CLANTON & ASSOCIATES

SALIDA STREET LIGHTING

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OUTLINE

- EXPERIENCE & QUALIFICATIONS
- STREET LIGHTING EVALUATION OVERVIEW
- EXAMPLE PROJECT GOALS
- EXAMPLE PROCESS & PHASING
- PLANNING FOR THE FUTURE
- SUMMARY & QUESTIONS

EXPERIENCE & QUALIFICATIONS

LIGHTING MASTER PLANS

- Salt Lake City, UT
- City of South Salt Lake, UT
- City of Bozeman, MT
- City & County of Denver, CO
- City of Pueblo, CO
- City of Westminster, CO
- City of Anchorage, AK
- City of San Diego, CA
- City of San Jose, CA
- City of Seattle, WA
- UC Berkeley, CA
- Olde Town Arvada, CO
- Aurora Light Rail Corridor, CO
- Three Springs, Durango, CO

PUBLIC REALM LIGHTING DESIGN

16th St Mall, Denver, CO

Denver Union Station, Denver, CO

THOUGHT LEADERSHIP

- Illuminating Engineering Society
- International Dark Sky Association
- US Green Building Council
- WELL Building Institute
- California Title 24 Energy Code
- City Lighting Ordinances
- Smart Cities
- Renewable Energy & MicroGrid

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PHASE 1: STREET LIGHTING EVALUATION

Evaluate Existing Street Lighting

Develop Street Lighting Options

Life Cycle Costs

PHASE 2: STREET LIGHTING MASTER PLAN

Public & Stakeholder Engagement

Develop Street Lighting Master Plan

Priorities and Phasing

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PHASE 1: STREET LIGHTING EVALUATION

1 Develop Street Lighting Options

DEFINE PROJECT GOALS

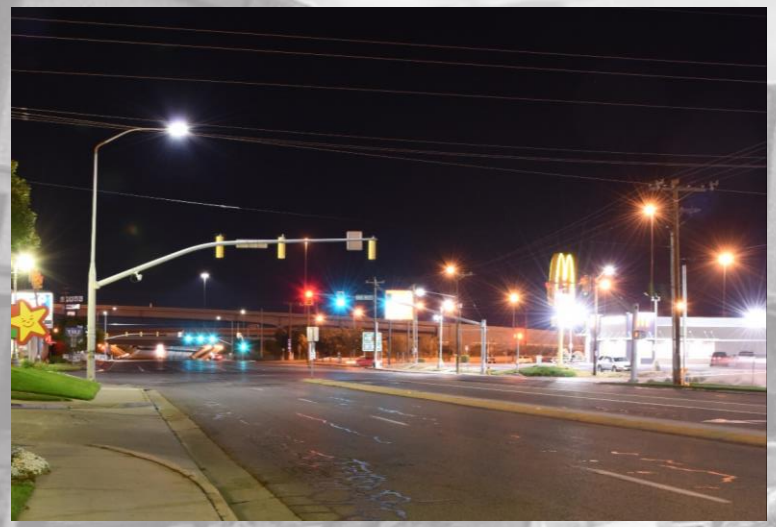
- Visibility
- Safety & Security
- Health & Wellbeing
- Design Aesthetics
- Initial Costs
- Long Term Life Cycle Costs
- Maintenance
- Energy
- Light Pollution
- Light Trespass
- Wildlife
- Environment

PHASE 1: STREET LIGHTING EVALUATION

1 Evaluate Existing Street Lighting

PHOTOGRAPH & MEASURE

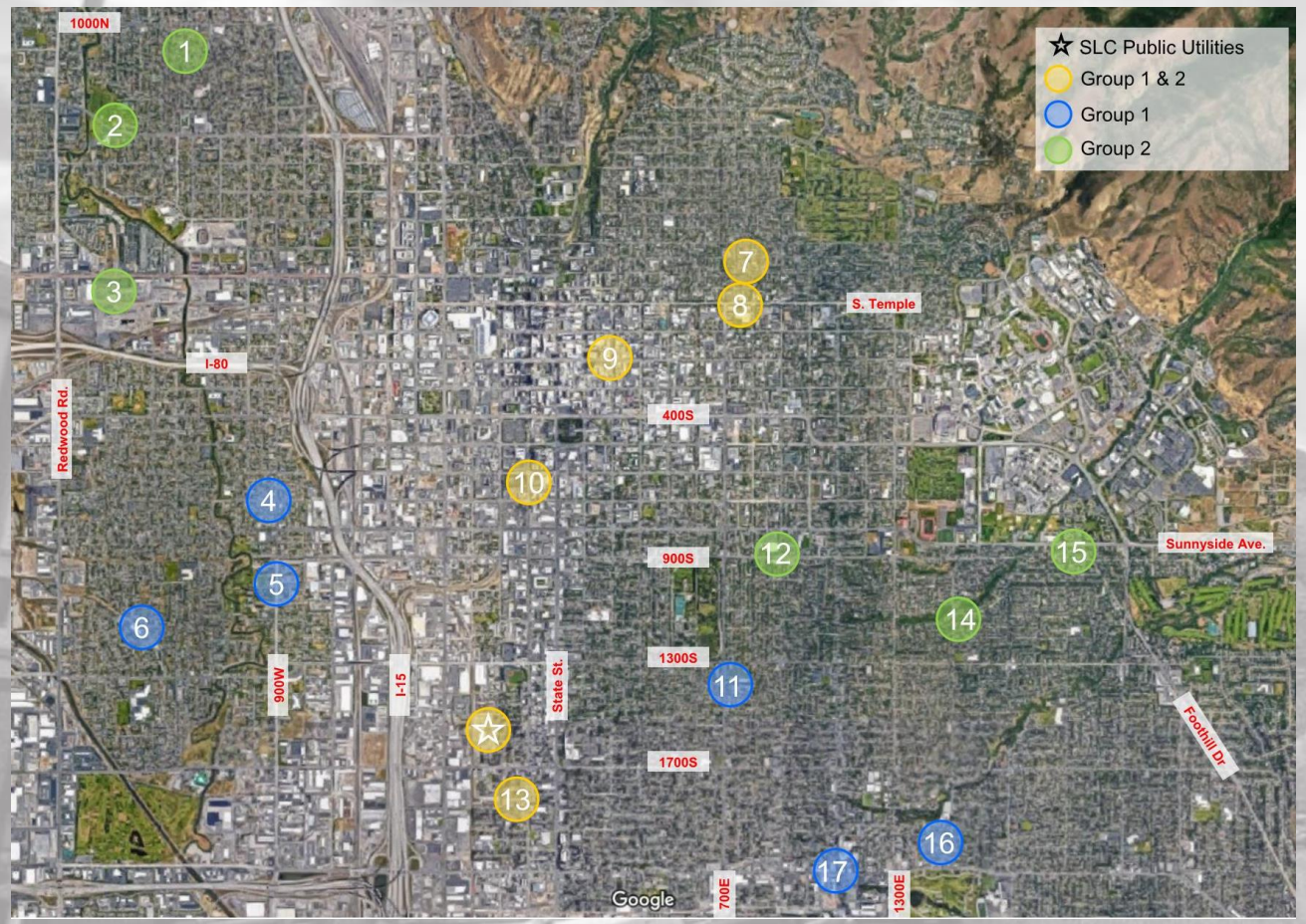
Acceptable Conditions	Moderately Acceptable Conditions	Poor Conditions
Minimal Improvements: 1-for-1 Luminaire Replacement on Existing Poles	**Supplemental Improvements**: 1-for-1 Luminaire Replacement on Existing Poles and Supplement with Additional Light Poles	**Comprehensive Improvements**: Extensive Additional Lighting and Electrical Required



PHASE 1: STREET LIGHTING EVALUATION

1 Evaluate Existing Street Lighting

STAKEHOLDER LIGHTING SURVEYS



Independent Web-based Map Survey

Example Questions

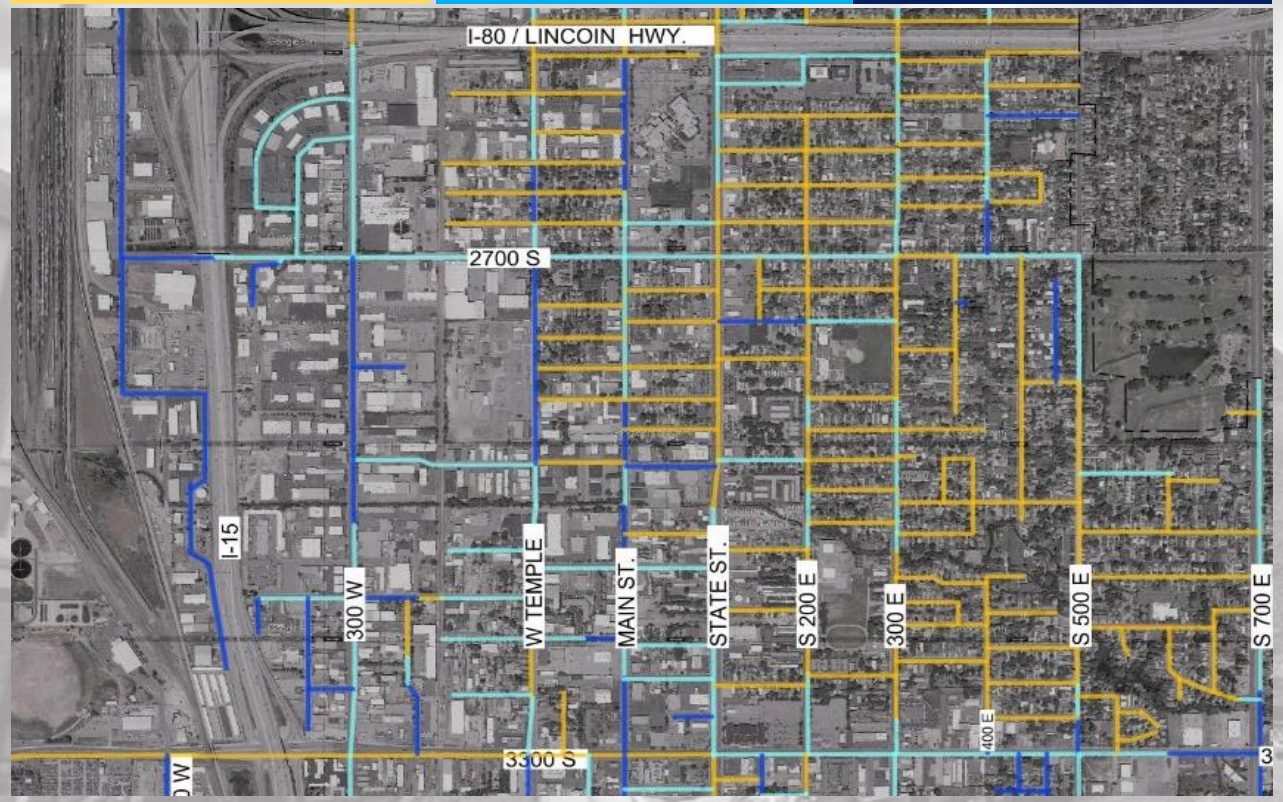
- Would you feel safe walking here at night?
- Is the lighting comfortable?
- Is there enough light on the street?
- Is there enough light on the sidewalk?

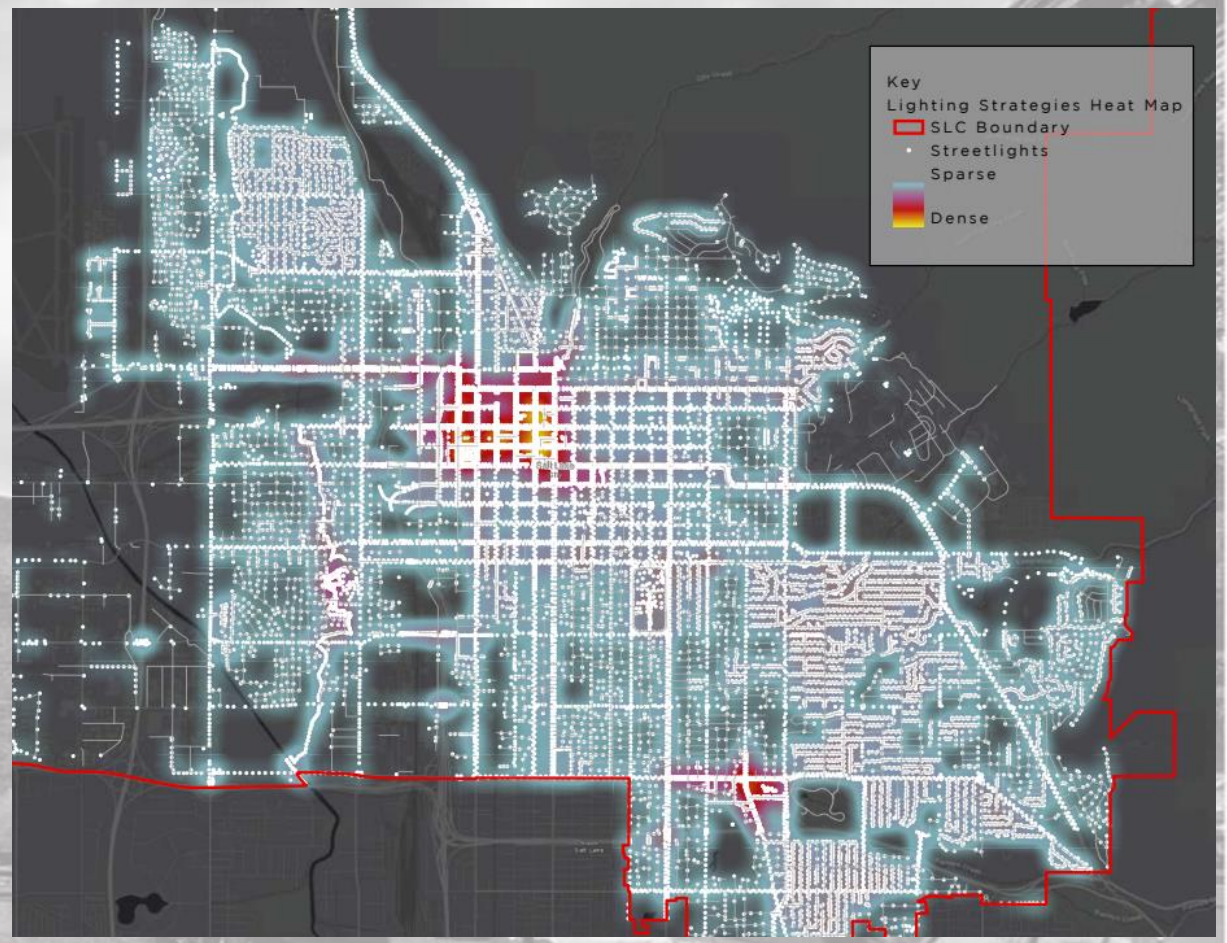
PHASE 1: STREET LIGHTING EVALUATION

1 Evaluate Existing Street Lighting

MAPPING OF EXISTING CONDITIONS

Acceptable | **Moderate** | **Poor**

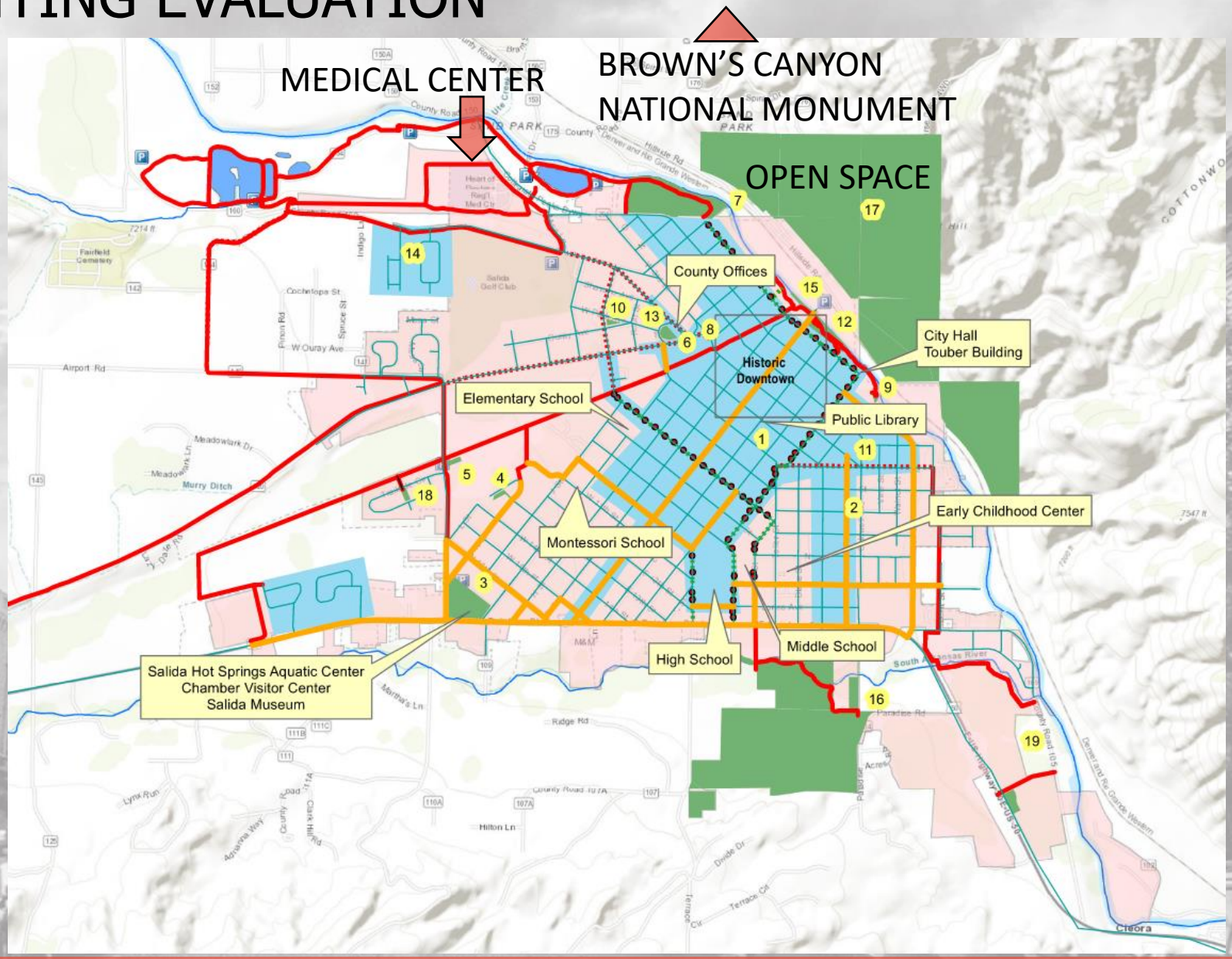




PHASE 1: STREET LIGHTING EVALUATION

Pedestrian Facilities

- Pedestrian_Designated_Priorities_Routes
- Trails
- Safe Routes to School
- Sharrows
- Bike Lanes
- General Sidewalk C&G Area



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PHASE 1: STREET LIGHTING EVALUATION

2 Develop Street Lighting Options

CREATE CHARACTER DISTRICTS

F ST. BRIDGE

Historic Pedestrian

F ST. DOWNTOWN

Historic Downtown

US-50 / E. RAINBOW BLVD

Transitional

1000 F ST. CRESTONE

Industrial

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PHASE 1: STREET LIGHTING EVALUATION

2 Develop Street Lighting Options

CREATE LIGHTING WARRANTS

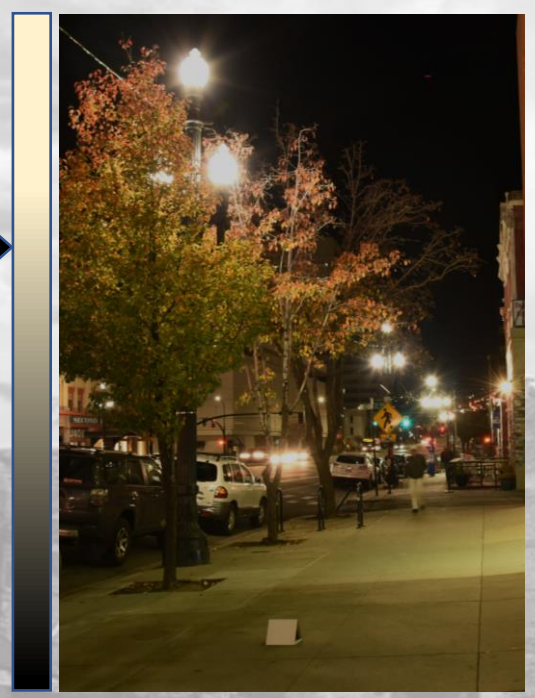
Road Classification	Adjacent Land Use	High Pedestrian Conflict Area	Medium Pedestrian Conflict Area	Low Pedestrian Conflict Area
Arterial	Commercial	Continuous	Continuous	Non-Continuous
	Industrial	Continuous	Continuous	Non-Continuous
	Residential	Continuous	Non-Continuous	Non-Continuous
	Open Space	Continuous	Non-Continuous	Non-Continuous
Collector	Commercial	Continuous	Continuous	Non-Continuous
	Industrial	Continuous	Continuous	Non-Continuous
	Residential	Continuous	Non-Continuous	Non-Continuous
	Open Space	Non-Continuous	Non-Continuous	Not Warranted
Local	Commercial	Continuous	Non-Continuous	Non-Continuous
	Industrial	Continuous	Non-Continuous	Non-Continuous
	Residential	Non-Continuous	Non-Continuous	Non-Continuous
	Open Space	Non-Continuous	Non-Continuous	Not Warranted

PHASE 1: STREET LIGHTING EVALUATION

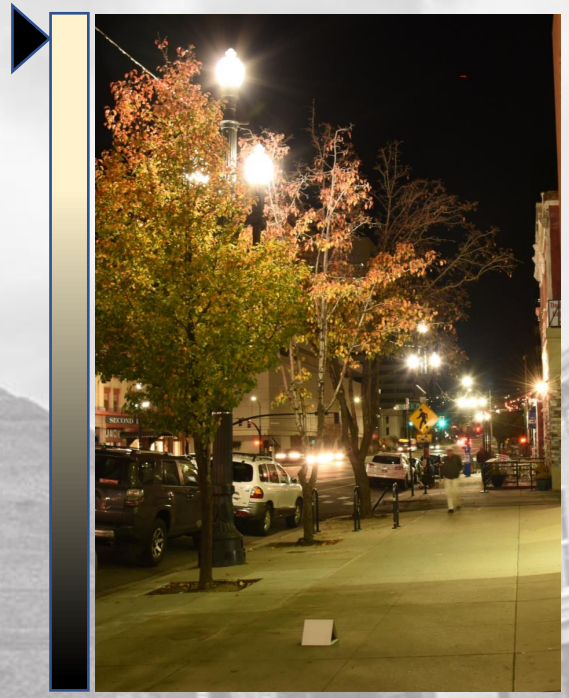
2 Develop Street Lighting Options

ADAPTIVE LIGHTING CONTROLS

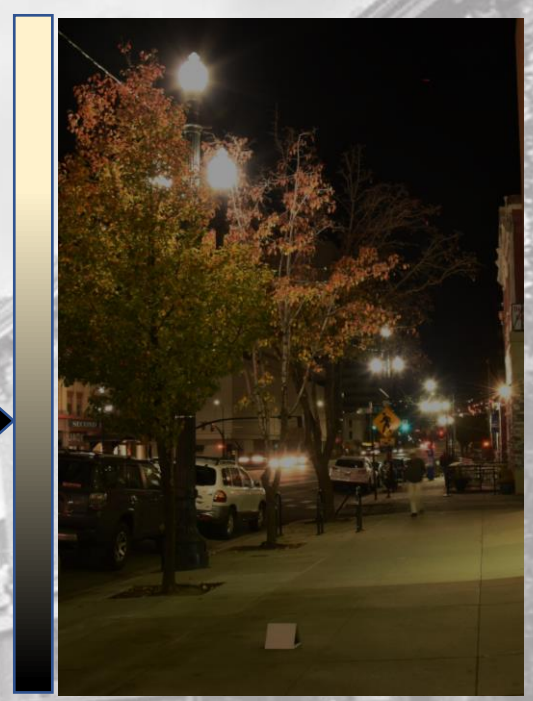
Dusk to 10pm
Light to Criteria



10pm to 12am
Reduce Pedestrian Criteria



12am to 2am
Light to Criteria

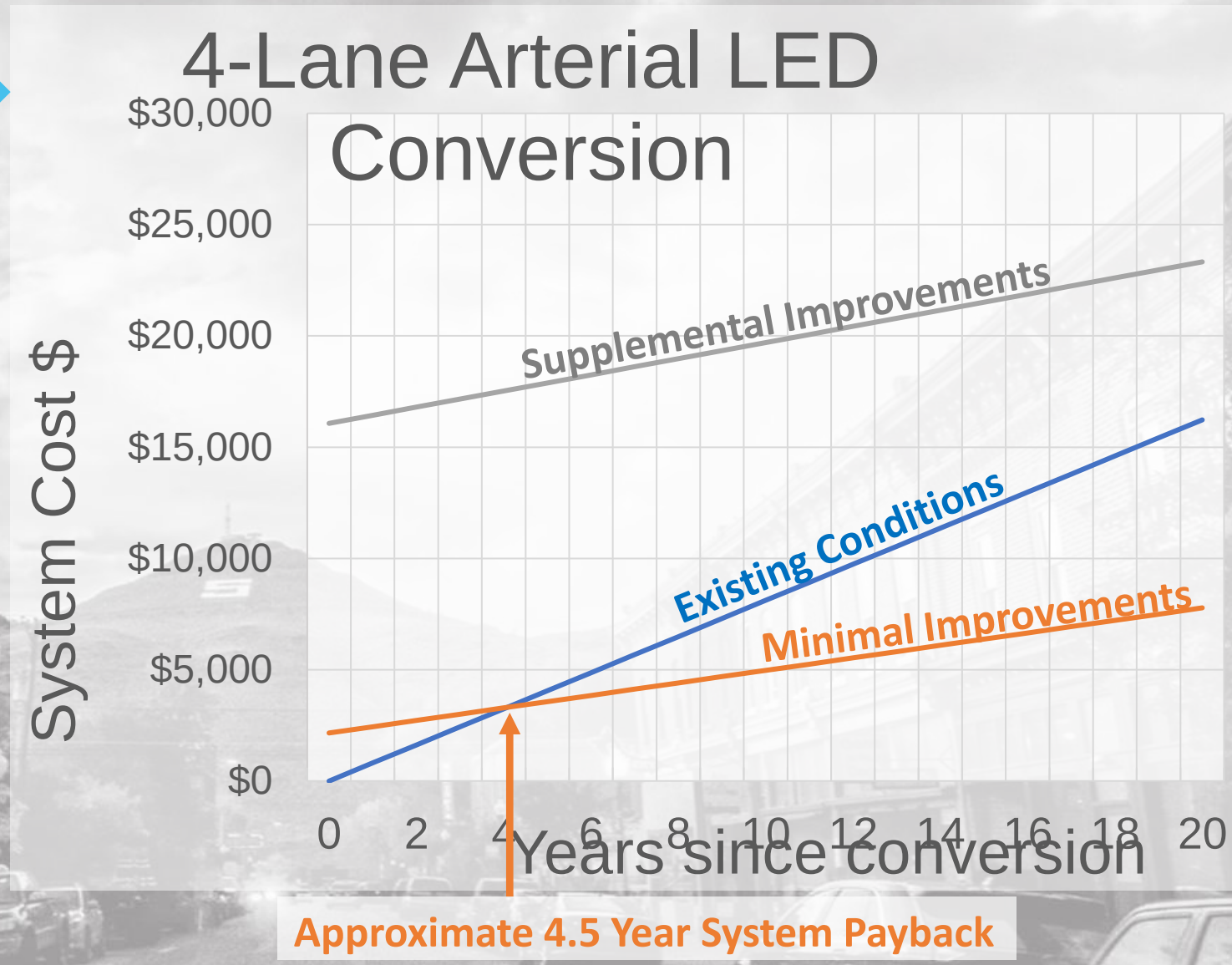


2am to Dawn
Reduce to Low Ped Criteria

PHASE 1: STREET LIGHTING EVALUATION

3 Life Cycle Costs

- **Initial project cost**
- **Annual maintenance cost**
- **Annual energy cost**
- **Net present value system cost over 10 years**
- **Total savings in net present value over 10 years**
- **System payback (yrs)**



PHASE 2: STREET LIGHTING MASTER PLAN

4 Public & Stakeholder Engagement

GATHER INPUT FOR GOALS & OUTCOMES

Public & Stakeholder Meetings

- **Affirm Goals & Priorities**
- **Gather Feedback**

Pilot Demonstrations

- **Mock-ups**
- **Stakeholder survey of new LED lights**
- **Dimming Levels**
- **Color Temperature**
- **Lighting Control System**

5 Develop Street Lighting Master Plan

LIGHTING STRATEGIES

	Street Lighting	Pedestrian Lighting	Public Transportation	Accent Lighting	Feature Lighting	Luminaire/Style	Luminaire	Electrical Needs	Auxiliary Features
Downtown	✓	✓	☑ Bus Stops ☑ Rail Stations	✓	✓	Contemporary - Landscape Forms Torres		☑ Event Power ☑ Stage Power ☑ Holiday Receptades	☐ Flag Pole Mount ☑ Planters ☑ Banner Arms
East Streetcar	✓	✓	☑ Bus Stops ☑ Rail Stations	✓		Contemporary - Landscape Forms Leo		☐ Event Power ☐ Stage Power ☑ Holiday Receptades	☐ Flag Pole Mount ☐ Planters ☑ Banner Arms
State Street	✓		☑ Bus Stops ☐ Rail Stations			Historic - Holophane Esplanade		☐ Event Power ☐ Stage Power ☐ Holiday Receptades	☑ Flag Pole Mount ☐ Planters ☑ Banner Arms
Corridor Commercial	✓	✓	☑ Bus Stops ☐ Rail Stations			Industrial - Cobrahead & We-ef ASP500		☐ Event Power ☐ Stage Power ☐ Holiday Receptades	☑ Flag Pole Mount ☐ Planters ☑ Banner Arms
Heavy Traffic Industrial	✓		☑ Bus Stops ☐ Rail Stations			Industrial - Cobrahead		☐ Event Power ☐ Stage Power ☐ Holiday Receptades	☐ Flag Pole Mount ☐ Planters ☐ Banner Arms

5 Develop Street Lighting Master Plan

LIGHTING STRATEGIES

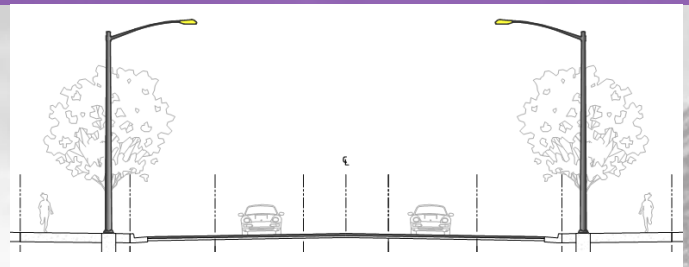

Commercial

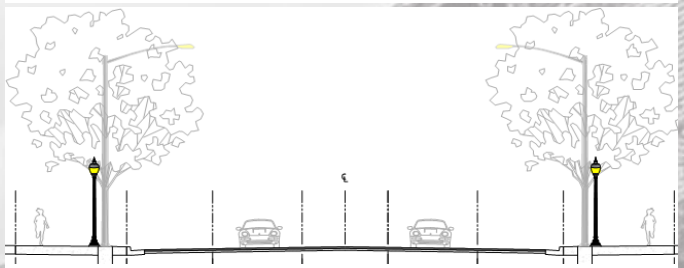

Industrial

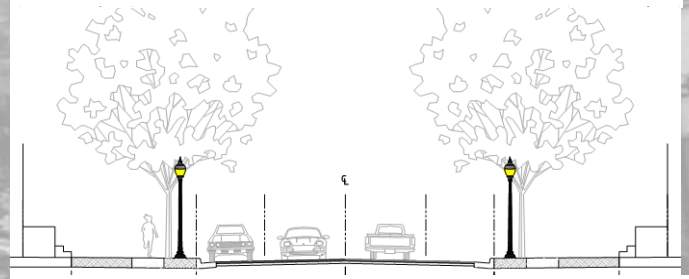

Retail / Restaurant / Civic


Residential


Open Space


Street Lighting Only


Street & Pedestrian Lighting


Pedestrian Lighting Only

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5 Develop Street Lighting Master Plan

LIGHTING CRITERIA

Lighting Criteria Based on Pedestrian Activity Level

Pedestrian Activity Level	Thresholds
Low	<10 people per hour
Medium	10 to 100 people per hour
High	100+ people per hour

Pedestrian Activity	Roadway		Sidewalks
	Average Luminance (cd/m2)	**Luminance Avg:Min Ratio**	**Average Illuminance (fc)**
High[3]	**1.2**	**3.0**	**1.0[4]**
Medium	**0.9**	**3.0**	**0.5**
Low	**0.6**	**3.5**	**0.4**

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5 Develop Street Lighting Master Plan

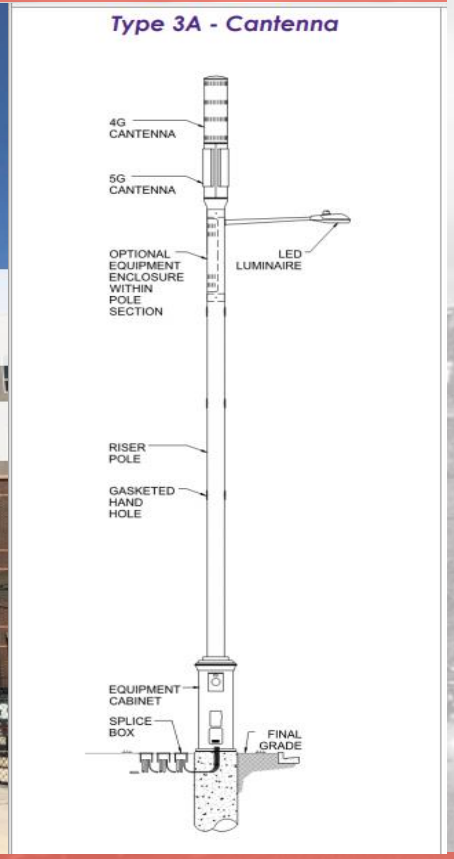
LIGHTING SPECIFICATIONS

Strategy	Commercial	Retail/ Restaurant/ Civic	Industrial	Multifamily Residential	Single Family Residential	Open Space & Wildlife Habitat
Example Lighting Strategy	Continuous Street	Continuous Street Continuous Ped	Int. Only Street	Continuous Street Non-Cont. Pedest.	Int. Only Street Non-Cont. Pedest.	Non-Continuous
Shielding (Backlight)	B3	B3	B1	B2	B1	B1
Shielding (Uplight)	U0 – U2	U0 – U2	U0	U0	U0	U0
Spectrum	≤3000 K	≤3000 K	≤2200 K	≤3000 K	≤2700 K	≤2200 K
Dimming	Yes	Yes	Yes	Yes	Yes	Yes
Part-night Lighting	No	No	Yes	No	No	Yes
Intensity	Manual & Network Dimming	Manual & Network Dimming	Manual & Network Dimming	Manual & Network Dimming	Manual & Network Dimming	Manual & Network Dimming

5 Develop Street Lighting Master Plan

OTHER CONSIDERATIONS

5G Small Cell



Smart Cities

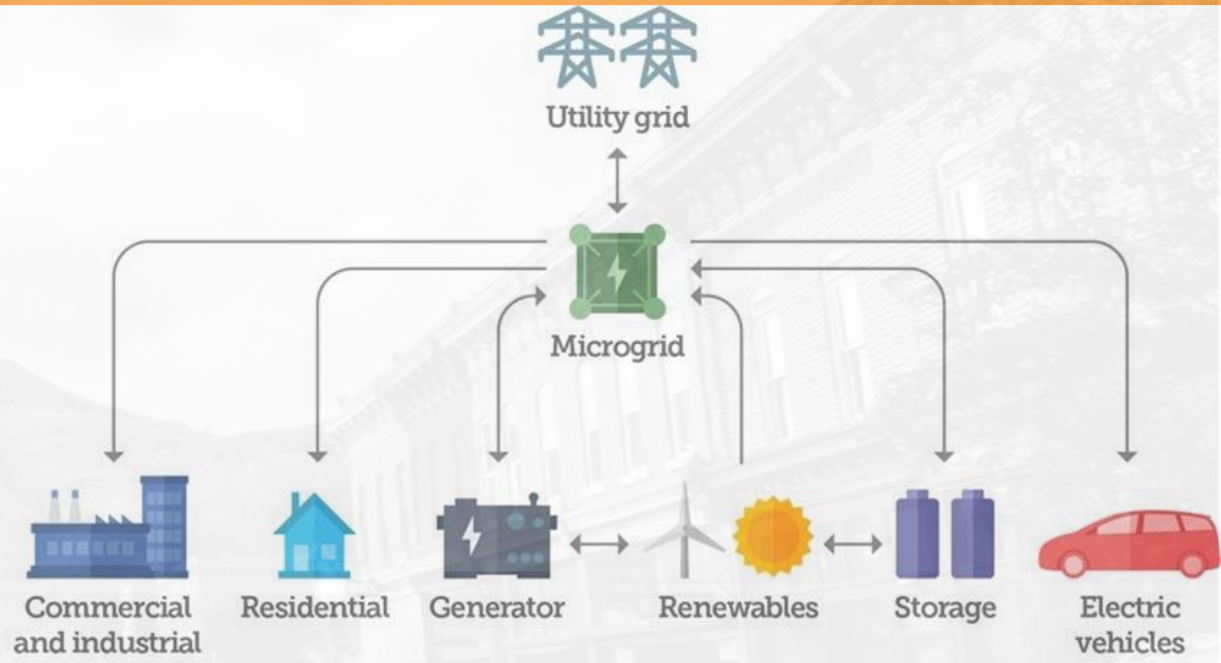
- **Control pilot program**
- **Asset management control integration**
- **Adaptive lighting controls**

5 Develop Street Lighting Master Plan

OTHER CONSIDERATIONS

Solar Power

MicroGrid



6 Priorities and Phasing

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QUESTIONS?

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THANK YOU!

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