



**Owner:** Stanford University  
**GC:** Vance Brown  
**Architect:** KSH Architects  
**SEOR:** John A. Martin & Associates  
**Design-Build Prefabricator:** Clark Pacific

# Escondido Village Graduate Residences

Stanford University – Palo Alto, CA

## How Stanford is Meeting its Student Housing Demand with Prefabricated Building Systems

Stanford University is a private research institution with over 16,000 students including 9,000 postgraduate. According to Stanford, with the high cost of rents in neighboring communities, the university need to provide additional housing options to better support quality of life for current graduate students and allow the university to continue to attract the best students from around the world.

To help meet its current needs, Stanford decided to remove several of its current low-rise wood frame apartments and replace them with high quality mid- to high-rise buildings. The project called the Escondido Village Graduate Residences is a collection of four residence halls that range from 10, 8 and 6 stories providing a total of 2,400 beds. Today, Stanford only houses about 55 percent of the more than 9,000 graduate students in on-campus housing. When complete, Stanford estimates the project will increase its on-campus graduate housing rate to at least 75 percent.

### The Project at-a-Glance

- 4 Buildings, 2434 Beds
- 1,835,000 SF Residences
- 1,025,000 SF Exterior Cladding
- **Resilience: Designed to Higher Class II Level than Code**
- **Building construction is expected to commence in fall 2017 with completion in 2020 to 2021**



# Benefits of Clark Pacific's Approach



Shortened  
Schedule



Reduced  
Site-Impact



Budget  
Certainty



Resilience

## CHALLENGES AND OBJECTIVES

Like many on-campus student housing projects, The Escondido Village Graduate Residences Project had challenges to overcome.

### On-Site Logistics

- Limited available onsite parking
- Limited delivery locations, access and times
- Active campus with students living near construction site

### Project Schedule

Because it is an active campus, a lot of thought went into how to minimize the impacts to on-campus life. There were typical concerns about construction schedule delays, and the University wanted to find ways to reduce construction durations and minimize the negative impacts to the campus.

### Project Objectives

These site challenges drove the project team to consider off-site construction strategies early in the project's conception. Increasing the off-site fabrication of the building would:

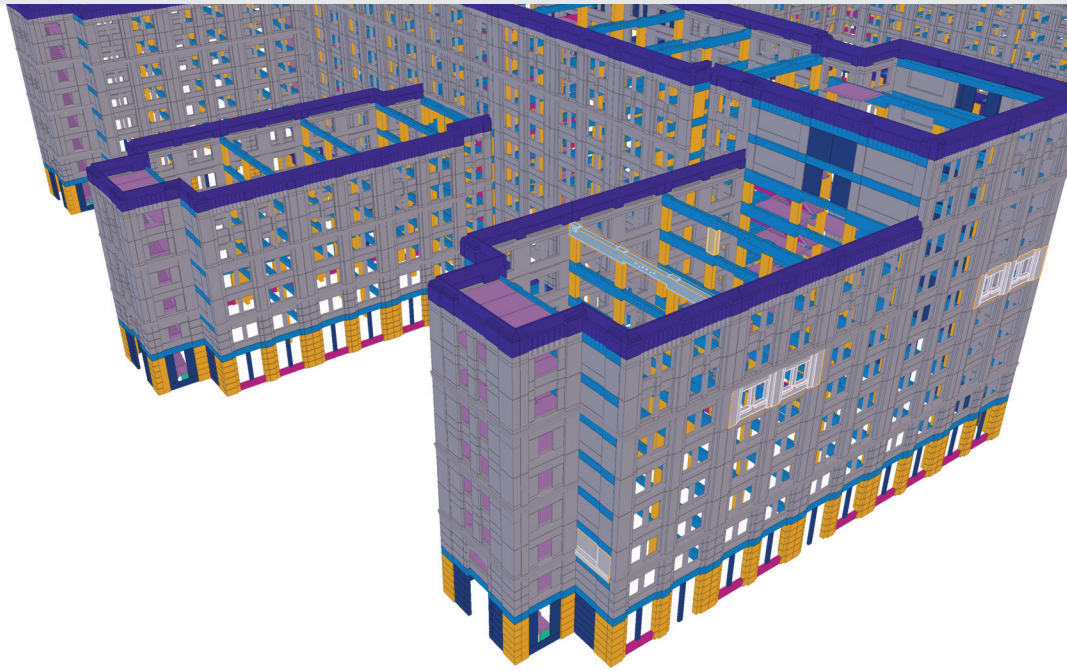
- Reduce on-site labor
- Reduce on-site material deliveries
- Decrease required parking, traffic and congestion
- Decrease campus disruptions
- Increase onsite building productivity
- Reduce overall schedule durations

## PROPOSED SOLUTIONS

To better improve the project's likely outcomes, Clark Pacific was brought onto the project to provide responsive solutions. This allowed the project to incorporate and ultimately take advantage of several customized off-site and prefabricated systems to meet their objectives.

Clark Pacific proposed four main prefabricated solutions that directly addressed the project objectives:

- Precast structure of beams, columns, walls, and slabs
- Precast exterior, integrating structure and cladding
- Pre-installed glazing system
- Modular kitchen and bathroom interior systems



### Total Precast Solution

By developing the project as a total precast concrete solution, the project would be able to benefit from moving 65,000+ mandays from the jobsite resulting in fewer onsite cars, parking spaces, idling trucks, and total campus congestion.

### Integrated Structure and Cladding

Rather than a typical exterior cladding system that simply covers the structure in an aesthetically pleasing way, Clark Pacific's solution integrates the structure with the exterior cladding providing both the desired aesthetic and meeting the enhanced resiliency demands for the project.

### Glazing System Installed Off-site

Proposed prefabricated systems for the project went beyond precast, as Clark Pacific proposed installing the glazing in the exterior precast panels in the factory setting which will increase quality and further reduce construction activity on campus.

### Living Module

Modular kitchen and bathroom interior systems  
With the adoption of the total precast structural solution, the project had the capability to increase the work done off-site by adding onto the structure, the Living Module which incorporates MEPF systems and is built on top of the precast slab in Clark Pacific's factory.



**11 Months**  
Install all 4 Buildings  
(with Cladding System)



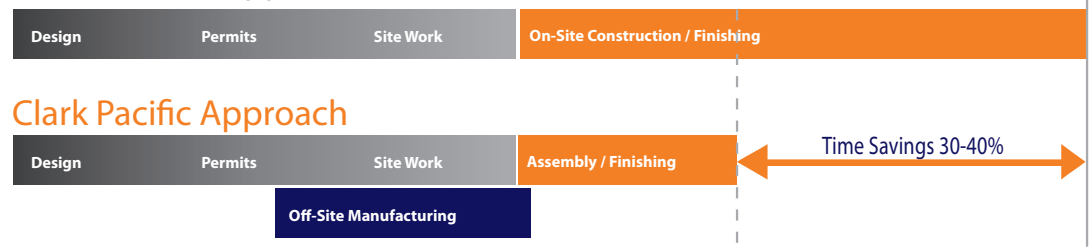
**65,000+**  
Man days Moved  
from the Jobsite



Rendering courtesy of KSH Architects

# 30-40% Faster

## Conventional Approach



## RESULTS

The Escondido Village Graduate Residences Project ultimately selected Clark Pacific to deliver three of the four proposed solutions to meet their desired project objectives.

Clark Pacific's total precast structural solutions were selected over competing systems because of their benefits to site and schedule challenges. The integrated exterior solution that incorporated the desired aesthetic with the building's structure and off-site window installation were also selected because they simplified construction and further reduced campus disruption.

The prefabricated living modular solution was not selected in the end because the project was too far along in design and procurement to reallocate the scope to support the approach.

Ultimately, Escondido Village Graduate Residences Project benefited from a 6-month schedule reduction and reduced campus disruption through the removal of more than 65,000+ man days from the campus.

## Benefits of removing a man day from the jobsite include:

- Improved jobsite safety
- Less dust and pollution
- Fewer car and delivery trips
- Less worker parking required
- Reduced disruption to adjacent neighborhood



## Clark Pacific / Prefabricated Systems Approach

### Project Scope

Project Scope	Data Point	Summary
Four Buildings: Full Precast Structures	1,835,000 sf Building Area	Fully Prefabricated: 14,700 Precast Panels
Exterior Cladding: Architectural Precast	1,025,000 sf	Integrated and Delivered With System.

### Advantage

Advantage	Data Point	Summary
Speed of Building Installation	4 Buildings Installed within 11 Months	Approach SUBSTANTIALLY reduces the project schedule. Final schedule dependent, all 4 buildings (with cladding system) can be completely installed within 11 months.
Reduced Impacts to Campus and Community	65,000 man days removed from jobsite	Off-site prefabrication: 130,000 fewer road trips, 65,000 fewer worker parking days, 65,000 fewer days of jobsite, campus and community safety hazards. Fewer workers = greater jobsite efficiency.
Enhanced Project Safety	Off-site production	Safety is greatly enhanced for the project with off-site prefabrication: workers at manufacturing site well-trained and working in safer environment - minimizing hazards associated with the project. Fewer workers at the jobsite itself results in less exposure and risk for all workers at the project as well as campus and community.
Schedule Certainty	Approach allows for maximum schedule certainty.	1. All elements are produced well in advance of need. 2. Pace of construction is completely controlled. 3. Inventoried product reduces chances of impacts such as weather causing missed pours, etc.
Enhanced Seismic Performance	Moment Frame System	Precast frames (which double as high-end cladding system) deliver efficient structure and greater system redundancy for enhanced occupant earthquake safety.
Lighter Structure than CIP	Over 30#/SF lighter than CIP structure (Over 50,000,000 lbs. total)	Precast system is significantly lighter than CIP. A lighter system reduces seismic design loads and overall material amounts on project by over 50,000,000 lbs (or more than 1,500 material truck loads)
Reduced Foundations Compared to CIP	20% Smaller Foundation	Foundations are smaller due to: Lighter Structure and use of Moment Frame vs. Shearwall. Positive schedule and cost benefits to project.
Pre-Glazed Windows at Exterior Precast		Integrated and delivered with the system, preglazing exterior elements saves time and further reduces impacts at jobsite and campus.