TOWARD A NEW INDUSTRY FOR CONVERTING OBSOLETE OFFICE BUILDINGS TO RESIDENTIAL USES

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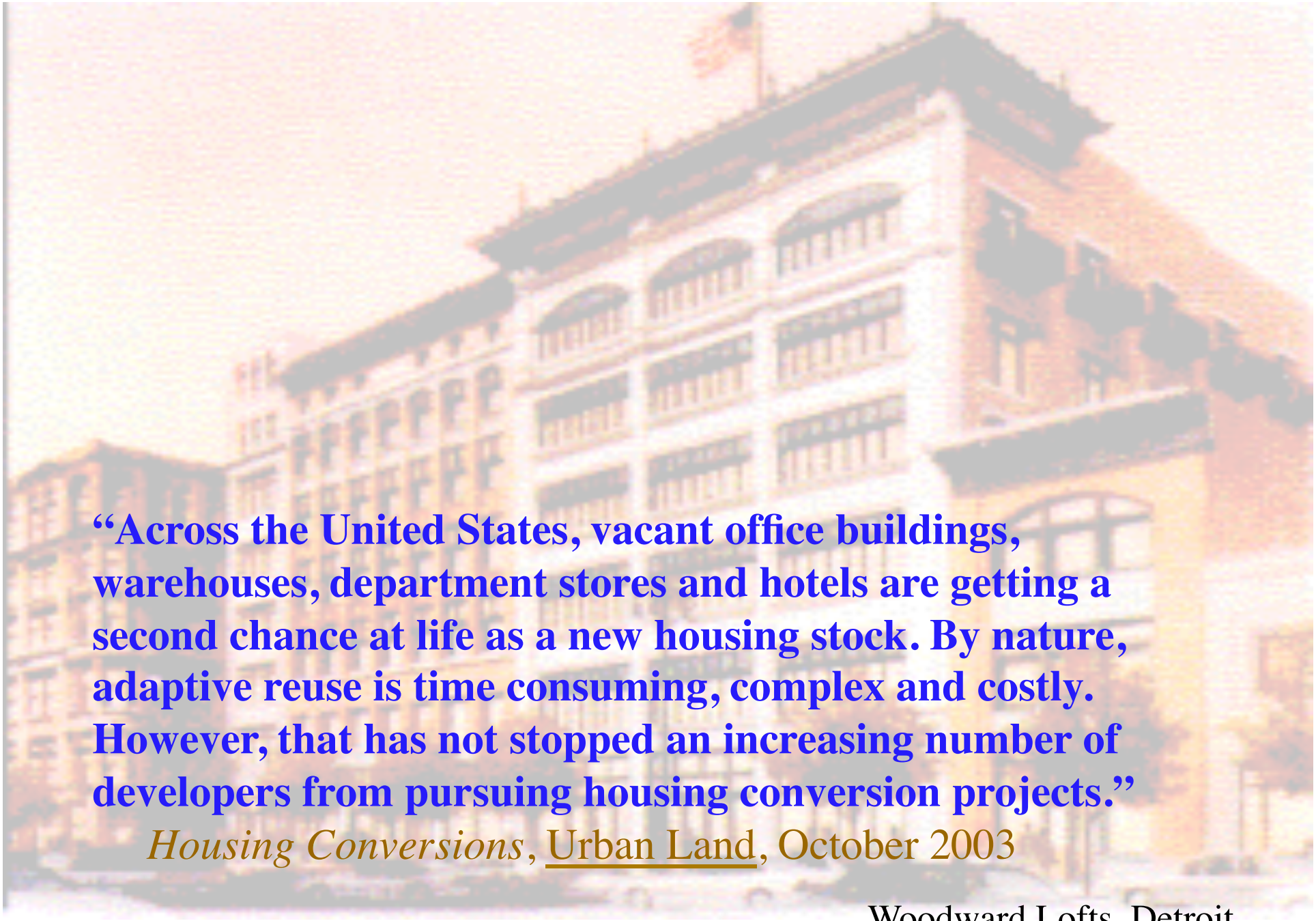


"Across the United States, vacant office buildings, warehouses, department stores and hotels are getting a second chance at life as a new housing stock. By nature, adaptive reuse is time consuming, complex and costly. However, that has not stopped an increasing number of developers from pursuing housing conversion projects."

Housing Conversions, Urban Land, October 2003

Woodward Lofts, Detroit

“Office vacancy rates have been rising across the country. Older Class B and Class C buildings in most markets have been hit particularly hard, because so much new or nearly new Class A space is available for lease or sublease. At the same time, many cities are struggling with significant housing shortages, because residential construction and renovation have not kept up with demand, and because many cities have started growing again after years of stagnation or decline.“

“Converting Commercial Space to Residential”, Urban Land, January 2003.

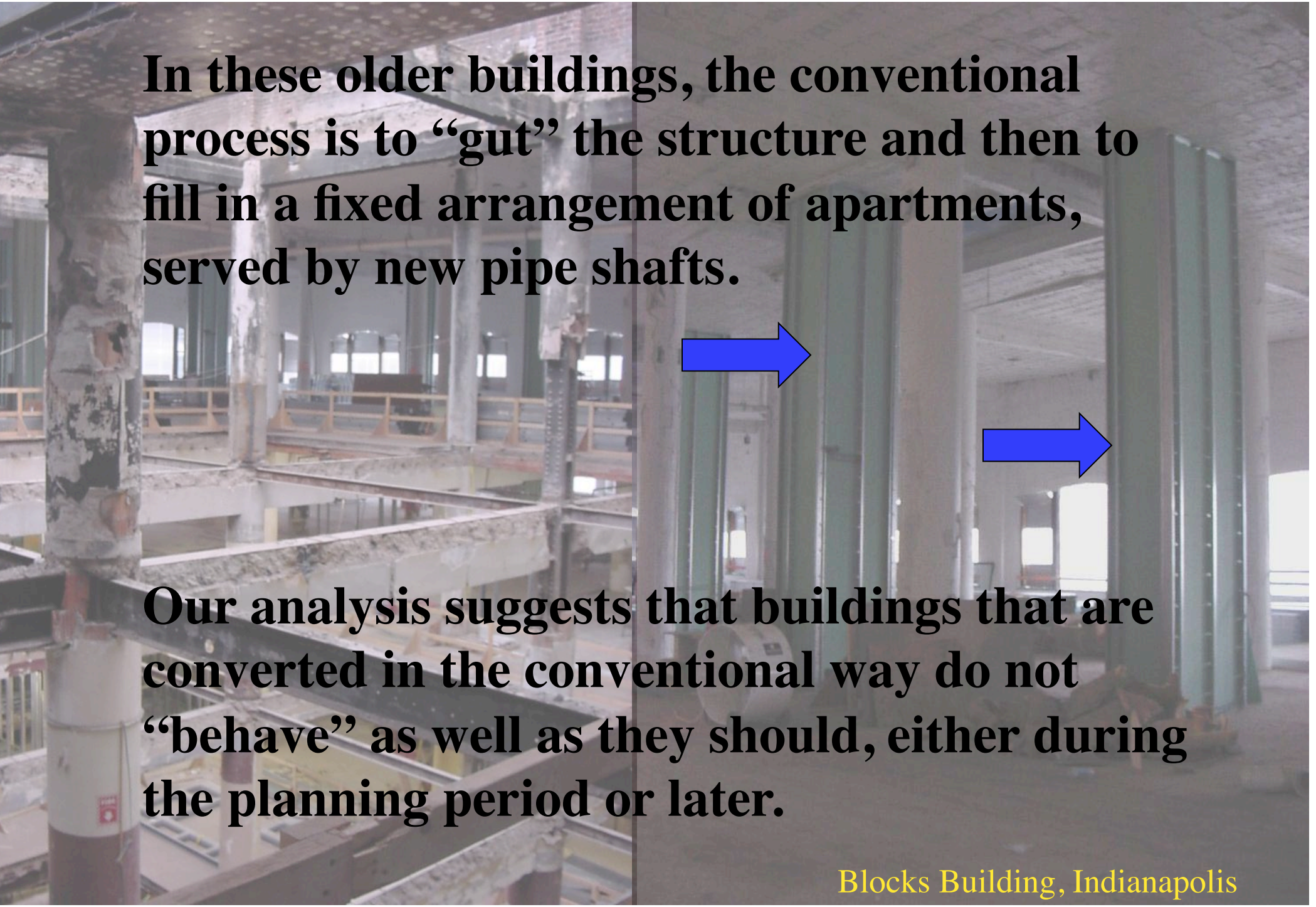
Woodward Lofts, Detroit

Analysis of these trends by our research team has led us to examine a new business and industry strategy for converting existing buildings.

This strategy is based on lean construction and open building principles.

We think it may help overcome some of the difficulties inherent in current methods.

Mitchell Building, Muncie



In these older buildings, the conventional process is to "gut" the structure and then to fill in a fixed arrangement of apartments, served by new pipe shafts.

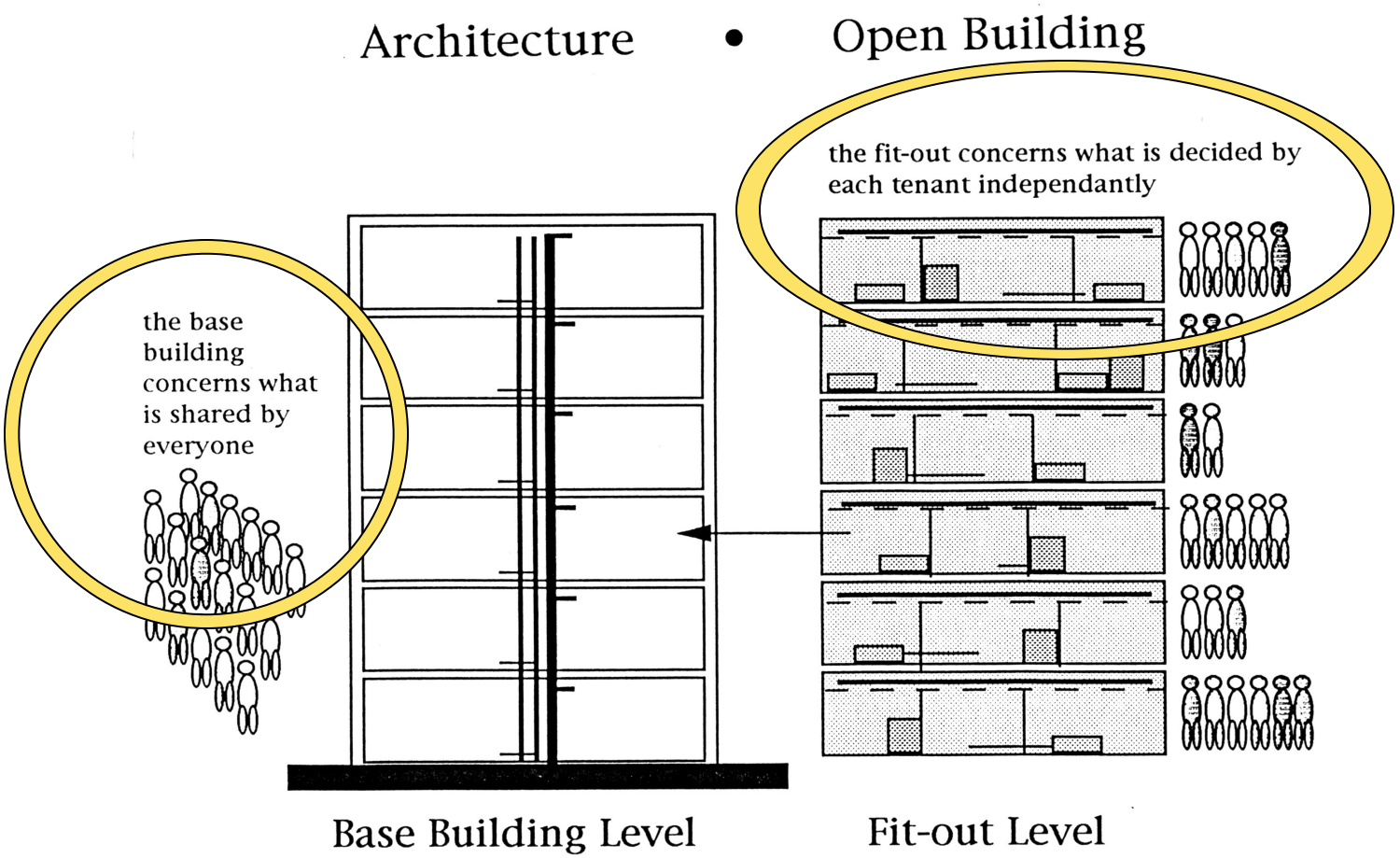
Our analysis suggests that buildings that are converted in the conventional way do not "behave" as well as they should, either during the planning period or later.

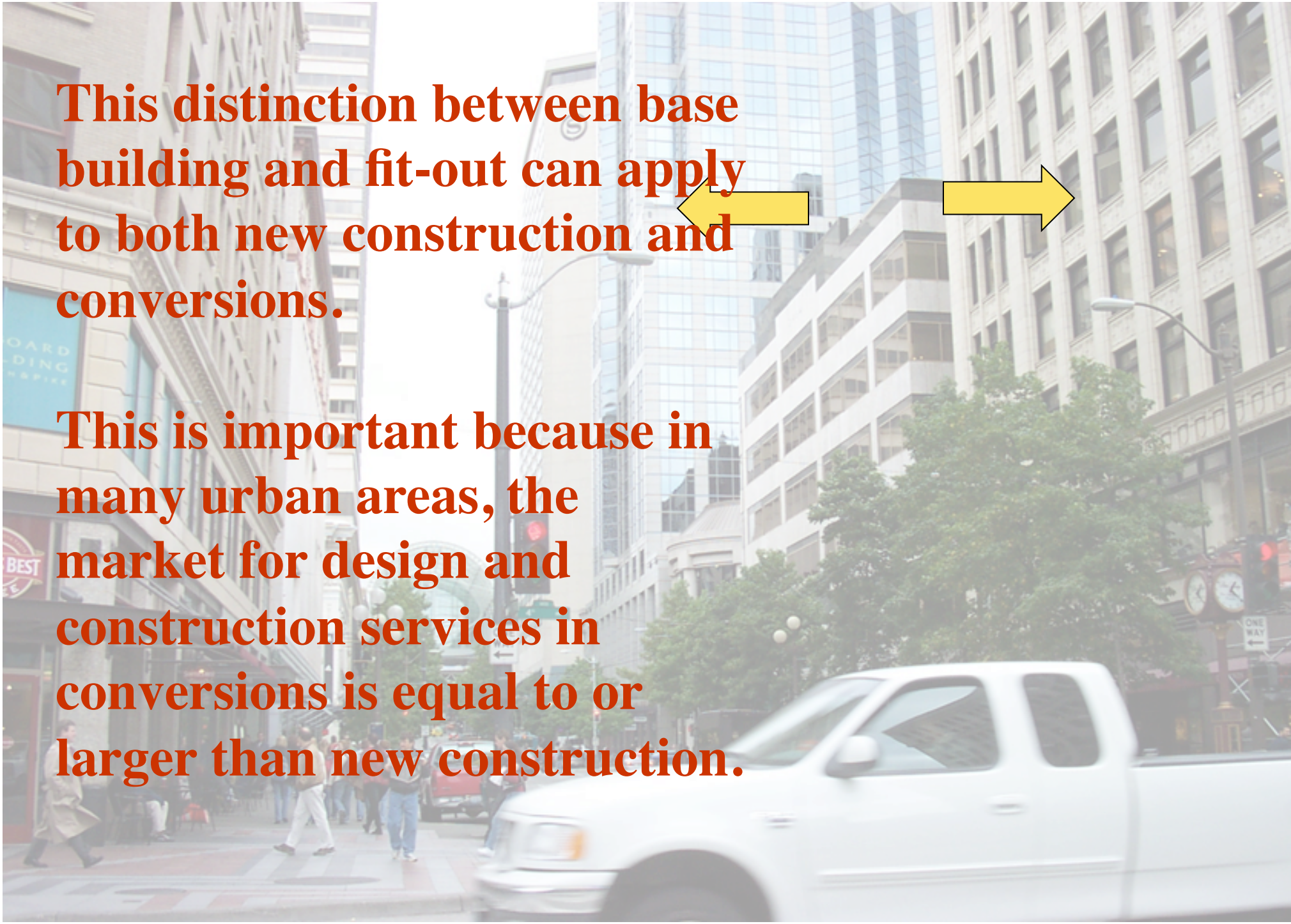
Blocks Building, Indianapolis

Actually, "new" residential buildings are "existing" after construction. But - with exceptions such as this building in Seattle - they too do not behave well in respect to inevitable change.

Banner Building, Seattle

Some technical terms used in the United States are helpful in describing the approach we are studying: they are **base building and fit-out**. These are familiar in the office market, and may become conventional in residential conversion work in the future.





This distinction between base building and fit-out can apply to both new construction and conversions.

This is important because in many urban areas, the market for design and construction services in conversions is equal to or larger than new construction.

This distinction is also useful in new light-frame construction. We are starting an R&D project with a prominent residential homebuilder to develop a new townhouse type using a SHELL - FITOUT approach, for the highly competitive and consumer-oriented urban housing market.

One of our guiding principles is to hold the individual household in mind. This is valid whether we build a rental or a for-sale project.

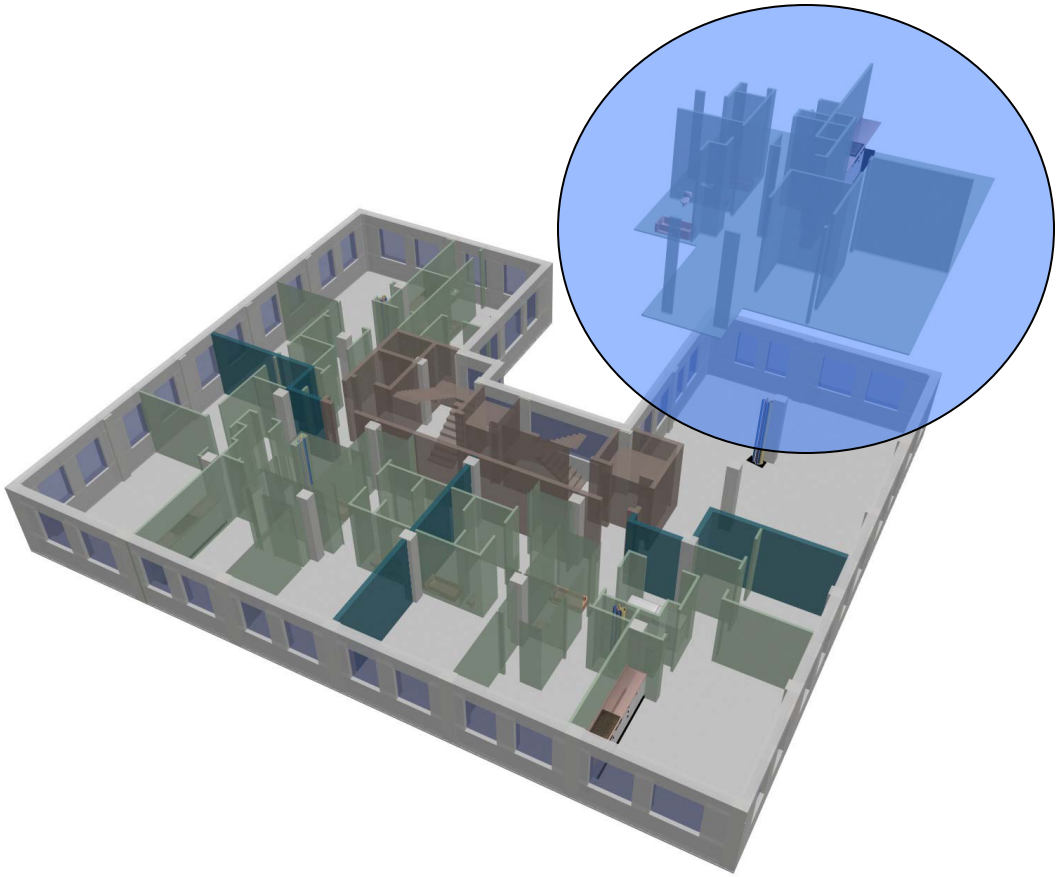
Doing so has not been easy in multi-unit buildings, where individuals are ignored in favor of bureaucratic or corporate efficiencies.

In both converted and new buildings, it should be possible that each dwelling unit is decided individually. The principle is: autonomy for the individual unit in large projects.

The key to this, we think, is "open building" and a new approach to work structuring.

In this new process, households can decide what they prefer with professional help, or the developer can decide what units to install.

I'd like to briefly discuss the approach we are studying for building conversion. It requires a change in design methods, logistics, work structuring and installation processes focused on **INTEGRATED INTERIOR FIT-OUT.**



Kales Building, Detroit

This is the building we are now using in a detailed case study.

It was built in 1923 as corporate offices and is a registered historic property.

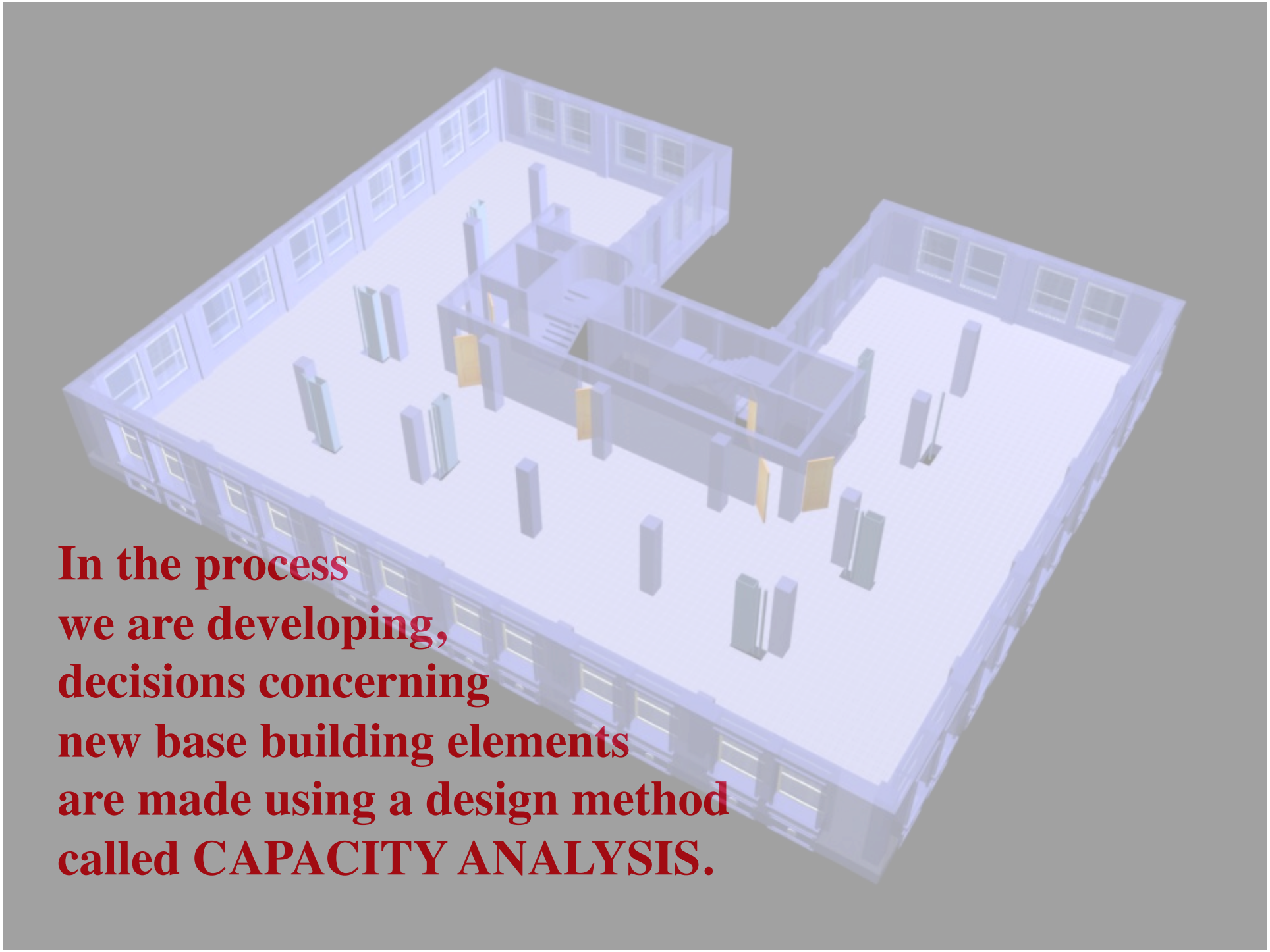
This study is being done simultaneously with the actual conversion of this building, to allow good comparisons.

This is what the top floor of the Kales Building looked like on November 5, when Professor Matsumura and his research team visited the building.

It shows the condition of the building after many years of vacancy and deterioration.

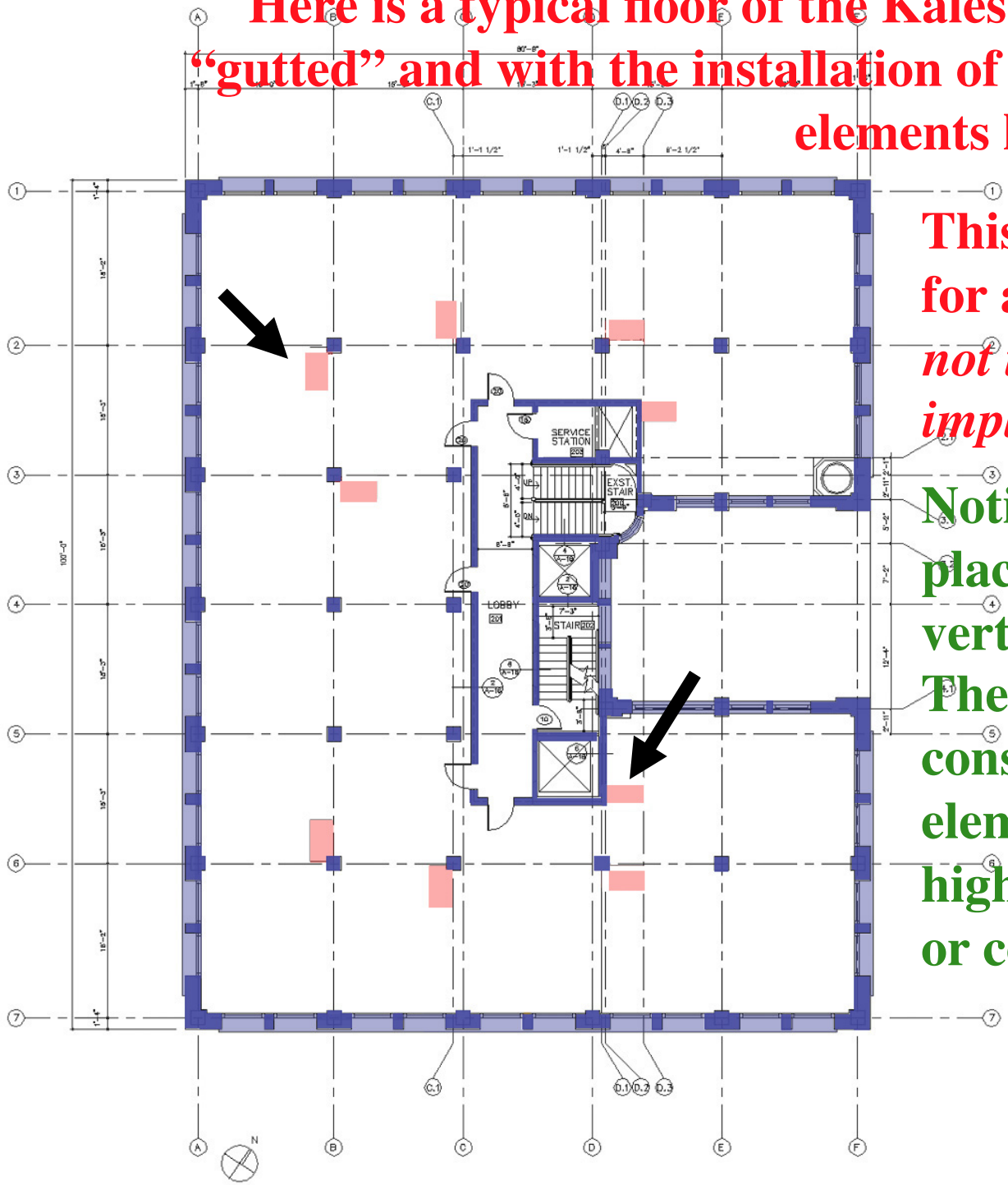
Large, conventionally organized conversion processes such as the Kales project

- Often require 5 or more years to complete;
- Must deal with unpredictable changes in financing, regulations, market conditions (competition) and so on;
- Must deal with the resulting frequent changes in architectural and planning decisions regarding number of units, floor plans, cost estimates, and technical systems;
- Cannot respond to “first buyer” preferences;
- And result in tightly integrated and inflexible buildings that cannot respond well to future changes in consumer preferences and technical system upgrades.



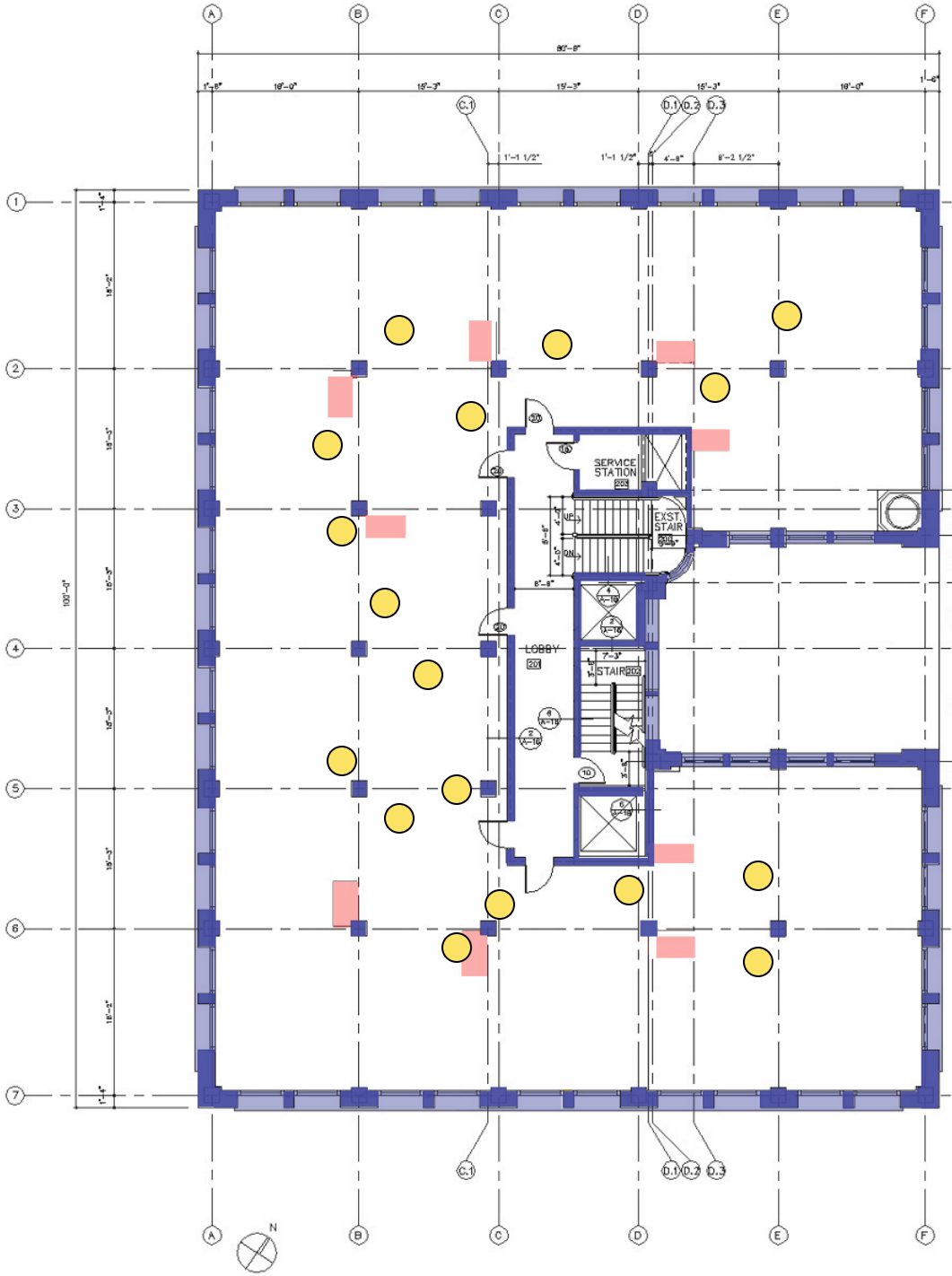
In the process
we are developing,
decisions concerning
new base building elements
are made using a design method
called CAPACITY ANALYSIS.

Here is a typical floor of the Kales Building after being "gutted" and with the installation of new "base building" elements like vertical services.



This is our proposal for a new base building, *not the design being implemented.*

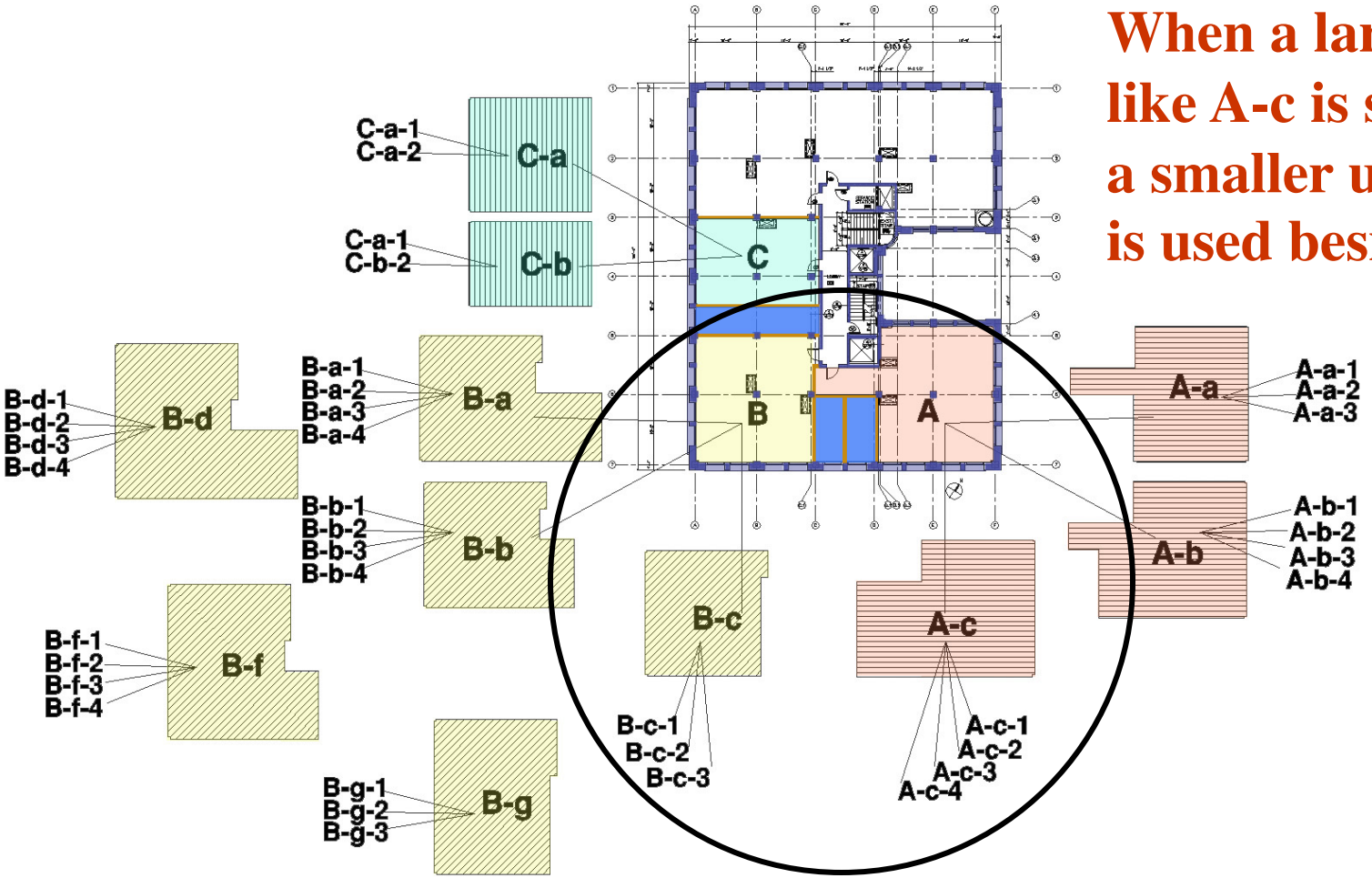
Notice our proposed placement of the vertical pipe shafts. These are the most constraining physical elements in a residential high-rise, newly built or converted.



Our recommendation for the position of vertical piping shafts (shown in pink) is radically different from what is actually being installed - shown schematically in yellow dots.

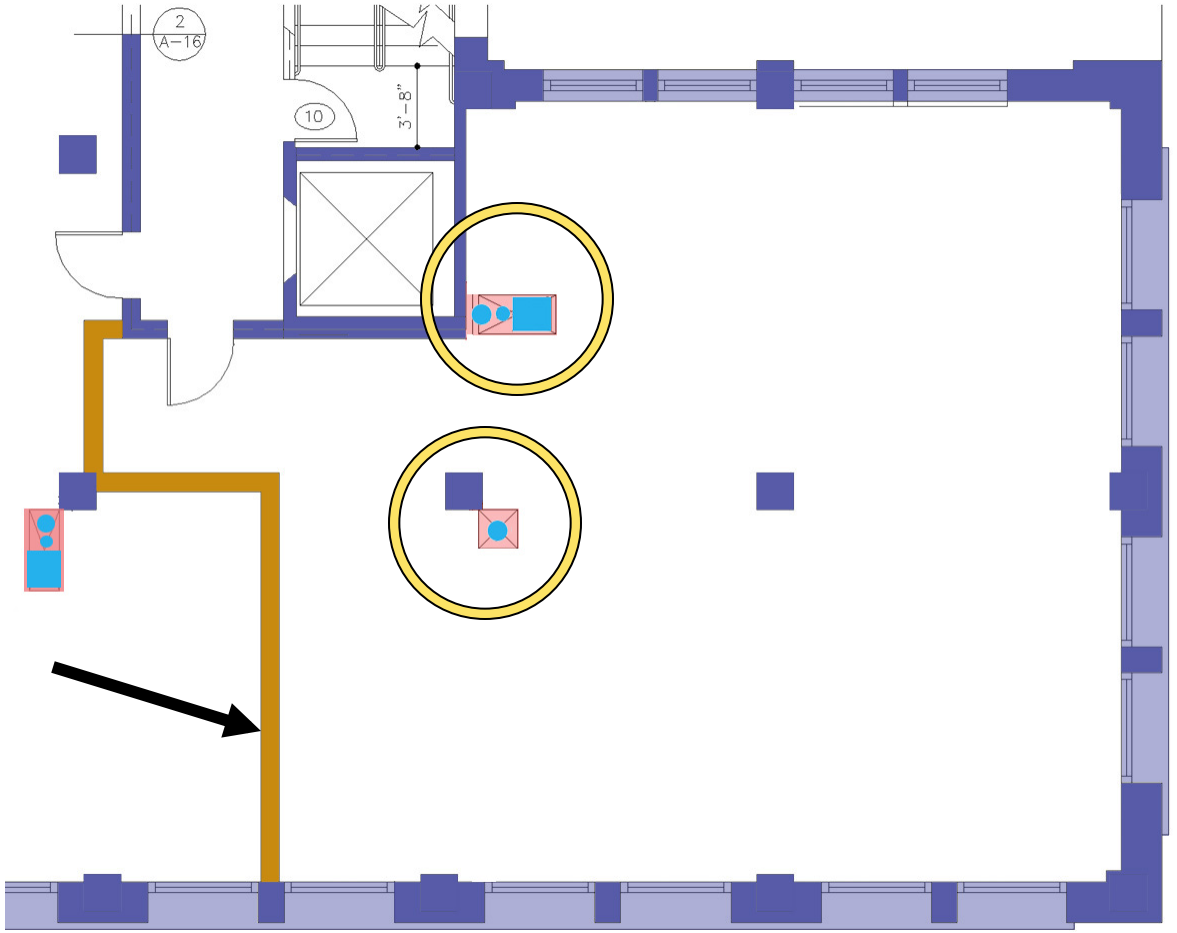
The pipe penetrations being built coincide with the unit sizes and floor plans finally selected for construction. Their locations have changed four times and once fixed do not allow other unit sizes or layouts.

A full **CAPACITY ANALYSIS** results in a diagram like this. It demonstrates to the developer the available choices of unit sizes, on any floor of the building. Each floor can be different. **FOR EVERY UNIT SIZE, 3 OR MORE FLOOR PLANS ARE POSSIBLE.**

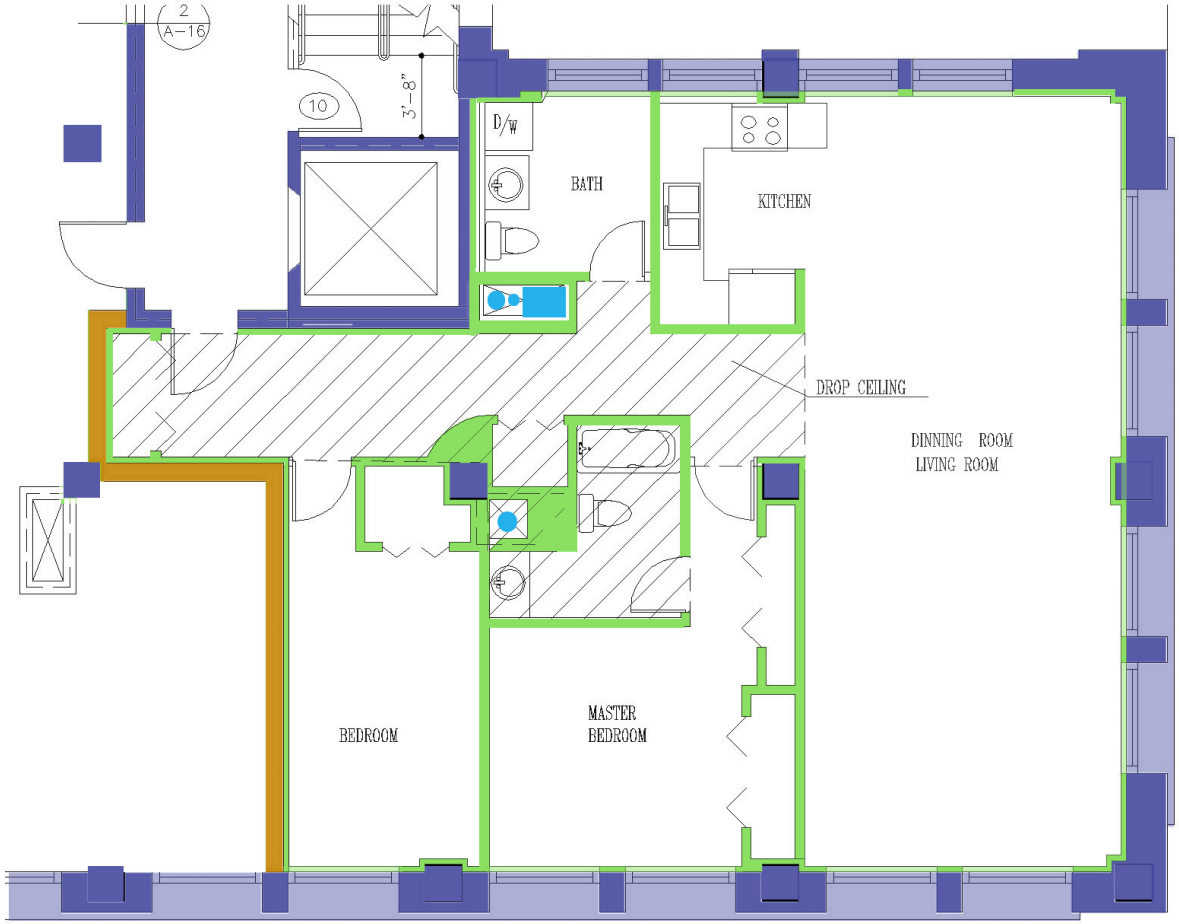


When a large unit like A-c is selected, a smaller unit B-c is used beside it.

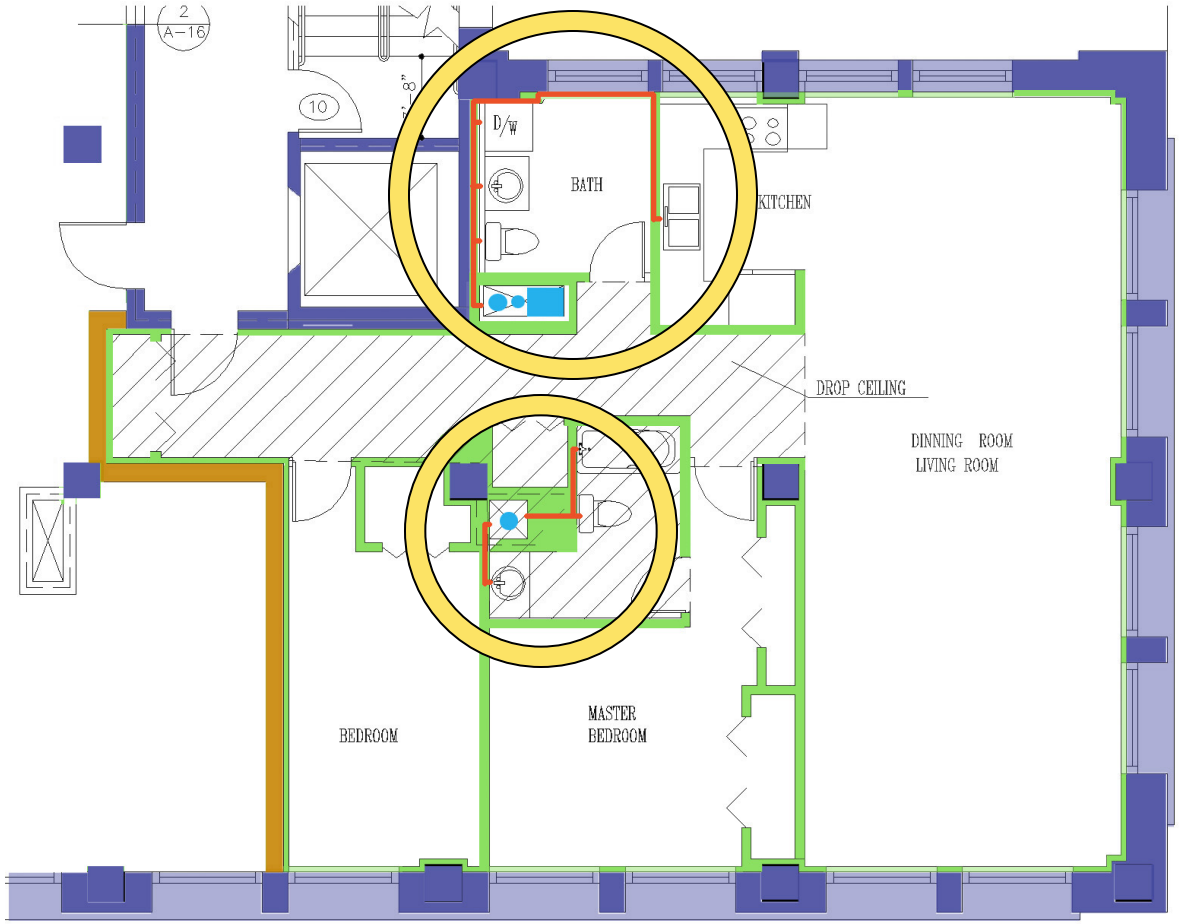
Here is one of the units from the previous diagram with no floor plan. The "base building" is in blue. Notice the two vertical plumbing shafts that are part of the proposed base building. The "demising wall" is yellow.



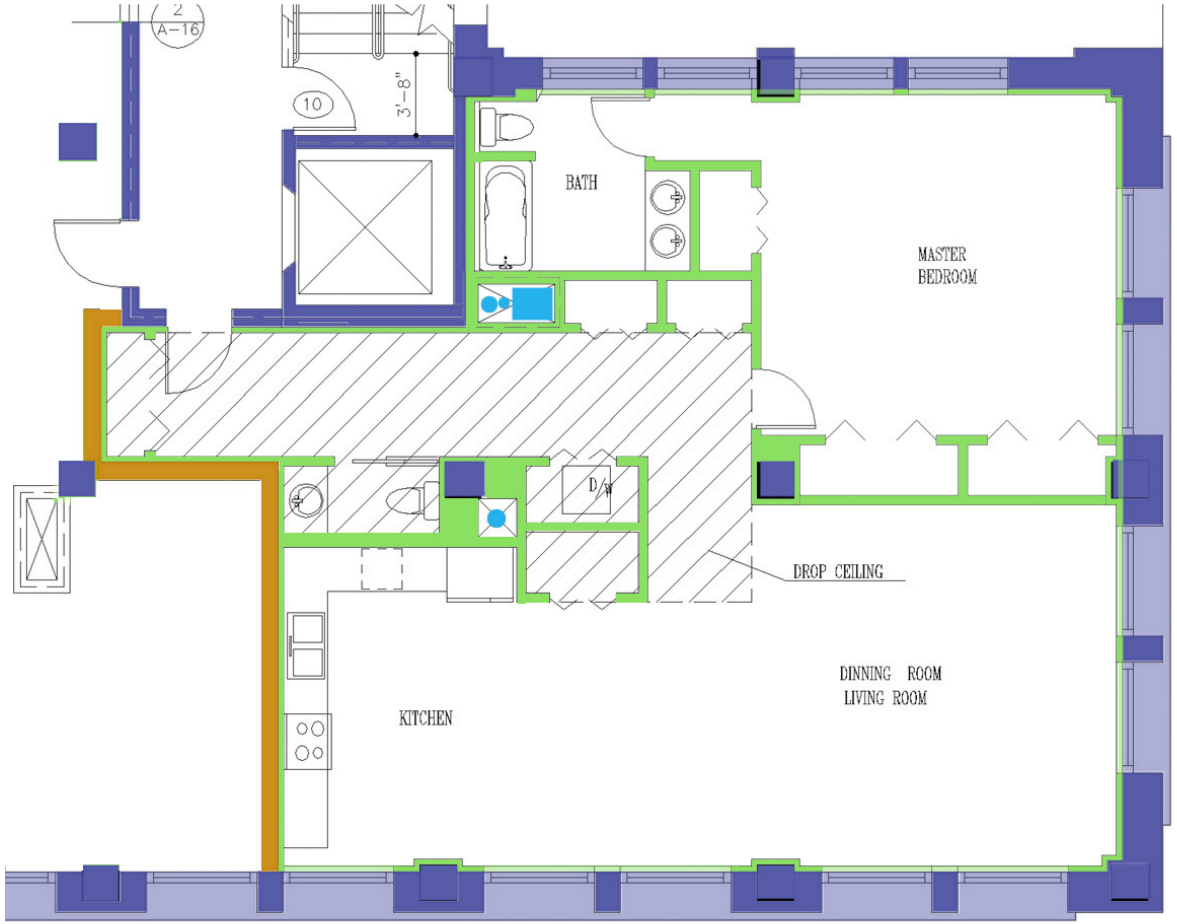
Here is one optional floor plan in this space. The parts colored green are the "fit-out" parts. They can be decided independently of other units in the building.



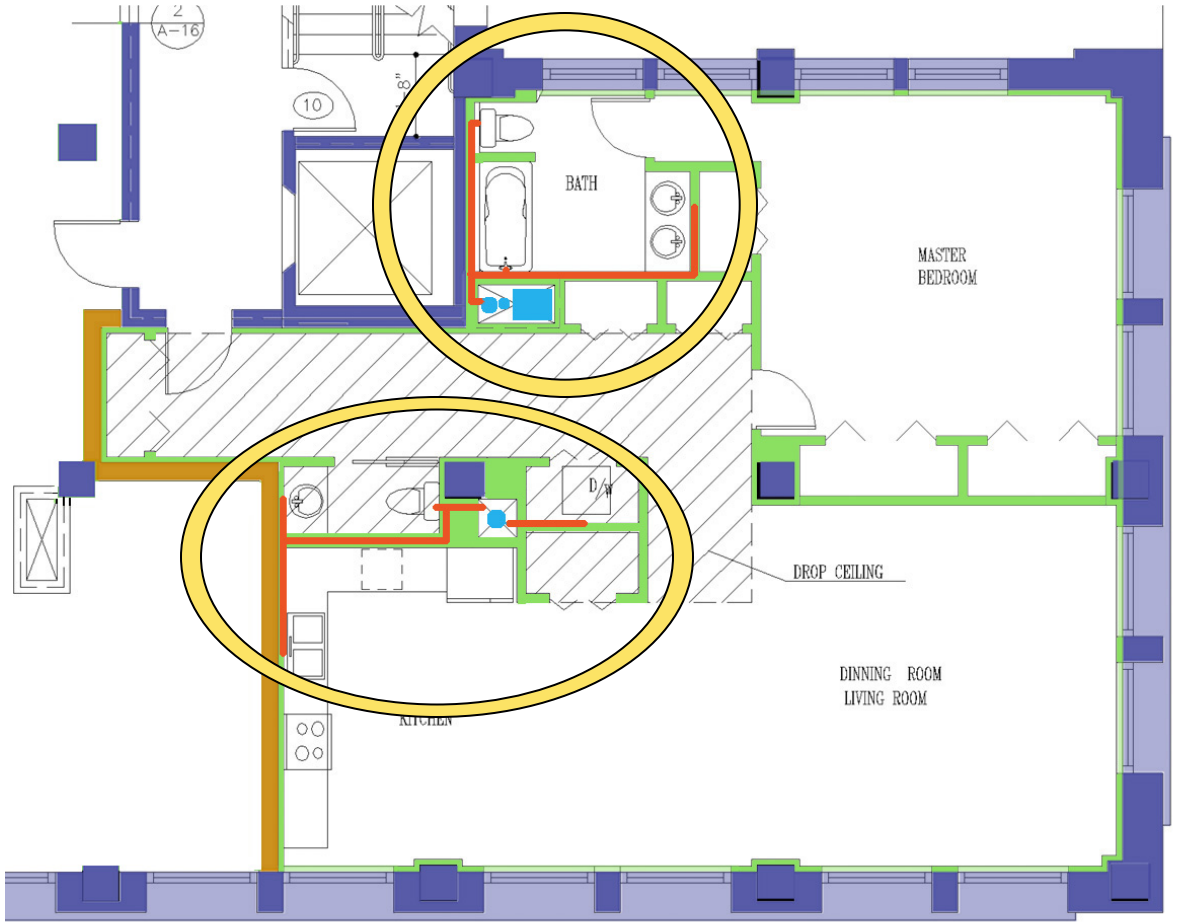
This is the horizontal piping diagram for that floor plan. We avoid any vertical penetrations except at the base building pipe shafts. All other piping stays inside the dwelling unit's territorial boundaries.



This is another variation in the same space. Many other variations are possible.

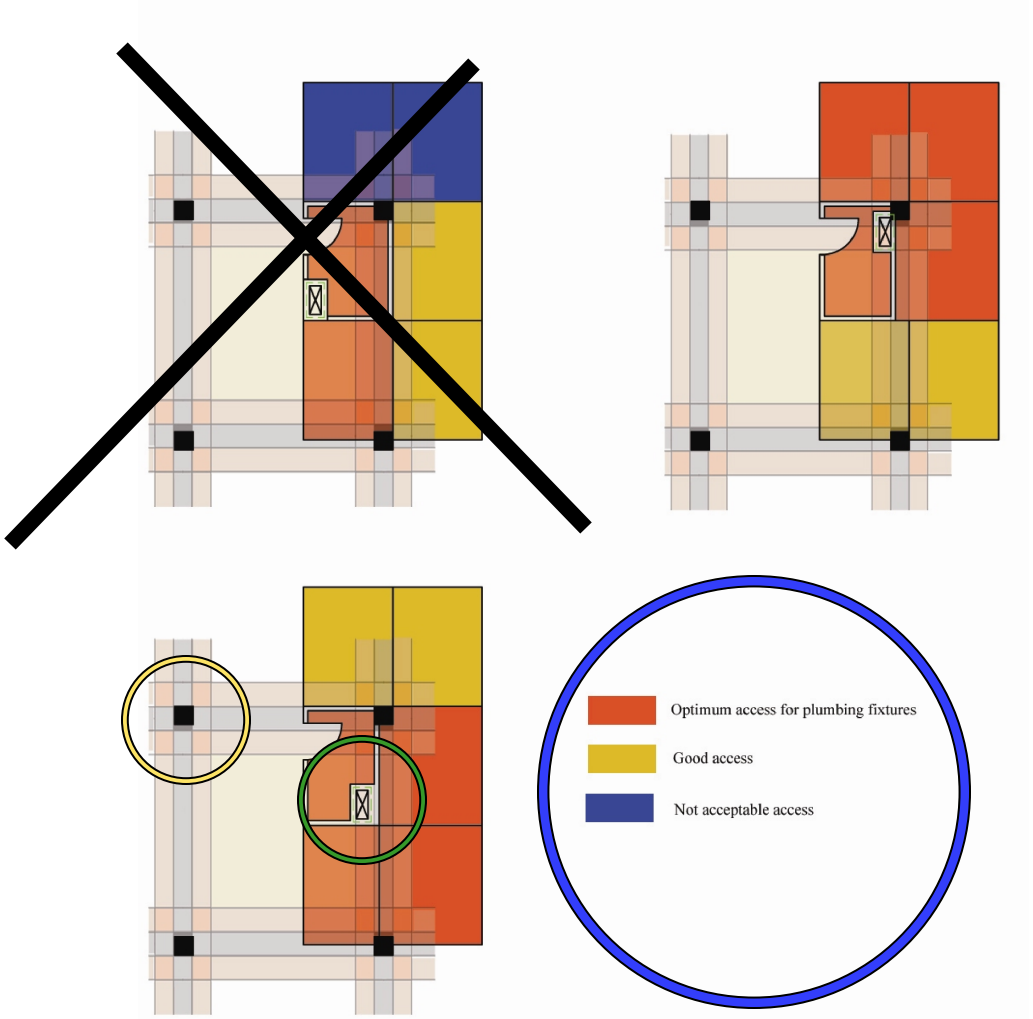


Here is the drainage piping for that unit, shown in red.



Designing Constraints for CAPACITY ANALYSIS

We have been working on the ***design of constraints*** or rules. Such rules are important to anyone doing capacity analysis, a basic part of an open building approach.

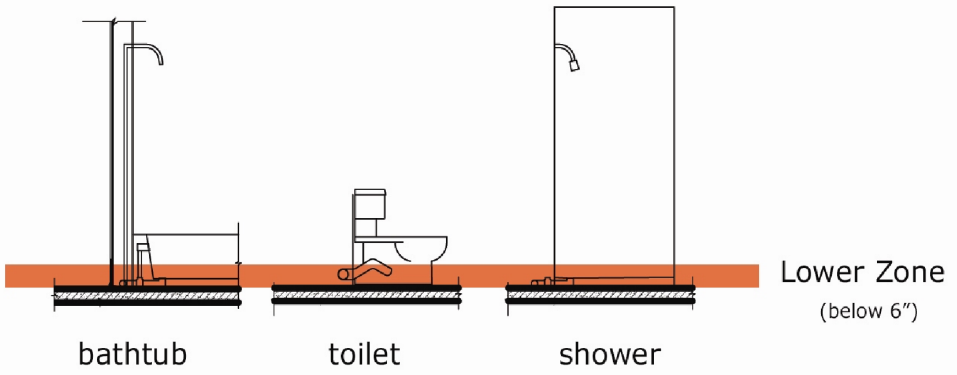


These diagrams help us consider alternative positions for the vertical plumbing stack in relation to the structural columns and the spatial zones for bathrooms and kitchens.

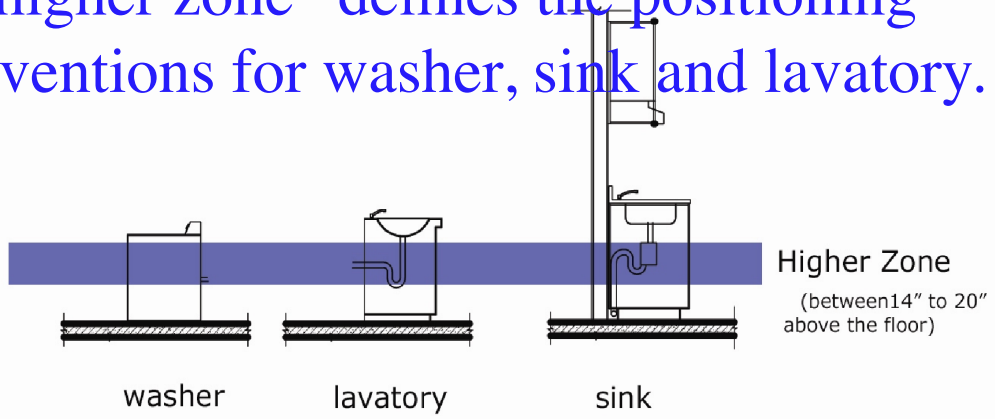
Designing Constraints for CAPACITY ANALYSIS

We have also studied the general conditions for horizontal routing of drainage lines considering building code requirements.

A “lower zone” defines the positioning conventions for WC, shower and tub.



A “higher zone” defines the positioning conventions for washer, sink and lavatory.

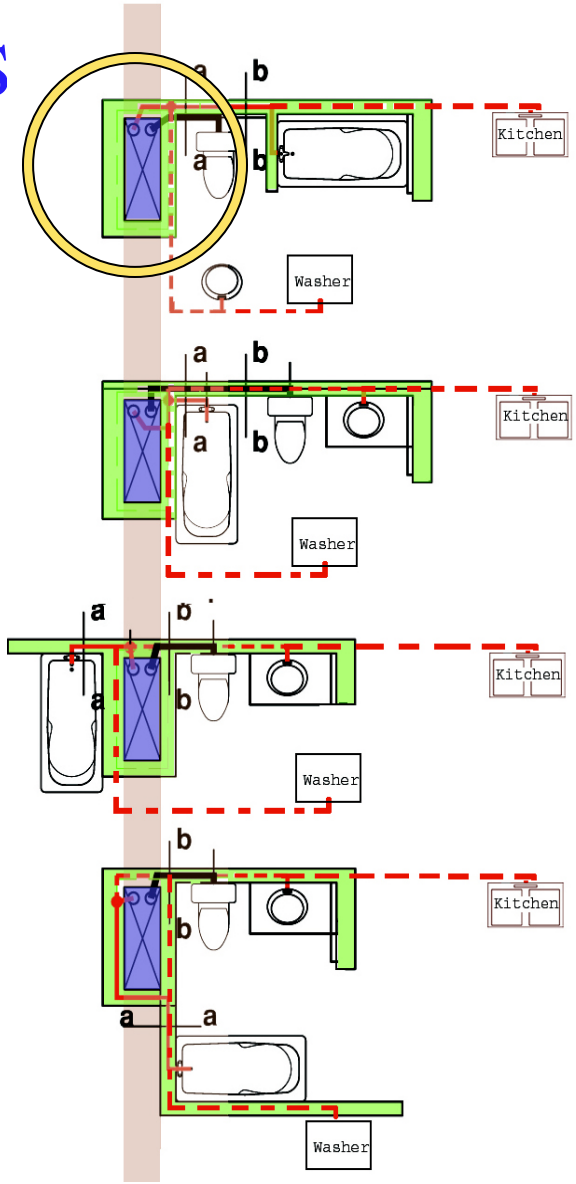


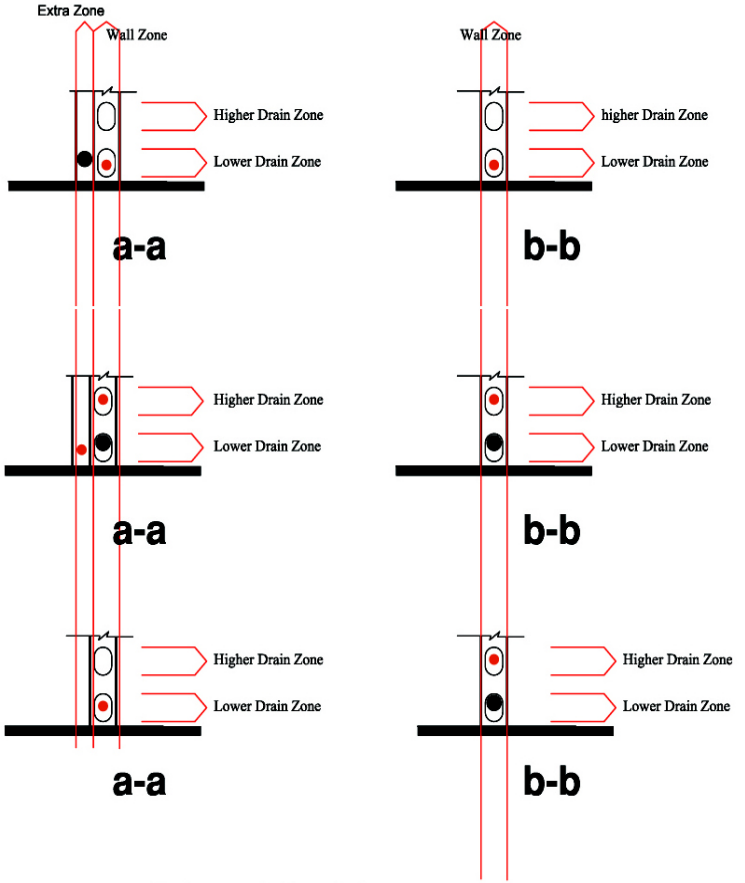
DRAINAGE CONSTRAINTS

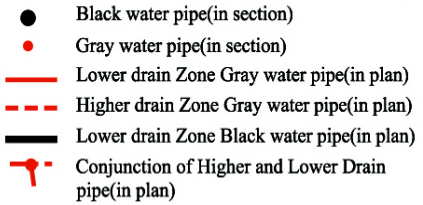
These diagrams are part of our study of the constraints we assume in our capacity studies.

They show a given base building "pipe shaft" with two drainage lines.

The diagrams show how a variety of plumbing fixtures may be positioned while still attaching to the vertical drain lines.







We are not suggesting any unusual products.

That may come later!

The reason for this is that we are first of all proposing a process change. With an industry that avoids risk, we want to demonstrate that this kind of work restructuring can be profitable before introducing new products.

We recommend this approach because:

This gives the developer financing and decision flexibility with a level of choice she can control with IT support.

It offers buyer choice in the case of a condominium.

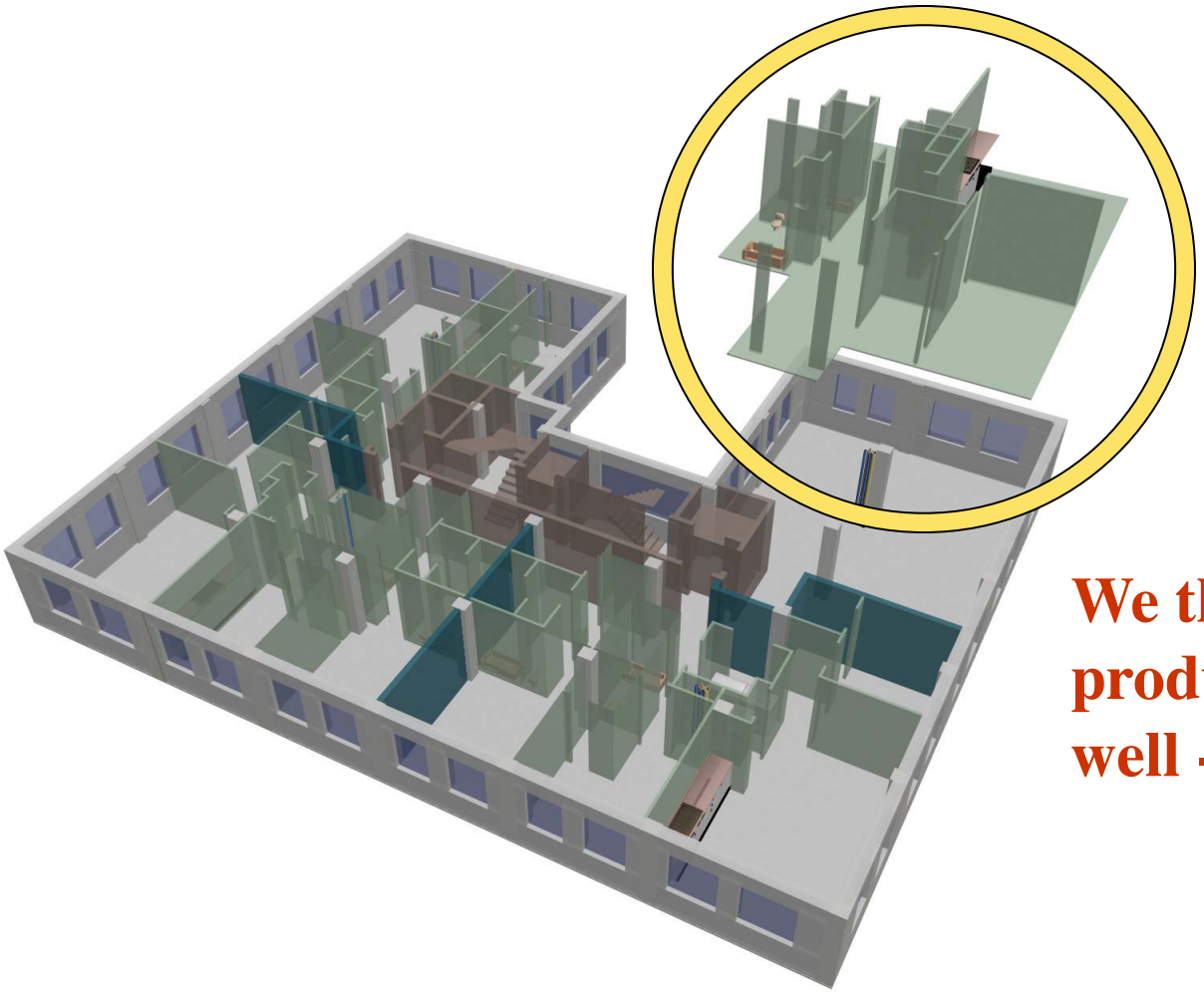
It provides autonomy of each dwelling unit in a multi-unit building, a goal of both occupants and managers.

It also makes later alterations easier, thus making the building more sustainable over a long period.

To implement this idea of autonomous dwelling units in multi-unit buildings, a new supply channel management or logistics strategy is needed.

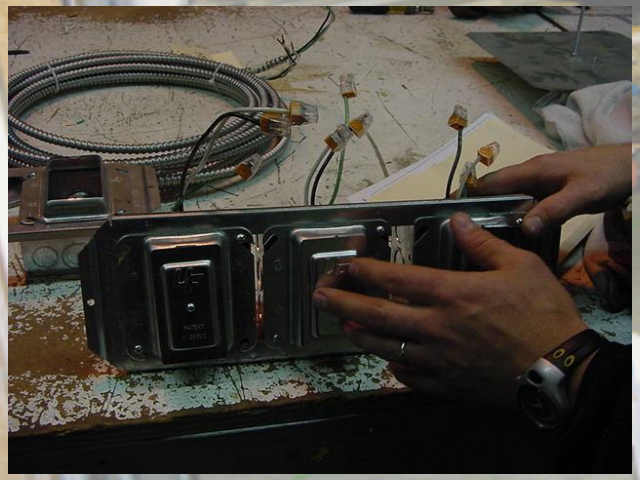
At this time, we are considering two business strategies. One is forming an alliance with Home Depot, a national company that already provides installation services.

We recommend that all parts specified for a given dwelling unit be prepared at an off-site fabrication / distribution facility.



We think of this as the production of a “kit of well - organized parts”.

Here is what an off-site kitting and distribution center might look like. In addition to racks and bins, there will be jigging tables, cut off and other work areas.



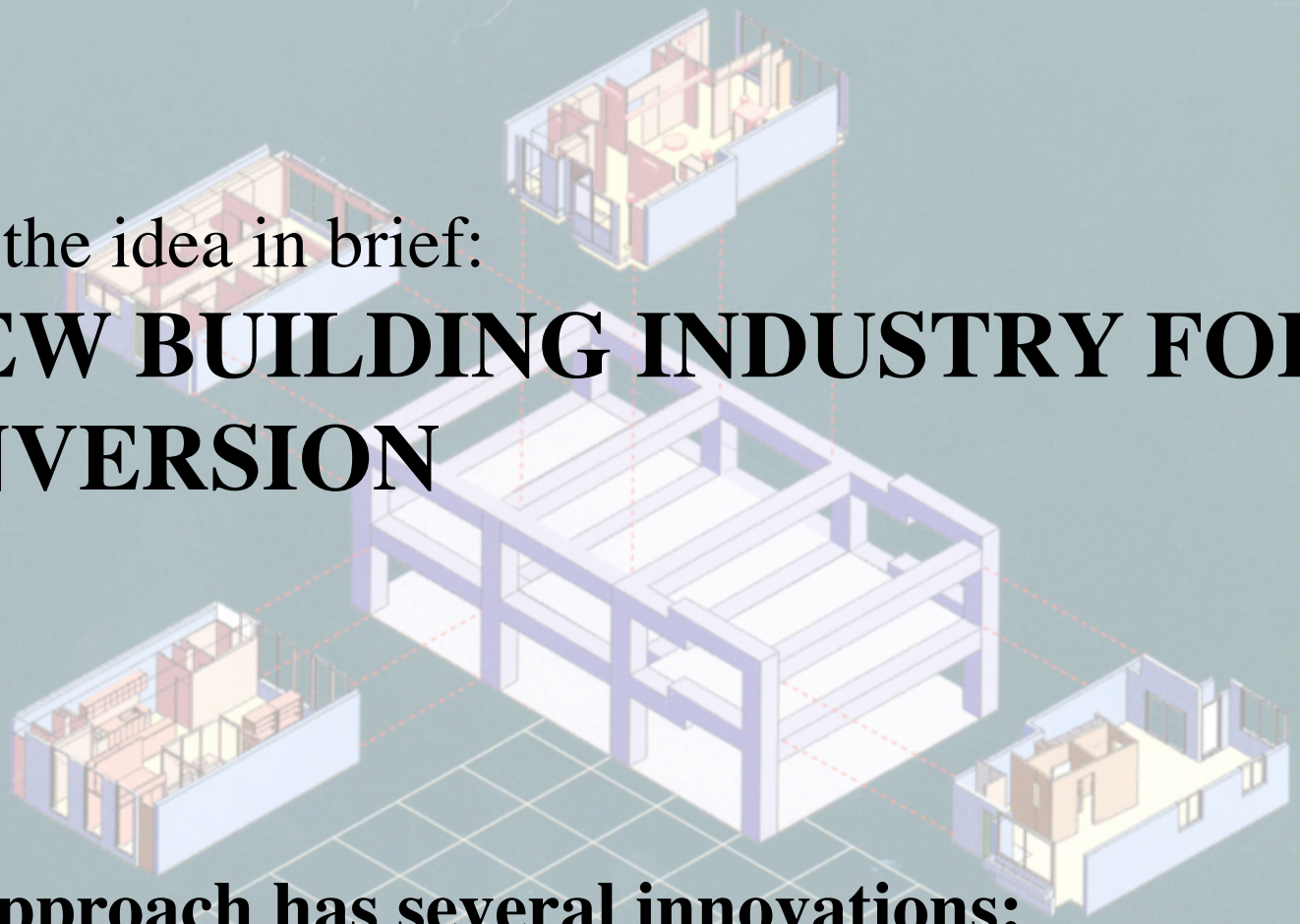
Everything needed to fit-out a dwelling unit is loaded into containers, in reverse order of their installation, and delivered to the site.

All parts are small enough to go into the building elevator and the unit's front door.

In our case study, we deliver the fit-out "kit" in several "bundles", given the size of the space to be fitted out, the number of elevators and other site conditions.

That's the idea in brief:

A NEW BUILDING INDUSTRY FOR CONVERSION



This approach has several innovations:

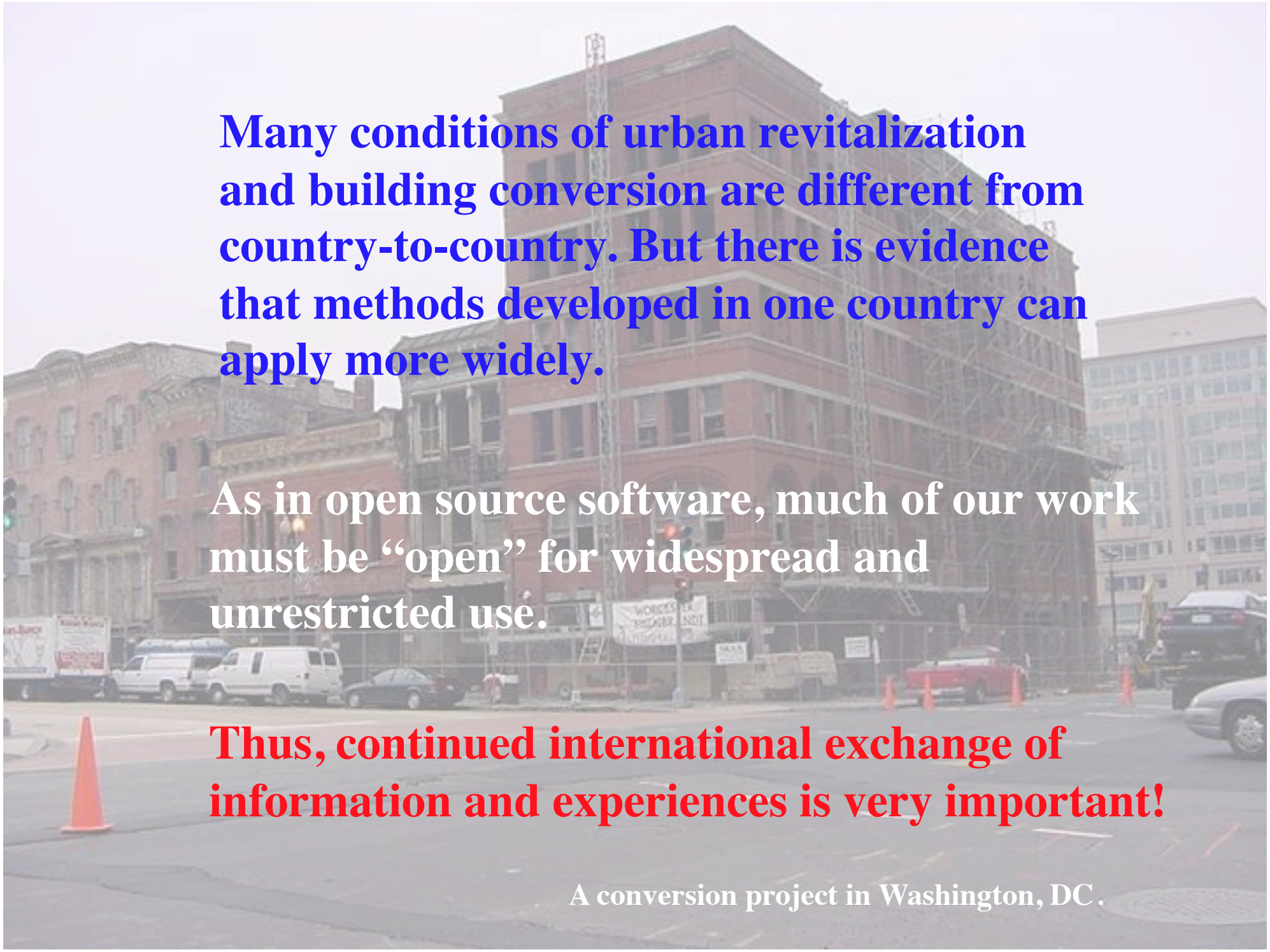
1. **New design methods for architects**
2. **A new logistics strategy**
3. **Improved work flows delivering turn-key dwellings**
4. **Improved information management systems**

IN SUMMARY

We have to ask architects to design conversion projects with "accommodation capacity" that can be out-fitted in a variety of floor plans, now and in the future, thus matching real household variety rather than arbitrary statistics or assumptions.

All work in an individual dwelling space must be done without disturbing other units in the building.

New businesses must be formed to produce and deliver "fit-out" packages, thus offering efficient but customized variety to the market.



Many conditions of urban revitalization and building conversion are different from country-to-country. But there is evidence that methods developed in one country can apply more widely.

As in open source software, much of our work must be "open" for widespread and unrestricted use.

Thus, continued international exchange of information and experiences is very important!

A conversion project in Washington, DC.

We would like to thank our industry partners in the US for their courageous participation in risky innovation research.

We especially want to thank Professor Matsumura and the research team working with him in the SUMCOB project here in Japan, for their long term, continuous initiative, friendship and support!

THANK YOU!