DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

IN THE MATTER OF the Complaint of James T. and Elizabeth A. Gruba, Leo G. and Jeanne R. Barsanti, and Michael W. and Frances E. Paterson on Behalf of Themselves and Others Similarly Situated,	)	REGULATORY DIVISION
	)	DOCKET NO. D2010.2.14
	)	ORDER NO. 7084h
Complainants,	)	
v.	)	
NorthWestern Energy,	)	
Defendant	)	

INTERLINEATED

TESTIMONY OF NATALIE MEYER

On the 11th day of March, 2014, the testimony of NATALIE MEYER, appearing at the instance of the Complainants, was taken at the offices of Bozeman City Hall, 121 N. Rouse Ave., Bozeman, Montana, before Tim Cooper, Notary Public.

NATALIE MEYER, called as a witness herein, having been first duly sworn, was examined and testified as follows:

Q. Please state your name business and email addresses and phone number.

A. I am Natalie Meyer. I work at the City of Bozeman, 121 N. Rouse Ave., PO Box 1230, Bozeman, MT 59771. My email address is NMeyer@BOZEMAN.NET . My phone number is (406) 582-2317.

Q. Please tell us about your educational background.

A. I received a B.A. in International Studies from the University of Idaho, a B.S. in Forest Resource Management from the University of Montana, and a M.S. in Land Resources and Environmental Studies from Montana State University.

Q. What is your occupation and occupational background?

A. I have worked for the City of Bozeman, Montana since 2008. I was responsible for coordinating the grants and climate protection programs during my first three years of service at the City. My current title is Sustainability Program Manager and I am responsible for the City's energy reduction efforts and associated community awareness campaigns.

Q. Have you constructed an inventory of street lights in Bozeman?

A. I personally have not, but we hired an Energy Corps intern in 2012 to complete an inventory of Bozeman's street lights. I've provided this database to Mr. Russell Doty, Attorney for Complainants. The inventory shows ownership, condition, location, and lighting districts. You will note there is only limited data available on system wattage.

Q. How many street lights does Bozeman have?

A. At the time of the inventory, we identified 1,647 within the City of Bozeman.

Q. Of the total street lights in Bozeman, how many does Bozeman own?

A. 254 or 15% are owned by the City of Bozeman.

Q. During the time you have worked for Bozeman, has it been part of your job to investigate ways for the city to save money while conserving energy?

A. Yes, it is my job to identify energy reduction strategies for municipal operations and the community at-large. It is generally better to find strategies that save money while saving energy.

Q. Has Bozeman installed any LED Street Lights?

A. Yes. In February 2012, the City of Bozeman replaced eight High Pressure Sodium units with eight LEDs on Durston Street from 7th Avenue to 11th Avenue. These units are BetaLED 168 Watt lamps. There are 12 streetlights associated with this account. At the time of the pilot, we did not have enough budgeted to complete the entire network, so we retrofitted only eight of the poles. We monitored energy consumption for a year, then retrofitted the remaining poles with LEDs in October 2013. One of the poles was knocked over during a construction project, so only three LEDs were retrofitted. In this second installation we used a Duralight 135 Watt unit.

Q. Other than agreeing to hook up your LED lights, did NorthWestern take an active role in their planning and installation?

A. We did not coordinate with NorthWestern Energy on this pilot project. We selected streetlights that were metered and owned by the City of Bozeman.

Q. Did NorthWestern propose to allow you to be charged on an unmetered tariff for those LEDs or did NorthWestern require you to install a meter?

A. We did not ask NorthWestern Energy for any special accommodation. There was an existing meter at this particular location.

Q. What have you discovered so far as a result of your installation of LED lights?

A. We have been pleased with the performance of the LEDs. I used the Department of Energy's Solid State Lighting Consortium Financial Analysis Tool to model the savings. Using this model, I anticipated a simple payback of 9 years, a 15-year unlevered Internal Rate of Return of 9%, a 15 year Net Present Value of $3,262, and annual energy savings of 4,363 kWh. After monitoring this pilot for more than a year, we have been happy with the lighting quality and have

not received any complaints from the public. In addition, the energy savings have exceeded our expectations. I've calculated a simple payback of 8.7 years, a 15-year unlevered Internal Rate of Return of 10%, a 15-year Net Present Value of $3,742, and annual energy savings of 4,638 kWh. This assessment includes not only electric savings, but also savings related to labor, installation equipment, and disposal costs. Since these LEDs are expected to last at least three times longer than the High Pressure Sodium units they replaced, labor savings are a considerable component of overall savings.

I also modeled the savings for the three LEDs we installed in 2013. With these units, the simple payback dropped by a year to 7.7 years, the 15-year unlevered Internal Rate of Return is 13%, the 15-year Net Present Value is $2,588, and the annual energy savings are 2,748 kWh for these three lights. I should also note that we likely could have received a better price on these LEDs if we had completed a large-scale retrofit.

Q. Are you familiar with the Municipal Solid State Lighting Consortium?

A. Yes, I'm familiar with this resource and have reviewed case studies, best practices, and the Financial Analysis Tool.

Q. Do you have a cost analysis of the City of Bozeman streetlight pilot?

A. Yes. I prepared an analysis summarizing the cost, system watts, expected life, and lumen output of the units. It includes tables that summarize the financial analysis from the 2012 and 2013 LED streetlight pilot on Durston Street.

Q. Please provide any findings or conclusions made from the analysis.

A. The first row shows the per unit cost of the existing High Pressure Sodium units at $303 dollars. The light and ballast require 295 watts, the light is rated to 36,500 hours, and the lumen output is 29,000. The second row provides the specifications for the LEDs we installed in

2012. We paid $771 per unit, they are 168 watts, rated for 139,000 hours and have a lumen output of 11,812. Because LEDs provide directional light with less light pollution, the overall lumen output is less than half of the traditional High Pressure Sodium lights. The third row gives the specifications for the LEDs we installed in 2013. They were $627 per unit, which is a $144 decrease from the units we purchased just one year earlier. The system is 135 watts, rated for 100,000 hours, and have a lumen output of 11,650. I previously described the other two finance tables.

Q. In your cost analysis of LED street lights, did you include the cost of metering the lights to monitor energy usage?

A. No. I have not looked into the cost of metering yet.

Q. Would it make LED lighting more cost effective if Bozeman could count on having energy usage assessed as part of an unmetered tariff rather than on the basis of metered usage?

A. I can reasonably speculate that it would be more cost-effective for the City and its residents to be offered an unmetered tariff for high-efficiency lighting, such as LEDs.

Q. Are you asking this Commission to establish an unmetered tariff for LED street lighting?

A. The Bozeman City Commission has not held a policy discussion on this point, so I cannot represent the City on the issue of a LED tariff. In my opinion, it would be highly beneficial to ratepayers if the City of Bozeman could work with NorthWestern Energy to establish a fair unmetered tariff for LEDs.

Q. Based on what you have found, is Bozeman interested in installing LED street lighting?

A. I presented the findings from our LED streetlight pilot at the December 16th Bozeman City Commission meeting. At that time, Mayor Jeff Krauss indicated that he would like to see the City establish a LED parking lot and streetlight standard for new development. On February 10, 2014, the Commission identified, LED lighting for streets and parking lots as one of fifteen new organizational goals for staff to explore. As I indicated, we only own 15 percent of our streetlights and LED retrofits are limited by a host of other factors, so we will first focus on requiring LEDs for new developments.

Q. Would Bozeman like to be able to use NorthWestern poles to house LED street lights owned by Bozeman?

A. The Bozeman City Commission has not held a policy discussion on this point, nor have we assessed how many NorthWestern-owned poles would be good candidates for a retrofit. The height and spacing of the poles would need to be evaluated. For the lights in which we have maintenance agreements with NorthWestern Energy, there likely would be interest in installing LEDs over time. This would be easier if the streetlights were either metered or if we were offered an unmetered tariff for LEDs.

Q. Would Bozeman like the street lights owned by NorthWestern converted to LED lighting?

A. We have been pleased with the results of our pilot and would like to see LEDs where the spacing and height of the poles is appropriate for this technology.

I, NATALIE MEYER, witness in the foregoing testimony, DO HEREBY CERTIFY, that I have read the foregoing -6- pages of typewritten material and that the same is a full, true and correct transcript of my oral testimony given at the date and place hereinbefore mentioned.

Natalie Meyer, witness

State of Montana)
County of Gallatin)

Signed and sworn to before me on March 11, 2014 by Natalie Meyer.

Notary Signature

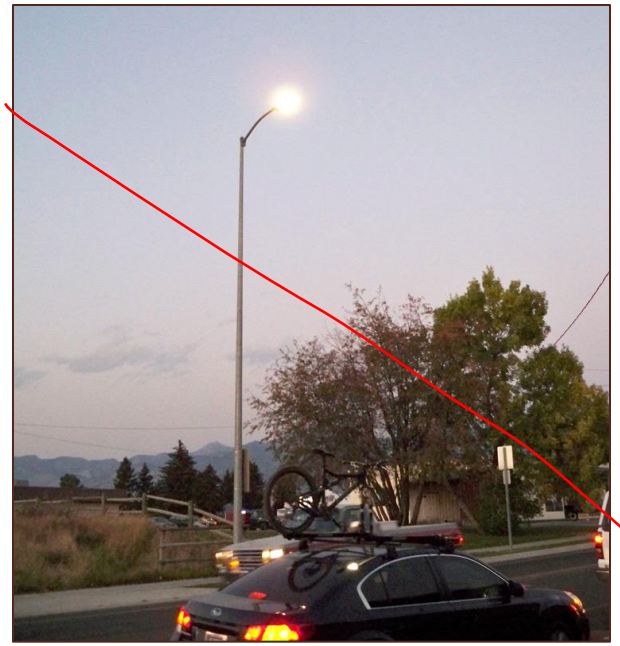
TIM COOPER NOTARIAL SEAL STATE OF MONTANA

Tim Cooper
Notary Public
for the State of Montana
Residing at:
Bozeman, Montana
My Commission Expires:
September 29, 2014

ATTORNEY MOTION: We respectfully move the Commission to take administrative notice of "LED Streetlight Pilot: 2012-2013" a public document of the City of Bozeman about which Ms. Meyer can answer questions. It is Complainants' Exhibit 11.

The above attorney motion and Exhibit 13 would be interlineated as stricken by the Hearing Examiner if the tool would in Adobe Acrobat could accomplish that. Please consider the motion and Exhibit 13 interlineated in compliance with the order to strike attorney comments and motions and testimony related to LED lighting.

Complainants' Exhibit 11
Bozeman's "LED Streetlight Pilot: 2012-2103"
Witness: Natalie Meyer



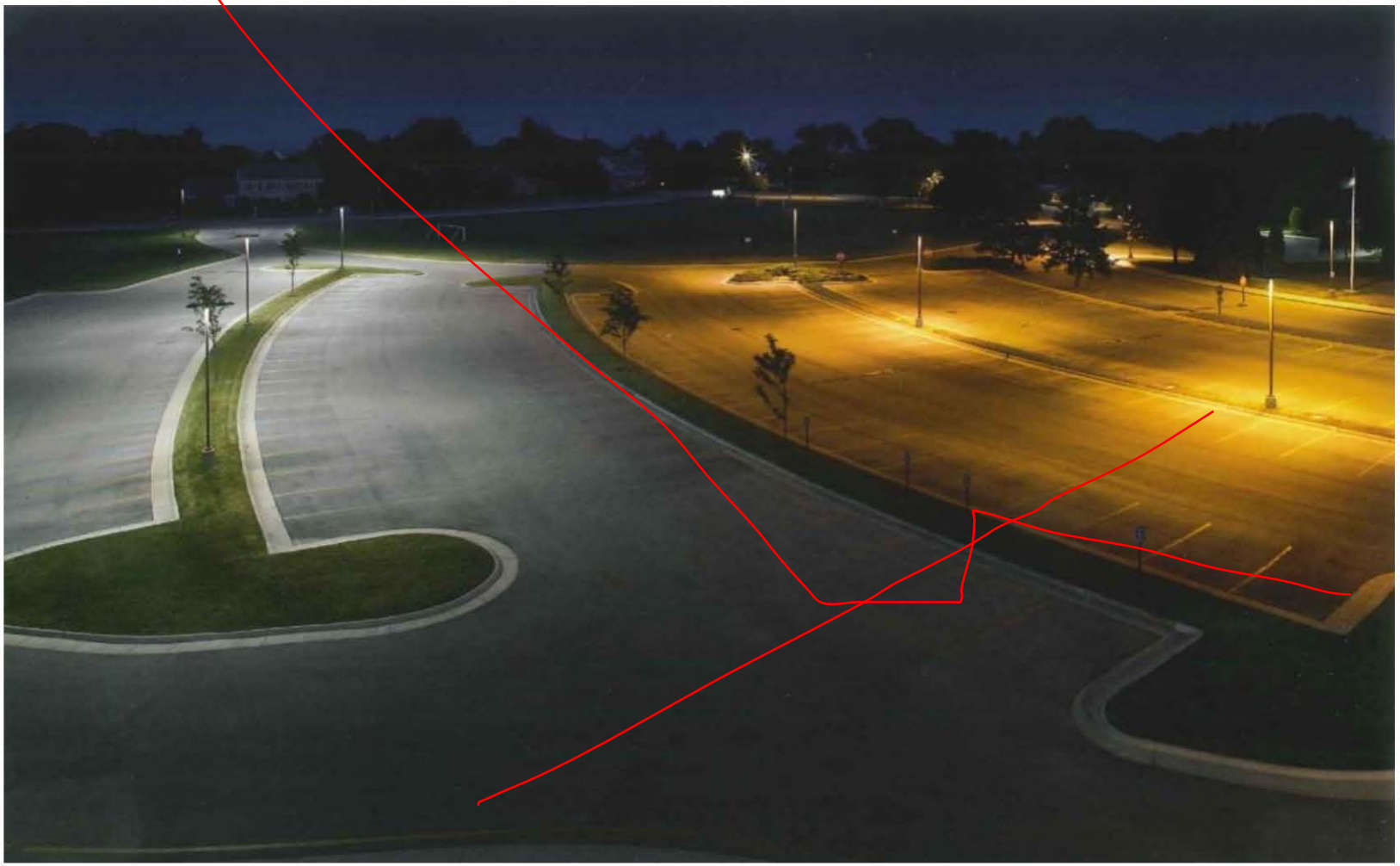
LED Streetlight Pilot

2012-2013

Why Light Emitting Diode (LED) Streetlights?

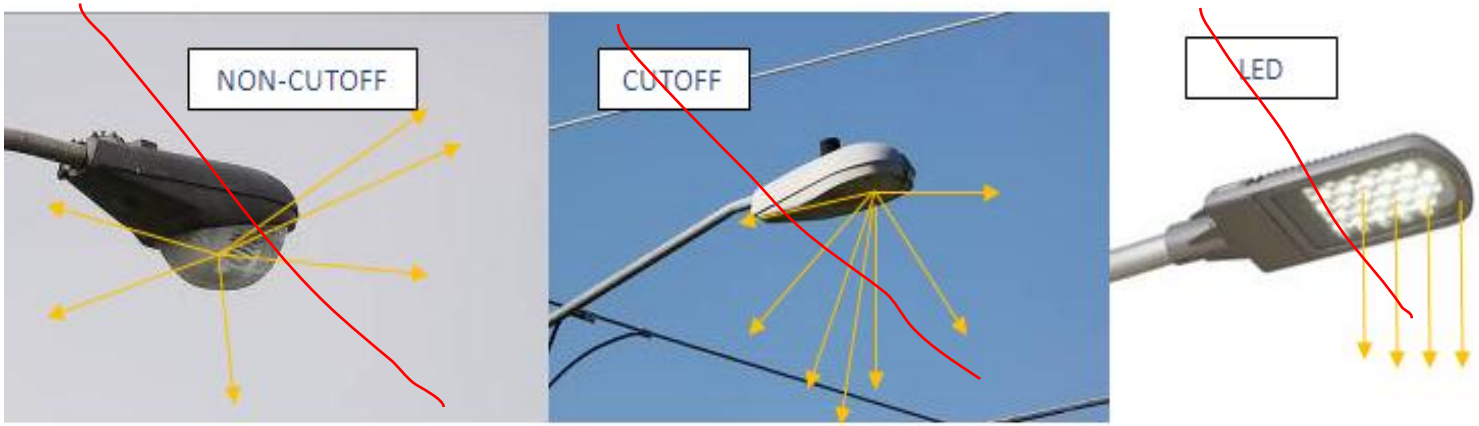
- Advantages of LED over traditional high-pressure sodium (HPS) and metal halide (MH) lamps:
  - Lower energy usage
  - No warm-up time
  - No humming or flickering
  - No mercury
  - Longer lifetime
    - Less maintenance
  - Better color rendering
  - Directional, dimmable, programmable

LED vs. HPS



HPS vs. LED
at Montana State University

LED Lights and the Night Sky



- LEDs give directional light, keeping the sky dark.
  - Full and partial backlight control
- Blue-rich light of LEDs may erode effectiveness of astronomical facilities.
  - Select lights with color temperature below 4,000 Kelvin

Streetlight System Overview

At A Glance:

- 1647 Streetlights
- 62 Lighting Districts

Ownership & Maintenance

- 254 City (15%)
- 1191 NorthWestern Energy
  (72%; monthly maint. charge paid by City)
- 195 Montana Department of Transportation (12%)
- 7 Home Owner Associations (0.4%; SILD 704)

And More Details

Metered

- 1221 Unmetered (74%)
- 200 Metered (12%)
- 226 Unknown

Special Improvement Lighting Districts

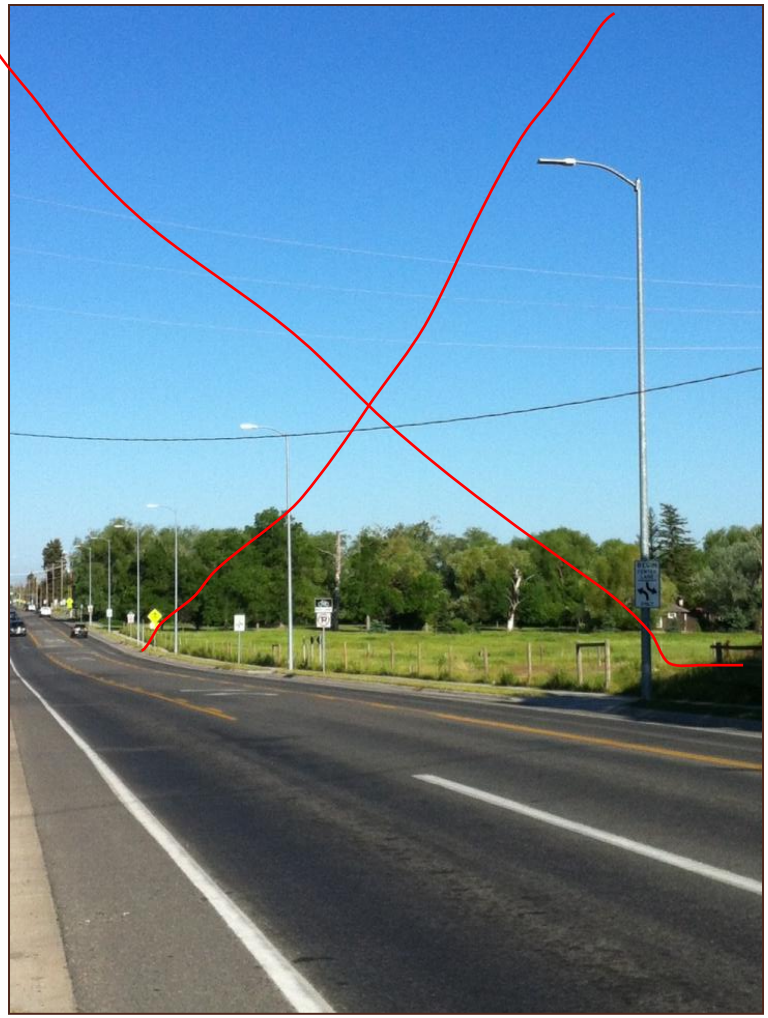
- 1181 SILD Lights (72%)
- 75 Street Maint. District Unmetered Lights (5%)
- 391 Metered & MDT (33%)

LED Pilot Site Selection

- Criteria
  - Streetlight ownership
  - Utility metering
  - Pole condition
  - Uniform pole height and spacing
- Limited Options
  - Durston Street / 7th to 11th Avenue

LED Streetlight Pilot

- Installed 8 units in February 2012
- Installed 3 units in October 2013
- Both Meet CoB Lighting Standards for Arterial



Financial Results

- Used DOE Municipal Solid-State Street Lighting Consortium Retrofit Financial Analysis Tool
  - Accounts for Costs Associated with:
    - Electricity
    - Replacement
    - Maintenance
    - Disposal
  - Annual Operating Hours
    - 4,294
  - 15 Year Analysis Period
    - Minimum life expectancy of LED units

LED Streetlight Pilot Product Comparison

	Cost / Unit ($)	System Watts	Fixture Rated Life (hrs)	Lumen Output
HPS	$303	295	36,500	29,000
LED (2012)	$771	168	139,000	11,812
LED (2013)	$627	135	100,000	11,650

2012 LED Streetlight Pilot, 8 units

	Modeled Savings	Actual Savings
Simple Payback (years)	9.0	8.7
15-Year Unlevered Internal Rate of Return (IRR)	9%	10%
15-Year Net Present Value (NPV) ($)	3,262	3,742
Annual Energy Savings (kWh)	4,363	4,638
Annual Energy Cost Savings ($)	524	557
Annual Greenhouse Gas Emissions Savings (tCO2e)	2.56	2.72

2013 LED Streetlight Pilot, 3 units

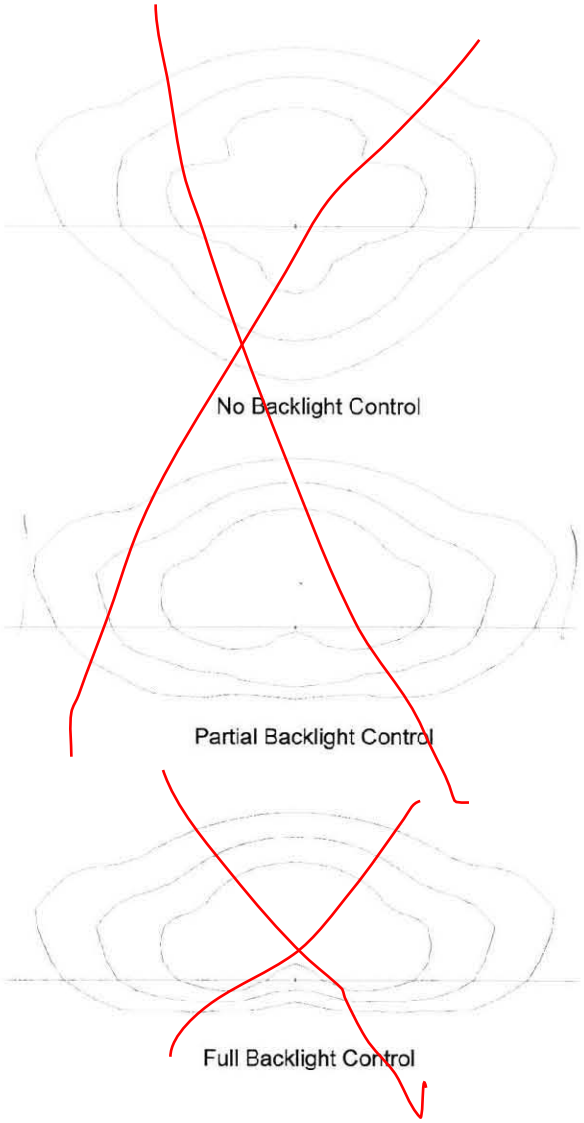
	Modeled Savings
Simple Payback (years)	7.7
15-Year Unlevered IRR	13%
15-Year NPV ($)	2,588
Annual Energy Savings (kWh)	2,748
Annual Energy Cost Savings ($)	330
Annual GHG Savings (tCO2e)	1.61

Discussion & Next Steps

- Update Streetlight Standard for New Subdivisions
- Policy Discussion About Existing Streetlights







No Backlight Control
Partial Backlight Control
Full Backlight Control