

Engineering Standard Updates



August 25, 2020

Street Lighting

Summary of Updates to
Chapter 13-12





Street Lighting to Enhance Dark Skies



• SLEDS project timeline

- Limited Field Testing – 89 North, West Street... - 2013
- Dark Skies Conference – ‘Blinded by the Light’– August 2014
- SLEDS
 - IGA with ADOT - Spring 2015
 - Hired Monrad Engineering - Fall 2015
 - FMPO – Surface Transportation Program funding
 - Cityscape – Spring 2018
 - Test Fixtures – Spring 2018
 - Public Survey and Neighborhood Door Hangars – Summer 2018
 - Lighting Tour – Summer 2018
 - arsTECHNICA article, NPR interview – Fall 2019
 - City Council Work Sessions: May 2017, March 2018, August 2019, August 2020
 - Engineering Standards Adoption – September 2020

ars TECHNICA BIZ & IT TECH SCIENCE POLICY CARS GAMING & CULTURE STORE

SHINE ON YOU CRAZY DIODE —

How Flagstaff, Arizona, switched to LEDs without giving astronomers a headache

The bluish light is efficient but worse for preserving dark skies.

SCOTT K. JOHNSON - 10/22/2019, 10:01 AM



© Scott K. Johnson

Enlarge / A couple of different types of dark-sky-friendly LED streetlights.



LED Lighting Equipment

Low Pressure Sodium to LED

- The Amber LED solution for Flagstaff:
 - Narrow Band Amber replaces Low Pressure Sodium and High Pressure Sodium
 - New construction and most retrofit locations
 - LEDs provide better optical distribution
 - More uniform light on the ground
 - Reduced light output per fixture – opportunity and constraint
 - Comparable power consumption across the City
 - Total Lumen reduction across the City
 - Future options – dimming, remote monitoring...



Residential Roadway Lighting

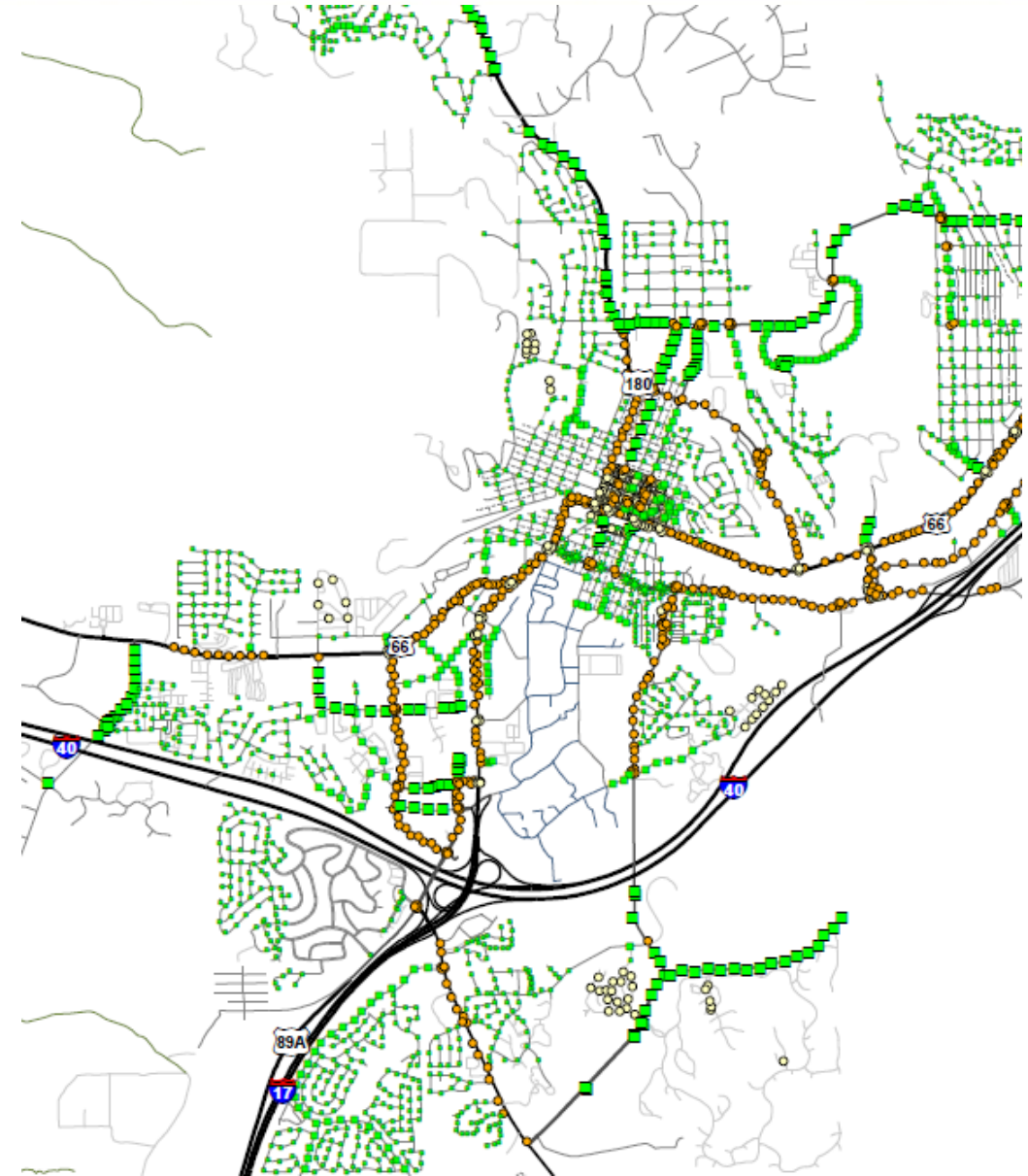
- Existing standard requires 300' pole to pole spacing
 - With emphasis on hazards such as curves, intersections and end of road conditions
- Proposed Standard
 - Urban areas – 300' spacing
 - Rural and Suburban
 - Lighting only at intersections with higher roadway types
 - Exception may be granted with acceptance of 20 year O&M agreement





Planned Retrofit

- Detailed review by the SLEDS team of all 3500 existing fixtures
- Existing pole and underground infrastructure is maintained
- Funding is allocated through Proposition 419
 - \$8.5 million over 7 years
- Mapping defines the translation from existing High Pressure Sodium and Low Pressure Sodium to Narrow Band Amber and Phosphor Converted Amber
- Green = Narrow Band Amber
 - All of the minor streets plus some major streets
- Orange = Phosphor Converted Amber
 - Subset of the major streets



Requested Modifications to Existing System

- A step by step process for requests for modification to the existing street lighting system.
- This code addition closely follows current internal processes.



LED Lighting



Traffic Signals, Signing, Markings, & Fiber Optic Conduit

Summary of Updates to
Chapter 13-16





Traffic Signing and Marking

- Streetlight detail
- Street Name sign detail
- Symbols, Legends and Markings

GENERAL NOTES

1. ALL STREETLIGHT POLES SHALL HAVE A GROUND ROD INSTALLED. WHERE A GROUND ROD CAN NOT BE DRIVEN, AN APPROVED ALTERNATE GROUND SHALL BE USED.
2. AN APS POLE BAND ADAPTOR (APN 33701054) WITH A SIMPLEX FITTING IS REQUIRED FOR DOUBLE MAST ARM APPLICATIONS.
3. POLES THAT HAVE MORE THAN ONE LUMINAIRE REQUIRE A SEPARATE CIRCUIT WITH FUSING FROM THE JUNCTION BOX TO EACH LUMINAIRE.
4. SEE 12-05-010 PAGE 3/3 FOR IN-LINE FUSE FOR UNDERGROUND FEEDS.
5. SEE 12-05-010 PAGE 3/3 FOR OVERHEAD ATTACHMENTS.
6. ADJUST PHOTO EYE TO FACE NORTH.

NOMINAL MOUNTING HEIGHT

LUMINAIRE OUTPUT	MOUNTING HEIGHT (ft)	POLE (ft)	MAST ARM
2000 lumens	26	30	20" x 6'
4000 lumens	26	30	20" x 6'
6000 lumens	39	38	8' x 8'
9000 lumens	39	38	8' x 8'

City of Flagstaff
ENGINEERING DETAIL

STREETLIGHT INSTALLATION DETAILS

DETAIL NO. 12-05-010 REVISION DATE: 01/22/2020 1/3



GENERAL NOTES

1. POST: PRE-FORMED SQUARE 1-3/4" X 1-3/4" X 12GA X 3'0" OR 4'0" NOMINAL LENGTH; TO BE INSERTED A MINIMUM OF 12" INTO 2" X 2" POST FROM DETAIL 16-05-030
2. SIGN BLADE: STREET NAME SIGN, BLANK DETAIL 16-05-010, EACH POST SHOULD HAVE 2, 4, OR 6 SIGNS PER POST.
3. BOLT ASSEMBLY: 5/16" X 3" BOLT, TWO 5/16" WASHERS (BETWEEN HEX BOLT HEAD AND SIGN, AND BETWEEN NUT AND SIGN), 5/16" NYLON LOCK NUT
4. RIVET AND SPACER ASSEMBLY: SIMI FASTENING SYSTEMS PART NO. VCR187-34 1/4" DIA CHERRY MATE RIVET WITH VCS237-1-3/4" LONG HOLLOW TUBE SPACER
5. FASTENER ASSEMBLY: 3/8-16UNC X 3-1/2" LONG CADMIUM PLATED HEX HEAD BOLT WITH LOCKING NUT AND FLAT WASHERS

SIGN BLANK HOLE LAYOUT DETAIL

City of Flagstaff
ENGINEERING DETAIL

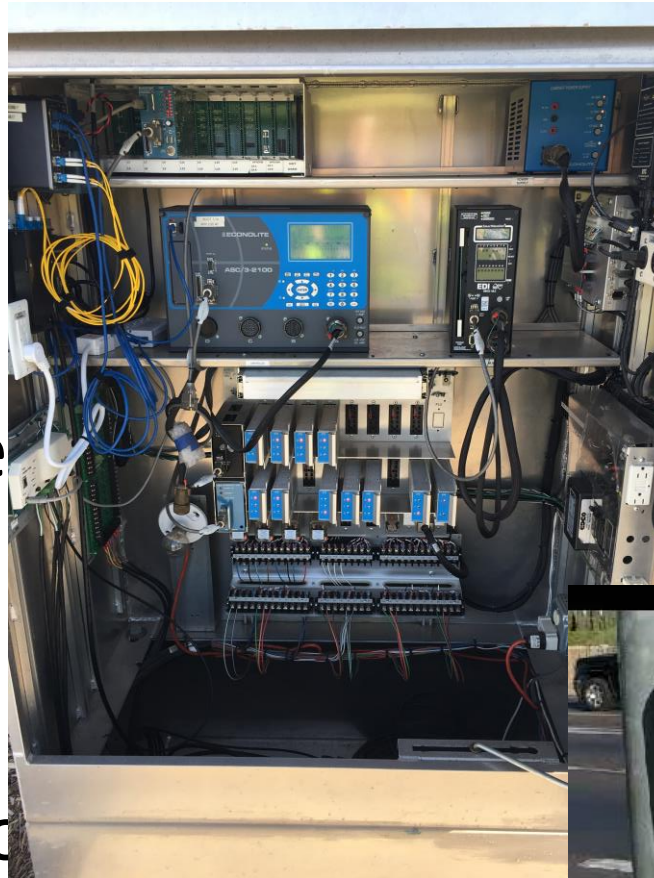
STREET NAME SIGN INSTALL DETAIL

DETAIL NO. 16-05-040 REVISION DATE: 01/22/2020 1/1



Signal Design and Equipment

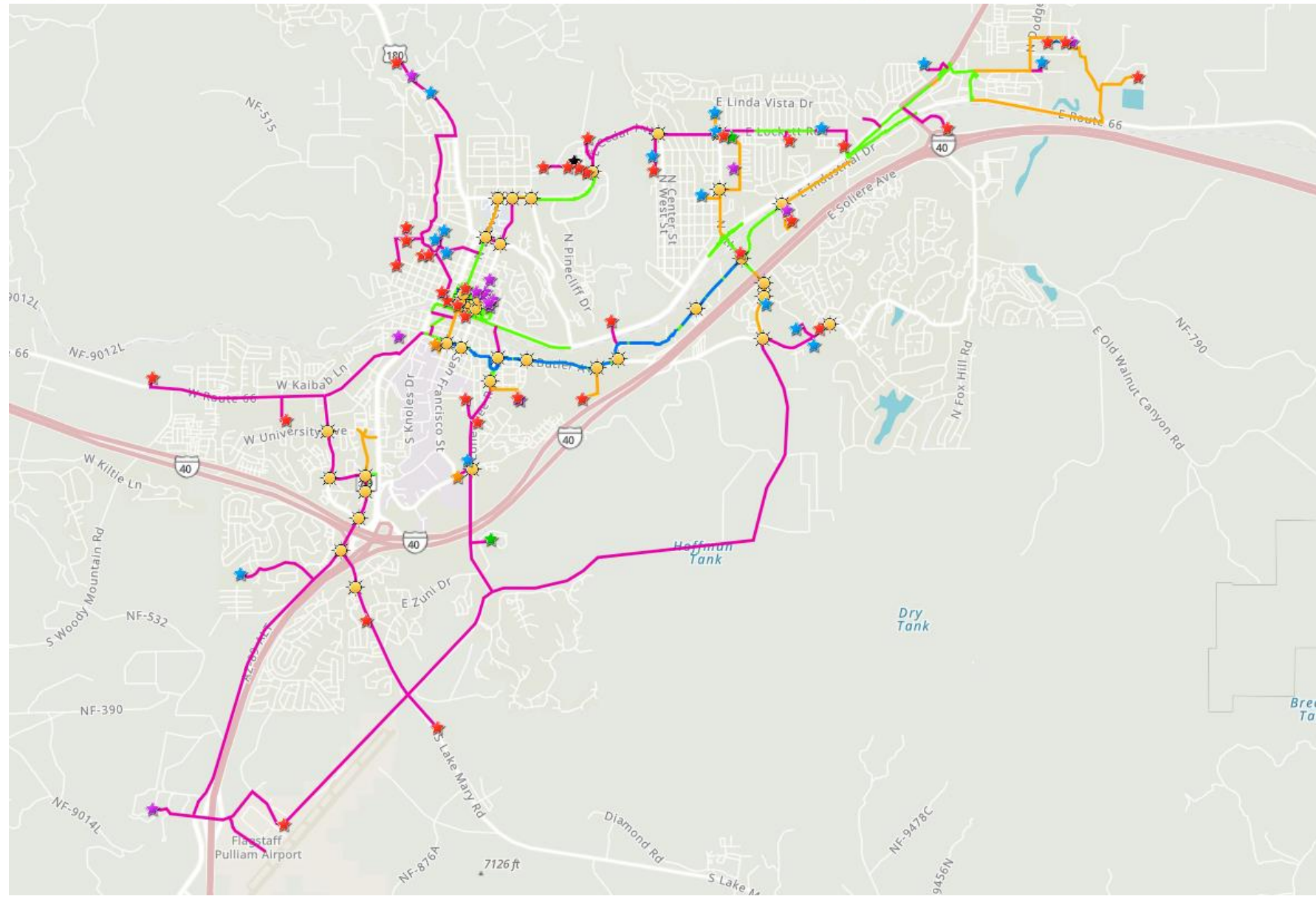
- Specifications for traffic signal controllers
- Fiber Optic termination modules
- Update Uninterruptable Power Supply (UPS) specification
- Accessible Pedestrian Signals (APS) specification
- Update vehicle detection system specification





Fiber Optic Network

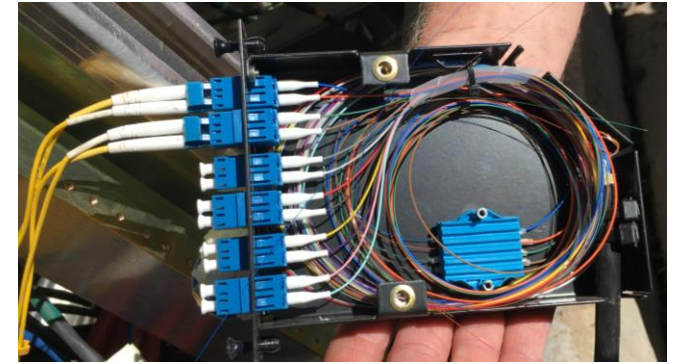
- City fiber optic network end users:
 - City Traffic Signals
 - City Well Sites
 - City Libraries
 - USGS Campus
 - Fire Stations
 - Public Works Yard
 - Utility Sites
 - Housing Sites



Fiber Optic Standards

City Fiber Optic Master Plan

- Mapping
- Details
- Pull boxes
- Conduit bends
- Specifications
 - Number and type of strands
 - Type and size of conduit
 - Terminations



Street Lighting, Signals, Markings and Fiber Optics

**Summary of Updates to
Chapter 13-12 & 13-16
Questions?**

