Streetlight Master Plan Update

City Council Study Session

10/31/2019

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mesa·az
TRANSPORTATION

Master Plan Objectives

- Ensure Mesa continues our path of being a “Smart City”- using latest technology to enhance service delivery and customer satisfaction
- Research lighting regulations and other communities’ LED transitions
- Develop lighting zones for different areas of the city and test dimming/lighting levels
- Perform financial analysis for LED conversion
- Review City Code, details, and design standards to address LED lighting/dimming

Research

Evaluated Dimming Studies

City of Seattle

Evaluated Engineering Reports

US/European Government reports on adaptive lighting

Evaluated Benchmarks from other Agencies

City of San Jose City of Durango

City Document Review and Update

- ***Section 4**: Chapter 4 Mesa Lighting and Electrical Code*
- ***Section 9** Chapter 6 Subdivision Regulations*
- ***Section 9**: Chapter 8 Off-Site Improvement Regulations*
- ***Engineering & Design Standards Chapter 9***
- ***2019 Street Light Technical Manual***

Pilot Study Achievements

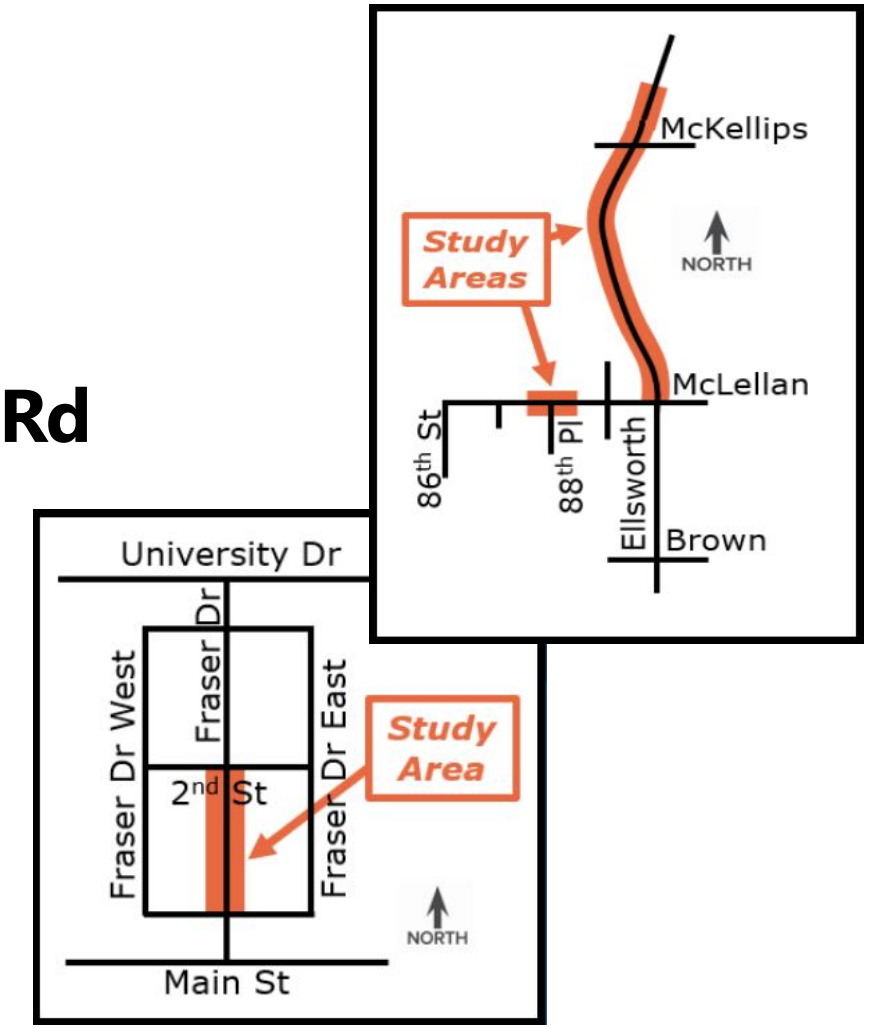
Streetlight Pilot Dimming

Tested various levels over 4-week period in three areas
Current Pilot expires on 12/31/2019

Extended Dimming Evaluation on Ellsworth Rd

Public Survey

Collected feedback via survey over 4-week period



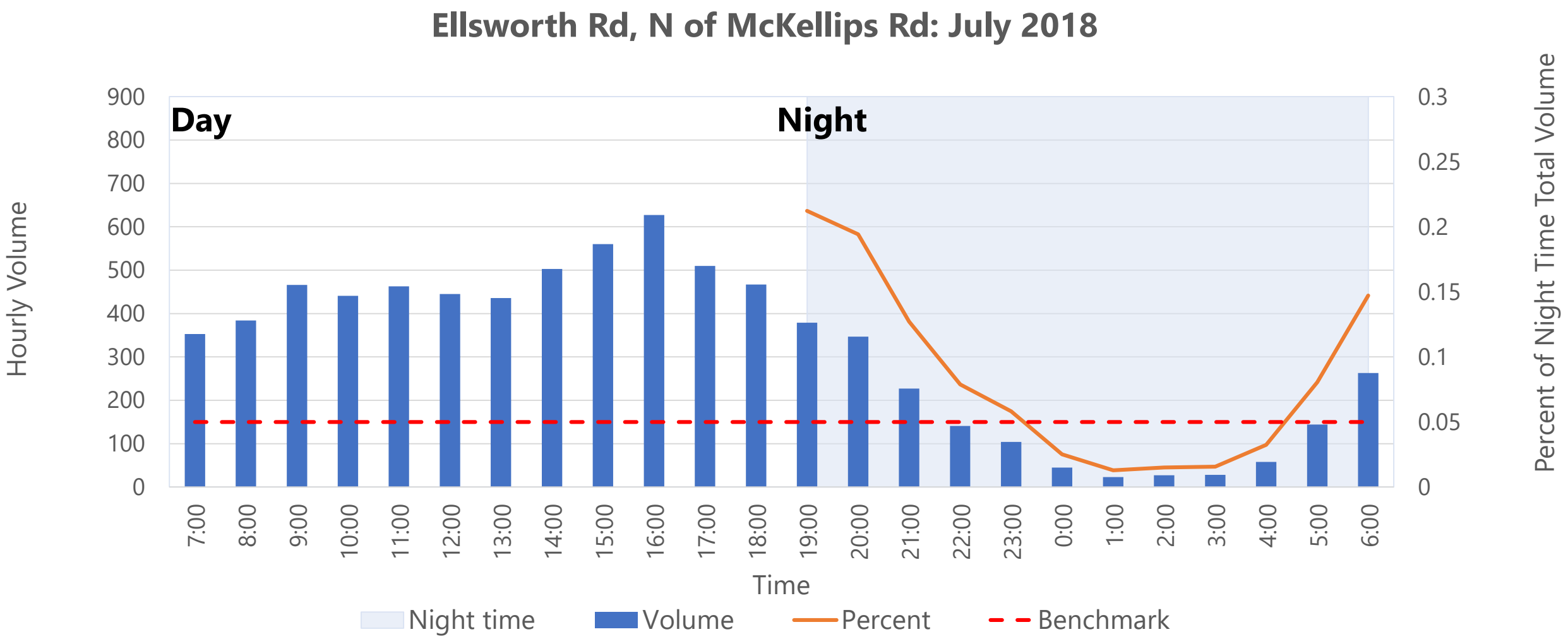
Pilot Study Achievements

Police/Fire Feedback
Public Safety personnel had no concerns with dimming

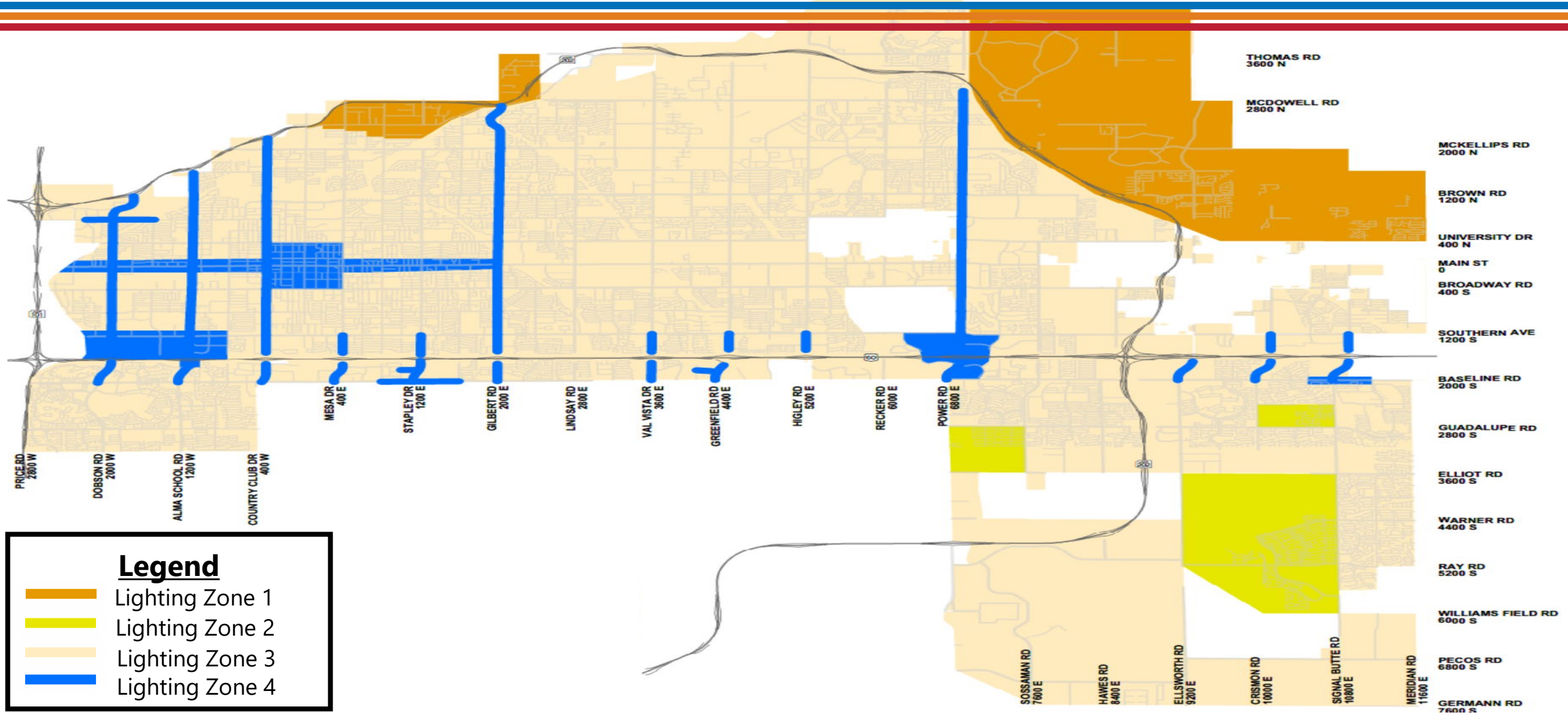
Public Meeting
Held on November 15, 2018

Light Shields
Fabricated light shields for Ellsworth Rd

Dimming Study



City of Mesa Lighting Zone Map



Legend

- Lighting Zone 1
- Lighting Zone 2
- Lighting Zone 3
- Lighting Zone 4

Lighting Zone 1

Description: Rural Residential and Low Density

Examples: *Desert Uplands, Lehi*

		Dimming (% Power Consumption)	
Roadway Class	**Designed Level**	**Time of Day**	**Dimmed Level**
Local	Desert Uplands Standards	No Dimming	N/A
Collector	Desert Uplands Standards	10pm - 5am	45%
Arterial	IES RP-8* Recommendations	10pm - 5am	25%

* Illuminating Engineering Society Roadway Practice

Lighting Zone 2

Description: Reduced and Variances by Developer Agreement (DA)

Examples: *Eastmark, Cadence, Morrison Ranch*

		Dimming (% Power Consumption)	
Roadway Class	**Designed Level**	**Time of Day**	**Dimmed Level**
Local	Varies by DA	10pm - 5am	45%
Collector	IES RP-8* Recommendations	10pm - 5am	45%
Arterial	IES RP-8* Recommendations	11pm - 5am	45%

* Illuminating Engineering Society Roadway Practice

Lighting Zone 3

Description: Standard Roadways - Majority of Public streets

Examples: *All other streets not included in other zones*

		Dimming (% Power Consumption)	
Roadway Class	**Designed Level**	**Time of Day**	**Dimmed Level**
Local	IES RP-8* Recommendations	11pm - 5am	45%
Collector	IES RP-8* Recommendations	11pm - 5am	45%
Arterial	IES RP-8* Recommendations	11pm - 5am	45%

* Illuminating Engineering Society Roadway Practice

Lighting Zone 4

Description: High Pedestrian Activity and Regional Commercial

Examples: *Downtown, Fiesta/Superstition Springs Malls, Stapley & US60*

		Dimming (% Power Consumption)	
Roadway Class	**Designed Level**	**Time of Day**	**Dimmed Level**
Local	IES RP-8* Recommendations	11pm - 5am	45%
Collector	IES RP-8* Recommendations	11pm - 5am	45%
Arterial	IES RP-8* Recommendations	12am - 4am	45%

* Illuminating Engineering Society Roadway Practice

Current Conditions

MH
Metal Halide

404

LED
Light-Emitting Diode

8,384

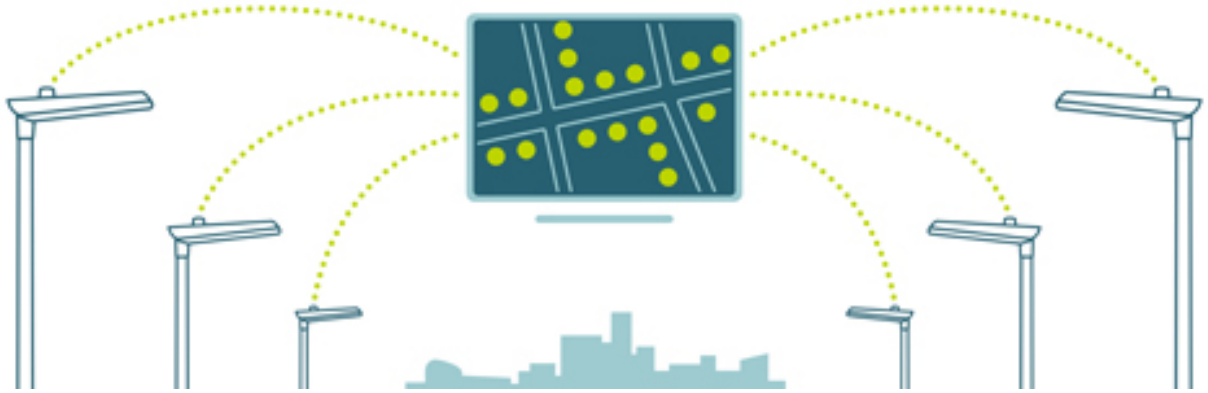
HPS
High Pressure Sodium

33,916

LED Smart Nodes

Smart Nodes allow staff to:

- Monitor energy usage
- Remotely dim and set schedules
- Receive outage reports



Going Forward: LED Conversion

Option 1: Mass Conversion with Debt Financing

- Replace all HPS and Metal Halide as one project
- **Cost Estimate**: $13M+ (installed by outside contractor)
- **Interest Costs**: $1.6M - $4.5M
- **Total Cost**: $14.6M - $17.5M (Does not include any Smart Nodes which are approx. $250 per node per pole)
- Consultant found it would take approximately **16 years** for Salt River Project payback with energy savings

Note: City of Mesa Energy Resources staff evaluating current streetlight rates

Going Forward: LED Conversion

Option 2: 7-Year In-House Conversion

- Utilize internal staff and utilize Transportation funding
- Phased approach will provide flexibility to adapt the latest technology
- **Cost Estimate**: $6.8M (only includes Smart Nodes for Desert Uplands and Lehi)
- **Interest Costs**: $0
- Assumes replacing approximately 4,850 fixtures per year for 7 years
- Smart Nodes for Lighting Zones 2/3/4 would add $10M to Cost Estimate

Note: No labor costs are included in the "Cost Estimate" as this option would utilize existing in-house staff

Staff Recommendation

Staff recommends that Council authorize the following as recommended by SAT:

- Option 2 (7-Year In-House Conversion)
- Amending Mesa City Code to allow for reduced roadway lighting to accommodate Lighting Zones

Questions/Discussion