# Scoping and Design Considerations for APS and ADA Curb Ramps

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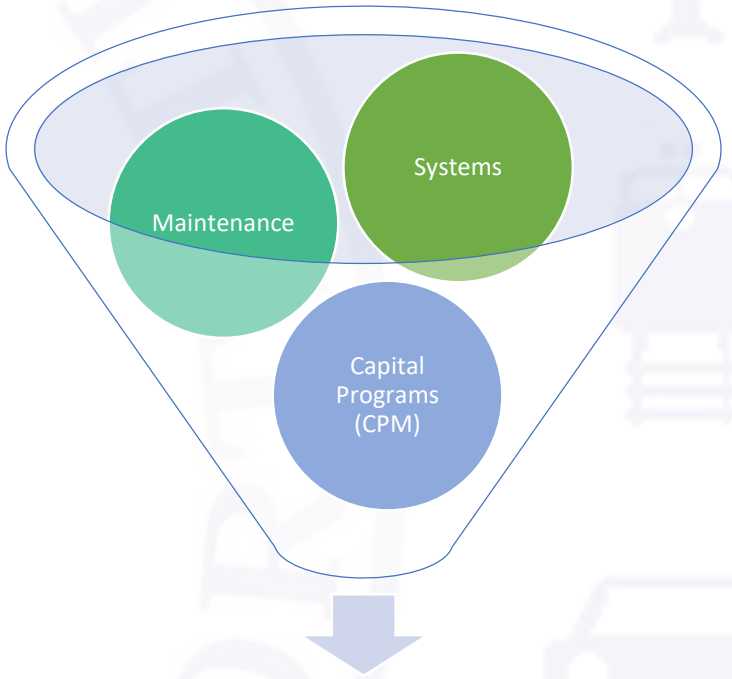
INDOT Greenfield District Traffic

# Background and Perspective

- Scoping and Asset Management for traffic signals for INDOT's Greenfield District
- Caveat: other DOTs and local gov'ts may have different needs or requirements
- This presentation will provide items that need to be considered in scoping and design. If these are not considered early on, it could lead to
  - Scope changes
  - Project delays
  - Cost overruns
  - Sub-standard final products




Successful Scope

# Need for Pedestrian Facilities

- No ramps if:
  - No sidewalk or
  - No accessible paved area (such as a parking lot) on a corner and
  - It is not a refuge between two diagonal corners
- No pedestrian heads or pushbuttons if:
  - No curb ramps or sidewalk on BOTH corners of a potential crossing
- Where feasible, pedestrians should be proactively accommodated, especially at those locations that are likely to be used by people with disabilities (such as hospitals, government buildings, and elderly communities).

# Example: US 40 & Apple St, Greenfield, IN

Aerial: Google Maps

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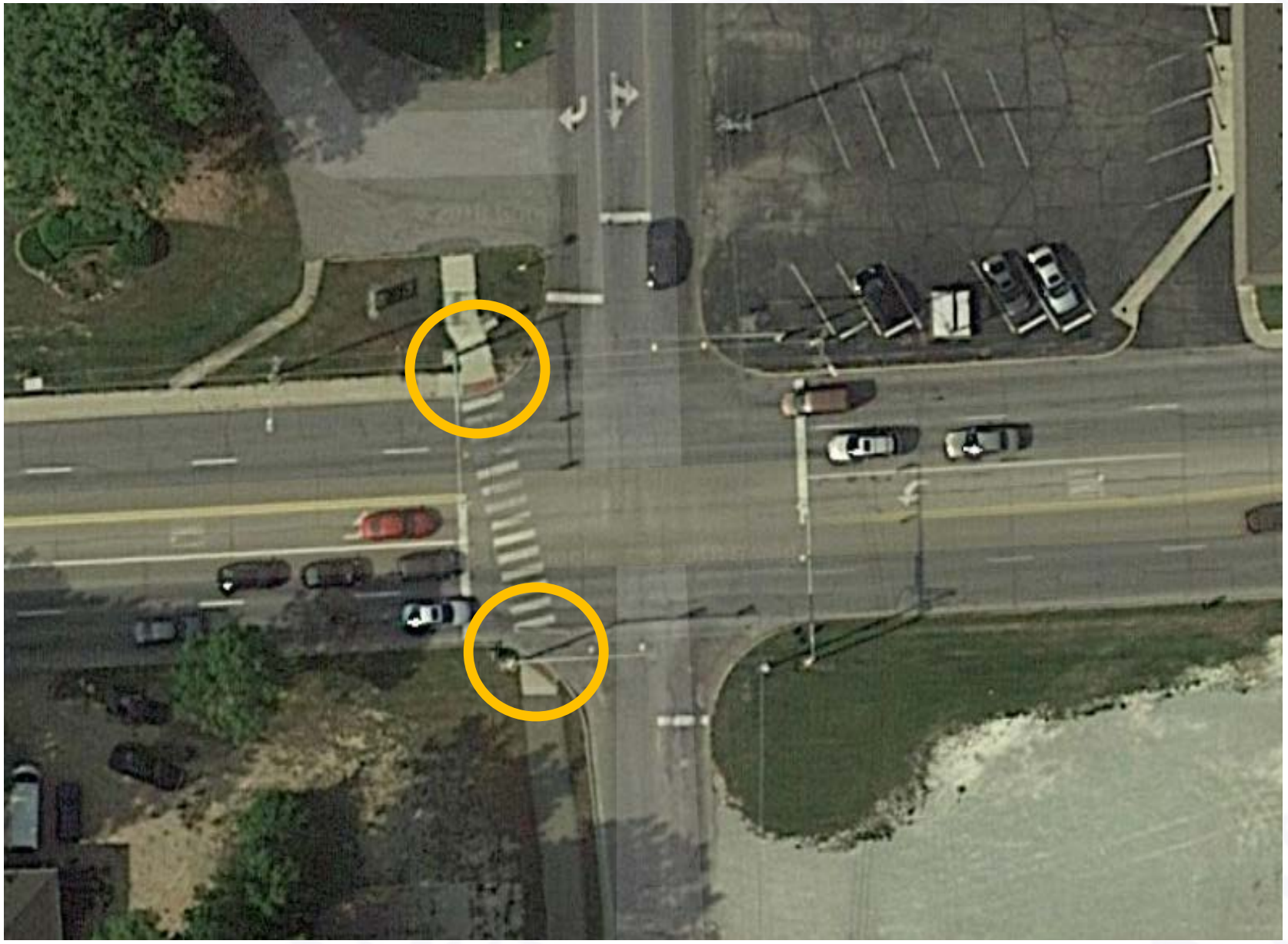

- Northwest and Southwest corners have existing pedestrian facilities (sidewalk and trail)
- Should be brought up to current standards for pedestrian-related improvements, if necessary

Aerial: Google Maps

# Example: US 40 & Apple St, Greenfield, IN

- Southeast corner has no sidewalk or other paved area to tie into and
- Therefore, should not have pedestrian improvements if sidewalks would not be built prior to/during project construction

Aerial: Google Maps

# Example: US 40 & Apple St, Greenfield, IN

- Northeast corner has a paved parking lot.
- Could be **considered** for a ramp and other pedestrian improvements for crossing to northwest corner based on:
  - Likely pedestrian need
  - Local Feedback
  - Right-of-way
  - Business owner's desires

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Aerial: Google Maps

# Curb Ramps: Things to Look For

- Geometric
  - Narrow sidewalks, possibly with buildings close to the curb line
  - Significant elevation change either along profile or between road and sidewalk
  - Curbs that have been mounted by vehicles regularly (tire tread marks)
  - Poor drainage and water ponding in ramp (anecdotal or visual evidence)
  - Large radii can make achieving an ideal ramp very difficult
- Historic District or Features (brick sidewalks, limestone curbs)
- Some projects that should include curb ramps (based on policy) do not necessarily have the budget or time in the schedule to acquire R/W
- Just because a ramp has raised domes (detectable warning surface) and other features you would find in modern ramps does not mean that it is necessarily up to current standards.
- Conversely, adding a detectable warning surface may be sufficient

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# Examples of Difficult Curb Ramp Sites

- Δ Elevation
- Possibly R/W and proximity to building
- Might be eligible for a technical infeasibility finding

Photo: Doug Corey (INDOT)

# Examples of Difficult Curb Ramp Sites

- Δ Elevation
- Proximity to building
- Potential drainage issue once a curb ramp is installed
- Fitting both ramps in such close proximity


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Photo: Doug Corey (INDOT)

# Examples of Difficult Curb Ramp Sites

- Large radius
- Sidewalk stops abruptly
- Ground slope could be a concern if the ramp needs to be much larger to line it up crosswalk
- Possible drainage issues
- Slight tread marks

Photo: Doug Corey (INDOT)

# Examples of Difficult Curb Ramp Sites

- Drainage appears to be an issue
- R/W is possibly going to be an issue with the parking lot

Photo: Doug Corey (INDOT)

# Examples of Difficult Curb Ramp Sites

- Up to current standards?
  - Check slopes
  - Extend detectable warning surface to edge of curb ramp (grass)
- Heavy Tire Marks

Photo: Doug Corey (INDOT)

# Don’t Forget to Look Up for Drainage Concerns

Photo: Unknown

# Pedestrian Signal: Things to Look For

## Equipment

- Old, obsolete, or damaged cabinet
- Not enough spare load bays
- Conduits full/damaged
- Controller is obsolete
- If physical space on the shelves are limited or full with detector racks or other equipment

## Placement

- Lack of R/W
- Utilities near ramps
- Close and unobstructed path to the push button (*pedestrian clear space*)
- Heads do not necessarily need to be on the same pedestal or pole as the push button.

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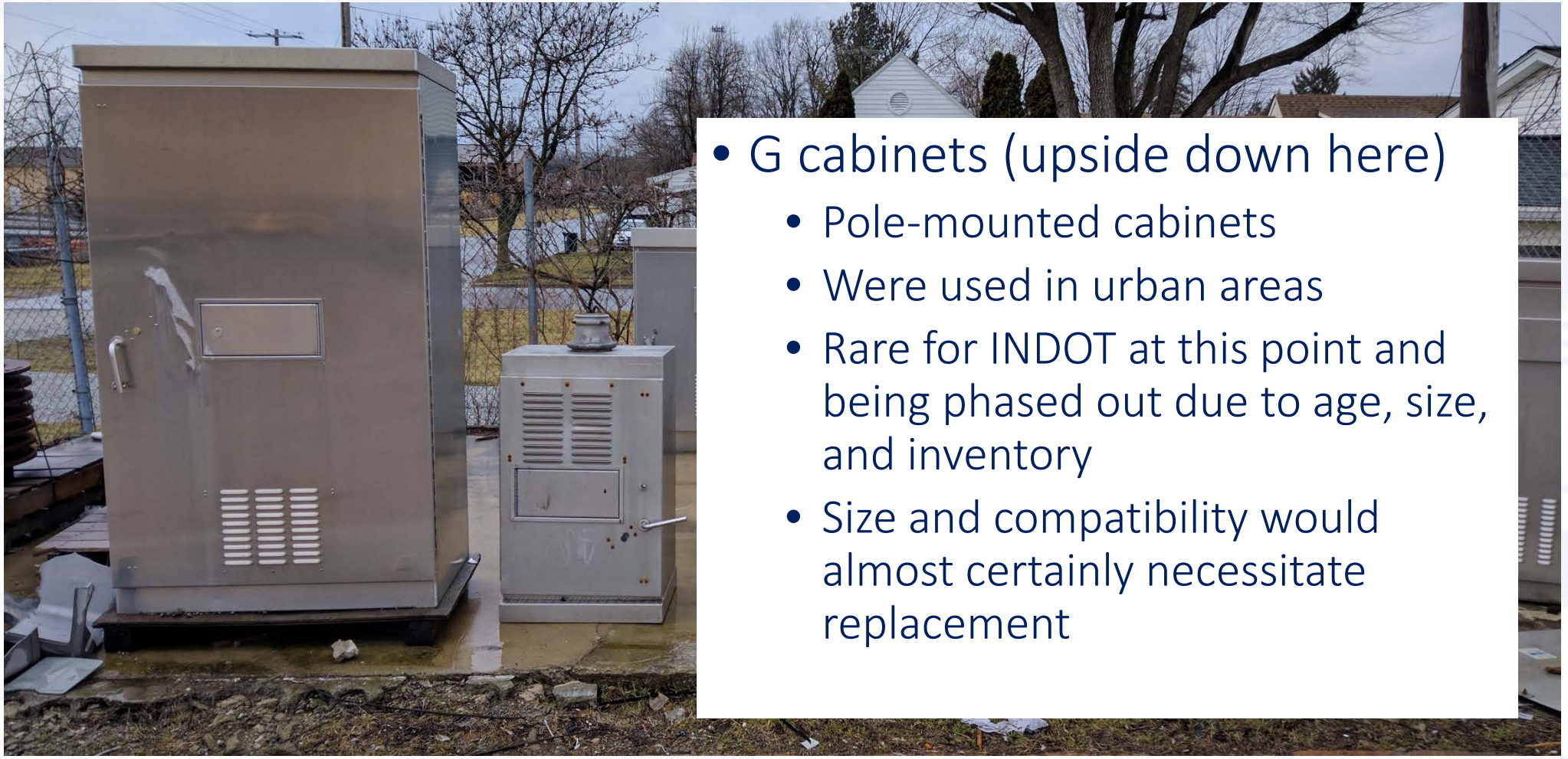
# Cabinet Sizes

| Size | R | G | P | M |
|---|---|---|---|---|
| Dimensions (HxWxD) | 78”x44”x27” | 40”x24”x17” | 55”x44”x27” | 51”x30”x18” |

Photo: Adam Tyra (INDOT)

# Cabinet Sizes



- G cabinets (upside down here)
  - Pole-mounted cabinets
  - Were used in urban areas
  - Rare for INDOT at this point and being phased out due to age, size, and inventory
  - Size and compatibility would almost certainly necessitate replacement

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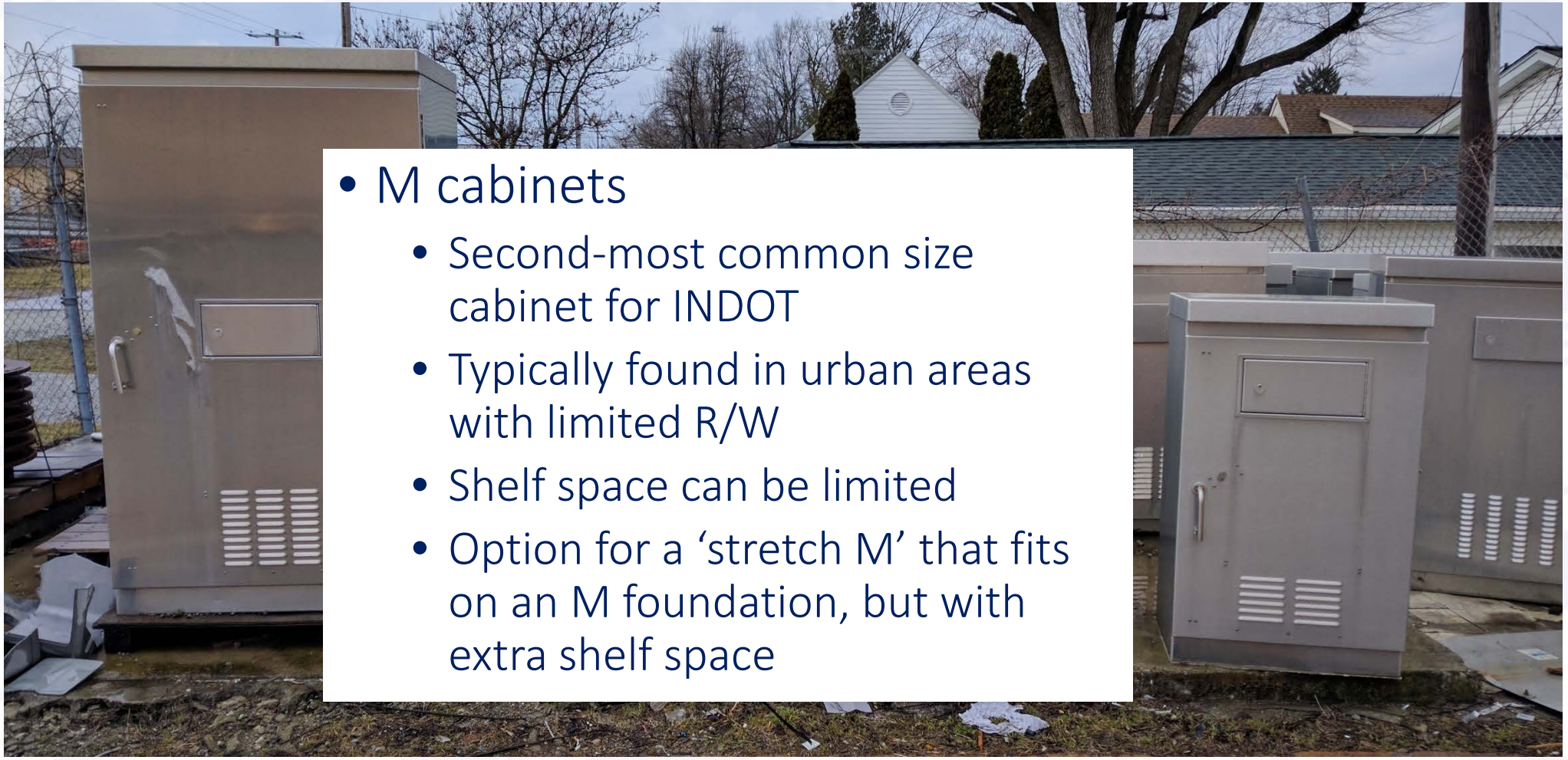

- M cabinets
  - Second-most common size cabinet for INDOT
  - Typically found in urban areas with limited R/W
  - Shelf space can be limited
  - Option for a ‘stretch M’ that fits on an M foundation, but with extra shelf space

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# Cabinet Sizes

- P cabinets
  - Are the most common size of cabinet for INDOT, especially in non-urban settings
  - Cabinet size might only be an issue if many other things are run through the cabinet such as ITS or two signals at a single cabinet
  - Can retrofit an M foundation with a P or R if either the larger cabinet or more conduits are needed

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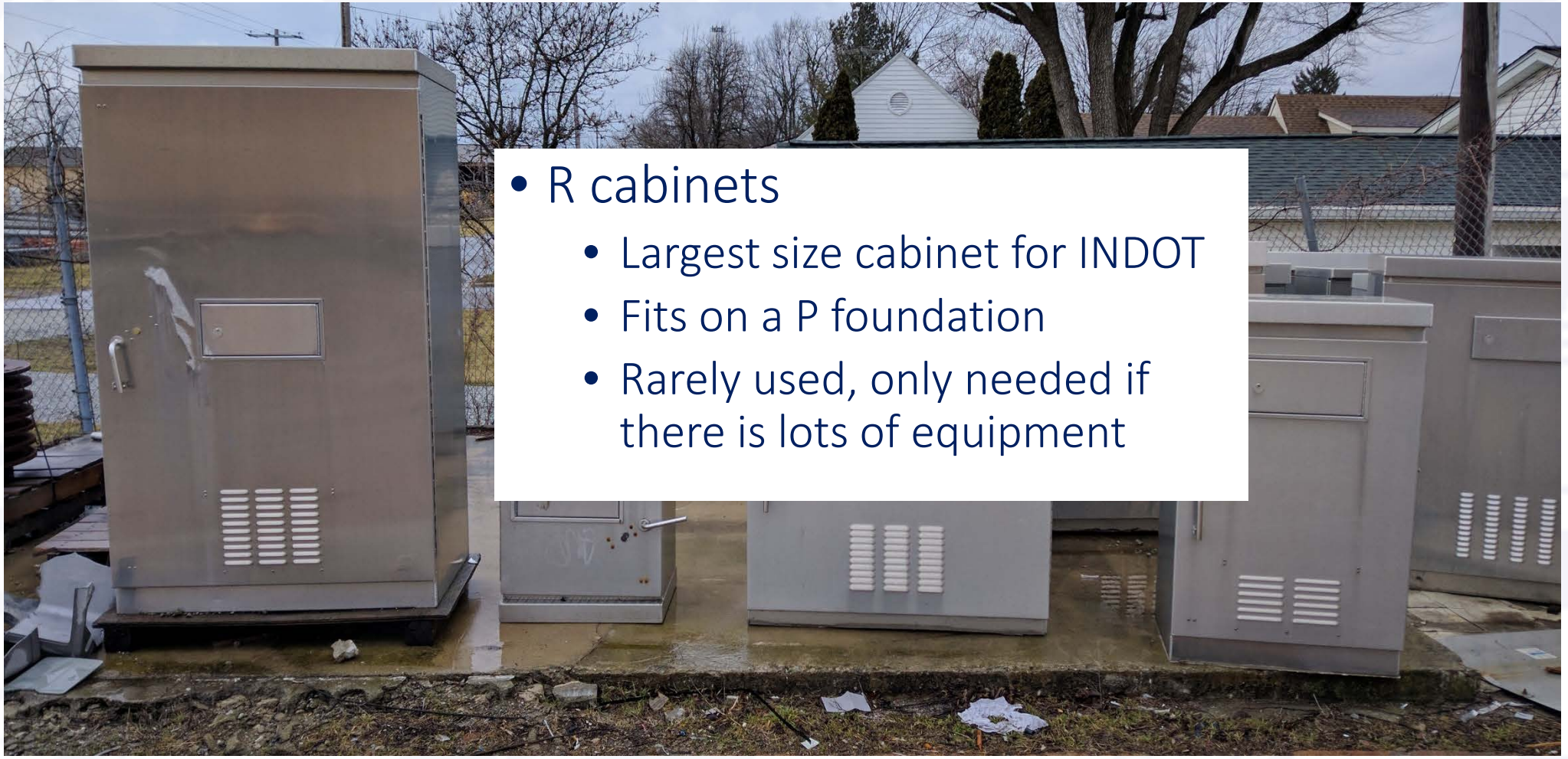
# Cabinet Sizes



- R cabinets
  - Largest size cabinet for INDOT
  - Fits on a P foundation
  - Rarely used, only needed if there is lots of equipment

| Size | R | G | P | M |
|---|---|---|---|---|
| Dimensions (HxWxD) | 78”x44”x27” | 40”x24”x17” | 55”x44”x27” | 51”x30”x18” |

Photo: Adam Tyra (INDOT)

# Cabinet Interior

- Things to look out for
  - NEMA TS-1 cabinet vs NEMA TS-2 (no BIUs generally means it is a TS-1)
  - Older style controller
  - Adequate number of spare load switch bays (1/ped crossing phase)
  - Shelf space
  - Adequate empty conduit space

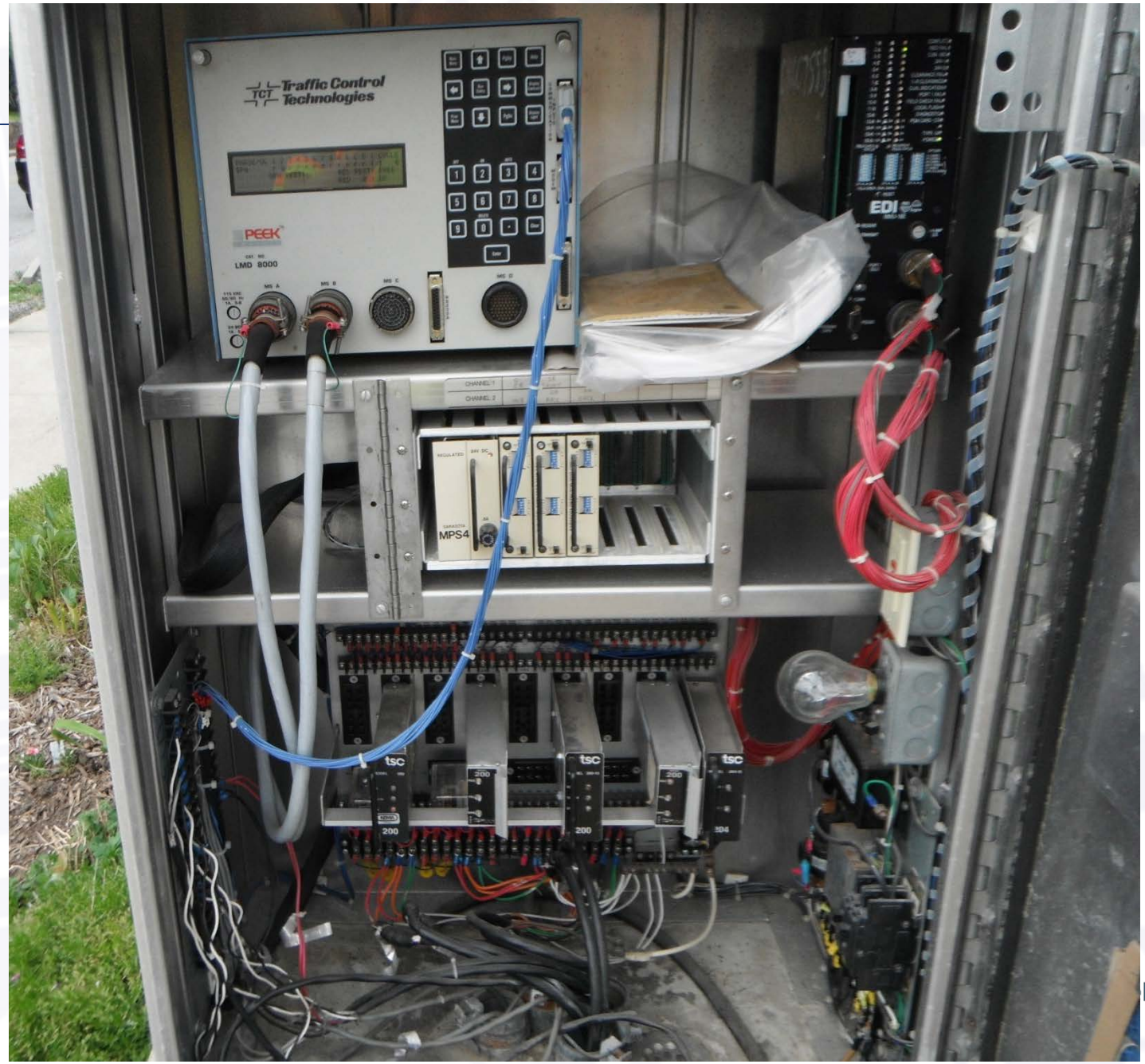



Photo: Unknown (INDOT)

# Cabinet Interior (Before & After)

- US 40 & Broadway St (2013)
- M-Size Cabinet
- TS-2 (has BIUs)
- Econolite ASC2 Controller
- 4 of 8 load switch bays used
- Difficult to see from picture, but the conduits are very full

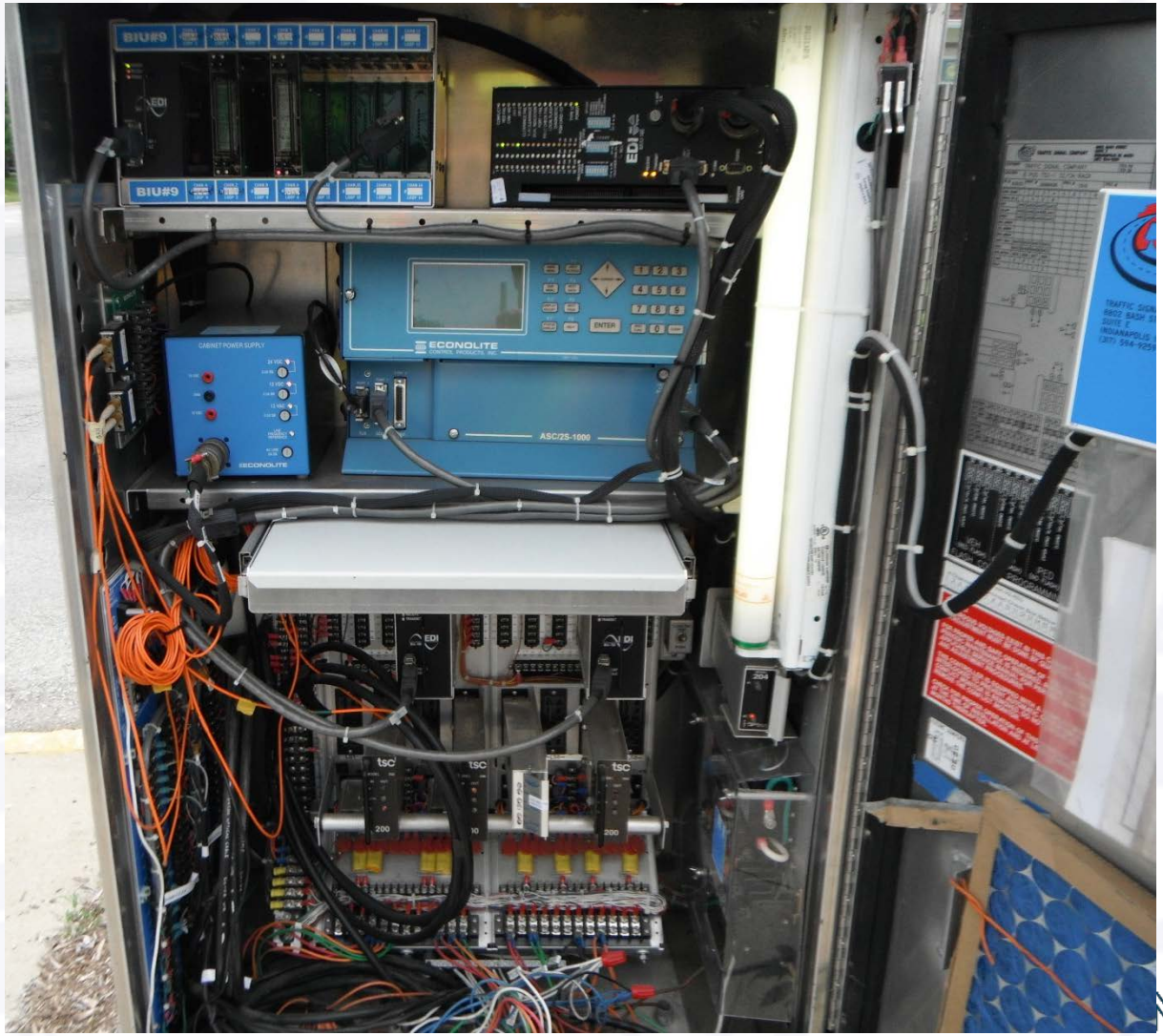
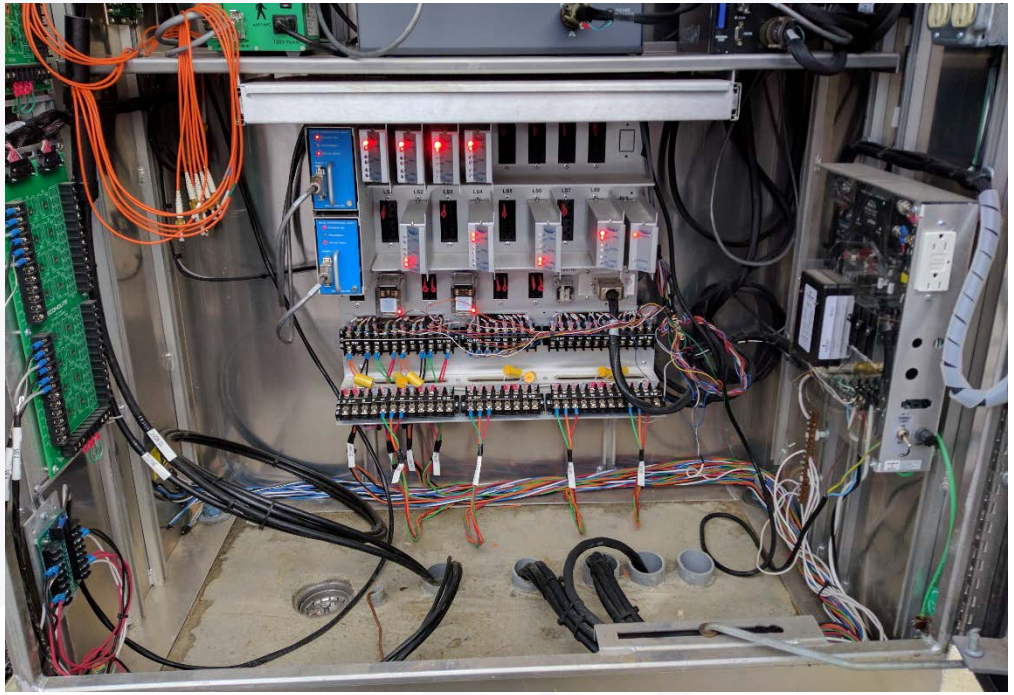



Photo: Unknown (INDOT)

# Cabinet Interior (Before & After)

- US 40 & Broadway St (2018)
- P-Size Cabinet
- TS-2 (has BIUs)
- Econolite ASC3 Controller
- 8 of 16 load switch bays used


- Separate APS control box
- Excess space in the conduit



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Photos: Adam Tyra (INDOT)

# Wiring

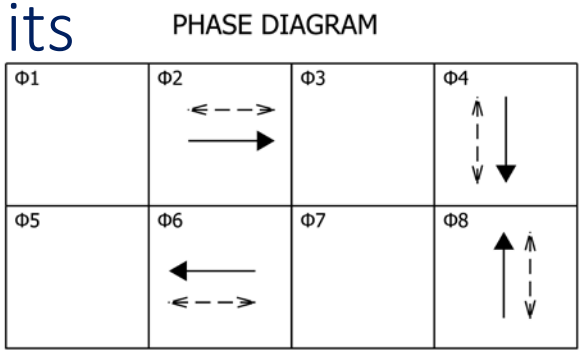
- 5c/14 for each pedestrian head
  - 1 Spare
  - 1 Ground
  - 2 for Walk/Don’t Walk
  - 1 for Countdown Timer
- 3c/14 for each push button
  - 1 Spare
  - 1 Ground
  - 1 for Push Activation
- Can combine to a single 9c/14

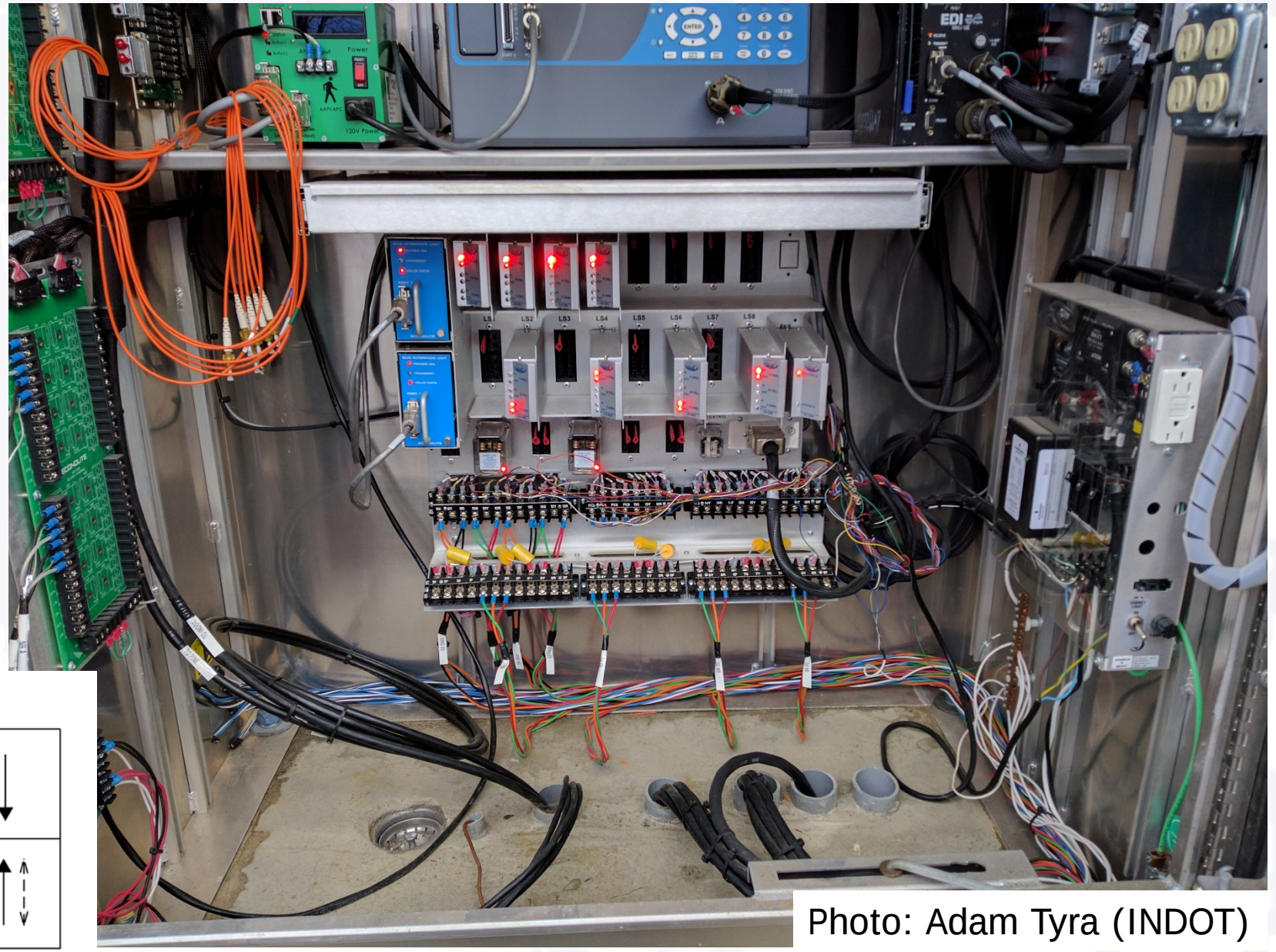
Notes on Conduit:

- 60% of the cross-sectional area of the conduit needs to remain empty after construction
- Spare conduit to first handhole and separate conduit for 3c/8 power

# Typical Wiring (US 40 & Broadway in Greenfield, IN)

- Fiber
- 4-7c/14 for vehicle signals (1 per phase)
- 8-7c/14 for pedestrian signals (2 ped heads and push buttons for 4 signalized crossings)
- 3c/8 for power
- 4-2c/16 for detection
- 5 conduits



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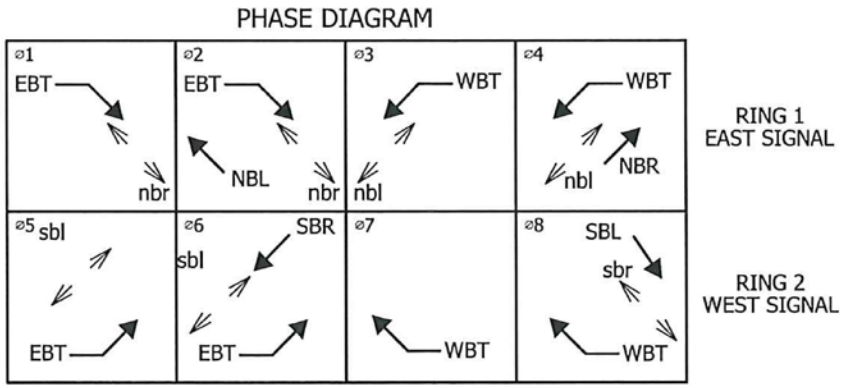
# Complicated Wiring (DDI at I-69 & Campus Pkwy)

- 3c/8 for power
- 22-2c/16 for detection
- 8-7c/14 for vehicle heads
- 8-9c/14 for signalized pedestrian crossings
- 4-3c/14 for emergency vehicle preemption
- 8 conduits in foundation



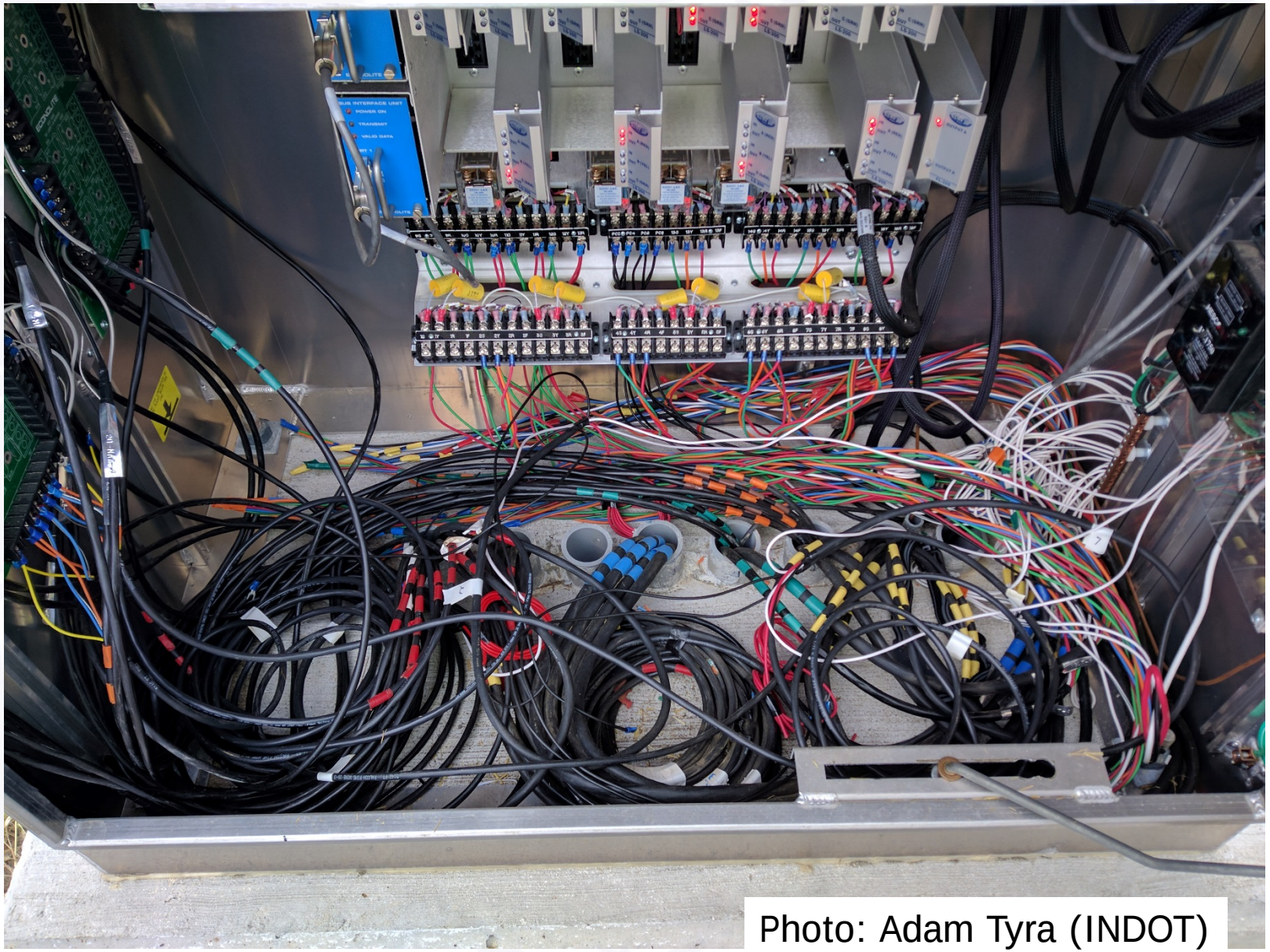



Photo: Adam Tyra (INDOT)

# Right-of-Way (R/W) Example

- Corners with curb ramps may or may not have well-recorded R/W
- Apparent R/W is not necessarily actual R/W
- Note: this is theoretical, not based on record research at this corner

# Right-of-Way (R/W) Example

- Expected R/W if the back of sidewalk is the boundary

# Right-of-Way (R/W) Example

- Expected R/W if the front of sidewalk is the boundary
- Also possible R/W wasn't properly recorded, may only own to back of curb

# Example: US 35 & SR 931, Kokomo, IN


- Path not aligned with crosswalk, at a slight skew
- Push button is too far away (pedestrian clear space)
- Push button is not the correct type

Photos: Google Maps

# Example: I-465 & Emerson Ave, Indianapolis, IN

- Tall Curb resulting in steep grade
- Sidewalk just turns into shoulder
- Unsignalized crossing is appropriate for this particular crossing, but there are other similar crossings that can and should be signalized at this interchange
- Could add a small curb section to discourage pedestrian use of the shoulder that could also serve as a place for a pedestal

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Photo: Adam Tyra (INDOT)

# Thank you.
# Questions?

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