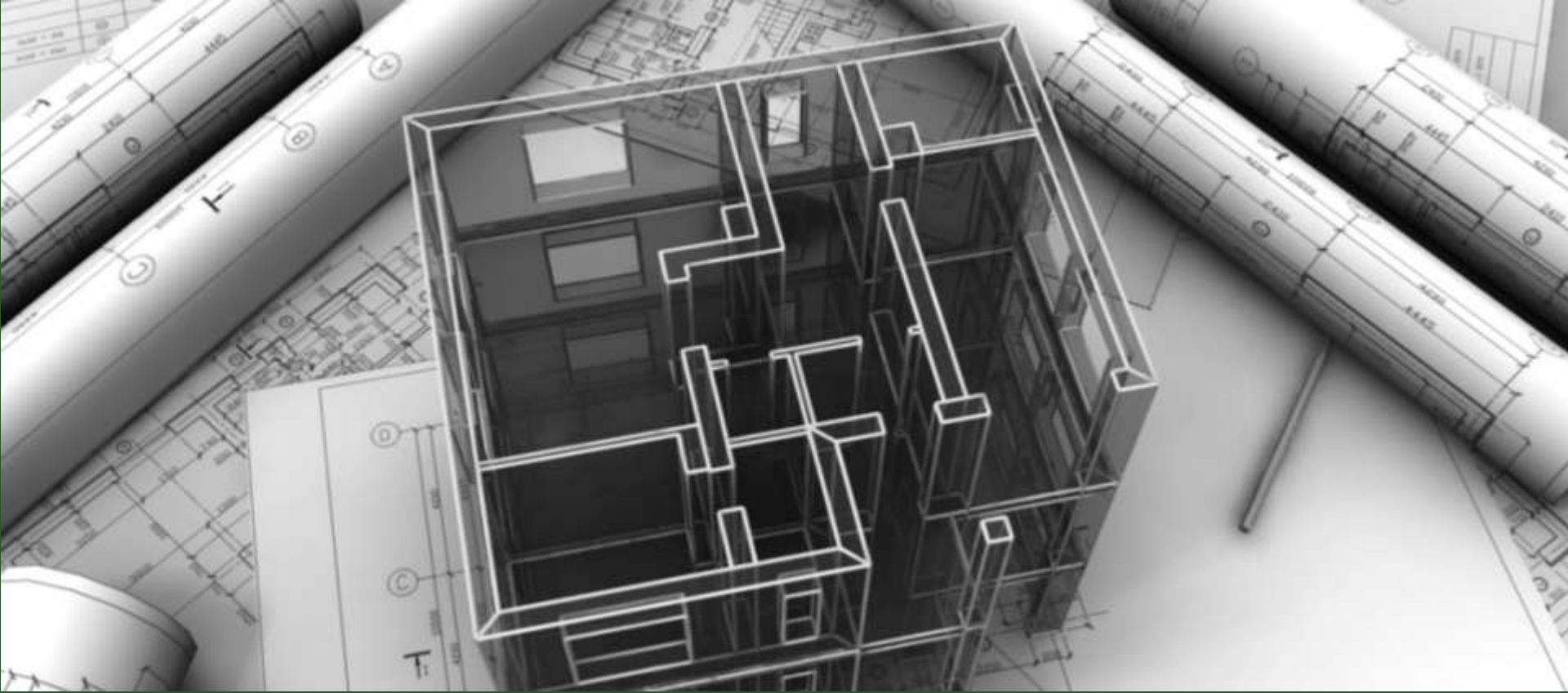




CASE STUDY: 4,100 PRECAST VILLAS AT AL FALAH

Presented by: MAX E. JORDAN

Fluor Mideast Limited

Date: 15 MAY 2012

FLUOR



An aerial photograph of a vast residential development, likely in Dubai, featuring thousands of small, uniform, two-story villas arranged in a grid-like pattern. The villas are primarily light-colored with flat roofs. In the background, a dense line of palm trees separates the built-up area from a desert landscape. The text "IT'S ONLY VILLAS" is overlaid in large, white, sans-serif capital letters.

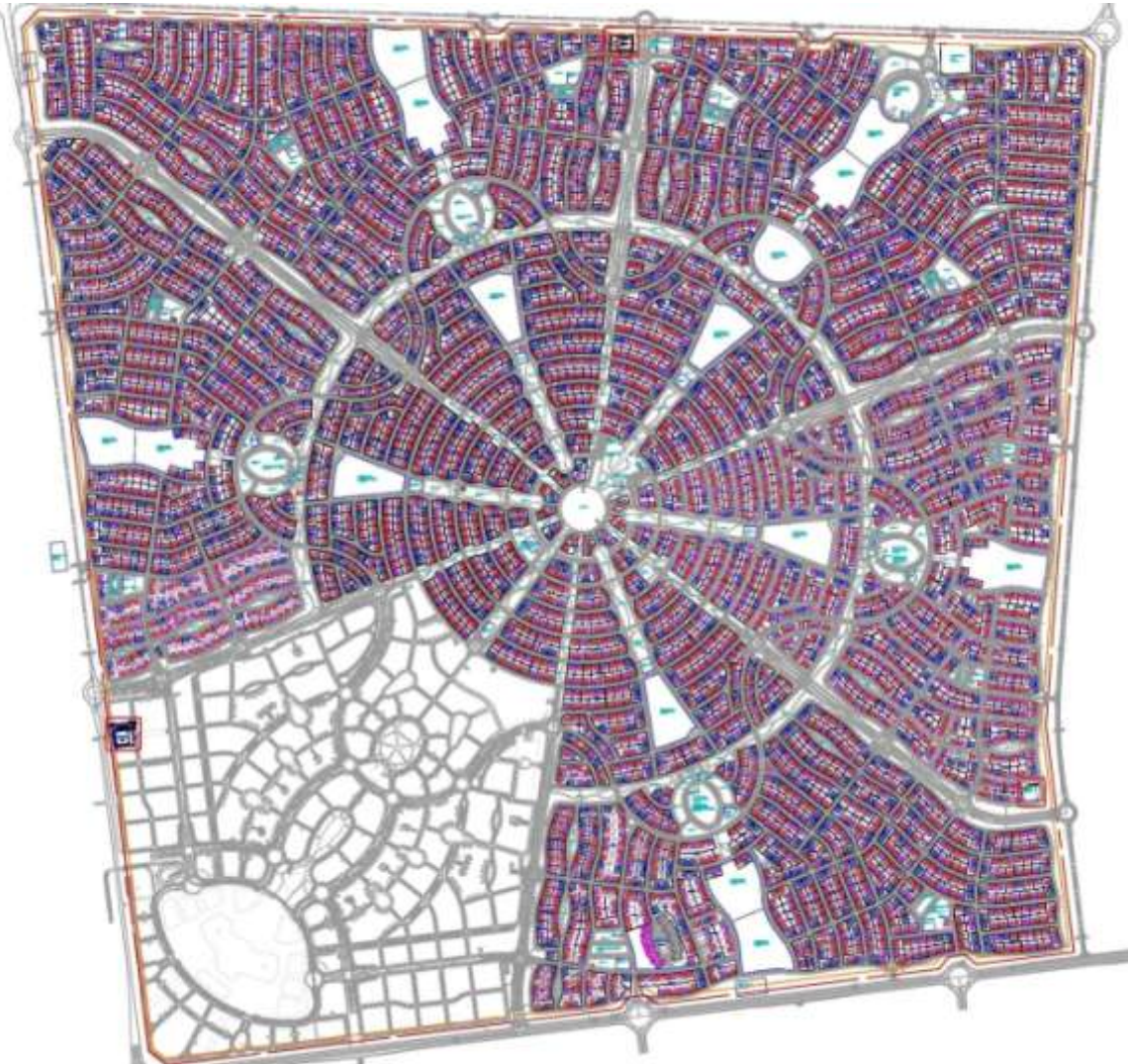
IT'S ONLY VILLAS

CASE STUDY: 4,100 PRECAST VILLAS

AL FALAH FACTS:

- Housing Development for the Government of Abu Dhabi
- Developer: ALDAR PJSC
- Project Management Consultant: Fluor Mideast Limited
- Lead Design/Masterplan: GHM Design, Ltd

Master Plan



- 12,000,000 m² site in 6 villages
- 5 Residential Villages contain 4,856 Villas
- 3 General Contracts for Villas
 - 2 Using Precast
 - 1 Using Cast in situ Concrete
- Contract Award: January 2010
- First Handover: 1000 Villas – 1 April 2012
- Last handover: December 2012 (Planned)

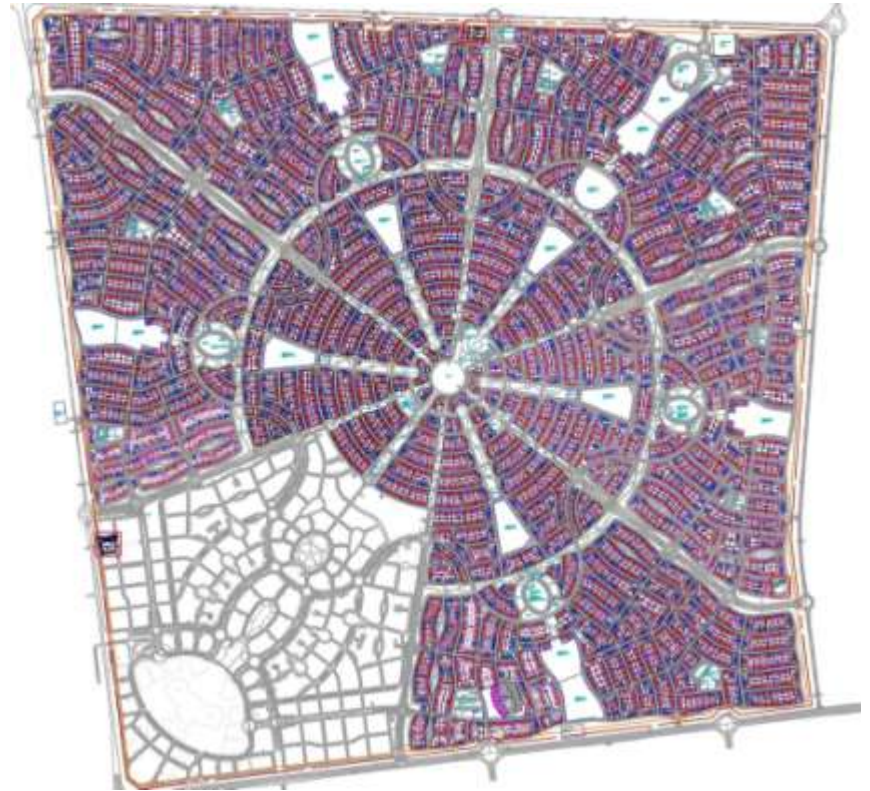
HISTORY

- Project launched in 2006 – To provide housing for Emirati Citizens
 - General Contracts Awarded – August 2009
 - Project Approvals Received – January 2010
 - Notice to proceed – January 2010
 - First handover of 1,000 villas – 1st April 2012
 - Last handover – December 2012 (Planned)

PROJECT APPROVAL PROCESS

Factors Related to a 4 year Approval Process

- Unique Masterplan Concept
 - Narrow Street Right of ways
 - Curved Road Design
 - Distributed Access Around Perimeter
- Evolving Planning Process
 - UPC was New
 - First Major Project through UPC
- Economic Boom followed by Distress in the market



DESIGN DECISIONS

3 STYLES



- 3 sizes – 3,4 and 5 Bedroom Villas
- 18 Villa Repeated

- Standard and Mirror Image
- 4,856 Total Units

DESIGN DECISIONS

CHALLENGES

- The design did not use factory components – a waste on a repetitive project like this
- The structural design was not efficient
- The budget was set in 2006
- Villa projects were not attractive to contractors with a high rise mentality
- How do we manage the logistics of all of the tradesmen required on site



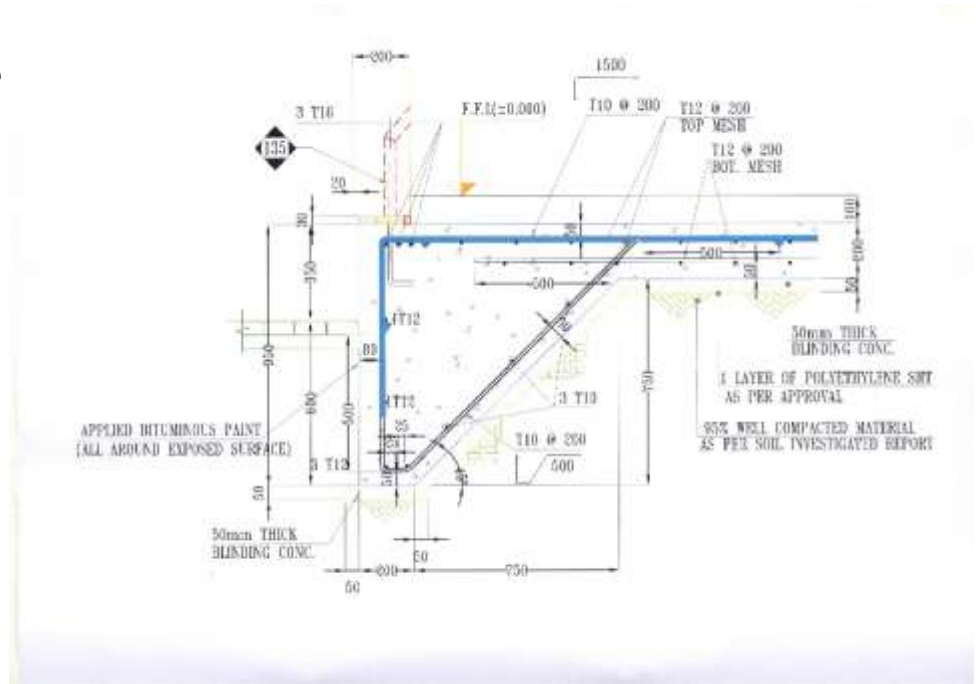
CONTRACTING PROCESS

ORIGINAL DESIGN

- Conventional Concrete frame
- Masonry and Plaster infill
- Concrete Piers
- Slab on grade

ISSUES

- The foundation was not the right choice
- The budget was set in 2006
- Shrinking construction market provided opportunity to improve the outcome
- Approval delays provided time to improve the outcome



MARKET DRIVEN STRUCTURAL DESIGN

- ALDAR accepted the recommendations to investigate alternative structural systems
- Certain things were non-negotiable
 - Longevity
 - Must feel solid
 - Must follow the architectural style
 - Must fit the budget



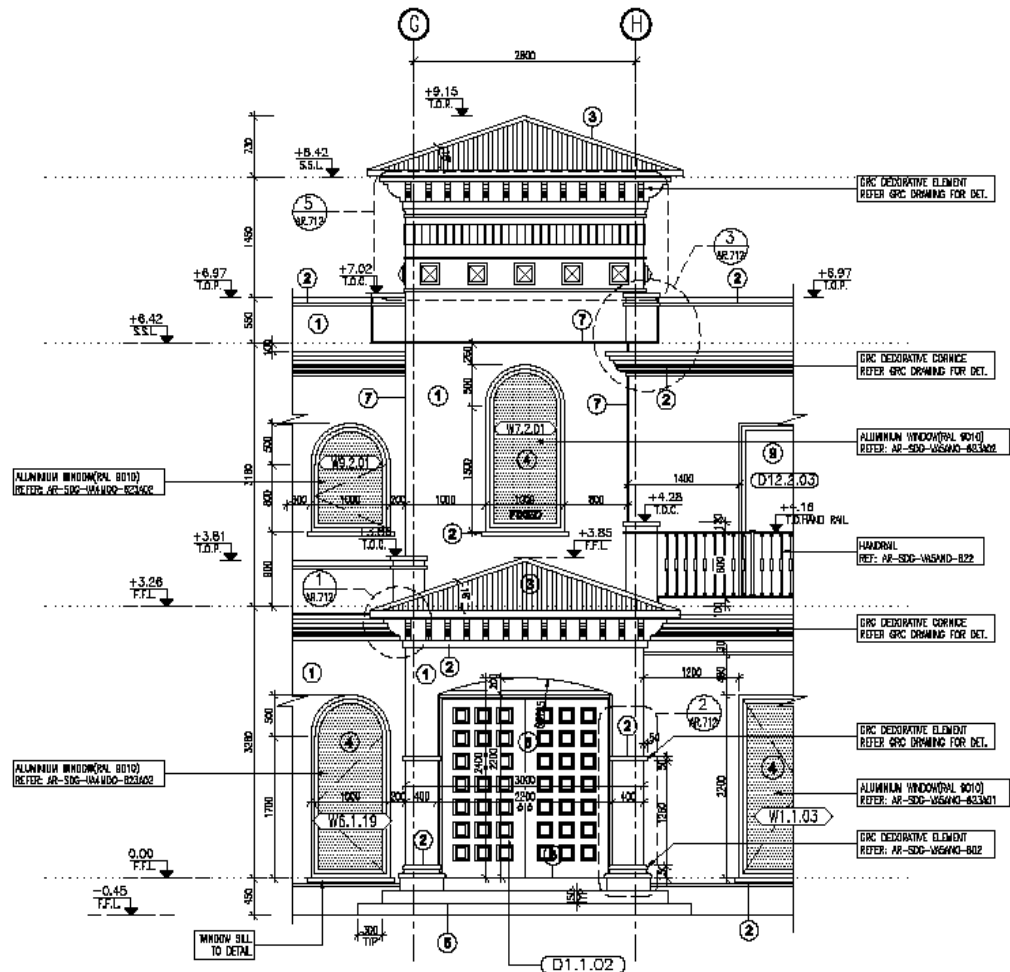
CONTRACTOR SELECTION

- At least eight contractors priced the villas
- Three contractors were selected
- All had the same price per square meter
- All three brought different solutions
 - Precast Solution
 - Original Design (Quickly changed to Precast Solution)
 - Cast in situ solution



EXECUTION

- Design a mat foundation
- Precast companies took on design liability for the structural
- Distributed precast production – Five main firms – 10 plants
- The Magic is in the Shop Drawing Coordination with Mechanical/Electrical Contractors



COMPARISON TO CAST IN SITU STRUCTURE

<i>Precast:</i>	4126 Villas – 24 months
<i>Cast in situ:</i>	730 Villas – 20 months
<i>Cost:</i>	Same – By Contract
<i>Precast:</i>	One fourth of the on site manpower
<i>Precast:</i>	Cleaner operations on site
<i>Precast:</i>	Exterior work off of lifts, not scaffolding
<i>Precast:</i>	Ready to paint











WHAT WOULD WE DO DIFFERENTLY?

- Design precast from the start
- Tweak the design to accommodate the panel layout
- Fully modularize the drivers units
- Replace some GRC components by casting them with the panels
- No cutting precast to make chases
- All precast components
- Joint sealants are better than grouted joints

WHAT SURPRISED PEOPLE?

- They really look *GREAT!*
- The precast panel joints look *great*
- The painted hollow core ceiling with exposed joints look *great*
- The precast industry rose to the need for *Attractive Efficient Villas*



JOINT DETAIL



JOINT DETAIL



CEILING JOINT

WHERE DO WE GO FROM HERE?

Full Modularization

Case Study: Iraq Villa

Project: 8-room, 4-bedroom villa, 225 m² (2,500 ft²)
Location: Samawah City, Al Muthanna Governorate, Southern Iraq

RW and RW Middle East have built the first modular precast concrete villa located in Samawah City, Southern Iraq. This villa demonstrates the technology and benefits of fast track precast modular concrete homes versus other forms of residential construction in the Gulf region, such as precast panels or traditional masonry construction.

Specialized supervisors temporarily moved to Samawah City to manage and train local Iraqi workers in precast modular construction. All materials and equipment used to build the villa were procured locally and the local workers gained knowledge and training which can now be transferred to their next jobs.

Each of the modules measures 8.5 x 4.5 x 3.2 meters; they were poured, cast, and erected within 16 hours, saving one hour from the standard 17 hour production and installation cycle.

The model villa is complete with interior finishes, electrical, and plumbing, and open for demonstration and viewing purposes. RW and RW Middle East hope to produce thousands of the modular precast villas in Iraq.



DISCUSSION

2009

2012

CASE STUDY: 4,100 PRECAST VILLAS

THANK YOU