INTERDEPENDENCE
TIANJIN, CHINA 2015
TABLE OF CONTENTS

4 INTRODUCTION
6 RESEARCH: INVENTORY & ANALYSIS
8 GROUP MASTER PLAN
14 ILLUSTRATIVE PLAN
   INDIVIDUAL PROJECTS
16 RACHEL PLESSING
18 JENNA KRUEGER
20 TYLER BOWDEN
22 MARCELLUS KIPRUTO
24 TAYLOR HOIER
26 GENEVRA OBREGON
28 FINAL MODEL PHOTOS
30 STUDIO CULTURE
Historic entrance gate to the former Watch Factory.
SUSTAINABILITY AND CHANGE
As contemporary sustainable designers move toward some form of self-sufficiency, it is important to remember that cities came into being as places of exchange. The concentration of human and financial resources that cities possess is a product of collective action. The synergy that proximity creates in urban environments has been documented to have a multiplier effect in the economies of cities. It is this synergy created by distributed sources and systems that may be the key to future sustainable cities. The hybridizing of human settlement with multi-nodal mixed use and mixed income development, the establishment of resilient systems that serve the needs of cities through a rich array of contributors and the establishment of places for interaction collectively allow the strength of interdependence to come forward.

CONTEXT
The scale of the city, as human settlement continues to urbanize, has grown beyond singularity in identity. The territory of the city requires transportation to traverse. The number and diversity of population they possess creates separate communities. The resources they consume draw further and further from their location. There is no place where this is truer than in China where the scale of everything seems magnified. The environmental result of this process would seem to indicate the city is hopelessly unsustainable, but this is only true if you fail to embrace this new reality for human habitation and the changes required to reduce its carbon footprint. As the Chinese city undergoes its next generation of reinvention, it will need to contribute to the resources required for survival, develop a shared and diverse community and embrace walkability as the base and most important form of urban circulation.

DESIGN RESEARCH
China is developed in large chunks. The old horizontal fabric of the historic city was replaced with a slightly taller row upon row of walkup slabs facing south. More recently this fabric is being replaced by collections of vertical towers spaced based on the solar code requirements. The uniformity of these projects related more to investment and consumer uniformity than community building. Rather than the mixed and connected environments of the old social city, the monocultures of these economically segregated precincts reduce the public space of the city to be the circulation defined by walls. Walls have always been a part of Chinese culture. The courtyard house is nothing, but a walled intimate scaled precinct. However with the scale shift of the vertical city the ‘front doors’ now are spaced 500 meters apart. The studio explored how traditional needs for separation can be balanced by adjusting the scale of development chunks, integrating community facilities in proximity to the new micro chunks allowing diverse communities to mix as a part of everyday life and reducing the resources required to support the basic needs of sustainable settlement.
For this phase of the project, the group looked at the surrounding context of the site, as well as the cultural influences of China, with a focus on Tianjin, China. The research showed that is an influx of people from rural towns moving into the large metro cities. The group wanted the master plan to reflect this data and help rural members of society adapt to city life.

The image above is of cooks looking for work by holding up signs that example the different meals they can cook to potential employers. Something often done among rural citizens looking for work within the city.

An existing site plan, after removing all existing abandon buildings on site.
The surrounding context consists of sport and event venues, Tianjin University, shopping areas, and a business district.

Looking at the density and heights of the buildings for the different residential programs.

A diagram showing the population growth because of the influx of rural workers and the type of program that would best suit the needs of those people and the surrounding context.
The following images highlight the ideas behind the four courtyards, and feature some of the activities seen in those courtyards.

The merged urban design scheme was organized around three public courtyards. One was dedicated for shopping, one for socialization and the final for entertainment. These were linked with pedestrian and vehicular circulation providing access through the super block. Additionally, private garden spaces were nestled amongst the different housing sections inside the super block to accommodate access to nature and leisure activity.
MASTER PLAN
Illustrated Plan and Program Massings

[Diagram of Master Plan and Program Development with various symbols and legend: Affordable Housing, Luxury & Market Rate Apartments, Agricultural, Day Care, Educational, Hotel, Commercial]
**Program Distribution**

1. **Hotel**
   - Program: 10,200 m² Hotel
   - Conference Center: 3,500 m²
   - Number of Rooms: 150 Rooms
   - Maximum Building Heights: Building 1: 2 levels (8m)
   - Building 2: 8 levels (25.3m)

2. **Affordable Housing**
   - Program: 23,500 m² Affordable Housing
   - Commercial: 4,000 m²
   - Number of Units: 392 Units
   - Maximum Building Heights: Building 1: 11 Levels (33m)
   - Building 2: 5 Levels (15.6m)
   - Building 3: 7 Levels (21.4m)
   - Building 4: 5 Levels (15.6m)
   - Building 5: 10 Levels (30.1m)

3. **Affordable Housing**
   - Program: 17,500 m² Affordable Housing
   - Commercial: 1,800 m²
   - Number of Units: 288 Units
Program:
7,000 m² Agricultural
2,000 m² Day Care
10,000 m² Educational

Maximum Building Heights:
Building 1: 5 Levels (15.6m)
Building 2: 5 Levels (15.6m)
Building 3: 8 Levels (40.6m)
Building 4: 4 Levels (11.6m)
Building 5: 1 Level (9m)

Maximum Building Heights:
Building 1: 10 Levels (30.1m)
Building 2: 10 Levels (30.1m)
Building 3: 6 Levels (17.1m)

Program:
West:
12,500 m² Luxury Apartments
14,000 m² Market Rate
Apartments
2,500 m² Commercial

Number of Units:
432 Units

Maximum Building Heights:
Tower 1: 18 Levels (54m)
Tower 2: 21 Levels (63m)
The full illustrative plan is showing the right hand side page with all six final designs of each sector. As a team, sustainable functions and materials were chosen based off the reality of function, sun angles, and use of program. Eighty percent of all rooftops contain either a green roof or solar panels. All hardscape is at some level of permeable. There are also areas for food production and sale. All projects highlight what sustainable uses they provide by the icons showing the black boxes on each individual project page.

Clockwise: Diagrams showing which buildings have green roofs & water management, solar panels energy offset, permeable and non permeable surfaces, and food production and sales.

Sustainable material and machine choices made by the group. Full permeable plant beds, solar panels to produce electricity for the site, pavers for the street and sidewalks, and vertical farming strategies in the greenhouses.
The main concept of the design was embrace the public spaces the buildings were designed around with private outdoor space on the roof. The courtyard on the site was dedicated towards socializing through the residential buildings as well as the school adjacent. It was important that the economy required in the sizing of affordable housing units was offset by the availability and access to comfortable public spaces. This building offered a substantial amount of bicycle parking for residents and visitors. Commercial programming remained on the ground level and help create a street presence.

A diagram showing progression of form and function.
A section perspective highlighting balcony spaces, underground parking for vehicles and bicycles.

A rendering of the outside stairs used for circulation as well as seating areas.

A rendering of the street view highlighting circulation, commercial shops, and uniqueness of the facade.

A rendering of the street view between the two buildings showing pedestrian and vehicles relationship of shared spaces, as well as showing paving material and street trees.
This site included one of the primary open courtyards that was essential to the overall master plan, the “open market courtyard”. To address this part of the concept, two of the buildings were skewed to promote movement into the space. Additionally first and second floors were programmed as commercial to compliment the program of the courtyard. To enter the residential units, people first move from the public courtyard into private courtyards for residents only, then into their respective dedicated stairwell, and into their unit. This arrangement focused on the cultural preference for a progression of spaces to enter the home. The design of the units themselves focused around creating the most efficient layout while still allowing all rooms’ access to natural light, something that is important to the Chinese culture. This resulted in the different facade depths. Some units and balconies were differentiated in response to the open space they faced and to break up the monotony of the facade.

**COMMERCIAL & MARKET-RATE RESIDENTIAL**

27,000 SQUARE METERS

392 UNITS

5 - 11 LEVELS

GARAGE PARKING

SOLAR PANELS

SEMI - PERMEABLE

ELECTRICITY

A ground level plan showing commercial courtyard, commercial spaces, and private residential courtyards to the west and east of the complex.

A north elevation with shadows highlights the different types of residential balcony spaces and access to the second level.
A diagram featuring material close-ups of the building render, such as ceramic colored tiles, cement tiles, colored stucco, and painted aluminum panels.

A rendering inside the commercial courtyard showing the water features, tree and plant beds and vendors in the background selling goods and food.

An image of the full final model highlighting rooftop solar panels and material changes on the facade.
The inclusion of the greenhouse provided local food, put ‘waste’ from the waste water treatment plant to work and served as a teaching platform for future green industry jobs. Thus lowering the impact of the waste leaving the project, and the energy/pollution requirements of bringing food in.

The school concept was to give new urban residents the opportunity to learn technical skills in a vocational school so that they may work within their new urban environment by utilizing the proximity to the existing power plant and the greenhouse, and creating a technical school.

The day care concept was to create a safe environment within the project that uses a free-flowing form to make a special place just for children.

EDUCATION, DAY CARE, AND FOOD PRODUCTION

- 19,000 SQUARE METERS
- N.A.
- 1 - 8 LEVELS
- STREET PARKING

SOLAR PANELS & GREEN ROOF
SEMI - PERMEABLE
ELECTRICITY & FOOD

The large site plan zoomed into the day care, vocational school, and greenhouse food production areas.
A ground level floor plan showing both the day care and vocational school.

A diagram showing how the living machine will help with food production inside the greenhouses, which is shown in the right axonometric drawing. Full glass greenhouse with vertical farming housed inside.

A rendering of the front entry to the vocational school.

An image of the final model of the day care, vocational school, greenhouse, living machine, and existing power plant, shown in context with the rest of the group model.
The concepts achieved in this design of the market rate housing complex was natural lighting, healthy living, and circulation. Natural light and south facing rooms were maximized in the design to relate to the Chinese market, and design layout of their homes. Healthy living was facilitated with the rooftop outdoor activity areas. Circulation was important over the entire site. The buildings’ design allows the interior and exterior circulation to be well connected. The site was narrow and along with the height codes and limitations, the project created a very dense design situation.

MARKET RATE RESIDENTIAL & COMMERCIAL

- 29,000 SQUARE METERS
- 432 RESIDENTIAL UNITS
- 18 - 21 LEVELS
- GREEN ROOF
- SEMI - PERMEABLE
- GARAGE PARKING
- ELECTRICITY

South elevation of all three market-rate towers.

A ground level floor and site plan showing private garden and seating areas, as well as ground level commercial spaces.
The main focus for the garden towers was to integrate traditional hutong courtyard homes into urban residential towers. As the idea of hutong courtyards went vertical, varying degrees of public and private courtyard gardens were created to rethink traditional concepts integrating into the quickly evolving 21st century city of Tianjin. The main garden, the most public garden, was to serve the tower occupants, its guests, and support staff. The mezzanine garden was proposed as a more private garden, to be only utilized by any tower resident. Each tower floor also contained its own, more private garden (considered to be the most similar to traditional courtyards by becoming the entrance to the residences) and would only serve the residents of that respective floor. The balcony gardens are the most private gardens of the project and have a wide array of unique arrangements to suit their varying occupant’s needs.
Selection of floor plans for the towers, levels 5, 14, 11, and 20. All showing main circulation and private floor garden space

Final model highlighting green roof feature.

Private ground level residents garden, featuring the multiple level water feature.

All three towers with basic site context showing level twists and turns.
Hotel and Convention Center was part of the project program to connect with surrounding sporting and event venues. The hotel took on a boutique specialty hotel concept. The courtyard in front of the hotel is programmed for entertainment. The hotel brings not only hotel guests in but attendees for the meeting facilities and visitors to the restaurant bar on the third floor patio. The facade has a large orange cement tile accent element that wraps over the building, noting the entrance to the hotel and third floor patio bar and outdoor seating area. The patio offers seating and views of the garden used by the restaurant.
Street perspective rendering of the front and main entry to the hotel and convention center. A waterfall pole feature with seating underneath and beside the underhang where there is guest loading and unloading.

Street view rendering of group designed planters with view into hotel ballroom.

Third floor rendering of the view from the seating looking into the patio garden and skylights.

Rendering of the view down the glass atrium, as showing a birds eye view of the third floor patio gardens.
The final models came together like a puzzle. Each of the six sectors had its own base where the final building models were built on to. The models could be placed together to form the entire developed site and then pulled apart to show individual projects. The representation of vegetation and materials were consisted throughout all six models.

The four images here are close up detail shots of our model, showing the retail courtyard, the entrance to the site, socializing courtyard, and low birds eye view from the vocational school.

A group photo of all six students and the final model. Left to Right: Marcellus Kiputo, Taylor Hoier, Rachel Plessing, Tyler Bowden, Genevra Obregon, and Jenna Krueger.
Commercial program occupied a majority of the ground level through the entire master plan. The building in the foreground as well as the background show two different ways commercial meets residential program.

The two images above are featuring the main street and vehicles entrance to the site lined with street trees and commercial shops leading to the socializing courtyard and the vocational school.
Working within a large group may seem difficult in the student atmosphere, however for us it made our studio stronger. We were able to make design decisions as a team and take consideration from all sectors of the projects. We also turned some of those decisions into fun events, like our tree pageant to decide what model trees to go with for the final. We spent several hours a day working in studio together, as well as found times to hang out as friends and relax. The enjoyable of being in studio definitely added to the success of the project.

My favorite part of studio was the team that worked together to complete this project. Everyone was very dedicated to planning and executing the master plan to be environmentally conscious and culturally viable for the people of China. What resulted was a very holistic project that we were able to take from start to finish in one semester; that would not have been possible if all our team members and professor had not been 100% dedicated.”

- JENNA

“ This was the largest project I have ever worked on and it was a lot of fun to collaborate back and forth with my studio-mates. Design decisions didn’t feel like they were in a vacuum. There was a real need to check in with my neighbors to make sure I wasn’t blocking a view or otherwise stepping on toes. Family dinner was pretty great too.”

- TYLER
"I enjoyed the master planning phase of the project. It allowed for the building to relate more and interact on a deeper level with its surrounding context."

- RACHEL

"My favorite part of studio was learning from my professor and peers. This was the first residential project I had ever undertaken and while 20 story towers seemed like a daunting task, it was very helpful in pushing me toward my professional career today. Having visited China for 6 weeks in a previous studio, I felt like I already had some sense of Chinese culture. With the help of research, Lily Lee, Mark, and other students who had visited China, I was confident we had the knowledge and help to produce a project that wasn’t Western in ideology but much more Eastern to accommodate its proposed region and culture. I very much enjoyed revisiting a Chinese project my last year in school. It brought back many memories of a beautiful culture much different from our own."

- TAYLOR

"I really enjoyed the collaboration between all of us during the entire project. Even after master planning, we were still considering other people design constraints and making group decisions. I am really proud of how the model came together allowing us to show the project as a whole development as well as individual projects. We could not have done that without the dedication and effort from all six of us."

- GENEVRA

"My most favorite part was team work and collaboration. Having one side but different programs that needs to be executed at the same time. The challenge of small space different programs, different culture and different designers working on it to create a well-designed and harmonious idea. Not forgetting the pressure to deliver a full design from Conceptual, to Construction details to physical models within shortest time possible."

- MARCELLUS