



# Networks of Philly

## Philadelphia's Hidden Network Infrastructure

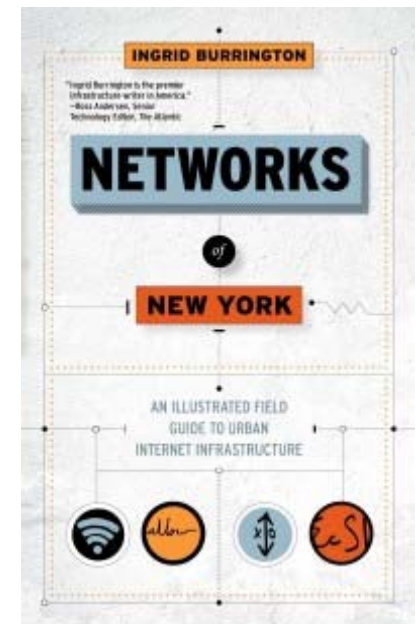
# Who am I?

- Not an expert in anything, but really like networks.
- Probably met me at *Philly 2600*.
- Editor of the *N-O-D-E* zines.
- Run **networksofphilly.org**

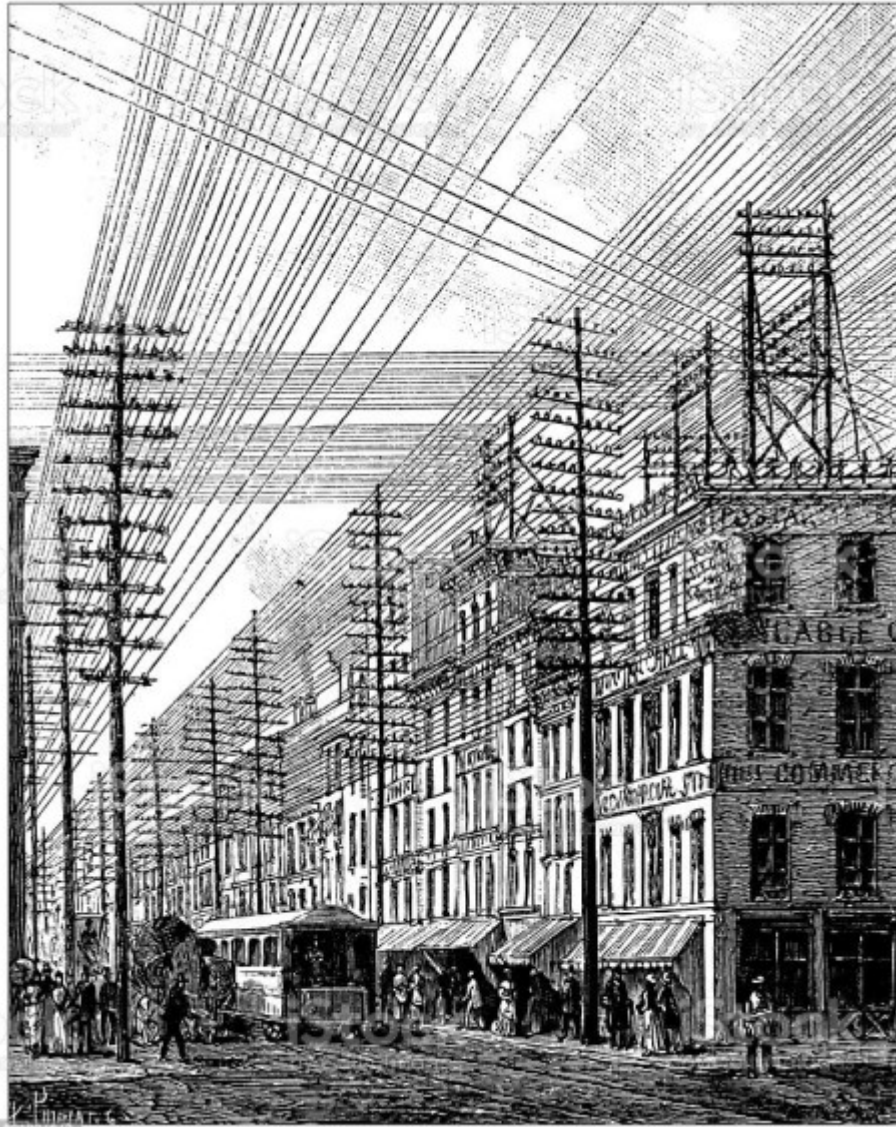


# How did this start?

- Ingrid Burrington's Book, *Networks of New York: An Illustrated Field Guide to Urban Internet Infrastructure* (2016)















# Look at the ground a lot



	<b>RED</b> Electric Power Lines, Cables, Conduit and Lighting Cables		<b>GREEN</b> Sewers and Drain Lines
	<b>YELLOW</b> Gas, Oil, Steam, Petroleum or Gaseous Materials		<b>PURPLE</b> Reclaimed Water, Irrigation and Slurry Lines
	<b>ORANGE</b> Communication, Alarm or Signal Lines, Cables or Conduit		<b>PINK</b> Temporary Survey Marking
	<b>BLUE</b> Potable Water		<b>WHITE</b> Proposed Excavation

## Line Markings



## Marking Gas Lines – High Pressure



## Corridor Markings



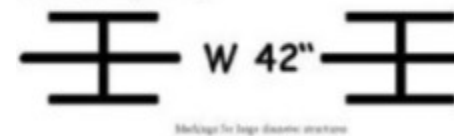
## Marking Termination Point, Dead End, Stub Outs



## Marking Offsets



## Oversized Utility Markings



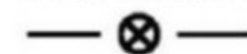
## No Conflict (No utilities within the requested area)



## Conduit Markings



## Marking Buried Splices, Valves, Manholes

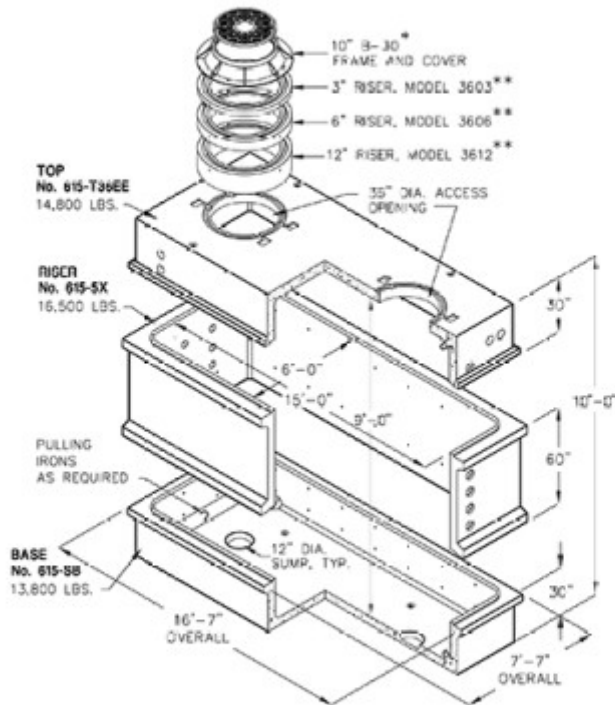




# Manholes

## 615-9 TELEPHONE MANHOLE

6' x 15' x 9' ID.  
MANHOLE



BOX DESIGN LOAD:  
H-20 TRAFFIC  
WITH 1\"/>

FOR COMPLETE DESIGN  
AND PRODUCT INFORMATION,  
CONTACT JENSEN PRECAST.

2/8/25  
615-9.dwg  
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\* SEE HARDWARE/APPLIANCE SECTION  
FOR SPECIFICATIONS.  
\*\* RISERS OPTIONAL. SEE COLLAR/RISER  
SECTION FOR SPECIFICATIONS.

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# PECO

- Formerly **Philadelphia Electric Company**, founded 1881.
- Owns 1,607 miles of high-voltage transmission lines, 15,250 square miles of underground distribution cable, and 12,933 miles of aerial distribution lines.
- Part of **Exelon** as of 2000.



# Philadelphia Transportation Co

- Main public transit operator from 1940 to 1968.
- Replaced **Philadelphia Rapid Transit Company** (PRT) founded in 1902, now replaced by **SEPTA**.





# Bell Telephone Company



- **Bell Telephone Company** began as a company in 1879.
- **Bell Telephone Company of Pennsylvania** started the same year.
- Bell was broken up in 1984, Philly's RBOC became **Bell Atlantic**.



# Keystone Telephone Company

- Founded 1900 as a direct competitor to **Bell Telephone Company**, bought by Bell in 1945.
- First telephone company in the world to have completely buried wires.
- Catered to businesses.
- Used for city communications.



# Electrical Bureau

- City department from 1856 – 1951.
- Maintained communications systems (call boxes) for police and fire.
- Now Communications group within the Department of Public Property.





# Western Union Telegraph Co

- Began operation in 1851.
- Telegraphy was spun off to **Western Union International** in 1963.
- Sold telegraphy system to **MCI** in 1983.



# Metromedia Fiber Network

- Launched in 1993 as **National Fiber Network**.
- Dark fiber to communications carriers in the U.S. and EU.
- Bankrupt by 2002, back in 2003 as **Abovenet**, bought by **Zayo** in 2012.



# MCI Metro

- Division of **MCI** that layed fiber in the '90s.
- Bought by **WorldCom** in 1998.
- **MCI** Acquired by **Verizon Communications** in 2006 after bankruptcy.





# Level 3 Communications

- Started building nation-wide fiber in 1998.
- Received \$411 million from the DOD in 2012.
- Bought by **CenturyLink** in 2017, now **Lumen Technologies**.
- Tier 1 Network Operator.

**Level(3)**<sup>®</sup>

 CenturyLink<sup>®</sup>

**LUMEN**

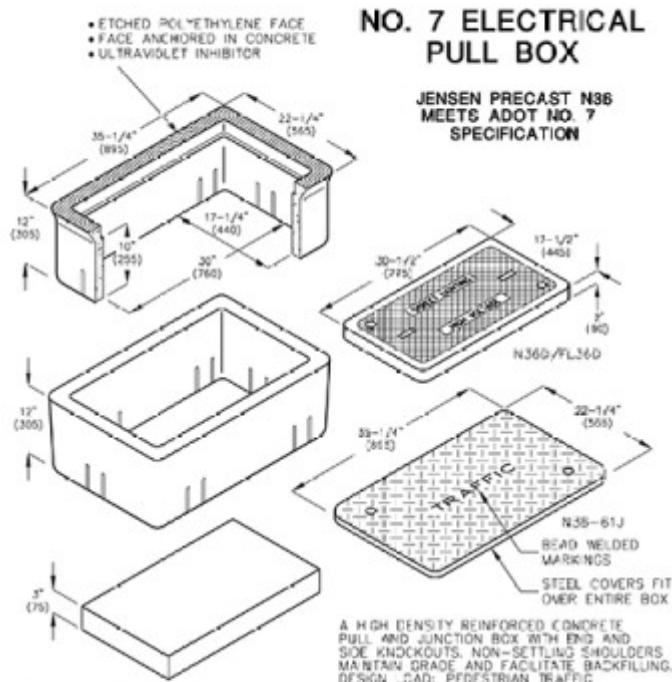


# Telephone & Communication

- “Telephone” is likely a replacement.
- “Communication” is for private cables.



# Handholes and Boxes



CATALOG NUMBER	PRODUCT	DESCRIPTION	APPROX. WT. (LBS.)
CYN36	BOX	REINFORCED CONCRETE	177
FL36D	LID	NONMETALLIC LID W/HOLD DOWN BOLTS	28
CYN36CJ	LID	CAST IRON W/HOLD DOWN BOLTS	74
CYN36-61J	COVER	STEEL CHECKER PLATE W/HOLD DOWN BOLTS	32
CYN36E	EXTENSION	12" HIGH REINFORCED CONCRETE	167
CYN36SL	SLAB	REINFORCED CONCRETE	113

FOR COMPLETE DESIGN AND PRODUCT INFORMATION, CONTACT JENSEN PRECAST.

NOTE: METRIC DIMENSIONS ROUNDED TO NEAREST 5 MM.

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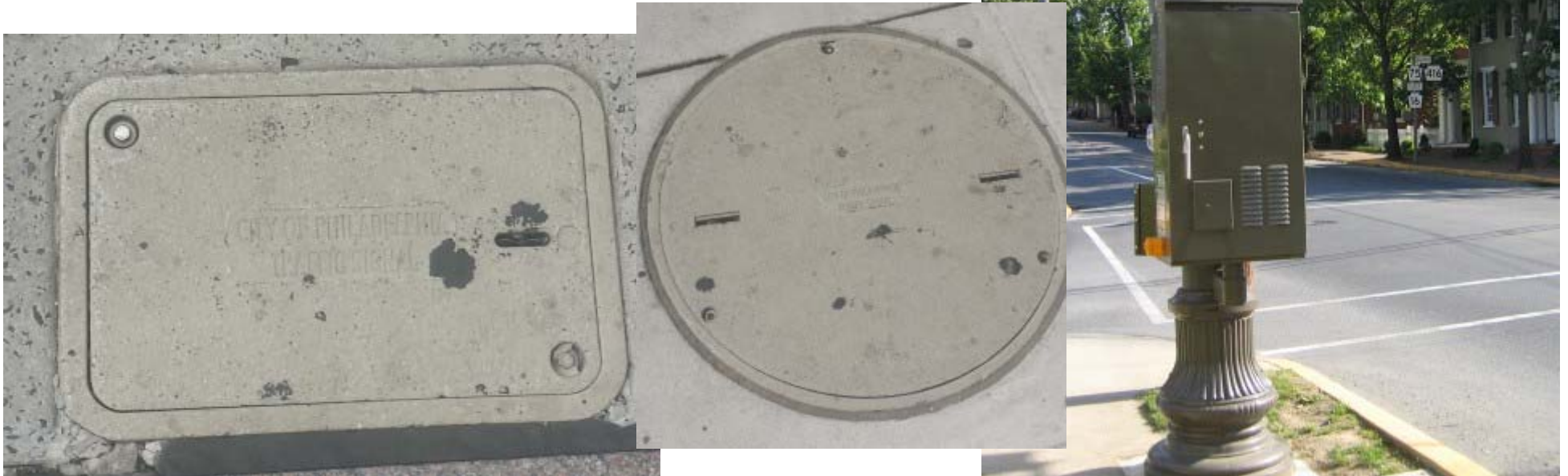
# CATV

- Cable TV is a Pennsylvania first.
- Provides cable services (coax) to buildings.
- Cable television came to Philadelphia in 1983 under 3 franchises: **Comcast**, **Cablevision Systems of Philadelphia**, and **Philadelphia Inner City Cable** (Wade Cablevision came in 1987).



# Traffic

- Seen on the sidewalk corners near crosswalks.
- Cabling here connects traffic lights to large metal control boxes nearby.
- Adaptive Traffic Control Systems



# Bell Atlantic

- Operated 1984 – 2000 as one of the 7 RBOCs.
- Was parent of **New Jersey Bell**, **Bell of Pennsylvania**, **Diamond State Telephone**, and the **C&P Telephone** companies.
- At its peak, it was the second largest telephone company in the USA with operations in 23 countries and 13 states.





# Verizon

- Carries telephone and Internet services within Philadelphia and is *the* current telephone provider for the city.
- Formed in 2000 after merger between **Bell Atlantic** and **GTE**.



# Zayo

- Founded in 2007, is a fiber network with 130,000 route miles of fiber laid in North America.
- Tier 1 Network Operator.
- Also work installing small cells.



# Antennae & Other Devices





# Small Cell

- Low-powered cellular radio access nodes.
- Range of 10 meters to a few kilometers.
- **Crown Castle** installs Fiber and Small Cells in the North East, bought **Lighttower**, a northeastern network provider in 2017.



# Distributed Antenna Systems

- Expand cell coverage, adding capacity in under-serviced areas.
- Repeater vs Active
- Usually cover different frequencies and different carriers.
- These units are manufactured by **JMA Wireless**.



# LinkPHL

- Provide free WiFi access, mobile device charging, phone calls, access to municipal/emergency services, maps, directions.
- Each LinkPHL kiosk has three cameras, and microphones, among other sensors.
- Created by **Intersection** (formerly **Titan**), with investment from **Alphabet**.





# LinkPHL



2022 Mike Dank @famicoman



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# Police Cameras

- Have been in the city since 2009, many are thought to be broken and in disrepair.
- Cameras automatically follow movement. Anyone watching?



# Not Covered Yet

- Payphones
- Parking Kiosks
- Transit Kiosks
- Shotspotters
- Ricochet (anything left?)
- More?





# Sight Seeing



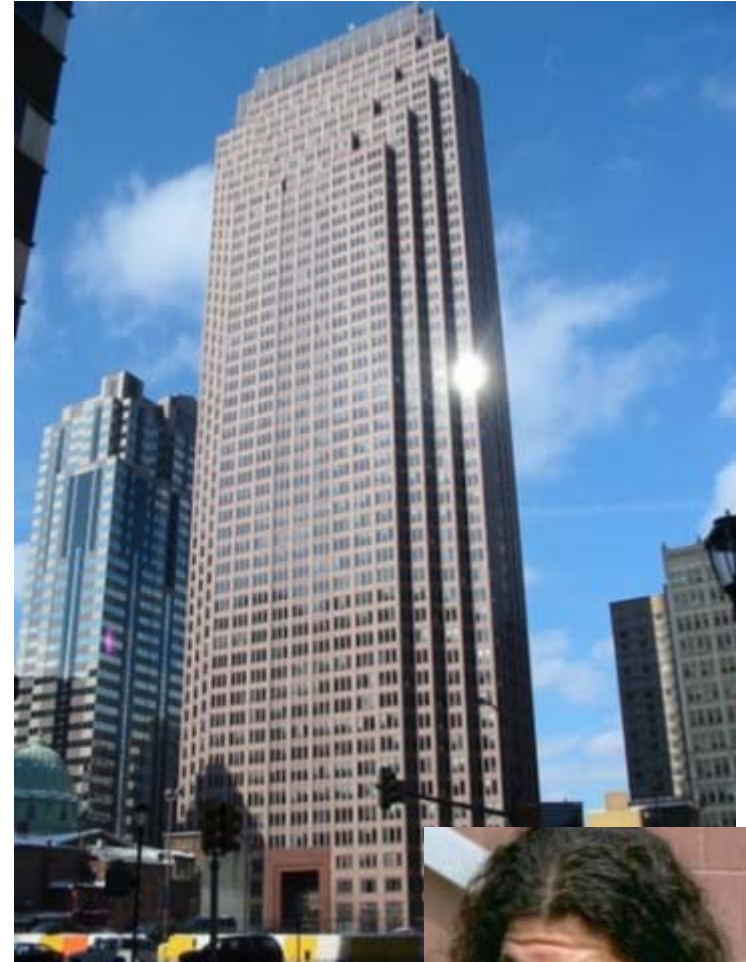
# 401 N Broad

- **Terminal Commerce Building**, this 14-story concrete building was built between 1929 and 1931 by the Reading Company.
- Largest carrier hotel within Philadelphia with over 80 carriers as of 2015.



# Three Logan Square

- Formerly the **Bell Atlantic Tower**, this 55-story office building was erected in 1991.
- After Bell split up, the Philadelphia-based Baby Bell **Bell Atlantic** headquartered within the building until 1996 when it purchased New York City-based **NYNEX** and moved operations to New York.
- Still houses **Verizon Communications of Pennsylvania** HQ.



**NYNEX**





# Comcast Center & CTC

- **Comcast** started as **American Cable Systems** in 1963.
- **Comcast Center** is a 58-story building built between 2005 and 2008, and is **Comcast's HQ**.
- **Comcast Technology Center** is a 60-story building built between 2014 and 2017.



# 500 South 27th

- **AT&T** building presumably used for continued **AT&T** service and collocation for other telephone companies.
- Built 1967 by **Bell Telephone** to replace an older exchange at 17th and the Parkway.
- Situated near railroad lines by the Schuylkill.



# Right To Know

- Created **Right To Know** requests that will be submitted to various organizations within the Philadelphia government in an attempt to gain information on surveillance equipment deployed throughout the city.
- inspired by the *Aaron Swartz Day Police Surveillance Project* #ASDPSP and information brought to light via "The Wiretap Room" by Ryan Gallagher and Henrik Moltke in *The Intercept*.
- Requests filed through **MuckRock**,  
<https://www.muckrock.com/project/philadelphia-police-surveillance-project-305/>







# Right to Know Request List

- GUNSHOT DETECTION MICROPHONES
- IMSI-CATCHER EQUIPMENT
- SOCIAL MEDIA MONITORING SOFTWARE
- PREDICTIVE SOFTWARE
- FEDERAL MOUS
- AUTOMATED LICENSE PLATE READERS
- FLIR THERMAL CAMERAS
- FACIAL RECOGNITION SOFTWARE
- UNMANNED AERIAL VEHICLES
- BODY WORN CAMERAS



# What's Next

- More walking around and looking at things.
- Refreshing the Right to Know requests.
- Ask for help to identify things I can't identify,  
<https://github.com/networksofphilly/unidentified-infrastructure-objects>
- Walking tours?

# Questions?

