Gold Nugget Drive climbs shortly before dropping down to a low point at station 16+80, at the property on 332 Gold Nugget Drive. From there it gradually climbs to a peak before dropping to its lowest point at station 6+00, 137 Gold Nugget Drive, then climbs again to a peak before dropping down to its intersection with Crown Drive. The average slopes range from 4 to 8%, with maximum slopes occurring at the tie-in with Crown Drive at nearly 10%. The road is narrow with sections of steep embankment slopes on either side. Key parameters are included in the table below:

Gold Nugget Drive Key Roadway Parameters	
Length	2,034 feet (+920 feet Crown to Hwy 9)
Surface Type	Gravel
Width	Narrow 18- 20 feet
Vertical Profile	4-8%, max 9.7%
Embankment Slopes	Steep (2:1 +)
Private accesses	Nine (9)
Intersections	Crown Drive Nugget Lane Spruce Creek Road

Drainage:

Runoff contributing to Gold Nugget is generally from the area between Crown Drive and Gold Nugget. Overall topography slopes from west to east. There are two low points in Gold Nugget at approximately 600 feet and 1700 feet south the intersection with Crown Drive. Much of Gold Nugget drains towards the first low point at 600 feet while the low point at 1700 feet is much higher in elevation and appears to drain a smaller offsite area. From each low point, runoff will flow northeast towards Highway 9 and is controlled in roadside ditches and culverts which outfall to the Tarn. There are small informal ditches along much of the west side of Gold Nugget while the topography generally slopes away from the roadway on the east.

There is a house on the downstream side of the roadway at the location of the first low point (approx. 600 ft south of Crown Drive, 137 Gold Nugget Drive). No culverts or storm conveyance were surveyed at this location or visible from aerial imagery. Conveying drainage across Gold Nugget at this location will require special attention due to the proximity of the house, although it appears that runoff will generally spill across the roadway and away from the site before reaching this low point. Actual conditions would be verified with on-site investigation.

The second low point (approx. 1700 ft south of Crown Drive) appears to have a culvert to drain the contributing area across Gold Nugget, although the culvert was not surveyed.

Access and Use:

Crown Drive provides access to approximately 13 properties: nine on Gold Nugget Drive, and four through Nugget Lane.

Identifying the Project:

Issues to Address

The issues observed by Muller Engineering Company and Town staff that are important to address with the project scope can be defined under the larger issues of safety and maintenance.

Safety:

- Spruce Creek Road approach and intersection with Highway 9.
- Spruce Creek Road is very steep and can be hazardous in the winter.
- Crown Drive is steep and narrow in sections and can be hazardous in the winter.
- Speeding through Town streets.

Maintenance:

- Significant maintenance burden on Spruce Creek Road to address washboarding and potholes from heavy use.
- Maintenance burden on Crown Drive to manage washboarding and potholing
- Maintenance issues from rutting caused by runoff on Spruce Creek Road
- Maintenance issues from rutting caused by runoff on Crown Drive.

- Increased maintenance and road grading affect drainage and fill in culverts with road material

Project Factors

In seeking to address the issues above, the project scope needs to consider the following project factors:

- Upfront cost (capital to construct the project)
- Long-term maintenance burden
- Aesthetic feel of the Town of Blue River
- Property impacts, including ROW acquisition and access
- Public engagement and input
- Environmental impacts
- Utility conflicts and coordination

Potential Options to Evaluate

The following conceptual options have been developed based on initial assessment of the survey data and previous feedback from the Town of Blue River. There are several available options that can help address the identified issues, but each comes with its own risks or drawbacks as it relates to the overall Project Factors.

Traffic Routing-Based Options

Recreational user traffic is a major factor in this area of the Town and must be included as roadway improvements are considered. In the following options, “uphill” refers to access from Highway 9 to Crystal Peak Wilderness, and “downhill” refers to access returning from Crystal Peak Wilderness to Highway 9.

<table>
<tr><th colspan="2">Traffic Option 1: “Do Nothing”</th></tr>
<tr><td colspan="2">Description: Maintain recreation access up and down Spruce Creek Road.</td></tr>
<tr><td>Benefit:
Low impact to residents on Crown Drive and Gold Nugget Drive
Higher town maintenance burden on shorter segment of road.</td><td>Risk:
Continued use of hazardous Spruce Creek Road and Highway 9 intersection.</td></tr>
<tr><td colspan="2">Consideration: While not addressing the intersection safety with Highway 9, current recreational access impacts the shortest section of roadway today.</td></tr>
</table>

Traffic Option 2: Crown Drive Downhill	
Description: Make Spruce Creek Road one-way uphill to Crown Drive, route downhill traffic onto Crown Drive to Highway 9.	
Implementation: Re-grade Spruce Creek and Crown Drive intersection, include signage to promote through traffic onto Crown Drive. Profile changes to steep sections of Crown Drive. Anticipate some recreational and local traffic would continue to use Spruce Creek Road in the wrong direction	
Benefit: • Downhill users access Highway 9 at Crown Drive instead of Spruce Creek Road.	**Risk:** • Crown Drive increases length of unpaved roadway used by recreation traffic that the Town maintains. • Crown Drive has similarly steep slopes to Spruce Creek Road. • Adverse resident feedback on increased traffic on Crown Drive.
Consideration: Improvements to Crown Drive are needed to mitigate increased maintenance burden to the Town.	

Traffic Option 3: Gold Nugget Drive Downhill	
Description: Make Spruce Creek Road One-Way uphill to Gold Nugget Drive, route downhill traffic onto Gold Nugget Drive to Crown Drive to Highway 9.	
Implementation: Re-grade intersections with Crown Drive as well as Spruce Creek Road, signage to promote through-traffic onto Gold Nugget Drive. Anticipate local and some recreation traffic would continue to use Spruce Creek Road in the wrong direction.	
Benefit: • Downhill users access Highway 9 at Crown Drive instead of Spruce Creek Road. • Gold Nugget Drive has the most mild grades of the three roads. • Gold Nugget Drive has fewer properties and accesses than Crown Drive.	**Risk:** • Gold Nugget Drive increases length of unpaved roadway used by recreation traffic that the Town maintains. • Adverse resident feedback on increased traffic on Gold Nugget and Crown Drive.
Consideration: Improvements to Gold Nugget and Crown Drive are needed to mitigate increased maintenance burden to the Town. Long-term recreational shuttle access may benefit from a gentler profile.	

Roadway Improvement Options:

As described above, the existing roadways in the Town are narrow with steep profiles and embankment slopes. As Muller Engineering Company and the Town review improvements, the more significant the improvement, the greater the project footprint and adjacent impact becomes, which needs to be balanced against the benefit of the improvements. The information

below summarizes “lighter scope” and “heavier scope” options for the Town’s consideration. The desirable traffic routing option may influence where a heavier scope option is applied.

For all options considering asphalt pavement on steep slopes: Consultation with a geotechnical engineer will be required to determine implementation and the appropriate pavement section.

For options considering walls: Consultation with a geotechnical engineer will be required to determine implementation and the appropriate foundation details. Muller Engineering Company is also compiling wall type options implemented on other projects that are relatively cost-effective, lower maintenance, and can uphold the desired aesthetic of the Town of Blue River.

These options are concept-level; those desirable to the Town can be further analyzed for feasibility following discussion on January 31st, 2023.

Spruce Creek Road (Lighter Scope) (see Preliminary Design)	
Overall Scope: Pave, perform minor roadway, drainage, and Hwy 9 intersection improvements to avoid property impacts or ROW needs.	
Implementation: • Perform profile adjustments where possible to flatten slope, especially at approach to Highway 9. • Replace culverts and install formal ditches on south side of Spruce Creek Road. • Work with CDOT on Highway 9 intersection, reducing skew and adjusting asphalt apron. • Consider asphalt pavement and appropriate pavement section.	
Benefit: • No significant environmental or resident impacts anticipated. • Gravel to pavement transition at Highway 9 addressed. • Maintenance burden to Town reduced	**Risk:** • Capital investment does not completely address the issues • Observed speeding may increase with pavement and addition of super elevations • Road may freeze-thaw, causing icy roads
Potential Limitations: • Appropriate pavement section for steep slopes.	
Project Value: • Lighter cost and impacts with proportional benefits	

Spruce Creek Road (Heavier Scope)
Overall Scope: Pave, regrade steep sections of Spruce Creek Road to extent possible without impacting houses.
Implementation: • Perform major profile adjustments to extent possible, especially at approach to Highway 9, tying into road where profile levels out.

• Determine extent of embankment slope extension, utilize walls to avoid impacts to houses. • Regrade property accesses and intersections with Miner Court, Louis Placer Road, and Gold Nugget Drive. • Replace culverts and install formal ditches on south side of Spruce Creek Road. • Work with CDOT on Highway 9 intersection, reducing skew and adjusting asphalt apron. • Consider asphalt pavement and appropriate pavement section.
Benefit: • More significant adjustment to approach with Highway 9 • Road maintenance burden to Town reduced **Risk:** • Highway 9 intersection remains with minor improvements • Wall installation and maintenance required • ROW required • Access reconstruction required • Similar risks to lighter scope
Potential Limitations: • Embankment slope and property at 97 Spruce Creek Road are extremely close to Spruce Creek Road and may limit ability to adjust roadway profile without large wall treatments
Project Value: • Higher cost and impact, increase in benefits though all issues may not be addressed.

Crown Drive (Lighter Scope)
Overall Scope: Perform minor roadway and drainage improvements to limit property impacts or ROW needs.
Implementation: • Perform profile adjustments where possible to flatten slope at steeper sections. • Replace culvert at intersection with Gold Nugget Drive • Improve drainage conveyance down Crown Drive, including addressing offsite basin conveyance as possible. • Consider asphalt pavement and appropriate pavement section.
Benefit: • Addresses issues identified in Capital Improvement Plan • Limits impact to adjacent properties **Risk:** • Increased maintenance burden if traffic is routed via Crown Drive • Offsite drainage may not be fully addressed
Potential Limitations: • Appropriate pavement section for steep slopes
Project Value: • Lighter cost and impacts with proportional benefits

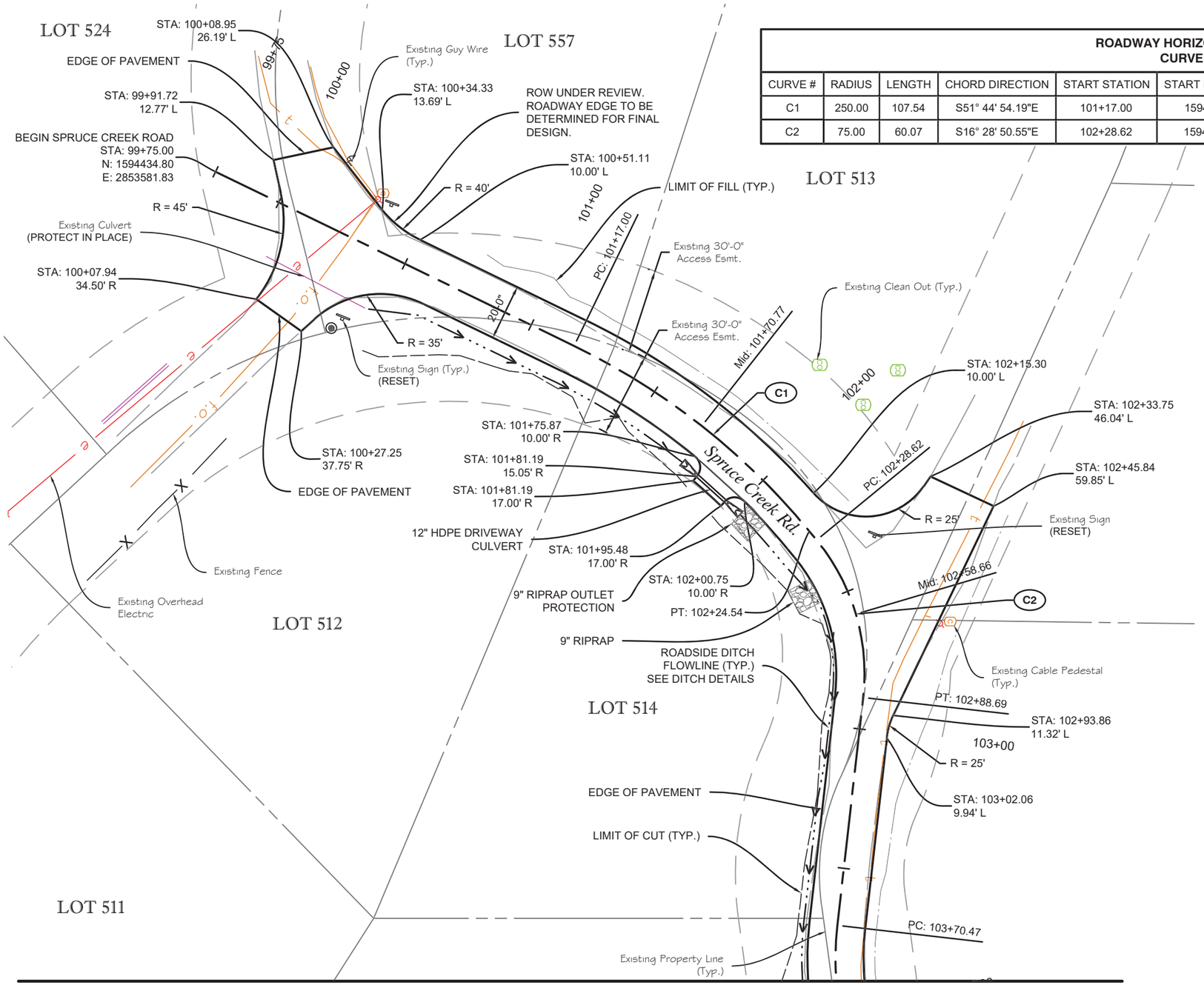
Crown Drive (Heavier Scope)	
Overall Scope: Regrade steep sections of Crown Drive, consider pavement, and formalize drainage conveyance to extent possible without impacting houses.	
Implementation: • Perform major profile adjustments to address Crown Drive's peak • Determine extent of embankment slope extension, utilize walls to avoid impacts to houses. • Regrade property accesses and intersections required. • Formalize drainage conveyance with ditches and driveway culverts along Crown Drive, including offsite drainage on west side of Crown Drive. • Consider asphalt pavement and appropriate pavement section.	
Benefit: • More substantial leveling out of the profile of Crown Drive • Formal drainage conveyance to address offsite basin • Unpaved road maintenance burden to Town reduced	**Risk:** • Wall installation and maintenance required • ROW required • Access reconstruction required • Increased maintenance for drainage infrastructure possible
Potential Limitations: • Offsite drainage basin at Crown Drive may require significant drainage conveyance improvements to fully address. • Tie-in to property accesses at Crown Drive peak may limit ability to adjust slope.	
Project Value: • Higher cost and impact but addresses major concerns. Requires additional evaluation and public coordination.	

Gold Nugget Drive (Heavier Scope) – considered if traffic option 3 is selected	
Overall Scope: Pave Golden Nugget Drive and portion of Crown Drive, rebuild intersections, and formalize drainage conveyance to extent possible without impacting houses.	
Implementation: • Perform minor adjustments to Golden Nugget profile and part of Crown Drive profile. • Regrade and design intersections at Crown Drive and Gold Nugget Drive. • Determine extent of embankment slope extension, utilize walls to avoid impacts to houses. • Regrade property access tie-ins as required. • Formalize drainage conveyance with ditches and driveway culverts along Gold Nugget Drive, including low point at station 6+00, and Crown Drive, including offsite drainage on west side of Crown Drive. • Consider asphalt pavement and appropriate pavement section.	
Benefit:	**Risk:**

• Gold Nugget Drive requires less significant profile adjustments • Less use of Spruce Creek Road and Highway 9 intersection • Formal drainage conveyance to address offsite basin at Crown Drive • Unpaved road maintenance burden to Town reduced	• Intersection(s) re-design needed, ROW may be needed • Public impact for residents • Increased maintenance for drainage infrastructure possible • Addressing low-point drainage at Gold Nugget Drive
Potential Limitations: • Offsite drainage basin at Crown Drive may require significant drainage conveyance improvements to fully address. • Addressing drainage low-point at Gold Nugget Drive at station 6+00 may require offsite ditch grading outside of roadway limits	
Project Value: • Higher cost and impact but addresses major concerns. Requires additional evaluation and public coordination	

Recommendation:

We recommend the Board of Trustees review the information included in this memorandum to prepare for a discussion regarding this project at the January 31st Board Meeting. The desired outcome of the meeting is to review and identify which traffic options the Town would like Muller Engineering Company to continue to pursue for feasibility and implementation. Our recommendation on roadway improvements is to establish base design for the lighter scope options, and work with the Town to identify any opportunities to implement heavier scope items on a case by case basis. Upon confirmation of the path forward, Muller Engineering Company will develop an adjusted scope, fee, schedule, and approach to perform the analysis and engage the residents to determine the appropriate solutions for the Spruce Creek Road and Crown Drive project.



ROADWAY HORIZONTAL CONTROL
CURVE TABLE

CURVE #	RADIUS	LENGTH	CHORD DIRECTION	START STATION	START NORTHING	START EASTING	END STATION	END NORTHING	END EASTING
C1	250.00	107.54	S51° 44' 54.19"E	101+17.00	1594372.71	2853709.53	102+24.54	1594306.64	2853793.33
C2	75.00	60.07	S16° 28' 50.55"E	102+28.62	1594303.49	2853795.93	102+88.69	1594247.41	2853812.52

N

0' 40' 80'

Attachment 1 - Spruce Creek Road

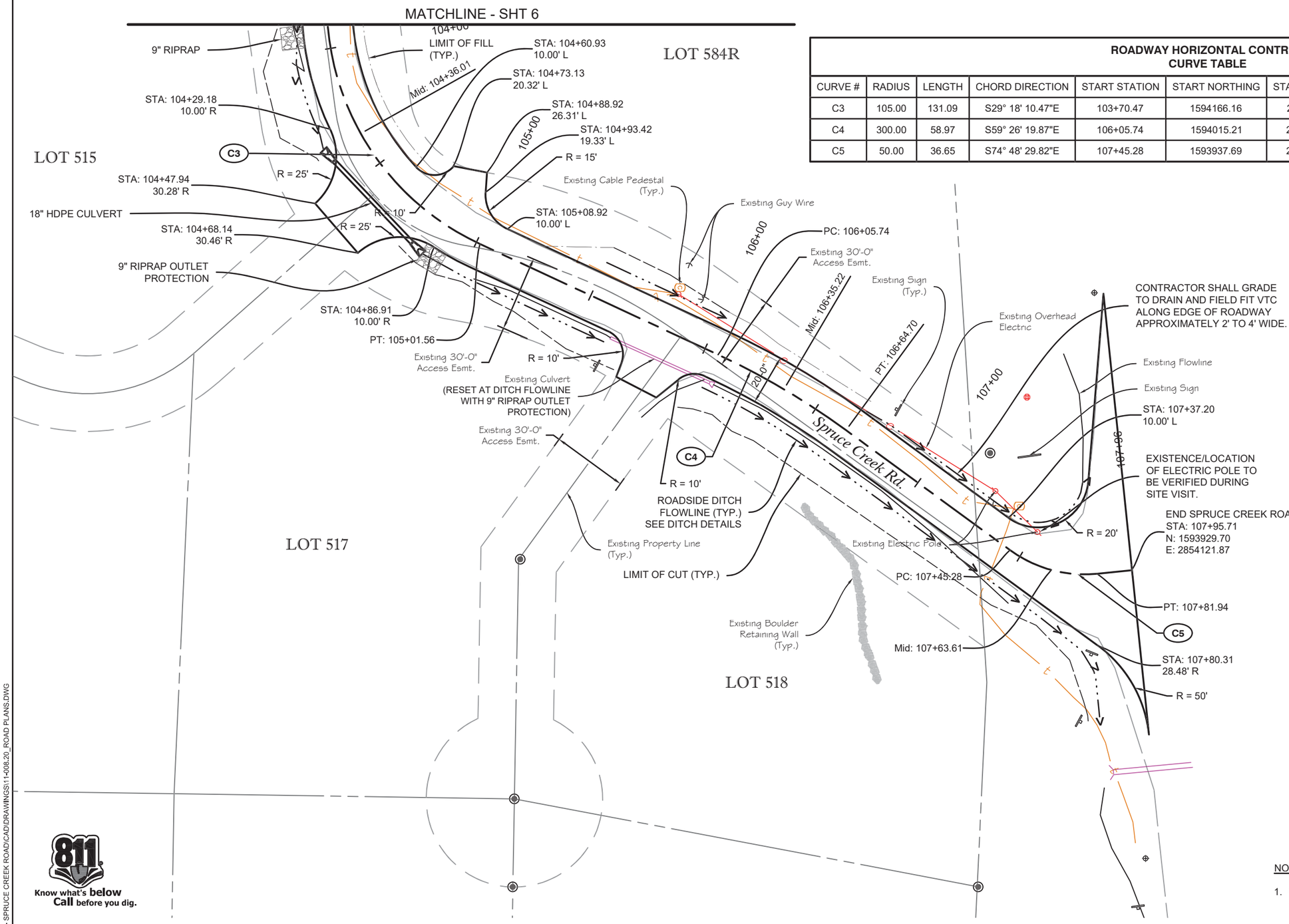
NOTE:

1. CONTRACTOR SHALL HAND GRADE AROUND CULVERT ENDS AND GRADE DITCH TO DRAIN.

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

PLOTTED: 2/25/2022 10:41:37 AM
NAME: P:\11-008.20 BLUE RIVER - SPRUCE CREEK ROAD\CAD\DRAWINGS\11-008.20_ROAD PLANS.DWG

PREPARED UNDER THE SUPERVISION OF	DESIGNED: LRN/WMG DRAWN: LRN/WMG CHECKED: NJL	**PRELIMINARY PLANS** PROJECT NO.	**SHEET REVISIONS** NO. DATE DESCRIPTION BY	MULLER ENGINEERING COMPANY 777 S. WADSWORTH BLVD. 4-100 LAKEWOOD, COLORADO 80226	**TOWN OF BLUE RIVER**	SPRUCE CREEK ROAD IMPROVEMENTS PROJECT **ROADWAY PLANS**	DATE 2/25/2022 DRAWING NO. C-7 SHEET 68 OF [illegible]



ROADWAY HORIZONTAL CONTROL
CURVE TABLE

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C4	300.00	58.97	S59° 26' 19.87"E	106+05.74	1594015.21	2853957.85	106+64.70	1593985.28	2854008.55
C5	50.00	36.65	S74° 48' 29.82"E	107+45.28	1593937.69	2854073.58	107+81.94	1593928.30	2854108.17

Attachment 1 - Spruce Creek Road

NOTE:

1. CONTRACTOR SHALL HAND GRADE AROUND CULVERT ENDS AND GRADE DITCH TO DRAIN.

811 Know what's below Call before you dig.

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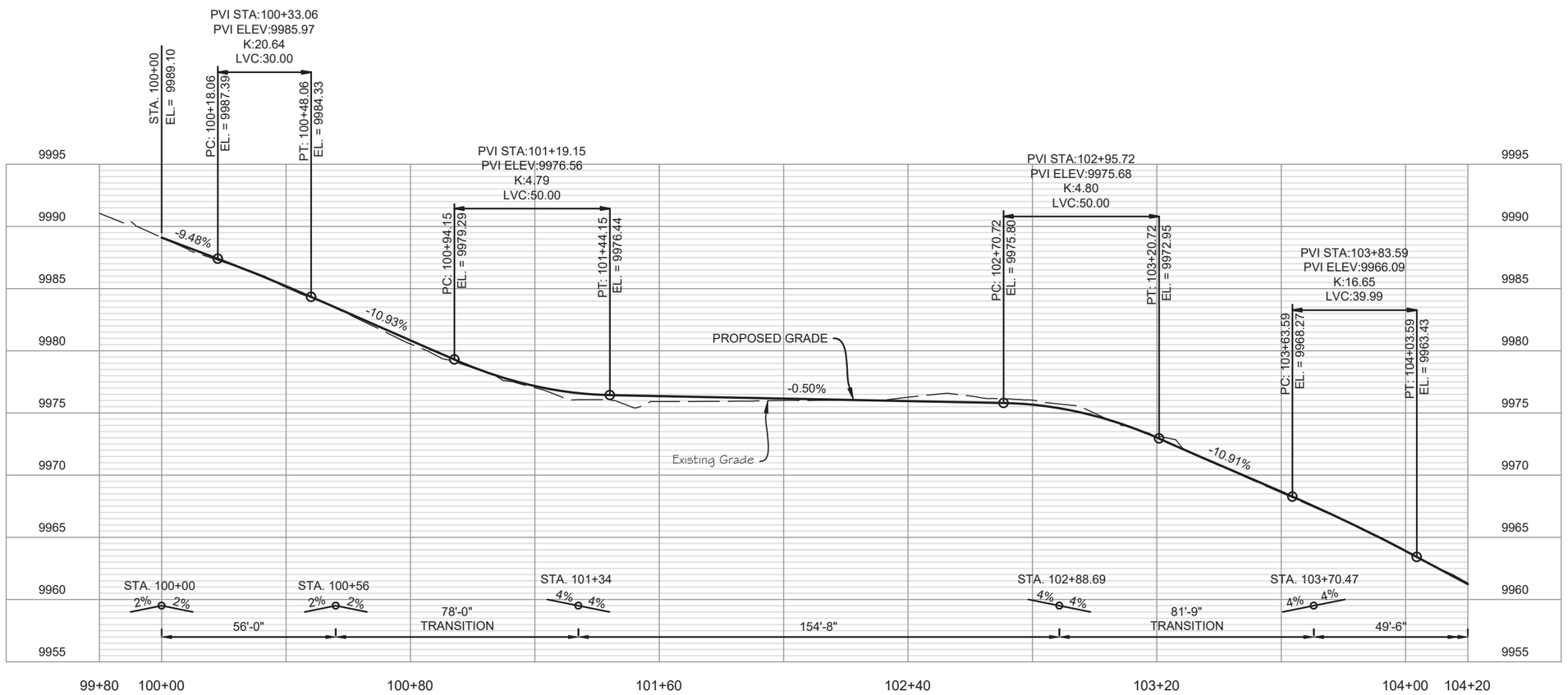
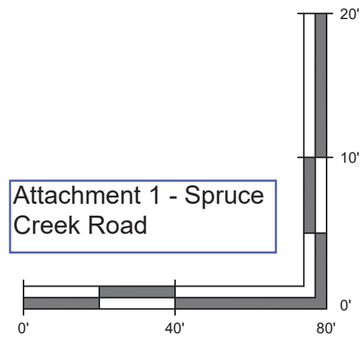
SPRUCE CREEK ROAD IMPROVEMENTS PROJECT	DATE 2/25/2022
ROADWAY PLANS	DRAWING NO. C-8



SPRUCE CREEK ROAD CENTERLINE ALIGNMENT



Attachment 1 - Spruce Creek Road

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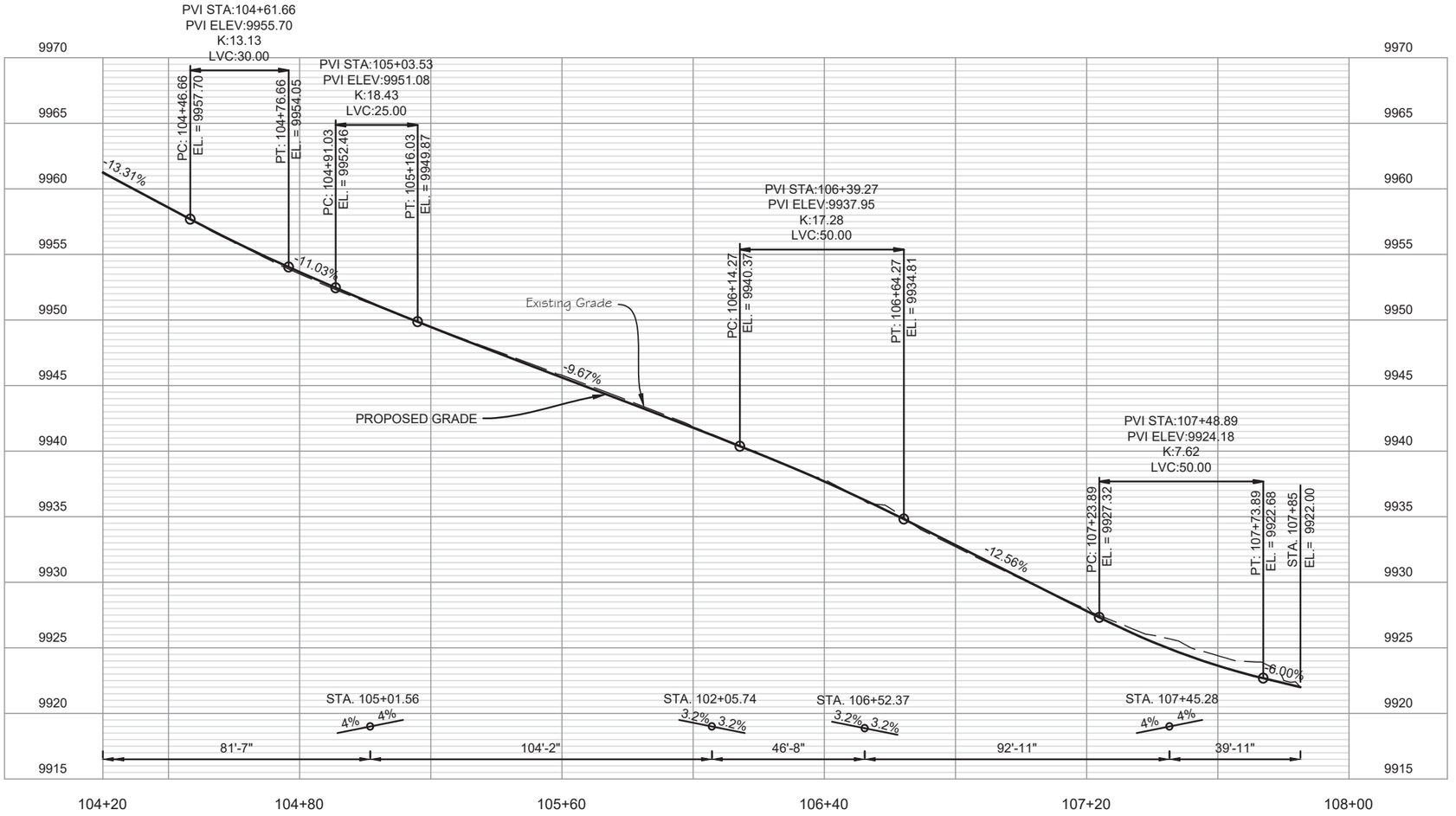
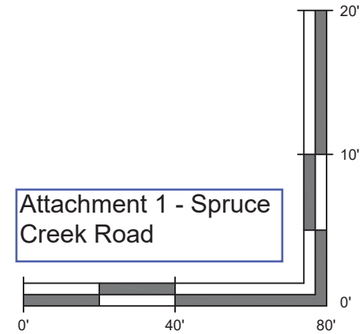


SPRUCE CREEK ROAD CENTERLINE ALIGNMENT



Attachment 1 - Spruce Creek Road

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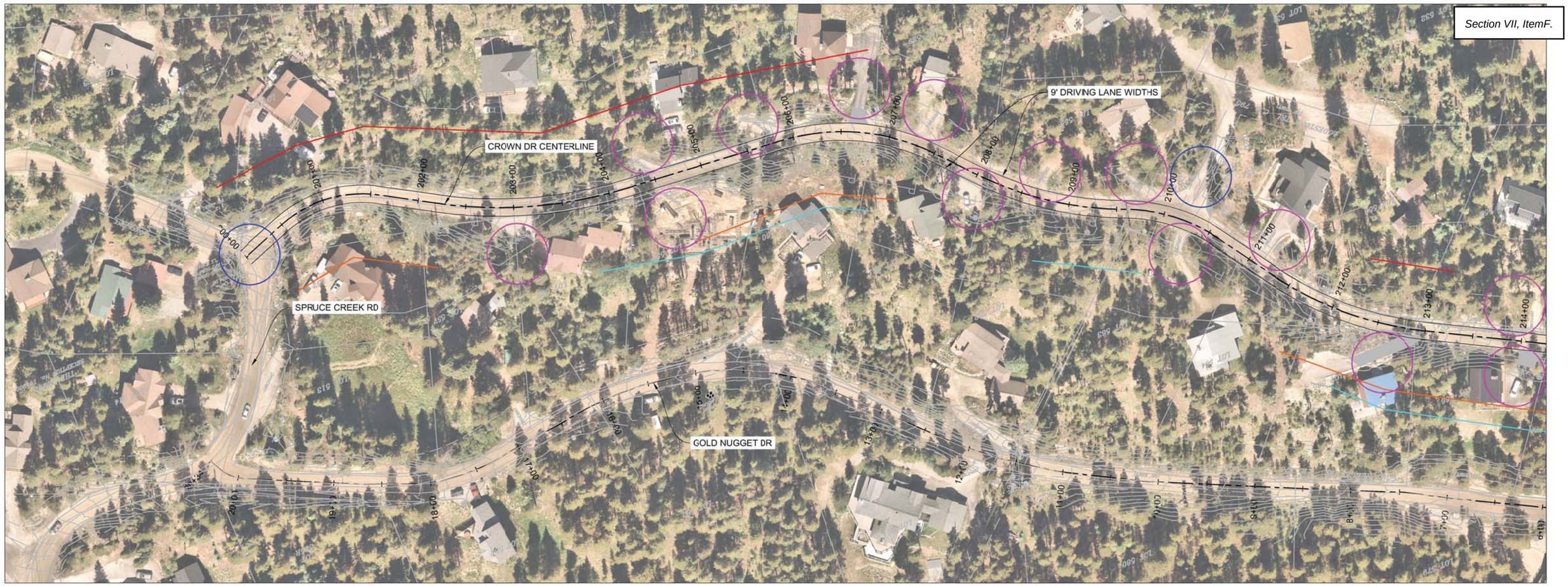
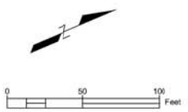
PREPARED UNDER THE SUPERVISION OF	DESIGNED: LRN DRAWN: MJS CHECKED: NJL	**PRELIMINARY PLANS** PROJECT NO.	**SHEET REVISIONS** NO. / DATE / DESCRIPTION / BY	MULLER ENGINEERING COMPANY 777 S. WADSWORTH BLVD. 4-100 LAKEWOOD, COLORADO 80226	**TOWN OF BLUE RIVER**	SPRUCE CREEK ROAD IMPROVEMENTS PROJECT **ROADWAY PROFILE**	DATE 2/24/2022 DRAWING NO. C-10 SHEET 10 OF 13

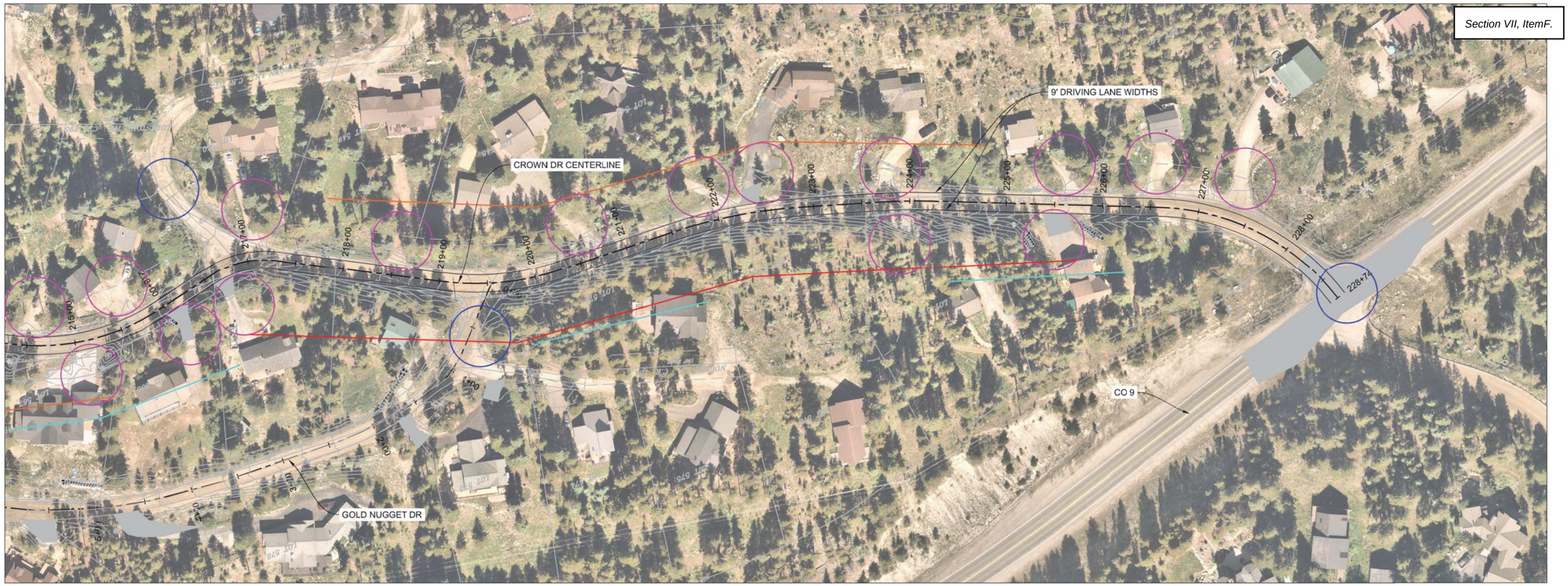


LEGEND
RED = LARGE EMBANKMENTS
ORANGE = STEEP DROP OFFS
CYAN = PROFILE >9%
BLUE = INTERSECTION
MAGENTA = DRIVEWAY ACCESS



Attachment 2 - Crown Drive

CROWN DR LAYOUT
STA. 200+00 TO 214+50
1/13/2023

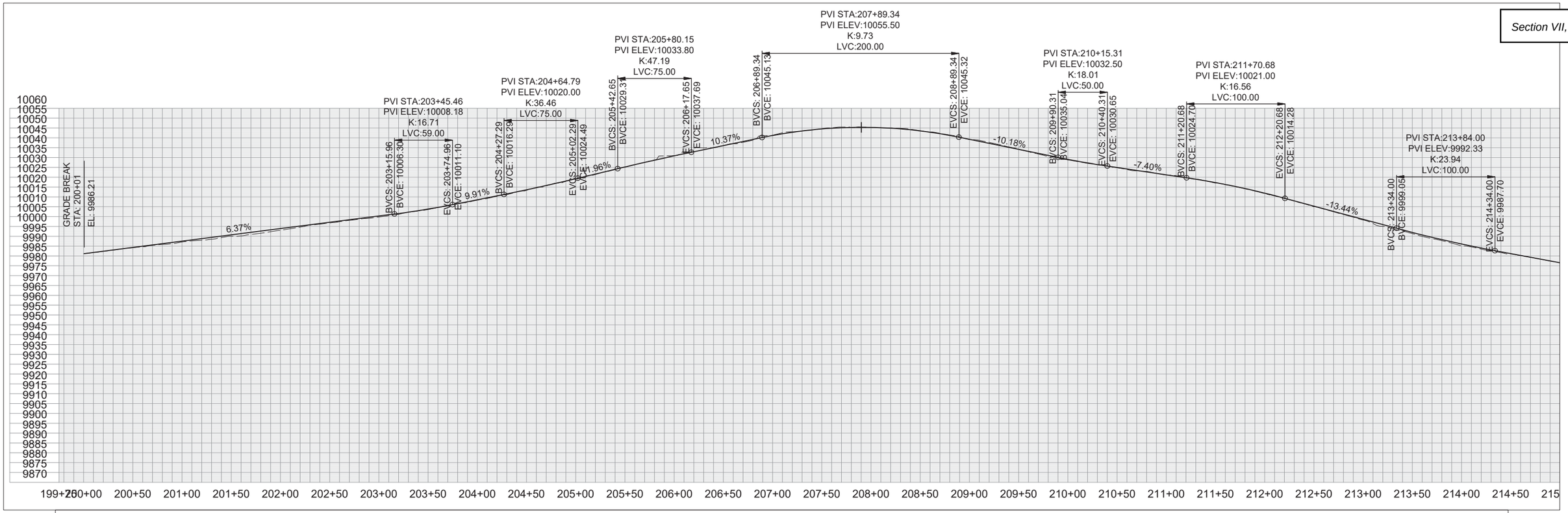


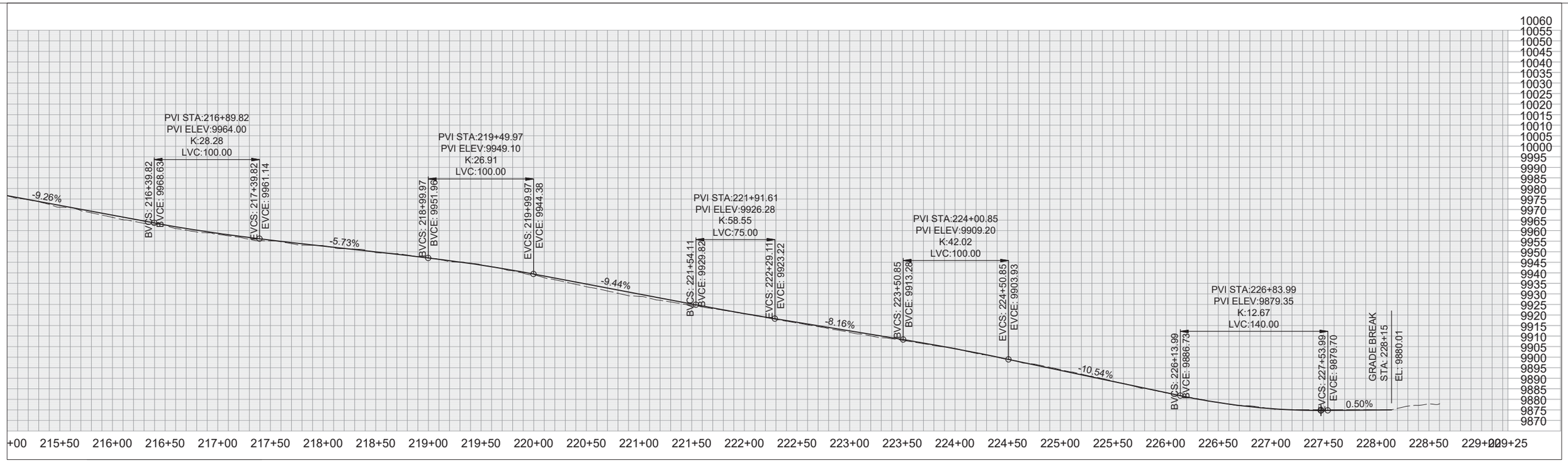
LEGEND
RED = LARGE EMBANKMENTS
ORANGE = STEEP DROP OFFS
CYAN = PROFILE >9%
BLUE = INTERSECTION
MAGENTA = DRIVEWAY ACCESS

0 50 100 Feet

Attachment 2 - Crown Drive

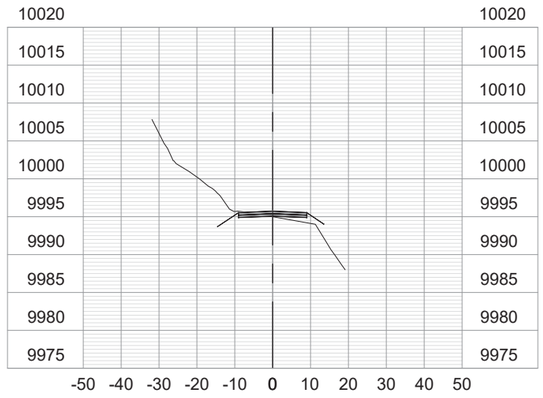
CROWN DR LAYOUT
STA. 214+50 TO 228+74
1/13/2023



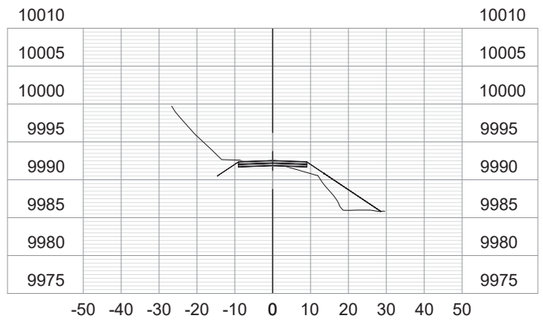


CROWN DRIVE PROFILE
1/13/2023

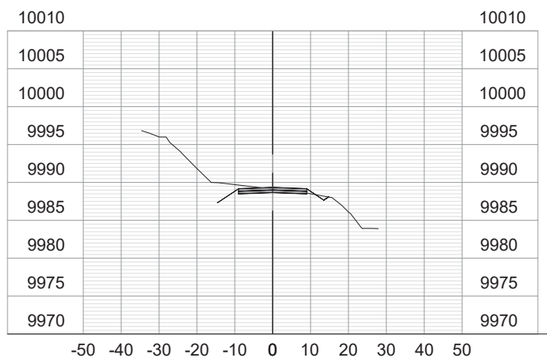
Attachment 2 - Crown Drive



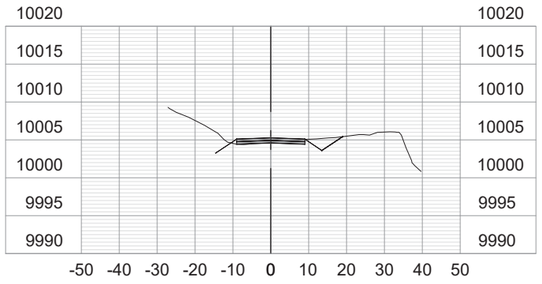
201+50.00 ~ SL-185



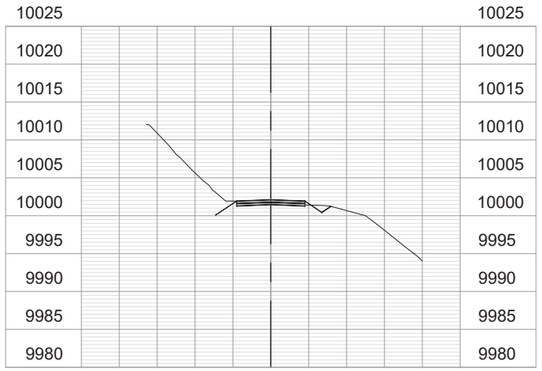
201+00.00 ~ SL-184



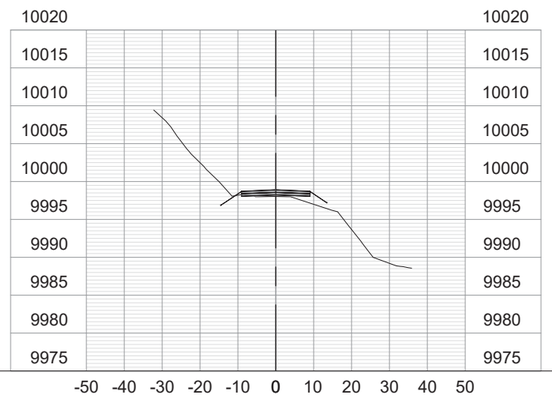
200+50.00 ~ SL-183



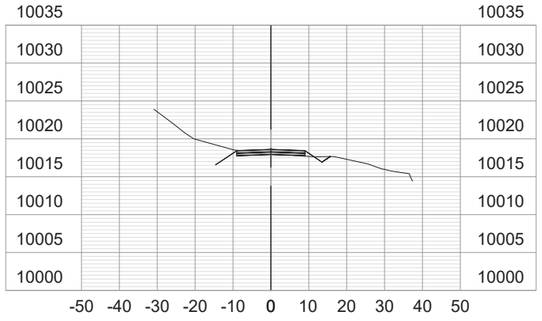
203+00.00 ~ SL-188



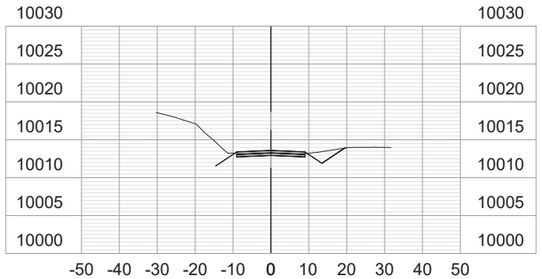
202+50.00 ~ SL-187



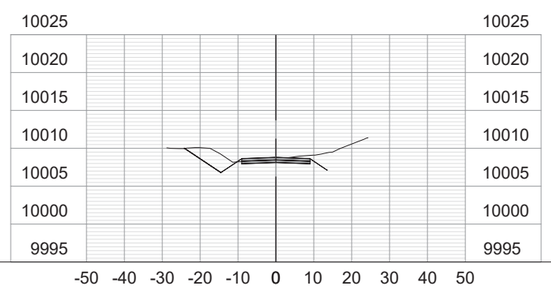
202+00.00 ~ SL-186



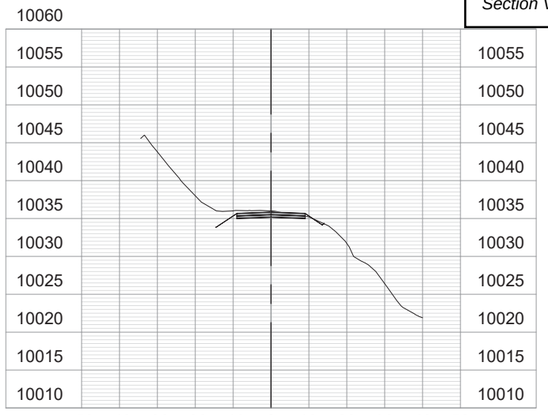
204+50.00 ~ SL-191



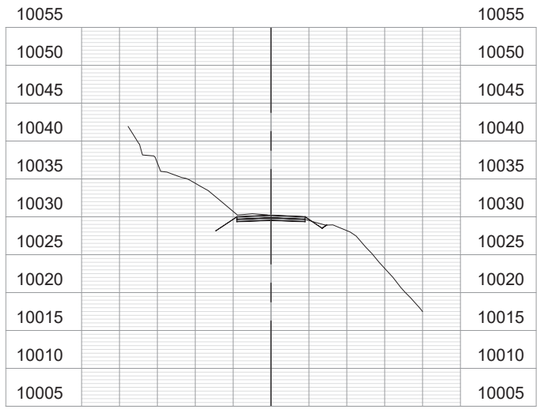
204+00.00 ~ SL-190



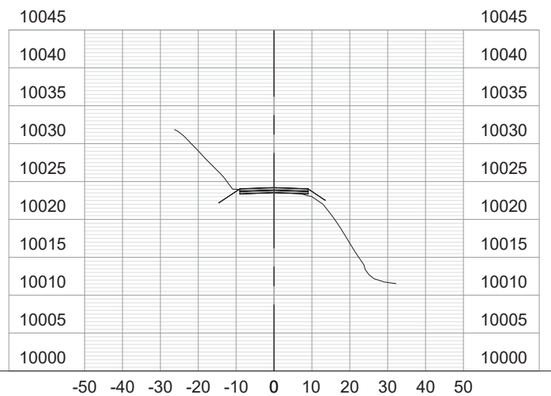
203+50.00 ~ SL-189



206+00.00 ~ SL-194



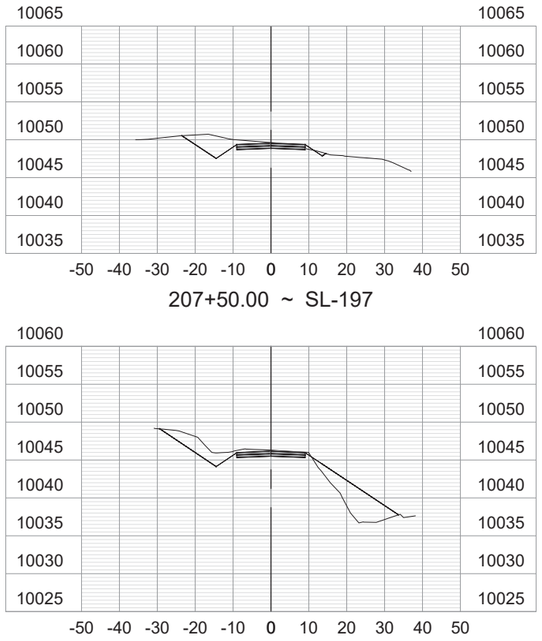
205+50.00 ~ SL-193



205+00.00 ~ SL-192

CROWN CROSS SECTIONS
STA. 200+50 TO 206+00
1/13/2023

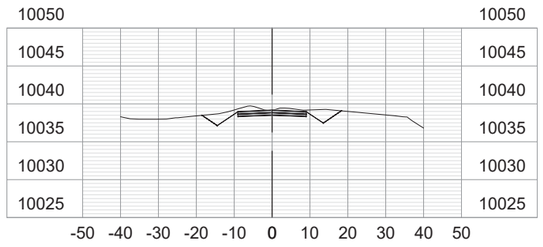
Attachment 2 - Crown Drive



207+50.00 ~ SL-197

207+00.00 ~ SL-196

206+50.00 ~ SL-195



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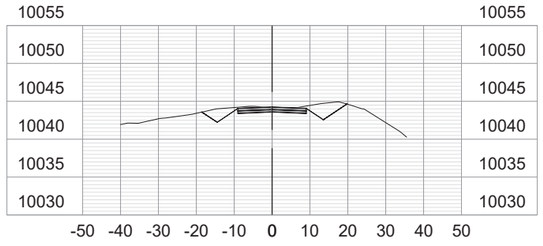

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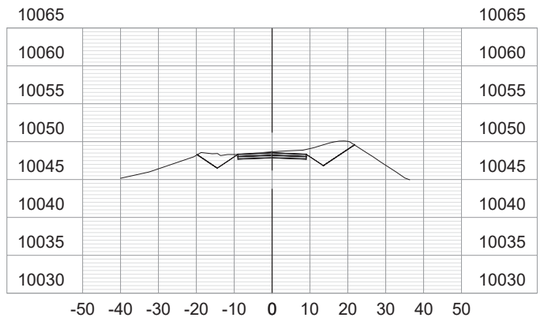

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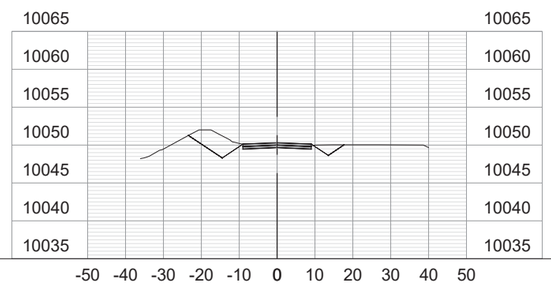
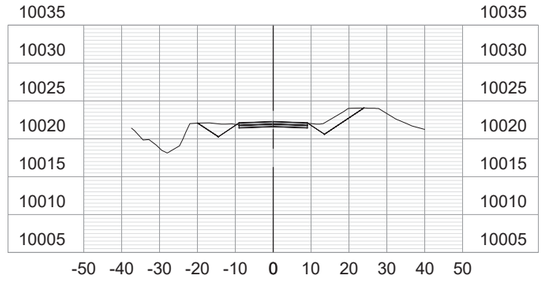
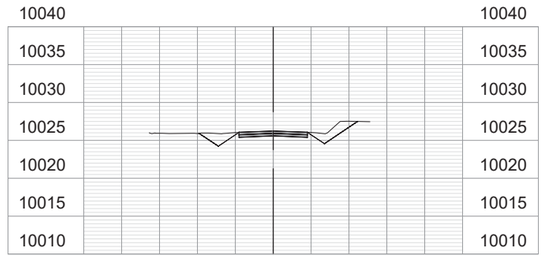


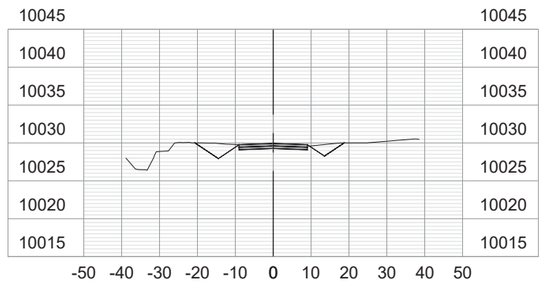
208+00.00 ~ SL-198



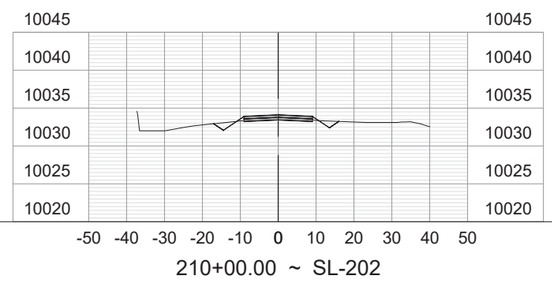
211+50.00 ~ SL-205



211+00.00 ~ SL-204



210+50.00 ~ SL-203



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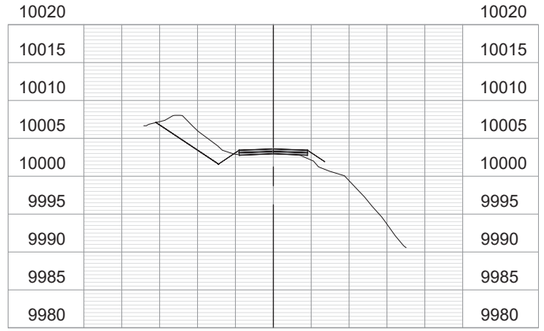
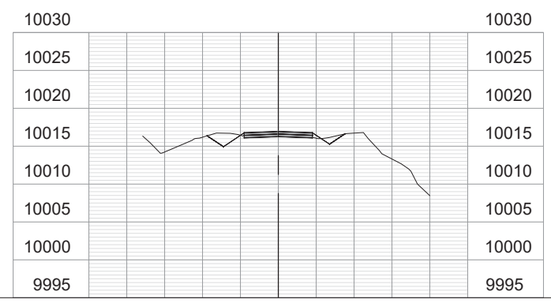


213+00.00 ~ SL-208

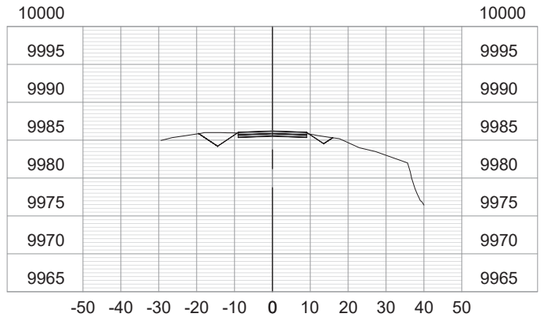
212+50.00 ~ SL-207



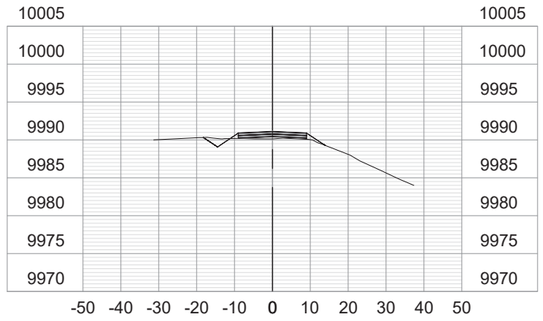
212+00.00 ~ SL-206

CROWN CROSS SECTIONS
STA. 206+50 TO 213+00
1/13/2023

Attachment 2 - Crown Drive



214+50.00 ~ SL-211



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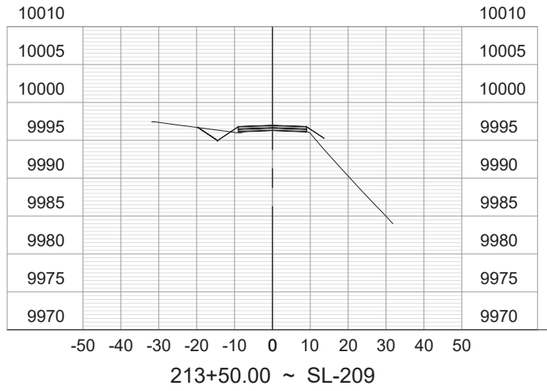

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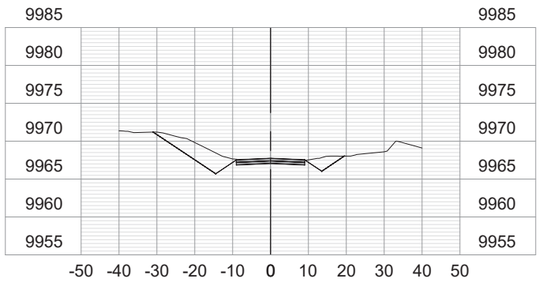

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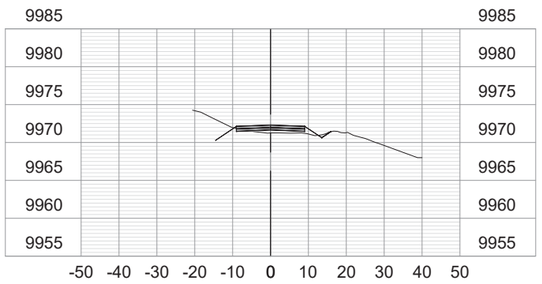
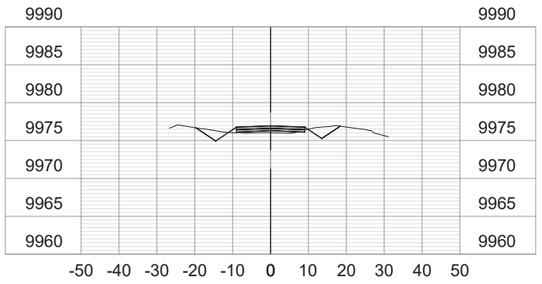
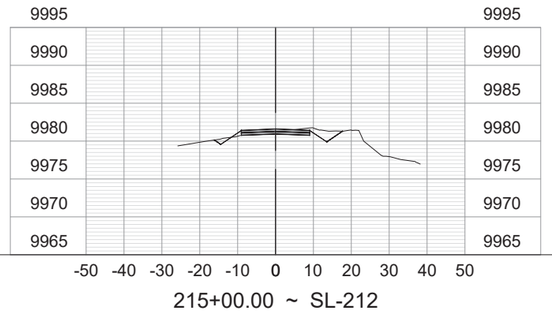


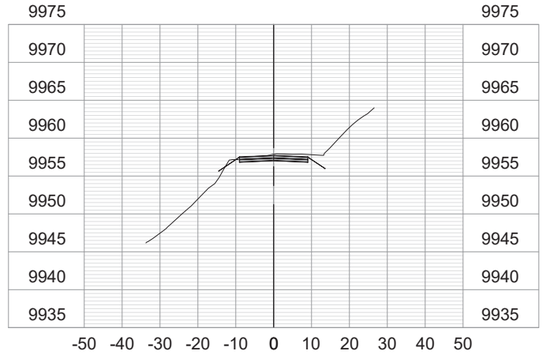
216+00.00 ~ SL-214



215+50.00 ~ SL-213



215+00.00 ~ SL-212



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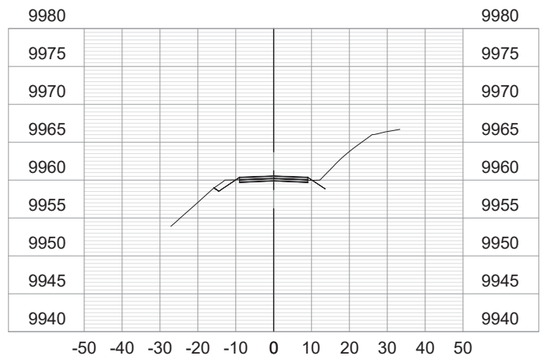

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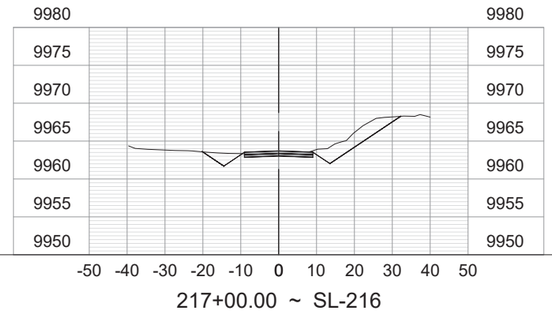

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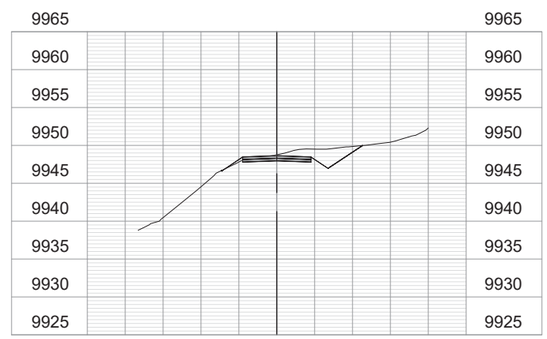

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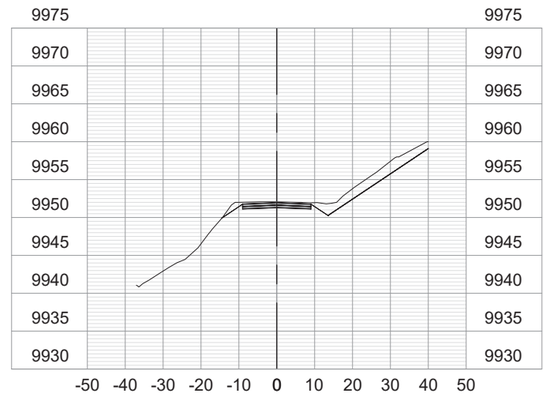

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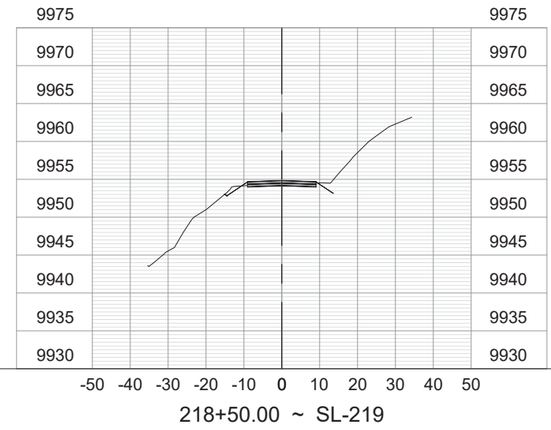
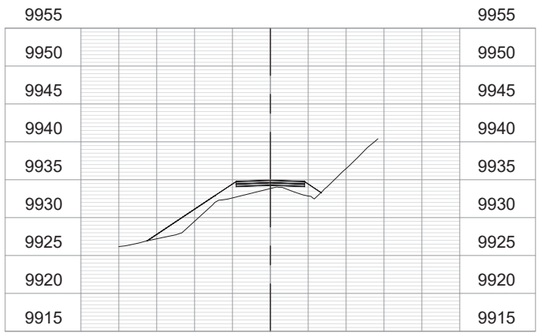


218+50.00 ~ SL-219

CROWN CROSS SECTIONS
STA. 213+50 TO 219+50
1/13/2023

Attachment 2 - Crown Drive



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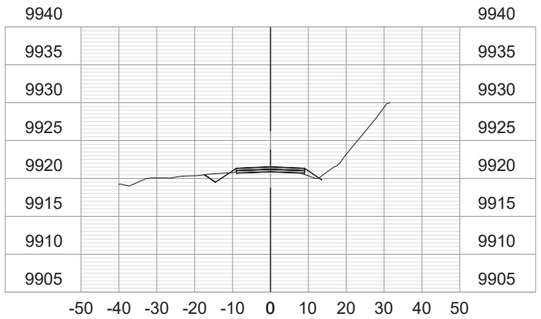
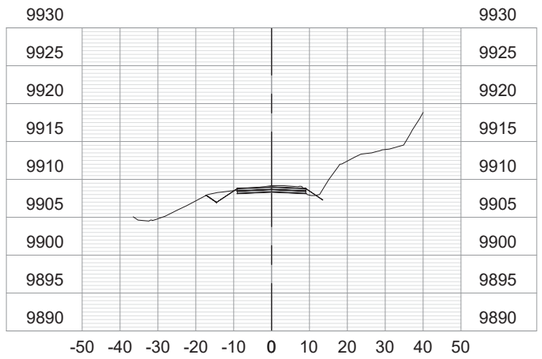
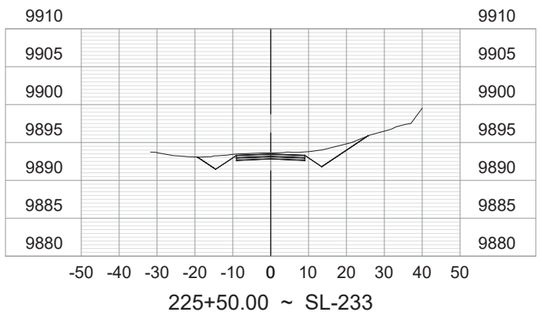


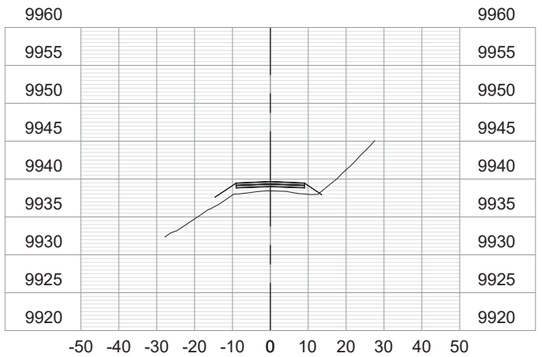
222+50.00 ~ SL-227



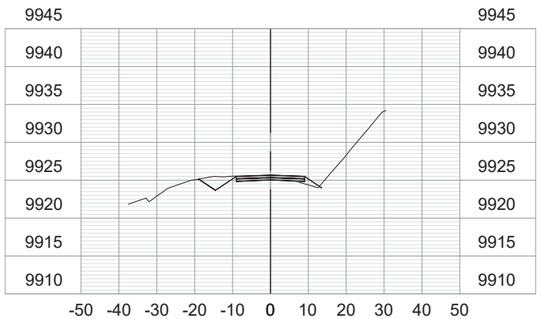
224+00.00 ~ SL-230



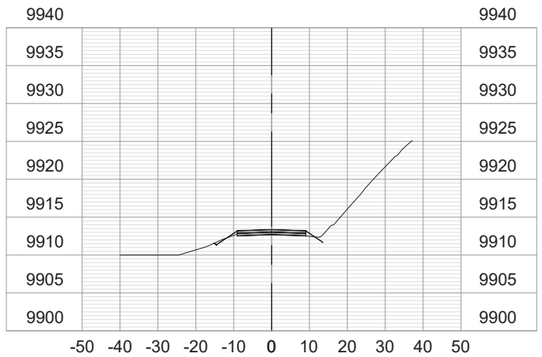
225+50.00 ~ SL-233



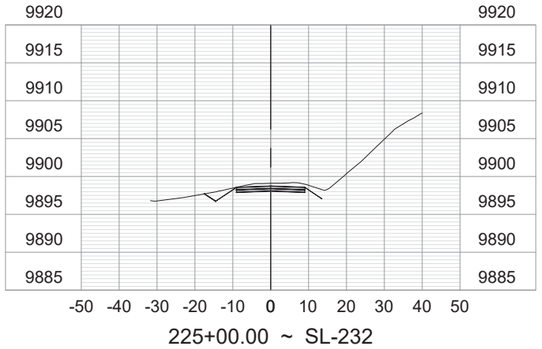
220+50.00 ~ SL-223



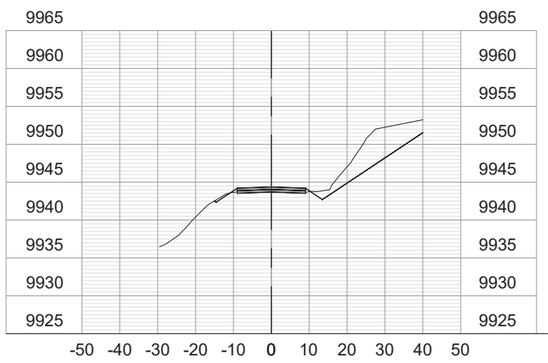
222+00.00 ~ SL-226



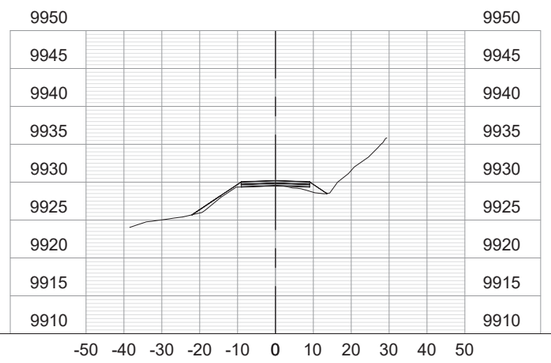
223+50.00 ~ SL-229



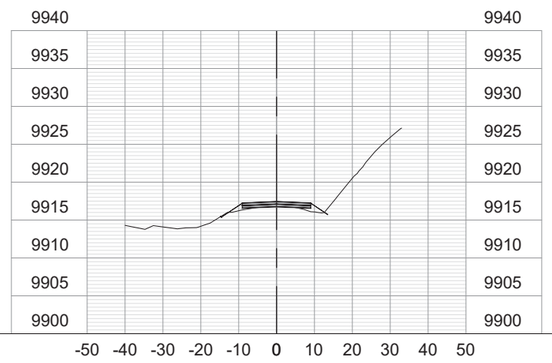
225+00.00 ~ SL-232



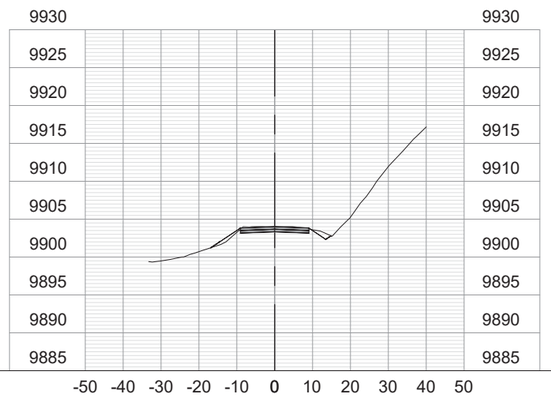
220+00.00 ~ SL-222



221+50.00 ~ SL-225



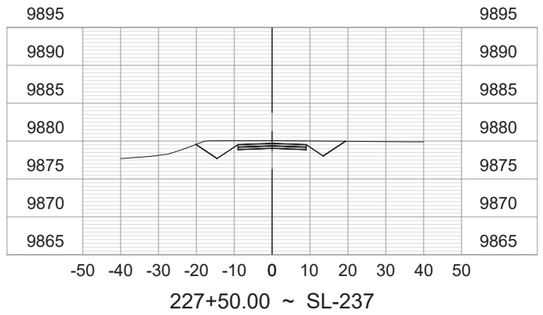
223+00.00 ~ SL-228



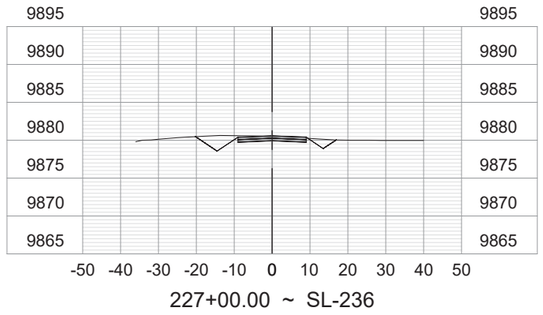
224+50.00 ~ SL-231

CROWN CROSS SECTIONS
STA. 220+00 TO 225+50
1/13/2023

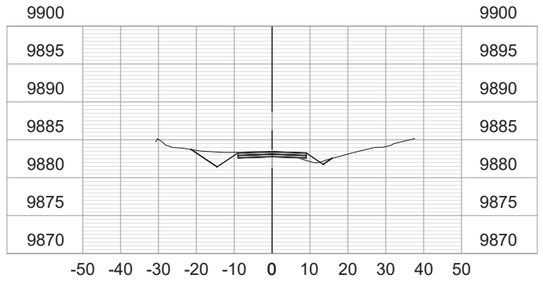
Attachment 2 - Crown Drive



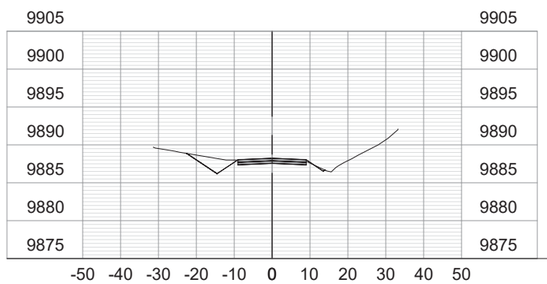
227+50.00 ~ SL-237



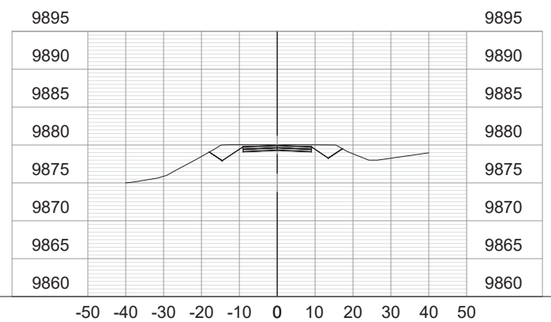
227+00.00 ~ SL-236



226+50.00 ~ SL-235



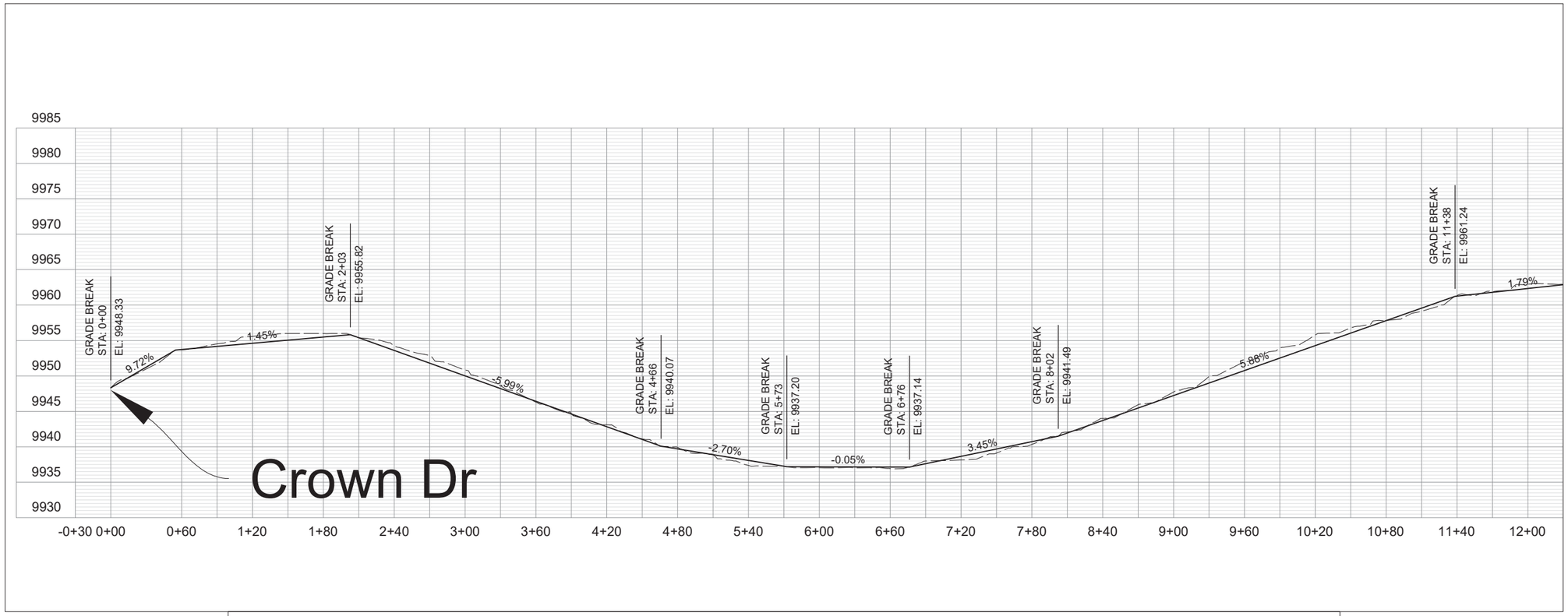
226+00.00 ~ SL-234

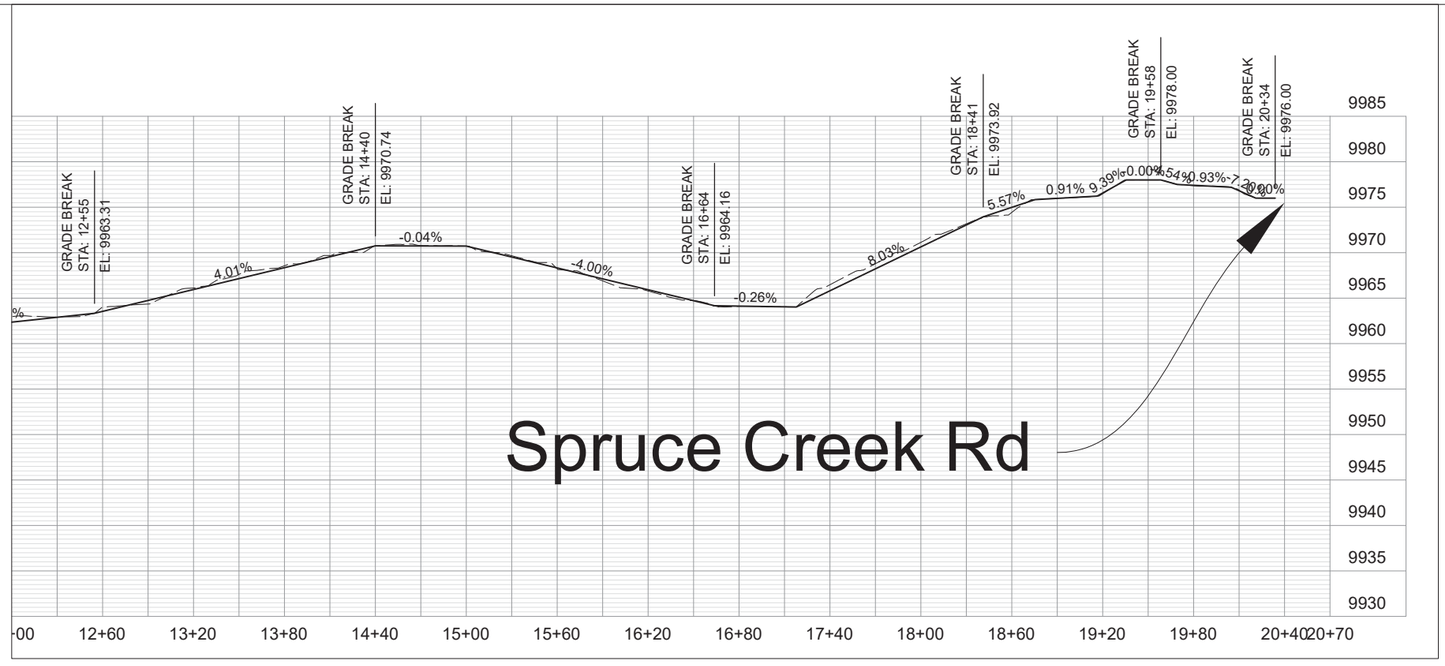


228+00.00 ~ SL-238

CROWN CROSS SECTIONS
STA. 226+00 TO 228+00
1/13/2023

Attachment 2 - Crown Drive





GOLD NUGGET DR PROFILE
1/13/2023

INTERNATIONAL DARK-SKY ASSOCIATION

3223 N First Ave - Tucson Arizona 85719 USA - +1 520-293-3198 - www.darksky.org

TO PRESERVE AND PROTECT THE NIGHTTIME ENVIRONMENT AND OUR HERITAGE OF DARK SKIES THROUGH ENVIRONMENTALLY RESPONSIBLE OUTDOOR LIGHTING

IDA

INTERNATIONAL DARK SKY COMMUNITIES

International Dark Sky Community Program Guidelines

June 2018

TABLE OF CONTENTS

DEFINITION OF AN INTERNATIONAL DARK SKY COMMUNITY

An International Dark Sky Community (IDSC) is town, city, municipality or other similar political entity that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of quality lighting policies, dark-sky education, and citizen support of the ideal of dark skies.

GOALS FOR IDSC CREATION

- To identify communities with exceptional commitment to and success in pursuing dark sky preservation and restoration, and their promotion of quality outdoor lighting
- To promote improved outdoor nighttime quality of life for residents and visitors
- To support protection of human health, nocturnal habitats, public enjoyment of the night sky and its heritage, and/or areas ideal for professional and amateur astronomy
- To provide local, national, and international recognition for such communities
- To promote the ideals of the International Dark-Sky Association (IDA) by encouraging communities to identify dark skies as a valuable community asset and aspiration

DESIGNATION BENEFITS

Achieving this designation brings recognition of the efforts made by the Community government, residents, and public and private organizations to protect the night sky and the nocturnal environment dependent on it. The IDSC designation enhances awareness of dark-sky matters on the part of Community residents and visitors.

Designation as an IDSC entitles the Community to display the International Dark Sky Community logo in official publications, promotions, signs at entrances or within the Community, and retain the use of this logo by other groups within the Community when identifying the area itself[1]. IDA will promote and highlight ongoing Community ef-

[1] For instance, a Community can identify itself as *"Flagstaff, the world's first IDA Dark Sky Community"* or other words to the same effect, or an organization within the Community can state *"located in Flagstaff, an IDA Dark Sky Community"*.

forts to protect night skies, and will maintain pages identifying and describing all IDSCs on its website.

ELIGIBILITY

The Community must have some type of legal organization that is officially recognized by outside groups. This can be in the form of a town, city, municipality, or other legally organized community (such as ~~a~~ urban neighborhoods and subdivisions), but need not be an incorporated entity. Unincorporated or otherwise informally organized communities are eligible for IDSC status if their governing jurisdictions enact public policy consistent with the requirements of "Minimum Requirements For All Communities" (below) that are legally binding in at least the territory of the Community.

MINIMUM REQUIREMENTS FOR ALL COMMUNITIES

1) A quality comprehensive lighting policy like the IDA/IES Model Lighting Ordinance[2] (MLO) that includes all of the following minimum standards for permanent lighting installations[3,4]:

   A) Full shielding[5] of all lighting fixtures over 1000 initial lamp lumens[6]

   B) A limit on the emission of short-wavelength light through one of the following restrictions:

      i) The correlated color temperature (CCT) of lamps must not exceed 3000 Kelvins; **OR**

[2] http://www.darksky.org/our-work/public-policy/mlo/

[3] More information on developing a lighting policy may be found on the IDA website.

[4] Lighting required by law under the authority of any legal jurisdiction higher than that of the Community may be formally exempted from the requirements of this section.

[5] "Fully shielded" is defined as a light source screened and its light directed in such a way that none is emitted above the horizontal plane passing through its lowest light-emitting part.

[6] "Initial lamp lumens" is defined as the number of lumens of light emitted by a lamp when new and not counting any depreciation of output due to the age of the lamp. This information can be found in manufacturer data sheets.

ii) Allowed lighting must not emit more than 25% of its total spectral power at wavelengths < 550 nanometers; **OR**

iii) The scotopic-to-photopic (S/P) ratio of allowed lighting must not exceed 1.3

C) A restriction on the total amount of unshielded lighting, such as a limit on lumens per net acre or a total site lumen allowance in unshielded fixtures (or equivalent wattages)

D) A policy to address over-lighting, such as lumens per net acre caps (irrespective of shielding state) or maximum illuminance specifications

E) Regulations of new installations of publicly-owned outdoor lighting:

i) A provision that clearly indicates where, when, and under what circumstances new publicly owned outdoor lighting, including street lighting, is warranted and will be permitted; **AND**

ii) A provision that requires that adaptive controls[7] and/or curfews[8] be employed in all future installations of public outdoor lighting

F) Restrictions on the installation and operation of illuminated signs[9]:

i) Luminance levels for operation between sunset and sunrise shall not exceed 100 nits (100 candelas per square meter) as measured under conditions of a full white display; **AND**

ii) Sign illumination shall be extinguished completely one (1) hour after sunset, and remain off until one (1) hour before sunrise; **AND**

[7] "Adaptive controls" is defined as devices such as timers, motion-sensors, and light-sensitive switches used to actively regulate the emission of light from light fixtures.

[8] "Curfew" is defined as a period of time at night during which lighting must be significantly dimmed in output or extinguished in accordance with an expected decrease in human presence.

[9] "Illuminated sign" is defined as any informational or advertising sign that is illuminated by either internal or external means. Descriptive terms are adjusted here accordingly according to the type of illumination.

iii) The luminous/illuminated surface area of an individual sign shall not exceed 200 square feet (18.6 square meters)

G) Outdoor recreational and/or athletic field lighting may be exempted from the strict shielding and short-wavelength emission requirements above provided that all of the following conditions are met:

i) Illuminating Engineering Society (IES) lighting guidelines (RP-6) are followed according to the appropriate class of play

ii) Field lighting is provided exclusively for illumination of the surface of play and viewing stands, and not for any other applications

iii) Illuminance levels must be adjustable based on the task (e.g., active play vs. field maintenance)

iv) Off-site impacts of the lighting will be limited to the greatest practical extent possible

v) A strict curfew requirement (e.g., lights must be extinguished by 10pm/2200h or one hour after the end of play, whichever is later) is observed

vi) Timers must be installed to prevent lights being left on accidentally overnight by automatically extinguishing them

H) Affects an amortization period, applicable to **ALL** publicly **AND** privately owned lighting, to end not more than ten (10) years from the effective date of the outdoor lighting policy, after which all non-conforming lighting extant at the time of enactment must be brought into compliance with the policy.

2) Community commitment to dark skies and quality lighting as shown by:

A) City owned lighting conforming with, or committed to conforming with, the lighting policy (if the latter, a detailed plan with a timeline for completion in no more than five (5) years), **AND**

B) Municipal support of dark skies and quality lighting as demonstrated by city publications, flyers, public service announcements, funding of lighting upgrades, etc.

3) Broad support for dark skies from a wide range of community organizations such as chambers of commerce, local electrical utilities, IDA chapters, lighting retailers, homeowners associations, and others.

4) Community commitment to dark skies and education as shown by at least one of the following:

   A) Planning and execution of at least two (2) community dark sky awareness events[10] per year. This may be organized through a local astronomy club, municipality, school, etc.

   B) Inclusion of dark sky awareness documents (IDA brochures or Community-created brochures) with other Community informational documents for residents and visitors.

   C) Inclusion of dark sky education in Community schools and curriculum.

5) Success in light pollution control as demonstrated by at least one of the following:

   A) Examples of a number of construction projects appropriate to the Community population and amount of new construction and renovation activity, built under the lighting policy and demonstrating its effective application

   B) Alternative evidence of success in light pollution control, to be discussed with the International Dark Sky Places Program Manager for compliance.

6) A sky brightness measurement program must be established and maintained either by the Community or by a public or private entity (e.g., university, research center, IDA chapter, astronomy club, etc.) to follow the evolution of light pollution in the IDSC. Applicants are encouraged, but not required, to submit their measurements

[10] Note that astronomy education events such as star parties do NOT qualify as "community dark sky awareness events" unless the presentation explicitly includes a message relating to dark skies and outdoor lighting.

to the citizen science projects such as My Sky At Night (myskyatnight.com) and Globe At Night (globeatnight.org).

7) Once established, the Community must erect and maintain appropriate signage indicating the International Dark Sky Community designation along a roadway entrance, along a footpath entrance if no roadway exists, a public gathering place such as a square or common, or at a municipal government center such as a city or town hall. If approved by IDA, language as an alternative to "International Dark Sky Community" may appear on the signage and in Community communications regarding the IDSC status. Once the sign is erected, a photograph documenting it must be taken and sent to IDA along with a description of its location.

PROVISIONAL STATUS

In some cases, a Community interested in the program may lack all of the resources required to achieve a designation outright. If resource unavailability otherwise hinders the progress of a Community's application, that Community may apply for and be granted Provisional status at the discretion of the IDA Board of Directors. Provisional status recognizes the Community's ongoing work to become an International Dark Sky Community and is intended as a leverage point to successfully enable actions such as lighting upgrades/retrofits.

Provisional status expires after three (3) years. At any time before the end of this period, a Community may reapply for full status. Material submitted for the removal of Provisional status may be an addendum to the initial application as long as the material includes a current assessment of the goals, outreach efforts, and lighting policy listed in the original application and clearly demonstrates that any program requirements left unmet at receipt of the Provisional status have been satisfied.

To be considered for ~~a~~ Provisional status, send a nomination package to IDA that includes all of the following information:

1) Documented intent to create and support an IDA Dark Sky Community
2) An enacted and legally effective outdoor lighting policy, and summary of outreach efforts to date
3) A description of the circumstances that currently prevent the Community from meeting the minimum Dark Sky Community requirements
4) An action plan describing steps the aspiring Community will take to meet all program requirements in the specified Provisional status period

IDSC APPLICATION PROCESS

NOMINATION

The nomination may be initiated by an IDA qualified nominator[11] who has personally reviewed a Community's outdoor lighting and commitment to night sky preservation. Nominators are encouraged to correspond with IDA staff and the Community throughout this process. In addition, the application must include evidence, such as in the form of a letter of support, from the Community government (mayor, council, etc.) consenting to the nomination for IDSC status.

STEPS FOR APPLICANT

1. Make initial contact with IDA by phone or email to discuss the process and receive recommendations, followed by continued communications to update IDA staff on progress and receive continued assistance.

2. Designate a formal point of contact (POC) person, such as a project manager, and provide their telephone number, address and email address to IDA staff. Before and after designation, any changes to this POC, or their information, must be communicated to IDA immediately in order to ensure accurate communication at all times.

3. Obtain a letter of nomination from a qualified IDA member nominator, as well as a supporting letter from elected representatives of the Community, such as the mayor and/or council of a municipality. Solicit additional letters of support from Community organizations, clubs, groups, universities, etc.

4. Upon completion, sends the application to IDA staff for review of the document at least one month before the chosen submission deadline date. IDA staff will confirms that the application is complete and ready for submission or return it with suggestions for improvements.

5. Submit the final application packet electronically in PDF and/or Microsoft Word (.doc) format to IDA staff for formal review. Submit in plenty of time for IDA staff

[11] An "IDA qualified nominator" is defined here as an individual or organization holding an IDA membership in good standing at the time that the IDSC application is submitted. The Community itself may join IDA as an organizational member and self-nominate.

to review and prepare your application to make the bi-monthly deadline that you prefer, as found on the IDA website. Requests to rush applications will **NOT** be honored; planning ahead is essential if the Community wishes to meet a specific deadline.

TO BE INCLUDED IN IDSC APPLICATION PACKAGE

1. Map of the Community clearly indicating its legal boundaries, and basic factual information about the Community

2. Letter of nomination support by IDA qualified nominator and elected representatives of the Community such as the mayor and/or council

3. The Community's lighting policy, meeting the minimum requirements as stated in the "Minimum Requirements For All Communities" section

4. Documentation of examples of Community commitment and construction/renovation projects demonstrating effective application of the lighting policy

5. Proposed alternative wording for a IDSC (e.g. Dark Sky Village, Starry Sky City, etc.), if desired, with a justification for the request

IDA REVIEW PROCESS

Six (6) application submission deadlines occur in each calendar year, commencing in January and continuing every other month. Before the Community's final application is submitted, it is highly recommended that the Community be in regular communication with the International Dark Sky Places Program Manager to perfect the application by the next application deadline.

The International Dark Sky Places Manager will forward applications to the IDA Dark Sky Places Committee (DSPC) for review. DSPC review lags the submission dates by one two-month cycle. The total elapsed time between deadline and final IDSC designation approval is approximately ten (10) weeks.

Endorsement of applications by the DSPC is by a 2/3 supermajority vote; otherwise, the DSPC will return applications with reasons for denial of an endorsement and specific recommendations for improvement. If endorsed, the applicants will be notified and the International Dark Sky Places Program Manager will present the application to the IDA Board of Directors (BOD) for final review and approval. A ten (10)-calendar-day

waiting period then commences during which the Board of Directors has the right to deny IDSC status should it determine that any problems with the application exist.

If the BOD registers no objection within the ten-calendar-day waiting period, the IDSC designation is considered immediately awarded by IDA. The Community has the right to choose when the designation is made public, but it must organize the announcement to be made at the same time as the IDA public notice unless otherwise agreed by both parties. Along with the announcement notice, IDA will publish the Community's application on its website; by submitting the application, the Community acknowledges in advance that the application will be made publicly available. If an application is denied final approval by the IDA BOD, a letter will be sent to the applicant outlining elements of the application that need improvement along with specific recommendations for ways to remedy any problems the BOD identifies. Applications may be resubmitted for future consideration after remediation is complete. Resubmitted applications will be considered without prejudice.

IDA realizes that certain circumstances surrounding an IDSC application may cause some potential authors of letters of support (or opposition) to feel uneasy about publicly declaring their opinions about the IDA designation. In the interest of providing the DSPC with as full a picture of Community sentiment about applications as possible, certain letters may be suppressed from online publication if it is felt that making the letters publicly available will subject their authors to retaliation or harassment. A prospective IDSC seeking this protection for letter-writers must make a formal written request. The International Dark Sky Places Program Manager must approve suppression of publication of any part of an application. Note that suppression of online publication does not prevent either the DSPC or the IDA BOD from reading all submitted letters.

POST-DESIGNATION REVIEW AND MAINTENANCE

The IDSC designation is not awarded in perpetuity. Rather, it is subject to regular review by IDA and possible revocation if the minimum program requirements are not maintained. More details may be found in the "Reassessment of IDSC designation" section below.

To ensure that Communities remain exemplary in their protection and restoration of natural nighttime darkness, IDA will periodically reevaluate each site in the International Dark Sky Places Program. This is done to confirm that the Community continues to meet the minimum requirements and is making adequate progress toward LMP compliance goals outlined in this document.

Each designated IDSC must submit to IDA a written report of its activities related to the maintenance of its designation on or before 1 October of each calendar year. The report is a short (typically less than ten-page) synopsis of the Community's activities and initiatives during the intervening year[12]. The report should include dates and brief descriptions of any interpretive events, lighting retrofit projects, outreach efforts, etc. Samples of printed materials and press articles should also be included, if available.

Annual reports should not be burdensome to produce, as they are intended as a compilation of information accumulated throughout the year. Annual reports and supporting documentation must be submitted electronically to the International Dark Sky Places Program Manager in either PDF or Microsoft Word format. If the annual report is not received by IDA in a timely fashion, IDA may suspend the site's IDSC status until the annual reporting requirement has been met (see the following section). On or about 1 August and 1 September of each year, the International Dark Sky Places Program Manager will remind local contacts at each IDSC of the pending 1 October annual report submission deadline.

A designated IDSC is exempt from the annual reporting requirement in the calendar year in which the IDA designation was awarded. If the designation is received after 1 October of a given calendar year, the IDSC's first annual report to IDA will be due on 1 October of the following calendar year.

REASSESSMENT OF IDSC DESIGNATIONS

From time to time, IDA receives comments from visitors to Communities that raise concerns about the veracity and timeliness of information provided to IDA by site administrators. IDA may, at its discretion, investigate claims in which it is alleged that IDSCs are not adhering to commitments made to IDA and to the public in their applications to the Program. This section details the IDA procedure for carrying out such investigations, and the rights of IDSCs in such matters.

An allegation of impropriety concerning any of the elements of participation in the Program outlined in this document is subject to IDA investigation and potential remedial action including temporary suspension and/or permanent revocation of the IDSC designation. IDA staff shall perform due diligence in gathering facts concerning such allegations it deems credible, and will prepare a report of its findings for consideration by the DSPC. The DSPC commits to weighing the evidence fairly and impartially, and to

[12] Examples of acceptable annual reports are available on the individual IDSC pages on the IDA website.

seek to resolve disputes whenever possible through dialog. A Community subject to an investigation shall be notified in a timely manner and solicited for evidence contrary to the specifics of the allegation at hand. The Community will be given an opportunity to correct any deficiencies with regard to the Program guidelines established by the IDA investigation within a reasonable time period to be prescribed by the DSPC.

Failure to achieve consensus through these means risks a DSPC recommendation for suspension or revocation of the IDSC designation. If made, such a recommendation will be forwarded to the IDA Board of Directors for formal ratification before coming into force. The Board's decision on any disciplinary matters involving an IDSC shall be considered definitive and binding.

Any IDSC so investigated has the right to review the allegations against it and all factual information collected by IDA pertinent to the allegations.

REINSTATEMENT FOLLOWING SUSPENSION

If the DSPC recommends a suspension of a Community's IDSC designation and the Board ratifies the suspension, the Community administration shall be immediately notified. The status of a suspended IDSC shall be changed to "Provisional" in all IDA communications until the designation is reinstated or revoked; however, the process of obtaining reinstatement of a designation is not the same as that outlined in the "Provisional Status" section of these guidelines.

To obtain reinstatement of a suspended designation, the IDSC must provide evidence to the DSPC's satisfaction that the specific issues identified by the DSPC as grounds for the suspension have been corrected and that all Program guidelines are once again met. The DSPC will consider the evidence presented by the IDSC and render a judgment to either:

- Accept the reinstatement petition, **OR**
- Reject the petition and recommend revocation, **OR**
- Return the petition with further instructions and a defined deadline for a IDSC response.

REVOCATION

A suspension left unresolved after one (1) year from the date of the Board's assent to the suspension automatically becomes a permanent revocation. Revocation entails removal of the IDSC from IDA's roll of approved International Dark Sky Places, and from mention on the IDA website and in member and external communications. IDA reserves the right to take legal action against any former IDSC whose designation is duly revoked but continues to use the IDA name/logo in advertising, communications,

and/or signage.

INTERNATIONAL DARK-SKY ASSOCIATION

INTERNATIONAL DARK SKY PLACE (IDSP) APPLICATION PROCESS

PHASE I: INITIAL INQUIRY

Applicant reviews eligibility with IDA staff; notifies IDA of intent to pursue IDSP application

Average Timeline: 45 days*

STEP 1: The applicant reviews certification process; indicates interest in the program
>Anytime; via darksky.org

STEP 2: The applicant receives an assessment of site eligibility and IDSP category recommendation from IDA staff
>Within 30 days of initial inquiry submission; Via communication with IDSP staff

STEP 3: After eligibility is determined by IDA staff, the applicant notifies IDA of intent to pursue formal Dark Sky Place certification
>Timeline varies based on eligibility and guideline requirements; Applicant confirms intent with IDSP staff via written communication

PHASE II: FORMAL APPLICATION

With support from IDA staff, applicant actively works to meet the application requirements.

Average Timeline: 1-3 years

STEP 1: The applicant works closely with IDSP Manager to develop application in accordance with appropriate guidelines
>Anytime, ongoing; Via email with IDSP staff/manager

STEP 2: With IDSP Manager approval, the applicant submits an application for Dark Sky Places Committee (DSPC) review
>On or before submission deadline for review at the following committee meeting; Via submission to IDSP Program Manager

PHASE III: CERTIFICATION

Applicant waits while review is in process

Average Timeline: 90-150 days

STEP 1: Application is reviewed by DSPC. One of the following outcomes occur:
>Application is approved by DSPC - application is submitted for approval by IDA Board of Directors
>Application is approved by DSPC with conditions - application is revised, applicant may resubmit anytime for re-review by DSPC
>Application is rejected - updated application may be eligible for submission at future deadline

STEP 2: DSPC submits recommendations to IDA Board for final approval
>Board approves or returns the application 10 business days after DSPC approval

STEP 3: New IDSP is certified upon Board Approval
>Announcement is coordinated with IDA staff at the applicant's discretion

*Phase I timeline varies depending on eligibility status and complexity of proposed place

Illuminating
ENGINEERING SOCIETY

INTERNATIONAL DARK-SKY ASSOCIATION

JOINT IDA - IES

MODEL LIGHTING ORDINANCE (MLO)

with USER'S GUIDE

June 15, 2011

The User Notes

The User Notes are intended to clarify the sections of the MLO for the various audiences who will use it: lighting designers, city officials, engineers, citizen groups, and others. Every effort has been made to keep the language technically accurate and clear, but since different disciplines may use the same term in different ways, or have different interpretations, some guidance may be helpful. While these Notes can not be a full tutorial on modern lighting design, it is hoped that the Notes will help facilitate the dialogue necessary to adopt the MLO.

Background

The problems of light pollution first became an issue in the 1970s when astronomers identified the degradation of the night sky due to the increase in lighting associated with development and growth. As more impacts to the environment by lighting have been identified, an international "dark sky" movement is advocating for the precautionary approach to outdoor lighting design.

Many communities have passed anti-light-pollution laws and ordinances. However, there is little or no agreement among these laws, and they vary considerably in language, technical quality, and stringency. This is confusing for designers, engineers, and code officials. The lack of a common basis prevents the development of standards, educational programs, and other means of achieving the goal of effective lighting control.

This MLO will allow communities to drastically reduce light pollution and glare and lower excessive light levels. The recommended practices of the IES can be met using readily available, reasonably priced lighting equipment. However, many conventional lighting practices will no longer be permitted, or will require special permits.

This Model Lighting Ordinance (MLO) is the result of extensive efforts by the International Dark Sky Association (IDA) and the Illuminating

Engineering Society of North America (IES). Among its features is the use of lighting zones (LZ0-4) which allow each governing body to vary the stringency of lighting restrictions according to the sensitivity of the area as well as accommodating community intent. In this way, communities can fine-tune the impact of the MLO without having to customize the MLO. The MLO also incorporates the Backlight-Uplight-Glare (BUG) rating system for luminaires, which provides more effective control of unwanted light.

Joint IDA-IESNA Model Outdoor Lighting Ordinance (MLO)

June 15, 2011

CONTENTS

General Notes in Adopting this Model Ordinance

Adoption of this ordinance should follow the established development, review, and approval processes of the adopting authority. If no such processes are in place, this ordinance may be adopted as a new independent section of the Municipal Code.

The MLO is probably best adopted as an "overlay zoning" ordinance. This means that it overlays, but is different from, land-use zoning. It can be added to or integrated into existing ordinances or codes and cross-referenced to other applicable codes and ordinances such as the electrical code, the sign code, planning ordinances, etc.

The MLO may best be managed by assigning it to planning officials and using existing administrative structures.

Because of the diverse community and lighting needs across large areas, this MLO is not intended for adoption as a state, provincial or national ordinance. Regional coordination is encouraged. Light pollution knows no boundaries, and the effects of polluting light persist as far as 200 kilometers (about 120 miles) from the source. One large city could adopt the MLO and dramatically affect a region, but adoption in suburbs and small towns must be part of a regional effort to achieve significant improvements in the overall quality of the night sky.

Adopting agencies should also consider that the MLO, like all other modern codes, is designed to evolve over time. Lighting technology will change, and MLO changes will be needed every few years. On-going renewal cycles are strongly recommended as any part of an adopting ordinance.

MLO Development and Task Force Members

This Model Lighting Ordinance has been developed as a joint undertaking by the Illuminating Engineering Society and the International Dark-Sky Association.

The Joint Task Force responsible for developing the MLO include

IDA	IES
Co-Chair: Jim Benya	Naomi Miller
Co-Chair: Nancy Clanton	Cheryl English
Leslie Lipstein	Denis Lavoie
Leo Smith	Eric Gibson
Michael Mutmansky	

John Walter representing the electric utility industry also contributed as a member of the Joint Task Force.

I. PREAMBLE - User's Guide

In general, the preamble is part of the ordinance but is typically not part of the code. It establishes the reasons why the municipality is undertaking these regulations.

Local governments may add other purposes to the Preamble including established local government environmental or energy goals that support the model lighting ordinance. The environmental impacts of outdoor lighting fall into two categories: carbon footprint (energy used in the life of a lighting product) and obtrusive light.

CARBON FOOTPRINT	OBTRUSIVE LIGHT
Cost & Impact of Mining the Materials Used	Impact on Humans
Energy Used in Production	Impact on the Environment
Energy Used during Product Life	
Disposal/Recylcing Costs	

II. LIGHTING ZONES - User's Guide

Lighting zones reflect the base (or ambient) light levels desired by a community. The use of lighting zones (LZ) was originally developed by the International Commission on Illumination (CIE) and appeared first in the US in IES Recommended Practice for Exterior Environmental Lighting, RP-33-99.

It is recommended that lower lighting zone(s) be given preference when establishing zoning criteria. Selection of lighting zone or zones should be based not on existing conditions but rather on the type of lighting environments the jurisdiction seeks to achieve. For instance, new development on previously rural or undeveloped land may be zoned as LZ-1.Using lighting zones allows a great deal of flexibility and customization without the burden of excessive regulation. For example, a jurisdiction may choose to establish vertical lighting zones with the lighting zone at street level at a higher zone than the residential housing on upper levels.

I. PREAMBLE - Ordinance Text

The purpose of this Ordinance is to provide regulations for outdoor lighting that will:

a. Permit the use of outdoor lighting that does not exceed the minimum levels specified in IES recommended practices for night-time safety, utility, security, productivity, enjoyment, and commerce.

b. Minimize adverse offsite impacts of lighting such as light trespass, and obtrusive light.

c. Curtail light pollution, reduce skyglow and improve the nighttime environment for astronomy.

d. Help protect the natural environment from the adverse effects of night lighting from gas or electric sources.

e. Conserve energy and resources to the greatest extent possible.

II. LIGHTING ZONES - Ordinance Text

The Lighting Zone shall determine the limitations for lighting as specified in this ordinance. The Lighting Zones shall be as follows:

LZ0: No ambient lighting

Areas where the natural environment will be seriously and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and/or detracting from human enjoyment and appreciation of the natural environment. Human activity is subordinate in importance to nature. The vision of human residents and users is adapted to the darkness, and they expect to see little or no lighting. When not needed, lighting should be extinguished.

II. LIGHTING ZONES (cont.) - User's Guide

However, if an adjacent use could be adversely impacted by allowable lighting, the adopting authority may require that a particular site meet the requirements for a lower lighting zone. For example, the authority could specify Lighting Zone 1 or 2 requirements if a commercial development were adjacent to a residence, hospital or open space, or to any land assigned to a lower zone.

Lighting zones are best implemented as an overlay to the established zoning especially in communities where a variety of zone districts exists within a defined area or along an arterial street. Where zone districts are cohesive, it may be possible to assign lighting zones to established land use zoning. It is recommended that the lighting zone includes churches, schools, parks, and other uses embedded within residential communities.

Zone	Recommended Uses or Areas	Zoning Considerations
LZ-0	Lighting Zone 0 should be applied to areas in which permanent lighting is not expected and when used, is limited in the amount of lighting and the period of operation. LZ-0 typically includes undeveloped areas of open space, wilderness parks and preserves, areas near astronomical observatories, or any other area where the protection of a dark environment is critical. Special review should be required for any permanent lighting in this zone. Some rural communities may choose to adopt LZ-0 for residential areas.	Recommended default zone for wilderness areas, parks and preserves, and undeveloped rural areas. Includes protected wildlife areas and corridors.
LZ-1	Lighting Zone 1 pertains to areas that desire low ambient lighting levels. These typically include single and two family residential communities, rural town centers, business parks, and other commercial or industrial/ storage areas typically with limited nighttime activity. May also include the developed areas in parks and other natural settings.	Recommended default zone for rural and low density residential areas. Includes residential single or two family; agricultural zone districts; rural residential zone districts; business parks; open space include preserves in developed areas.

II. LIGHTING ZONES (cont.) - Ordinance Text

LZ1: Low ambient lighting

Areas where lighting might adversely affect flora and fauna or disturb the character of the area. The vision of human residents and users is adapted to low light levels. Lighting may be used for safety and convenience but it is not necessarily uniform or continuous. After curfew, most lighting should be extinguished or reduced as activity levels decline.

LZ2: Moderate ambient lighting

Areas of human activity where the vision of human residents and users is adapted to moderate light levels. Lighting may typically be used for safety and convenience but it is not necessarily uniform or continuous. After curfew, lighting may be extinguished or reduced as activity levels decline.

LZ3: Moderately high ambient lighting

Areas of human activity where the vision of human residents and users is adapted to moderately high light levels. Lighting is generally desired for safety, security and/or convenience and it is often uniform and/or continuous. After curfew, lighting may be extinguished or reduced in most areas as activity levels decline.

LZ4: High ambient lighting

Areas of human activity where the vision of human residents and users is adapted to high light levels. Lighting is generally considered necessary for safety, security and/or convenience and it is mostly uniform and/or continuous. After curfew, lighting may be extinguished or reduced in some areas as activity levels decline.

II. LIGHTING ZONES (cont.) - User's Guide

Zone	Recommended Uses or Areas	Zoning Considerations
LZ-2	**Lighting Zone 2 pertains to areas with moderate ambient lighting levels. These typically include multifamily residential uses, institutional residential uses, schools, churches, hospitals, hotels/motels, commercial and/or businesses areas with evening activities embedded in predominately residential areas, neighborhood serving recreational and playing fields and/or mixed use development with a predominance of residential uses. Can be used to accommodate a district of outdoor sales or industry in an area otherwise zoned LZ-1.**	**Recommended default zone for light commercial business districts and high density or mixed use residentialdistricts.** Includes neighborhood business districts; churches, schools and neighborhood recreation facilities; and light industrial zoning with modest nighttime uses or lighting requirements.
LZ-3	**Lighting Zone 3 pertains to areas with moderately high lighting levels. These typically include commercial corridors, high intensity suburban commercial areas, town centers, mixed use areas, industrial uses and shipping and rail yards with high night time activity, high use recreational and playing fields, regional shopping malls, car dealerships, gas stations, and other nighttime active exterior retail areas.**	**Recommended default zone for large cities' business district.** Includes business zone districts; commercial mixed use; and heavy industrial and/or manufacturing zone districts.
LZ-4	**Lighting zone 4 pertains to areas of very high ambient lighting levels. LZ-4 should only be used for special cases and is not appropriate for most cities. LZ-4 may be used for extremely unusual installations such as high density entertainment districts, and heavy industrial uses.**	**Not a default zone**. Includes high intensity business or industrial zone districts.

III. GENERAL REQUIREMENTS - User's Guide

This Section sets out the requirements that apply to all lighting, both residential and non-residential.

Each adopting jurisdiction should incorporate their existing standards as to when compliance with new regulations is required, when repair or remodeling triggers compliance and if the new ordinance will be retroactive to existing development. The Applicability section of this model ordinance should serve as a guide if the adopting jurisdiction does not have standards or policies in place. Likewise, the adopting jurisdiction should use their existing policies and definitions of what constitutes public monuments, and temporary and/or emergency lighting. Community attitudes and precedents should be taken into account in deciding to regulate seasonal holiday lighting.

EXEMPTIONS - User's Guide

This is standard language intended to prevent conflict of laws and to give the community the ability to set specific lighting requirements in special plans and under use permits. It can be amended to conform to similar language in other ordinances. For example, while public monuments, statuary, and flags should be lighted, the lighting also should be limited to avoid excess.

Lighting for streets, roads, and highways is usually regulated by a street lighting ordinance, and is not covered by this model ordinance. However, since street lighting can affect nearby areas, some recognition of its effect is appropriate. (See Section XI)

SIGN LIGHTING - User's Guide

A sign lighting ordinance is strongly recommended if not already in place. It should carefully limit lighting to prevent over-lighted signs from being used to circumvent lighting ordinances.

III. GENERAL REQUIREMENTS - Ordinance Text

A. Conformance with All Applicable Codes

All outdoor lighting shall be installed in conformance with the provisions of this Ordinance, applicable Electrical and Energy Codes, and applicable sections of the Building Code.

B. Applicability

Except as described below, all outdoor lighting installed after the date of effect of this Ordinance shall comply with these requirements. This includes, but is not limited to, new lighting, replacement lighting, or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party.

Exemptions from III.(B.) The following are not regulated by this Ordinance

a. Lighting within public right-of-way or easement for the principal purpose of illuminating streets or roads. No exemption shall apply to any lighting within the public right of way or easement when the purpose of the luminaire is to illuminate areas outside the public right of way or easement, unless regulated with a streetlighting ordinance.

Note to adopting agency: if using the street lighting ordinance (Section XI), this exemption should read as follows:

Lighting within the public right-of-way or easement for the principal purpose of illuminating roads and highways. No exemption shall apply to any street lighting and to any lighting within the public right of way or easement when the purpose of the luminaire is to illuminate areas outside of the public right of way or easement.

b. Lighting for public monuments and statuary.

c. Lighting solely for signs (lighting for signs is regulated by the Sign Ordinance).

d. Repairs to existing luminaires not exceeding 25% of total installed luminaires.

LIGHTING CONTROLS - User's Guide

This section requires all outdoor lighting to have lighting controls that prohibit operation when sufficient daylight is available, and to include the capability, either through circuiting, dimming or alternating sources, to be able to reduce lighting without necessarily turning all lighting off.

III. GENERAL REQUIREMENTS (cont.) - Ordinance Text

e. Temporary lighting for theatrical, television, performance areas and construction sites;

f. Underwater lighting in swimming pools and other water features

g. Temporary lighting and seasonal lighting provided that individual lamps are less than 10 watts and 70 lumens.

h. Lighting that is only used under emergency conditions.

i. In lighting zones 2, 3 and 4, low voltage landscape lighting controlled by an automatic device that is set to turn the lights off at one hour after the site is closed to the public or at a time established by the authority.

Exceptions to III. (B.) All lighting shall follow provisions in this ordinance; however, any special requirements for lighting listed in a) and b) below shall take precedence.

a. Lighting specified or identified in a specific use permit**.**

b. Lighting required by federal, state, territorial, commonwealth or provincial laws or regulations.

C. Lighting Control Requirements

1. Automatic Switching Requirements
   Controls shall be provided that automatically extinguish all outdoor lighting when sufficient daylight is available using a control device or system such as a photoelectric switch, astronomic time switch or equivalent functions from a programmable lighting controller, building automation system or lighting energy management system, all with battery or similar backup power or device.

CURFEW REQUIREMENTS - User's Guide

The intent is to reduce or eliminate lighting after a given time. Benefits include reduced environmental impact, longer hours of improved astronomy, energy savings, and improved sleeping conditions for residents. Additionally, some police departments have indicated that post-curfew light reductions make drive-by patrolling easier because it allows them to see further into and through a site.

The authority should determine the time of curfew and the amount of lighting reduction based on the character, norms and values of the community.

Typically, curfews go into effect one hour after the close of business. Restaurants, bars and major entertainment facilities such as sports stadiums, may require the curfew go into effect two hours after the close of business. The authority may elect to have no curfew for facilities with shift workers and 24 hour operations, or to extend the curfew time to meet specific needs. The MLO can be modified to address those concerns.

Areas without street lights or with very low ambient light levels should consider turning off all non-emergency lighting at curfew while commercial areas or urban areas may prefer a reduction in lighting levels. A reduction of at least 30% is recommended for most uses.

III. GENERAL REQUIREMENTS (cont.) - Ordinance Text

Exceptions to III.(C.) 1. Automatic lighting controls are not required for the following:

a. Lighting under canopies.

b. Lighting for tunnels, parking garages, garage entrances, and similar conditions.

2. Automatic Lighting Reduction Requirements
The Authority shall establish curfew time(s) after which total outdoor lighting lumens shall be reduced by at least 30% or extinguished.

Exceptions to III.(C.) 2. Lighting reductions are not required for any of the following:

a. With the exception of landscape lighting, lighting for residential properties including multiple residential properties not having common areas.

b. When the outdoor lighting consists of only one luminaire.

c. Code required lighting for steps, stairs, walkways, and building entrances.

d. When in the opinion of the Authority, lighting levels must be maintained.

e. Motion activated lighting.

f. Lighting governed by special use permit in which times of operation are specifically identified.

g. Businesses that operate on a 24 hour basis.

IV. NON-RESIDENTIAL LIGHTING - User's Guide

This section addresses non-residential lighting and multiple-family residences having common spaces, such as lobbies, interior corridors or parking. Its intent is to:

- **Limit the amount of light that can be used**
- **Minimize glare by controlling the amount of light that tends to create glare**
- **Minimize sky glow by controlling the amount of uplight**
- **Minimize the amount of off-site impacts or light trespass**

This MLO provides two methods for determining compliance. The *prescriptive method* contains precise and easily verifiable requirements for luminaire light output and fixture design that limit glare, uplight, light trespass and the amount of light that can be used. The *performance method* allows greater flexibility and creativity in meeting the intent of the ordinance. Note that both the prescriptive and the performance method limit the *amount* of light that can be used, but do not control *how* the lighting is to be used.

Most outdoor lighting projects that do not involve a lighting professional will use the prescriptive method, because it is simple and does not require engineering expertise.

For the prescriptive method, the initial luminaire lumen allowances defined in Table A (Parking Space Method) or B (Hardscape Area Method) will provide basic lighting (parking lot and lighting at doors and/or sensitive security areas) that is consistent with the selected lighting zone. The prescriptive method is intended to provide a safe lighting environment while reducing sky glow and other adverse offsite impacts. The Per Parking Space Method is applicable in small rural towns and is a simple method for small retail "mom and pop" operations without drive lane access and where the parking lot is immediately adjacent to the road. A jurisdiction may

IV. NON-RESIDENTIAL LIGHTING - Ordinance Text

For all non-residential properties, and for multiple residential properties of seven domiciles or more and having common outdoor areas, all outdoor lighting shall comply either with Part A or Part B of this section.

PRESCRIPTIVE METHOD - User's Guide

also allow a prescriptive method for classes of sites, such as car dealerships, gas stations, or other common use areas.

Note that the values are for initial luminaire lumens, not footcandles on the target (parking lot, sidewalk, etc). Variables such as the efficiency of the luminaire, dispersion, and lamp wear can affect the actual amount of light so the lumens per square foot allowance is not equal to footcandles on the site. By specifying initial luminaire lumen values, it is easier for officials to verify that the requirement is being met. Initial luminaire lumens are available from photometric data. Each initial luminaire lumens calculation should be supplied on the submittal form.

Solid state luminaires, such as LEDs, do not have initial lamp lumens, only initial luminaire lumens (absolute photometry). Other luminaires tested with relative photometry will have initial luminaire lumens which can be calculated by multiplying initial lamp lumens by the luminaire efficiency. In this example, three types of luminaires are used to light a parking area and building entry in a light commercial area. Two of these three luminaires use metal halide lamps: 70 watt wall mounted area lights and 150 watt pole mounted area lights. For these, the Initial Luminaire Lumens is equal to the initial lamp lumens multiplied by the luminaire efficiency. These values are entered into the compliance chart. The lumen value for the building mounted LED luminaires is equal to the lumens exiting the luminaire. Therefore, the value already represents the Initial Luminaire Lumens and no luminaire efficiency is needed. The total Luminaire Lumens for the site is equal to 247,840.

The allowable lumens are based on the lighting zone and the total hard-scape area. Referencing Table B, the allowed lumens are 2.5/SF for LZ2. Multiplying this by the total hardscape square footage gives a value of 250,000 lumens allowed. Because this value is greater than the value calculated for the site, the project complies. Listed below is an example on a typical compliance worksheet for the Prescriptive Method.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

A. Prescriptive Method

An outdoor lighting installation complies with this section if it meets the requirements of subsections 1 and 2, below.

1. Total Site Lumen Limit

The total installed initial luminaire lumens of all outdoor lighting shall not exceed the total site lumen limit. The total site lumen limit shall be determined using either the Parking Space Method (Table A) or the Hardscape Area Method (Table B). Only one method shall be used per permit application, and for sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens.

The total installed initial luminaire lumens is calculated as the sum of the initial luminaire lumens for all luminaires.

IV. NON-RESIDENTIAL LIGHTING (cont.) - User's Guide

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

In this example, three types of luminaires are used to light a parking area and building entry in a light commercial area. Two of these three luminaires use metal halide lamps: 70 watt wall mounted area lights and 150 watt pole mounted area lights. For these, the Initial Luminaire Lumens is equal to the initial lamp lumens multiplied by the luminaire efficiency. These values are entered into the compliance chart. The lumen value for the building mounted LED luminaires is equal to the lumens exiting the luminaire. Therefore, the value already represents the Initial Luminaire Lumens and no luminaire efficiency is needed. The total Luminaire Lumens for the site is equal to 247,840. The allowable lumens are based on the lighting zone and the total hardscape area. Referencing Table B, the allowed lumens are 2.5/SF for LZ2. Multiplying this by the total hardscape square footage gives a value of 250,000 lumens allowed. Because this value is greater than the value calculated for the site, the project complies.

PRESCRIPTIVE METHOD EXAMPLE - COMPLIANCE CHART			
Lamp Descriptions	*QTY*	*Initial Luminaire Lumens*	*Total*
70 W Metal Halide	8	3,920	31,360
150 W Metal Halide	20	9,600	192,000
18 W LED	24	1,020	24,480
TOTAL INITIAL LUMINAIRE LUMENS			247,840
SITE ALLOWED TOTAL INITIAL LUMENS*			250,000
PROJECT IS COMPLIANT?			YES

* Listed below is the method of determining the allowed total initial lumen for non-residential outdoor lighting using the hardscape areamethod. (Table B).

SITE ALLOWED TOTAL INITIAL LUMENS	
Site Description	Light Commercial
Lighting Zone	LZ-2
Hardscape Area (SF)	100,000
Allowed Lumens per SF of Hardscape (Table B)	2.5
Site Allowed Total Initial Lumens (lumens per SF X hardscape area)	250,000

PRESCRIPTIVE METHOD (cont.) - User's Guide

LIMITS TO OFFSITE IMPACTS

The prescriptive method of the MLO restricts uplighting, including upward light emitted by decorative luminaires. A jurisdiction may choose to preserve some types of lighting, including lighting of monuments or historic structures. In this case, the adopting jurisdiction should exempt or otherwise regulate these types of lighting carefully so that it does not inadvertently allow glaring or offensive lighting systems.

Offsite effects of light pollution include glare, light trespass, sky glow, and impacts on the nocturnal environment . All of these are functions of the fixture or luminaire design and installation. This document replaces the previous luminaire classification terminology of full cut-off, semi cut-off, and cut-off because those classifications were not as effective in controlling offsite impacts as with the new IESNA luminaire classification system as described in TM-15-07.

A traditional method of defining light trespass is to identify a maximum light level at or near the property line. However, this method does not address offensive light that is not directed toward the ground, or the intensity of glaring light shining into adjacent windows. The requirements defined in Table C limit the amount of light in all quadrants that is directed toward or above the property line. The Backlight/Uplight/Glare (BUG) rating will help limit both light trespass and glare. (A detailed explanation of the BUG system is provided in the section on Table C.)

The limits for light distribution established in Table C (for the BUG rating system) prevent or severely limit all direct upward light. A small amount of uplight reflected by snow, light-colored pavement or a luminaire's supporting arms is inevitable and is not limited by the prescriptive method of this ordinance.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

PRESCRIPTIVE METHOD

2. Limits to Off Site Impacts

All luminaires shall be rated and installed according to Table C.

3. Light Shielding for Parking Lot Illumination

All parking lot lighting shall have no light emitted above 90 degrees.

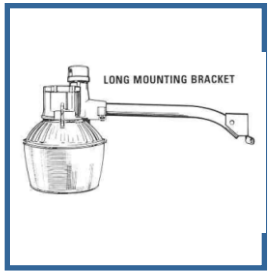
Exception:

a) Ornamental parking lighting shall be permitted by special permit only, and shall meet the requirements of Table C-1 for Backlight, Table C-2 for Uplight, and Table C-3 for Glare, without the need for external field-added modifications.

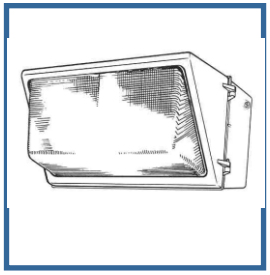
PRESCRIPTIVE METHOD (cont.) - User's Guide

LIMITS TO OFFSITE IMPACTS

A seemingly non-compliant fixture, such as a post-top translucent acorn luminaire, may in certain cases meet the BUG ratings, as long as it has proper interior baffling within the acorn globe. However, the BUG ratings in Table C will limit the use of the following types of luminaires in all lighting zones:



Barn Lights



Non-Shielded Wall Packs

Floodlights or lights not aimed downward

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

PERFORMANCE METHOD - User's Guide

The performance method is best for projects with complex lighting requirements or when the applicant wants or needs more flexibility in lighting design. The performance method is also used when any lighting designer plans to aim or direct any light fixture upward (above 90 degrees). An engineer or lighting professional generally will be required to design within the performance method. An adopting jurisdiction may also wish to hire an engineer or lighting professional to review and approve projects using this method and/or incorporate review of the performance method into special review procedures.

The Performance Method is also best for projects where higher lighting levels are required compared to typical area lighting. An example might be a car sales lot where more light might be required on the new cars than would be needed for a standard parking lot. Another example is a gas station canopy requiring more light than a building entrance canopy.

The first step in the Performance Method regulates overlighting by establishing the Total Initial Site Lumens (Table D) that are allowed.

Allowances include the summation of the following (Table D):

1) Initial lumen allowance per site
2)Per area (SF) of hardscape

Table E allows additional lumens for unique site conditions.
Examples of allowances include:

1)Per building entrance/exit
2)Per length (linear feet) of Outdoor Sales Frontage Perimeter
3)Per area (SF) of Vehicle Service Station Canopy
4)Plus more …

The Site Total Initial Site Lumens allowed are a combination of allowances from Table D and Table E.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

B. Performance Method

1. Total Site Lumen Limit

The total installed initial luminaire lumens of all lighting systems on the site shall not exceed the allowed total initial site lumens. The allowed total initial site lumens shall be determined using Tables D and E. For sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens.

The total installed initial luminaire lumens of all is calculated as the sum of the initial luminaire lumens for all luminaires.

IV. NON-RESIDENTIAL LIGHTING (cont.) - User's Guide

LIMITS TO OFFSITE IMPACTS (cont.)

The second step in the Performance Method is to determine if the proposed luminaires are producing off site impacts such as glare, sky glow and light trespass. One may either use Option A which are the Maximum Allowable BUG Ratings in Table C, or Option B through computer lighting calculations show compliance with Maximum Vertical Illuminance at any point in the plane of the property line in Table F. Option B will be required for all non-residential luminaires that
A) do not have BUG ratings, or
B) exceed the BUG ratings,
C) are not fully shielded, or
D) have adjustable mountings.

For the performance method, Option B (2) requires photometric calculations for the site perimeter, to a height of no less than 33 feet (10 meters) above the tallest luminaire. Vertical illuminances at eye height (5 feet above grade) will give values that can be used to verify compliance by comparing actual site conditions to the photometric plan submitted during review.
Note that the MLO specifies 'total initial luminaire lumens' as a measurement in addition to footcandles/lux. The footcandle (lux) is equal to one lumen per square meter. Lux is the metric unit and is equal to one lumen per square meter.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

PERFORMANCE METHOD

2. Limits to Off Site Impacts
All luminaires shall be rated and installed using either Option A or Option B. Only one option may be used per permit application.

Option A: All luminaires shall be rated and installed according to Table C.
Option B: The entire outdoor lighting design shall be analyzed using industry standard lighting software including inter-reflections in the following manner:

1) Input data shall describe the lighting system including luminaire locations, mounting heights, aiming directions, and employing photometric data tested in accordance with IES guidelines. Buildings or other physical objects on the site within three object heights of the property line must be included in the calculations.

2) Analysis shall utilize an enclosure comprised of calculation planes with zero reflectance values around the perimeter of the site. The top of the enclosure shall be no less than 33 feet (10 meters) above the tallest luminaire. Calculations shall include total lumens upon the inside surfaces of the box top and vertical sides and maximum vertical illuminance (footcandles and/or lux) on the sides of the enclosure.

The design complies if:

a) The total lumens on the inside surfaces of the virtual enclosure are less than 15% of the total site lumen limit; and

b) The maximum vertical illuminance on any vertical surface is less than the allowed maximum illuminance per Table F.

DESIGN COMPLIANCE - User's Guide

The application form will require information about the number of luminaires, the number of lamps in each luminaire, the initial luminaire lumens for each luminaire and the initial lumen output for each lamp (based on the wattage and type of lamp selected) as well as plans showing the site area measurements. This will allow the reviewer to verify that the lumen output of all the luminaires does not exceed the allowance.

Field verification can be achieved by asking the applicant and/or owner to verify that the luminaire type, lamp type and wattages specified have been used. Also ask the applicant for photometric data for each luminaire, since the initial luminaire lumens and B-U-G ratings are stated on the photometric report.

However, if a jurisdiction requires additional on-site verification, it may also request a point-by-point photometric plan. While this will not be a true measure of compliance with the criteria of this Ordinance, comparing the actual measured levels on site to the photometric plan can be an indication whether or not the installed lighting varies from the approved design.

V. RESIDENTIAL LIGHTING - User's Guide

This section applies to single family home, duplexes, row houses, and low rise multi-family buildings of 6 dwelling units or less.

RESIDENTIAL LIGHTING EXCEPTIONS

The exceptions allow for typical lighting that might exceed the specified limits.

Landscape Lighting - While not common in residential areas, it can cause light pollution and light trespass if it is not controlled.

Lighting controlled by Vacancy (Motion) Sensor - Reduces light pollution and light trespass and should be encouraged.

RESIDENTIAL LIGHTING EXAMPLE

In this example on the following page, five different luminaires are used on a residential property. Each luminaire must comply to meet the requirements. The site plan following shows luminaire types followed by a tabulation of each uminaire, whether or not it is fully shielded, lamp type, and initial luminaire lumens. If the luminaire lumens are not known, multiply the initial lamp lumens by the luminaire efficiency. If the efficiency is not known, multiply the initial lamp lumens by 0.7 as a reasonable assumption. The maximum allowable lumen values come from Table G, based on the shielding classification and location on the site. In this case, each luminaire complies with the requirements of Table G.

Comparison of efficacy by power
(120 Volt Incandescent lamps)

Output (Lumens)	Power (Watt)		
	Incan	CFL	LED
500	40	8 - 10	9
850	60	13 - 18	12 - 15
1,200	75	18 - 22	15
1,700	100	23 - 28	18

V. RESIDENTIAL LIGHTING - Ordinance Text

A. General Requirements

For residential properties including multiple residential properties not having common areas, all outdoor luminaires shall be fully shielded and shall not exceed the allowed lumen output in Table G, row 2.

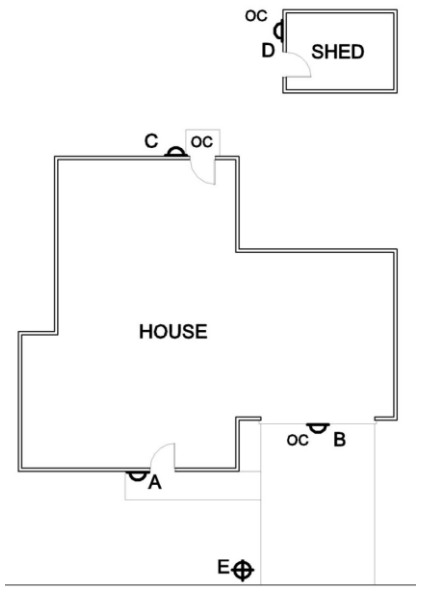
Exceptions

1. **One partly shielded or unshielded luminaire at the main entry, not exceeding the allowed lumen output in Table G row 1.**
2. **Any other partly shielded or unshielded luminaires not exceeding the allowed lumen output in Table G row 3.**
3. **Low voltage landscape lighting aimed away from adjacent properties and not exceeding the allowed lumen output in Table G row 4.**
4. **Shielded directional flood lighting aimed so that direct glare is not visible from adjacent properties and not exceeding the allowed lumen output in Table G row 5.**
5. **Open flame gas lamps.**
6. **Lighting installed with a vacancy sensor, where the sensor extinguishes the lights no more than 15 minutes after the area is vacated.**
7. **Lighting exempt per Section III (B.).**

B. Requirements for Residential Landscape Lighting

1. **Shall comply with Table G.**
2. **Shall not be aimed onto adjacent properties.**

V. RESIDENTIAL LIGHTING - User's Guide



Property Type: Residential
Lighting Zone 1

Luminaire Type	Location	Luminaire Description	Fully Shielded	Lamp Type	Initial Luminiare Lumens*	Maximum Allowed Initial Luminaire Lumens (Table G)	Controls	Compliant
A	Front Entry	Decorative wall sconce	No	9W CFL	420	420	None	Yes
B	Garage Door	Fully shielded wall pack	Yes	23W CFL	1050	1260	Occupancy Sensor	Yes
C	Back Entry	Decorative wall sconce	No	7W CFL	280	315	Occupancy Sensor	Yes
D	Shed Entry	Fully shielded wall pack	Yes	40W INC	343	1260	Occupancy Sensor	Yes
E	Driveway	Fully shielded post top	Yes	13W CFL	1260	1260	None	Yes

*Initial Luminaire Lumens are calculated by multiplying the total initial lamp lumens by the luminaire efficiency.
If the luminaire efficiency is not known, assume an efficiency of 70% and multiply the lamp lumen value by 0.7.

VI. LIGHTING BY SPECIAL PERMIT ONLY - User's Guide

This section addresses types of lighting that are intrusive or complex in their impacts and need a higher level of scrutiny and/or site sensitivity.

It should be noted that safety could be compromised if lighting conforming to this ordinance is located adjacent to excessively bright and/or glaring lighting.

It is important that the authority set clear and reasonable guidelines for applying for a special lighting use permit, and establish rules and procedures for granting or refusing them. They may differ from existing special use policies, in which case one or the other may be changed to achieve the overall goal of effective lighting without glare, sky glow, or light trespass.

SPORTS FIELD LIGHTING

For athletic and sports fields, the appropriate level of lighting will depend on the Class of Play and Facilities. Class of Play is divided into 4 categories, depending on the number of fixed spectator seats. (Competition play intended for nighttime TV broadcast may require higher lighting levels).

CLASS I: Competition play at facilities with 5,000 or more fixed spectator seats. (Professional, Colleges & Universities, some Semi-Professional & Large Sports Cubs)

CLASS II: Games at facilities with over 1,500 fixed spectator seats. (Smaller Universities and Colleges, some Semi-pro, large amateur leagues and high schools with large spectator facilities)

CLASS III: Games at facilities with over 500 fixed spectator seats. (Sports Clubs and amateur leagues, some high schools and large training professional training facilities with spectator sections)

CLASS IV: Competition or recreational play at facilities with 500 fixed spectator seats or less. Class IV Class of Play applies to games at which family and close friends of the players and staff are usually the majority of spectators. (Smaller amateur leagues, park and recreation department facilities, most Little Leagues smaller high schools, elementary and middle schools, and social events)

VI. LIGHTING BY SPECIAL PERMIT ONLY - Ordinance Text

A. High Intensity and Special Purpose Lighting

The following lighting systems are prohibited from being installed or used except by special use permit:

1. Temporary lighting in which any single luminaire exceeds 20,000 initial luminaire lumens or the total lighting load exceeds 160,000 lumens.
2. Aerial Lasers.
3. Searchlights.
4. Other very intense lighting defined as having a light source exceeding 200,000 initial luminaire lumens or an intensity in any direction of more than 2,000,000 candelas.

B. *Complex and Non-Conforming Uses*

Upon special permit issued by the Authority, lighting not complying with the technical requirements of this ordinance but consistent with its intent may be installed for complex sites or uses or special uses including, but not limited to, the following applications:

1. Sports facilities, including but not limited to unconditioned rinks, open courts, fields, and stadiums.
2. Construction lighting.
3. Lighting for industrial sites having special requirements, such as petrochemical manufacturing or storage, shipping piers, etc.
4. Parking structures.
5. Urban parks
6. Ornamental and architectural lighting of bridges, public monuments, statuary and public buildings.
7. Theme and amusement parks.
8. Correctional facilities.

To obtain such a permit, applicants shall demonstrate that the proposed lighting installation:

a. Has sustained every reasonable effort to mitigate the effects of light on the environment and surrounding properties, supported by a signed statement describing the mitigation measures. Such statement shall be accompanied by the calculations required for the Performance Method.

SPORTS FIELD LIGHTING

When Class of Play is above Class IV, a dual control should be installed to limit illumination to Class IV levels during practices where spectators are fewer than 500.

(See IES Recommended Practice for Sports and Recreational Area Lighting RP-6)

VII. EXISTING LIGHTING - User's Guide

Adoption of this section on existing lighting is strongly encouraged.

If the adopting jurisdiction has criteria in place that require a property to come into compliance with the current zoning ordinance, it is recommended that the criteria also be applied to bringing existing lighting into compliance. If there are no established criteria, this section of the MLO is recommended.

Amortization allows existing lighting to gradually and gracefully come into compliance. Substantial changes or additions to existing properties are considered the same as new construction, and must comply.

Most outdoor lighting can be fully depreciated once it is fully amortized, usually no longer than 10 years, if not sooner, from the date of initial installation. Some jurisdictions may prefer to require phase-out in a substantially shorter period. The Authority may also wish to require compliance much sooner for "easy fixes" such as re-aiming or lowering lumen output of lamps. Where lighting is judged to be a safety hazard, immediate compliance can be required.

VI. LIGHTING BY SPECIAL PERMIT ONLY (cont.) - Ordinance Text

b. Employs lighting controls to reduce lighting at a Project Specific Curfew ("Curfew") time to be established in the Permit.
c. Complies with the Performance Method after Curfew.

The Authority shall review each such application. A permit may be granted if, upon review, the Authority believes that the proposed lighting will not create unwarranted glare, sky glow, or light trespass.

VII. EXISTING LIGHTING - Ordinance Text

Lighting installed prior to the effective date of this ordinance shall comply with the following.

A. Amortization

On or before [amortization date], all outdoor lighting shall comply with this Code.

B. New Uses or Structures, or Change of Use

Whenever there is a new use of a property (zoning or variance change) or the use on the property is changed, all outdoor lighting on the property shall be brought into compliance with this Ordinance before the new or changed use commences.

C. Additions or Alterations

1. Major Additions.
   If a major addition occurs on a property, lighting for the entire property shall comply with the requirements of this Code. For purposes of this section, the following are considered to be major additions:

VIII. ENFORCEMENT AND PENALTIES - User's Guide

Enforcement and penalties will vary by jurisdiction. There are, however, certain practices that will promote compliance with lighting regulations. Education is a key tool in promoting compliance. Proactive enforcement procedures can include providing a copy of the lighting regulations to every contractor at the time they visit to obtain a building permit. Another effective tool is a requirement that the builder or developer acknowledge in writing that the he or she is familiar with the lighting requirements and will submit a lighting plan for approval.

VII. EXISTING LIGHTING (cont.) - Ordinance Text

Additions of 25 percent or more in terms of additional dwelling units, gross floor area, seating capacity, or parking spaces, either with a single addition or with cumulative additions after the effective date of this Ordinance.

Single or cumulative additions, modification or replacement of 25 percent or more of installed outdoor lighting luminaires existing as of the effective date of this Ordinance.

2. Minor Modifications, Additions, or New Lighting Fixtures for Non-residential and Multiple Dwellings

For non-residential and multiple dwellings, all additions, modifications, or replacement of more than 25 percent of outdoor lighting fixtures existing as of the effective date of this Ordinance shall require the submission of a complete inventory and site plan detailing all existing and any proposed new outdoor lighting.

Any new lighting shall meet the requirements of this Ordinance.

3. Resumption of Use after Abandonment

If a property with non-conforming lighting is abandoned for a period of six months or more, then all outdoor lighting shall be brought into compliance with this Ordinance before any further use of the property occurs.

VIII. ENFORCEMENT & PENALTIES - Ordinance Text

(Reserved)

VIII. ENFORCEMENT AND PENALTIES (cont.) - User's Guide

Submission of the Lighting Plan should be required as a precondition to any approvals. The Lighting Plan should include the location and BUG rating for each luminaire, specify whether compliance is by the performance or prescriptive method, and a worksheet to show that the luminaires and their BUG ratings are compliant.

IX. TABLES - User's Guide

The tables are to be reviewed periodically by a joint committee of the IES and IDA, and adjusted as standards and technology permit. If more research on the impacts of outdoor lighting shows the effects of light pollution to be a significant concern, then the values in the tables may be modified. Such changes will have no significant impact to the balance of the language of the Ordinance or Code.

VIII. ENFORCEMENT & PENALTIES - Ordinance Text

IX. TABLES - Ordinance Text

Table A - Allowed Total Initial Luminaire Lumens per Site for Non-residential Outdoor Lighting, Per Parking Space Method
May only be applied to properties up to 10 parking spaces (including handicapped accessible spaces).

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
350 lms/space	490 lms/space	630 lms/space	840 lms/space	1,050 lms/space

Table B - Allowed Total Initial Lumens per Site for Non-residential Outdoor Lighting, Hardscape Area Method
May be used for any project. When lighting intersections of site drives and public streets or road, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting.

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Base Allowance				
0.5 lumens per SF of Hardscape	1.25 lumens per SF of Hardscape	2.5 lumens per SF of Hardscape	5.0 lumens per SF of Hardscape	7.5 lumens per SF of Hardscape

IX. TABLES - Ordinance Text

Table B - *Lumen Allowances, in Addition to Base Allowance*

	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Additional allowances for sales and service facilities. No more than two additional allowances per site, Use it or Lose it.					
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non sales areas. To use this allowance, luminaires must be within 2 mounting heights of sales lot area.	**0**	**4 lumens per square foot**	**8 lumens per square foot**	**16 lumens per square foot**	**16 lumens per square foot**
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area	**0**	**0**	**1,000 per LF**	**1,500 per LF**	**2,000 per LF**
Drive Up Windows. In order to use this allowance, luminaires must be within 20 feet horizontal distance of the center of the window.	**0**	**2,000 lumens per drive-up window**	**4,000 lumens per drive-up window**	**8,000 lumens per drive-up window**	**8,000 lumens per drive-up window**
Vehicle Service Station. This allowance is lumens per installed fuel pump.	**0**	**4,000 lumens per pump (based on 5 fc horiz)**	**8,000 lumens per pump (based on 10 fc horiz)**	**16,000 lumens per pump (based on 20 fc horiz)**	**24,000 lumens per pump (based on 20 fc horiz)**

IX. TABLES - TABLE C BUG RATING - User's Guide

Work on the BUG system started in 2005 when the IES upgraded the roadway cutoff classification system. The original system, which included the ratings full cutoff, cutoff, semi-cutoff and non cutoff, had been designed as a rating system focused on brightness and glare control. However, with increasing demand for control of uplight and light trespass in addition to glare, IES realized that a more comprehensive system was needed. IES developed TM-15 *Luminaire Classification System for Outdoor Luminaires*.

As this is a relatively new rating system, and many people may not be familiar with it, more explanation of how the rating system works is provided here. For example, some people are familiar with terms such as "full cutoff" and they may expect the MLO to include those terms. It will be very important that all groups recognize that older terms and concepts are inadequate for the complex tasks of controlling light pollution. It is recommended that the new rating system adopted in TM-15, as followed herein by the MLO, be used intact and exclusively.

BUG requires downlight only with low glare (better than full cut off) in lighting zones 0, 1 and 2, but allows a minor amount of uplight in lighting zones 3 and 4. In lighting zones 3 and 4, the amount of allowed uplight is enough to permit the use of very well shielded luminaires that have a decorative drop lens or chimney so that dark sky friendly lighting can be installed in places that traditional-appearing luminaires are required. BUG typically cannot be used for residential luminaires unless they have been photometrically tested. For non-photometrically tested residential luminaires, shielding description is used instead.

The lumen limits established for each lighting zone apply to all types of lighting within that zone. This includes, but is not limited to, specialty lighting, façade lighting, security lighting and the front row lighting for auto dealerships. BUG rating limits are defined for each luminaire and

IX. TABLES (cont.) - Ordinance Text

Table C - Maximum Allowable Backlight, Uplight and Glare (BUG) Ratings

May be used for any project. A luminaire may be used if it is rated for the lighting zone of the site or lower in number for all ratings B, U and G. Luminaires equipped with adjustable mounting devices permitting alteration of luminaire aiming in the field shall not be permitted.

TABLE C-1	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Allowed Backlight Rating*					
Greater than 2 mounting heights from property line	B1	B3	B4	B5	B5
1 to less than 2 mounting heights from property line and ideally oriented**	B1	B2	B3	B4	B4
0.5 to 1 mounting heights from property line and ideally oriented**	B0	B1	B2	B3	B3
Less than 0.5 mounting height to property line and properly oriented**	B0	B0	B0	B1	B2

*For property lines that abut public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the center-line of the public roadway or public transit corridor for the purpose of determining compliance with this section. NOTE: This adjustment is relative to Table C-1 and C-3 only and shall not be used to increase the lighting area of the site.

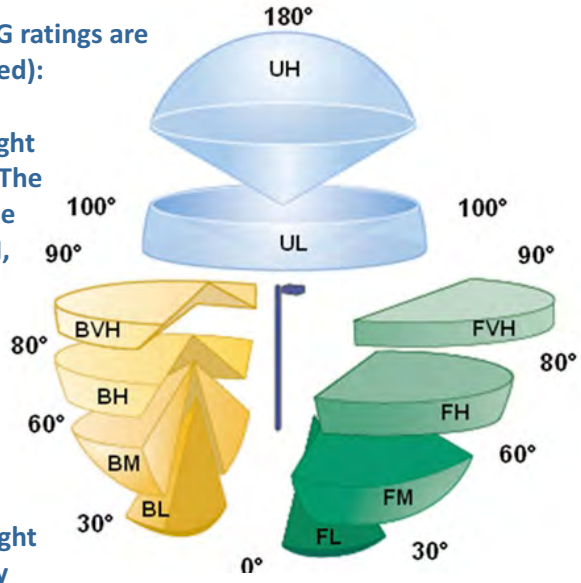
** To be considered 'ideally oriented', the luminaire must be mounted with the backlight portion of the light output oriented perpendicular and towards the property line of concern.

IX. TABLES - TABLE C BUG RATING (cont.) - User's Guide

IX. TABLES (cont.) - Ordinance Text

are based on the internal and external design of the luminaire, its aiming, and the initial luminaire lumens of the specified luminaires. The BUG rating limits also take into consideration the distance the luminaire is installed from the property line in multiples of the mounting height (See Table C).

The three components of BUG ratings are based on IES TM-15-07 (revised):



Backlight, which creates light trespass onto adjacent sites. The B rating takes into account the amount of light in the BL, BM, BH and BVH zones, which are in the direction of the luminaire OPPOSITE from the area intended to be lighted.

Uplight, which causes artificial sky glow. Lower uplight (zone UL) causes the most sky glow and negatively affects professional and academic astronomy. Upper uplight (UH) not reflected off a surface is mostly energy waste. The U rating defines the amount of light into the upper hemisphere with greater concern for the light at or near the horizontal angles (UL).

Glare, which can be annoying or visually disabling. The G rating takes into account the amount of frontlight in the FH and FVH zones as well as BH and BVH zones.

BUG ratings apply to the Lighting Zone of the property under consideration.

IX. TABLES - TABLE C BUG RATING (cont.) - User's Guide

(Key: UH=Uplight High, UL=Uplight Low, BVH=Backlight Very High, BH=Backlight High, BM=Backlight Medium, BL=Backlight Low, FVH=Forward Light Very High, FH=Forward Light High, FM=Forward Light Medium, FL=Forward Light Low.)

In general, a higher BUG rating means more light is allowed in solid angles, and the rating increases with the lighting zone. However, a higher B (backlight) rating simply indicates that the luminaire directs a significant portion of light behind the pole, so B ratings are designated based on the location of the luminaire with respect to the property line. A high B rating luminaire maximizes the spread of light, and is effective and efficient when used far from the property line. When luminaires are located near the property line, a lower B rating will prevent unwanted light from interfering with neighboring properties.

At the 90-180 degree ranges:

- Zone 0 allows no light above 90 degrees.
- Zone 1 allows only 10 lumens in the UH and UL zones, 20 lumens total in the complete upper hemisphere. (This is roughly equivalent to a 5 W incandescent lamp).
- Zone 2 allows only 50 lumens in the UH and UL zones, 100 lumens total (less than a 25W incandescent lamp).
- Zone 3 allows only 500 lumens in the UH and UL zones, 1000 lumens total (about the output of a 75W incandescent bulb).
- Zone 4 allows only 1,000 lumens in the UH and UL zones, 2000 lumens total (about the output of a 100W incandescent bulb).

IX. TABLES (cont.) - Ordinance Text

Table C - 2 Maximum Allowable Uplight (BUG) Ratings - Continued

TABLE C-2	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Allowed Uplight Rating	U0	U1	U2	U3	U4
Allowed % light emission above 90° for street or Area lighting	0%	0%	0%	0%	0%

Table C - 3 Maximum Allowable Glare (BUG) Ratings - Continued

TABLE C-3	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Allowed Glare Rating	G0	G1	G2	G3	G4
Any luminaire not ideally oriented*** with 1 to less than 2 mounting heights to any property line of concern	G0	G0	G1	G1	G2
Any luminaire not ideally oriented*** with 0.5 to 1 mounting heights to any property line of concern	G0	G0	G0	G1	G1
Any luminaire not ideally oriented*** with less than 0.5 mounting heights to any property line of concern	G0	G0	G0	G0	G1

*** Any luminaire that cannot be mounted with its backlight perpendicular to any property line within 2X the mounting heights of the luminaire location shall meet the reduced Allowed Glare Rating in Table C-3.

TABLE D EXAMPLE - PERFORMANCE METHOD - User's Guide

The first step in the Performance Method is to establish the Site Total Initial Site Lumens which regulates overlighting. The performance method allows layers of light depending on the complexity of the site.

Table D establishes the basic total initial site lumens allowed. These lumen allowances are added together for a total initial site lumen allowance. Allowances include:

1) Initial lumen allowance per site

2) Per area (SF) of hardscape

IX. TABLES (cont.) - Ordinance Text

Table D Performance Method Allowed Total Initial Site Lumens

May be used on any project.

Lighting Zone	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Allowed Lumens Per SF	0.5	1.25	2.5	5.0	7.5
Allowed Base Lumens Per Site	0	3,500	7,000	14,000	21,000

Table E Performance Method Additional Initial Luminaire Lumen Allowances. All of the following are "use it or lose it" allowances.

All area and distance measurements in plan view unless otherwise noted.

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Additional Lumens Allowances for All Buildings except service stations and outdoor sales facilities. A MAXIMUM OF THREE (3) ALLOWANCES ARE PERMITTED. THESE ALLOWANCES ARE "USE IT OR LOSE IT".					
Building Entrances or Exits. This allowance is per door. In order to use this allowance, luminaires must be within 20 feet of the door.	400	1,000	2,000	4,000	6,000
Building Facades. This allowance is lumens per unit area of building façade that are illuminated. To use this allowance, luminaires must be aimed at the façade and capable of illuminating it without obstruction.	0	0	8/SF	16/SF	24/SF

TABLE E PERFORMANCE METHOD - User's Guide

The allowable light levels for these uses defined in Table E may be used to set a prescriptive lighting allowance for these uses in each lighting zone. It should be noted that the lighting allowance defined in Table E is only applicable for the area defined for that use and cannot be transferred to another area of the site. For some uses, such as outdoor sales, the jurisdiction is encourages to define a percentage of the total hardscape area that is eligible for the additional lighting allowance. For example, a set percentage of a car dealership's lot may be considered a display area and receive the additional lighting allowance where the remainder of the lot would be considered storage, visitor parking, etc. and cannot exceed the base light levels defined in Table A.

TABLE E EXAMPLE - PERFORMANCE METHOD - User's Guide

IX. TABLES (cont.) - Ordinance Text

Table E - Performance Method Additional Initial Lumen Allowances (cont.)

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Sales or Non-sales Canopies. This allowance is lumens per unit area for the total area within the drip line of the canopy. In order to qualify for this allowance, luminaires must be located under the canopy.	0	3/SF	6/SF	12/SF	18/SF
Guard Stations. This allowance is lumens per unit area of guardhouse plus 2000 sf per vehicle lane. In order to use this allowance, luminaires must be within 2 mounting heights of a vehicle lane or the guardhouse.	0	6/SF	12/SF	24/SF	36/SF
Outdoor Dining. This allowance is lumens per unit area for the total il-luminated hardscape of outdoor dining. In order to use this allowance, luminaires must be within 2 mounting heights of the hardscape area of outdoor dining	0	1/SF	5/SF	10/SF	15/SF
Drive Up Windows. This allowance is lumens per window. In order to use this allowance, luminaires must be within 20 feet of the center of the window.	0	2,000 lumens per drive-up window	4,000 lumens per drive-up window	8,000 lumens per drive-up window	8,000 lumens per drive-up window
Additional Lumens Allowances for Service Stations only. Service stations may not use any other additional allowances.					
Vehicle Service Station Hardscape. This allowance is lumens per unit area for the total illuminated hardscape area less area of buildings, area under canopies, area off property, or areas obstructed by signs or structures. In order to use this allowance, luminaires must be illuminating the hardscape area and must not be within a building, below a canopy, beyond property lines, or obstructed by a sign or other structure.	0	4/SF	8/SF	16/SF	24/SF

Table E - Performance Method Additional Initial Lumen Allowances (cont.)

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Vehicle Service Station Canopies. This allowance is lumens per unit area for the total area within the drip line of the canopy. In order to use this allowance, luminaires must be located under the canopy.	**0**	**8/SF**	**16/SF**	**32/SF**	**32/SF**
Additional Lumens Allowances for Outdoor Sales facilities only. Outdoor Sales facilities may not use any other additional allowances. **NOTICE:** lighting permitted by these allowances shall employ controls extinguishing this lighting after a curfew time to be determined by the Authority.					
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non sales areas and shall not exceed 25% of the total hardscape area. To use this allowance, Luminaires must be within 2 mounting heights of the sales lot area.	**0**	**4/SF**	**8/SF**	**12/SF**	**18/SF**
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	**0**	**0**	**1,000/ LF**	**1,500/ LF**	**2,000/ LF**

IX. TABLES (cont.) - Ordinance Text

Table F Maximum Vertical Illuminance at any point in the plane of the property line

Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
0.05 FC or 0.5 LUX	0.1 FC or 1.0 LUX	0.3 FC or 3.0 LUX	0.8 FC or 8.0 LUX	1.5 FC or 15.0 LUX

IX. TABLES (cont.) - Ordinance Text

Table G - Residential Lighting Limits

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Row 1 Maximum Allowed Luminaire Lumens* for Unshielded Luminaires at one entry only	Not allowed	420 lumens	630 lumens	630 lumens	630 lumens
Row 2 Maximum Allowed Luminaire Lumens* for each Fully Shielded Luminaire	630 lumens	1,260 lumens	1,260 lumens	1,260 lumens	1,260 lumens
Row 3 Maximum Allowed Luminaire Lumens* for each Unshielded Luminaire excluding main entry	Not allowed	315 lumens	315 lumens	315 lumens	315 lumens
Row 4 Maximum Allowed Luminaire Lumens* for each Landscape Lighting	Not allowed	Not allowed	1,050 lumens	2,100 lumens	2,100 lumens
Row 5 Maximum Allowed Luminaire Lumens* for each Shielded Directional Flood Lighting	Not allowed	Not allowed	1,260 lumens	2,100 lumens	2,100 lumens
Row 6 Maximum Allowed Luminaire Lumens* for each Low Voltage Landscape Lighting	Not allowed	Not allowed	525 lumens	525 lumens	525 lumens

*** Luminaire lumens equals Initial Lamp Lumens for a lamp, multiplied by the number of lamps in the luminaire**

TABLE G RESIDENTIAL LIGHTING - User's Guide

Residential Light Levels

Most residential lighting has traditionally used incandescent lamps which are identified by their wattage. However, since new technologies provide more light for fewer watts, it is no longer possible to regulate residential lighting solely by providing a maximum wattage. Table G, therefore, lists maximum initial luminaire lumens only.

X. DEFINITIONS - User's Guide

Definitions are typically generally added to any code when new code sections are added. The definitions are legally required and play a significant role in the interpretation of the ordinance and code.

Most city attorneys will not accept references to outside sources regardless of credibility, such as the IES Handbook. Thus as a general rule, a definition for an unfamiliar term (e.g. lumens) must be added by the adopting ordinance.

When adopting or integrating the MLO definitions, be sure to retire conflicting technical terminology. In particular, the latest IES Luminaire Classification System as defined in IES TM-15-07 is likely to need attention.

X. DEFINITIONS - Ordinance Text

Absolute Photometry	Photometric measurements (usually of a solid-state luminaire) that directly measures the footprint of the luminaire. Reference Standard IES LM-79
Architectural Lighting	Lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is incidental.
Authority	The adopting municipality, agency or other governing body.
Astronomic Time Switch	An automatic lighting control device that switches outdoor lighting relative to time of solar day with time of year correction.
Backlight	For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the luminaire. For luminaires with symmetric distribution, backlight will be the same as front light.
BUG	A luminaire classification system that classifies backlight (B), uplight (U) and glare (G).
Canopy	A covered, unconditioned structure with at least one side open for pedestrian and/or vehicular access. (An unconditioned structure is one that may be open to the elements and has no heat or air conditioning.)
Common Outdoor Areas	One or more of the following: a parking lot; a parking structure or covered vehicular entrance; a common entrance or public space shared by all occupants of the domiciles.
Curfew	A time defined by the authority when outdoor lighting is reduced or extinguished.

Examples of Fully Shielded Luminaires

X. DEFINITIONS - Ordinance Text

Emergency conditions	Generally, lighting that is only energized during an emergency; lighting fed from a backup power source; or lighting for illuminating the path of egress solely during a fire or other emergency situation; or, lighting for security purposes used solely during an alarm.
Footcandle	The unit of measure expressing the quantity oflight received on a surface. One footcandle is the illuminance produced by a candle on a surface one foot square from a distance of one foot.
Forward Light	For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the direction of the intended orientation of the luminaire.
Fully Shielded Luminaire	A luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the luminaire, is projected below the horizontal plane through the luminaire's lowest light-emitting part.
Glare	Lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.
Hardscape	Permanent hardscape improvements to the site including parking lots, drives, entrances, curbs, ramps, stairs, steps, medians, walkways and non-vegetated landscaping that is 10 feet or less in width. Materials may include concrete, asphalt, stone, gravel, etc.
Hardscape Area	The area measured in square feet of all hardscape. It is used to calculate the Total Site Lumen Limit in both the Prescriptive Method and Performance Methods. Refer to Hardscape definition.

X. DEFINITIONS - Ordinance Text

Hardscape Perimeter	The perimeter measured in linear feet is used to calculate the Total Site Lumen Limit in the Performance Method. Refer to Hardscape definition.
IDA	International Dark-Sky Association.
IESNA	Illuminating Engineering Society of North America.
Impervious Material	Sealed to severely restrict water entry and movement
Industry Standard Lighting Software	Lighting software that calculates point-by-point illuminance that includes reflected light using either ray-tracing or radiosity methods.
Lamp	A generic term for a source of optical radiation (i.e. "light"), often called a "bulb" or "tube". Examples include incandescent, fluorescent, high-intensity discharge (HID) lamps, and low pressure sodium (LPS) lamps, as well as light-emitting diode (LED) modules and arrays.
Landscape Lighting	Lighting of trees, shrubs, or other plant material as well as ponds and other landscape features.
LED	Light Emitting Diode.
Light Pollution	Any adverse effect of artificial light including, but not limited to, glare, light trespass, sky-glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

X. DEFINITIONS - Ordinance Text

Light Trespass	Light that falls beyond the property it is intended to illuminate.
Lighting	"Electric" or "man-made" or "artificial" lighting. See "lighting equipment".
Lighting Equipment	Equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(s), and related structures, electrical wiring, and other necessary or auxiliary components.
Lighting Zone	An overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.
Lighting Equipment	Equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(s), and related structures, electrical wiring, and other necessary or auxiliary components.
Low Voltage Landscape Lighting	Landscape lighting powered at less than 15 volts and limited to luminaires having a rated initial luminaire lumen output of 525 lumens or less.
Lumen	The unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire (as distinct from "watt," a measure of power consumption).
Luminaire	The complete lighting unit (fixture), consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light (reflector, lens, diffuser), to position and protect the lamps, and to connect the lamps to the power supply.

***Mounting Height*: The horizontal spacing of poles is often measured in units of "mounting height". Example: "The luminaires can be spaced up to 4 mounting heights apart."**

X. DEFINITIONS - Ordinance Text

Luminaire Lumens	For luminaires with relative photometry per IES, it is calculated as the sum of the initial lamp lumens for all lamps within an individual luminaire, multiplied by the luminaire efficiency. If the efficiency is not known for a residential luminaire, assume 70%. For luminaires with absolute photometry per IES LM-79, it is the total luminaire lumens. The lumen rating of a luminaire assumes the lamp or luminaire is new and has not depreciated in light output.
Lux	The SI unit of illuminance. One lux is one lumen per square meter. 1 Lux is a unit of incident illuminance approximately equal to 1/10 footcandle.
Mounting height	The height of the photometric center of a luminaire above grade level.
New lighting	Lighting for areas not previously illuminated; newly installed lighting of any type except for replacement lighting or lighting repairs.
Object	A permanent structure located on a site. Objects may include statues or artwork, garages or canopies, outbuildings, etc.
Object Height	The highest point of an entity, but shall not include antennas or similar structures.
Ornamental lighting	Lighting that does not impact the function and safety of an area but is purely decorative, or used to illuminate architecture and/or land-scaping, and installed for aesthetic effect.

X. DEFINITIONS - Ordinance Text

Ornamental Street Lighting	A luminaire intended for illuminating streets that serves a decorative function in addition to providing optics that effectively deliver street lighting. It has a historical period appearance or decorative appearance, and has the following design characteristics: · designed to mount on a pole using an arm, pendant, or vertical tenon; · opaque or translucent top and/or sides; · an optical aperture that is either open or enclosed with a flat, sag or drop lens; · mounted in a fixed position; and · with its photometric output measured using Type C photometry per IESNA LM-75-01.
Outdoor Lighting	Lighting equipment installed within the property line and outside the building envelopes, whether attached to poles, building structures, the earth, or any other location; and any associated lighting control equipment.
Partly shielded luminaire	A luminaire with opaque top and translucent or perforated sides, designed to emit most light downward.
Pedestrian Hardscape	Stone, brick, concrete, asphalt or other similar finished surfaces intended primarily for walking, such as sidewalks and pathways.
Photoelectric Switch	A control device employing a photocell or photodiode to detect daylight and automatically switch lights off when sufficient daylight is available.
Property line	The edges of the legally-defined extent of privately owned property.

X. DEFINITIONS - Ordinance Text

Relative photometry	Photometric measurements made of the lamp plus luminaire, and adjusted to allow for light loss due to reflection or absorption within the luminaire. Reference standard: IES LM-63.
Repair(s)	The reconstruction or renewal of any part of an existing luminaire for the purpose of its on-going operation, other than relamping or replacement of components including capacitor, ballast or photocell. Note that retrofitting a luminaire with new lamp and/or ballast technology is not considered a repair and for the purposes of this ordinance the luminaire shall be treated as if new. "Repair" does **not** include normal relamping or replacement of components including capacitor, ballast or photocell.
Replacement Lighting	Lighting installed specifically to replace existing lighting that is sufficiently broken to be beyond repair.
Sales area	Uncovered area used for sales of retail goods and materials, including but not limited to automobiles, boats, tractors and other farm equipment, building supplies, and gardening and nursery products.
Seasonal lighting	Temporary lighting installed and operated in connection with holidays or traditions.
Shielded Directional Luminaire	A luminaire that includes an adjustable mounting device allowing aiming in any direction and contains a shield, louver, or baffle to reduce direct view of the lamp.
Sign	Advertising, directional or other outdoor promotional display of art, words and/or pictures.

X. DEFINITIONS - Ordinance Text

Sky Glow	The brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere. Skyglow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the night sky.
Temporary lighting	Lighting installed and operated for periods not to exceed 60 days, completely removed and not operated again for at least 30 days.
Third Party	A party contracted to provide lighting, such as a utility company.
Time Switch	An automatic lighting control device that switches lights according to time of day.
Translucent	Allowing light to pass through, diffusing it so that objects beyond cannot be seen clearly (not transparent or clear).
Unshielded Luminaire	A luminaire capable of emitting light in any direction including downwards.
Uplight	For an exterior luminaire, flux radiated in the hemisphere at or above the horizontal plane.
Vertical Illuminance	Illuminance measured or calculated in a plane perpendicular to the site boundary or property line.

XI. OPTIONAL STREETLIGHT ORDINANCE - User's Guide

This section was added since the first public review. It is designed to work closely with the proposed revision to ANSI/IES RP-8 Standard Practice for Roadway and Street Lighting.

Street and roadway lighting is one of the world's largest causes of artificial skyglow. Many adopting agencies will recognize that the MLO will make privately owned lighting more efficient and environmentally responsible than their street lighting systems. But because the process of designing street lighting often requires more precise lighting calculations, applying the MLO directly to street lighting is not advised. Using existing standards of street lighting is recommended, particularly IES RP-8 and AASHTO standards.

Until a new recommended practice for street lighting can be developed, this section can serve to prevent most of the uplight of street lighting systems without setting specific requirements for the amount of light, uniformity of light, or other performance factors. Adopting agencies should include these basic improvements to street lighting along with regulations to private lighting.

Lighting streets with "period" ornamental luminaires that evoke the look of a time when the light source was a gas flame can cause glare if high-lumen lamps are used. Such ornamental street lights should not exceed a BUG rating of G1. If additional illuminance and/or uniformity is desired, the ornamental fixtures should be supplemented by higher mounted fully shielded luminaires, as illustrated in RP-33-99.

Few street lighting warranting processes exist. The adopting agency needs to gauge whether a complex warranting systems is required, or if a simple one using posted speeds, presence of pedestrians, or other practical considerations is sufficient.

Examples of a current street lighting warranting system are included in the Transportation Association of Canada's Guide for the Design of Roadway Lighting 2006.

XI. OPTIONAL STREETLIGHT ORDINANCE - Ordinance Text

Note to the adopting authority: the intent of this section is that it only applies to streets and not to roadways or highways.

A. Preamble

The purpose of this Ordinance is to control the light pollution of street lighting, including all collectors, local streets, alleys, sidewalks and bikeways, as defined by ANSI/IES RP-8 Standard Practice for Roadway and Street Lighting and in a manner consistent with the Model Lighting Ordinance.

B. Definitions

Roadway or Highway lighting is defined as lighting provided for freeways, expressways, limited access roadways, and roads on which pedestrians, cyclists, and parked vehicles are generally not present. The primary purpose of roadway or highway lighting is to help the motorist remain on the roadway and help with the detection of obstacles within and beyond the range of the vehicle's headlights.

Street lighting is defined as lighting provided for major, collector, and local roads where pedestrians and cyclists are generally present. The primary purpose of street lighting is to help the motorist identify obstacles, provide adequate visibility of pedestrians and cyclists, and assist in visual search tasks, both on and adjacent to the roadway.

Ornamental Street Lighting is defined as a luminaire intended for illuminating streets that serves a decorative function in addition to providing optics that effectively deliver street lighting. It has a historical period appearance or decorative appearance, and has the following design characteristics:

- designed to mount on a pole using an arm, pendant, or vertical tenon;
- opaque or translucent top and/or sides;
- an optical aperture that is either open or enclosed with a flat, sag or drop lens;
- mounted in a fixed position; and
- with its photometric output measured using Type C photometry per IESNA LM-75-01.

XI. OPTIONAL STREETLIGHT ORDINANCE - Ordinance Text

C. Scope

All street lighting not governed by regulations of federal, state or other superceding jurisdiction.

EXCEPTION: lighting systems mounted less than 10.5 feet above street level and having less than 1000 initial lumens each.

D. Master Lighting Plan

The Authority shall develop a Master Lighting Plan based on the American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide GL-6, October 2005, Chapter 2. Such plan shall include, but not be limited to, the Adoption of Lighting Zones and:

1. Goals of street lighting in the jurisdiction by Lighting Zone
2. Assessment of the safety and security issues in the jurisdiction by Lighting Zone
3. Environmentally judicious use of resources by Lighting Zone
4. Energy use and efficiency by Lighting Zone
5. Curfews to reduce or extinguish lighting when no longer needed by Lighting Zone

E. Warranting

The Authority shall establish a warranting process to determine whether lighting is required. Such warranting process shall not assume the need for any lighting nor for continuous lighting unless conditions warrant the need. Lighting shall only be installed where warranted.

XI. OPTIONAL STREETLIGHT ORDINANCE - Ordinance Text

F. Light Shielding and Distribution

All street lighting shall have no light emitted above 90 degrees.

Exception: Ornamental street lighting for specific districts or projects shall be permitted by special permit only, and shall meet the requirements of Table H below without the need for external field-added modifications.

Table H - Uplight Control Requirements for Ornamental Street Lights - by Special Permit Only

Lighting Zone	Maximum Uplight Rating
LZ-0	U-0
LZ-1	U-1
LZ-2	U-2
LZ-3	U-3
LZ-4	U-4

International Dark Sky Community Application Checklist (June 2018 Guidelines Version)

Proposed Community: _____

Submitted by: _____ Affiliation: _____

Reviewer: _____ Date: _____

Provisional? **YES NO**

	YES	NO	PAGES
Table of Contents	____	____	_____
Is the proposed area a "legally organized community"?	____	____	
Which type? _____			
Date of incorporation: _____			
Letter of Introduction (**OPTIONAL**)	____	____	_____
IDA Member Letter of Nomination (*p6, B*)	____	____	_____
Author/affiliation: _____			
Letter(s) of Support (**1 REQUIRED**; complete list, page 3)	____	____	
Is at least one letter from "elected representatives of the community, such as the mayor and/or council"? (*p6, B*)	____	____	_____
Map(s) of area to be designated (*p6, A*)	____	____	_____
"Factual information" about the community (*p6, A*)	____	____	_____
Description of town/city/community lighting code (*p6, C*)	____	____	_____
Does the lighting code include the minimum requirements?	____	____	
Fully-shielded or FCO standard for all fixtures over 1000 lumens initial lamp output? (*p3, A, i*)	____	____	_____
Minimizes blue light by one of the following methods			
The correlated color temperature (CCT) of lamps must not exceed 3000 Kelvins; **OR**			
Allowed lighting must not emit more than 25% of its total spectral power at wavelengths < 550 nanometers; **OR**	____	____	_____
The scotopic-to-photopic (S/P) ratio of allowed lighting must not exceed 1.3			

	YES	NO	PAGES
Restrictions on total amount of unshielded lighting, such as lumens per acre or total site lumens in unshielded fixtures (or equivalent wattages)? (*p3, A, iii*)	____	____	_____
A policy to address over-lighting, such as energy density caps, lumens/acre caps, or maximum illuminance specifications? (*p3, A, iv*)	____	____	_____
A provision that clearly indicates **where, when, and under what circumstances new public outdoor lighting is warranted** and will be permitted (*p3, A, v*)	____	____	_____
A provision that clearly **requires that adaptive controls and curfews be employed in all future installations of public outdoor lighting** (*p3, A, v*)	____	____	_____
Affects an amortization period, applicable to ALL publicly AND privately-owned lighting, to end **not more than 10** years from the effective date of the outdoor lighting policy, after which all non-conforming lighting extant at the time of enactment must be brought into compliance with the policy.	____	____	_____

Restrictions on the installation and operation of illuminated signage as shown by:

Luminance levels for operation between sunset and sunrise shall not exceed 100 nits (100 candelas per square meter) as measured under conditions of a full white display; **AND** (*p3, A, vi*)	____	____	_____
Sign illumination shall be extinguished completely one (1) hour after sunset, and remain off until one (1) hour before sunrise; or at business close **AND** (*p3, A, vii*)	____	____	_____
The luminous/illuminated surface area of an individual sign shall not exceed 200 square feet (18.6 square meters) (*p3, A, viii*)	____	____	_____

Outdoor recreational and/or athletic field lighting may be exempted from the strict shielding and short-wavelength emission requirements above provided **that all of the following conditions are met:**

Illuminating Engineering Society (IES) lighting guidelines (RP-6) are followed according to the appropriate class of play (*p3, A, ix*)	____	____	_____

	YES	NO	PAGES
Field lighting is provided exclusively for illumination of the surface of play and viewing stands, and not for any other applications (*p3, A, x*)	____	____	_____
Illuminance levels must be adjustable based on the task (e.g., active play vs. field maintenance)	____	____	_____
Off-site impacts of the lighting will be limited to the greatest practical extent possible	____	____	_____
A strict curfew requirement (e.g., lights must be extinguished by 10pm/2200h or one hour after the end of play, whichever is later) is observed	____	____	_____
Timers must be installed to prevent lights being left on accidentally overnight by automatically extinguishing them	____	____	_____

Evidence of "**community commitment to dark skies and quality lighting**" as shown by:

City-owned lighting conforms, or city shows commitment to achieve conformity, with lighting code? (*p3, B, i*) **AND**	____	____	_____
Municipal support of dark skies and good lighting through community outreach efforts (e.g., flyers, PSAs, etc.)? (*p3, B, ii*)	____	____	_____

Description of efforts: _____

_____

Evidence of "**broad community support**" (*p3, C*)	____	____	_____

Who? _____

_____

Evidence of "**community commitment to dark skies and Education**"	____	____	
Planning and execution of at least two (2) dark-sky awareness events per year (*p4, D, i*) **AND/OR**	____	____	_____

Examples: _____

_____

	YES	NO	PAGES
Inclusion of dark-sky awareness documents with other community info documents for residents and visitors (*p4, D, ii*) **AND/OR**	____	____	_____
Examples: _____			
_____			
Inclusion of dark-sky education in community school curricula (*p4, D, iii*)	____	____	_____
Examples: _____			
_____			
Evidence of **success in light pollution control** (*p4, E*)	____	____	
Examples of an appropriate number of projects built under the lighting code showing effective application of the code (*p4, E, i*) **AND/OR**	____	____	_____
Projects: _____			
_____			
Alternative demonstration of success, approved by the IDSPP Manager (*p4, E, ii*)	____	____	_____
Evidence of a **sky brightness monitoring program** (*p4, F*)	____	____	_____
Who responsible? _____			
Has the applicant requested **alternate designation wording** other than ISDC (e.g., Dark Sky Village, Starry Sky City, etc.)? (*p6, E*)	____	____	_____
If so, state here: _____			
Is a **justification** provided for the alternate designation?	____	____	_____
Explain: _____			
_____			
References (if applicable)	____	____	_____
Provisional			
Initial sky quality measurements	____	____	_____
Documented intent to create and support an IDSC	____	____	_____
Action plan to achieve full status	____	____	_____

Letters of support **PAGE**

(1) Author/affiliation: _____ _____

(2) Author/affiliation: _____ _____

(3) Author/affiliation: _____ _____

(4) Author/affiliation: _____ _____

(5) Author/affiliation: _____ _____

(6) Author/affiliation: _____ _____

(7) Author/affiliation: _____ _____

(8) Author/affiliation: _____ _____

(9) Author/affiliation: _____ _____

(10) Author/affiliation: _____ _____

Notes:

RECOMMENDATION _____ **Forward to committee as-is**

_____ **Return to authors with the following suggested changes**:

_____ **Other** (specify: _____)

DARK SKY ASSESSMENT GUIDE

EVALUATION METHODS, TOOLS, & RESOURCES

WHAT IS LIGHT POLLUTION?

Light pollution is "the inappropriate or excessive use of artificial light," and consists of four main factors[1]:

1. **Glare:** Excessive brightness that causes visual discomfort
2. **Sky glow:** Brightening of the night sky over inhabited areas
3. **Light trespass:** Light falling where it is not intended or needed
4. **Clutter:** Bright, confusing and excessive groupings of light sources

Light pollution caused by the inappropriate or inefficient use of outdoor lighting is costly, and effects people, wildlife, and outdoor environments—most noticeably, it limits our view of the starry night sky.

HOW DO I USE THIS WORKSHEET & GUIDE?

The initial groundwork for a dark sky designation is establishing the current status. This worksheet guides users through several evaluation methods which could be used for a general assessment of dark sky-friendly lighting. While not all of the included methods are required for a quality assessment, it is recommended that those conducting the assessment use as many methods as appropriate to gain a broader perspective. In addition, the various methods may be adapted for public education and engagement on dark sky issues.

After completing your assessment, you will know the current state of lighting in your community or area and will have identified key areas for improvement.

For help with this guide, contact Utah's Community Development Office: (801) 468-0133, info@ruralplanning.org or the Colorado Plateau Dark Sky Cooperative: darkskycooperative@gmail.com

PREPARING FOR YOUR DARK SKY ASSESSMENT

1. Define your purpose

- ☐ Who requested the assessment? Who is sponsoring or supporting it?
- ☐ What is the goal of your assessment?
- ☐ How will you use information gathered during the assessment?
- ☐ Will it be the only assessment or will there be more?

2. Identify who should be involved

- ☐ List and invite key stakeholders (leaders, active citizens, business owners, etc).
- ☐ What do they need to know to support your project and engage in the assessment?
- ☐ Who might help you engage with necessary stakeholders and supporters?

3. Design and prepare for the assessment

- ☐ Prepare a map of town (can use Google maps, a hand drawn map, or existing city maps).
- ☐ Organize where the assessment will begin and end. It may help to divide into different areas, separating commercial districts, residential sectors, or government districts for the purposes of the assessment.
- ☐ Walk the route beforehand—are there safety concerns or other considerations that should be acknowledged before conducting an assessment?
- ☐ Select areas during the day to take illustrative photos—most SLR cameras can take a good night photo.
- ☐ You should try to carry out your assessment on a clear night, with little or no cloud cover. Don't do the assessment when the moon is in the sky.

4. Get the word out

- ☐ If not initiated or conducted by the town, notify the town when your assessment will be performed.
- ☐ Notify and remind stakeholders.
- ☐ Notify the public (fliers, posters, Facebook, etc.); assessments can be helpful and fun for community education (e.g. Our Town Nights, Community Night Connections, etc.).
- ☐ Gather maps and other assessment materials.

NOTES

REMEMBER TO TAKE...

- ☐ This guide
- ☐ Printed map of assessment area
- ☐ Pencils / pens / colored markers
- ☐ Clipboards
- ☐ Measuring tape
- ☐ DSLR camera & tripod
- ☐ Orange vests / visible clothing / reflective gear
- ☐ Comfortable walking shoes
- ☐ A friend—work in groups for safety

TABLE OF CONTENTS

GENERAL LIGHTING TERMS

CLUTTER: Bright, confusing and excessive groupings of light sources.

COLOR SPECTRUM: Refers to the portion of the electromagnetic spectrum that is visible to the human eye.

CORRELATED COLOR TEMPERATURE (CCT): Specifies the color appearance of light emitted by a lamp.

DARK SKY: Denoting or located in a place where the darkness of the night sky is relatively free of interference from artificial light.

DSLR CAMERA: "Digital single-lens reflex" or DSLR cameras are versatile cameras with changeable lenses that produce high-quality photos.

FIXTURE: The assembly that holds the lamp in the lighting system and includes elements such as a reflector (mirror) or refractor (lens), the ballast, housing, and the attachment parts.

FOOTCANDLE (fc): Illuminance produced on a surface that is everywhere one foot from a uniform point source of light of one candle and equal to one lumen per square foot.

FULLY SHIELDED: A fixture that allows no emission above a horizontal plane passing through the lowest light-emitting or light-reflecting part of the fixture.

GLARE: Excessive brightness that causes visual discomfort.

KELVIN: A measurement unit for light's "warmness" or "coolness."

KILOWATT (Kw): A measure equal to1,000 watts of electrical power.

KILOWATT HOUR (kWh): A measure of electrical energy equivalent to a power consumption of 1,000 watts for 1 hour.

LAMP: A device for giving light which can consist of an electric bulb with its holder and shade or cover, or one burning liquid fuel and consisting of a wick or mantle and a glass shade.

LIGHT TRESPASS: Light falling where it is not intended or needed.

LUMEN: A measurement unit for the brightness from a light source.

LUMINAIRE: A complete lighting unit that usually includes the fixture, ballasts, and lamps.

LUX: One lumen per square meter. Unit of illuminance.

REFLECTION: Light redirected back into the sky off of surfaces that are being illuminated.

SKYGLOW: Brightening of the night sky over inhabited areas.

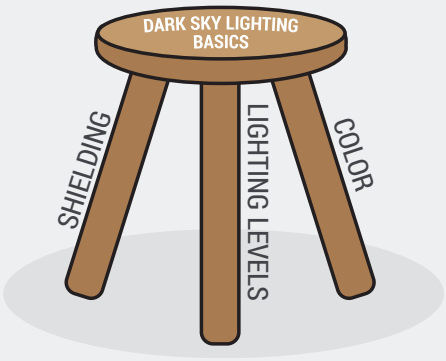
WATT: The standard unit of power in the International System of Units (SI).

DARK SKY ASSESSMENT GUIDE

DARK SKY LIGHTING BASICS: THE "THREE-LEGGED STOOL"

We need lighting for safety at night. However, many city lights are undirected and waste energy while causing light pollution. Proper lighting begins with proper lighting design standards which form a proverbial "three-legged stool". The legs of the stool are:

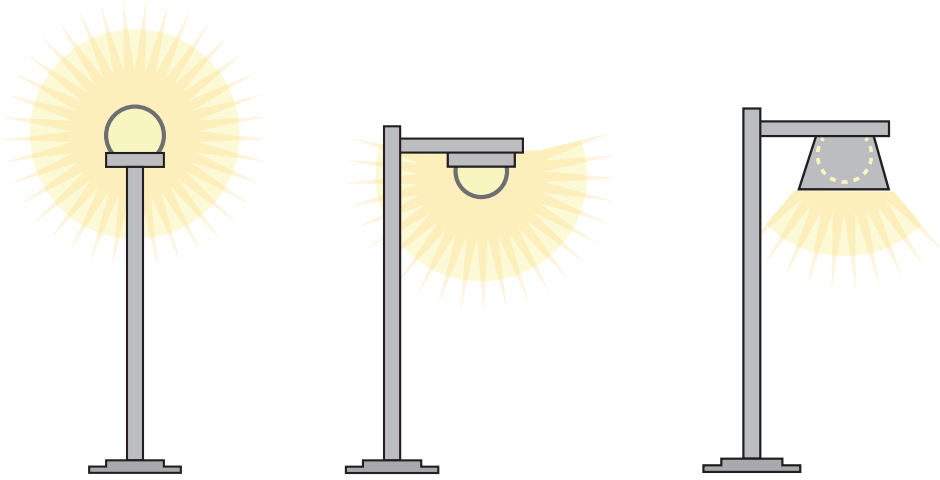
1. **Shielding**
2. **Appropriate lighting levels**
3. **Lighting color**



These three basic design principles form the basis for good lighting design, and when applied correctly, will reduce light pollution.

1. LIGHTING SHIELDING

UNSHIELDED PARTIALLY SHIELDED FULLY SHIELDED



Outdoor lighting should be "fully shielded," meaning no light above a 90-degree angle. The goal of fully shielded light fixtures is to prevent:

- **Light trespass** is light falling where it is not wanted or needed. Light trespass can create problems for neighboring and distant properties.
- **Glare** is intense and blinding light that can cause discomfort and temporary blindness.
- **Skyglow** reduces our ability to view celestial objects due to scattered light from sources on the ground.

The more light is directed towards the intended subject, the better. Fully shielded lighting can be purchased or retrofitted.

2. APPROPRIATE LIGHTING LEVELS

Outdoor lighting can easily become excessive or "cluttered." Appropriate lighting levels means practically managing the amount of outdoor lighting in terms of duration and illuminated area. Ordinances that support appropriate lighting levels will specify the acceptable amount of lumens within an area (such as lumens per acre). Many municipalities use illumination guidelines established by the Illuminating Engineering Society (IES) to set lighting levels in their ordinances. In addition municipalities will remove lights no longer in use or needed. Note that International Dark Sky Association (IDA) standards are more strict than IES standards.

- **Lumens** are a measurement unit of the brightness from a light source.
- **Clutter** is excessive groupings of light sources that create a bright and confusing environment.
- **Reflection** off of what is being illuminated causes light to be redirected back into the sky, contributing to sky glow.

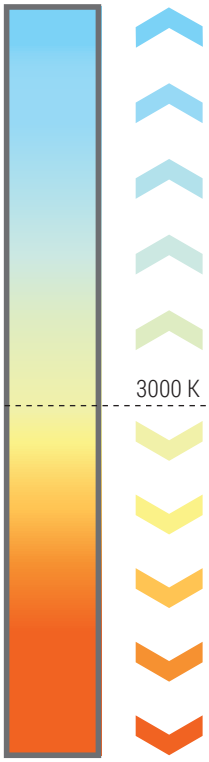
Timers, motion sensors, dimmer switches, and turning lights off when not in use can help improve lighting levels.

Generally, use lighting where it's needed, when it's needed, and only as bright as needed.

3. LIGHTING COLOR

The color of the light is important as well. Cool, blue spectrum lights brighten the night sky more than amber colored light and researchers are beginning to connect blue light spectrum to negative health effects in people and greater problems for wildlife. IDA recommends using long-wavelength lighting with a color temperature of < 3000 Kelvin.

- **Kelvin** refers to a temperature scale used to measure light's warmness or coolness.
- **Color Spectrum** refers to the portion of the electromagnetic spectrum that is visible to the human eye.



WARM SPECTRUM

COOL SPECTRUM

ESSENTIAL TAKEAWAYS

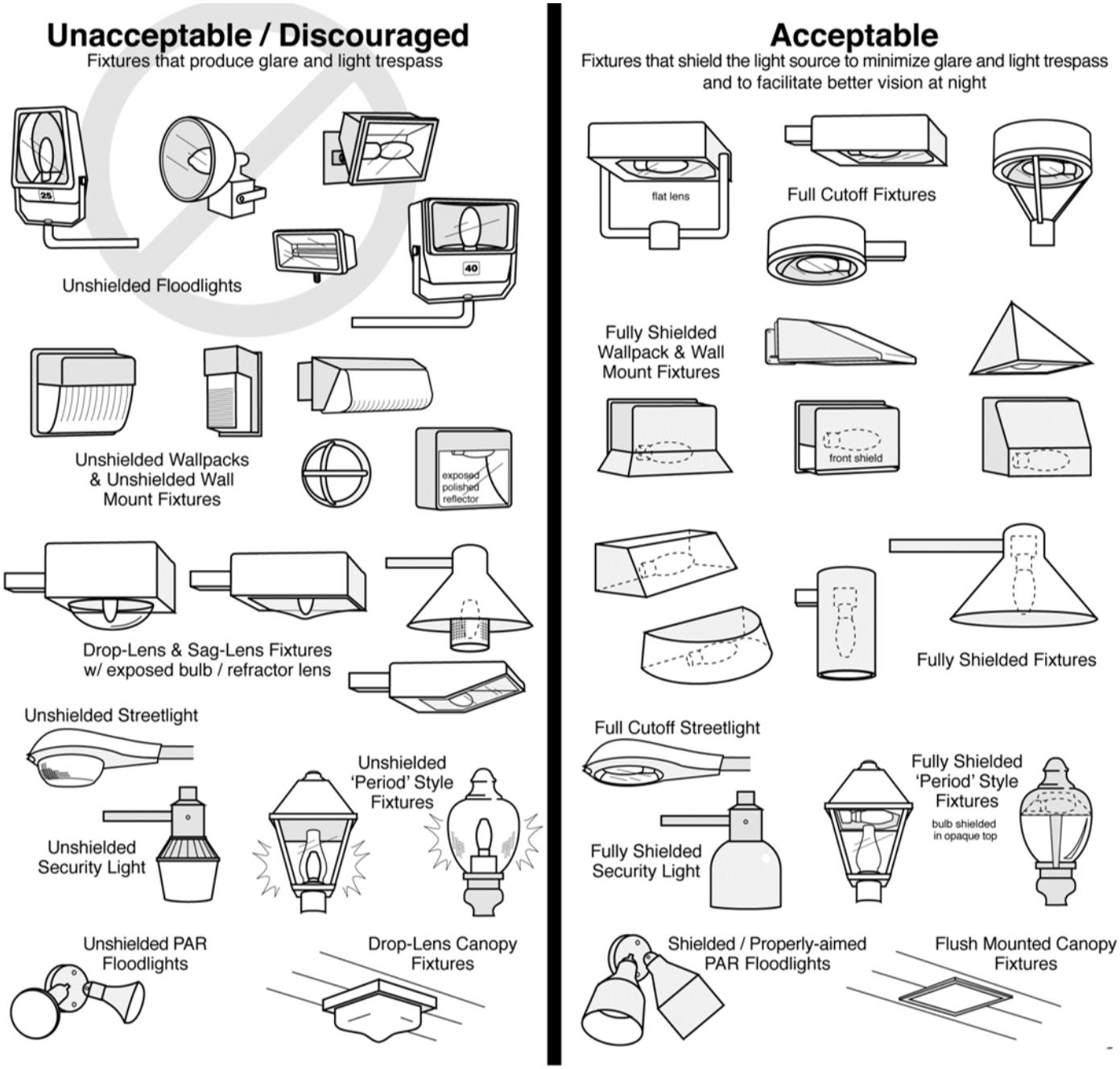
- ☐ **LIGHT ONLY WHAT YOU NEED:** Use fully shielded fixtures. Shine lights down, not up. Direct lighting at desired areas. Be strategic with lighting and only use it where needed.
- ☐ **LIGHT ONLY WHEN YOU NEED:** Install timers, motion sensors, and dimmer switches, and turn off lights when not in use.
- ☐ **LIGHT ONLY HOW MUCH YOU NEED:** Use the right amount of light. Save electricity by using the lowest adequate wattage bulbs. Too much light is wasteful, impairs vision, and can be costly.
- ☐ **LIGHT ONLY HOW YOU NEED:** Use long-wavelength lights with a red or yellow tint to minimize negative health effects. Use warmer colored bulbs, like yellow or amber instead of white. Avoid bluish light, which is known to have a variety of negative effects.

ADAPTED FROM THE INTERNATIONAL DARK-SKY ASSOCIATION, DARKSKY.ORG

NOTES

ACCEPTABLE LIGHTING TYPES

The images below illustrate various acceptable lighting forms. For more informations, visit http://www.darksky.org/fsa/fsa-products/.



ILLUSTRATIONS BY BOB CRELIN©. RENDERED FOR THE TOWN OF SOUTHHAMPTON, NY. COURTESY OF INTERNATIONAL DARK-SKY ASSOCIATION.

CONDUCTING A FORMAL LIGHTING AUDIT

The IDA requires formally designated Dark Sky Communities (DSC) to adopt a quality and comprehensive lighting code which includes a commitment to a brightness measurement program. The brightness measurement program can be maintained either by the community or by another public or private organization. The measurement program is meant to monitor success in reducing light pollution. A formal lighting audit should be performed to establish a baseline for monitoring success.

A formal audit may require outside help from organizations such as a university, research center, IDA chapter, astronomy club, or other qualified entities since determining the electrical, physical, and operational characteristics of lighting can be difficult or technical. The process for lighting audits vary depending on the organization; however, the Federal Department of Energy (DOE) recommends several basic guidelines.

BASIC LIGHTING AUDIT GUIDELINES

THE FOLLOWING ITEMS ARE RECOMMENDED FOR CONSIDERATION:

- ☐ The age, condition, quality, and location of existing light fixtures.
- ☐ Model and manufacturer of lighting system to obtain existing photometrics (perceived brightness).
- ☐ Lamp wattage and ballast type (if appropriate).
- ☐ Take note of the environment, is there the possibility of particulate, moisture, or dirt buildup in or around the lighting fixture?
- ☐ Take note of what kinds of activities, or uses are being performed in the space. Are there are special visual requirements?
- ☐ Observe how the lighting system is controlled and how often it is used.
- ☐ Note the perceived color of the lighting, e.g. blue, white, or amber light.
- ☐ Measure the physical layout of the existing lighting system and take note of height and spacing.
- ☐ If possible, use an illuminance meter to measure light intensity. Readings should be taken on the ground and at even intervals to create a "grid" of measurements.

ADAPTED FROM THE FEDERAL DEPARTMENT OF ENERGY EXTERIOR LIGHTING AUDIT GUIDELINES

A lighting audit provides benchmarks for determining the effectiveness of lighting improvements and energy savings.

USEFUL MEASUREMENT EQUIPMENT

ON HAND

- ☐ TAPE MEASURE
- ☐ DSLR CAMERA *(see pg. 15)*
- ☐ SMART PHONE *(see pg. 13)*

OPTIONAL EQUIPMENT

- ☐ LIGHT METER
- ☐ COLOR TEMPERATURE METER
- ☐ SKY QUALITY METER
- ☐ LASER DISTANCE METER

EQUIPMENT RENTAL

The Colorado Plateau Dark Sky Cooperative has some equipment available to rent for free! Contact *darkskycooperative@gmail.com* for more information.

Available:

- ☐ Sky Quality Meter (SQM) - 1 available
- ☐ Laser Distance Meter - 2 available

OPTIONAL EQUIPMENT?

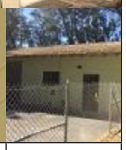
- **Light Meter** an instrument used to measure the intensity of light.
- **Color Temperature Meter** a device used to measure color temperature in degrees Kelvin.
- **Sky Quality Meter (SQM-L with lens)** an instrument used to measure the luminance of the night sky.
- **Laster Distance Meter** a portable device designed to measure distance from the device to a remote target.

LIGHTING INVENTORY TEMPLATE: DOWNLOAD AN EXAMPLE SPREADSHEET *HERE*

There are different ways to log lighting inventory information. One simple way is to record the information on a spreadsheet. The following example spreadsheet was adapted from the *Anza-Borrego Desert State Park IDA Nomination* with supplemental information from *John Barentine, International Dark Sky Association Director of Conservation*. Accompanying the template are descriptions of the content found in the columns of the sample Lighting Inventory worksheet below. The template can be adapted by parks, communities, and other entities performing a lighting inventory. **Some data points can be captured during the day while other data points will require a nighttime visit.**

A detailed description of each item and examples of fixture and lamp types follows.

EXAMPLE LIGHTING INVENTORY TEMPLATE #1

ID	FUNCTION			FIXTURE/ LAMP										PHOTOS	
FIXTURE ID	LOCATION	FUNCTION	HAZARDS	NUMBER OF FIXTURES	LAMPS PER FIXTURE	FIXTURE TYPE	LAMP TYPE	COLOR TEMP (K)	LUMENS	SHIELDING STATE	OPERABLE?	ADAPTIVE CONTROLS?	LIGHT MANAGEMENT PLAN (LMP) COMPLIANT?	CLOSEUP	CONTEXT
1	Restroom building at parking lot in Visitor Center	Building egress	None	8	1	Can	Par 16 Amber Lamp, 3W	1800	120	Fully	Yes	None	Yes		
2	Path near Visitor Center	Wayfinding	Uneven Surface	22	1	Post	8 5W Amber A-lamp, 4 yellow LED or CFL "bug lites"	<2700	200	Partially	Yes	None	8 Yes / 14 No		
3	Admin Building	Building approach	Steps	1	2	Spot	8W Par30 Amber LED	1800	320	Eave	Yes, only one socket in use	Motion sensor, 4 min duration/ 15 sec. delay/ Programed 10%-60%10%	Yes		
4	Lab Building	Building egress	None	1	1	Jelly Jar	3W Par 16 Amber LED	1800	320	Unshielded	No	None	No		
5	Staff Housing	Building egress	Step	1	1	Wallpack	7W Amber LED	1800	280	Fully	Yes	None	Yes		
6															
7															
8															
9															

TEMPLATE ADAPTED FROM THE ANZA-BORREGO DESERT STATE PARK IDA NOMINATION & JOHN BARENTINE

TEMPLATE OVERVIEW

FIXTURE ID: Any unique identifier for the fixture or group of fixtures. This usually takes the form of some running number (e.g., 1, 2, 3, …) but could include letters or other location-specific information. For example, a set of fixtures at a visitor center could be identified as VC1, VC2, …, etc. Ideally the Fixture ID is sufficiently specific to identify individual fixtures among a group.

LOCATION: A short description of where the lighting is located; e.g., "Campground restrooms", "Staff housing", "Administration building". If no location is otherwise available, give GPS coordinates (latitude/longitude).

FUNCTION:
The nominal purpose of the lighting, whether or not such lighting is warranted according to the park's LMP. "Function" should indicate why the lighting exists at the location. If the function is not evident, enter "Unknown".

FUNCTION EXAMPLES:

- ☐ Area (illuminates a large area of ground)
- ☐ Decorative (serves no safety or task performance purpose, but is installed for aesthetic reasons)
- ☐ Egress (as from a structure)
- ☐ Other
- ☐ Pathway (to prevent tripping or to point out a drop-off)
- ☐ Parking
- ☐ Roadway
- ☐ Safety (to point out specific safety hazards)
- ☐ Security (intended to discourage or prevent the incidence of property or violent crime; note that this is NOT a valid reason for lighting in an International Dark Sky Park/Reserve/Sanctuary)
- ☐ Sign
- ☐ Wayfinding (safe transit between points, marking, e.g., the edges of a trail)

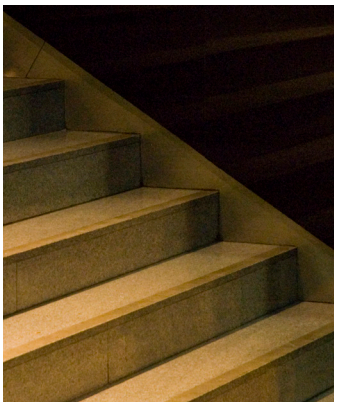
HAZARDS:
What safety hazard is the lighting intended to mitigate? If no hazards are evident, enter "None". If hazards cannot be determined, enter "Unknown".

HAZARD EXAMPLES:

- ☐ Curb
- ☐ Pathway
- ☐ Stairs (indicating multiple steps)
- ☐ Step (indicting a single step)
- ☐ Uneven surface
- ☐ Water
- ☐ Other

CURB

STAIRS



NUMBER OF FIXTURES: If more than one identical fixture is present at a discrete location, group these together. For example, a restroom building might have several identical fixtures on its various sides.

LAMPS PER FIXTURE: The number of discrete lamps per individual fixture, regardless of the number of fixtures at a site. The total number of lamps at a site = number of fixtures × lamps per fixture.

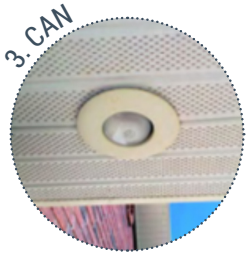
FIXTURE TYPE: The variety of fixture, usually relating to its function. If the fixture type is not evident, enter "Unknown".

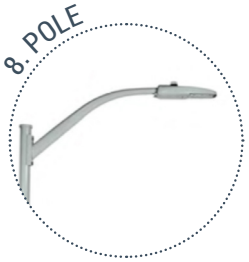
DARK SKY ASSESSMENT GUIDE

FIXTURE EXAMPLES:

1. Barn
2. Bollard
3. Can
4. Ceiling
5. Emergency
6. Flood
7. Phone Booth
8. Pole
9. Spot
10. String
11. Vending Machine
12. Wallpack
13. Wall Sconce

FIXTURE TYPE EXAMPLE IMAGES



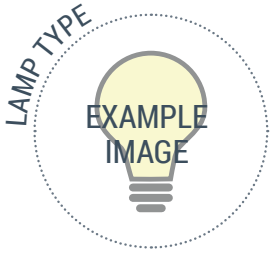


LAMP TYPE: If no lamp is present, enter "Empty Socket". If the lamp type cannot be determined, enter "Unknown".

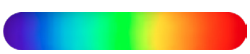
LAMP TYPE EXAMPLES:

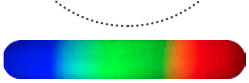
1. Compact Fluorescent ("CFL")
2. Incandescent
3. Halogen
4. Neon (or other gas-filled tube)
5. High-pressure Sodium ("HPS")

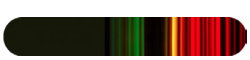
LAMP TYPE EXAMPLE IMAGES

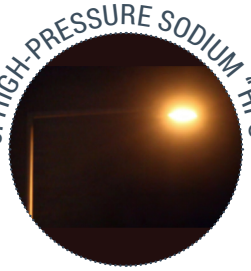


SPECTRUM (COLOR)





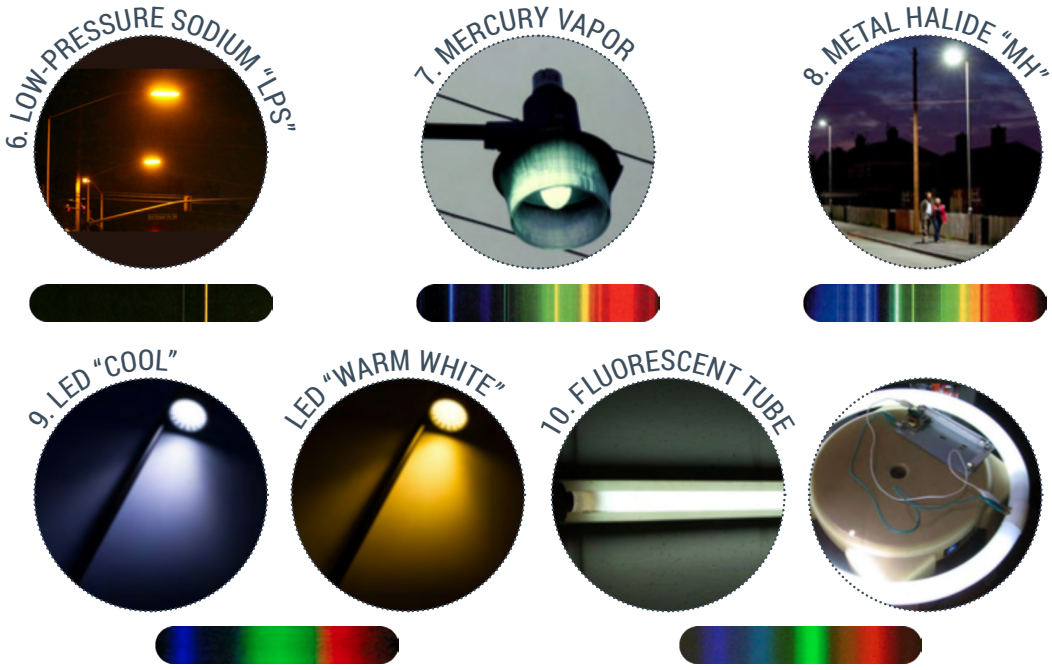




MORE LAMP TYPE EXAMPLE IMAGES

MORE LAMP TYPE EXAMPLES:

6. Low-pressure Sodium ("LPS")
7. Mercury Vapor
8. Metal Halide ("MH")
9. LED (specify "amber", "white" or other color)
10. Fluorescent Tube



SHIELDING STATE:

To what extent is the fixture shielded? Response should be one of the following states.

SHIELDING STATES:

- ☐ Fully (shielded in such a way that no light can be seen above a horizontal plane passing through the lowest light-emitting part of the fixture with respect to the illuminated surface)
- ☐ Partially (some shielding, usually of the fixture top, but not meeting the definition of 'fully shielded')
- ☐ Unshielded (shielding is not a part of the design, with light emitted or diffused from all surfaces other than the mounting point)
- ☐ Other (some other arrangement not captured by 'fully shielded', 'partially shielded', or 'unshielded')
- ☐ Unknown (unable to determine in the field)

OPERABLE?: Can the fixture be operated according to the manufacturer's instructions? Response should be "Operable", "Inoperable", or "Unknown". Lights are typically inoperable because they are fully disconnected from a power supply, and are thus considered LMP-compliant by nature. Note that a light with a broken switch or missing lamp is not considered "inoperable".

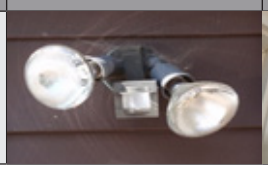
ADAPTIVE CONTROLS

ADAPTIVE CONTROLS:

Any electronic or mechanical device attached to a light intended to dynamically control the duration, intensity, spectrum, or area illuminated by the lighting.

ADAPTIVE CONTROL EXAMPLES:

- ☐ Automatic switch
- ☐ Motion sensor
- ☐ Timer

ADAPTIVE CONTROL INFORMATION				PHOTOS	
LIGHT SOURCE	ADAPTIVE CONTROLS	COLOR TEMP (K)		BEFORE ADAPTIVE CONTROLS (2016)	AFTER ADAPTIVE CONTROLS (2017 - 2018)
LED	Programmed 10%-60%-10% Motion detection 15 sec. delay	3000 K	1600 (60%)		

LMP COMPLIANT?:
Does the light meet all of the requirements of the park's Lighting Management Plan (if applicable)?

CLOSEUP PHOTO: An image of the light in place, taken sufficiently close to reveal some details about it.

CONTEXT PHOTO:
An image of the light in place, taken from further away to illustrate the function or other contextual information about it.

PHOTO EXAMPLES

CLOSEUP

CONTEXT

NOTES

DARK SKY ASSESSMENT GUIDE

EXAMPLE LIGHTING INVENTORY TEMPLATE #2 DOWNLOAD A BLANK WORKSHEET *HERE*

Below is another example of how to record and organize your lighting audit data. Specific technology or technical assistance may be required to capture each data point. No matter what method or structure you use, be consistent and well organized.

DAYTIME VISIT

Visit Date:

Fixture Height (ft):

Fixture Lighting Purpose:

- ☐ Area
- ☐ Entrance/Egress
- ☐ Pathway
- ☐ Parking
- ☐ Roadway
- ☐ Sign
- ☐ Stairway
- ☐ Other

Fixture Type:

- ☐ Barn
- ☐ Bollard
- ☐ Ceiling Mount
- ☐ Dark Cowbell
- ☐ Flood
- ☐ Hanging Light
- ☐ Lamp Post
- ☐ Phone Booth
- ☐ Recessed
- ☐ Spotlight
- ☐ Tin Hat
- ☐ Tube
- ☐ Vending Machine
- ☐ Wall Pack
- ☐ Wall Sconce
- ☐ Other

Number of Fixtures

Lamps per Fixture:

Historic Fixture?

- ☐ Yes
- ☐ No

Fixture Power:

- ☐ Solar
- ☐ Utility
- ☐ Other

Fixture Adaptive Controls:

- ☐ Motion Sensor
- ☐ None
- ☐ Photocell
- ☐ Switch
- ☐ Timer Switch
- ☐ Other

Lamp Type:

- ☐ CFL
- ☐ Empty Socket
- ☐ Fluorescent Tube
- ☐ Halogen
- ☐ HPS
- ☐ Incandescent
- ☐ Induction
- ☐ LED
- ☐ LPS
- ☐ Mercury Vapor
- ☐ Metal Halide
- ☐ Other

Shielding:

- ☐ Fully Shielded Eve
- ☐ Fully Shielded Fixture
- ☐ Fully Shielded Lamp Lens
- ☐ Partially Shielded Eve
- ☐ Partially Shielded Fixture
- ☐ Partially Shielded Lamp Lens
- ☐ Unshielded

NIGHTTIME VISIT

Visit Date:

Fixture Height (ft):

Correlated Color Temperature CCT:

Illuminance:

Footcandle:

MITIGATION

Mitigation Required

- ☐ Yes
- ☐ No

Mitigation Date:

ADDITIONAL NOTES

ESTABLISH A SKY BRIGHTNESS MEASUREMENT PROGRAM

THINKING LONG TERM

A lighting inventory provides the foundational knowledge needed to improve lighting used at night. Before improvements are made, a **sky brightness measurement program*** should be established and maintained in order to monitor the evolution of light pollution in a community over time. **Note that evidence of a sky brightness monitoring program is a requirement for International Dark Sky Place Designation.*

WHAT ARE YOU MONITORING?

You are monitoring sky brightness (or quality) over time.

HOW IS SKY QUALITY MEASURED?

There are a variety of ways to conduct a sky quality survey including:

1. *A Sky Quality Meter (SQM-L) Survey*
2. *Bortle Scale Interpretation*
3. *Photographic Evidence*

Below is a brief description of how to conduct a sky quality survey using a Sky Quality Meter. For more information and descriptions of other methods visit: http://darksky.org/our-work/conservation/idsp/become-a-dark-sky-place/sky-quality-survey/

NEW TERMS

- **Zenith** the point in the sky directly above an observer.
- **Astronomical Darkness** When the sun is at least 18º below the local horizon. You can easily find times for sunset, sunrise, twilight, moon rise/set, etc. on sites like Time And Date.

ADAPTED FROM THE INTERNATIONAL DARK SKY ASSOCIATION: HOW DO CONDUCT A SKY QUALITY SURVEY

TAKING A SKY QUALITY SURVEY

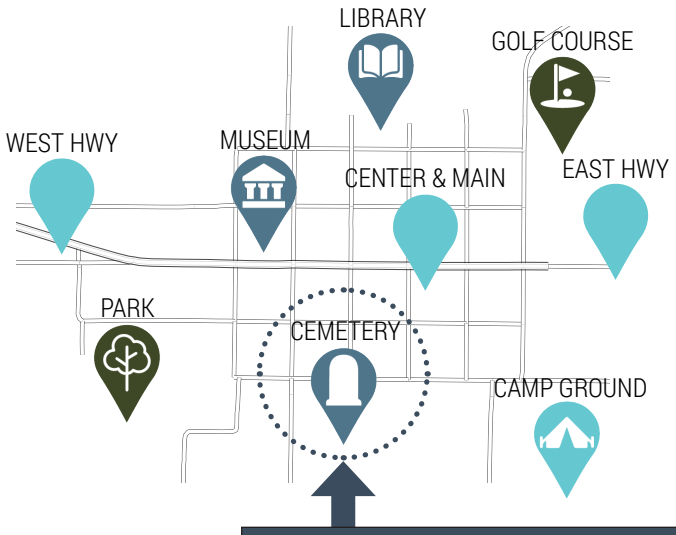
The Unihedorn Sky Quality Meter *(SQM-L version with "lens")* is a small battery powered device that is used to take scientific-quality measurements of sky brightness.

To use a Sky Quality Meter simply hold the device directly above your head so that the photometer is pointed toward the sky (*at zenith*) and click the start button. The screen will then display the sky brightness at the point you are standing. The higher the number, the darker the sky is.

Take 5-6 measurements per location per visit, discarding the first measurement (the first measurement will not be accurate). Choose several locations throughout your community that will represent the darkest and the brightest areas in order to achieve a comprehensive survey of the location.

We recommend collecting data over several nights spaced out by a week or two. This dilutes the effects of fog, dust, and other atmospheric conditions that can reduce accuracy.

Remember that you will need to return to these locations in the future as you continue to monitor sky quality over time.



BEST PRACTICES

- ☐ Never take a measurement directly underneath a light source or anything that might block the clear sky.
- ☐ Always take measurements under a clear, open, cloudless sky,
- ☐ Always take measurements when the moon is below the horizon or when the moon is new.
- ☐ Always take measurements under conditions of "astronomical darkness" meaning the sun is at least 18º below the local horizon.
- ☐ The success of your sky brightness measurement program will depend on staying organized and consistent with your data.
- ☐ Share your data with the Globe at Night citizen science project at globeatnight.org

DATA TO CAPTURE (WITH EXAMPLES)

- ☐ **Location:** Cemetery
- ☐ **Latitude:** 39.686
- ☐ **Longitude**: 110.846
- ☐ **Altitude:** 1,814m
- ☐ **Time:** 9:15pm
- ☐ **Date:** 5/20/19
- ☐ **SQM measurements taken at zenith:**

1. 21.02 *(record the first number but remember that it should be discarded later for accuracy)*
2. 20.95
3. 20.95
4. 20.96
5. 20.95
6. 20.97

CEMETERY
AVERAGE SQM RATING = 20.96

DIFFERENT ASSESSMENT TOOLS

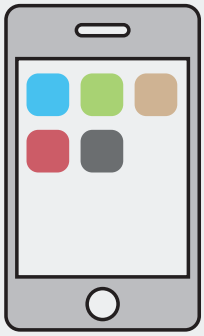
There are a variety of ways to collect information for your dark sky assessment. The following pages describe different methods for collecting, documenting, and organizing information. While the DOE and IDA offers basic guidelines, each community is unique, and the methods used and data collected will depend on individual goals, capacity, and access to technology. Dark Sky Community status won't be the goal for every community, but a formal audit will provide a baseline for limiting light pollution.

USE TECHNOLOGY

A wide variety of Iphone and Android apps can be used to take night sky brightness measurements. Other applications, such as COLLECTOR FOR ARCGIS can capture a comprehensive set of geographic data points.

For more precise measurements, the IDA recommends using a SKY QUALITY METER with lens (SQM-L) *see page 13.* Choose apps and resources that make sense for you and your community or contact a dark sky expert for help. Below is a list of basic apps to get you

MOBILE APPS AND RESOURCES



DATA COLLECTION

COLLECTOR FOR ARCGIS

Collector can capture geolocated measurements for:

- ☐ Shielding
- ☐ Fixture height
- ☐ Lamp type
- ☐ Color temperature
- ☐ Lumens (Lux)
- ☐ Footcandles (fc)

SKYGLOW

SKY QUALITY METER

DARK SKY METER APP (IOS)

CITIES AT NIGHT PROJECT

GLOBE AT NIGHT PROJECT

MY SKY AT NIGHT PROJECT

LOSS OF THE NIGHT APP

WHO CAN I CONTACT IF I HAVE QUESTIONS?

The International Dark Sky Association (IDA)
(520) 293-3198
http://www.darksky.org

The Colorado Plateau Dark Sky Cooperative
(435) 213-7026
https://cpdarkskies.org/
darkskycooperative@gmail.com

The Consortium for Dark Sky Studies
http://www.darkskystudies.org/
daniel.l.mendoza@gmail.com
valspal13@gmail.com

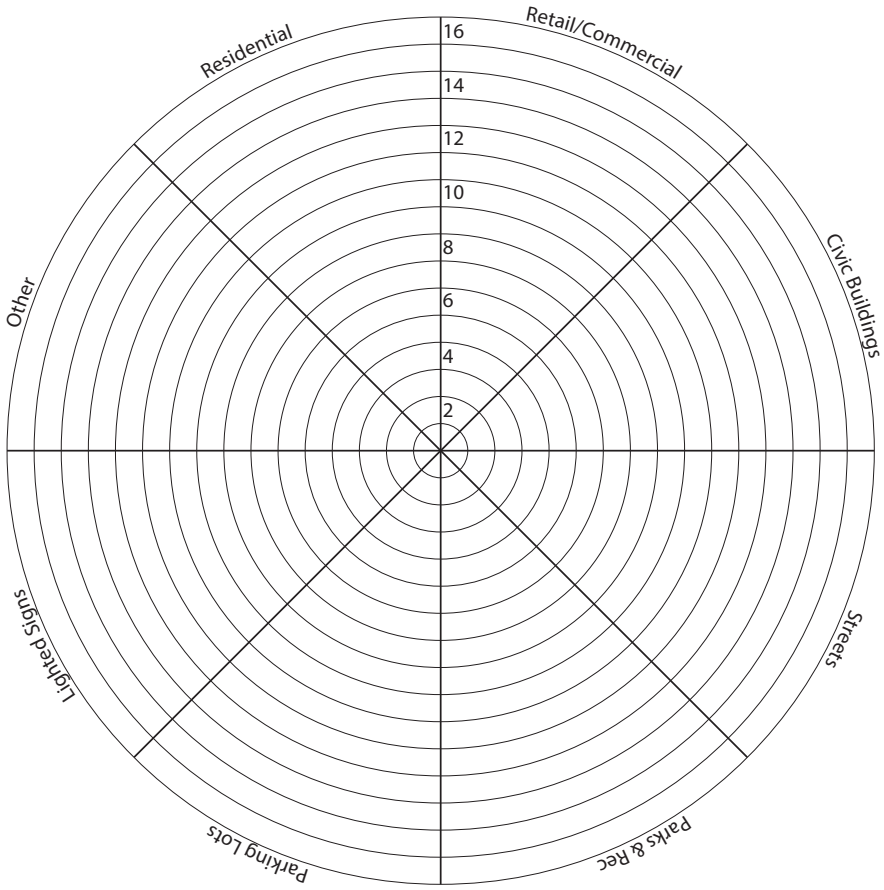
National Park Service Natural Sounds & Nights Skies Division
https://www.nps.gov/orgs/1050/index.htm
randy_stanley@nps.gov

NOTES

DARK SKY ASSESSMENT GUIDE

LIGHTING ISSUE CONCERNS & LAND USE

Another tool for documenting light pollution sources is to mark the number of issues (e.g. poor shielding, blue/white lighting color, excessive lighting) observed in relation to land use. This can help identify focus areas and large-scale opportunities. Color in the number of issues related to the "three-legged stool" observed in the radial table below. Optional "issue-related" color coding is suggested below. The goal is to be able to compare the size of the "pie slices" after the assessment.



OPTIONAL "ISSUE" COLOR CODING

- Shielding
- Lighting Color
- Inappropriate/ Excessive Lighting

RESIDENTIAL
All types, single-family, apartments, etc.

RETAIL
Stores, shops, businesses, restaurants, etc.

CIVIC BUILDINGS
Government, post office, schools

STREETS
Street lighting

PARKS & REC
Sports parks, baseball fields, tennis courts, etc.

PARKING LOTS
Lighted parking lots

LIGHTED SIGNS
Business signs, advertising signs, etc.

OTHER
Any other uses, industrial, etc.

PUBLIC ENGAGEMENT & EDUCATION

Community engagement is an essential part of any kind of community-wide initiative. The support of local leaders, residents, and business owners can be gained from talking to people on an individual level and addressing their concerns. Make an effort to talk to neighbors and friends about light pollution and educate them on the benefits of improved lighting.

2 MINUTE SURVEYS...

Ask residents and business owners about their experience with light pollution. As you survey people educate them about basic light pollution concepts and issues. Why should they care?

QUICK QUESTIONS	EDUCATE
Is preserving dark skies important to you?	Briefly explain why light pollution is an issue.
Would you support simple changes to limit light pollution?	Describe why preserving the night sky is important to you.
What concerns do you have?	Discuss the "three-legged stool" and simple ways to mitigate light pollution.

DARK SKY ASSESSMENT GUIDE

MARKING A MAP

Marking lighting issues on a map can help identify and document spatial clusters and provide a reference for others.

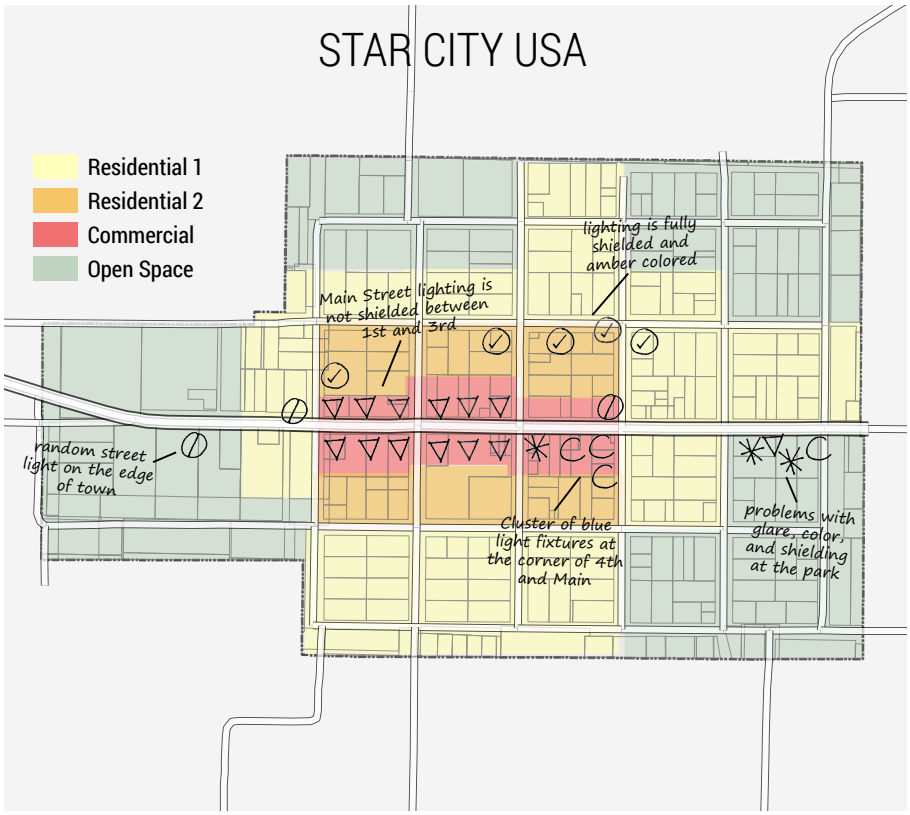
An official zoning map, Google map, or other reference map of your community can be used to document sources of light pollution as well as examples of "dark-sky friendly" lighting.

Some areas may require a map that is "zoomed in on an area" such as on main street or a sports park. Your assessment may include just publicly owned lighting or all lighting including commercial, residential, and open space. The scale and amount of detail are up to the community.

Marked lighting issues should relate to the "three-legged stool" but should also be tailored to your community's specific dark sky assessment goals.

IDEAS FOR WHAT TO MARK

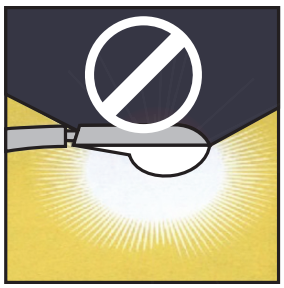
- Unshielded lighting
- Glare/ intense brightness
- Unnecessary lighting
- Blue/ White Colored Light
- Good lighting

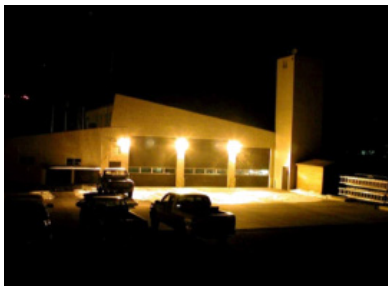


TAKING NIGHT PHOTOS

Documenting light pollution is an important way for educating the public on the actual situation and to support a case for improved lighting.

UNSHIELDED





SHIELDED

IMAGES FROM IDA INTRO TO LIGHTING POWERPOINT

NIGHT PHOTO GUIDELINES

The following are helpful guides on settings for taking certain types of photos at night. Remember, always use a tripod. These settings should be adjustable on the manual mode for any DSLR camera.

- **DSLR** stands for "digital single-lens reflex." DSLR cameras are versatile cameras with changeable lenses that produce high-quality photos.

	SHUTTER	APERTURE	ISO	FLASH
SIGNS	1/50	F/2.8	100	N
CITY SCAPE	1/320	F/4.5	100	N
BRIDGES	15/1	F/5.6	100	N
STREET	1/5	F/4	320	Y
MONUMENTS	15	F/16	250	Y
LIFE	6	F/9	100	Y
THE MILKY WAY	20+	F/2.8	1600	N

CALCULATE THE SAVINGS

Many communities are now realizing the benefits of controlling energy waste through better-quality and better-designed lighting. Calculating potential energy savings and payback for upgrade conversions is another way to understand how adopting dark sky policies and best practices can benefit your community. Use the following formula from the Federal Department of Energy's Exterior Lighting Guidelines to calculate an estimation of lighting power and energy use. Compare your current lighting energy costs with estimated energy costs of an upgrade conversion. Calculating an energy use estimation for prospective lighting replacements is an effective way to illustrate cost savings.

LIGHTING POWER & ENERGY USE ESTIMATION

1. COMPUTE THE TOTAL POWER (kW) USED BY THE EXISTING SYSTEM

EXISTING LAMP OR LUMINAIRE WATTAGE		NUMBER OF LAMPS		TOTAL POWER CONSUMED
_____	W x	_____	lamps =	W

2. COMPUTE THE TOTAL ENERGY (kWh) CONSUMED ANNUALLY BY THE EXISTING SYSTEM.

TOTAL POWER CONSUMED BY SYSTEM LUMINAIRE		HOURS OF USE PER DAY		DAYS OF USE PER WEEK		WEEKS OF USE PER YEAR		TOTAL ENERGY CONSUMED
_____	W x	_____	hrs/day x	_____	days/wk x	_____	wks/yr =	kWh/

3. COMPUTE THE TOTAL ENERGY COST (DOLLARS) ANNUALLY FOR OPERATION OF THE EXISTING SYSTEM.

TOTAL ENERGY CONSUMED		ENERGY RATE		TOTAL COST
_____	kWh/yr	_____	$/kWh =	$/yr

BACK TO THE BASICS

- **W (watt)** the standard unit of power in the International System of Units (SI)
- **Wh (watt hour)** a unit of energy equal to the power of 1 watt operating for 1 hour
- **kW (kilowatt)** a measure of 1,000 watts of electrical power.
- **kWh (kilowatt hour)** a measure of electrical energy equivalent to a power consumption of 1,000 watts for 1 hour.
- **Luminaire** a complete lighting unit that usually includes the fixture, ballasts, and lamps.

IN A NUTSHELL...

ENERGY = POWER x TIME

SWOT ANALYSIS

A SWOT analysis is a strategic planning and brainstorming tool that encourages participants to assess and reflect on the ***S****trengths,* ***W****eaknesses,* ***O****pportunities, and* ***T****hreats* of a place, situation, or goal. Use a SWOT analysis to assess the strengths, weaknesses, opportunities, and threats that are relative to your community's goal to preserve and protect dark skies (see example content below).

SWOT ANALYSIS SUBJECT: *Star City USA - becoming a dark sky destination*

STRENGTHS	WEAKNESSES
- Shared values among community members - Tourist destination - Friendly - Small town values - Low population - Historical assets - Close to outdoor recreation	- Lack of cultural resources - Limited funding - Perception town is anti-business - Lack of destination facility - Vacant store fronts - Lack of rental housing - Codes are too flexible
OPPORTUNITIES	**THREATS**
- Public education - Retrofitable lighting - Room to grow - Explore astro-tourism - Attract new businesses and families	- Light pollution from nearby city - Attitudes towards change - Afraid to try new things - Youth leaving - High employee turnover

DARK SKY ASSESSMENT GUIDE

NOW WHAT? AFTER YOUR DARK SKY ASSESSMENT

What you do after your dark sky assessment is almost as important as the assessment itself. Depending on your specific goals, the following steps can lead to an organized and effective action plan.

1. Debrief after the assessment

- ☐ Hold a post-assessment meeting with all assessors.
- ☐ Compile information, recording comments and clarifying notes.
- ☐ Brainstorm and record suggestions for changes and improvements. Develop ideas for projects that take advantage of opportunities, improve strengths, strengthen weaknesses, or mitigate threats.
- ☐ Invite participants to be involved in your project and identify how they will be committed.
- ☐ Thank everyone for their participation and outline next steps.

2. Form a local Dark Skies Group

(adapted from Advice on Starting a Local Dark Skies Group, Ed Stewart, Dark Skies, Inc., of the Wet Mountain Valley)

- ☐ Educate yourself on the various aspects of light pollution.
- ☐ Develop a core working group to support the initiative.
- ☐ Build awareness and education through local media and social media.
- ☐ Personally contact business owners and managers on the benefits of proper outdoor lighting.
- ☐ Provide a vendors list of dark sky friendly fixtures to contractors, hardware stores, and home improvement businesses.
- ☐ Contact the local power company for potential incentives or discounts on amber LED fixtures.
- ☐ Individually approach town leadership to get a feel for local support.
- ☐ Take the long-range approach. This may be seen as a "tree hugger" issue, but is about protecting the rural environment and quality of life.
- ☐ Stay positive and focus on benefits and advantages: reduced power consumption, cost savings, improved quality of life, and improved potential tourism.

3. Pursue International Dark Sky Places certification

- ☐ Provide the compiled report to local leadership, with suggested actions.
- ☐ Gauge the level of willingness of local leadership to take action.
- ☐ Outline the current project prioritization for leaders and ask leaders for input.
- ☐ Examine the potential to become a dark-sky certified community at http://www.darksky.org/idsp/become-a-dark-sky-place/.
- ☐ Fill out the application at http://www.darksky.org/idsp/become-a-dark-sky-place/dark-sky-community-inquiry/.

4. Plan action

- ☐ Create an implementation plan based on prioritized projects or actions.
- ☐ Identify potential funding sources as needed, required partners, and any needed changes to town code.
- ☐ Plan completion of small simple tasks first to build momentum for larger projects.
- ☐ Build critical mass—get the word out! Notify and continually engage and invite stakeholders, land owners, business owners and general public.

NOTES

IDA DARK SKY COMMUNITY

An IDA Dark Sky Community (DSC) is a town, city, or municipality that has shown exceptional dedication to the preservation of the night sky through the implementation and enforcement of quality lighting codes, dark sky education, and citizen support of dark skies.

Communities apply to the IDA who will make a decision in an average of one-to-two years from the initial request.

Requirements that must be maintained:

- ☐ Quality comprehensive lighting code
- ☐ Community commitment to dark skies
- ☐ Broad support from community organizations
- ☐ Community commitment to education on dark skies
- ☐ Success in light pollution control
- ☐ A continuing sky brightness measurement program

For full instructions and information: http://www.darksky.org/idsp/become-a-dark-sky-place/

ADDITIONAL RESOURCES

GENERAL

International Dark Sky Association: http://www.darksky.org

Colorado Plateau Dark Sky Cooperative: https://cpdarkskies.org

The Consortium for Dark Sky Studies: http://darkskystudies.org

Dark Sky Planning Guidance & Best Practices: http://ruralplanning.org/assets/dark-sky---web.pdf

Dark Sky Lighting Ordinance Walkthrough: https://utah.maps.arcgis.com/apps/MapSeries/index.html?appid=1cb7caaa1aa543dea3c813ec9f1f7f93#

CPDSC Educational Video Series: https://vimeo.com/user95912242

Interactive light pollution mapping tool: https://www.lightpollutionmap.info

Building Energy Codes Program: https://www.energycodes.gov/comcheck

Watts-to-lumens free calculator: http://www.rapidtables.com/calc/light/watt-to-lumen-calculator.htm

Sensible outdoor lighting: https://darkskywisconsin.uwex.edu/files/2015/11/township-brochure.pdf

The new world atlas of artificial night sky brightness: http://advances.sciencemag.org/content/2/6/e1600377.full

Federal Department of Energy's Exterior Lighting Guidelines: http://cltc.ucdavis.edu/sites/default/files/files/publication/2010_DOE_FEMP_Exterior_Lighting_Guide.pdf

How to carry out a dark sky survey: https://darkskydiary.wordpress.com/2010/12/18/how-to-carry-out-a-dark-sky-survey/

Luginbuhl and Hall. "How Flagstaff is Preserving Dark Skies." *Astronomy,* Sept. 2017, pp. 56-60.

RECREATION LIGHTING

International Dark Sky Association criteria for community-friendly sports lighting: https://www.darksky.org/wp-content/uploads/2018/03/IDA-Criteria-for-Community-Friendly-Outdoor-Sports-Lighting.pdf

Powder Mountain Night Skiing: 6,248,060 total lumens for 19 acres of skiable terrain (ratio of 7.6 lumens per square foot). 6500 Kelvin color temp. http://ultratechlighting.com/wp-content/uploads/2016/01/SNBT-FL-300W-B2.pdf

Nordic Valley Night Skiing: 6,639,390 lumens and about 54 acres of skiable terrain (ratio of about 3 lumens per square foot). 6500 Kelvin color temp.

International Tennis Federation: http://www.itftennis.com/technical/facilities/facilities-guide/lighting.aspx

FLAG LIGHTING

Federal law for US flag: http://www.senate.gov/reference/resources/pdf/RL30243.pdf

Federal and state facilities: See UCA §17-27a-304. http://le.utah.gov/xcode/Title17/Chapter27A/17-27a-S304.html

Canopy lighting a parking lot light: See IDA model ordinance regarding lumens per gas pump and lumens per parking stall: http://darksky.org/our-work/public-policy/mlo/

TOWER LIGHTING

Federal Aviation Administration: https://www.faa.gov/regulations_policies/faa_regulations/

Federal Communications Commission: https://www.fcc.gov/general/rules-regulations-title-47

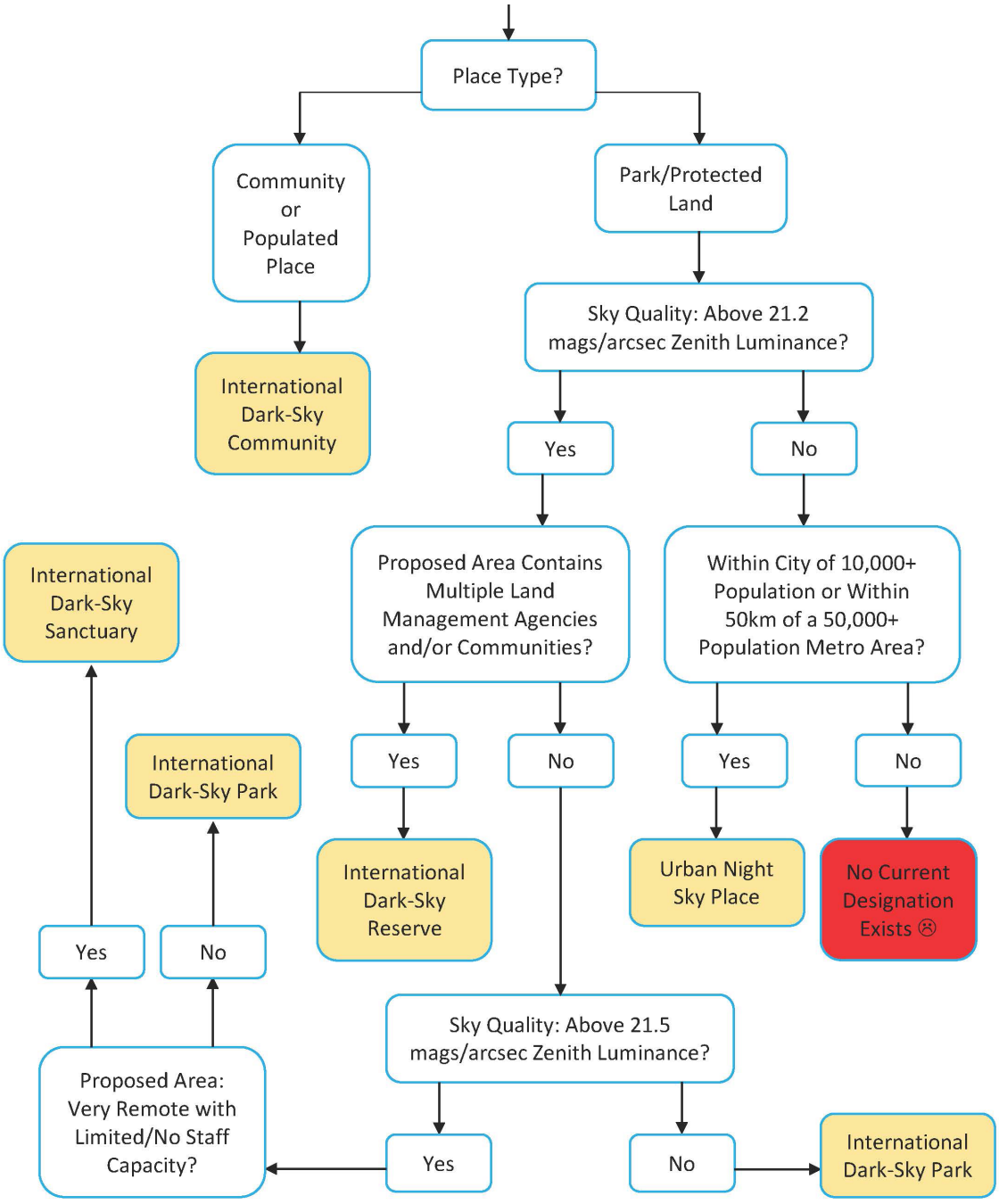
ILLUMINATION STANDARDS

Illuminating Engineering Society (IES): https://www.ies.org/standards/

INTERNATIONAL DARK SKY PLACES

DESIGNATION FLOWCHART

There are five different categories for designation. Each category has its own set of guidelines for certification based on land management, sky quality, and size. Follow this flowchart to see where your place fits.



Five Principles for Responsible Outdoor Lighting

Too often, outdoor electric lighting installations at night are over lit, left on when not needed, and are harmful to the environment. As a result, light pollution is a growing global issue that can negatively affect our environment and impact our quality of life. IDA and the Illuminating Engineering Society have published the joint Five Principles for Responsible Outdoor Lighting By joining forces, our shared goal is to prevent and reduce light pollution through the proper application of quality outdoor electric lighting.

By applying these principles, properly designed electric lighting at night can be beautiful, healthy, and functional. Projects that incorporate these principles will save energy and money, reduce light pollution, and minimize wildlife disruption.

Five Principles for Responsible Outdoor Lighting

If light is deemed useful and necessary, follow these guidelines to prevent, or when that's not possible, minimize light pollution:

USEFUL – All light should have a clear purpose.

Before installing or replacing a light, determine if light is needed. Consider how the use of light will impact the area, including wildlife and the environment. Consider using reflective paints or self-luminous markers for signs, curbs, and steps to reduce the need for permanently installed outdoor lighting.

TARGETED – Light should be directed only to where needed.

Use shielding and careful aiming to target the direction of the light beam so that it points downward and does not spill beyond where it is needed.

LOW LIGHT LEVELS – Light should be no brighter than necessary.

reflect more light into the night sky than intended.

CONTROLLED – Light should be used only when it is useful.

Use controls such as timers or motion detectors to ensure that light is available when it is needed, dimmed when possible, and turned off when not needed.

COLOR – Use warmer color lights where possible.

Limit the amount of shorter wavelength (blue-violet) light to the least amount needed. Light where you need it, when you need it, in the amount needed, and no more.

. . .

To gain a fuller understanding of IDA's approach to lighting, click here.

Download the Lighting Principles in these languages:
English, Spanish, French, Mandarin, Arabic, Portuguese, Polish, Swahili, Japanese, Slovenian, Italian, German, Malay, Tamil.

Read the original April 2020 Lighting Principles announcement (includes a Spanish language version).

Public Policy

GUIDANCE & BEST PRACTICES

DARK SKY PLANNING

AN INTRODUCTION FOR LOCAL LEADERS

WORKFORCE SERVICES
HOUSING & COMMUNITY DEVELOPMENT
COMMUNITY DEVELOPMENT OFFICE

COLORADO PLATEAU DARK SKY COOPERATIVE

Special thanks for review and consultation on this document:

John Barentine, *International Dark Sky Association*, Director of Public Policy

Bettymaya Foott, *International Dark Sky Association*, Director of Engagement

TABLE OF CONTENTS

INTRO

"Appreciation for dark skies is entering the social consciousness. Light pollution is one of the only types of pollution that's completely and immediately reversible. I don't think we'll realize the value of seeing the Milky Way, until it's gone."

Bettymaya Foott, International Dark Sky Association, Director of Engagement[1]

THE DISAPPEARING NIGHT

When we think of natural resources, few of us think of darkness. Centuries ago, when human settlements were relatively free of artificial lighting, the moon and stars dominated the night sky. Street lighting as we know it began approximately 300 years ago with oil lamps placed on wooden poles. By the 19th century, gas lamps came into use and by the 20th century the utilization of artificial electric lamps was widely spread.

Advances in lighting technology have slowly flooded our world with light, and city nightscapes are now dominated by the artificial lighting of buildings, streets, signs, parking lots and open spaces. The stars and constellations are outshone by the light emanating from human development and even the brightest constellations are no longer fully visible to residents in and around large cities whose artificial glow can be seen from over 200 miles away.[2] While artificial lights are important for safety, sense of security, and navigation, light pollution results when lighting is excessive or inappropriately used.[3]


3000 BC
CANDLES
1700s
OIL LAMPS
1790s
GAS LIGHTING
1880s
ELECTRIC LIGHTING
1960s
LED LIGHTING

Light pollution has become synonymous with population growth, urbanization and human development. As one of the fastest growing states in the nation, Utah's population is projected to reach over 5.8 million people by 2065. Much of that growth will be concentrated within the four Wasatch Front urban core counties, including Weber, Davis, Salt Lake, and Utah Counties, but projections show significant geographic expansion outwards. All 29 counties are projected to grow over the next 50 years.[4] The majority of Utahns, along with the majority of the world's population, will live in urbanized areas without regular access to dark, star-filled skies.

For naturally darker and less-populated rural areas, dark sky protection is an important opportunity to preserve an ever-shrinking natural resource and capitalize on economic benefits including energy cost savings, night sky-based tourism, and increased property values.

Light pollution is a threat because of the negative effects on humans and the environment as well as long-term consequences, such as biodiversity, economic, and cultural loss, that cannot easily be reversed.[5] However, in contrast to other types of pollution, the negative effects of light pollution can be mitigated easily and cost-effectively.[6]

Utah is home to some of the darkest skies in the nation and is a national leader in dark sky protection and preservation. Many Utahns recognize natural nighttime darkness as an important natural resource and understand the economic, ecological and cultural value of protecting the dark. This guide will help decision makers, community leaders, and residents understand the value of dark skies, provide important guidelines and resources in regards to their preservation and protection, and highlight a variety of dark sky efforts throughout the state.

THE BASICS OF DARK SKIES

LIGHT POLLUTION

Most of us think of light pollution as the inability to see the stars from within a city but it includes other things such as glare on roadways at night, or unwelcome light from a neighbor's porch light falling into a bedroom window making it difficult to sleep. These are all aspects of light pollution that are related to legitimate uses of light at night, but create consequences that are unintended and usually considered to be intrusive.

The International Dark-Sky Association (IDA), the leading non-profit organization dedicated to preserving night skies, defines light pollution as, "any adverse or unintended effect of the use of artificial light at night, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste."[7] Today light pollution is a growing, global problem and is the result of poor lighting design and simple over use.

The ability to recognize poor lighting design and determine whether lighting is appropriate or excessive is the first step towards choosing appropriate solutions. For a more in-depth guide on identifying light pollution look for the **Dark Sky Assessment Guide: Evaluation Methods, Tools, & Resources** available at cpdarkskies/resources. For a quick overview of light pollution watch **"What is Light Pollution"** available at https://vimeo.com/325249584

TYPES OF LIGHT POLLUTION

LIGHT TRESPASS When light falls where it is not wanted or needed. Use fully shielded light fixtures whenever possible.

GLARE Intense and blinding light that reduces visibility and causes discomfort. Direct light downwards and use the lowest adequate light intensity.

CLUTTER Excessive groupings of light sources that are bright and confusing. Only direct lighting onto desired areas and avoid excessive lighting.

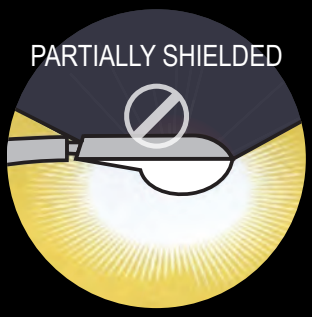
SKYGLOW The brightening of the night sky over inhabited areas. Use fully shielded light fixtures, direct light downwards, use the lowest adequate light intensity, and optimize lighting placement.

DARK SKY LIGHTING BASICS

Raising the awareness of local decision-makers and the general public about light pollution-related issues can contribute significantly to a general acceptance of (or even demand for) lighting policies and regulations.[9] Effective policies and regulations come from an understanding of proper lighting design standards. These basic design standards can be described as a "three-legged stool"[10] and form the basis for dark-sky-friendly lighting and policy decisions.

The "Three-legged stool"

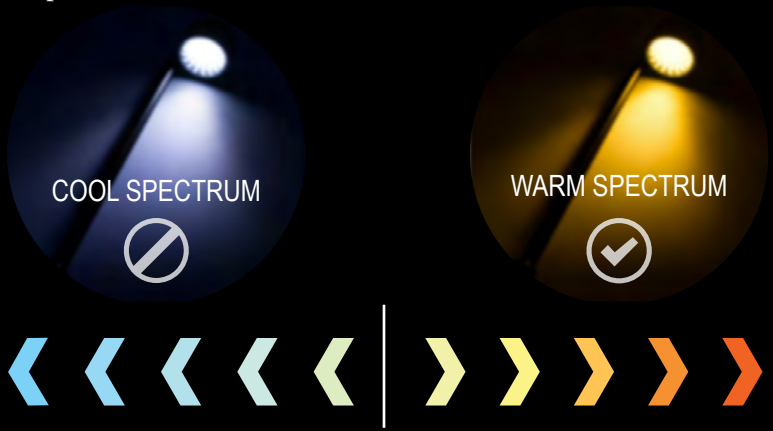
1- SHIELDING OF FIXTURES Downward pointing, fully shielded lighting keeps unwanted light from escaping into surrounding areas and the sky above. They direct the light onto the desired areas and limit glare. Outdoor lighting should be "fully shielded," meaning no light emitted above a 90 degree angle. The more directed towards the intended subject, the better. Fully shielded lighting can be purchased or retrofitted.



"Generally, use lighting where it's needed, when it's needed, and only as bright as needed."

2- AMOUNT OF LIGHT Outdoor lighting can easily become excessive. Limiting the total amount of installed lighting can help reduce light pollution. Designing for the appropriate amount of lighting includes shining lights down instead of up, directing light only onto desired areas, and using the lowest adequate bulb intensity. Timers, motion sensors, dimmer switches, and turning lights off when not in use can all contribute to darker skies, and in many cases, reduce municipal and property owner electrical costs.

3- LIGHTING COLOR The color of the light is important as well. Blue-rich lighting brightens the night sky more than warm colored lighting and researchers are beginning to connect blue light emission to negative health effects in people and greater problems for wildlife. The IDA recommends using warm, amber-colored lighting with a color temperature of 3000 Kelvin or less. Look at product packaging to determine color temperature.



ESSENTIAL TAKEAWAYS

- LIGHT ONLY WHAT YOU NEED: Use fully shielded fixtures. Shine lights down, not up. Direct lighting at desired areas. Be strategic with lighting and only use it where needed.
- LIGHT ONLY WHEN YOU NEED: Install timers, motion sensors, and dimmer switches, and turn off lights when not in use.
- LIGHT ONLY HOW MUCH YOU NEED: Use the right amount of light. Save electricity by using the lowest adequate wattage bulbs. Too much light is wasteful, impairs vision, and can be costly.
- LIGHT ONLY HOW YOU NEED: Use long-wavelength lights with a red or yellow tint to minimize negative health effects. Use warmer colored bulbs, like yellow or amber instead of white. Avoid bluish light, which is known to have a variety of negative effects.

ENERGY SAVINGS

Some of the most persuasive arguments for improved lighting management are economic. Globally, outdoor lighting makes up approximately eight percent of global energy use with about 60 percent of that wasted as unneeded, overlit or poorly aimed lighting.[12] In the United States, approximately one-third of all lighting is wasted, and estimates suggest that nearly $7 billion dollars of energy is wasted as light pollution annually.[13] For every $100 spent operating a dusk-to-dawn light fixture, $45 is wasted on light that never reaches the ground.[14]

Cities are now realizing the benefits of eliminating this energy waste through higher-quality, better-designed lighting. Today there are many energy efficient lighting alternatives that, when combined with proper design, can significantly reduce energy costs. The **IDA provides outdoor lighting basics** on their website, as well as information on where to find energy efficient and dark-sky friendly lighting. Visit www.darksky.org/lighting/lighting-basics for more information.

LIGHT EMITTING DIODES (LEDS)

LEDs are essentially very small light bulbs that fit into an electrical circuit. In many communities, LEDs are replacing conventional high-intensity discharge (HID) lamp types for outdoor lighting. The improved quality and lower prices make LEDs a very efficient alternative to HID lamps, but the central deficiency of early generation LEDs is that they emit an excessive amount of blue light.[15] Outdoor lighting with high blue content is more likely to contribute to light pollution, increase glare and compromise human vision. Blue light at night has also been shown to adversely affect human health and wildlife behavior.[16] Today, a new generation of 3,000 K "warmer color" LED products are available.

"...The bottom line for planners and elected officials is what's good for dark skies also saves money, by making sure light is used most efficiently—including the most effective ways to improve public safety."

John Barentine, IDA Director of Public Policy[11]

RETURN ON INVESTMENT (ROI)

The benefits of using more energy efficient lighting such as Light Emitting Diodes (LEDs) and adaptive lighting can be assessed through a Return on Investment (ROI) analysis. The following is a general overview of a city's ROI when investing in more energy efficient lighting and controls.

$$\text{Simple ROI} = \frac{(\text{Gain} - \text{Cost})}{\text{Cost}} \times 100$$

Formula:

For an LED retrofit of 97,500 street lights we would assume the following to define the ROI:

Gain from Investment

1. Luminaire life will be 20 years
2. 50% reduction in power consumption: $3.25m x 20 years = $32.5m
3. Maintenance costs will be reduced by 60 percent as the majority of these costs are for re-lamping - $3.54m x 20 years = $35.5m
4. Total gain $32.5m + $35.5m = $68m plus a factor of 1.2 to include power cost rise and increase labor costs = $81.6M

Cost of Investment

1. Assume luminaire cost of $500
2. Assume installation of $60
3. Total cost $560 x 97,500 = $54.6m

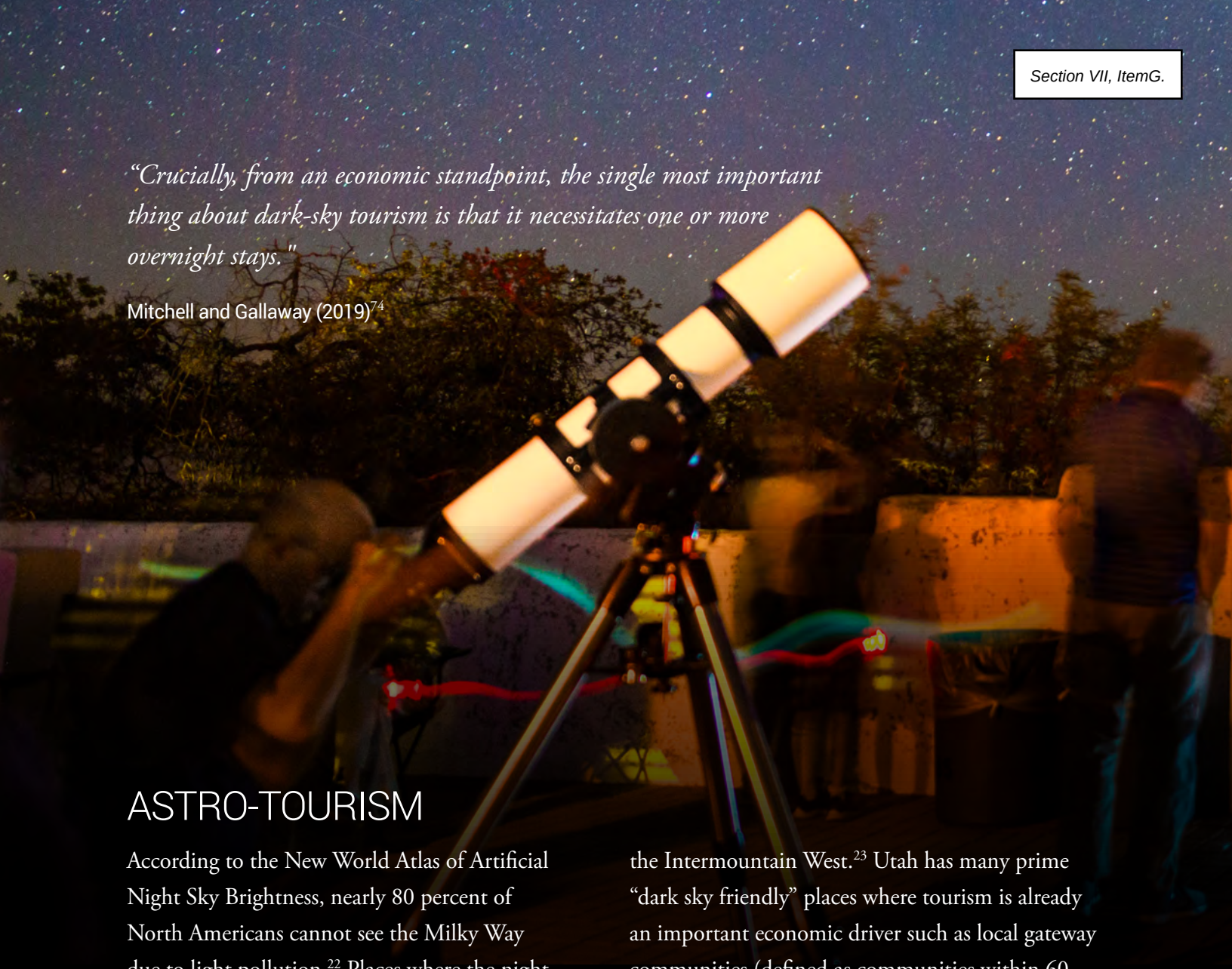
$$\text{Simple ROI} = \frac{(\$81.6\text{m} - \$54.6\text{m})}{\$54.6\text{m}} \times 100 = 49.4\%$$

The simple ROI from an LED retrofit would be approximately 50 percent. These costs and ROI are approximate and would require extensive study and evaluation to define further. The ROI should be considered an order of magnitude at best and will need to be verified by individual cities.

PROPERTY VALUE

Light trespass, the unwanted or unneeded invasion of light, is an issue because it interferes with a property owner's private enjoyment and use of his or her own land. Commercial property owners also face problems when outside light sources interfere with their business such as drive-in theaters, apartment complexes or other business entities. For the scientific world, light pollution disrupts and limits research conducted in astronomical observatories.[18]

Dark skies can also enhance property values due to the scarcity of dark, starry skies. In select Western real estate listings, dark skies are even being used as a key selling point. Sedona, AZ for example, enjoys higher property values from being proactive about preserving dark skies. A recent Sedona property description included, "Private sunbathing during day - incredible red rock views and Dark Sky telescope observations at night!"[19] In Colorado, a new development called Summit Sky Ranch is building dark-sky preservation standards into the community's overall design, including streetlights and an observatory. Home prices start around $600,000 compared to Denver's median home price of $350,000. Incorporating dark sky ordinances into their design has contributed to the new development's overall attractiveness to potential buyers.[20]



"Crucially, from an economic standpoint, the single most important thing about dark-sky tourism is that it necessitates one or more overnight stays."

Mitchell and Gallaway (2019)[74]

ASTRO-TOURISM

According to the New World Atlas of Artificial Night Sky Brightness, nearly 80 percent of North Americans cannot see the Milky Way due to light pollution.[22] Places where the night skies are free from artificial light pollution have become increasingly popular tourist destinations. Astronomical Tourism, or "Astro Tourism," is a form of nature-based tourism specifically concerned with the viewing of celestial objects, space and the physical universe. Astro-tourism is also one of the most sustainable forms of tourism.

While high levels of light pollution can be seen in the more populous areas of the U.S., primarily along the east and west coasts, there are also regions which exhibit very little light pollution, such as the Intermountain West.[23] Utah has many prime "dark sky friendly" places where tourism is already an important economic driver such as local gateway communities (defined as communities within 60 miles of a national park). In 2016, 14.4 Million park visitors spent an estimated $1.1 Billion in local gateway regions while visiting NPS lands in Utah. These expenditures supported a total of 17.9 Thousand jobs, $546.7 Million in labor income, $886.1 Million in value added, and $1.6 Billion in economic output in the Utah economy.[24]

One of the many benefits of astro-tourism is that it generally leads to one or more overnight stays. According to the National Park Service (NPS) the average spending per-party per-day for a local day

trip is $40.63. This price rises to over $430 for parties staying overnight in an NPS lodge and a little over $290 for those staying in motels outside parks. One study suggested that, "from an economic standpoint, the single most important thing about darky-sky tourism is that it necessitates one or more overnight stays."[25] Overnight stays naturally lead to increased spending by visitors and astro-tourism programs and activities increase the incentive to stay overnight.[26]

In addition, astro-tourism can increase the number of visitors during the off-peak seasons since it is not a seasonally dependent activity. In fact, night sky viewing in winter is often better because of longer nights and greater clarity. More sustained periods of tourism activity ultimately provide local businesses with a steadier source of income and allow for a more efficient use of park and community resources.[27] Astro-tourism combined with dark sky designations, programs, and proactive planning efforts can attract new visitors and added revenue. In Utah, state parks managers have found that changing to night sky-enhancing fixtures and bulbs brings significant benefits to their parks' wildlife species, visitor experiences and revenue streams.[28]

ASTRO-TOURISM IN BRYCE CANYON

A 2011 study[29] of astro-tourism in Bryce Canyon National Park found that a dark sky can be an important resource for a natural park—especially when combined with dark sky programming. Bryce Canyon National Park offers a variety of astronomy and night sky programs, and during the 2010 fiscal year 14,552 park visitors participated in one or more of Bryce Canyon's night sky activities and 146,847 park visitors stayed overnight.

In 2016, over 5.5 million people visited an International Dark Sky Park or a park within the International Dark Sky Places Program accreditation process in Utah. Based on statistics from the Bryce Canyon study, of those 5.5 million people a potential of 61,500 visitors would have participated in astronomy related programming (if available) and approximately 621,875 visitors would have stayed overnight. Data also suggest that park visitors will seek out dark sky parks more frequently than they have done in previous years.[30] For national and state parks that have dark skies as a natural resource, astro-tourism represents an opportunity to expand park visitation—especially as dark skies become scarcer throughout the world.

"Having internationally recognized dark skies bolsters our ability to attract more visitors and offer more night programming which results in more people enjoying our parks at more times of the day."

Fred Hayes, Former Utah State Parks Director[21]

Annual Park Recreation Visitation
BRYCE CANYON NATIONAL PARK 1979–2017

Data Source: National Park Service

THE VALUE OF DARK-NESS

ECOLOGICAL

CIRCADIAN DISRUPTION

One of the results of light pollution is increased exposure to both indoor and outdoor artificial light-at-night (ALAN). Scientists are just beginning to understand the negative impacts that excessive nighttime light exposure can have on human health. The circadian clock, or 24-hour day/night cycle, affects important physiologic processes in almost all organisms. Disruption of these important biological processes are associated with sleep-wake disorders, psychiatric disorders, cardiovascular diseases, immunological disorders, metabolic disorders, obesity and cancer progression. Studies show that the circadian system is most sensitive to short wavelengths, such as blue-rich light emitted from LED lighting at night time.[31]

Light-emitting diode (LED) lighting is transforming the way we light our cities and towns while drastically improving how we use energy and light outdoor spaces at night. However, with these advances in technology comes an obligation to manage these changes responsibly and sustainably.[34]

AMA GUIDANCE TO REDUCE LED STREET LIGHTING Many communities are adopting LED lighting without an understanding of proper lighting design and engineering features. In June of 2016 the American Medical Association (AMA) released an official policy statement[32] about street lighting: warm it and dim it. The AMA recognizes the detrimental human and environmental effects of blue-rich white light specifically related to high-intensity LED lighting design. In addition to its ill effects on human health, the blue light increases nighttime glare, discomfort and visual disability, and heightens safety concerns for drivers and pedestrians. The AMA encourages communities to limit blue light, use proper shielding to minimize glare, and to utilize the ability of LED lighting to be dimmed for off-peak time periods[33].

SAFETY

One of the main goals of night lighting is to increase safety, however, "bright" lighting does not necessarily mean "safer" lighting. Bright, glaring lights create sharp contrast between light and darkness, making the area outside of the illuminated area difficult to see. Sharp contrasts between light and darkness also create deep shadows that offer concealment. Additionally, nighttime glare from bright, blue-rich street lights heightens safety concerns, driver discomfort and visual impairment.

There is a strong tendency to light up property in the name of safety and security—especially in smaller towns. In fact, relative to their populations, small towns actually emit more light per capita than their urban counterparts. Most people believe that more, brighter light at night improves safety, but there is no scientific evidence to support this popular opinion.[35] The appropriate use of "dark-sky friendly" lighting will actually improve overall safety.[36] Lower lighting levels, warmer light temperatures, and better coverage are safer lighting methods.

Bright, unshielded lights can increase visual impairment at night.

Images: George Fleener

NATURAL ECOSYSTEMS

Humans are not the only ones who are adversely affected by light pollution. Wildlife and other organisms use natural light as both a resource and a source of information about their environment.[37] Artificial light disrupts these natural processes and cues in both plants and animals. Prolonged exposure to artificial lighting prevents trees from adjusting to changing seasons and can alter behaviors, foraging areas, and breeding cycles for insects, turtles, birds, fish, reptiles and other wildlife species.[38] Ecosystems are complex networks of interacting organisms; when one species is disturbed by light pollution, the chain of an entire habitat can be harmed.

Migrant birds, especially nocturnal migrants, are vulnerable to fatal light attraction to artificial lights. Nocturnal migrants naturally use constellations and celestial cues as a way to guide their flight pattern but today's abundant artificial lights confuse the birds. Each year countless birds are being killed by either flying off course or colliding with buildings. Artificial lighting on the beach can fatally misguide baby sea turtles as they make their way back to the sea. Newly hatched turtles are naturally attracted to light, but when they are confused by artificial light emanating from nearby cities, they wander lost on the beach and are eaten by waiting predators.[39]

"We are just now understanding the nocturnality of many creatures… Not protecting the night will destroy the habitat of many animals."

Chad Moore, formerly of the National Park Service

REINDEER EYES Researchers in Norway and England have found that one part of a reindeer's eye changes color in winter in order to increase the sensitivity of the animal's vision. During the summer months the eye is a golden color, and during winter the eye color changes to blue. For Arctic reindeer living near the University of Tromsø in Norway, there is a third eye color possibility - green. Lighting from town and reflection of light off of clouds keeps the reindeer habitat dimly lit and never truly dark. As a result, the researchers believe, the eyes of these reindeer cannot shift fully to blue.[40] The disruption of natural processes and hormone levels in reindeer and other animals adversely affect their natural behaviors and leads to problems with natural hormone regulation, reproduction, adaptation and survival.

THE VALUE OF DARK-NESS CULTURAL

HERITAGE AND RURAL CHARACTER

Star gazing has been a human pastime since ancient times. The ancients interpreted constellations and arrangements of the stars and planets that they saw in the night sky to have important meaning for themselves and their families. Similarly, night skies were important to the Native Americans and early settlers. As light pollution becomes more prevalent, the ability of humans to view and enjoy the night sky diminishes. This has subtle but significant cultural impacts, especially for future generations.[42] [43]

Communities recognize, appreciate, and work to protect their unique and beautiful night skies often from a cultural, value-based perspective.

The Utah Community Development Office recently assisted the Town of Leeds in conducting a community-wide survey, and without any prompting, several respondents mentioned dark skies specifically.

TOWN OF LEEDS SURVEY RESPONSES

Question A: What two things do you appreciate most about living in your community?

Responses:

- No street lights so I can see the night sky - yay!
- Views by day and night sky
- The "quietness" and dark conditions in town that make the night sky very unique in a great way.
- See night stars/ lack of light pollution
- Peace and quiet, dark nights
- Low light pollution
- Dark skies / beautiful views

Question B: How do you think leadership and the community can best address the two things you would like to change ?

Responses:

- Discourage excess lights (uplit homes) we want to see stars at night, not bright lights
- Lights! Use downward facing shields on all outdoor lights (dark skies initiative)

Question C: Please describe your desired future for your community in one sentence.

Response:

- Would like to see Silver Reef area west of freeway remain bedroom community with open space and see stars at night

AN INTERVIEW WITH DANIEL BULLETTS
SPECIAL PROJECTS DIRECTOR, KAIBAB BAND OF PAIUTE INDIANS

How would you describe your community?

- Words to describe my reservation are remote, quiet, untouched, and just plain wonderful. We are a 30-minute drive to the grocery store and a one hour drive to the nearest Walmart. There are certain sections on the reservation where new constructions are permitted but the rest of the 122,000 acres remains untouched. The Paiute are caretakers of the land because we come from the land, live off the land, and then go back to the land. Preserving things at ground level also preserves things at sky level and the two are very much connected.

Why is dark sky conservation important to your community?

- For the tribe it is different than for cities and towns in many ways. We see "sky" conversation as a teaching tool to help us reconnect with songs, stories, dances and the spirituality of what the dark night really means to my Paiute people. Our songs, stories and dances connect us to our surroundings both during the day and night. We look at conservation of the sky through a cultural connectedness aspect which incorporates many different things. A more modern aspect is that we do have a lighting ordinance which affects all new construction on the reservation. The ordinance applies to our new RV park, billboard signs, and tribal homes.

What is your community doing about dark sky conservation?

- Since our 2015 designation we have been uncovering songs, stories and dances related to the night sky. The songs, stories and dances are structured around our Bighorn Sheep to which we have songs and dances that have not been done since the 40's and stories that have not been told since the 50's.

- This year we will be teaching our youth the dances, songs, and stories. It has been a four-year struggle to relearn and find people willing to put their time into helping teach a forgotten, important piece of our culture that was considered lost until the [dark sky] designation happened.

What do you need to be successful?

- A core group of people willing to commit time and energy into all that needs to be done to make events, classes, or projects happen in fun and friendly ways.

What advice would you share with another community?

- Paiutes have a saying "one person speaks, one person listens. Many people speak, many people listen." So, in other words, one person can not do it alone and it will take many people to help spread the word of the importance of dark sky conservation.

Learn more about the world's first **IDA Dark Sky Nation** at https://www.darksky.org/the-worlds-first-ida-dark-sky-nation/

Dark skies matter to many diverse communities and cultures throughout the Intermountain West. However, an appreciation for the night sky is not enough to protect it; action must be taken. The following section discusses how to plan for dark skies, the International Dark Sky Places Program, and how to build momentum in your community.

PLANNING FOR DARK SKIES

Planning and community effort are essential to accomplish a sustained reduction of light pollution and conservation of the night sky.[44] Just as with other types of land use planning, planning for dark skies includes administrative code (the how) and zoning (the where).

OUTDOOR LIGHTING CODE

The principal purpose of most lighting regulation is to limit light pollution, promote energy conservation, regulate outdoor lighting fixtures, and to create a unifying, community-wide approach to outdoor lighting. The more effective your lighting code, the more successful your reduction of light pollution. Note that lighting codes can be enacted at different governmental levels—from state (most general), to county, or community and even down to a development project or neighborhood (most specific).[45]

EFFECTIVE ORDINANCES INCLUDE[46]

- Definitions
- Standards
- Exemptions
- Procedures
- Compliance methods
- Enforcement
- Actions in cases of violation

The IDA, in partnership with the Illuminating Engineering Society of North America (IES), jointly designed a **Model Lighting Ordinance (MLO)**[47] to address the need for strong, consistent outdoor lighting regulation in North America. An additional resource for model lighting code is the **Pattern Outdoor Lighting Code v2.0**[48] recommended by the Flagstaff Dark Sky Coalition. For good, general guidance and background for effectively tailoring a lighting code to meet local priorities, see the **IDA Outdoor Lighting Code Handbook.**[49]

For a breakdown of what a lighting ordinance is, the different formats it may take, links to example ordinances, and best practices see **Lighting Ordinance Walkthrough**.

LIGHTING ZONES

Lighting zones define areas where general conditions related to lighting uses are sufficiently different to merit some differences in lighting standards in the lighting code.[50] Lighting zones can be approached in three ways:

LAND-USE ZONING APPROACH Also referred to as Euclidean Zoning, the Land-use Zoning approach is based on the concept of single-use zones. With this approach, lighting code is tied closely to the different land-use zoning categories (such as heavy commercial or single-family detached residential).

RELATIONSHIP AND PROXIMITY APPROACH Lighting zones can be based on relation to or proximity to a particular resource (such as an observatory or park. These kinds of overlay zones are also common around airports, though primarily for airport safety considerations).

COMBINED APPROACH A third option combines the land-use zoning and relationship/ proximity approaches. Commercial zoning near an observatory would be considered one lighting zone, whereas in an urban surrounding the same commercial zoning would be considered a different lighting zone.

OVERLAY ZONING Lighting zones are often defined as overlay zones. Overlay zoning is a regulatory tool that creates a special zoning district placed over an existing base zone(s) which identifies special provisions in addition to those in the underlying base zone.[51] This means that the lighting zones "overlay" but are different from land-use zoning. This makes it easier to integrate lighting code into existing ordinances or codes and cross-reference to other applicable codes and ordinances such as electrical code, sign code or planning ordinances. After deciding upon an approach, the IDA recommends the use of five outdoor lighting zones for codes and ordinances.[53]

LZ0: No ambient lighting—areas where the natural environment will be seriously of adversely affected.

LZ1: Low ambient lighting—areas where the natural environment might be adversely affected by lighting.

LZ2: Moderate ambient lighting—areas where lighting may typically be used for safety, security and convenience but it is not necessarily uniform or continuous.

LZ3: Moderately high ambient lighting—areas where lighting is generally desired for safety, security and convenience and is usually uniform and continuous.

LZ4: High ambient lighting—Lighting is considered generally necessary for safety, security and convenience.

For greater detail on the five recommended lighting zones see the **Joint IDA-IESNA Model Lighting Ordinance (MLO) User's Guide**.

LIGHTING CODE ENFORCEMENT All code, including lighting code, requires enforcement. Lighting code enforcement is essential to achieving a sustained reduction of light pollution and conservation of the night sky. Communities should adopt an enforcement framework and strategy that outlines their intended means of enforcing the code. Enforcement methods vary significantly based on a community's size, resources, culture and needs. Enforcement strategies that match capacity and community culture will be most successful.[54]

Typical lighting code enforcement may require:

1. Redirection of the luminaire
2. Shielding of the light source
3. Redesign or relocation of the luminaire
4. Replacement of the luminaire with a conforming luminaire
5. Removal of the luminaire
6. Penalties such as fines

"Regulation at the state level is necessary to ensure that minimum standards are met across the state. It is important to have these minimum standards, but it is also important to give local areas a chance to formulate their own additional rules and regulations."

Andrea L. Johnson

THE INTERNATIONAL DARK SKY PLACES PROGRAM

An important part of dark sky planning in the Intermountain West is the International Dark Sky Places Program. The Dark Sky Places Program was started in 2001 by the IDA to encourage parks and communities around the world to preserve and protect dark skies through responsible lighting policies and education. The International Dark Sky Places Program offers five types of designations.[55]

1. International Dark Sky Communities are legally organized cities and towns that adopt quality outdoor lighting ordinances and undertake efforts to educate residents about the importance of dark skies.

2. International Dark Sky Parks are publicly or privately-owned spaces protected for natural conservation that implement good outdoor lighting and provide dark sky programs for visitors.

3. International Dark Sky Reserves consist of a dark "core" zone surrounded by a populated periphery where policy controls are enacted to protect the darkness of the core.

4. International Dark Sky Sanctuaries are the most remote (and often darkest) places in the world, whose conservation states are most fragile.

5. Dark Sky Developments of Distinction recognize subdivisions, master planned communities and unincorporated neighborhoods and townships whose planning actively promotes a more natural night sky but does not qualify them for the International Dark Sky Community designation.

The International Dark Sky Places Program also offers independent, third-party certification under a transparent, no-fee based evaluation process.

For more information and how to apply visit: www.darksky.org/idsp/

Building momentum for local municipal policy initiatives requires action from leaders, citizens and other stakeholders. The following are actions taken by municipalities that have successfully limited light pollution and adopted dark sky policies and regulations.

HOW CAN WE BUILD MOMENTUM?

COMMIT Commitment means making dark sky preservation a priority and becoming actively involved.

EDUCATE AND SHARE INFORMATION
Without an understanding of why light pollution is a problem and what the benefits of preserving dark skies are, it can be difficult to gain community support. Educate leaders, planners, local governments and individuals about light pollution. Talk openly about the problem and address concerns.

PERFORM A DARK SKY ASSESSMENT
A dark sky assessment identifies problem areas and provides benchmarks for determining the effectiveness of lighting improvements and energy savings. For more information, tools and resources on performing an assessment see **Dark Sky Assessment Guide.**

SURVEY A survey is a great tool for gauging people's understanding about dark skies as well as their opinion. A survey can highlight common concerns, common questions and common values. Use a survey to gauge public interest and support.

CREATE AN ACTION PLAN You eat an elephant one bite at a time. Establish realistic goals and objectives and follow a timeline. Organization and collaboration are key.

DEMONSTRATE ENERGY COST SAVINGS
Calculating potential energy savings and payback for upgrade conversions is an effective way to gain support and to illustrate the benefits of energy-efficient lighting.

FORM A SUPPORT GROUP Forming a dark sky coalition or interest group will unite stakeholders and community members and build support around shared goals. Involve the IDA, a dark sky interest group, or astronomy club and let them know of your efforts and goals. Talk to and involve your local energy provider. For a case study on the topic visit: https://www.darkskiescolorado.org/newdarkskiesgroup

RAISE FUNDS Cost is a common barrier to local initiatives and planning efforts. Options include raising money through crowd-sourcing and promotion. Many organizations, institutes, student groups and government agencies are able to provide support and guidance for free or at a minimal cost. Your local energy provider may be willing to decrease rates on certain lighting types and help with lighting conversions. For recommendations on creating a strategic donation plan visit: https://www.darkskiescolorado.org/strategic-donation-plan

ADOPT LIGHTING CODE AND DARK SKY BEST PRACTICES Lighting code establishes lighting design standards. The more effective your lighting code, the more successful your reduction of light pollution and sustained dark sky conservation.

ADOPT PROPER LIGHTING DESIGN STANDARDS Replace or retrofit existing lighting so that it follows dark sky lighting basics. Talking to your local energy provider will be key to determining what is feasible and to create a plan. If funds are tight, work in phases by assigning priority to different areas, such as main street or public facilities. Lighting design standards will be an important part of your lighting code.

ENFORCE DARK SKY PROTECTION Develop a plan for enforcing lighting code and make provision for future updates and improvements to your code. Enforcement is key!

PROMOTE A "DARK-SKY" CULTURE AND BRANDING Is you community known for something? If not, a dark sky designation presents an opportunity to create a unique brand and culture. A unique culture and brand can be the mechanisms that attracts new residents, visitors and businesses to an area.

THINK REGIONALLY, BUT ACT LOCALLY Dark sky preservation is inherently a regional issue. One municipality or park can make a significant difference, but efforts to minimize light pollution will be far more effective if regionalism is recognized and efforts expand beyond one location's boundaries.

THE FIRST IDA DARK SKY COMMUNITY

FLAGSTAFF, AZ

In 2001 the community of Flagstaff, AZ was awarded the first "International Dark Sky Community" designation by the International Dark sky Association (IDA). Flagstaff's efforts to protect dark skies go back to 1958 when the city banned advertising searchlights - enacting one of the world's first laws to protect night skies. Today, dimmed lights are an integral part of the city's culture.[57]

Each year the city hosts the annual "Flagstaff Star Party" which brings dark sky experiences to residents and visitors from across the Southwest and around the world. The Star Party's goal is to share the wonder of Flagstaff's dark skies with those who may not have the opportunity to view starry skies because of light pollution. Up to 30 telescopes are hosted by amateur and professional astronomers from the Flagstaff area for visitors to view the beauty and wonder of the night sky.[58]

Flagstaff is divided into zones with specific lighting regulations for each zone. Regulations include requirements for maximum lumens per acre, shielded light fixtures, and even different classes of light. New businesses are required to comply with the city's lighting standards. Visit https://cpdarkskies.files.wordpress.com/2019/11/dark-sky-community-overview-1.pdf for an overview of the International Dark Sky Community Program.

DARK SKIES IN UTAH

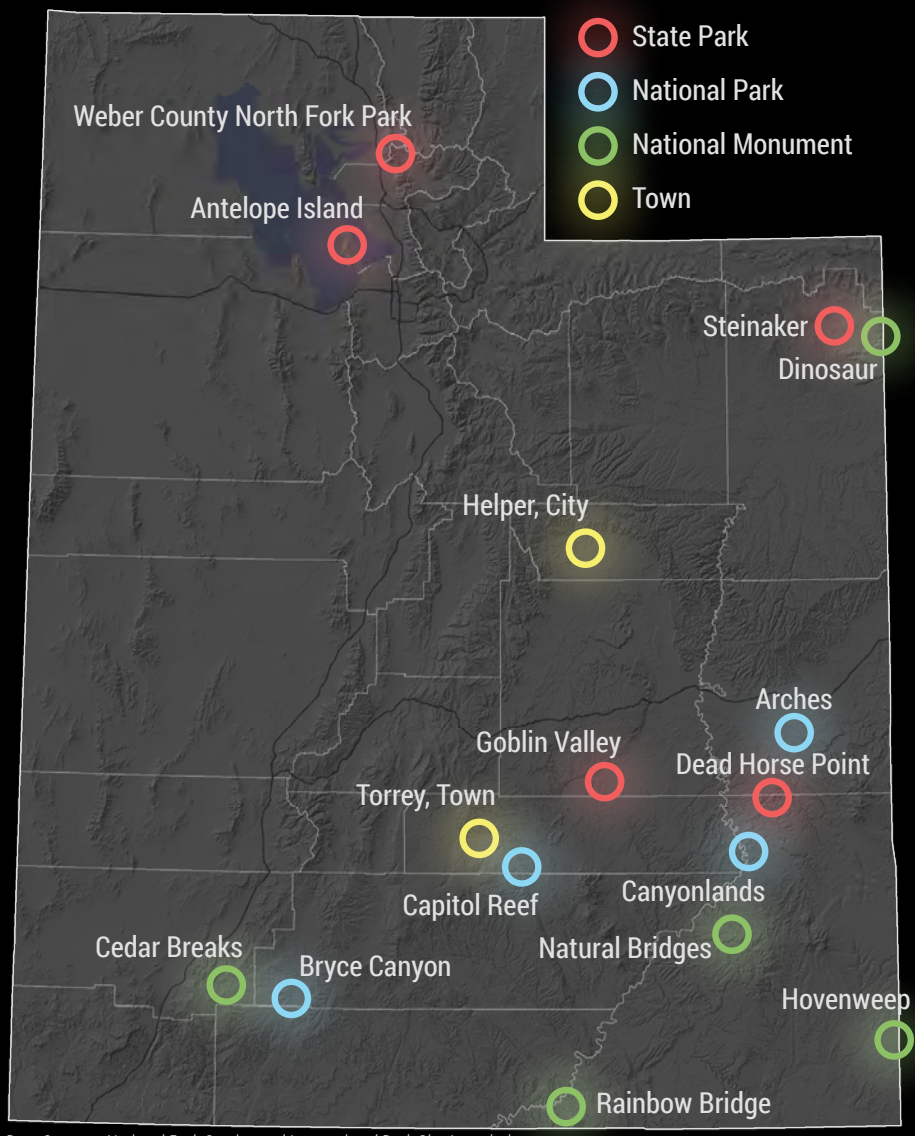
Utah leads the world with fourteen certified International Dark Sky Parks, two International Dark Sky Communities (Torrey - January 12, 2018 and Helper - April 1, 2020), and multiple parks and communities currently working through the accreditation process. The number of Utah designations continues to grow as more parks and communities enter into the International Dark Sky Places Program.[56]

DARK SKY PARKS IN UTAH

Antelope Island State Park
Arches National Park
Bryce Canyon National Park
Canyonlands National Park
Capitol Reef National Park
Cedar Breaks National Monument
Dead Horse Point State Park
Dinosaur National Monument
Goblin Valley State Park
Hovenweep National Monument
Natural Bridges National Monument
Rainbow Bridge National Monument
Steinaker State Park
Weber County North Fork Park

DARK SKY COMMUNITIES

Helper
Torrey



Data Sources: National Park Service and International Dark Sky Association

BRYCE CANYON - PARKS NEED PROGRAMS

A dark sky can be an important resource for a national or state park that is free from light pollution. Bryce Canyon National Park (BCNP) offers close to 59 different astronomy programs per year including solar observing, educational multimedia presentations in the evening, night sky viewing and full moon hikes. Visitors to the park can take part in any of these activities.

In a 2009 survey of BCNP visitors, 67 percent indicated that they learned about one or more park topics with 56 percent indicating that they learned about "night skies/astronomy." Of those who learned about night skies/astronomy, 21 indicated that their learning improved a lot and 38 percent indicated that their learning had improved somewhat. When asked to rate the importance of protecting park attributes and resources, 47 percent indicated "Dark, starry night sky" as important.[60]

OGDEN VALLEY - GETTING AHEAD OF GROWTH

Ogden Valley is home to the Weber County North Fork International Dark Sky Park, which was designated in 2015. The Weber County North Fork Park is unique from other Dark Sky Parks due to its urban adjacency, intense focus on wildlife, extensive outreach program, and innovative public art exhibitions incorporating dark sky themes.[61]

Ogden Valley began protecting dark skies in 2000 when Weber County commissioners approved a lighting ordinance for the upper Ogden Valley. Today with growth projections of 20,000 new homes in the next 20 years, dark sky protection is a priority. By getting ahead of growth, Ogden Valley has been able to put protections in place that will preserve and protect their dark sky even when future growth and development occur.[62]

IVINS - ALL ABOUT INITIATIVE

The "Ivins Night Sky Initiative" was started in January 2019 and is a 100% volunteer, not for profit, citizen organization. The mission of the Ivins Night Sky Initiative is to improve, preserve, and protect the night sky over Ivins and the town's heritage of dark skies through environmentally responsible outdoor lighting, and to serve as a resource for city officials, residents, and businesses.

Situated beneath iconic Big Red Mountain, Ivins is home to the Tuacahn Center for the Arts, the Center for the Arts at Kayenta, Red Mountain Resort and Spa, Movara Fitness Resort, Coyote Gulch Art Village, the Crescent Moon Inn, the Southern Utah Veterans Home, Rocky Vista University, the Tuacahn High School for the Performing Arts, and Vista School. Although Ivins is gaining in popularity as a center for tourism, the city is first and foremost a peaceful family and retirement friendly bedroom community with pockets of agriculture.

TORREY - BECOMING A DARK SKY COMMUNITY

When her view of the stars surrounding Capitol Reef National Park became obstructed by excessive artificial light, Torrey resident Mary Bedingfieldsmith found out what her small town could do to curb light pollution. Today, Torrey is Utah's first International Dark Sky Community.

In order to make a change, Bedingfieldsmith began talking to neighbors and met with town officials with a proposal. The proposal demonstrated how the municipality would save more than $900 in lighting costs each year and how funds to install new lighting would be raised by Mary's group. By speaking to people on an individual level and assuring residents that no one would be forced to replace existing lighting, Mary was able to reach a consensus.[63]

On March 15, 2017, ten old high pressure sodium street lights were replaced with new, warm-white LED lights that direct illumination onto the roadway rather than into the sky. True to Mary's proposal, friends and residents of Torrey were able to fund the replacements raising over $18,000 via an online campaign.

"Torrey has proven its commitment to protecting this resource for the benefit of both its residents and national park visitors [visiting Capitol Reef National Park]."

Former IDA Executive Director, J. Scott Feierabend

"When we talk individually, we can discuss specific lighting needs and what can be done to get there. Without individuals and associations working together, the last remaining dark areas on the planet could well disappear without anyone noticing."

Mary Bedingfieldsmith

Garkane Energy and The Entrada Institute also played significant roles in the project. Garkane Energy decreased the rate renters pay for street and security lights that are switched to the new dark-sky friendly LED lights. In addition, Garkane Energy linemen spent many hours installing the new lights and taking down the old ones.[64]

The Entrada Institute is an arts and education center with a goal of fostering community-based economic development in Wayne County and the surrounding region. Through the Institute's dark sky initiative, Torrey's project was promoted to members and patrons and an additional $7,000 was raised.[65]

On January 12, 2018 Torrey became Utah's first International Dark Sky Community. Torrey is also the first national park gateway community to earn the designation, according to the IDA.[66] In order to maintain its International Dark Sky Community status, Torrey must continue to preserve its night sky through education and awareness materials, dark sky events, exhibits and programs.[67]

HELPER - TAKING INVENTORY

Helper, Utah is one of the first cities in the nation to have a thorough inventory of public light fixtures. With help from a team of University of Utah students and a representative from the Consortium for Dark Skies/Colorado Plateau Dark Sky Cooperative, Helper documented the number of public light fixtures, which lights are on all night, how high each street lamp and security light stands, and whether the light is fully shielded, partially shielded or unshielded. There is also information on available illumination levels and where each light falls on the visible light spectrum. Information collected during a lighting inventory provides benchmarks for determining the effectiveness of future lighting improvements and energy savings. Helper's thorough inventory will help the community monitor success and to know where improvements need to be made.[68]

Many other communities and places throughout Utah are making efforts to reduce light pollution and protect the night sky, including Boulder, Eagle Mountain, Virgin, Bryce Canyon City, Eden, Moab, Rockville, Kanab, Heber City, Park City, Garden City, Bluff and others. Even though efforts almost always begin with a small group of individuals, those efforts create a framework and a positive example for other communities, states and countries to follow.

MOAB DARK SKIES

Founded June 29, 2016, Moab Dark Skies is a group dedicated to promoting the appreciation and conservation of Moab's dark skies. The impetus for the group's formation was the desire to engage community support around the appeal for Arches National Park to receive the International Dark Sky Designation in 2018. Since then, activities facilitated by the group have become much more holistic.[69]

Members of the Moab Dark Skies group recently performed an audit of publicly owned light fixtures in Moab. Based on findings, the City of Moab could save nearly $16,000 per year by upgrading streetlights, exterior building lights, and shielding fixtures. Aside from labor costs, the return on investment time for this capital improvement project is estimated to be just over two years. The City Council has allocated funding in their 2018-2019 budget to make the recommended changes.[70]

Today the Moab Dark Skies' goals are to: [71]

- Maintain and preserve the dark skies in the Moab region.
- Encourage night-sky-friendly lighting for municipal, business and private use.
- Increase public awareness of the unique resource in Moab's dark skies.
- Provide dark sky educational opportunities and events for the community.

THE UTAH DARK SKIES INITIATIVE

The Utah Dark Sky Initiative is a collaborative group of stakeholders committed to promoting Dark Sky efforts in the state of Utah by: educating decision makers, community leaders, and the public about the value of dark skies, and by providing support for outreach, sky-quality monitoring, and lighting ordinance authorship to equip communities as stewards of Dark Sky preservation, restoration, and protection.

Initiative members include:

- The Utah Community Development Office
- The International Dark Sky Association
- Utah State Parks
- Utah Office of Tourism
- The Colorado Plateau Dark Sky Cooperative
- The Consortium for Dark Sky Studies
- Other committed agencies

Contact the Utah Community Development Office for more information about the initiative, how to become involved, and for additional dark sky tools and resources: **(801) 436-0133 or community@utah.gov**

The Initiative's objectives are:

Objective 1: Establish a statewide "dark-sky-network" between Initiative stakeholders in order to coordinate efforts, communicate effectively, share resources and information, and provide mutual support.

Objective 2: Increase awareness of light pollution's impacts by educating target audiences about the significant economic, human health, ecological, and safety benefits of preserving dark skies, as well as the cultural and heritage implications of restoring our citizens' access to starry nights.

Objective 3: Support and create actionable dark sky tools, guides, and resources.

Objective 4: Connect communities with the appropriate tools, resources, programs, and agencies based on their specific needs and goals.

Objective 5: Facilitate trainings and provide technical assistance, where feasible, to build the capacity of communities to build and enact their own dark-sky preservation plans.

THE END

"This symbol, composed of a hive of stars, transposes our beehive symbol to a new and grand level as we enter our second century as a group of people living in a place where we can still see, with our own eyes, the beautiful and dim features of the starry universe."

House Bill 140, 1996 [72]

In Utah, as in all places, how dim the stars become will depend on the value we place on dark sky protection. If reducing light pollution becomes a priority, municipal policy initiatives to protect the night sky will follow. Those initiatives will require community involvement, action and education in order to produce effective lighting plans. Proactively preserving and protecting dark skies gives Utah the opportunity to become the dark sky capital of the world.

The people and places that recognize dark skies as a valuable resource understand the numerous benefits that come from dark sky protection, which include the conservation of energy, money savings, increased tourism, improved human health, safety and wellbeing, protection of ecosystems, and the preservation of culture and heritage. Fortunately, the decision to protect the night sky can be made today. This important decision will maintain "the beautiful and dim features of the starry universe" for us and the generations who follow.

"I want people to be able to see the wonder of the night sky without the effects of light pollution. The universe is our view into our past and our vision into the future. … I want to help preserve its wonder."

Jennifer Barlow, Founder of International Dark Sky Week[73]

NEED HELP?

THE INTERNATIONAL DARK SKY ASSOCIATION (IDA) is the recognized authority on light pollution and is the leading organization combating light pollution worldwide. The IDA runs the International Dark Sky Places Program.

Contact:
(520) 293-3198
http://www.darksky.org

THE IDA UTAH CHAPTER is Utah's local base for the International Dark Sky Association. IDA chapters organize events such as dark sky festivals, conferences and star parties while working to educate their communities and government officials about the importance of protecting night skies, eco-friendly outdoor lighting, and much more.

Contact:
darkskyut@gmail.com
https://utah.darksky.ngo/

THE COLORADO PLATEAU DARK SKY COOPERATIVE aims to voluntarily link communities, tribes, businesses, state agencies, federal agencies and citizens in a collaborative effort to celebrate the view of the cosmos, minimize the impact of outdoor lighting, and ultimately restore natural darkness the area.

Contact:
Aubrey Larsen, Coordinator
(435) 213-7026
darkskycooperative@gmail.com
https://cpdarkskies.org/

THE BASIN AND RANGE DARK SKY COOPERATIVE is a newly formed dark sky cooperative that serves the Pacific West region by coordinating efforts, communicating effectively, sharing resources and information, and providing mutual support.

Contact:
Ashley Pipkin, Coordinator
(702) 293-8847
brdarkskies@gmail.com
https://brdarkskies.org/

THE CONSORTIUM FOR DARK SKY STUDIES was founded in 2015 at the University of Utah, The Consortium for Dark Sky Studies (CDSS) is dedicated to the discovery, development, communication and application of knowledge across a wide range of disciplines and professional fields pertaining to the quality of night skies, growing light pollution and the varied human, animal and environmental responses to the “disappearing dark.”

Contact:
daniel.l.mendoza@gmail.com
http://www.darkskystudies.org/

THE UTAH STATE PARKS DARK SKY INITIATIVE helps to guide Utah's state parks through the application and accreditation process to become International Dark Sky Parks.

Contact:
Justina Parsons-Bernstein, Heritage, Interpretation and ADA Resources Coordinator
jparsonbernstein@utah.gov or (801) 538-7428
https://stateparks.utah.gov/resources/utah-state-parks-dark-sky-initiative/

THE NATIONAL PARK SERVICE protects nighttime views and environments and other critical park features. Night sky protection enhances qualities of solitude and undeveloped wilderness character that animals depend on for survival, park visitors seek for connections, and many cultural-historical parks require for preservation. NPS recognizes a naturally dark night sky as more than a scenic canvas; it is part of a complex ecosystem that supports both natural and cultural resources.

Contact:
Karen Trevino, Natural Sounds and Night Skies Division Chief
https://www.nps.gov/orgs/1050/index.htm

THE UTAH OFFICE OF TOURISM provides detailed information about Utah's unique dark sky destinations and guidance on implementing "dark sky-tourism" as a community development strategy.

Contact:
Flint Timmins, Destination Development Specialist
fdtimmins@utah.gov or (801) 538.1394
https://www.visitutah.com/places-to-go/dark-sky-parks/

THE ENTRADA INSTITUTE serves the public as an arts and education center to promote public understanding and appreciation of the arts, the natural, historical, and traditional cultural heritage of the high desert Colorado Plateau, and to foster community-based economic development in Wayne County, Utah and the surrounding region. This nonprofit organization also supports artists, writers, scholars and scientists in their development of new works.

Contact:
info@entradainstitute.org
http://www.entradainstitute.org/

UTAH'S COMMUNITY DEVELOPMENT OFFICE (CDO) supports community development by facilitating coordination between stakeholders, delivering training and tools, and providing planning and technical assistance. The CDO's vision is resilient communities that are self-reliant, self-determined and prepared for the future. The CDO supports a state-wide dark sky initiative.

Contact:
(801) 438-0133
community@utah.gov
https://jobs.utah.gov/housing/community/index.html

APPEN-DIX

LIGHTING CODE, ORDINANCES, AND ZONING

Flagstaff Dark Skies Coalition - Outdoor Lighting Codes
Hub of information, resources, and links
http://www.flagstaffdarkskies.org/dark-sky-solutions/dark-sky-solutions-2/outdoor-lighting-codes/

Pattern Outdoor Lighting Code (POLC) - 2010
Defines practical and effective measures by which the obtrusive aspects of outdoor light usage can be reduced, while preserving safety, security, and the nighttime use and enjoyment of property.
http://www.flagstaffdarkskies.org/wp-content/uploads/2015/10/CBL-POLC-standard-v2.0.pdf

Modeling lighting ordinances - dark sky impacts
Analysis of the light pollution control effectiveness of the IDA-IES Model Lighting Ordinance and the IDA Pattern Outdoor Lighting Code
http://www.flagstaffdarkskies.org/model-lighting-ordinances-dark-sky-impacts/

IDA Lighting Code Handbook - 2002
This Handbook discusses issues relative to outdoor lighting codes, their effectiveness, implementation, and enforcement.
http://www.flagstaffdarkskies.org/wp-content/uploads/2013/02/IDA-Outdoor-Lighting-Code-Handbook-Version-1.14.pdf

IDA Model Lighting Ordinance (MLO) - 2011
This Model Lighting Ordinance (MLO) is the result of extensive efforts by the International Dark Sky Association (IDA) and the Illuminating Engineering Society of North America (IES). Among its features is the use of lighting zones (LZ0-4) which allow each governing body to vary the stringency of lighting restrictions according to the sensitivity of the area as well as accommodating community intent.
http://www.darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF
The MLO is best adopted as an "overlay zoning" ordinance"

IDA Recommended Lighting Zones
IDA suggested lighting zones for codes and ordinances
https://www.darksky.org/our-work/lighting/public-policy/model-lighting-laws-policy/lighting-zones/

IDA - Lighting for Policy Makers
Arguments for why you municipality should be concerned about light pollution.
http://www.darksky.org/lighting/policy-makers/

Lighting Ordinance Walkthrough
A breakdown of what a lighting ordinance is, the different formats it may take, links to example ordinances, and best practices
https://utah.maps.arcgis.com/apps/MapSeries/index.

LIGHTING CODE EXAMPLES

Multiple Lighting Ordinance Examples
Links to example code from multiple communities like Torrey, UT; Springdale, UT; Jackson, WY; and Kanab, UT.
http://darkskystudies.org/lighting-ordinances/

Flagstaff Outdoor Lighting Code
Example code from Flagstaff, AZ
https://www.flagstaff.az.gov/3698/Dark-Sky-City

Eagle Mountain Lighting Code
Eagle Mountains Outdoor Lighting Standards
http://www.codepublishing.com/UT/EagleMountain/html/EagleMountain17/EagleMountain1756.html

Torrey General Plan
General Goals (pg. 8): Land Use addresses the following areas of critical concern:private Land use, public Land use, municipal property, annexation,zoning,water usage,ordinances,town signage, trees, lighting, noise, animal control and the preservation of the aesthetic values of the town, such as the dark night sky and viewsheds.

Zoning (pg. 11): A commercial district should be established to encourage the central location of all businesses and preserve the residential community structure, including the reduction of sound and light pollution in areas away from the Town's core commercial area.The establishment of such district should also include definitions of appropriate commercial and industrial uses.

Preservation of Aesthetic Values, Noise and Light (pg. 15)
Appendix C - Analysis of 2013 Citizen Survey (pg. 33): There are aspects of life in Torrey we don't like. High on that list are bright, glaring lights. Fifteen respondents felt strongly enough about that to comment.The Saddlery was often cited specifically but also the "junction."Next on the "don't like" list are yards with junk and trash.Ten people mentioned that. Noise and dust from ATV traffic was the complaint of seven respondents and barking dogs were the complaint of six.Other complaints mentioned the wind and isolation from shopping and medical services.

http://www.torreyutah.gov/applications/PlanningZoningGeneralPlan.pdf

Torrey Sign Ordinance
An ordinance providing for the construction and implementation of signs within the city limits of Torrey Town
http://www.torreyutah.gov/applications/tto/SignOrd2015.pdf

Helper Municpal Code
Example lighting code.
https://www.codepublishing.com/UT/Helper/#!/html/Helper18/Helper1897.html

Springdale
Example lighting code.
https://www.springdaletown.com/AgendaCenter/ViewFile/Agenda/_02012017-329?packet=true

Additional code examples
Telluride, Steamboat Springs, Springdale, Ogden Valley, Ketchum, Jackson, Breckenridge, and Aspen.
https://drive.google.com/open?id=0B1CVKFshW7jPMzd5MXU5TUhpZ28

FINDING ENERGY EFFICIENT AND DARK SKY FRIENDLY LIGHTING

IES Standards
The IES is an accredited Standards Development Organization (SDO) that develops its standards using American National Standards Institute (ANSI) approved procedures.
https://www.ies.org/standards/

IDA - Find Dark Sky Friendly Lighting
IDA's Fixture Seal of Approval program certifies outdoor lighting fixtures as being Dark Sky Friendly, meaning that they minimize glare while reducing light trespass and skyglow.
http://www.darksky.org/fsa/fsa-products/

IDA - LED Practical Guide
Considerations and tradeoffs for choosing LED products for outdoor lighting applications.
http://www.darksky.org/lighting/led-guide/

DOE - Outdoor Area Lighting
This document reviews the major design and specification concerns for outdoor area lighting, and discusses the potential for LED luminaires to save energy while providing high quality lighting for outdoor areas.
https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/outdoor_area_lighting.pdf

DOE - Outdoor Lighting Resources
DOE offers a variety of resources to guide municipalities, utilities, and others in their evaluation of LED street lighting products.
https://energy.gov/eere/ssl/outdoor-lighting-resources

DOE - Toolkit: Outdoor Lighting
Includes an outdoor lighting decision tree tool, outdoor lighting challenges and solutions pathways report, OLA partner summary table, and lessons learned.
https://energy.gov/eere/slsc/downloads/toolkit-outdoor-lighting

DOE - Outdoor Lighting Accelerator Partner Summary Table
This is how they did it: pathways to energy savings with street lights.
https://betterbuildingssolutioncenter.energy.gov/outdoor-lighting/partner-summary-table

ADDITIONAL RESOURCES

DOE - Retrofit Financial Analysis Tool
Property owners, city and other government agencies, utilities, and energy efficiency organizations can use this tool to compute annualized energy and energy-cost savings, maintenance savings, greenhouse gas reductions, net present value, and simple payback associated with potential lighting upgrades.
https://energy.gov/eere/ssl/retrofit-financial-analysis-tool

Utah CDO Dark Sky Assessment Guide
The initial groundwork for a dark sky designation is establishing the current status. This worksheet guides users through several evaluation methods which could be used for a general assessment of dark-sky-friendly lighting.
https://www.darksky.org/wp-content/uploads/bsk-pdf-manager/2019/06/Dark-Sky-Assessment-Guide-Update-6-11-19.pdf

Colorado Plaeau Dark Sky Cooperative
General tools and resources.
https://cpdarkskies.org/resources/

Dark Skies of the West Mountain Valley
Light pollution resources.
https://www.darkskiescolorado.org/links

IDA - Electronic Messaging Centers
EMC Guidelines to provide planners, lighting designers, architects, biologists, government officials, and the general public with solutions for EMCs, both on and off premises, that minimize harm to the natural night and even reduce sky brightness when replacing poorly designed lit signs and billboards.
https://www.darksky.org/our-work/lighting/lighting-for-industry/emc/

IDA - Home Lighting
A step-by-step guide to conduct an outdoor lighting assessment around your house, apartment building, property line, business, community center, wherever, to evaluate the impact of your light on the night.
https://www.darksky.org/our-work/lighting/lighting-for-citizens/residentialbusiness-lighting/

TERMS & ACRO-NYMS

CLUTTER Bright, confusing and excessive groupings of light sources.

COLOR SPECTRUM Refers to the portion of the electromagnetic spectrum that is visible to the human eye.

DARK SKY Denoting or located in a place where the darkness of the night sky is relatively free of interference from artificial light.

FOOT CANDLE A uniform point source of light of one candle and equal to one lumen per square foot.

FULLY SHIELDED A fixture that allows no emission above a horizontal plane passing through the lowest light-emitting or light-reflecting part of the fixture.

GLARE Excessive brightness that causes visual discomfort.

KELVIN A measurement unit for light's "warmness" or "coolness."

LIGHT TRESPASS Light falling where it is not intended or needed.

LUMEN A measurement unit for the brightness from a light source.

LUMINAIRE A complete lighting unit that usually includes the fixture, ballasts, and lamps.

REFLECTION Light redirected back into the sky off of surfaces that are being illuminated.

SPECTRUM Referring to light it is the group of different colors (red, orange, yellow, green, blue, indigo, and violet) seen when light passes through a prism.

SKYGLOW Brightening of the night sky over inhabited areas.

IDA International Dark Sky Association

IES Illuminating Engineering Society

POLC Pattern Outdoor Lighting Code

MLO Model Lighting Ordinance

DOE Department of Energy

BUG Backlight-Uplight-Glare rating system for luminaires

LED Light-emitting diode

OLA Outdoor Lighting Accelerator

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PHOTO CREDITS

COVER Moab Bridge, Bettymaya Foott

TOC Moab Utah House, Bettymaya Foott

PG 3 Fairyland Canyon, Adam Derewecki

PG 6 Earth at Night, NASA

PG 8 Streetlight, Morguefile

PG 10 Lights, Pixabay

PG 12 Street at night, Pixabay

PG 14 Cabin, Kelly Lacy

PG 16 Oracle Star Party, Bettymaya Foott

PG 18 Bryce Canyon, Bettymaya Foott

PG 20 Sleeping man, Pixabay

PG 22 Robin, Pixaby

PG 23 Reindeer, Pixabay

PG 24 Kaibab Campfire Stories, Bettymaya Foott

PG 26 Green River planning, Paul Moberly

PG 29 Eclipse, Bettymaya Foott

PG 30 Dead Horse, Bettymaya Foott

PG 32 Dark sky party, Flagstaff Dark Skies Coalition

PG 34 Bryce Canyon Trees, Bettymaya Foott

PG 36 Dead Horse nebula, Bettymaya Foott

PG 38 People at Dead Horse, Bettymaya Foott

PG 40 Scope and sky, Bettymaya Foott

PG 42 Dark home, pxhere.com

PG 44 Goblin Valley scope, Bettymaya Foott

BACK Cedar Breaks, Bettymaya Foott

WORKFORCE SERVICES
HOUSING & COMMUNITY DEVELOPMENT
COMMUNITY DEVELOPMENT OFFICE

COLORADO PLATEAU DARK SKY COOPERATIVE

For more resources, visit ruralplanning.org/toolbox and cpdarkskies.org

community@utah.gov • 801-468-0133
darkskycooperative@gmail.com • 435-213-7026

JUL2020

DRAFT - DRAFT - DRAFT **TOWN OF BLUE RIVER - PRIORITY TRAIL ROUTES BY SUBDIVISION** **Prepared by Paul Semmer 6/27/22** **page 1 of 4**

LOCATION				TYPE OF EASEMENT FROM ORIGINAL PLATS					SGNIFICANCE			COMMENTS
Subdivision	TOWN OF BLUE RIVER EASEMENT	POTENTIAL CONNECTOR ROUTE TO BLUE RIVER	Route Identification	Pedestrian Easement - length in feet; 10 ft wide	Access Road Easement- length in feet; 20 ft wide	River/Creek Pedestrian Easement - length in feet either side of center line; (Pennsylvania Creek = 20 ft wide / Blue River =25 ft wide)	Utility/Access/Other Easement - length in feet; width	Social Trail - length in feet; width varies	H=High -provides access to large population and/or important connection to other existing recreation resources.	M=Medium - provides access to more than two subdivisions and indirectly connects to other existing recreation resources and trails.	L=Low- provides access to a limited number of residences and does not connect to other existing recreation resources.	Unless otherwise noted all platted easements are granted to the lot owners of the subdivison. The Town of Blue River is not vested as an easement holder unless noted below.
Crown	X		CR-1 TRACT A CROWN SUB -Golden Crown Lane		700				H			TRACT A CROWN SUB -Golden Crown Lane. Strong candidate for promotion of route to Breckenridge from Golden Crown Lane along Silver Queen Dr. (SCR 781). Town of Blue River owns Tract A.
Bryce Estates	X		BE-1_8 ft Ski Trail Esmt				1,490			M		Provides connection to non-system trails on NF land to west and eventually to Burro Trail. Does not provide connection to significant routes within Town of Blue River. **TOBR EASEMENT**
Leap Year			LY-1_Spruce Creek_USFS			500			H			HIGH PRIORITY to work with landowners on Lot 320 & 321 to perfect as a legal public right-of-way to access social trail on south side on Spruce Creek on NF
			LY-2_Lot 320 & Lot 321	215					H			HIGH PRIORITY to work with landowners to perfect as a legal public right-of-way to access social trail on south side on Spruce Creek on NF
			LV-9 Social Trail on south side of Spruce Creek on NFS land					3,600		M-H		Well marked Social Trail on south side of Spruce Creek on NFS land goes from Lot 320 to Spruce Creek Trail. Lots 318 is vacant and provides logical connection to TOBR road. Social trail on NF land is 3,600 feet long to intersection with Spruce Creek Trail.
Timber Creek	X		TCE-2_Lots 31B, 31A & 32_USFS	554						M-H		Provides connection to well-defined social (non-system) trail on National Forest along eastern boundary of Timber Creek Estates. Comments from Ron S. 9/15/21 -- 31B is under construction now. I assessed the easement from the NFS trail (is there a name?) to Hwy 9, as it appears in plat map TCE 2. There is a faint trail West from the NFS trail to the East boundary of 31A. From there West to Hwy 9 there is thick forest and no visible trail. There used to be a social trail across 31B and I think the traffic up to the NFS trail came from use of that. However that route was blocked by the new owner of 31B. **TOBR EASEMENT**
			LOT 17B TIMBER CREEK ESTATES # 3					175		M-H		Possible access route to NF land to east and social trail along private /USFS boundary from 39 Degree North Sub to Fredonia Gulch Rd..
Aspen View	X		AV-1_Access Esmt - Fredonia Rd		490				H			Fredonia Gulch Road (CR 600) - Developed road, built to access Fredonia Mine (patented land). **TOBR EASEMEN**
	X		AV-3_Tract A	92					H			Provides an important connection between Aspen View SUB and Fredonia Gulch Road and further north to Blue River Trail Extension (FDT606.1) via Fredovania Trail (FDT 519.1) **TOBR EASEMENT**
			AV-4_ Social Trail east of Government Lot 5					1600		M		Potential for formal connection between Fredonia Gulch Road and subdivisions to south; Timber Creek Estates, 39 Degrees North, DOT Condo, etc. TR 7-77 Sec 30 Qtr 2 Acres 4.570 GOVT LOT 5. Formerly NFS land. Social trail on NF is a poor alignment that should be relocated onto Gov Lot 5 , if lot cannot be acquired as open space. Needed to povide better trail routing on NFS land to east.
New Eldorado	X		NE-2_Tract A South Half-Lot 7 & Lot 8		446					M-H		Consider use of easement as future route to crossing Blue River and connect to Sherwood Forest Subdivision at south end of Starlit Lane easement. Verify legal status of ped easement on revised plats. **TOBR EASEMENT**
	X		NE-4_Social Trail_Tract B-South					450	H			HIGH PRIORITY to work with landowner to perfect as a legal public right-of-way. **TOBR EASEMENT**
			NE-5_Social Trail_Lot 5 & Lot 6					356	H			HIGH PRIORITY to work with landowner to perfect as a legal public right-of-way IF legal access cannot be obtain from Tract B to east. Bob R. 11-2-21 -- , it appears there is not a clear path from this easement to Fredonia Gulch trail, and so we may need to reach out to the property owner next to Audrey's, and explain that an easement on their property would be far away from their house.
	X		NE-6 Ped Esmt on North Tract B	366					H			Platted Ped Esmt on North Tract B provides access from Bue River to Calle be Plata and Blue River Trail. Ped Esmnt is on West and North lot line of Tract B- Verify!! **TOBR EASEMENT**
	X		NE-7 Platted Ped Esmt on Amended Plat for Resub Lot 7A & 8a (Recpt 136916)	200					H			Platted Ped Esmt on Amended Plat for Resub Lot 7A & 8a (Recpt 136916). Ped easement along north and east boundary of Lot 7A. Verify!! Provides access from river to south and along ped easement of west lot line of Tract B to Calle De Plata. **TOBR EASEMENT**

CONTINUED ON PAGE 2 OF 4

DRAFT - DRAFT - DRAFT **TOWN OF BLUE RIVER - PRIORITY TRAIL ROUTES BY SUBDIVISION** **Prepared by Paul Semmer 6/27/22** **page 2 of 4**

LOCATION				TYPE OF EASEMENT FROM ORIGINAL PLATS					SGNIFICANCE			COMMENTS
Subdivision	TOWN OF BLUE RIVER EASEMENT	POTENTIAL CONNECTOR ROUTE TO BLUE RIVE	Route Identification	Pedestrian Easement - length in feet; 10 ft wide	Access Road Easement- length in feet; 20 ft wide	River/Creek Pedestrian Easement - length in feet either side of center line; (Pennsylvania Creek = 20 ft wide / Blue River =25 ft wide)	Utility/Access/Other Easement - length in feet; width	Social Trail - length in feet; width varies	H=High -provides access to large population and/or important connection to other existing recreation resources.	M=Medium - provides access to more than two subdivisions and indirectly connects to other existing recreation resources and trails.	L=Low- provides access to a limited number of residences and does not connect to other existing recreation resources.	Unless otherwise noted all platted easements are granted to the lot owners of the subdivison. The Town of Blue River is not vested as an easement holder unless noted below.
Sherwood Forest			SF-1_Access Rd Esmt_N Sherwood Ln		256				H			The easement is a significant element for providing a loop trail on Sherwood Lane and Blue Grouse Trail for the northern portion of the subdivision. Verify that easement was not vacated with replat of Lot 108 and construction of Blue Grouse Trail.
			SF-8_Existing Access Rd_Lots 88, 92, 97 & 100		850				H			Route is considered system trail by USFS, Pennsylvania to Fredonia Trail (aka "Fredovania Trail" (FDT5-9.1) VERIFY STATUS OF "ROAD EASEMENT" UNDER JURISDICTION TO TOBR.
	?		SF-10_Lots 44, 45, 51 & 52	432						M-H		Route serves a neighborhood need and is likely already established. Only action needed is to resolve encroachments and promote use of the route. VERIFY NEW EASEMENT ON LOT 52- Vested to Summit County Government?
			SF-13_Existing Access Road-Lot 81 and Lot 82		302				H			Does provide a significant contribution to a town trail network in that it connects to the Blue River on the south and Town owned property at North Half Tract A, New Eldorado Sub.
Mountain View			MV-1_Blue River_Lots 134 to 149			2460				M-H		Opportunity to develop low use single track non-mechanized trail on east side of river to connect Blue River Road and Theobald Way and loop onto Mountain View Road.
			MV-3_Lot 136 & Lot 137	110						M-H		If the Pedestrian Easement along the Blue River is made accessible for public use, the easement between Lot 136 and 137 would provide a very accessible route to the river from Mountain View Road.
			MV-4_Lot 130 & Lot 131	145					H			The easement between Lot 131 and 130 would provide a very accessible route from Mountain View Road to Wilderness Road via the Pedestrian Easement between Lots 175 and 176 Wilderness Sub.
			MV-6_Lot 141 & Lot 142	310						M-H		If the Pedestrian Easement along the Blue River is made accessible for public use, the easement between Lot 141 and 142 would provide a very accessible route to the river from Mountain View Road.
			MV-7_Lot 125 & Lot 126	214					H			This easement is better than the easement between Lots 130 and 131 to provide access to Wilderness Drive for the following reasons: 1) there are no encroachments to deal with, 2) the slope at the east end is more manageable for trail construction, and 3) the connection to Wilderness Dr is at the intersection of Hinterland Trail which provides better access to the Blue River Trail Extension (FDT 606.1)
			MV-8_Lot 147 & Lot 148	220						M-H		If the Pedestrian Easement along the Blue River is made accessible for public use, the easement between Lot 147 and 148 would provide a very accessible route to the river from Mountain View Road.
			MV-9_Lot 119 & Lot 120	142					H			The easement between Lot 119 and 120 would provide a very accessible route from Mountain View Road to Wilderness Road via the Pedestrian Easement between Lots 194 and 195 Wilderness Sub. OR negotiate alternative easement on Lot 119 to go along south and east boundary lines to joins easement between Lots 194 & 195.
Wilderness			W-1_Lot 175 & Lot 176	183					H			The route could provide a connection between Mountain View and Wilderness subdivisions if the corridor were cleared and made visually open and encouraging for use
			W-2_Lot 181 & Lot 182	171					H			Intersection of Wilderness Drive and Hinterland Trail makes this route a significant route to connect Mountain View Sub to the east along Hinterland Trail to tie with social trails to National Forest
			W-3_Lot 194 & Lot 195	214					H			The route could provide a connection between south end of Mountain View and Wilderness subdivisions if the corridor were cleared and made visually open and encouraging for use. OR if new alignment is made to easement on Lot 119 consider relocating Lot 195 easement to lie along southern lot line to tie into Mountain View Rd. 5 ft width on Lot 195 only may be OK.
			W-5 Blue River Trail across Clyde Lode and Lots 6, 7, 8, 9, &10						H			Historic trail along "ditch" that was never completed. Highly used socially recognized trail across private lands."No Trespassing signs erected in 2018.
		A, B, C	W-6_Social Trail-Lot 214 & Lot 215					500	H			Both social trails on the National Forest, from Lot 243 and Lot 215, provide access from two different subdivisions with public road access, Royal/Creek Side Drive and Wilderness/Hinterland Trail

CONTINUED ON PAGE 3 OF 4

DRAFT - DRAFT - DRAFT **TOWN OF BLUE RIVER - PRIORITY TRAIL ROUTES BY SUBDIVISION** **Prepared by Paul Semmer 6/27/22** **page 3 of 4**

LOCATION				TYPE OF EASEMENT FROM ORIGINAL PLATS					SIGNIFICANCE			COMMENTS
Subdivision	TOWN OF BLUE RIVER EASEMENT	POTENTIAL CONNECTOR ROUTE TO BLUE RIVER	Route Identification	Pedestrian Easement - length in feet; 10 ft wide	Access Road Easement- length in feet; 20 ft wide	River/Creek Pedestrian Easement - length in feet either side of center line; (Pennsylvania Creek = 20 ft wide / Blue River =25 ft wide)	Utility/Access/Other Easement - length in feet; width	Social Trail - length in feet; width varies	H=High - provides access to large population and/or important connection to other existing recreation resources.	M=Medium - provides access to more than two subdivisions and indirectly connects to other existing recreation resources and trails.	L=Low- provides access to a limited number of residences and does not connect to other existing recreation resources.	Unless otherwise noted all platted easements are granted to the lot owners of the subdivison. The Town of Blue River is not vested as an easement holder unless noted below.
Royal		A	R-1A_N Penn Cr_Blue River Rd to Royal Dr			375			H			The easement route along Pennsylvania Creek is the most logical connection from Blue River Road to Town Park and it provides connection to significant routes within Town of Blue River
		A	R-1B_N Penn Cr_Royal Dr to Town Park			974			H			Strong candidate for trail construction and promotion of route along Creek as a formal trail connection between Blue River Road and Town Park
			R-2_Lot 270 & Lot 271	177						M-H		If the Pedestrian Easement along the Pennsylvania Creek is made accessible for public use, the easement between Lot 270 and 271 would provide a very accessible route from Regal Circle and the eastern portion of the Royal subdivision to the Creek and connect to Blue River Trail Extension (FDT606.1)
		A	R-3_Lot 269 & Lot 270	136						M-H		This is a significant route to provide connections to many existing easement/roads in the town
		A	R-4_Lot 245 & Lot 246	111					H			This is a VERY significant route to provide connections to many existing easement/roads in the town, connection subdivisions and National Forest at FDT 606.1
		A, B	R-5_Lot 241 & Lot 242	150					H			This is a VERY significant route to provide connections to many existing easement/roads in the town, connection subdivisions and National Forest at FDT 606.1
		A	R-6_Lot 267 & Lot 268	195					H			Easement connects, via Pedestrian Easement between Lot 248 and 249, to Creek Side Drive AND then along Creekside Drive east to Pedestrian Easement between Lots 241 and 242 to connect to National Forest and eventually Blue River Trail Extension (FDT 606.1).
			R-7_Lot 248 & Lot 249	210					H			Route along Creek Side Drive east to Pedestrian Easement between Lots 241 and 242 connects to National Forest and eventually Blue River Trail Extension (FDT 606.1).
			R-10_Lot 239 & Lot 240	150					H			The easement connects, via Creek Side Dr, with the Pedestrian Easement between Lots 248 and 249 and easement between Lot 267 and 268 and then Regal Circle, thereby linking the Royal and Wilderness subdivisions.
			R-11B_Royal-Wilderness Bndry-Middle	165						M-H		This is a significant route to provide connections to many existing easement/roads in the town, connection subdivisions and National Forest at FDT 606.1
			R-11C_Royal-Wilderness Bndry-East End	273						M-H		This is a significant route to provide connections to many existing easement/roads in the town, connection subdivisions and National Forest at FDT 606.1
			R-12A_South Fork Penn Cr_East End			970				M-H		Strong candidate for trail construction and promotion of route as a formal trail connection between Royal Subdivision and Blue River Trail Extension (FDT 606.1)
		A, B	R-13_Social Trail-Lot243 to USFS					450	H			High Priority - The platted Pedestrian Easement between Lot 241 and Lot 242 abuts National Forest and is a viable route to provide access from Creek Side Drive to National Forest and the social trail to connect with FDT 606.1 (Blue River Trail Extension). This must be considered as an alternative to negotiating a new easement across Lot 243.
		B	R-14_Social Trail between Lot 244 and 243					129	H			High Priority - The route is the shortest and most direct connection from Creek Side Drive to the Pennsylvania Creek easement on Lot 416 and Royal Placer and directly connects to the Blue River Trail Extension (FDT 606.1).
Coronet		A1	C-1_Pennsylvania Cr_Lot 415 & Royal Placer			274			H			IMPORTANT ROUTE for trail construction and promotion of route as a formal trail connection between Royal Subdivision and Royal Placer to east
		A1	C-2_Ped Esmt & Penn Cr Esmt Lot 416			300			H			IMPORTANT LINK TO SIGNIFICANT ROUTES IN TOWN OF BLUE RIVER
		A1	C-3_Penn Cr Esmt-Lot 417 to Royal Placer			695			H			Strong candidate for trail construction and promotion of route along creek as a formal trail connection between Royal Subdivision and Royal Placer to east
	X	A1	C-4_Lot 435 & Lot 451_USFS		44				H			HIGH PRIORITY to maintain and encourage as connector to Blue River Trail (FDT 606.1) to northwest near Blue River Road, and Blue River Trail Extension on south side of Pennsylvania Creek on Royal Placer. **TOBR EASEMENT**
			C-5_Old Pennsylvania Cr RD on Royal Placer					660		M		Route provides for connection between Pennsylvania Creek Road and Blue River Trail (FDT 606.1) off Blue River Road via use of non-system trail on National Forest north of Lot 451
Pennsylvania Canyon	X	PC-1	Pedestrian Easement on Lot 1 and Lot 2 along north side of Pennsylvania Creek			630			H			Strong candidate for trail construction and promotion of route along creek as a formal trail connection between Royal Subdivision and Royal Placer to east. Private property signs are misleading. **TOBR EASEMENT**

CONTINUED ON PAGE 4 OF 4

DRAFT - DRAFT - DRAFT	TOWN OF BLUE RIVER - PRIORITY TRAIL ROUTES BY SUBDIVISION	Prepared by Paul Semmer 6/27/22	page 4 of 4

LOCATION				TYPE OF EASEMENT FROM ORIGINAL PLATS					SGNIFICANCE			COMMENTS
Subdivision	TOWN OF BLUE RIVER EASEMENT	POTENTIAL CONNECTOR ROUTE TO BLUE RIVER	Route Identification	Pedestrian Easement - length in feet; 10 ft wide	Access Road Easement- length in feet; 20 ft wide	River/Creek Pedestrian Easement - length in feet either side of center line; (Pennsylvania Creek = 20 ft wide / Blue River =25 ft wide)	Utility/Access/Other Easement - length in feet; width	Social Trail - length in feet; width varies	H=High -provides access to large population and/or important connection to other existing recreation resources.	M=Medium - provides access to more than two subdivisions and indirectly connects to other existing recreation resources and trails.	L=Low- provides access to a limited number of residences and does not connect to other existing recreation resources.	Unless otherwise noted all platted easements are granted to the lot owners of the subdivison. The Town of Blue River is not vested as an easement holder unless noted below.
96		A1	96-1_Social Trail-Blue River Road north to Tarn					2900	H			High Priority to convert to system trail and connect to Blue River Trail (FDT 606.1) and further southeast to Blue River Trail Extension. Recommend working with USFS to get trail under special use permit and into USFS travel management system.
			96-7_USFS Tail on Old Penn Cr Road on National Forest					1500	H			High Priority National Forest system trail to connect to Blue River Trail Extension at Royal Placer, via Coronet Drive and Holly Lane
Spruce Valley Ranch	X	A, A1	SVR-1_ Blue River Trail	3,800					H			Plats for Spruce Valley Ranch do not show entire length of Blue River Trail through the subdivision. Need to research this to determine if a platted right-of-way for the trail does exist. **TOBR EASEMENT**
			SVR-2_East Shoreline Goose Pasture Tarn	2501						M-H		Opportunity may exist to develop a shoreline trail that extends from the Boat house on Spruce Valley Drive north to Spruce Valley Ranch HOA open space adjacent to Indiana Creek Road close to dam. Need to determine if this is decicated to the SVR only or Town of Blue River.
		A1	See 96-1_Social Trail-Blue River Road north to Tarn						H			High Priority to convert to system trail and connect to Blue River Trail (FDT 606.1) and further southeast to Blue River Trail Extension.Crosses, NF, Brownell Bailey and Theobald parcels
Blue Rock Springs			BR-1 --LOT 44 BLUE ROCK SPRINGS SUB, 0041 ROCK SPRINGS RD (CR 577)					900	H			Provides connection from Blue Rock Springs Sub to well-defined social (non-system) trail on Theobald vacant land along Blue River and then east to north end of Blue River Road. Pedestrian easement needed if parcel cannot be acquired as open space.
			BR-2 --Blue River San District Lift Station LOT 28R BLUE ROCK SPRINGS SUB. 0158 BLUE ROCK DR (CR 579)					100	H			Provides connection to well-defined social (non-system) trail on Theobald vacant land along Blue River and then east to north end of Blue River Road. Need to co-locate trail with Sanitation District easements.
			BR-3 --Social trail along east side of Hwy 9 between Blue River Rd and Blue Rock Dr.					3000	H			Provides connection along Hwy9 from Blue River Rd to Blue Rock Springs Sub

DRAFT - TOWN OF BLUE RIVER OPEN SPACE PARCEL ACQUISTION CHECK LIST - DRAFT **Prepared by Paul Semmer (6/27/22)** **page 1 of 2**

LOCATION			OPEN SPACE CHARACTERISTICS							SIGNIFICANCE
SUBDIVISION	Parcel Identification	Current RESIDENTIAL VACANT LAND or RESIDENTIAL UNSUB LAND or RESIDENTIAL LAND - NO IMPROVEMENT	Acres	**ACCESS** - Lands that provide trailheads or public access to recreation areas on National Forest and other significant properties.	**BUFFERS:** Natural and undeveloped lands which separate and buffer the impacts of development, define the boundaries of urbanized areas and contribute to the rural mountain quality of the Town.	**EXTENSIONS:** Land adjacent to publicly held property which meets open space criteria guidelines, and which can combine with other open space properties to enlarge and / or connect existing open space parcels.	**RECREATIONAL:** Lands with significant recreational value, particularly non-motorized passive uses not requiring intensive maintenance or management; including lands or easements providing for public use of existing and proposed trails.	**UNIQUE LANDS:** Lands possessing unique values such as outstanding (but not necessarily generally visible) scenic quality, rare flora, riparian quality, wetlands, critical wildlife habitat, fragile alpine areas, or unusual geologic, or topographical formations.	**VIEW CORRIDORS:** Lands with high aesthetic appeal and variety within major view sheds, whose lands are generally visible, apparent, and appreciated by residents and visitors and through preservation will maintain the rural mountain appearance of Summit County.	
Aspen View	OS-1	TR 7-77 Sec 30, GOVT LOT 5	4.57	H	M	H	H			Formerly NFS land. Needed to povide better trail routing on NFS land to east and heavily used social trail east of Aspen Springs Sub that connects to Fredonia Road to north and 39 Degrees Sub to south.
Sherwood Forest	OS-2	Lot 82 - 0215 STARLIT LN (CR 587)	1.78	H	H	H	H	H	H	Potential Open Space Parcel -Lot 82. Provide connection with NF to east and Town Open Space to southwest. Provides possible trail connection to Calle de Plata. Quality wildlife habitat along Blue River. Possible location for extension of Starlit Lane to New Eldorado sub.
	OS-3	Lot 92 & 97 - Summit County and Town of Breckenridge	0	H	H	H	H		H	Currently in Open Space status. Prepare draft management plan for County/Breckenridge lands. Borders National Forest lands to east.
Mountain View	OS-4	LOT 170R MOUNTAIN VIEW SUB LOT LINE ADJUST LOTS 169 AND 170	0.428				M	H	H	Potential Open Space Parcel - LOT 170R MOUNTAIN VIEW SUB LOT LINE ADJUST LOTS 169 AND 170. Provides for future bus stop/park-n-ride, access portal to all routes (roads and trails) in TOBR.
	OS-5	LOT 154 MOUNTAIN VIEW SUB	0.76		H	H		H		High wetland and wildlife values
	OS-6	LOT 155 MOUNTAIN VIEW SUB	0.74		H	H		H		High wetland and wildlife values
	OS-7	LOT 159 MOUNTAIN VIEW SUB	0.77		H	H		H		High wetland and wildlife values
Wilderness	OS-8	LOT 184 WILDERNESS SUB	0.47	H	H					Potential Open Space Parcels and/or access easement to provide connection between Hinterland Trail (CR610) and Backland Ct (CR606).
	OS-9	LOT 186 WILDERNESS SUB	0.43	H	H					Potential Open Space Parcels and/or access easement to provide connection between Hinterland Trail (CR610) and Backland Ct (CR606).
	OS-10	Lot 219	0.72	H			H			Lot 219 and 220 - Potential Open Space Parcels and/or access easement to provide connection between Hinterland Trail (CR610) and Royal Placer Trail (CR607).
	OS-11	Lot 220	0.78	H			H			Lot 219 and 220 - Potential Open Space Parcels and/or access easement to provide connection between Hinterland Trail (CR610) and Royal Placer Trail (CR607).
Royal	OS-12	TR 7-77 Sec 19 Mining Claims-LEAP YEAR MS# 13358 Acres 20.5700 & ROYAL PLACER MS# 13638 Acres 41.59	62.16		H	H		H	H	Potential Open Space Parcel - High quality wetland/wildlife/view shed values. Social trail on north end, access to HWY on SW corner, Fronts Blue River Road on south end.
	OS-13	Lot 236	0.5	H			H			Lot 236 Royal Sub - Potential Open Space Parcel and/or access easement to provide connection between Hinterland Trail (CR610) and Royal Placer Trl (CR607).
Coronet	OS-14	Lot 416	0.7	H			H			Lot 416 Coronet - High priority Open Space -provides connection between Blue River Trail on NF land to north and trail along Pennsylvania Cr on Royal Placer.
	OS-15	Lot 418	1.00	H			H			Lot 418 Coronet - Provides access from Pennsylvania Cr Rd to Royal Placer and trails to south.

CONTINUED ON Page 2 of 2

COMMENTS

OPEN SPACE CHARACTERISTICS are from the Open Space Lands section (pages 11 & 12) of the Town of Blue River Open Space and Trails Plan adopted December 2020.

SIGNIFICANCE RATING

H = High - Significantly meets criteria
M = Medium - Adequately meets criteria
L = Low- Minimally meets criteria
NA - Does not meet criteria

DRAFT - TOWN OF BLUE RIVER OPEN SPACE PARCEL ACQUISTION CHECK LIST - DRAFT **Prepared by Paul Semmer (6/27/22)** **page 2 of 2**

LOCATION			OPEN SPACE CHARACTERISTICS							SIGNIFICANCE
SUBDIVISION	Parcel Identification	Current RESIDENTIAL VACANT LAND or RESIDENTIAL UNSUB LAND or RESIDENTIAL LAND - NO IMPROVEMENT	Acres	**ACCESS** - Lands that provide trailheads or public access to recreation areas on National Forest and other significant properties.	**BUFFERS:** Natural and undeveloped lands which separate and buffer the impacts of development, define the boundaries of urbanized areas and contribute to the rural mountain quality of the Town.	**EXTENSIONS:** Land adjacent to publicly held property which meets open space criteria guidelines, and which can combine with other open space properties to enlarge and / or connect existing open space parcels.	**RECREATIONAL:** Lands with significant recreational value, particularly non-motorized passive uses not requiring intensive maintenance or management; including lands or easements providing for public use of existing and proposed trails.	**UNIQUE LANDS:** Lands possessing unique values such as outstanding (but not necessarily generally visible) scenic quality, rare flora, riparian quality, wetlands, critical wildlife habitat, fragile alpine areas, or unusual geologic, or topographical formations.	**VIEW CORRIDORS:** Lands with high aesthetic appeal and variety within major view sheds, whose lands are generally visible, apparent, and appreciated by residents and visitors and through preservation will maintain the rural mountain appearance of Summit County.	**COMMENTS** **OPEN SPACE CHARACTERISTICS** are from the Open Space Lands section (pages 11 & 12) of the Town of Blue River Open Space and Trails Plan adopted December 2020. **SIGNIFICANCE RATING** **H** = High - Significantly meets criteria **M** = Medium - Adequately meets criteria **L** = Low- Minimally meets criteria **NA** - Does not meet criteria
Bryce Estates	OS-16	Lot 6	2.2	M	H	H	M	M	;L	Lot 6 Bryce Estates - 2 + acre wooded Vacant Residential land immediately adjacent to Town owned Open Space parcel on Bruce Estates Road and nearby to platted public parking area. Potential access to NF and Burro Trail.
Blue Rock Springs	OS-17	LOT 44 BLUE ROCK SPRINGS SUB, 0041 ROCK SPRINGS RD (CR 577)	1.09	H		H	H			Blue Rock Springs Lot 44 _ 1.09ac Vacant Residential land immediately west and adjacent to Theobald open space parcel along Blue River. SW corner of parcel abuts Lift Station. Social trail extends east to end of Blue River Road. Provides connection to well-defined social (non-system) trail on Theobald vacant land along Blue River and then east to north end of Blue River Road.
	OS-18	TR 7-77 Sec 18 Mining Claim - LEAP YEAR PLACER MS# 13358 Acres 20.2200	20.22	H		H		H	H	Potential Open Space Parcel - High wetland/wildlife/viewshed values along Blue River. AND, parcel may have portions of social trail on east end that goes from end of Blue River Rd to Tarn. Consider conservation easement of parcel to protect these resources.
Leap Year	OS-19	LOT 319 LEAP YEAR SUB, 0083 LEAP YEAR TRL (CR 578)	0.77	H		H	H			Provides connection to well-defined social (non-system) trail on National Forest along south side of Spruce Creek. Parcel has potential for small access portal.
Sunny Slope	OS-20	LOT 1 SUNNYSLOPE SUB	0.49	H		H		H		Potential Open Space Parcel -LOT 1 SUNNYSLOPE SUB. Provides access to NF land. However, no significant social or system trails currently exist on NF land.
	OS-21	LOT 2 LEAP YEAR SUB	0.41	H		H		H		Potential Open Space Parcel - LOT 2 SUNNYSLOPE SUB. Provides access to NF land. However, no significant social or system trails currently exist on NF land.
	OS-22	LOT 30 SUNNYSLOPE SUB	4.6			H		H	H	Potential Open Space Parcel. Adjacent to NF land. Wetlands.
	OS-23	LOT 31 SUNNYSLOPE SUB LKA PT OF LOT 31	3.36			H		H	H	Potential Open Space Parcel. Adjacent to NF land. Wetlands
Other	OS-24	West of Hwy 9 between Lots 315 & 316 Leap Year Sub (TR 7-77 Sec 18 Mining Claim LEAP YEAR MS# 13358 Acres 1.546)	1.546	H		H		H	H	Potential Open Space Parcel -West of Hwy 9 between Lots 315 & 316 Leap Year Sub. Provide potential access to NF land. However, no significant social or system trails currently exist on NF land.

TOWN OF BLUE RIVER OPEN SPACE AND TRAILS PLAN – IMPLEMENTATION STRATEGY

The Blue River Open Space and Trails Master Plan (Master Plan), drafted by the Town of Blue River Open Space and Trails Committee and approved by the Board of Trustees on July 19, 2022, establishes the community vision, goals, and policies for open space and trails throughout the Town of Blue River. *Chapter IV. Goals and Policies/Actions* and the goals for geographic areas in *Chapter VI. Trail Planning Areas* of the Master Plan identify specific action items to achieve the vision set forth in the Master Plan. It is understood that the Master Plan is a dynamic undertaking that may take several years to achieve the desired outcomes.

This document "Town of Blue River Open Space and Trails Plan – Implementation Strategy" presents action items in the short term (0-3 years) that will help the Town develop annual budgets and work plans. A number of action items will depend on future staffing levels and capacity, funding, and partnerships. Town of Blue River Staff will work with other public land managers, and other organizations to identify action items that may be conducted collaboratively.

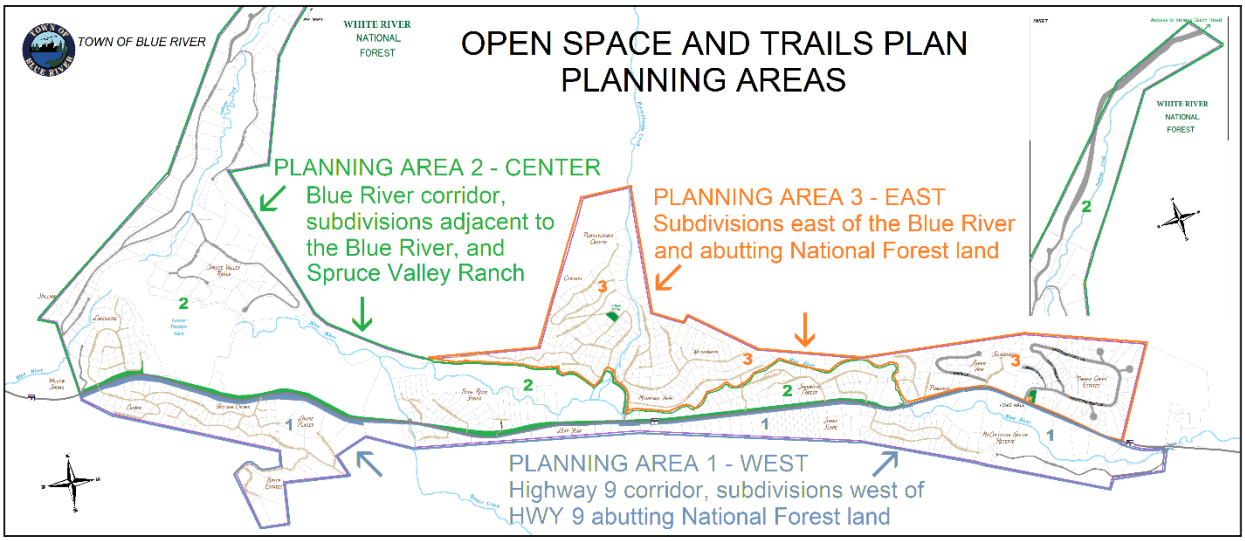
To ensure adaptability in how the Master Plan is implemented, action items and their priority will be reviewed on a regular basis during annual Town budgeting, work plan development, and meetings with staff, the Blue River Open Space and Trails Committee and partners. Action items can be refined, removed, or added as projects are accomplished or priorities change. Annually reviewing action items will also allow Staff and BROSAT to evaluate whether it is meeting the goals of the Master Plan. A more extensive check-in should be completed every five years to evaluate any significant changes or updates to the Master Plan action items. Significant changes could stem from a substantial change in landownership, shifts in demographics, recreation trends, or impacts from climate change or natural disasters.

This document identifies significant tasks considered priority action items for the short-term, next 0-3 years, or actions that are ongoing or completed on an annual basis. to achieve the desired outcome of the goals stated in Master Plan Goals and Policies/Actions and the goals for geographic areas in the Open Space and Trails Planning Areas. (The notation in parentheses that follows an action item refers to the specific trail segment or open space parcel identified in the *7-13-22 Trails and Open Space Inventory Summary-9 worksheets.xlsx* and *7-13-22_Open Space and Trails Map-Esmnt&Parcel ID.pdf* (available at the Town of Blue River website: https://townofblueriver.colorado.gov/board-of-trustees/commissions/committees/blue-river-open-space-trails-committee.

MASTER PLAN GOAL AND POLICIES ACTIONS

- In fall 2022 set up staff level meeting with TOBR, SC, TOB and USFS to review/discuss regulations, and develop cooperative messaging related to TOBR trail/open space objectives (i.e.. neighborhood use).
- Resolve encroachments, trespass, and unauthorized uses within existing dedicated easements, including easements to subdivision landowners as well as easements to the TOBR.
- Get on White River National Forest (WRNF) Schedule of Proposed Actions (SOPA) mail list and specifically request notifications on Travel Management Plan (TMP) updates and opportunities to provide comment on USFS projects near Town. (Specifically projects related to the Social Trail along Spruce Creek (LY-9) and Burro Trail access at Bryce Estates (BE-1))
- Create electronic map of Appendix C in a format similar to other mapping done by Mueller (zoning, land ownership, CIP projects, etc.). Consider hyperlinks on Appendix C map to spreadsheet data for "one stop shopping" of information on open space parcels and potential trail easements shown on Appendix C.
- Create regular topic in TOBR Newsletter for Open Space and Trails information (e.g., trail etiquette, trailhead parking, Leave No Trace, encroachments in easements, wildlife issues/sightings, etc.).
- Create an overlay zoning district designating "open space and recreation management zones" for TOBR properties, based on natural, historic, and cultural resources, and outdoor recreation opportunities. Consider amending TOBR Land Use Code/Zoning to include "River Corridor and Open Space Protection Zone":
    - Include specific high priority parcels identified in Appendix C and described in detail in the spreadsheets.
    - Draft protection criteria, guidelines, and requirements for said zone(s) and start review process with P&Z to codify the new land use zone(s) in current the Land Use Code or amendment thereto.
- Begin discussions with pertinent landowners to determine interest in working with the Town to grant mutually agreed upon property interests for important open space lands and collaborate with Summit County Safe Passages to protect movement corridors and reduce wildlife-vehicle collisions.
- Monitor, identify, and treat noxious weed populations on TOBR properties.
- Start dialogue with USFS about special use permit for all NF trails of interest to TOBR (i.e., Blue River Trail)
- Work with the USFS to obtain a legal right-of-way granted to the Town of Blue River for the northern portion of Blue River Road that is on National Forest lands. Determine what level of parking should be allowed, designed, signed, and enforced. Consider trail work to create a better entrance to the trail, and similarly access to the Blue River Trail to the east.
- Create new land use code – "Conservation Corridor" for significant segments of Pennsylvania Creek and work through the administrative process to codify this. (PC-1)

PLANNING AREA ACTIONS



A. Planning Area 1: West -Highway 9 corridor, subdivisions west of Highway 9 and adjacent National Forest land

- Identify and prioritize Open Space parcels that facilitate future Recpath alignment along Hwy 9 ROW and future access to National Forest. (OS-20, 21 & 24).
- Continue pursuing construction of a paved recreational pathway or designated bicycle lane between Hoosier Pass and Breckenridge, with Summit County taking the lead in the planning process.
- Consider having the Town of Blue River formally adopt the segments of the Blue River Trail and Lower McCullough Gulch Trail within and immediately adjacent to Town.

B. Planning Area 2: Center – Blue River corridor, subdivisions immediately adjacent to the Blue River, and Spruce Valley Ranch subdivision

- Partner with like-minded agencies to acquire high priority open space lands, including access to the Blue River Trail in Planning Area 2. (OS-2, 5, 6, 7, 12 & 18)
- Work with landowners and USFS to acquire authority to build, use and maintain non-motorized trail ROW across respective parcels from the end of Blue River Road to the Goose Pasture Tarn that allow for single track non-motorized travel. (96-1)
- Verify TOBR has legal easements and documentation, for the Town records for the Blue River Trail through Spruce Valley Ranch in Planning Area 2. (SVR-1)
- Work with landowners and owners of Blue River San District easement parcels to acquire authority to build, use and maintain non-motorized trail ROW to tie end of Blue River Road with Blue Rock Springs Sub. (BR-1& BR-2)

C. Planning Area 3: Planning Area 3- East - Subdivisions East of the Blue River Adjacent to National Forest Lands

- Secure easements across Lot 6 New Eldorado Sub and Lot 18 Aspen View Subs to perfect trail route from end of Vogt easement to Fredonia Gulch Rd. (NE-5)
- Work with landowners on encroachment issues on north end of Audry's Trail easement (cars parked in easement right-of-way visually discouraging use of trail as well as potential liability issues with damage to cars, tripping on stuff in easement, etc.) (NE-4)
- Work to obtain access easement from Creekside Dr and Hinterland Tr to Pennsylvania Creek (Royal Placer) (W-6 and R-4 & 5)
- Work with USFS on the Old Wagon Road trail that goes from Blue River Road to Coronet Drive to get this on the 2023/24 program of work for heavy maintenance to establish sustainable water diversion features within existing Trail ROW. (96-7)
- Identify significant travel routes, separated from roads where reasonable, that connect the Town Park and Old Wagon Road north of Coronet Drive with the Blue River Trail on Summit County/Town of Breckenridge lands near Pennsylvania Creek, including:
    - Regal Circle near Town Park (Royal Sub, Lot 270 & Lot 271) to the Blue River Trail segment on Town of Breckenridge and Summit County land in the Royal Placer. (R-2)
    - Holly Lane/Bonanza Tr to Pennsylvania Creek (Royal Placer) (C-1 & 2 and OS-14)
    - Coronet Dr to Pennsylvania Creek (Royal Placer) (C-3 and OS-15)
    - North Pennsylvania Creek from Blue River Road to Town Park. (R-1A, 1B, & 1C)
- Cooperate with landowners to secure appropriate right-of-way across lots along the Blue River Trail from Pennsylvania Creek to Calle De Plata, and further south to Timber Creek Estates.
    - High priority – start on north end by securing easements across lots in Sherwood Forest (Lots 82, 83, 88 and 100) up to Clyde Lode. (SF-8)
    - Verify status of "Road Easement" on New Eldorado/Sherwood Forest subdivision plats – Does the TOBR have a legal ROW for the platted road?
    - After establishing credibility in working to secure and manage easements on Calle De Plata-Fredonia segment, approach landowners of Clyde Lode et al concerning easements on Blue River Trail. (W-5)
    - Acquire vacant unsubdivided residential land east of Aspen View Sub in unincorporated Summit County (Government Lot 5, TR 7-77 Sec 30, Acres 4.570) to provide re-routing of non-system trail on National Forest that links Fredonia Gulch Road to Timber Creek Estates and 39 Degrees North Sub south of TOBR. (OS-1)
    - Start dialogue with USFS to get the existing non-system trail included in the USFS Travel Management Plan, after Gov Lot 5 has been acquired. (AV-4)
- Work with Summit County/Town of Breckenridge on the design and construction of an improved parking plan for the trailhead at the end of Coronet Drive and access to Pennsylvania Creek. and develop management plan for Royal Placer and Sherwood Forest Lots. (PC-1)
- Work with Summit County/Town of Breckenridge and USFS to evaluate the socially created trail network that is located immediately east of the trailhead at the end of Coronet Drive and north of Pennsylvania Creek and tie this with management plan for Royal Placer and potential forest fuels mitigation planning in 2023. (PC-1)

Blue River Staff Report

February 2023

Town of Blue River
0110 Whispering Pines Circle
Blue River, CO 80424

970-547-0545
michelle@townofblueriver.org
https://townofblueriver.colorado.gov

Communications & Happenings

- **Broadband**
  - Agreement with NEO has been signed. Staff and NEO will be meeting to outline process and timeline.
- **Town Hall**
  - New cameras and card access systems are being installed.
- **Upper Blue Planning Commission**
  - A report from Dan Cleary indicated the Commission has submitted information to the County Commissioners on short-term rental zonings for the Upper Blue Basin and will be incorporated with the other basin recommendations.
- **Audit**
  - The Accountant is closing out financials for the year-end reports. The annual Audit will take place the week of April 1st.
- **Staffing**
  - Deputy Clerk John DeBee has been designated as the staff representative for everything trails for Blue River. He will be attending meetings as needed for the Quandary Trail Head project and any staff level meetings with Summit County and Breckenridge Open Space and Trails. He will also join the Town Manager on the Mountain Ideals Committee.
  - Police Department: The Police Department currently has three staff members including the Chief. Officer Elijah Brito comes from Buena Vista and Officer Carl Meltzer comes from Ft. Collins. The officers stay at the Town owned condo for all shifts. The Chief is continuing recruitment to fulfill the fourth and final position.
- **Countywide Discussions**
  - The County is bringing back their noxious weed event to address noxious weeds in the county. All of the towns, including Blue River, will be participating. The event is tentatively scheduled for July 8th. This will be done in conjunction with Blue River's Weed/Seed program. Citizen Advisory, as the Noxious Weed Advisory Board, will be tasks to work with staff on developing this event. More information to come.
  - There is potential legislation coming that could affect local control over land use. All towns and the county are awaiting to see what the legislation looks like and more information will be provided as available.

- The Town Managers have been tasked to evaluate current trash/recycling programs including pay as you throw to develop a comprehensive approach to long-term solutions surrounding the landfill and recycling.

Town Statistics

Facebook Page Likes
Town-1,297
Police Department-894
Instagram-1,132 followers
Twitter-70 followers
TikTok-0
Residents on Email List-967
Blue River News-1,131

Business Licenses-290

Lodging Registrations-203

Municipal Court
February 2023

Total tickets written for January Court: 1
Total on the February Docket: 2
Total February Failure to appear(s): 1
Total February OJW(s): 0

Building Statistics
December 2022

Permits Issued: 7
YTD: 205
Inspections: 5
New Construction 2022: 6
Certificates of Occupancy: 6

End of Month Report: January 2023

Calls for Service

Total number of a calls: 142 Top
10 calls as follows:

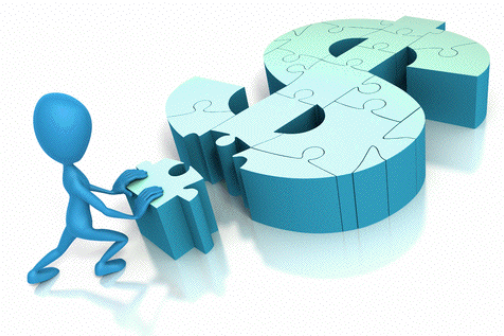
Area Patrol	76
Motorists Assists	10
Traffic Stops	9
Motor Vehicle Accidents	8
Other Agency Assists	5
Residential Alarms	5
Road Hazards	3
Medicals	2
School Bus Violations	2
Parking Violations	2

Summary: Snow and weather-related conditions effected January's type of incidents. Motor vehicle accidents went up along with assisting other agencies. There was a spike in vehicles passing the school bus when it is stopped at Hwy. 9 and Blue River Rd.

Current Administrative Focus

- Officer Safety – Conditions are not favorable for officers responding to motor vehicle incidents along Hwy. 9. Officers are focusing on safely managing these situations.
- Training – As the department continues become more self-sufficient, we are certifying as many officers as instructors in the appropriate disciplines.
- Vehicle Maintenance – The high alpine environment is hard on patrol vehicles. All fleet vehicles required recall maintenance or additional maintenance.

Report prepared by: Chief,
David Close



Financial Summary Report
Prepared by: Michelle Eddy, Town Manager
Year Ending December 31.2022

Revenues:
Revenues finished strong for sales and lodging tax collections, and building. Court finished behind budget by 61.64%. Overall revenues ended the year 22.44% ahead of budget. While sales/lodging taxes remain strong, the biggest increase in revenues came from interest on investments from higher interest rates. Building was stronger than expected and finished 12% ahead. Currently the town is at 90% building out with 85 vacant lots available within town limits.

Expenses
Expenses remained on target budget with capital expenditures coming in below due to delays. Overall expenses finished the year 27.04% under budget for 2022.

Reserve Accounts*As of 12/31/2022

Unrestricted	
Reserve accounts Alpine Bank:	$1,340,373.93
Reserve account First Bank:	$100,001.00
CD's Citywide Bank:	$211,498.41
Colorado Trust:	$950,110.73
CSAFE:	$100.00
Petty Cash	$1,148.16
Illiquid Trust Funds:	$1,187.42
Total Unrestricted	**$2,604,419.65**
Restricted	
American Rescue Plan Funds:	$231,519.47
Conservation Trust:	$125,151.58
Total Reserves Restricted	**$356,671.05**

Open Building Permits
2022

Issued

- **New Construction Permits: 13**
- **Addition/Garage/Remodel Permits: 30**

Under Review or Approved waiting additional information

- **New Construction: 3**
- **Addition/Garage: 4**

Total Project under construction or pending: 50

Projects provided extensions: 4*

***Three projects will be completed by December 2022 and one May 2023. Most delays were due to COVID.*

Town of Blue River

Staff Report
Short-term Rental Update
January 12, 2023
Submitted By: Michelle Eddy, Town Manager

Renewals

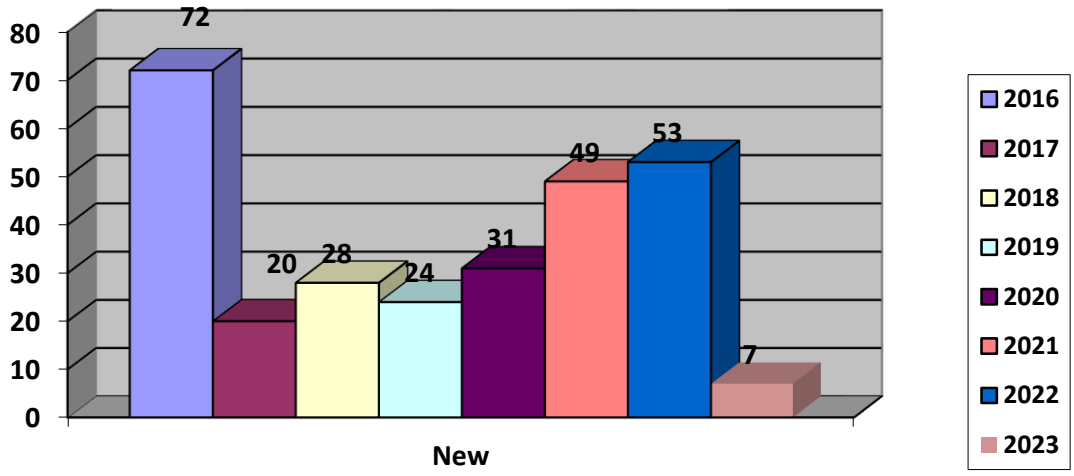
- 196 Licenses Renewed for 2023
- 9 Licenses were cancelled/not renewed
- 1 is outstanding/voided

Statistics

Issued by Year

2016	72 *Previous number included previous years prior to Town taking over program
2017	20
2018	28
2019	24
2020	31
2021	49
2022	53
2023	8

Total Active Licenses as of 1/12/2023: 204



New (never rented before) Licenses by year:

- 2017-20
- 2018-25
- 2019-20
- 2020-25
- 2021-43
- 2022-35

License turnover (STR one owner to the next):

- 2017-0
- 2018-3
- 2019-4
- 2020-6
- 2021-6
- 2022-18

Total Housing Units Per 2020 Census:	761
Total Housing Units Occupied Full Time Per 2020 Census:	350
Build Out:	90%
Percentage of STR's in Blue River	25%*

This is based on built lots and does not include vacant lots or lots owned by a municipality, HOA or special district

Annual Revenue

Year	Sales Tax	Lodging Tax
2016	$264,757.05	$123,742.00
2017	$237,468.92	$126,585.55
2018	$286,968.54	$155,511.07
2019	$425,616.72	$166,883.33
2020	$842,141.13	$176,339.81
2021	$844,558.23	$228,743.34
2022	$1,002,256.27	$327,762.62

Percentage of STRs by Subdivision

*****Please note the percentage of STRS is based on total homes built within each subdivision and NOT buildable lots.***

Subdivision	Buildable Lots	# STR	%STR **	% Build Out	% Full-Time Res.
96 Sub	41	7	19%	90%	30%
97 Sub	49	9	22%	84%	41%
Aspen View	20	7	44%	80%	19%
Blue Rock Springs	54	12	24%	93%	44%
Bryce Estates	7	1	25%	57%	25%
Clyde Lode	2	0	0%	50%	0%
Coronet	40	10	32%	78%	32%
Crown	72	21	32%	92%	35%
DOT Condo	37	5	14%	100%	27%
DOT Placer	4	0	0%	50%	100%
Golden Crown	8	3	60%	63%	20%
Lakeshore	43	11	28%	93%	30%
Leap Year	23	8	38%	91%	52%
Louise Placer	11	3	38%	73%	13%
McCullough Gulch	7	1	33%	43%	33%
Misc Sec TR7-77 Land	23	0	0%	22%	40%
Mountain View	46	12	27%	96%	36%
New Eldorado Sub	11	4	50%	73%	63%
New Eldorado Townhomes	9	1	11%	100%	67%
Pennsylvania Canyon	2	0	0%	100	0%
Pennsylvania Canyon	1 open space	0	0%	0%	0%
Pomeroy	1	0	0%	0%	0%
Rivershore	8	0	0%	63%	20%
Royal	71	14	21%	94%	39%
Sherwood Forest	87	18	23%	90%	24%
Silverheels	6	1	25%	67%	25%
Spillway	21	2	11%	90%	26%
Spruce Valley Ranch	65	0	0%	68%	11%
Sunnyslope	35	12	40%	86%	47%
Timber Creek Estates	79	27	38%	89%	10%
Wilderness	57	14	25%	96%	38%

General Statistics

- Total Percentage of short-term rentals **25%**
- "Local" Breckenridge, Dillon, Frisco or Silverthorne addresses with STR License: 26 or 13%
- New Construction homes obtaining a STR License upon completion of home: 12 out of 53 new construction 2016-YTD 2022. (23%).
- 19 out of 41 home sales in 2022 obtained a STR License 46%.
- Total home sales for 2022: $65,121,000. The average home sales price $1,588,317.
- 27/200 are listed in a name of a Trust/LLC/Ltd. Partnership 14%

Code Violations 2015-2022

Total Violations:	**277**
Violations for STR's while licensed as an STR:	117 (42%)
Percentage of Repeat Offenders:	>1%

Violations By Type Associated with STR in order of violation:

- Trash-majority
- Parking
- Occupancy Violation
- Noise
- Occupancy during Public Health Order