

PRESIDIO

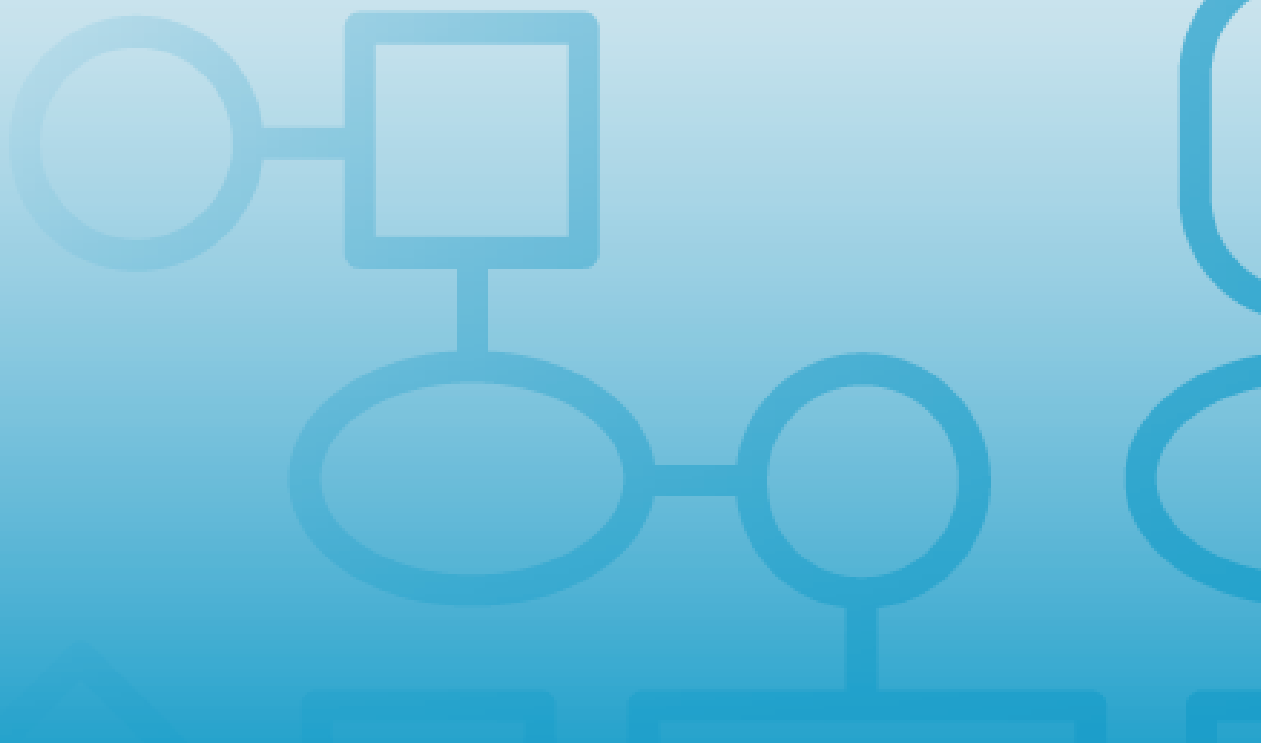
BRIDGEPORT PUBLIC LIBRARY MAIN BRANCH

SYSTEM ENGINEERING REPORT

CEN MERAKI OUTDOOR WIRELESS DESIGN

December 9, 2020

Revision: 1.0



Contents

1. Introduction	3
2. Site Detail	4
3. Wireless Implementation.....	5
3.1. Predicted RF Coverage	5
3.2. Hardware Requirements.....	6
3.3. SSID Configuration	6
3.4. Meraki MR86 Outdoor Location	7
3.5. AP Connectivity to CEN Switch.....	11
3.6. CEN Switch Details	11
4. Meraki MR86 AP and Enclosure Details.....	12
4.1. Meraki MR86 Outdoor AP	12
4.2. Oberon 1021-00 Skybar Wi-Fi Enclosure	13
5. System Engineering Report Acceptance Document	14

1. INTRODUCTION

This Systems Engineering Report documents the detailed planning and design performed by the Presidio Team and JKS Systems as a part of the Outdoor Meraki Wireless Implementation project. As such, this document provides a detailed roadmap for the final solution and sets the stage for a successful Execution/Installation Phase.

Presidio has been engaged by Connecticut Education Network (CEN) to configure and implement a new Meraki outdoor wireless network throughout various locations within the state of Connecticut. It is a project driven by Governor Lamont's "Everyone Learns Initiative" program to provide public wireless access in support of learning and business development through the statewide connectivity infrastructure.

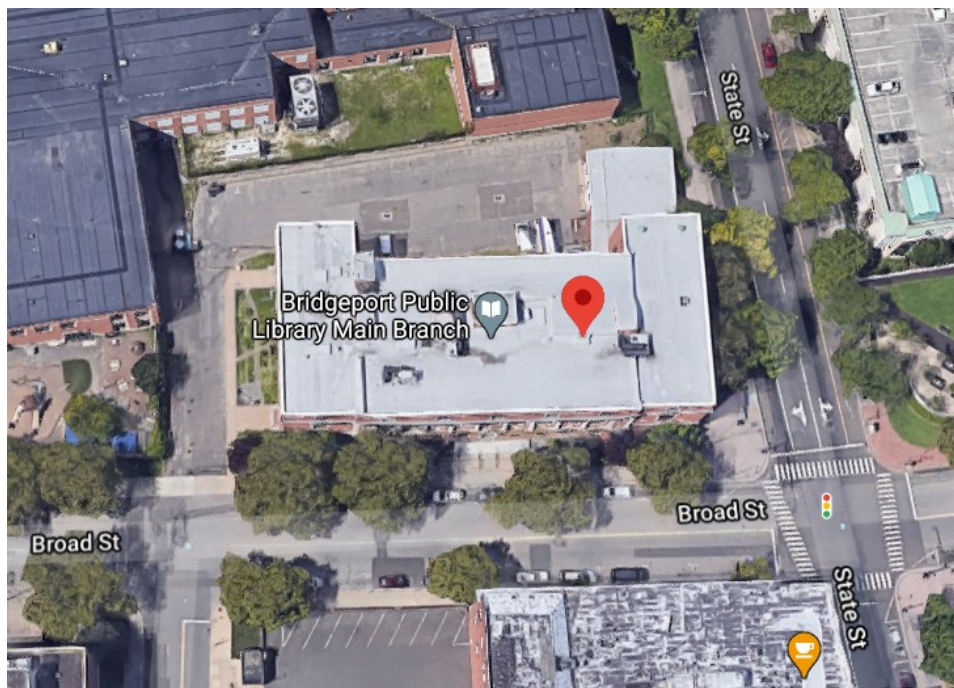
The public wireless infrastructure will provide walk-up / drive-up Internet access throughout multiple urban and rural towns. The public wireless will be accessed at various public libraries, municipal building, and schools throughout Connecticut.

Presidio has teamed with JKS Systems who will provide the internal wiring from the network infrastructure to the outdoor Meraki AP. JKS Systems will also physically install the AP and its enclosure.

This service, installation, and support will be covered by CEN for one year. After the one year period, the Meraki wireless AP will become the property and responsibility of the site where it is installed. The Meraki AP was purchased by CEN with a five (5) year license, so after the initial 1-year period it will continue to operate without additional cost for a further four (4) years.

2. SITE DETAIL

Bridgeport Public Library Main Branch
925 Broad Street
Bridgeport, CT 06604



Site Contact: Elaine Braithwaite
City Librarian
ebraithwaite@bridgeportpubliclibrary.org
203-576-7400 x430

Presidio Contact: Brad MacMahon, Sr. Wireless Engineer
610-684-2958 (o) / 484-948-7642 (c)

JKS Contact: Mark Baker, Operations Manager
860-436-4664 (o) / 860-639-9629 (c)

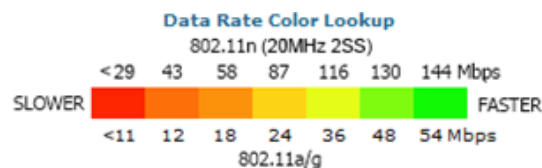
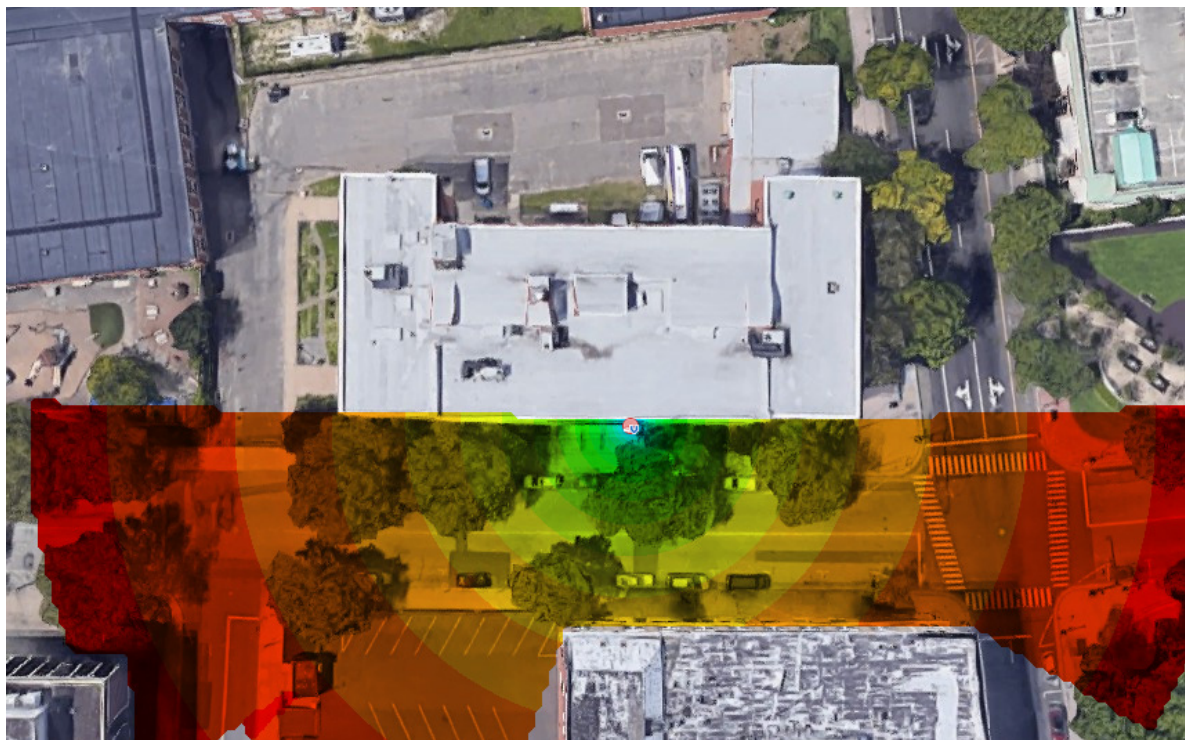
Onsite: November 10, 2020

3. WIRELESS IMPLEMENTATION

3.1. Predicted RF Coverage

The Meraki AP is intended to provide wireless coverage within 30-50 yards when a person is sitting inside a vehicle, and within 50-80 yards for people standing or sitting outside with a clear line-of-sight to the Meraki AP.

Bridgeport Public Library has requested Wi-Fi coverage to the east of the building along Broad Street. The heat map identifies the predicted RF coverage from the Meraki MR86 AP once installed and active in the designated location:



Coverage details:

- Performance is best when the client device is close to the wireless AP, with a clear line-of-site and no obstructions in the path. The farther a wireless device is from the AP, the slower the speeds will become.
- Heatmaps represent 5GHz 802.11a/n performance; 2.4GHz 802.11g/n coverage is typically slightly better, although the 2.4GHz performance is almost always significantly worse than 5GHz performance because of interference. For this reason,

most dual-band client devices will prefer 5GHz when it is available and the signal levels are above a threshold.

- 802.11n speeds assume a 20MHz Channel Width, and a device with support for two spatial streams (still most common in 2020). Areas with no color are predicted to have speeds below 29Mbps (802.11n) or 11Mbps (802.11a/g). Areas in red may have weak coverage, and may not support reliable wireless connectivity.
- 802.11ac clients will support speeds ~20-33% higher than the speeds shown for 802.11n. 802.11ax clients will support speeds ~100% higher than 802.11n.

3.2. Hardware Requirements

Bridgeport Public Library has been allocated one (1) Meraki MR86 exterior AP with an enclosure. Details of the AP and enclosure are provided later in the document. Here is a list of the required parts:

Qty 1: Meraki MR86 Outdoor AP

Qty 2: Meraki MA-ANT-20 Dual Band Antennas, 1 pair (4 antennas total)

Qty 1: Meraki PoE Injector

Qty 1: Terrawave LAN/PoE surge suppressor, p/n TW-SP-1GBPS-10-1T

Qty 1: Oberon 1021-00 Skybar Wi-Fi Enclosure with Screw-on Cover

3.3. SSID Configuration

Two (2) SSIDs will be active on the Meraki AP(s):

- eduroam: Eduroam stands for “education roaming”; it allows users (researchers, teachers, students, staff) from participating institutions to securely access the Internet from any eduroam-enabled institution. This SSID is an encrypted SSID, preventing anyone from eavesdropping on the traffic,.
- CTPublicWiFi: an open (unencrypted) SSID will be configured for use by the public. This SSID will provide open access with no security parameters applied. The users will be prompted to accept CEN’s captive portal terms and conditions (T&Cs) prior to being able to access the internet.

3.4. Meraki MR86 Outdoor Location

The AP and its enclosure will be mounted at the East side of the building facing Broad Street. The AP/enclosure will be mounted between the two windows close to the front entrance. The new Cat6 cable will run from the CEN switch on the 3rd floor. Via a new penetration point at the corner, the conduit will run down the building and follow the 1st floor ledge to the AP. Half-inch EMT conduit will be used for the Cat6 cable run. The conduit will be anchored to the building. A lift is required in order to access the 3rd floor from the outside.



Overhead View



View from Broad Street



Closeup of Outdoor AP Location



Cable run from 3rd Floor “Cube Rm” CEN switch to AP



Conduit run along building to AP

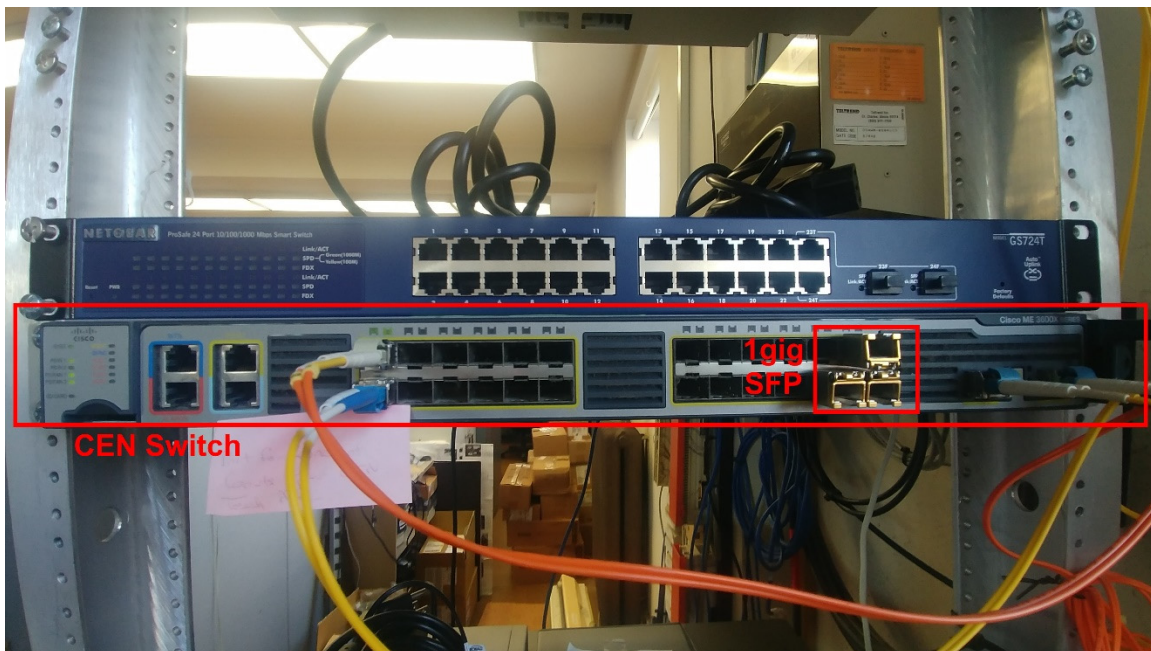
3.5. AP Connectivity to CEN Switch

The Meraki AP will be directly connected to the CEN switch. The following configurations will be made for AP connectivity:

- Direct AP Cat6 Ethernet to CEN switch
- CEN will configure the port accordingly for the AP to obtain an IP address via DHCP

3.6. CEN Switch Details

The CEN switch is a Cisco ME 3600 24-port SFP switch. There are three available 1 Gigabit copper SFPs. The MR86 requires 802.3at power, so it will require a Meraki Power Injector to power the AP.



Bridgeport Public Library CEN Switch

4. MERAKI MR86 AP AND ENCLOSURE DETAILS

4.1. Meraki MR86 Outdoor AP

Full details for the Meraki MR86 AP can be found here:

https://documentation.meraki.com/MR/MR_Overview_and_Specifications/MR86_Datasheet

The key physical details:

- Physical dimensions: 12" x 6" x 2.25", not including cable gland, mounts or antennas
- About 18" tall with antennas
- Weight: 3.3 pounds
- Shown with Meraki Dual-Band Dipole Antennas below



Meraki MR86 AP with Antennas

4.2. Oberon 1021-00 Skybar Wi-Fi Enclosure

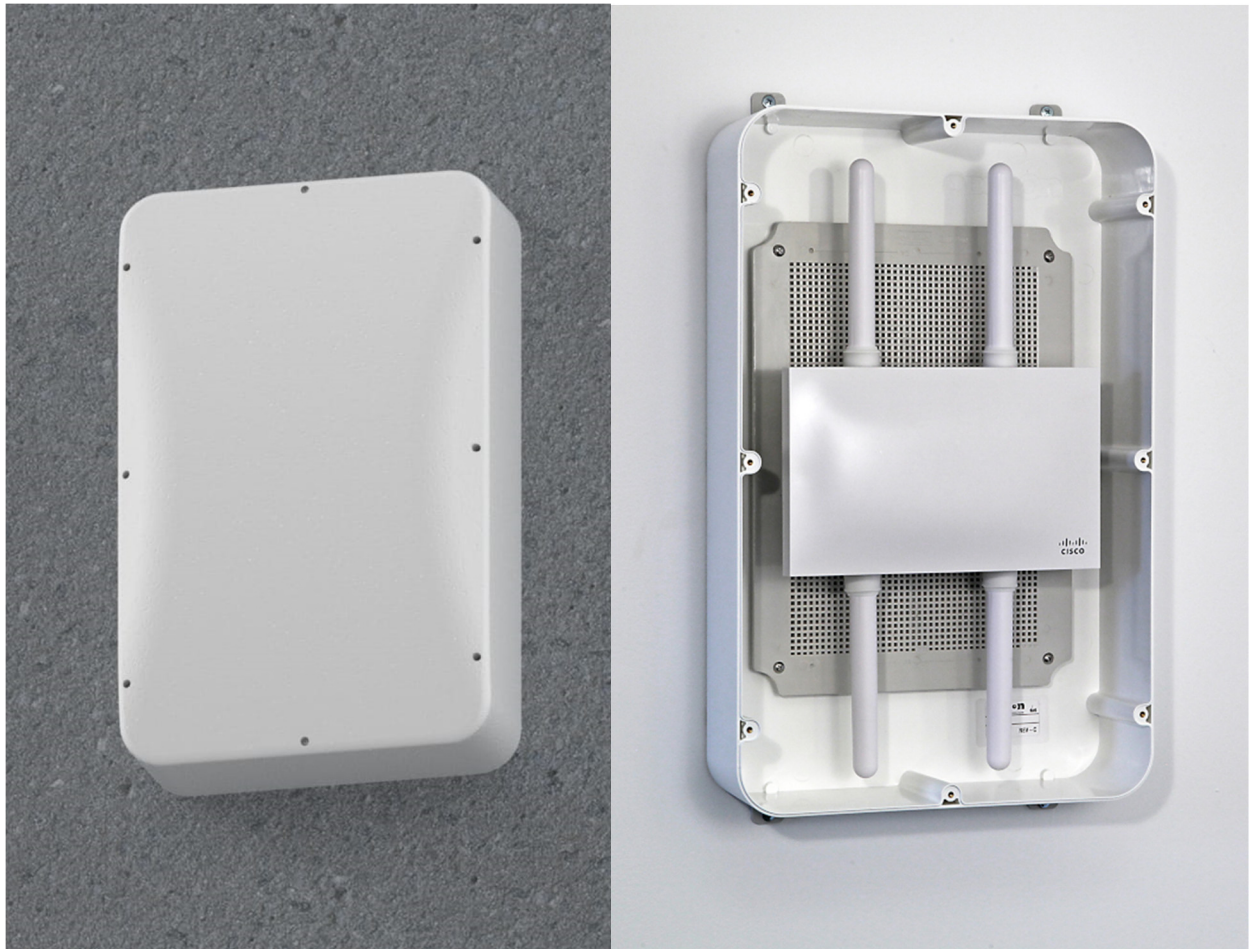
Oberon 1021-00 21 in. Skybar NEMA 4 Plastic Wi-Fi Access Point Enclosure with Opaque Screw-on Cover

- Exterior Size: 13.5" x 21" x 5.5"
- Color: White
- Paintable

The enclosure will protect the AP from damage, and can be painted to “blend in” with the façade of the building exterior using any non-metallic paint (or possibly a vinyl wrap).

Painting or wrapping the enclosure is the responsibility of the site.

Full details of the enclosure can be found here: <https://oberoninc.com/products/1021-00/>



Oberon 1021-00 Enclosure (closed on left, open on right)

5. SYSTEM ENGINEERING REPORT ACCEPTANCE DOCUMENT

The System Engineering Report outlines the plans and installation details for the Client. Acceptance of this document by the Client is required prior to equipment installation. Network Engineers from Presidio and JKS Systems will use this document as a guide to install and configure the outdoor wireless solution. Any changes to the design after acceptance will be handled according the change management procedures defined in the CEN Statement of Work.

Client Information	<i>Presidio Job ID: 3001072000556</i>	
Site Name Bridgeport Public Library Main Branch	Project / Task Name CEN Outdoor Wi-Fi Deployment	
Address 925 Broad Street	Client Name Elaine Braithwaite, City Librarian	
City, State and Zip Bridgeport, CT 06604	Phone/Email 203-576-7400 x430	Email ebraithwaite@bridgeportpubliclibrary.org
Acceptance		
Client Authorizing Signature and Title		Date