How does resident-led design fit with deep sustainability goals?

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Learning Objectives

- Identify ways that the primary development goals for multi-family affordable housing align or conflict with deep sustainability goals.
- Use layman's terms to describe testing protocols for PHIUS certification to clients and residents with no design or construction background.
- Analyze building envelope air tightness testing strategy options for multi-family housing development that lacks connecting interior circulation or common spaces.
- Apply the case study's lessons to other nontraditional multi-family housing types to predict potential air tightness testing challenges.

Case Study Introduction & Affordable Housing in the U.S.

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Case Study: Kindlewood Redevelopment

Project History

Pre-1970
Credit: Charlottesville Tomorrow
Rufus Holsinger

2022

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Design Team

PIEDMONT HOUSING ALLIANCE

NHT COMMUNITIES

OMNI

HARKINS

DUNBAR

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ICONOGRAPH

STAENGL ENGINEERING

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS.

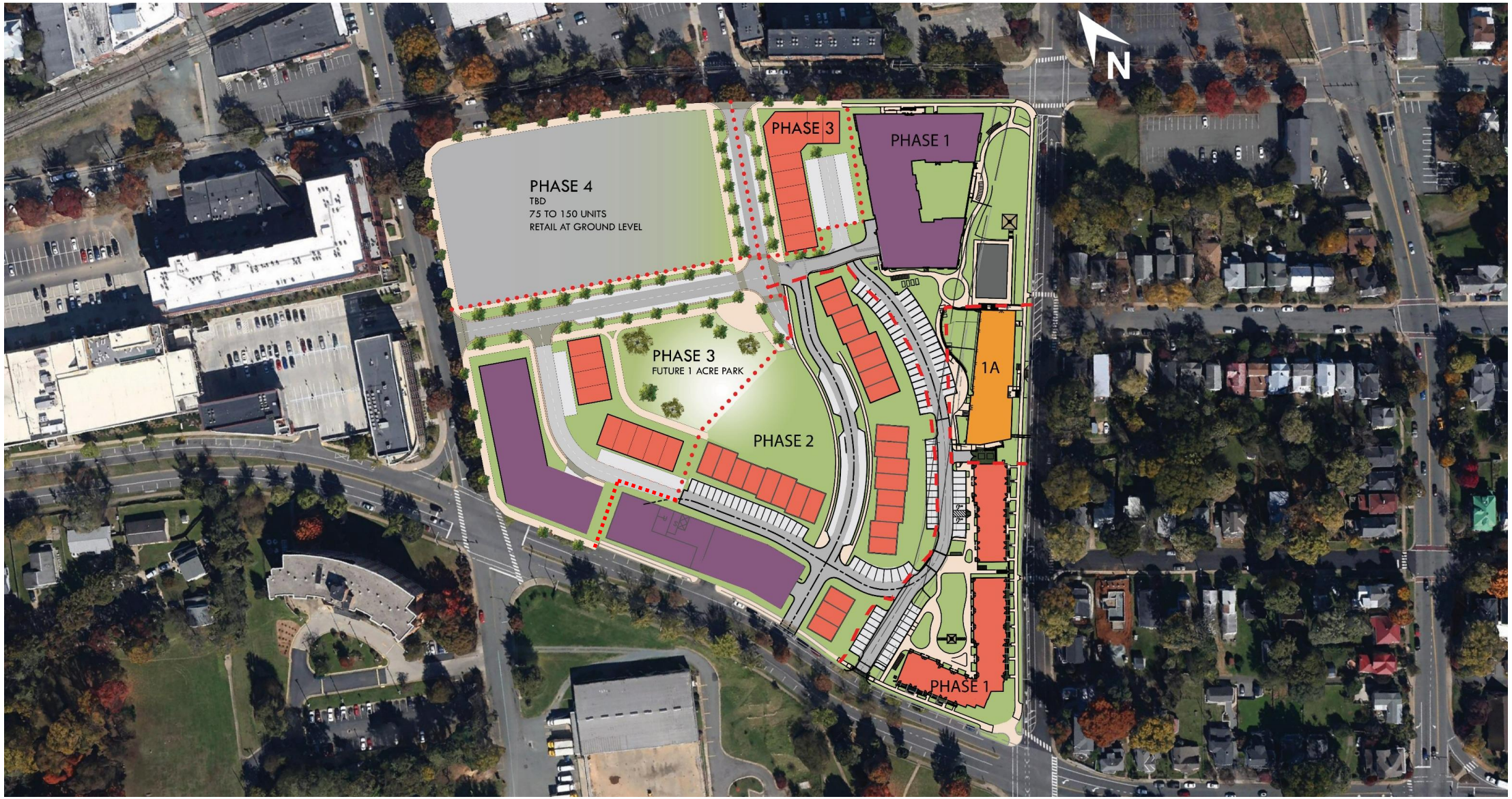
THE COMFORT SQUAD

Resident Advisory Committee

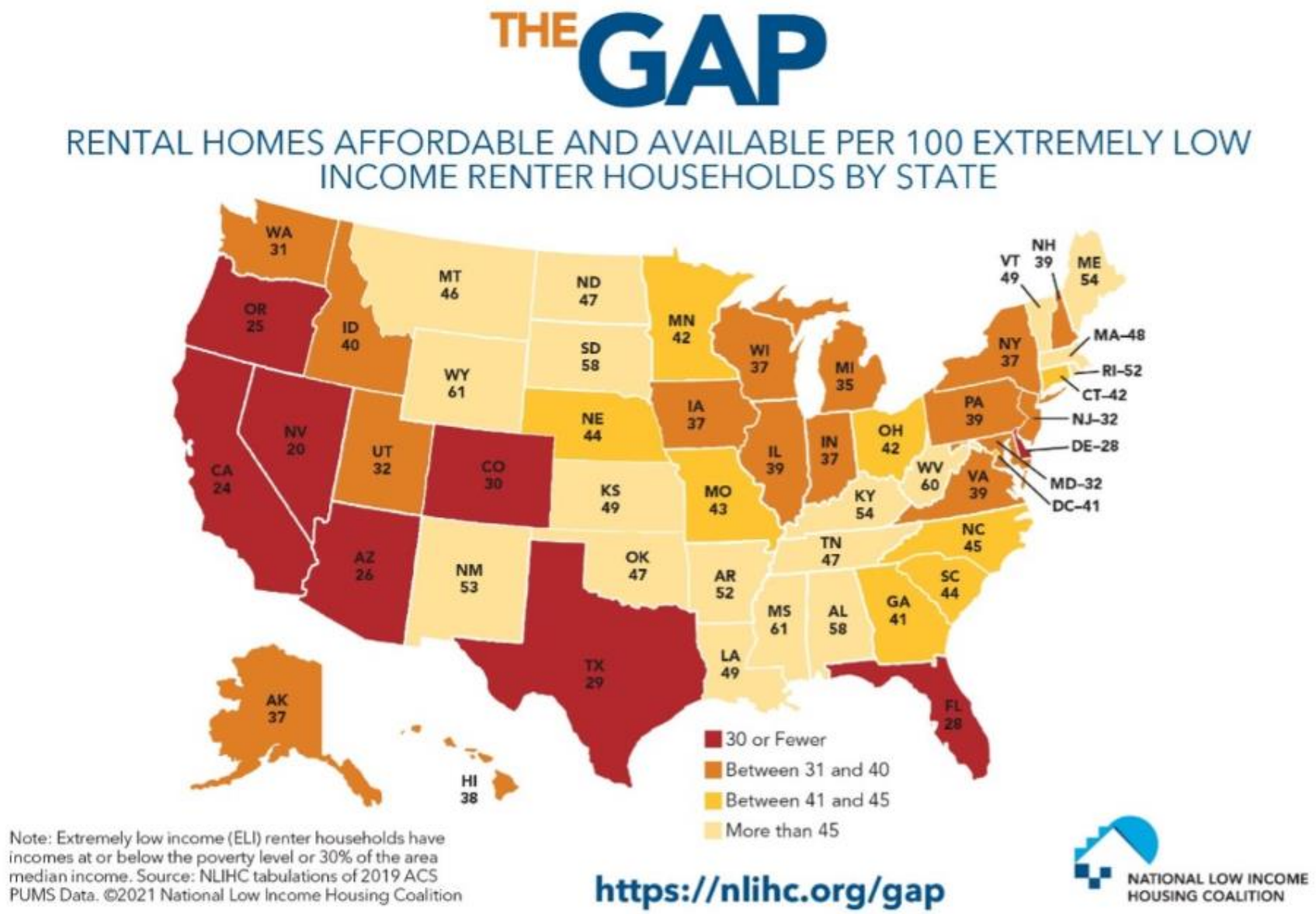
Project History – Development Principles

- Elevate the health and safety of residents and the planet
- Zero displacement of existing residents
- Resident-lead design
- Community support spaces
- Ladder of affordability
- Break generational cycles of poverty

Project History



Affordable Housing in the US



Affordable Housing & Sustainable Construction

AFFORDABLE HOUSING

↓

?

↓

SUSTAINABLE CONSTRUCTION

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Resident-Led Design

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Confusing & Misunderstood Terms

Mini-split

Heat pumps

Prescriptive vs. Performance

Carbon neutral

ERV

Envelope

Low Flow

Passive House

Passive vs. Active Ventilation

Air Quality

DOAS

“Smart” vs. “Dumb”

Electrification

Affordability vs. Sustainability: Alignments

- Lower Utility bills
- Compact & efficient floor plans
- Ecologically advantageous planting
- Central / semi-central systems
- Thermal comfort & improved indoor air quality
- Better moisture mitigation
- Equitable design & amenities
- Design of more resilient infrastructure & communities

Affordability vs. Sustainability: Conflicts

- Resident and staff education on advanced systems & appliances
- Higher first cost for systems
- More involved maintenance
- Resident desire for privacy & identity vs. jurisdictional desire for density & efficiency
- Perception of reduced safety in multi-family housing
- Gabled roofs

What is the “Missing Middle”?

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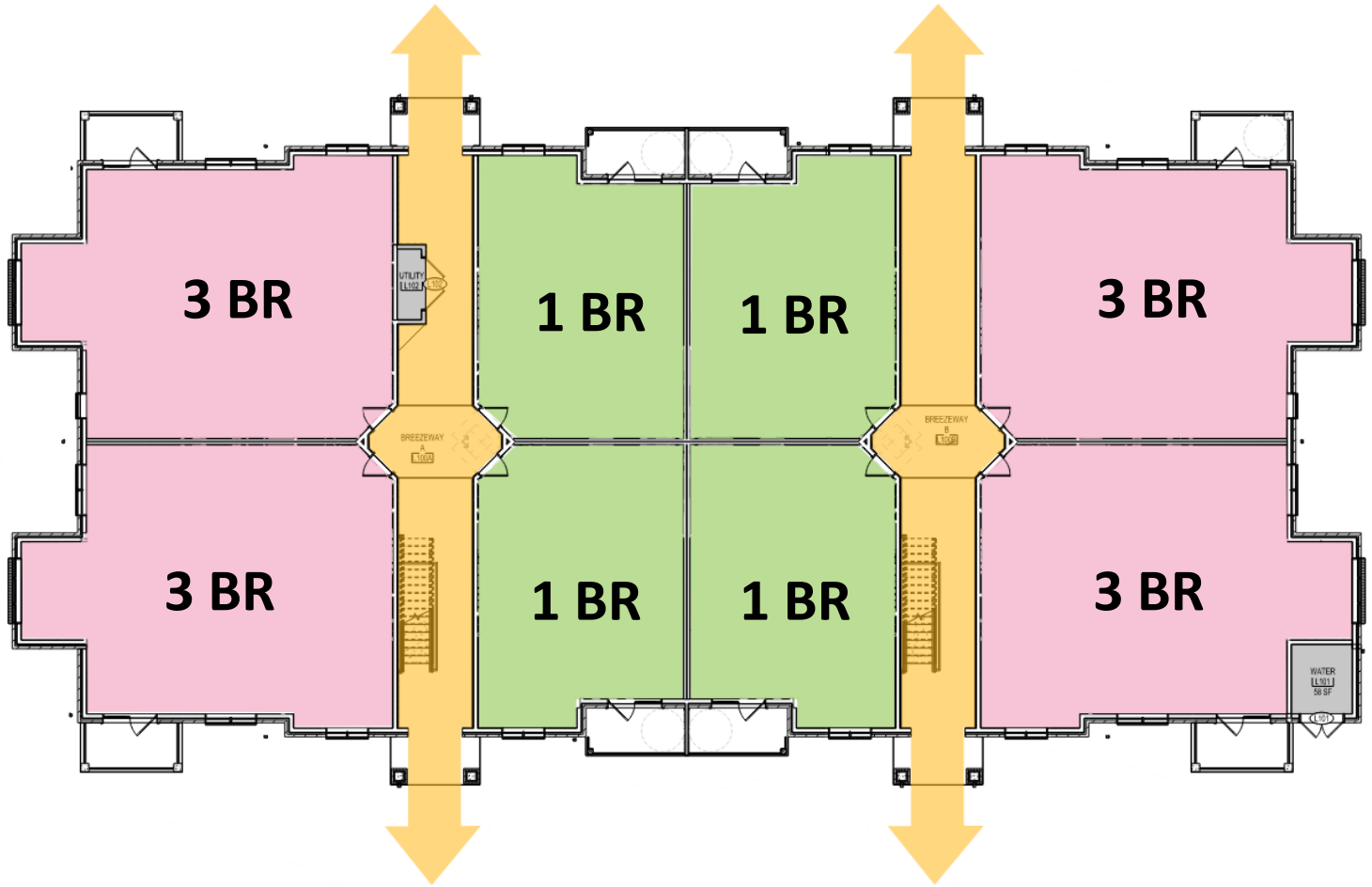
Traditional Elevator Building

Garden Style Apartment Building



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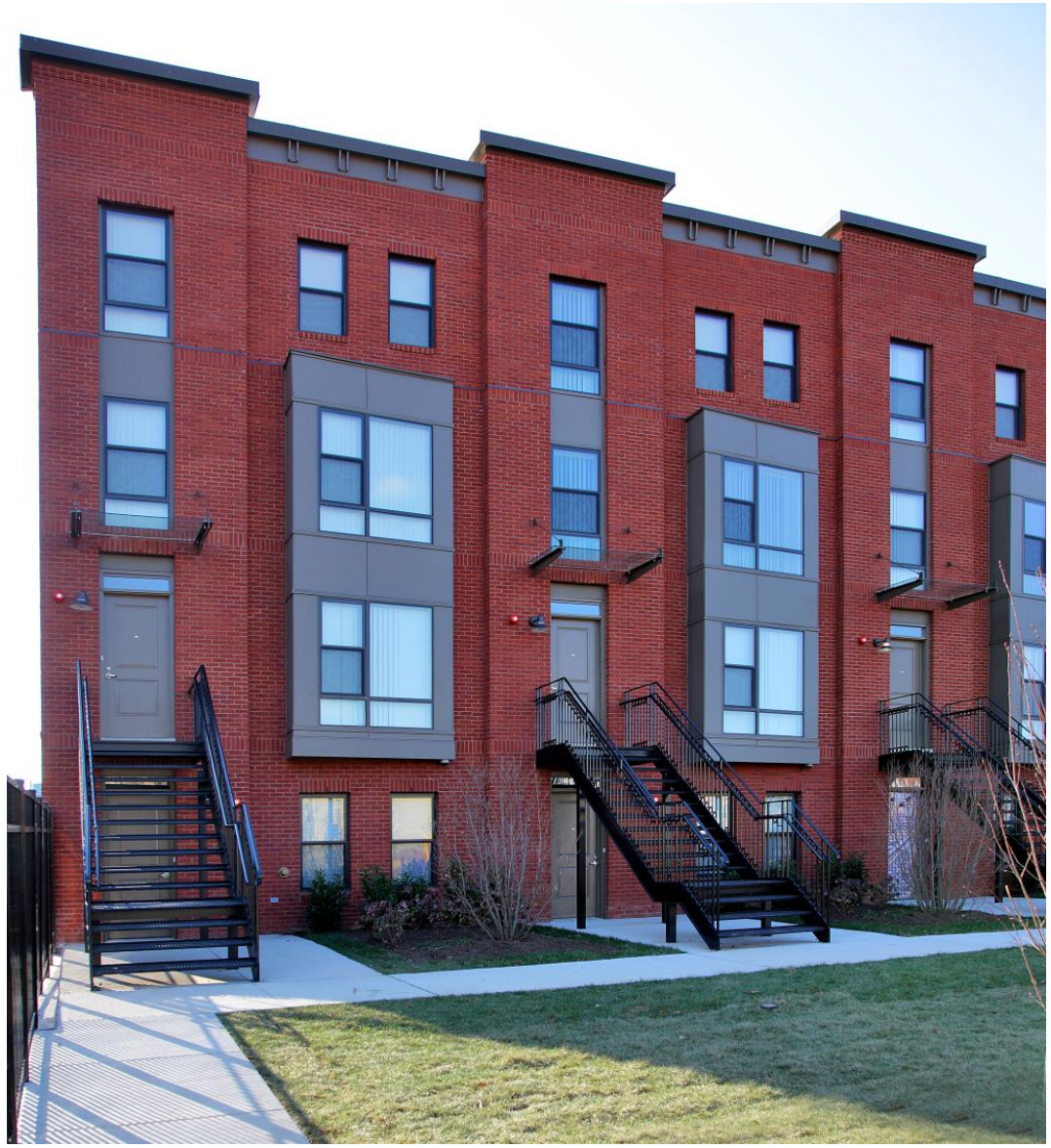
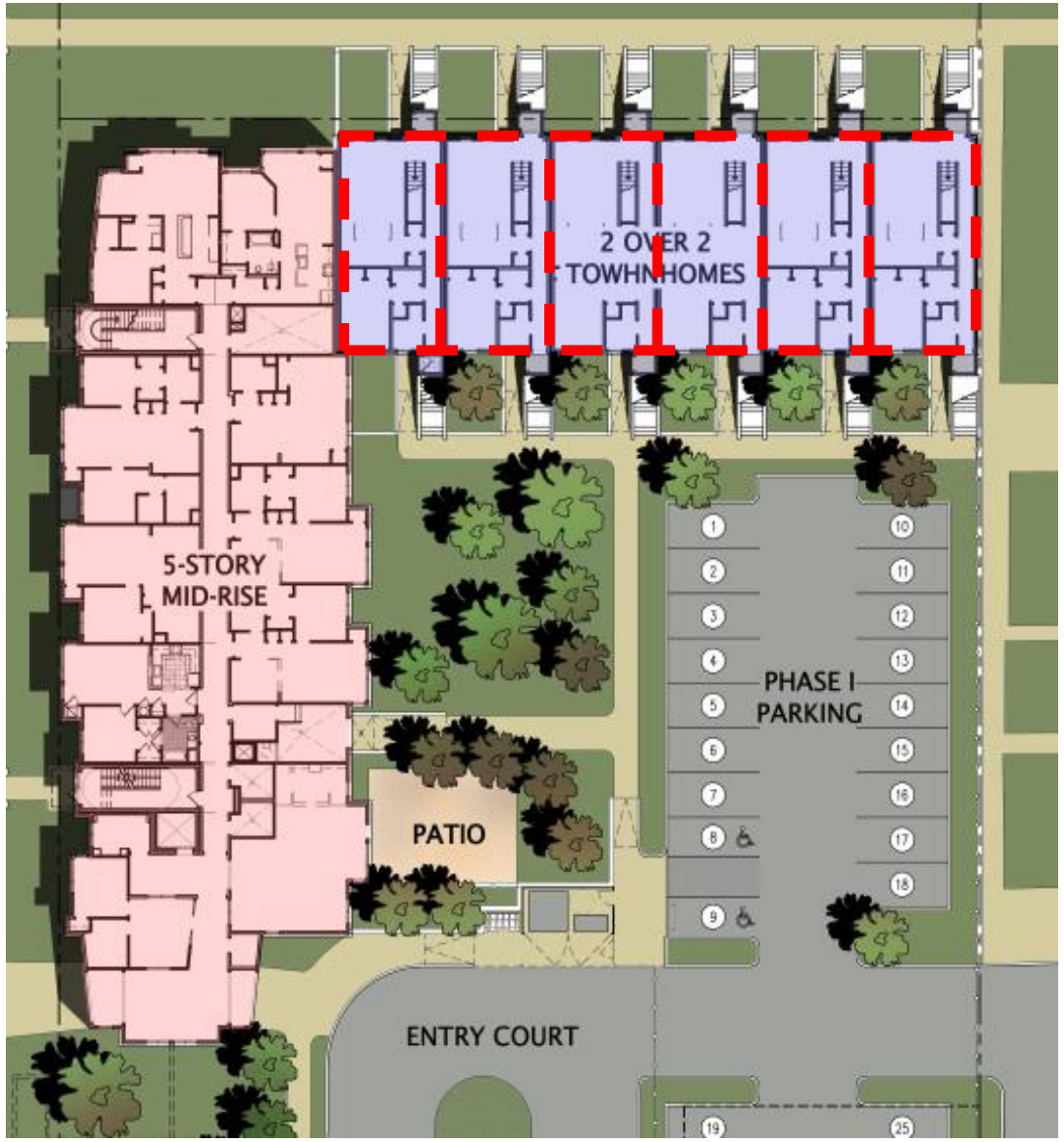
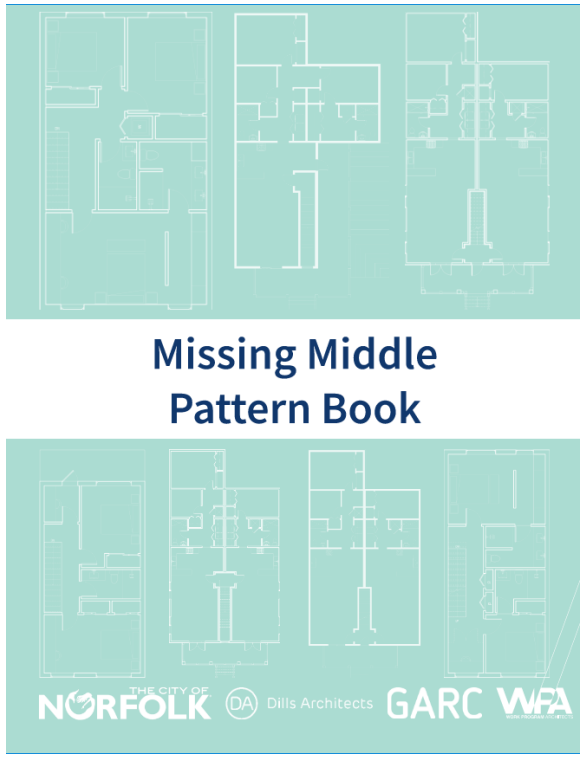
Stacked Townhome Building





Missing Middle Resources



https://wparch.com/projects/urban-design-planning/missing-middle-pattern-book/

Missingmiddlehousing.com

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Phius Testing in “Missing Middle” Housing Types

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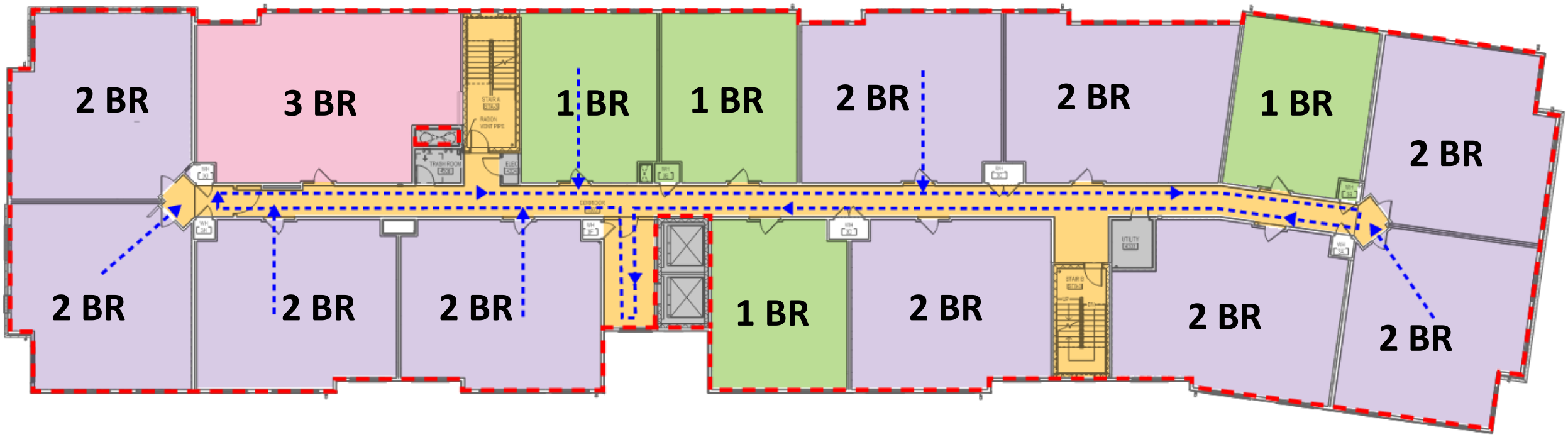
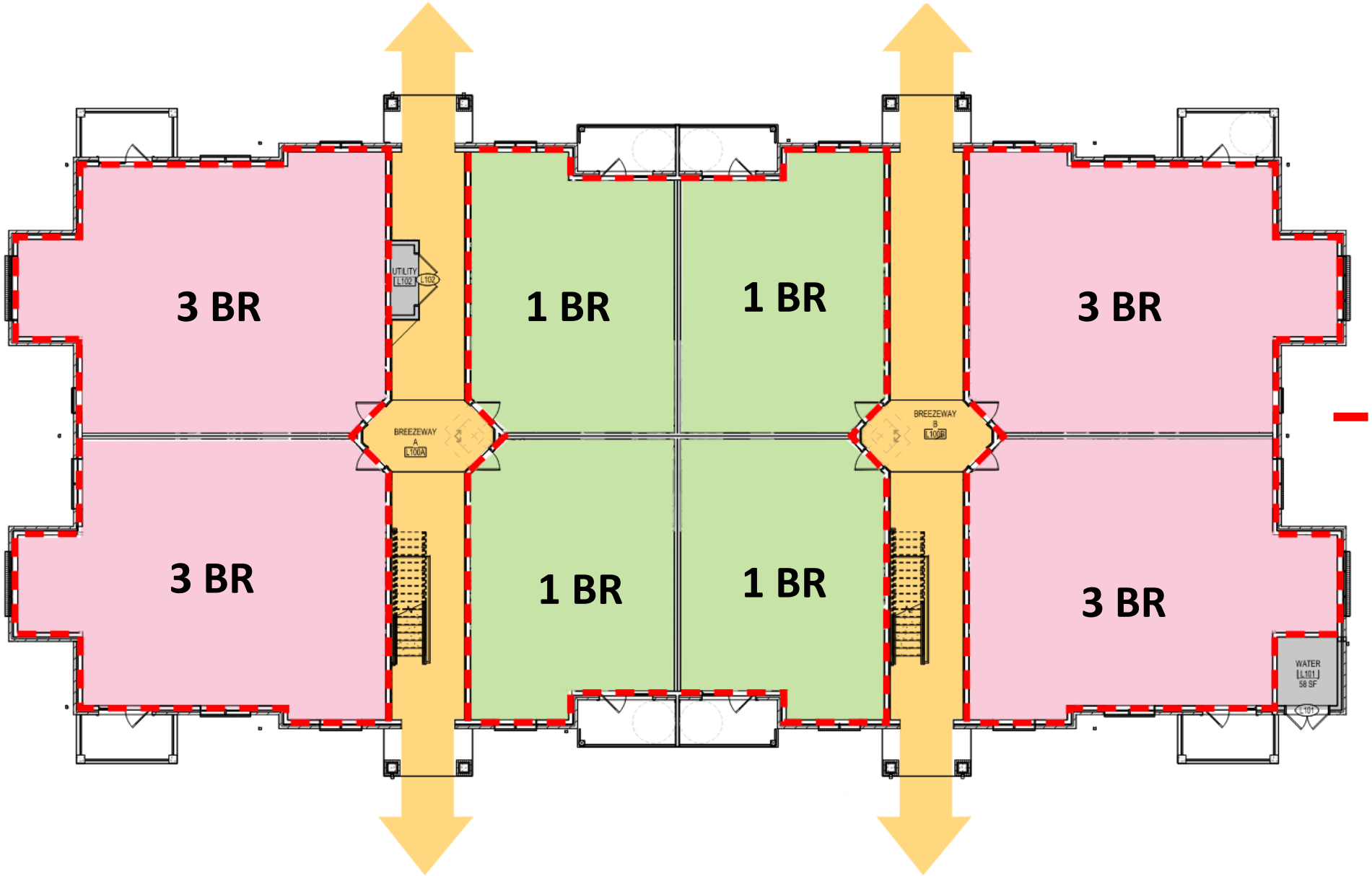
Testing Traditional Elevator Buildings



Testing Non-Traditional Buildings



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Case Study Testing – Guarded Units

- Fan procurement
- Power challenges
- Trained staffing shortage
- Air balancing guarded units
- **Results 26% above target**

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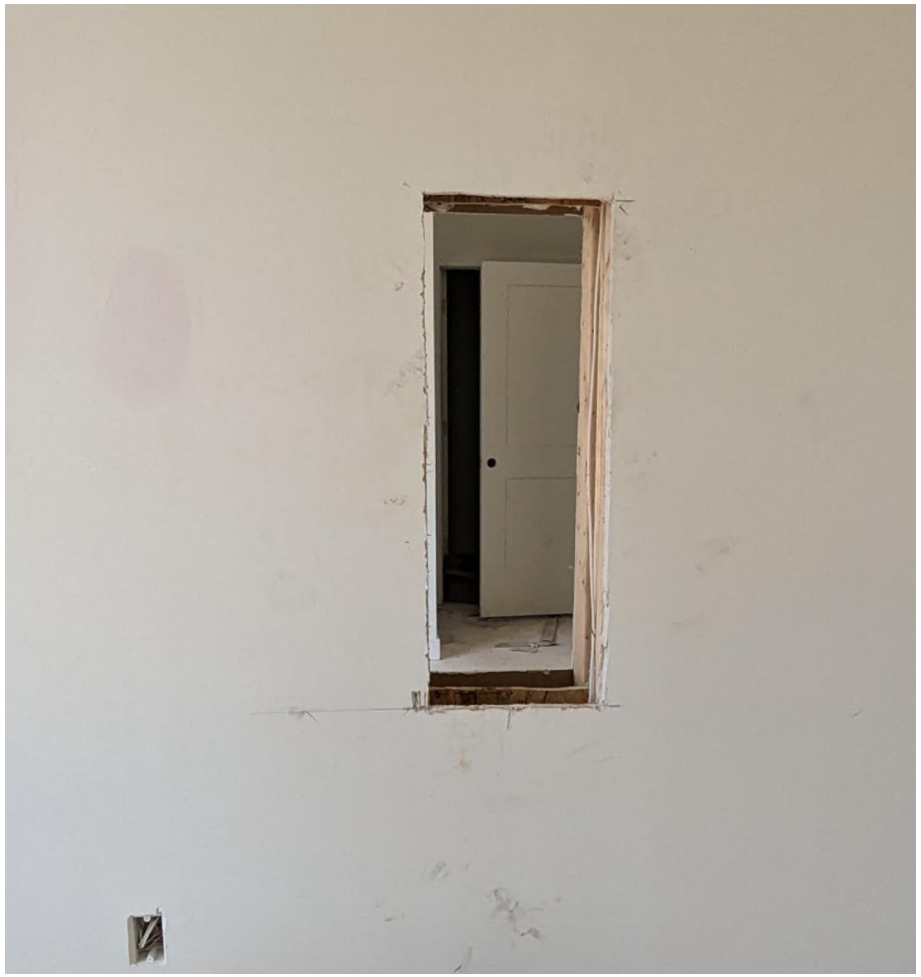
Cast Study Testing – Aerosol Envelope Sealing

- “Hail Mary” strategy
- Significant added cost
- Implemented too late in the project
- Enduring power challenges
- **Results 100% above target**

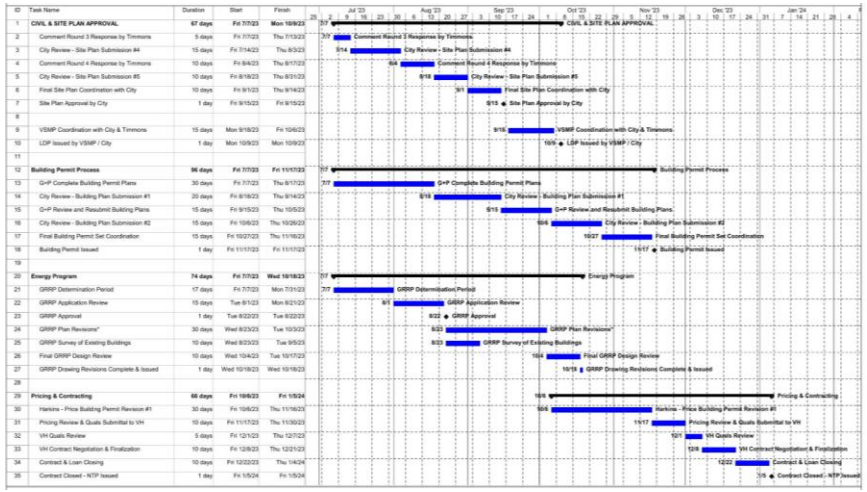
Case Study Testing – Communicating Openings

- Power challenges
- Communicating openings not sealed – new leak points?
- Testing eating into construction schedule
- Most air leakage observed at ceiling/attic (where detail not constructed as designed)
- **Results 9.5% above target**



Testing Non-Traditional Buildings

phius ≠ ENERGY STAR



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Lessons Learned

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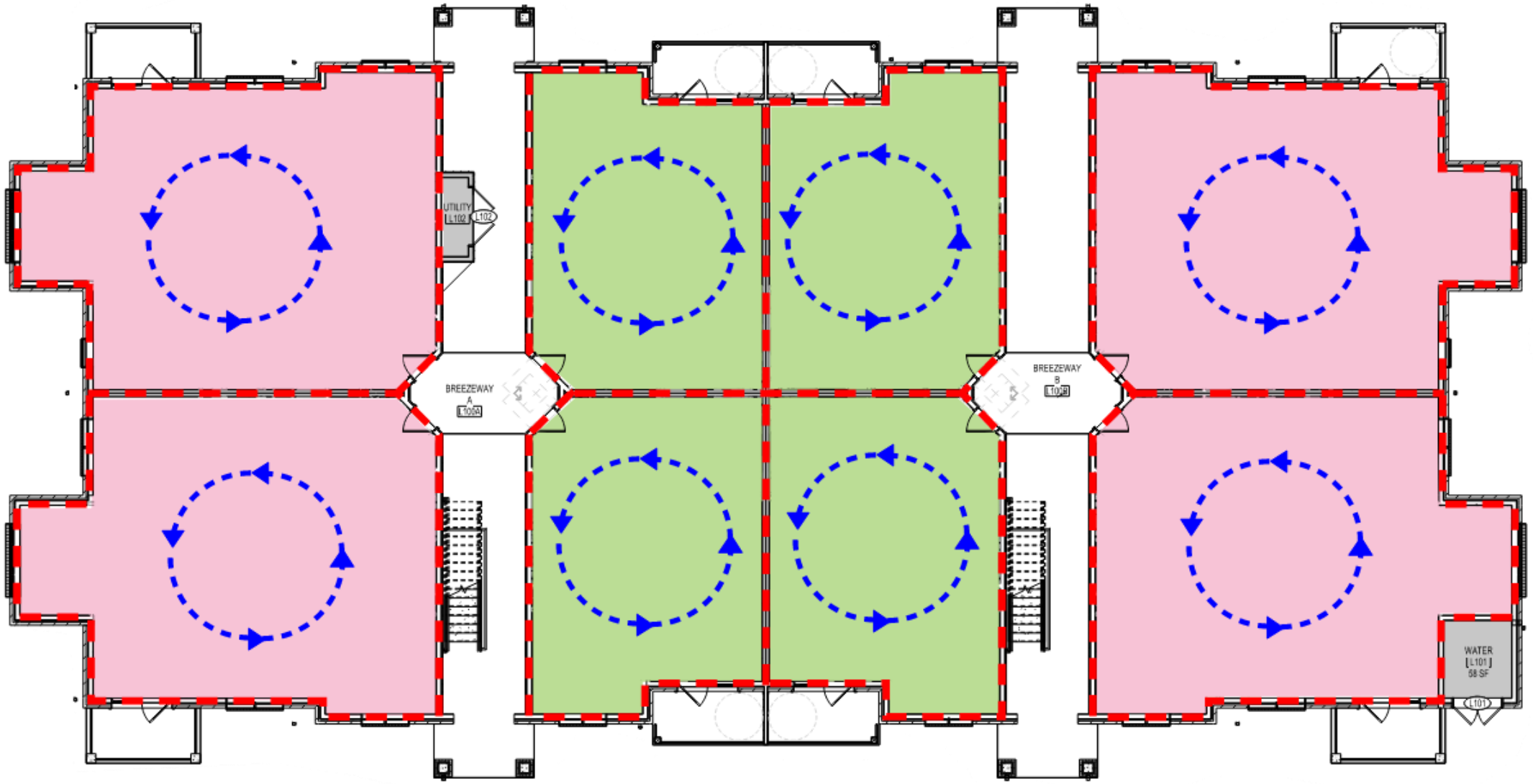
Strategy #1: Design it like a traditional townhouse



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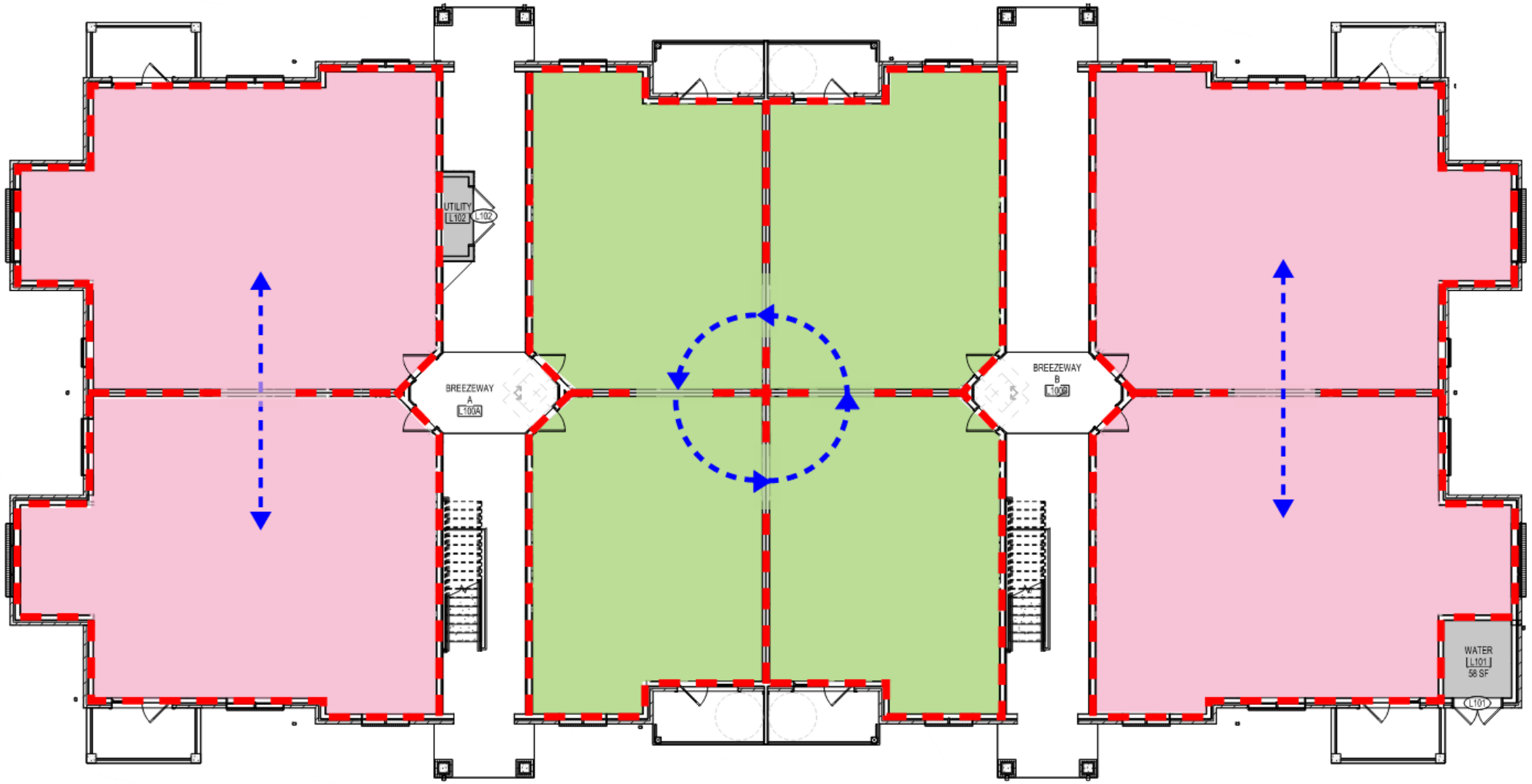
Strategy #2: Create temporary “doors” to connect units



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Takeaways

- Review testing procedures in detail **BEFORE** construction
- Include testing & prep time in construction schedule
- Include testing **IN** your building design
- Communicate with your team

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Thank You!

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