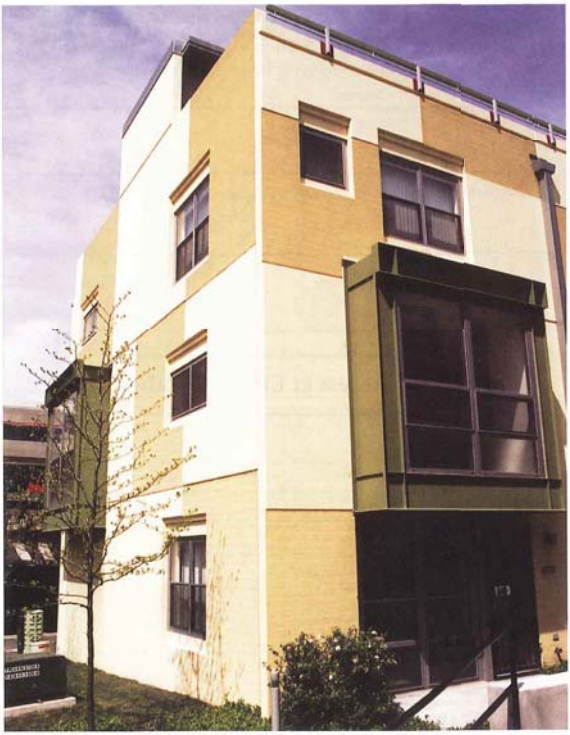
Archer Courts Townhouses Chicago, Illinois



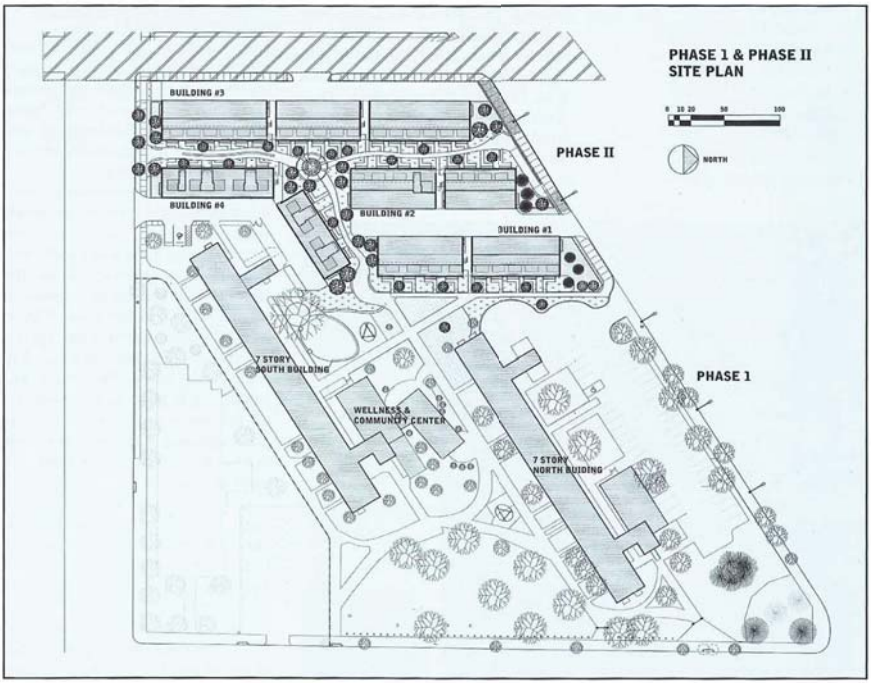
Nearly 600 precast concrete loadbearing wall panels, including many panels with openings for doors and windows, were used to construct four residential, privately owned townhouse buildings for tenants with mixed-income levels.

The recently completed Archer Courts Townhouses on South Archer Avenue in Chicago, Illinois, brings further testimony to the growing use of precast concrete in building townhouses, condominiums, apartments, and other multi-family dwellings across the United States.

The major reason this housing project became a reality was the close collaboration between the developer, Chicago Community Development Corporation; the architect, Landon Bone Baker Architects; the precaster, Prestress Engineering Corporation; and the general contractor, Burling Builders. Together, they devised a well thought-out plan whereby affordable housing could be provided to mixed-income residents (see sidebar on page 101).

This townhouse project was the second phase in the creation of a mixed-income housing community. The first phase involved the renovation and transformation of two existing mid-rise buildings that contain rental units. The townhouse phase started soon after the completion of the mid-rise rehabilitation.

In all, 43 single family townhouses were constructed within four separate buildings on a 1.134-acre (0.46 ha) vacant lot adjacent to and adjoining the mid-rise buildings. The townhouses were sold to customers with diverse income levels at prices ranging from $290,000 to $350,000 per unit.


PHASE 1 & PHASE II
SITE PLAN
0 10 20 50 100
NORTH
BUILDING #3
BUILDING #4
BUILDING #2
BUILDING #1
PHASE II
PHASE 1
7 STORY
SOUTH BUILDING
WELLNESS &
COMMUNITY CENTER
7 STORY
NORTH BUILDING

The four buildings comprised the following linear dimensions and a square footage area of:

- Building 1:
  164 × 37 ft; 18,723 sq ft
- Building 2:
  149 × 37 ft; 16,893 sq ft
- Building 3:
  276 × 37 ft; 31,295 sq ft
- Building 4:
  100 × 28 ft; 16,269 sq ft

Total area: 83,180 sq ft

Note: 1 ft = 0.305 m;
1 sq ft = 0.093 m².

A total of 592 exterior and demising (firewall) precast concrete loadbearing wall panels were used on the four buildings for a total surface area of 97,250 sq ft (9044 m²). The panels were 6 and 8 in. (152 and 203 mm) thick. They contained mild reinforcing steel and welded wire reinforcement. Note that no prestressing was used in the panels. In addition to the wall panels, the precaster supplied stairs and firewalls.

As required by the Chicago Fire Code for separation walls, the firewalls were designed for a 4-hour U.L. design (U-926). This is an additional advantage gained by using precast concrete.

Altogether, about 2000 cu yd (1530 m³) of concrete were used in the project as well as 54,000 lb (24,500 kg) of No. 4 and No. 5 mild steel reinforcement, and 115,000 sq ft (10,700 m²) of welded wire reinforcement.

The fabrication of the panels in a controlled environment allowed the project to avoid the typical construction slowdown during the cold winter months. Erection of the panels continued nonstop throughout the year resulting in significant savings.

From the very start of the project, the architect worked closely with the precaster to determine panel sizes, panel configurations, and design details that would be the most affordable to produce. For their part, the precaster contributed several cost and labor saving ideas that made construction more affordable and efficient.

The architect and precaster also worked together to develop a building that was not simply an imitation of a house made out of brick, stone, or wood but one that reflected the true characteristics of precast concrete as a material in its own right.

The study of the panel size and configuration resulted in tall narrow panels acting as two-story "columns" at the first and second floors with a wide panel spanning from column to column. The large openings between the columns on the first and second floors were filled in with a storefront-type window configuration on the first floor and a shop-fabricated metal bay on the second. The painted metal bays were constructed off-site and hoisted and welded into place with the same construction crane that was used for erection of the precast concrete panels.

The architectural detailing of the panels was also developed in close collaboration with the precaster. Since the budget did not allow for extra formwork expenses, the details needed to work within the precaster's standard formwork. Thus, window headers and sills are recessed into the panel instead of protruding. A water spray test done

TYPICAL DIMENSIONS

TOP OF PRECAST PANEL ELEVATIONS

BUILDINGS 1, 2, AND 3:

TOP OF SIDE PANELS = +33'-5"
TOP OF FRONT PANELS = +32'-5"
TOP OF REAR PANELS = +29'-6 1/4"

BUILDING 4:

TOP OF SIDE PANELS = +33'-8"
TOP OF FRONT PANELS = +32'-8"
TOP OF REAR PANELS = +33'-8"

WINDOW OPENING ELEVATIONS

1ST FLOOR:

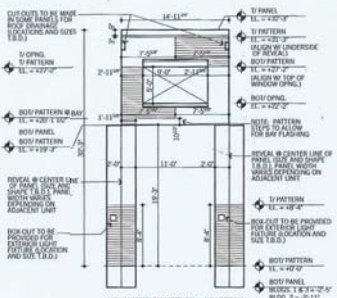
BOTTOM OF OPNG. = +7'-4 1/2" (+7'-4 1/2" IN BLDG. 4)
TOP OF OPNG. = +15'-4 1/2" (+15'-4 1/2" IN BLDG. 4)

2ND FLOOR:

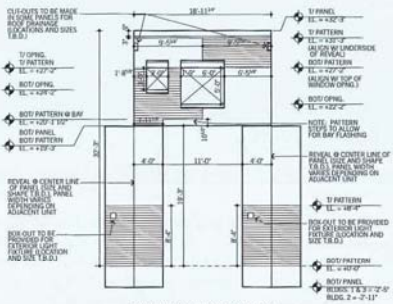
BOTTOM OF OPNG. = +17'-9 3/4"
TOP OF OPNG. = +25'-9 3/4"

3RD FLOOR:

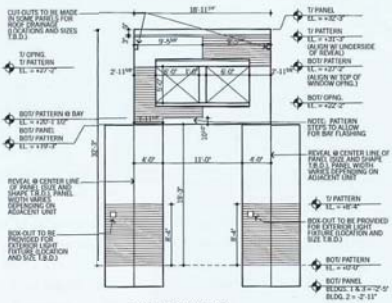
BOTTOM OF OPNG. = +28'-5"
TOP OF OPNG. = +33'-5"



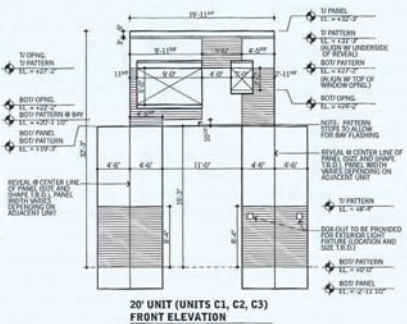
15' UNIT (UNIT A1, A2 SIM.)
FRONT ELEVATION
1/8" = 1'-0"



19' UNIT (UNIT B1, B2 SIM.)
FRONT ELEVATION
1/8" = 1'-0"

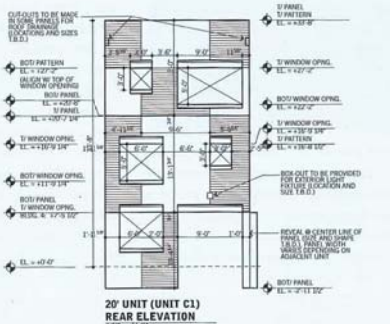


19' UNIT (UNIT B3)
FRONT ELEVATION
1/8" = 1'-0"

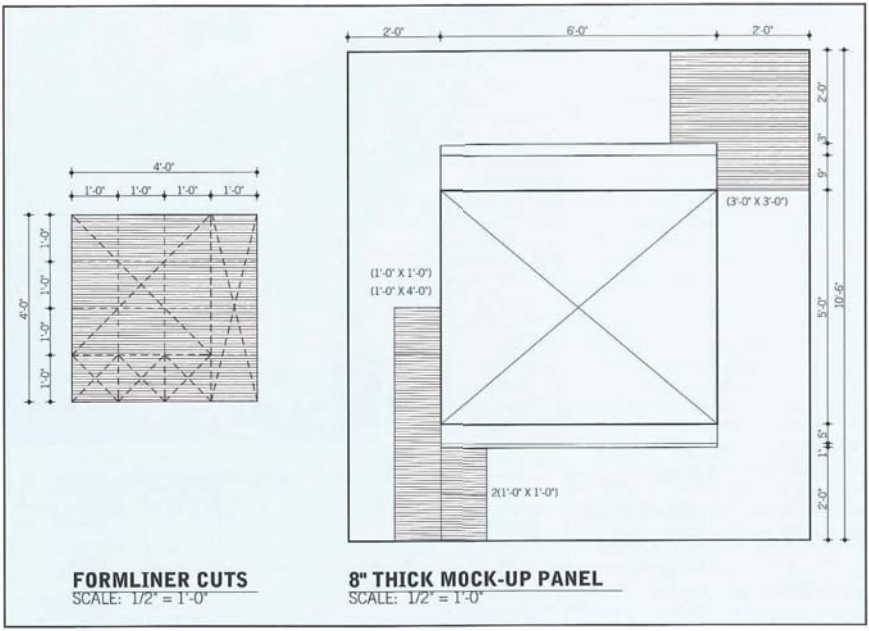


20' UNIT (UNITS C1, C2, C3)
FRONT ELEVATION
1/8" = 1'-0"

NOTE: UNIT C3 FRONT ELEVATION IS MIRRORED.



20' UNIT (UNIT C1)
REAR ELEVATION
1/8" = 1'-0"



FORMLINER CUTS
SCALE: 1/2" = 1'-0"

8" THICK MOCK-UP PANEL
SCALE: 1/2" = 1'-0"

on a panel mock-up at the manufacturer's yard showed that water could seep back into the windows, so a recessed drip edge was added at the header.

The precast concrete also worked well in the site context. The concrete massing buffers the sound of the adjacent elevated train line. The interiors of the townhouses along the tracks remain quiet while the configuration of the townhouses along the tracks helps to reduce the sound of the trains from the rest of the housing development.

Texture was added to the precast panels with formliners. The tightly ribbed pattern is a standard formliner that was placed at strategic locations on the panel to maximize the use of a single formliner.

The formliner was cut and arranged so that almost every square inch of it was used with minimal wasted pieces. The tightly ribbed pattern does not suggest a type of material, but provides a texture and a break in the plane of the panel.

The precision of the panel details also worked well with the very dense arrangement of the buildings.

Multiple concrete finishes and colors were not an option within the budget, so a single color stain was used on all of the panels. Many colors were tested and applied to mock-ups before the final shade of yellow was determined and accepted. Because of the rib pattern, there appears to be several tones of the yellow color.

The precast concrete components were fabricated by Prestress Engineering Corporation at their plant in Blackstone, Illinois. They were delivered on A-frame trailers to the project site — a distance of about 100 miles (160 km). The precaster was also responsible for the transportation, erection, and field finishing of the precast components. In addition, the precaster provided the structural engineering and shop drawings for the precast portion of the project.

Design of the project began in December 2000. Precast production was done between July 2002 and June 2003. While this was going on, site preparation got started and the footings were cast-in-place with concrete. Precast erection took place between September 2002 and July 2003. The first tenants moved into their townhouses in April 2003 and this continued until the final occupants were housed in January 2005.

The total cost of the project was $8,791,000.

The owner and design-construction team are very pleased with the manner in which this project progressed and the final outcome. More importantly, the residents are enjoying their new homes.

The advantages of using precast concrete on large industrial and housing projects are well known. However, the use of precast concrete on this townhouse project has also demonstrated that even relatively small residential projects can reap the same benefits, namely, a strong, durable product with excellent thermal properties, a quick construction schedule, flexibility of form and color, and aesthetics — all at an affordable price.

The Archer Courts Townhouses have

Creating affordable housing in a major city is always a challenge. There are many variables that must be explored before an owner commits to such an investment. Once the need for public housing has been established, an experienced architect is selected. One important decision to be made right away is the type of building material and construction method to be used. This will impact architectural/structural details, density, size of housing units, and length of construction time. Other important considerations are insurance costs, meeting fire codes, noise abatement, site restrictions, maintenance, and durability issues.

When all these factors are analyzed, it is now increasingly being found that precast concrete is the best option. This product provides the most durable material with almost limitless design options that can be constructed in the shortest time frame with minimal interference from inclement or cold weather. On top of that, the housing is attractive and long lasting with minimal maintenance. The bottom line is that precast concrete can create affordable housing.

already received acclaim by the design community and PCI. Earlier this year, the architect was awarded the Richard H. Driehaus Foundation Award for Architectural Excellence and Community Design. The project also won an award for "Best Multifamily Building" in the 2005 PCI Design Awards Program. The jury comments were as follows:

"This project shows a beautiful use of precast concrete. The paneling, the use of controlled joints, and the use of color in the precast concrete creates a visually interesting project and an elegant design solution for multifamily housing. This design will create a durable cladding for many years to come. We hope this solution will be emulated by others. It sets the proper standard for future projects."

CREDITS

Developer: Chicago Community Development Corp., Chicago, Illinois

Architect of Record: Landon Bone Baker Architects, Chicago, Illinois

Engineer of Record: GFGR, Chicago, Illinois

Contractor: Burling Builders, Chicago, Illinois

Precaster: Prestress Engineering Corporation, Prairie Grove, Illinois

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