

# **Residential Adaptive Reuse:**

Office Retrofit



## A New Way of Living and Working.

Hybrid work culture is here to stay. Our living spaces have shifted to integrate our work needs, responding to new expectations for spacious and versatile residences. With this, the state of the office remains up in the air. The large, traditional office is no longer a necessity for companies, presenting opportunities for new life to be breathed into empty office buildings. One option explored here is for vacant office buildings to be converted into residential or mixed-use buildings that support our new hybrid lifestyle.



## Rethinking Downtowns

Office buildings today are nowhere near full capacity, and downtowns in urban areas are suffering as a result. The next era of downtowns, as described by urbanist Richard Florida, requires a transformation “into places for robust social connectivity.” Downtowns must become places where we live and socialize, rather than monolithic areas designated for work. By bringing residential and a variety of mixed-uses to downtowns, we can tackle two issues at once: the need to revitalize these vacant areas, and a critical housing shortage. Downtowns are ready to evolve from the limitations of a 9-5 lifestyle into lively 24/7 neighborhoods in the center of our cities.



## A Cost-Effective Approach

Adaptive reuse is the transformation of an existing building into something new. This strategic approach—as opposed to demolition—can offer time, cost, and environmental advantages. The ever-changing supply and demand of construction materials, combined with inflation, can significantly impact the budget of a project. The less material the project needs, the less the overall construction cost. In the adaptive reuse of existing office buildings, structure, vertical transportation, and parking are already provided, resulting in a cheaper and faster construction process. A fast-tracked timeline allows units to become more quickly available for rent. By taking an adaptable approach to our changing cityscapes, we can keep buildings desirable and in use, ultimately optimizing a portfolio.





## People, Planet, Positive

Adaptive reuse is an effective tool for addressing the climate crisis while retaining the cultural identity of spaces and places through architecture. Preserving both our past and a livable future, retrofitting a building has the potential to save resources, as well as reduce energy and a building's overall carbon footprint. Rather than consuming additional resources, the existing building retains materials that would otherwise go to a landfill. This approach reduces the embodied carbon of a project, which includes all greenhouse gas emissions that result from the construction process, including the extraction, manufacturing, and installation of building materials.



## Structure

When retaining the existing structure of a building, the following aspects must be evaluated during its transformation into a residential building:

- Acoustics – to ensure the building meets the expectations of a living space.
- Adaptability – to understand how the new program fits within the existing structure.
- Configuration – to modify the building for residential unit layouts.



## Exterior Envelope

Residents prefer large expanses of windows for better views and natural light. Often, existing office buildings will need to be modified to accommodate this desire. There are several techniques for increasing the amount of glazing on the exterior envelope:

- Replace the building skin with new glazing and sun shading
- Complete a partial “re-skin” of the building to modernize the exterior and increase its marketability
- Incorporate balconies and outdoor spaces
- Add operable, high-performance windows or penetrations in the enclosure for both natural and mechanical ventilation

The project team will need to carefully evaluate the performance of the curtain wall system while considering these strategies. Additionally, if the building has historical significance, the appearance of the exterior needs to be visually maintained, with the potential for receiving a Historic Preservation Tax Credit.



## Balconies

A hybrid work lifestyle places pressure on homes to offer access to the outdoors, fresh air, and natural light. Adding a balcony to an existing building gives residents the wellness benefits of outdoor space from the comfort of their apartments. Though balconies require careful consideration due to the sensitive nature of wind-driven loads and drainage conditions, there are several additional reasons to include them in a project:

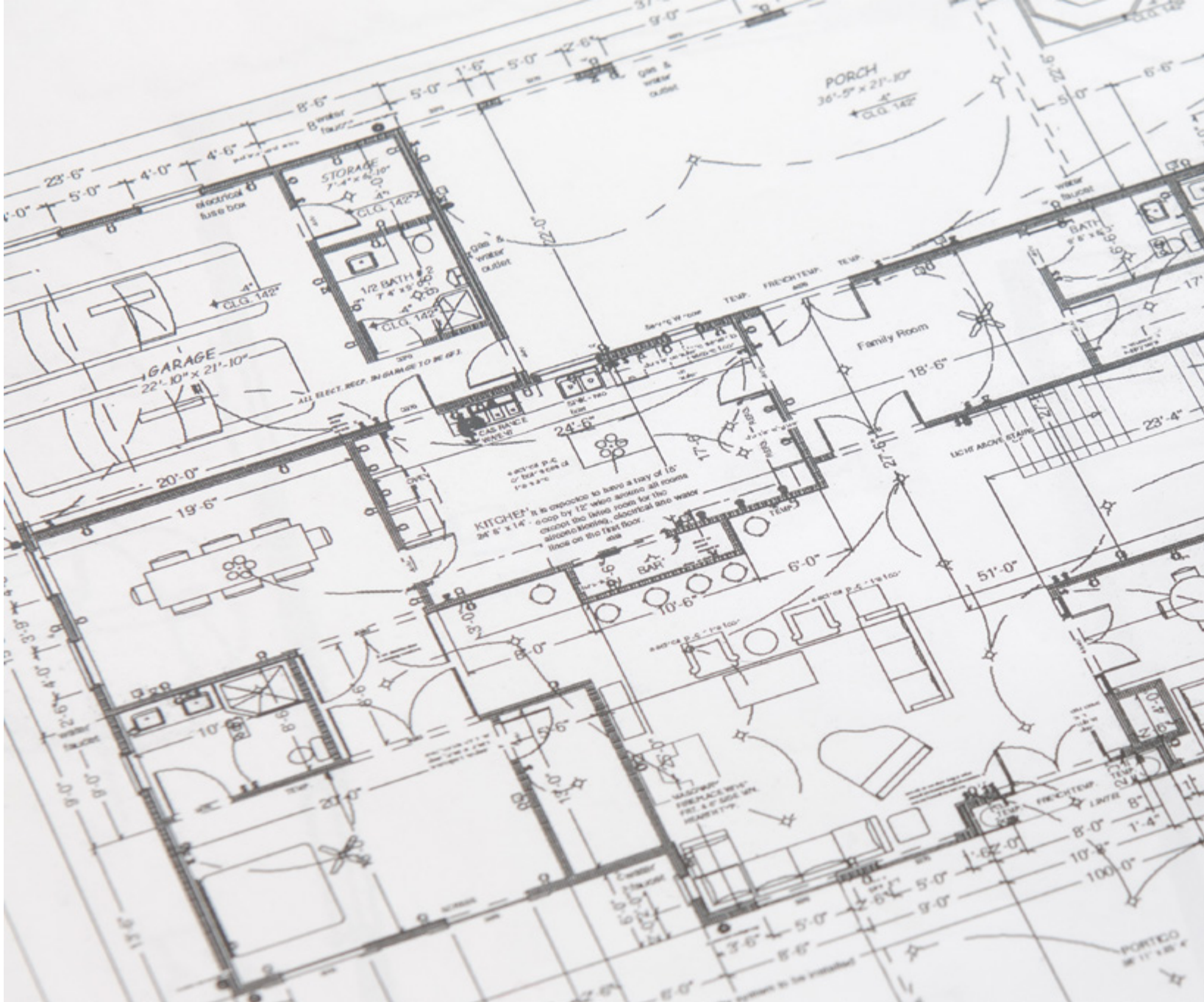
- Inset balconies protect residents from wind and rain
- Water penetration into the unit can be better managed in an inset condition
- Potential for a new window wall to bring daylight into the unit





# Vertical Transportation / Elevators

It's critical for high-rise buildings to have short elevator wait times for their residents. Oftentimes, an office building has substantially more elevators than is necessary for a residential building, offering certain advantages. Existing elevators can be modernized to work more efficiently with digital operating systems. Service elevators can be reserved and are convenient for people moving in and out of the building. Any excess elevators can also be removed, providing an opportunity to increase the rentable area on several floors of the building, as well as additional MEP shafts.

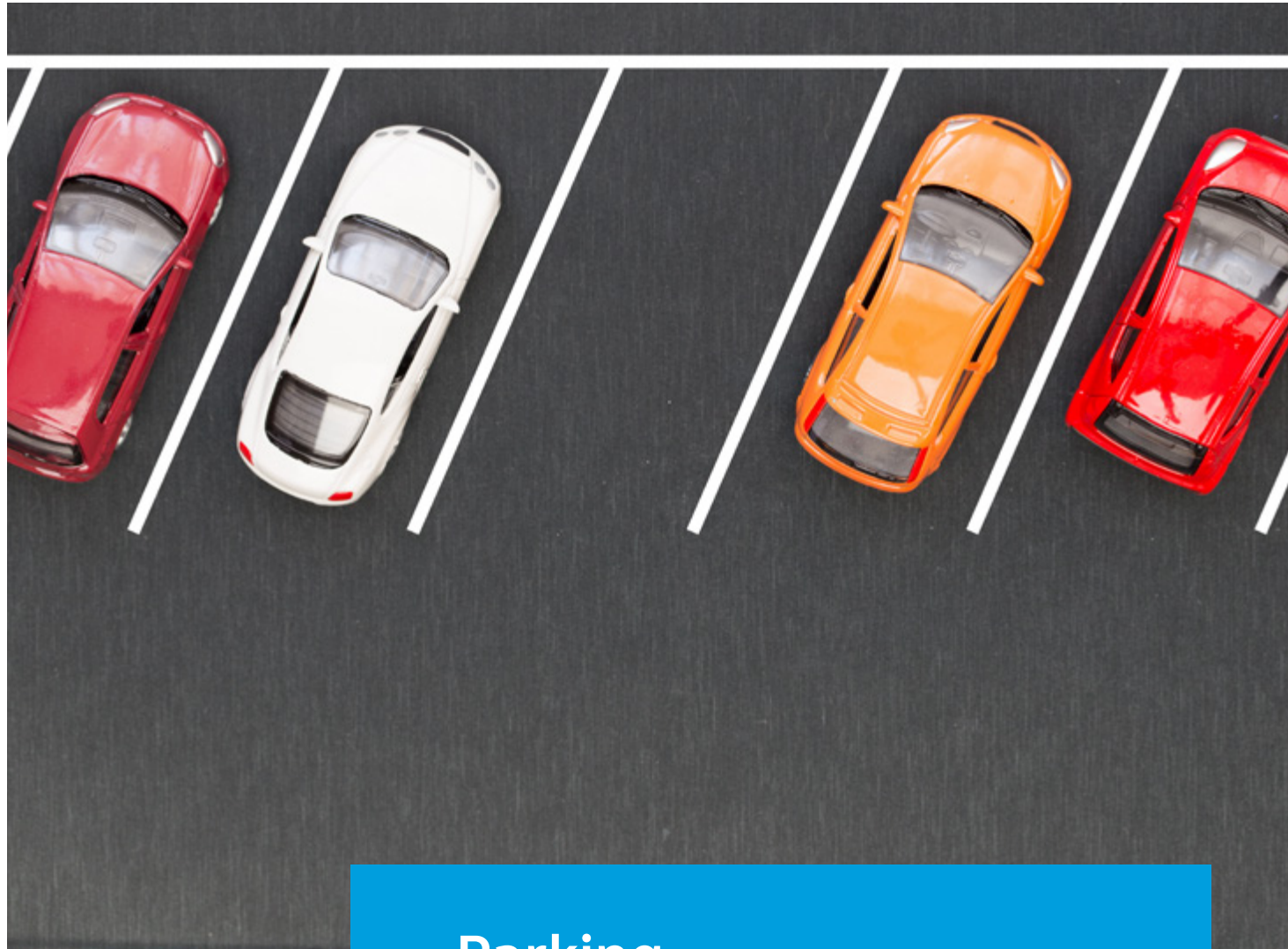


## Floor Plate Configuration

While evaluating an existing structure for residential uses, key considerations for typical residential floor plates include:

- Floor area
- Maximum depth from exterior to the core
- Relationship to structure
- Floor-to-floor heights
- Floor plate geometry





## Parking

Typically, residential use requires 30-40% less parking as compared to office use. Office parking requires 3-4 spaces per 1,000 square feet, while residential uses are about half of that, in the range of 1-2 spaces per 1,000 square feet. With an adaptive reuse project, ample residential parking should be available. This additional space presents the opportunity for residential buildings to gain rentable area. Mixed-use projects can explore various options for shared parking.



## MEP

Most electrical and plumbing systems in existing office buildings allow for the transformation to a residential building. An office building usually has an air handling unit and a large air shaft for both incoming and exhaust air, suitable for common spaces like lobbies or amenities. A vertical fan coil, heat pump, or VTAC can be accommodated within residential units. Make up air—or fresh air from outside the building to replace air removed by exhaust fans—can be brought

in vertically or horizontally. Though reusing parts of existing systems can reduce costs in the short term, a project team must consider the potential long-term increases due to the lack of competitiveness for larger community central plant systems.

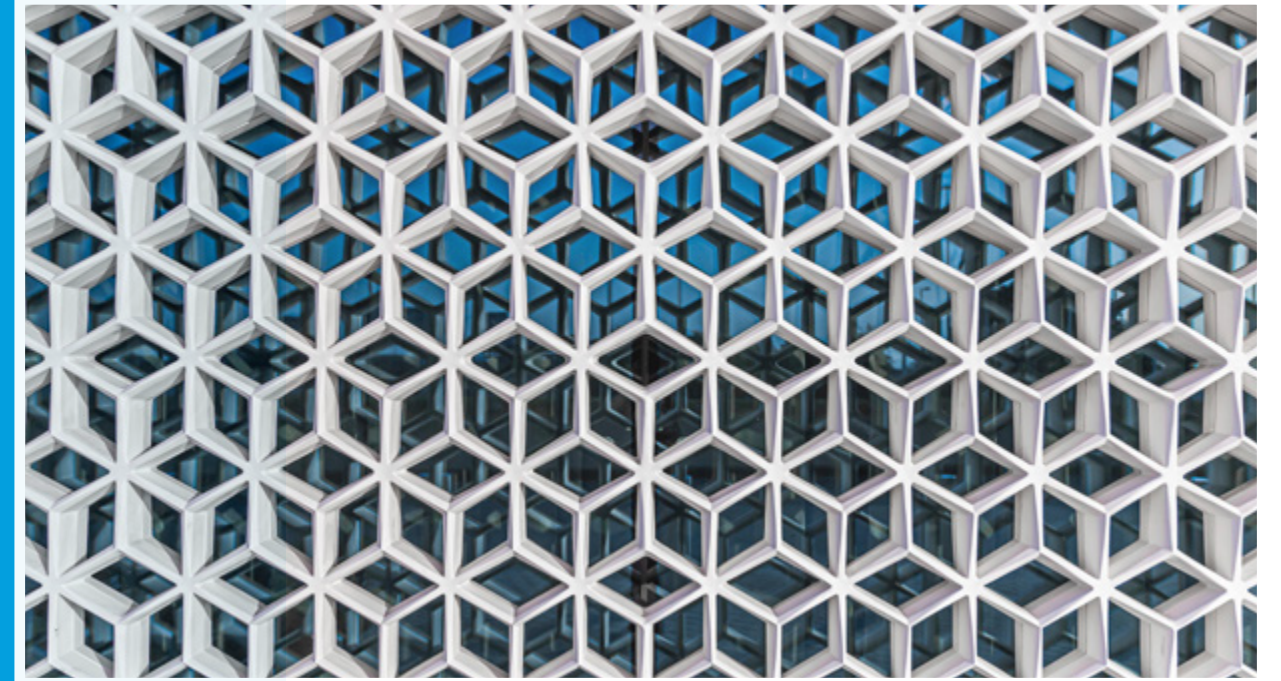




## Advantages of Existing Towers

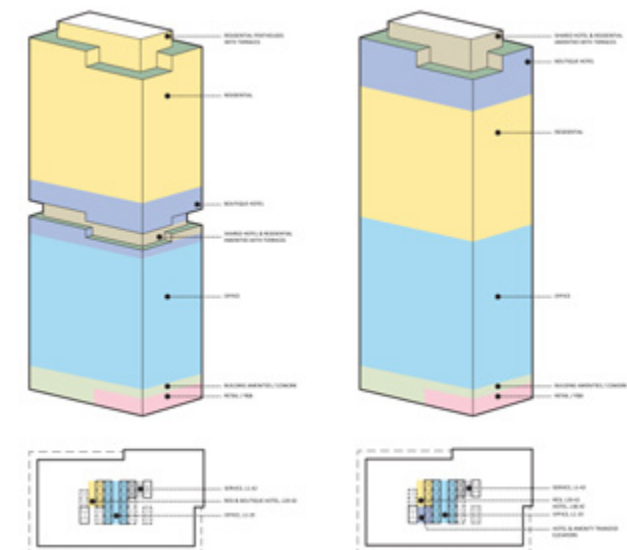
In addition to the cultural and environmental benefits offered by an existing office tower, there are many perks that directly translate to desirable residential spaces, including:

- High-quality building construction
- An abundance of glass for views and daylight
- Plenty of floor space
- Abundant parking
- Opportunity for a mix of uses by stacking the program



## Opportunities for Mixed-Use

The adaptive reuse of office towers is not limited to residential and can support a wide variety of uses by stacking a diverse program. This approach creates the feeling of a city within a building by combining residences with hotel, workplaces, retail, and entertainment. Amenities can be shared between the different uses to create more dynamic spaces that are activated throughout day and night. Unlike single use, a mixed-use building offers people a vast array of services all in one place.







## Unit Planning

### Challenges

Office buildings have atypical spaces to support residential units. The deep spaces are usually configured with a column grid of 30' and may or may not have interim columns between the cores. In steel buildings, girders at 30' will occur at the perimeter and span towards the interior with purlins in between to support a steel deck. There are a couple of strategies to keep in mind when addressing this challenge:

- Carefully place vertical plumbing stacks to avoid conflicts with structure, which is key for controlling costs and preventing schedule delays
- Horizontal air intake (such as HVAC make up air) as well as exhaust (such as toilet or dryer exhaust) will need to avoid the perimeter girder beam

### Planning for Deep Units (48-50')

The deeper spaces that office buildings offer can be used in a variety of ways. CallisonRTKL has studied options for these deeper spaces to be reimaged as den spaces, work environments, storage areas, and laundry rooms.



## Floor Plan Analysis

### Existing building working assumptions:

- High-rise Class A office building with a single elevator zone
- Center core
- 45' lease depth
- Curtain wall, 1/4" glass, no operable windows
- 30' column grid
- Steel construction

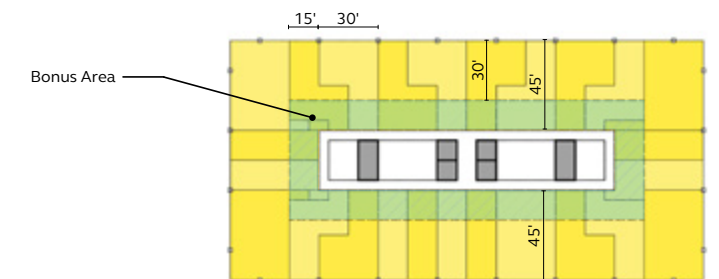
### Program for Conversion

Due to the existing lease depth, residential units will be larger and deeper. Assuming a 15' planning module (30' column grid divided into two 15' modules and a 45' lease depth glass line to corridor wall) the following would apply:

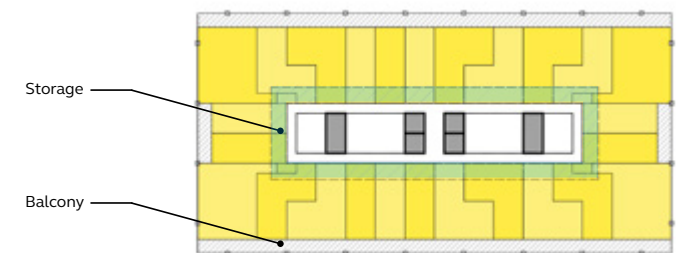
- Studio/Urban 1 Br – 675 SF
- Interlocking 1 Br – 1,012 SF
- 2 Br – 1,350 SF

The above could be reduced by providing a balcony. Assuming a 7' deep balcony, the same units would be:

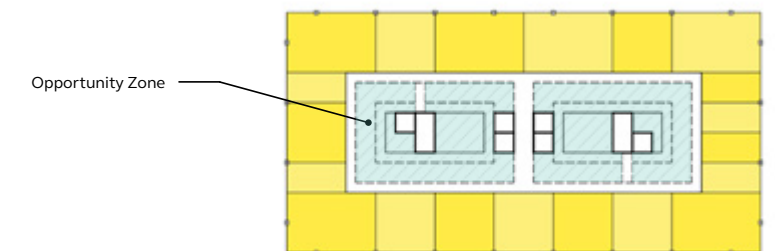
- Studio/Urban 1 Br – 570 SF
- Interlocking 1 Br – 907 SF
- 2 Br – 1,252 SF



Standard Floor Plan

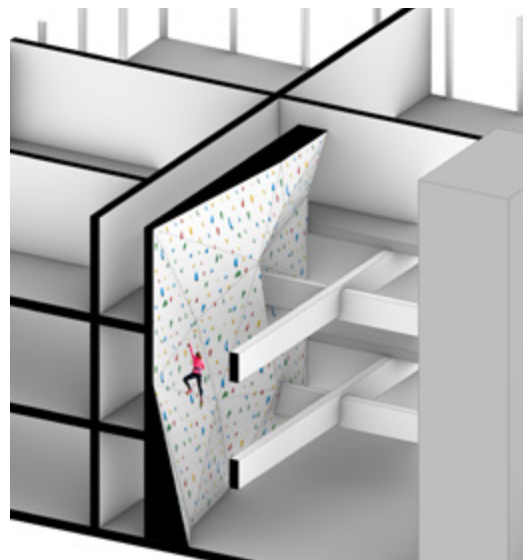


Floor Plan with Balconies



Floor Plan with Big Internal Spaces





## Lighting for Internal Spaces

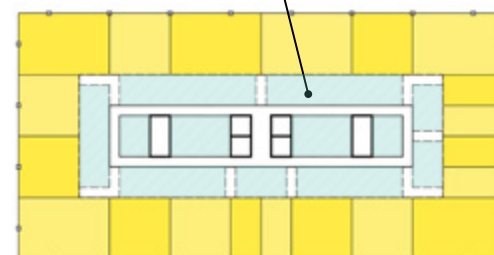
Optical fiber is a potential solution for dark spaces, which allows natural light to be brought in through the roof. This strategy was used in the design of an underground park, The Lowline, in New York City, which incorporates solar technology to light up a historic trolley terminal.

## Advantages of Existing Towers

The deep internal space around the core is usually considered dead space because it is not illuminated by natural light. We believe this space presents an opportunity to offer creative solutions. Below are a few ways to reimagine this space:

- Indoor farming
- Wall climbing
- Home office
- Storage
- Additional amenities

Amenity Zone



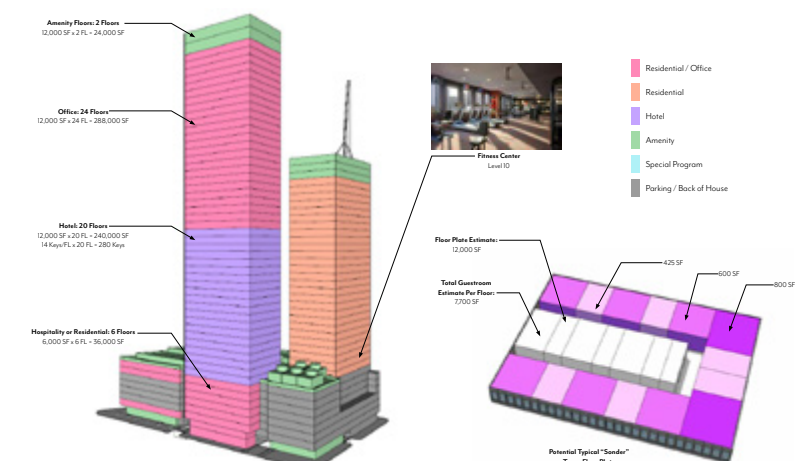
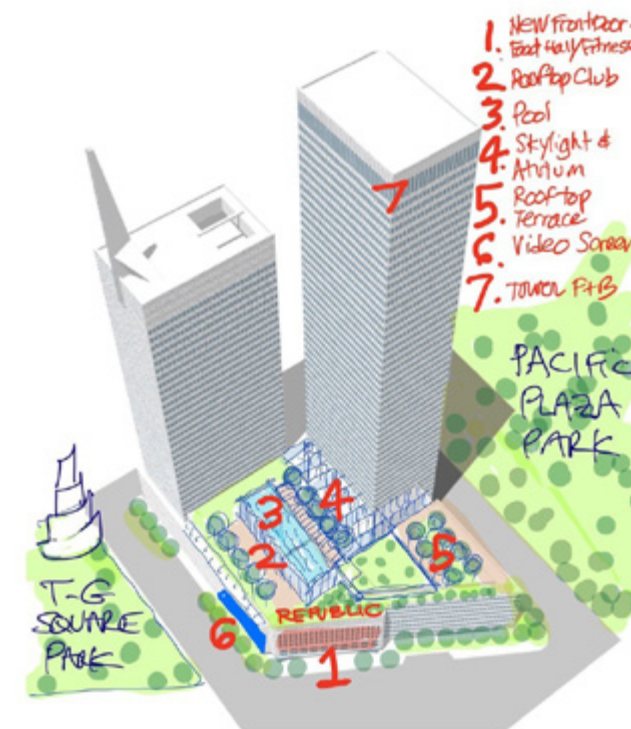
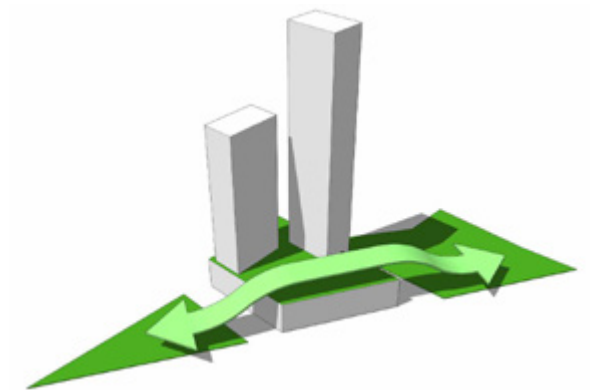




## Republic Center

Republic Tower was awarded a National AIA Green Housing Award for providing greater health and comfort to all inhabitants while reducing resource use. The client desired a mixed-use block where people could live, work, and be entertained in one area, all of which was delivered 15 years ago in the form of a residential retrofit of an existing tower. Our recent studies have confirmed that Tower Two could accommodate hospitality, short-term homestay, rental or owner-occupied residential, office, club, and other uses. In addition, the enhanced podium structure would allow for a full resort-style pool environment on the roof, with the potential to include a private club or fitness facility that complements the entire complex.

Sandwiched between two public green spaces, the site location ensured future view corridors and access to green urban space. This context provided the opportunity to create a building that had more interior height, daylight, views, and a better material quality than a typical multifamily project. This project is a perfect example of an office tower retrofit that helps save a massive amount of resources while energizing its existing neighborhood with new residents and opportunities.







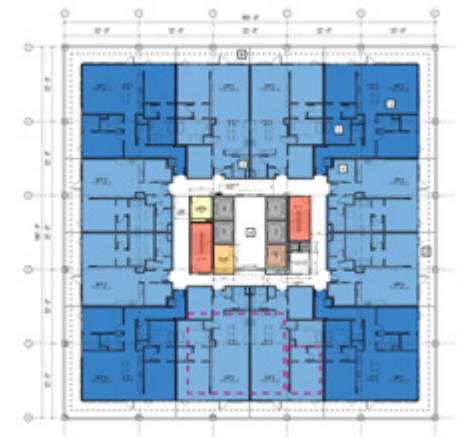
# Warner Center

A nearly empty 13-story office tower in Los Angeles' Woodland Hills is ripe for change in a city short of residential apartments, especially those that respond directly to current work-from-home needs. While this project is an office-to-residential conversion, it functions as the centerpiece of the larger redevelopment of the entire suburban site. Additional uses are integrated into the open space area of the site, including an extended-stay hotel, restaurants, coworking spaces, and a grocery store.

The deeper office floor plate allows for exterior shading of a deep balcony and a dedicated on-site office space, including a shared dining and conference area with a residential kitchen. Common coworking spaces let visitors meet in a state-of-the-art conference facility from the comfort of a residential site. Other amenity spaces include pools and barbecue gathering areas providing recreational access to open air and sunlight.

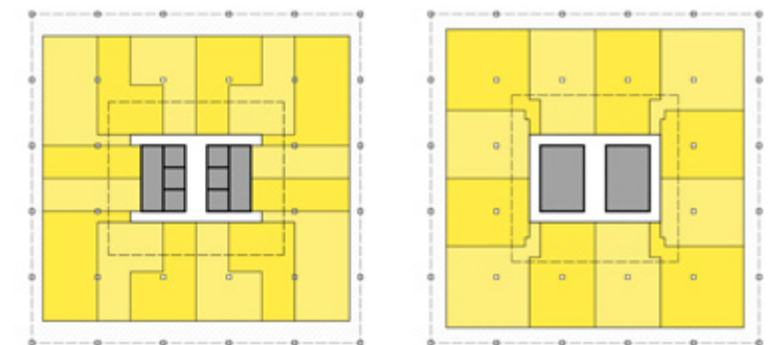
This outdated structure will get a complete exterior makeover, modernizing the façade with a new glazing system that will both refresh the building's mid-century aesthetic and provide deep balcony shading.

TYPICAL RESIDENTIAL FLOOR

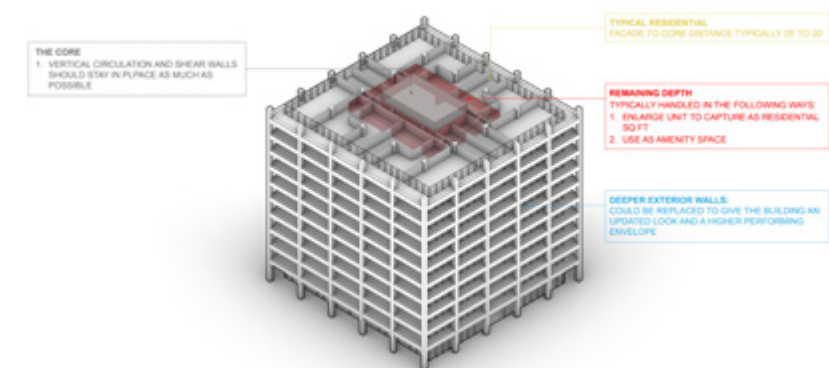


- 1 All units stack for improved MEP efficiency
- 2 Replicated bathroom & kitchen layouts
- 3 New exterior Glazing
- 4 Core upgrades for change of use
- 5 Large Unit size provides live-work flexibility
- 6 Private terraces for indoor/ outdoor living
- 7 Existing Core to be demolished

PLAN STUDIES



AREA CONFIGURATION

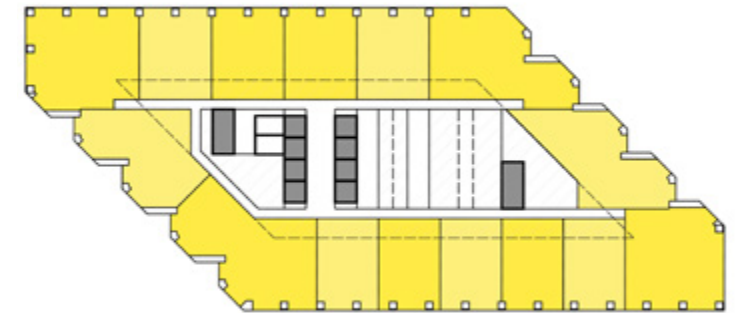






## 5555 San Felipe

5555 San Felipe is an attractive, high-quality, 200,000-square-foot office building in a desirable location. The building offers sought-after views of downtown Houston, making it a great option for a residential retrofit. Existing challenges include a current feeling of isolation, given its fortress-like feel from the ground, and confusing vertical transportation.

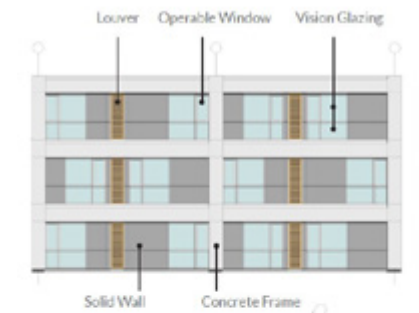






## Watermark at Westwood

The design for the Watermark at Westwood seeks to put wellness first while also maintaining a contemporary mid-century modern aesthetic. The idea was to envision the new independent senior and assisted living community beyond its specific context, instead treating the site as a comprehensive service provider capable of meeting all the needs and wants of a rapidly expanding demographic. This design utilized the existing structure while making key upgrades to infill, core, and roof walls, as well as windows, helping to open up views. The result is a contemporary and comfortable scheme with plenty of opportunity for indoor and outdoor connections and ample daylight.



TYPICAL RESIDENTIAL FLOOR PLAN



SHARED PATIO







# Bryan Tower

Located in downtown Dallas, Bryan Tower has the potential to provide the surrounding area with retail, food, and beverage opportunities on the lower levels, while providing hotel and residential space on the upper floors. This redesign converts the existing office tower into a mixed-use hub in the heart of downtown.

Lifestyle, security, and well-being are key to the transformation. New cut-outs would create a more exciting image of Bryan tower. With multiple existing elevator cores, separate specific-use lobbies can be created

to allow different users to feel comfortable inside the building. A cut-out in the middle two floors can house an amenity deck with terraces for both residents and hotel guests, providing ample outdoor space and scenic views of downtown.

Office and residential lobbies are stacked at the entrance, with the staircase on the left acting as the connector between the two. At first glance, the two vertically stacked spaces seem to form one continuous lobby, though they serve distinct uses inside the building.



FRONT ENTRY



PROGRAM SUMMARY

SITE AREA	: 871,636 ft <sup>2</sup> / 20.0 ac
RESI AREA	: 521,232 ft <sup>2</sup>
RETAIL AREA	: 5,000 ft <sup>2</sup>
TOTAL GFA	: 526,232
FAR	: 0.60
UNIT COUNT	: 474
RESI DENSITY	: 24 unit/ac
PARKING RATIO	: 15 PER UNIT
PARKING STALLS	: 711



SITE LOCATION  
AERIAL VIEW

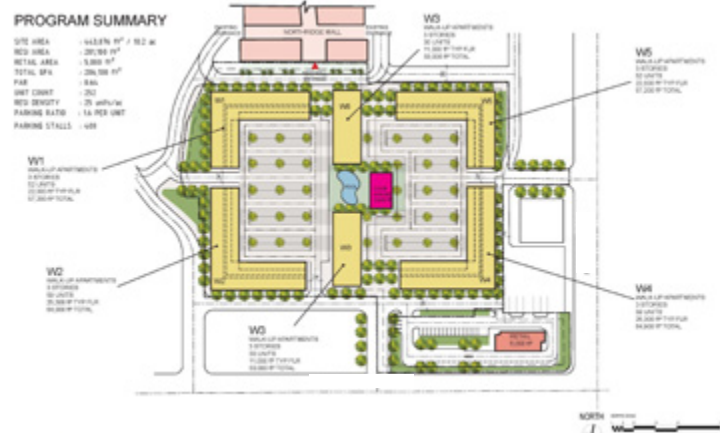


# Sears Malls and Parking

Under-utilized shopping malls around the United States can be used to create green space and help solve moderately priced market housing shortages. These conversions help to rejuvenate the malls themselves, introducing new regular shoppers to the existing areas. This redesign converts the existing Sears Department Stores into a mixed-use community, including retail, residential, amenities, and open spaces.

PROGRAM SUMMARY

SITE AREA	: 14,876 ft <sup>2</sup> / 0.34 ac
RESI AREA	: 20,280 ft <sup>2</sup>
RETAIL AREA	: 1,500 ft <sup>2</sup>
TOTAL GFA	: 21,780 ft <sup>2</sup>
FAR	: 0.60
UNIT COUNT	: 148
RESI DENSITY	: 25 unit/ac
PARKING RATIO	: 15 PER UNIT
PARKING STALLS	: 148



SITE LOCATION  
AERIAL VIEW



PROGRAM SUMMARY

SITE AREA	: 10,000 ft <sup>2</sup> / 0.23 ac
RESI AREA	: 14,280 ft <sup>2</sup>
RETAIL AREA	: 1,500 ft <sup>2</sup>
TOTAL GFA	: 15,780 ft <sup>2</sup>
FAR	: 0.60
UNIT COUNT	: 148
RESI DENSITY	: 25 unit/ac
PARKING RATIO	: 15 PER UNIT
PARKING STALLS	: 148



SITE LOCATION  
AERIAL VIEW





# CRTKL

CRTKL is a global architecture, planning, and design practice that began over seven decades ago and has evolved into a cultural agency to advance positive outcomes in our communities. Focusing on People, Planet and Positive Design allows us to realize a climate-positive and equitable future dedicated to inspiring experiences, human wellbeing and socially responsible outcomes through research-empowered and data-driven design.



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