a form of construction

an inquiry into Architecture through the making of a school

by patrick allen doan

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william galloway

steven thompson

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keywords: houston montessori concrete tilt-wall Architecture

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abstract

i am humbled by the prospect of Architecture.

it is not formulaic or linear in thought and action and at times it can be difficult and elusive to define.

i believe Architecture exists yet experience has shown that not all building endeavors lead to Architecture.

i search for Architecture with a willingness to embrace the unknown, allowing my practice to provide a defined realm into which Architectural questions and propositions can evolve and open new forms of discovery.

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acknowledgements

those who have inspired, empowered and believed in me.

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in memory of my mother

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introduction

the work that follows is a search that seeks insight into Architecture.

a dialogue of action, reflection and speculation structures the search as the work unfolds through the measure and play of drawings, words, sketches, writings, photographs and models.

at the heart of the search is the examination of the conventional building process, the making of boundaries and the qualities of material and place that inform and inspire Architecture. the city, the school, the room and the building material studies provide scales of exploration and establish a place to test, challenge and transform these ideas into an Architectural proposition through the making of a Montessori School[1] situated within the museum district of Houston, Texas.[2]

it is a work in progress that seeks questions and looks to process as a way of building a foundation for future Architectural thought and inquiry.

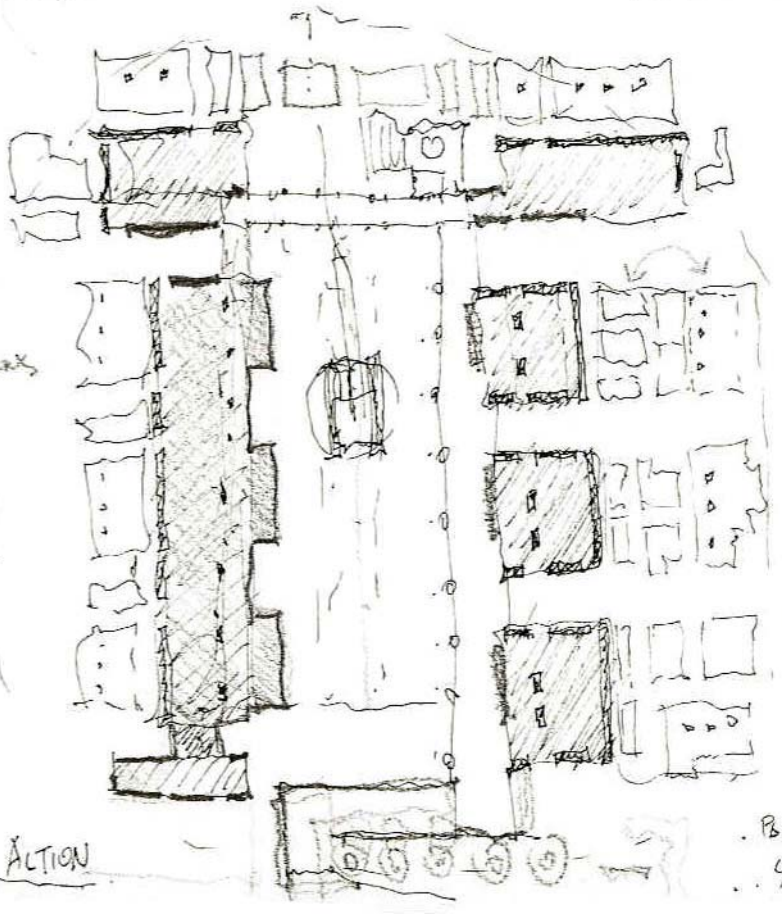
the proposition

“a great building, in my opinion, must begin with the unmeasurable, must go through measurable means when it is being designed, and in the end must be unmeasurable. the only way you can build, the only way you can get the building into being, is through the measurable. you must follow the laws of nature and use quantities of brick, methods of construction, and engineering. but in the end, when the building becomes part of living, it evokes unmeasurable qualities, and the spirit of its existence takes over.

architecture has existence, but it has no presence. only a work of architecture has presence, and a work of architecture is presented as an offering to architecture.” [3]

Louis I. Kahn

40' x 28' x 1' THK
W AT



PUZZLE | UNFOLDING

04/14/07

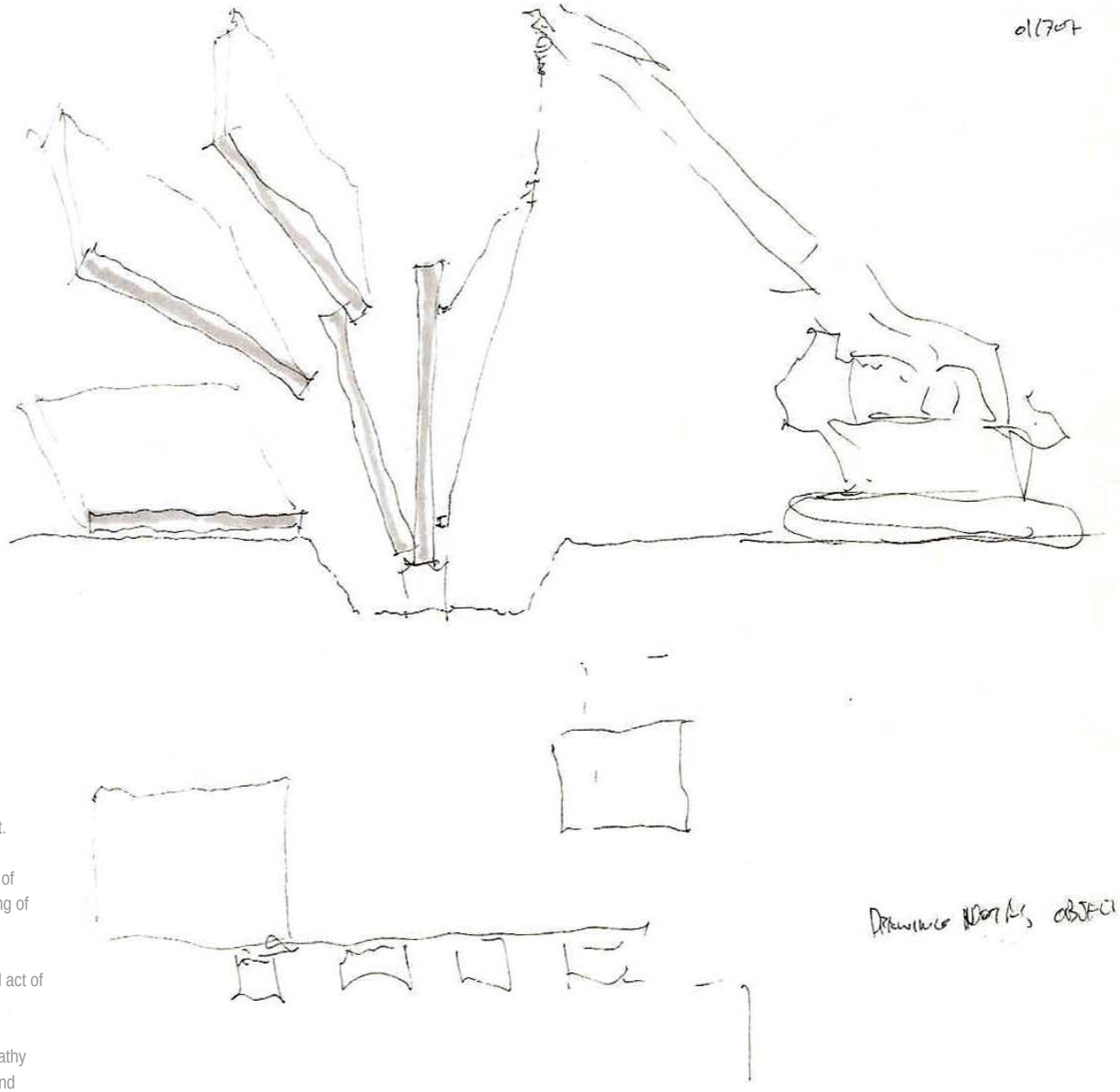
CRANE - #OF PICKS
- SIZE
- REACH
- LOCATION
- WT.
- SEQUENCE OF LIFTS.

CASTING BEDS - TRACE OF BUILDING -
DIALOGUE OF GARDEN / BLDG.
MEANS / METHODS CAN BE TRACED & REVEALED IN SCHOOL
DRAW IT AS A BUILDER WOULD SEE & UNDERSTAND IT...
CAST FIXED - INT PANEL
- DETAIL OF BED / PANEL / POUR

3 GIVENS - HOUSTON, MONTESSORI, CONC. TILT-WALL
. FRAGMENT - CONSTRAINTS, RULES, MATERIALS
. MATERIAL, METHODS, MEANS
SEQUENCE / HYBRID
. CONCRETE - PRIMARY
. STEEL - SECONDARY
- GLASS - CANOPY
. SCALES OF INVESTIGATION

KIT OF PARTS
SCARPA-BRION
PUZZLE

. PANEL REVEAL AND GROUND..
.. SET OF DRAWING SHOWING ASSEMBLY...



a form of construction

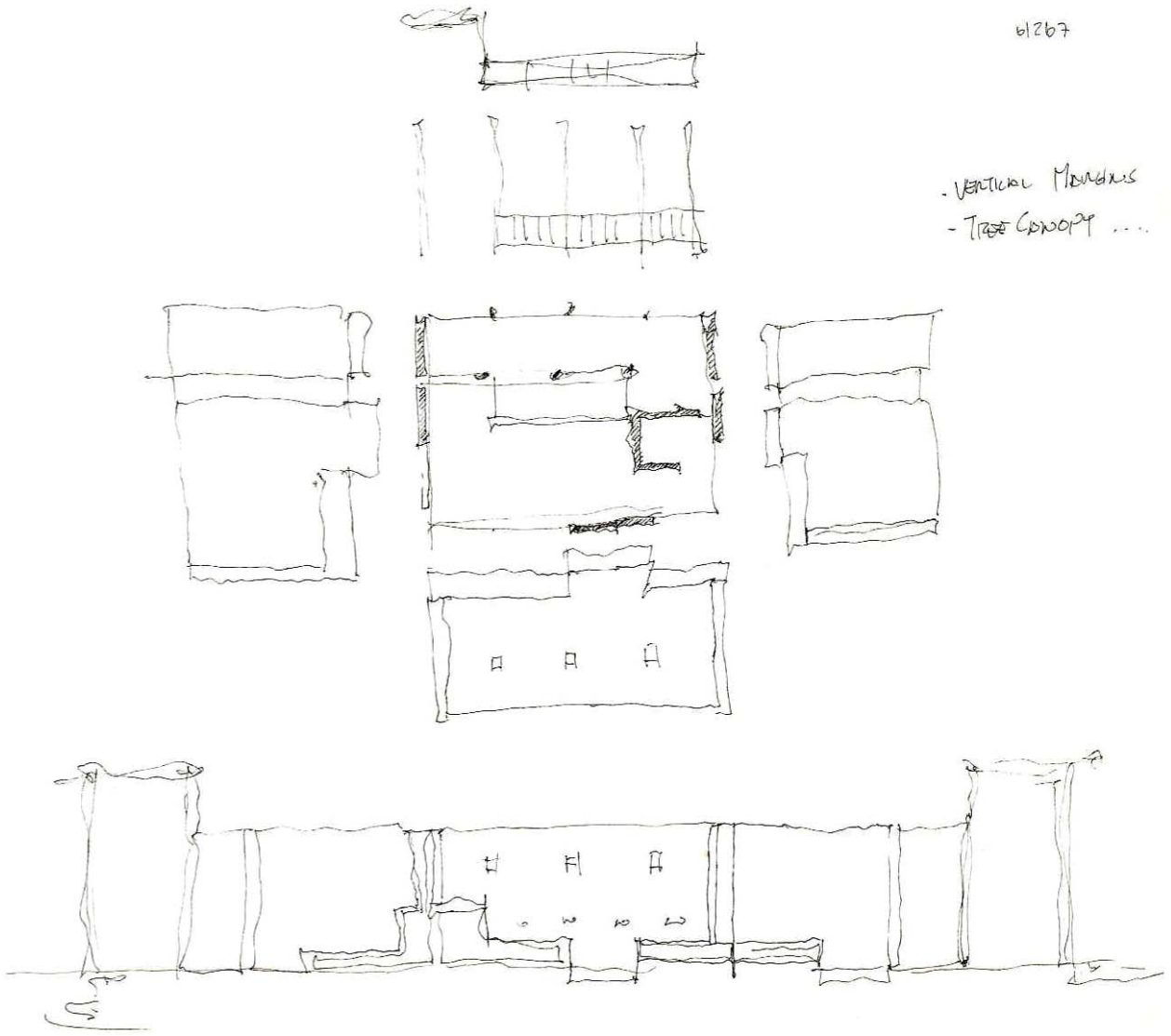
the act of constructing requires physical effort.

the weight of materials, gravity, and methods of assembly all play an integral role in the making of Architecture.

by understanding and respecting the physical act of building the work becomes more authentic.

the Architect is working from a place of sympathy that allows for an appreciation of how hand and mind come together in the making of Architecture.

realized model: april 2007
constructing the school

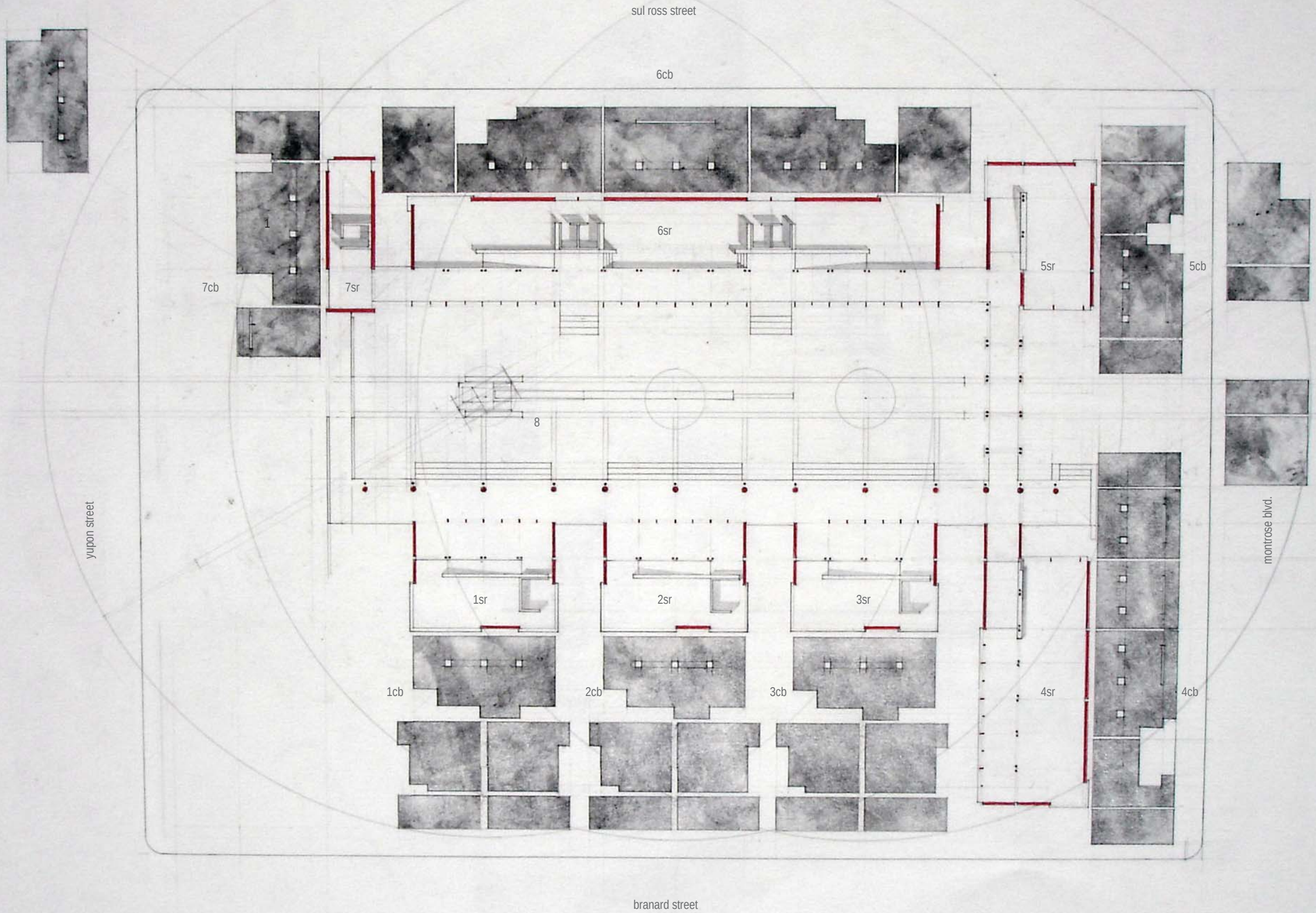


concrete tilt-wall

concrete tilt-wall is introduced into the Architectural proposition as a way of taking a conventional building technique and exploring its properties, searching for opportunities to elevate and incorporate its making into the design of a school.[4]

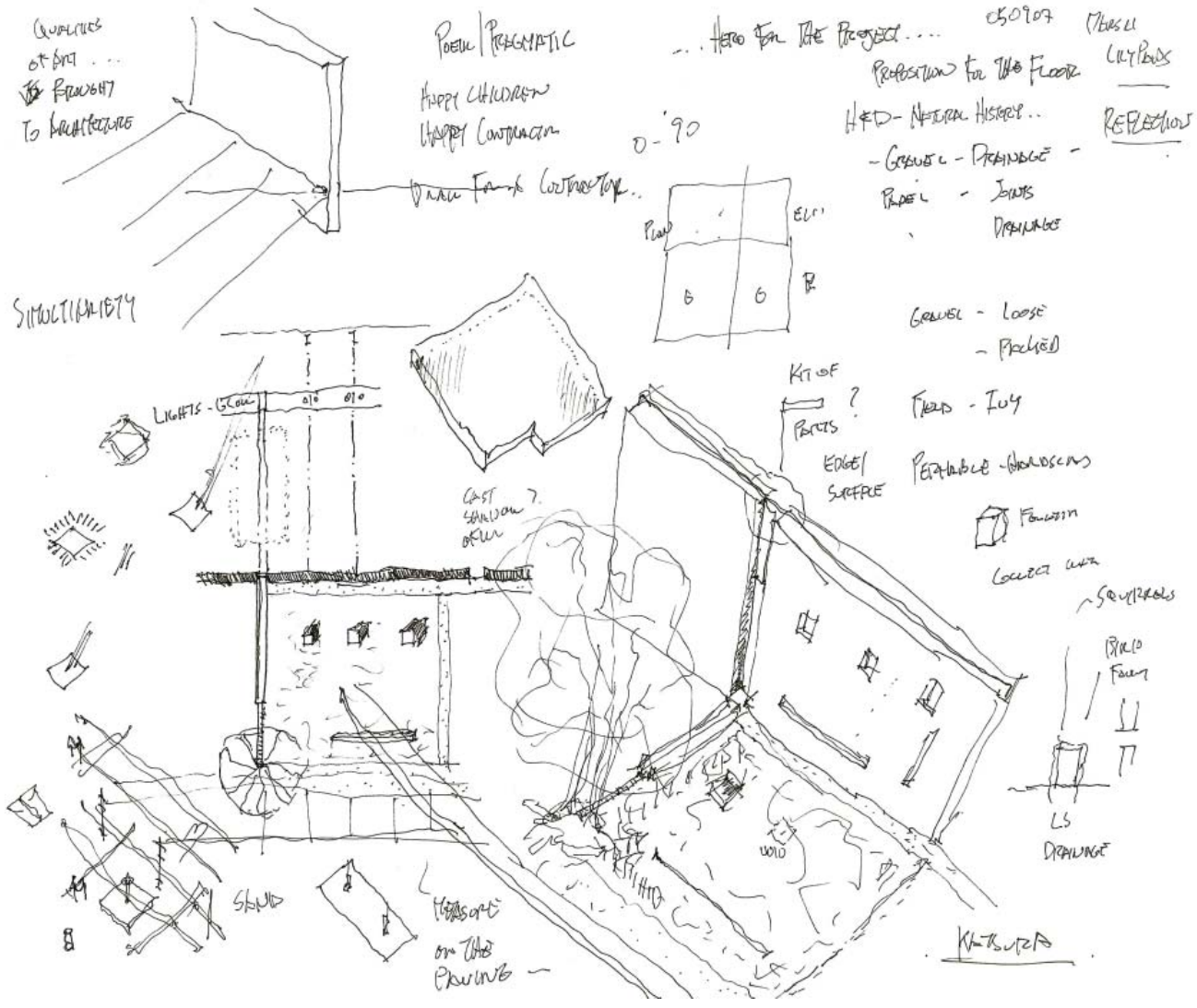
the work focuses on the relationships and sequences of casting, lifting, placing, and joining concrete tilt-wall.

the casting bed, the movement / placement of the crane and the panel joint define the realms of investigation where the proposition is played out.



1cb - 7cb casting beds
1sr - 7sr school rooms
8 crane placement / movement

drawing: april 2007
'plan of action'



casting bed

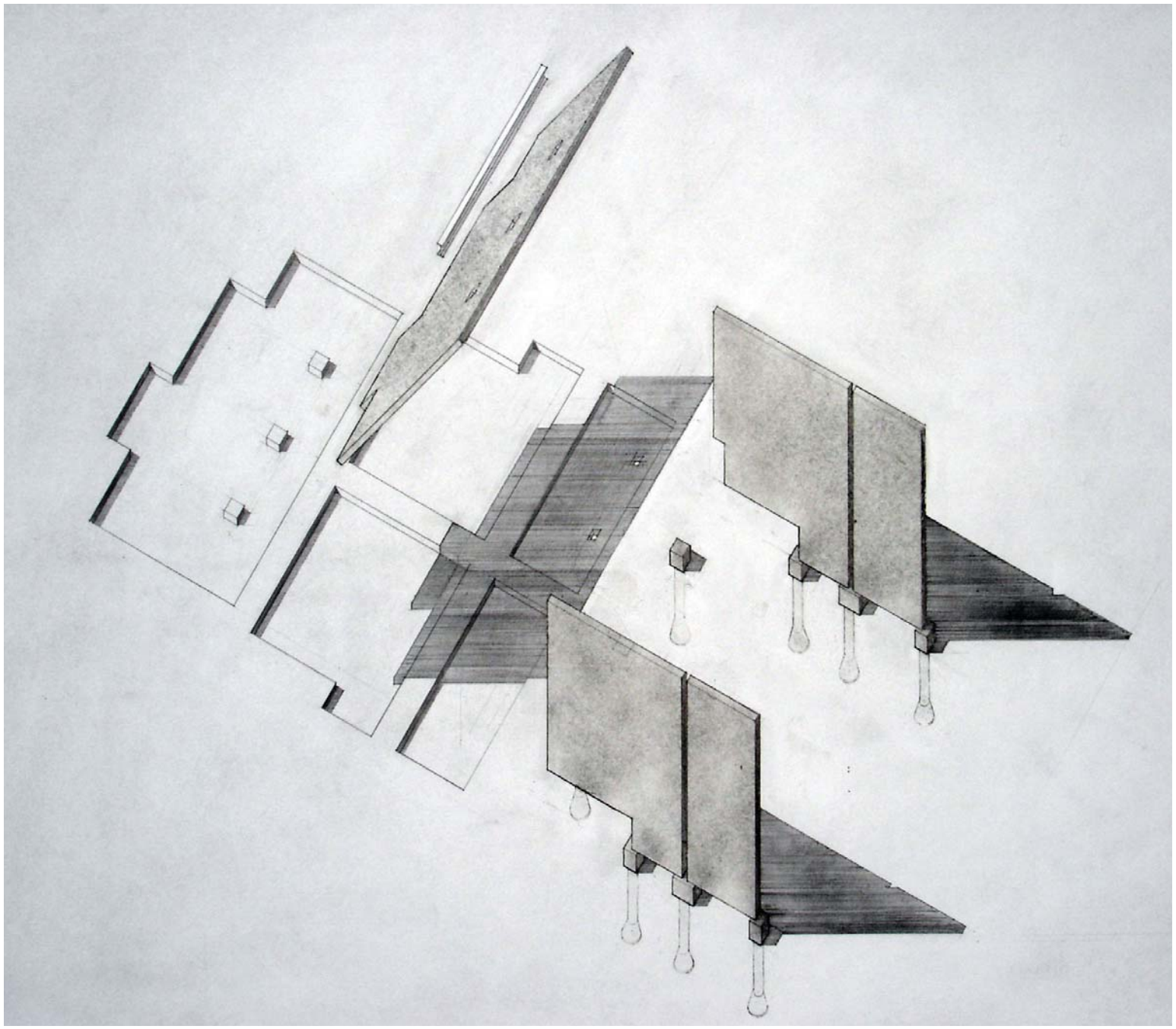
the casting bed provides a place on the floor of the construction site for the forming and casting of concrete tilt-wall panels.

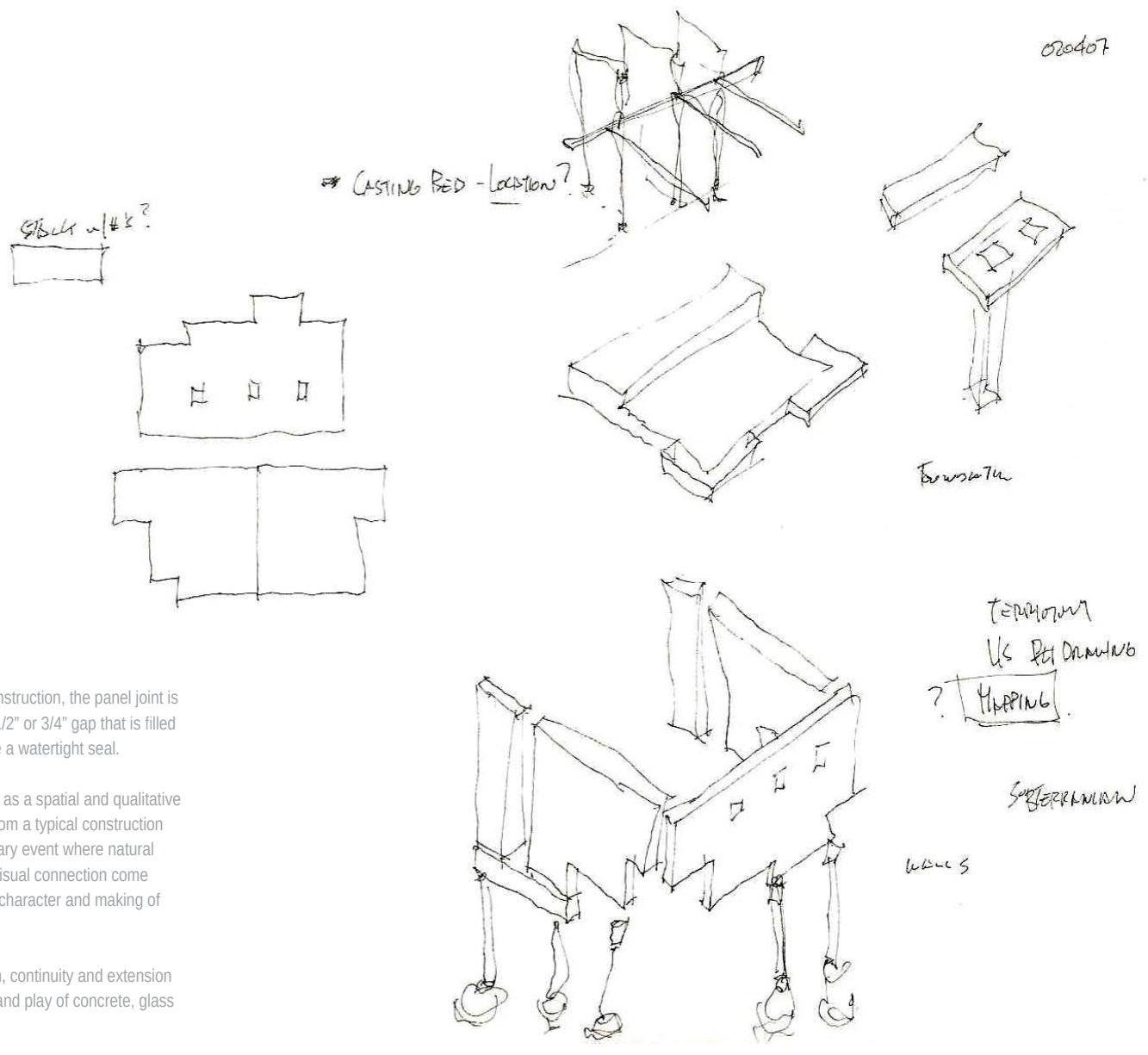
cast horizontally on the ground, the making of the wall physically imprints the elevation of the school into the floor of the construction site.

in turn, the floor is transferred to the casting face of the wall through surface textures and markings incorporated into the casting bed.

once lifted and placed the measure and order of the construction floor is brought to the building elevation.

the casting bed reveals remnants of the elevation, providing a formal structure to the floor of the construction site that can be used to inform future landscape and garden design.



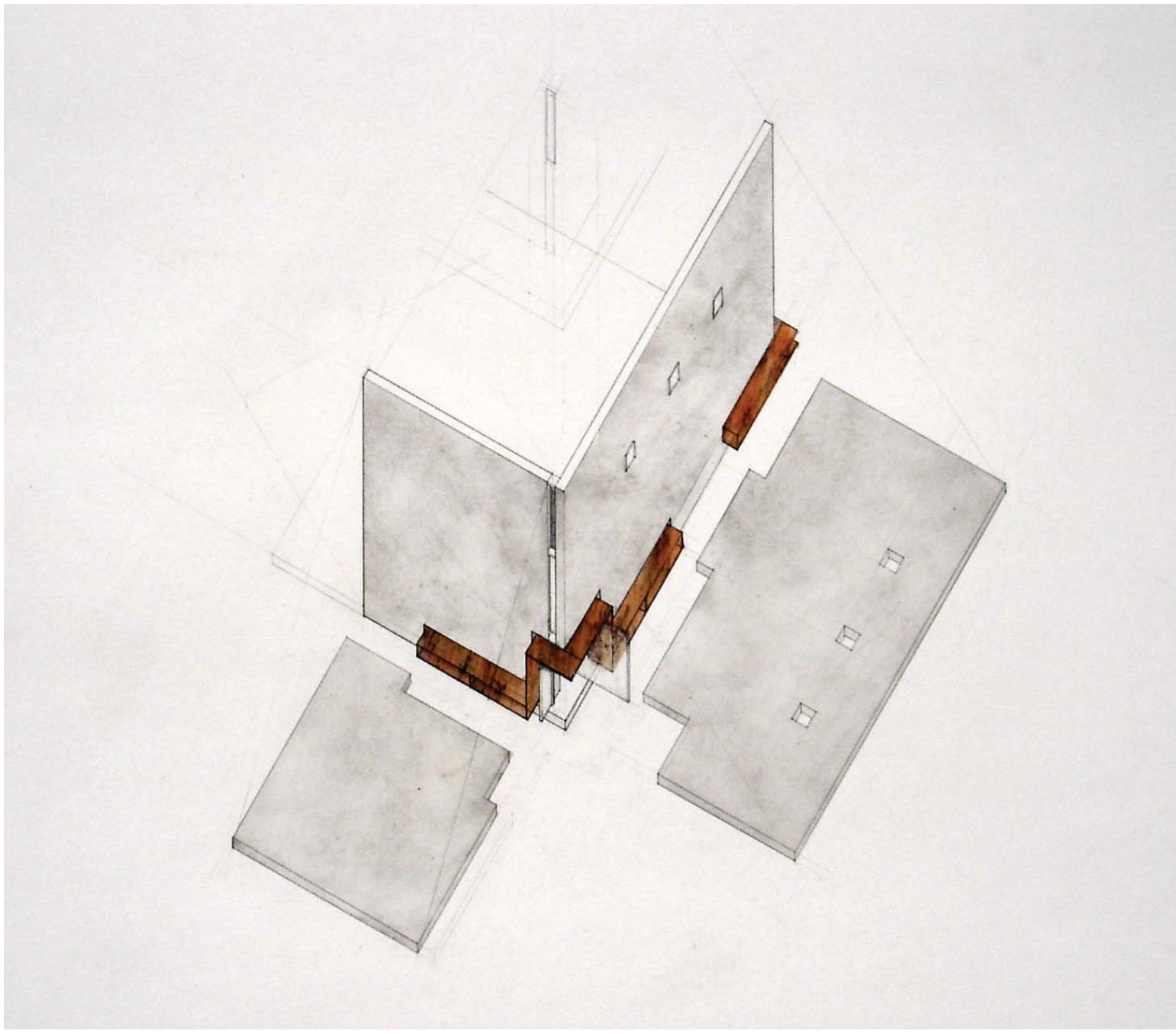


panel joint

in concrete tilt-wall construction, the panel joint is typically treated as a 1/2" or 3/4" gap that is filled with sealant to provide a watertight seal.

reconsidering the joint as a spatial and qualitative condition elevates it from a typical construction detail to an extraordinary event where natural light, movement and visual connection come together to define the character and making of the joint.

the joint is given depth, continuity and extension through the measure and play of concrete, glass and steel.



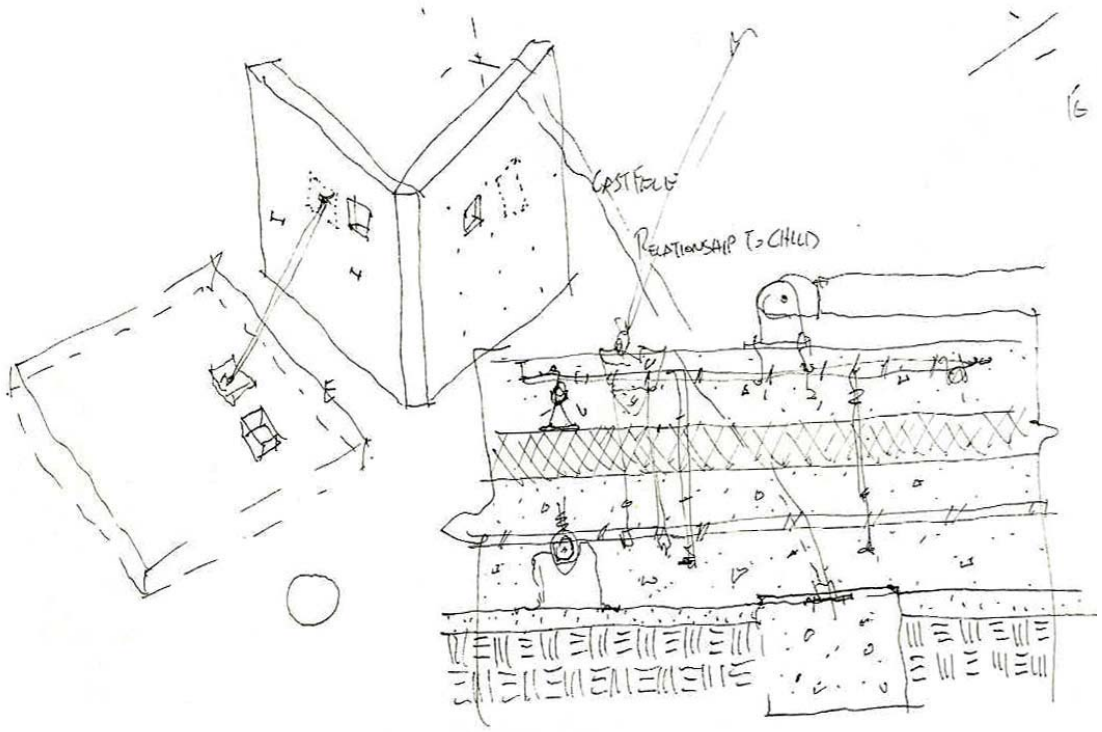
drawing: november 2006
constructing a joint with concrete, glass and steel

materials

“it is important that you honor the material you use. you don’t bandy it about as though to say, ‘well, we have a lot of material, we can do it one way, we can do it another way.’ it’s not true. you must honor and glorify the brick instead of shortchanging it and giving it an inferior job to do in which it loses its character, as, for example, when you use it as infill material, which i have done and you have done. using brick so makes it feel as though it is a servant, and brick is a beautiful material. it has done beautiful work in many places and still does. brick is a completely live material in areas that occupy three quarters of the world, where it is the only logical material to use. concrete is a highly sophisticated material, not so available as you think.

you can have the same conversation with concrete, with paper or papier-mache, or with plastic or marble or any material. the beauty of what you create comes if you honor the material for what is really is. never use it in a subsidiary way so as to make the material wait for the next person to come along and honor its character.” [5]

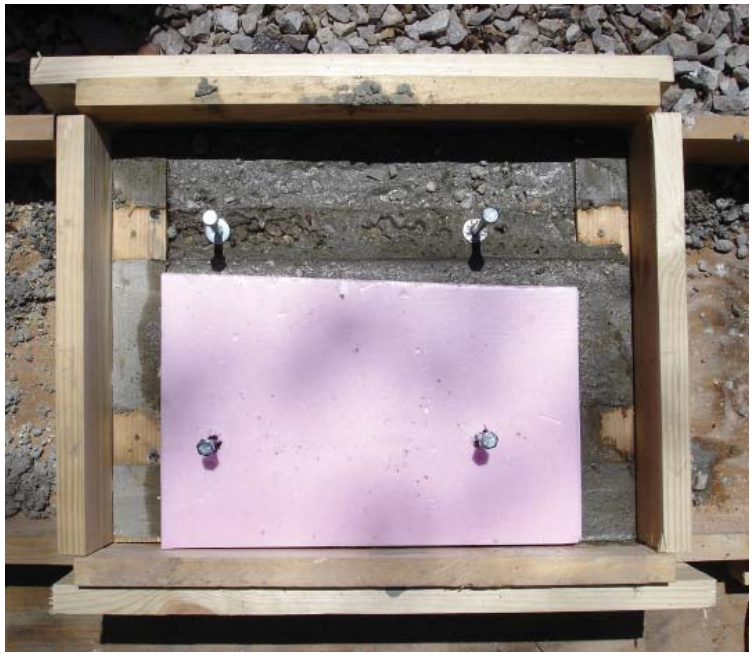
Louis I. Kahn



sketchbook: 26 april 2007
section through wall panel

sand casting bed

formwork is constructed and embedded hardware set

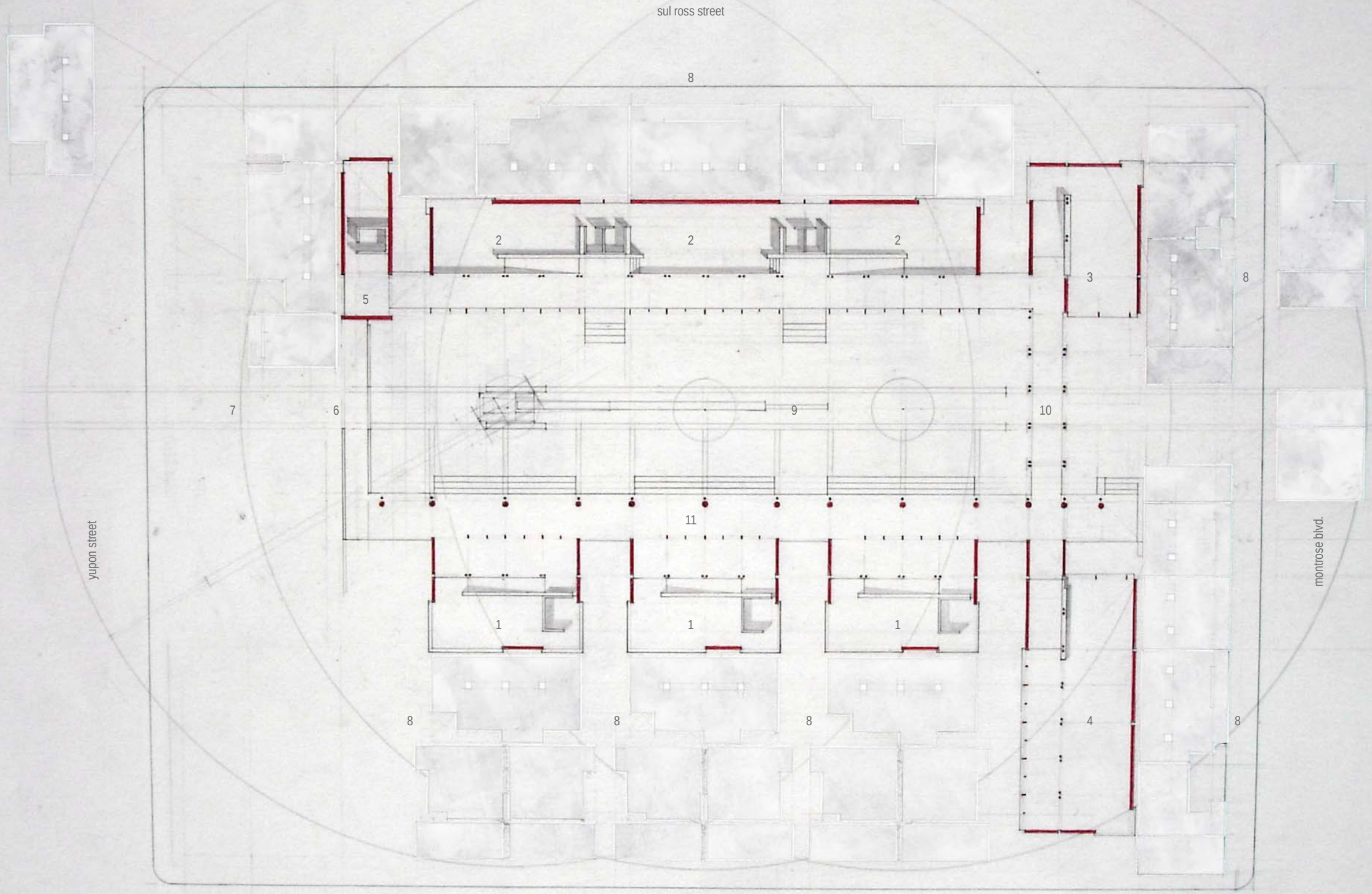


insulation is inserted and fastened into the formwork after the first concrete pour to create a thermal barrier within the concrete tilt-wall.

concrete panel after removal from the formwork. sand from the casting bed is still adhered to the panel face.

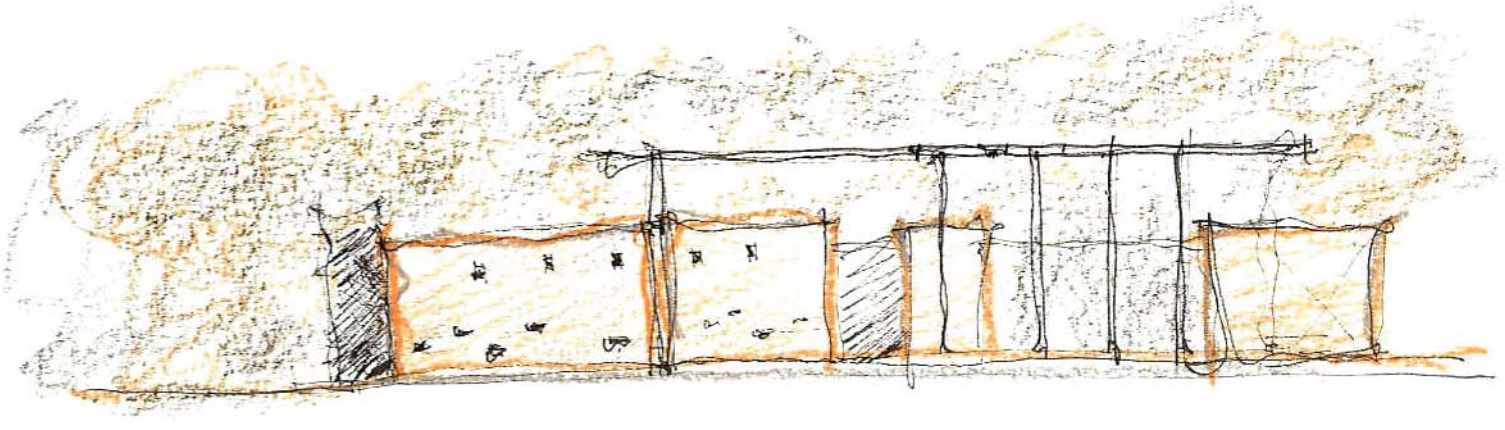
a key to the school

1 school room: 3 - 6 years old
2 school room: 1st - 6th grade
3 library
4 school room: multi-use
5 administrative offices
6 school entrance and drop-off
7 parking lot
8 individual school room gardens [location of casting beds during construction]
9 shared school garden [location of crane during construction]
10 exterior covered walk
11 exterior canopy



drawing: april 2007
plan of school

02.14.07



the canopy and the covered walk

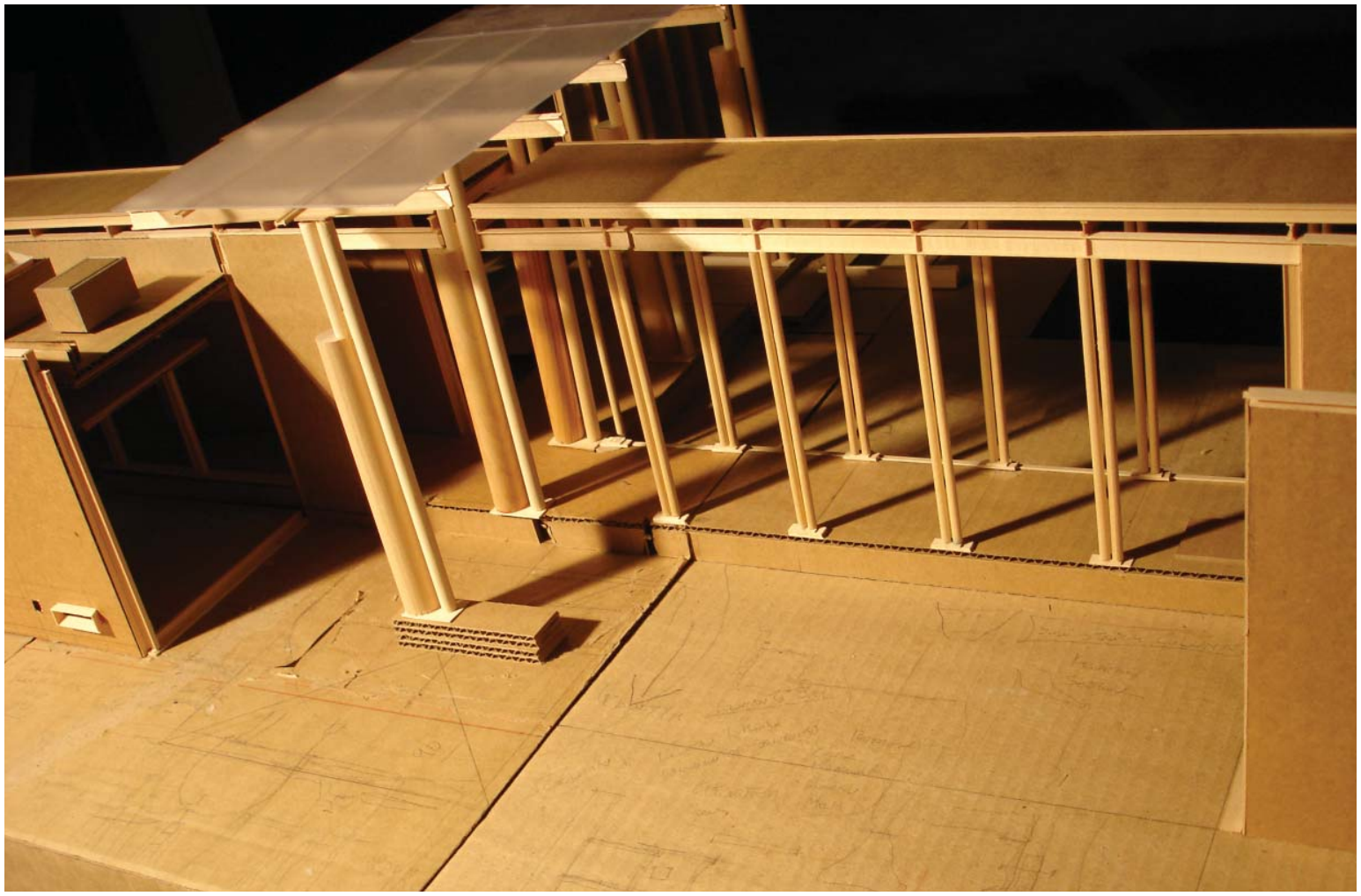
the use of steel in the construction of the canopy and covered walks introduces a linear dimension and precision to the construction of the school, playing off the mass and coarseness of the concrete tilt-wall panels.

round columns supporting the canopy are grouped in pairs to reduce their diameter, accentuating and reinforcing the slenderness and verticality of the exterior covered walks and canopies.

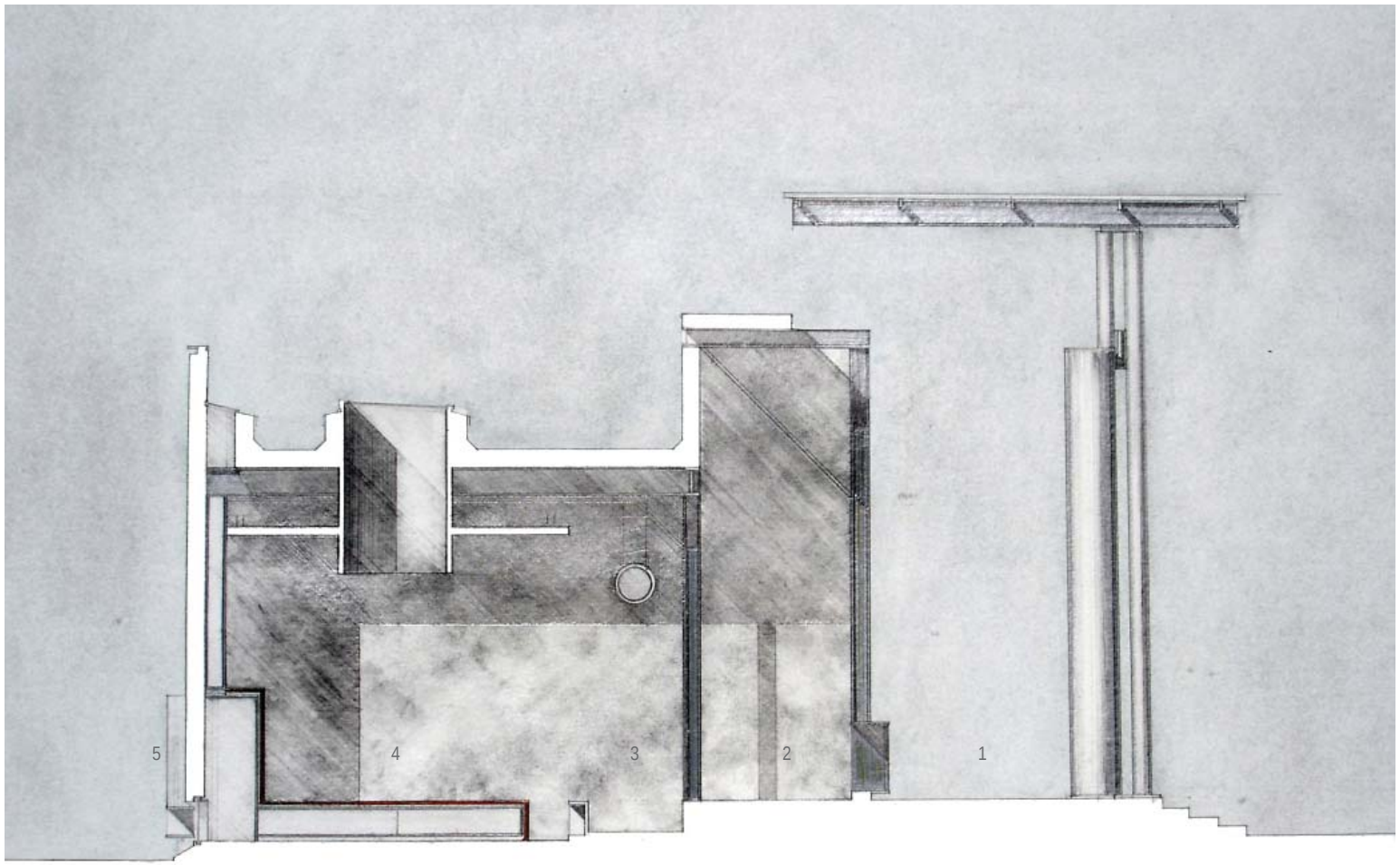
the columns are capped with i-beams that establish a bounded horizon to the school.

translucent panels create the canopy roof, filtering the sunlight while illuminating the ‘ceiling’ of the school.

sketchbook: 14 february 2007
formal elevation of the school



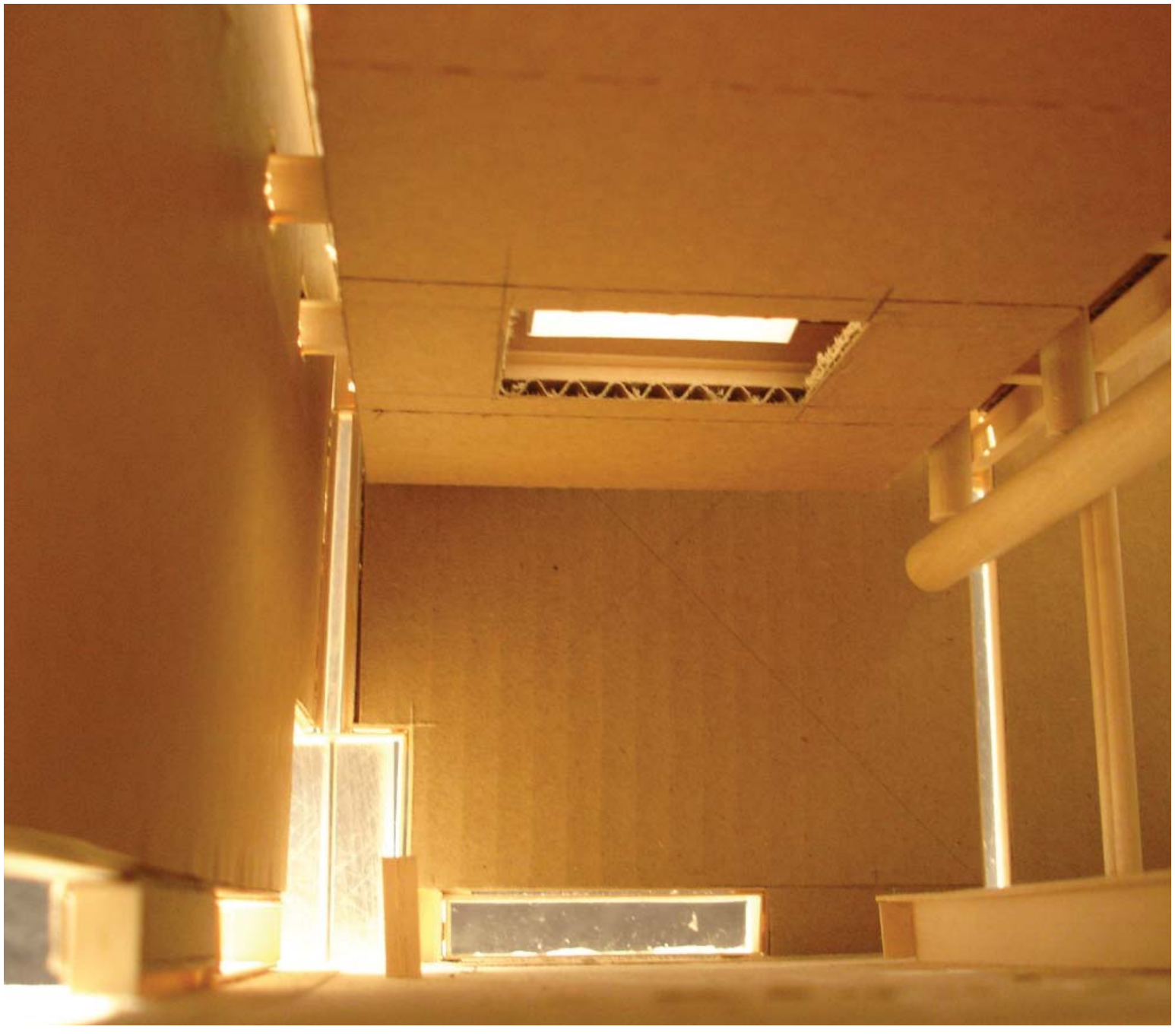
sketch model: october 2006 - april 2007
exterior canopy and covered walk



spatial sequence through school room

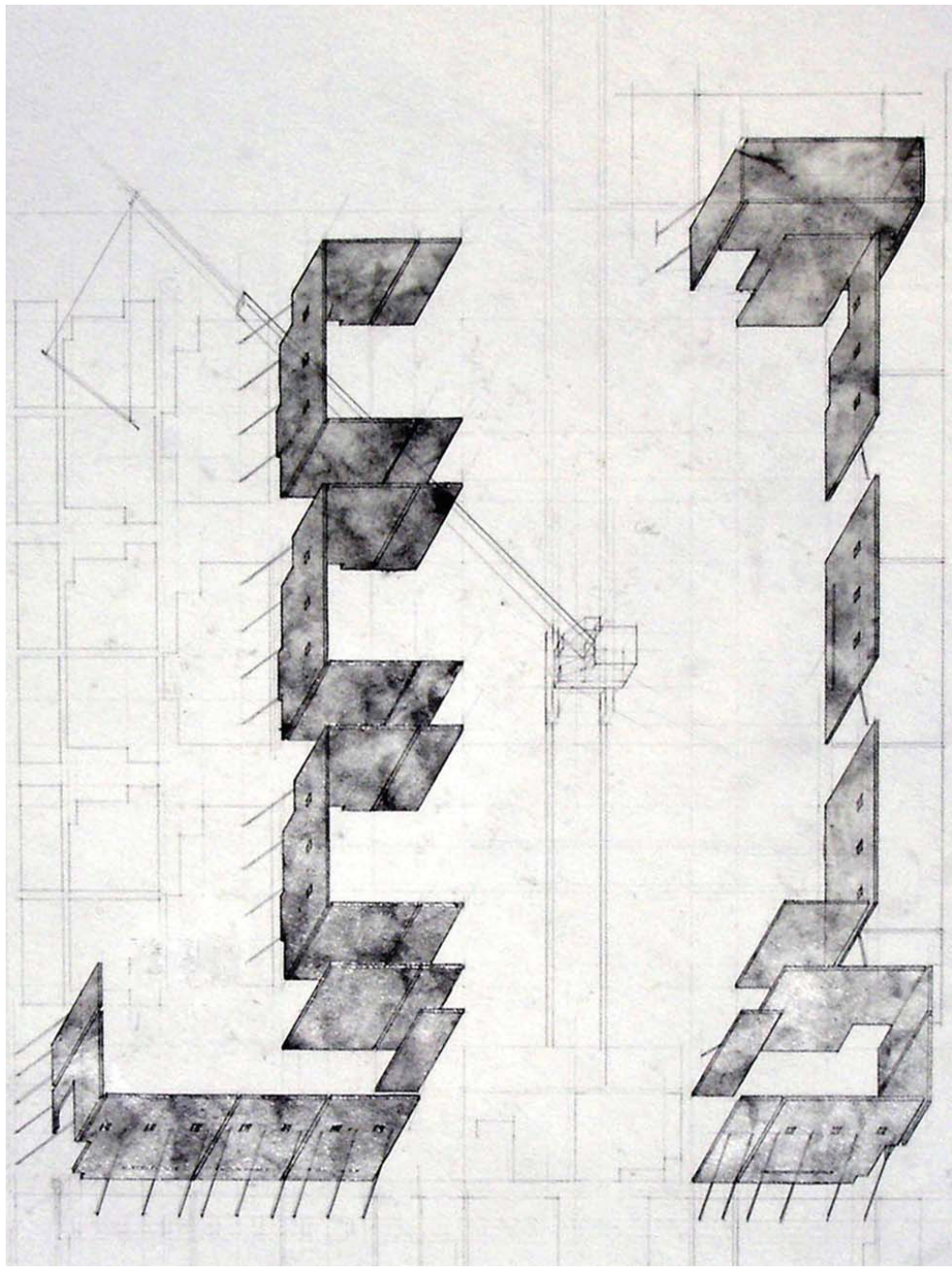
1 exterior canopy and elevated walk
2 entry vestibule where cubicles and benches provide storage for the children's personal items
3 ramp that transitions the elevation change within the room
4 formal work space of the room
5 pivoting wall panels allow direct access to the exterior gardens

drawing: april 2007
building section through school room [3 - 6 years old]



openings are formed along the floor to provide the children with a visual connection to the gardens beyond. the center skylight marks the gathering area for the school room.

sketch model: october 2006 - april 2007
section model through school room [3 - 6 years old and 1st - 6th grade]



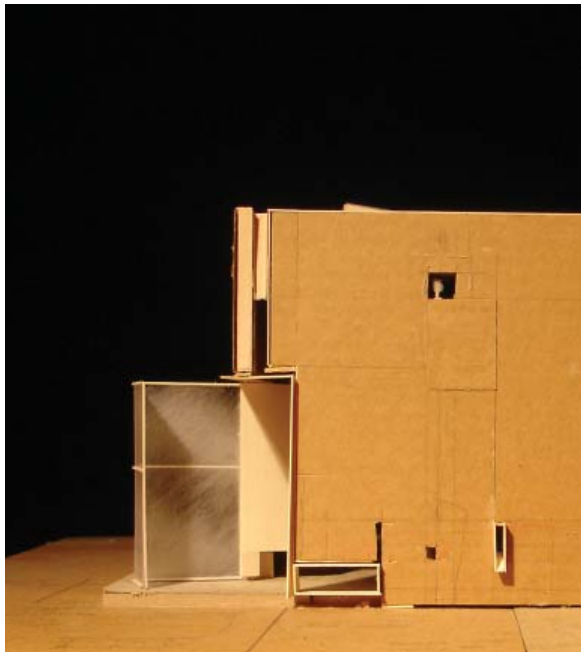
concrete tilt-wall panels provide the primary structural support and spatial definition to the school

the room

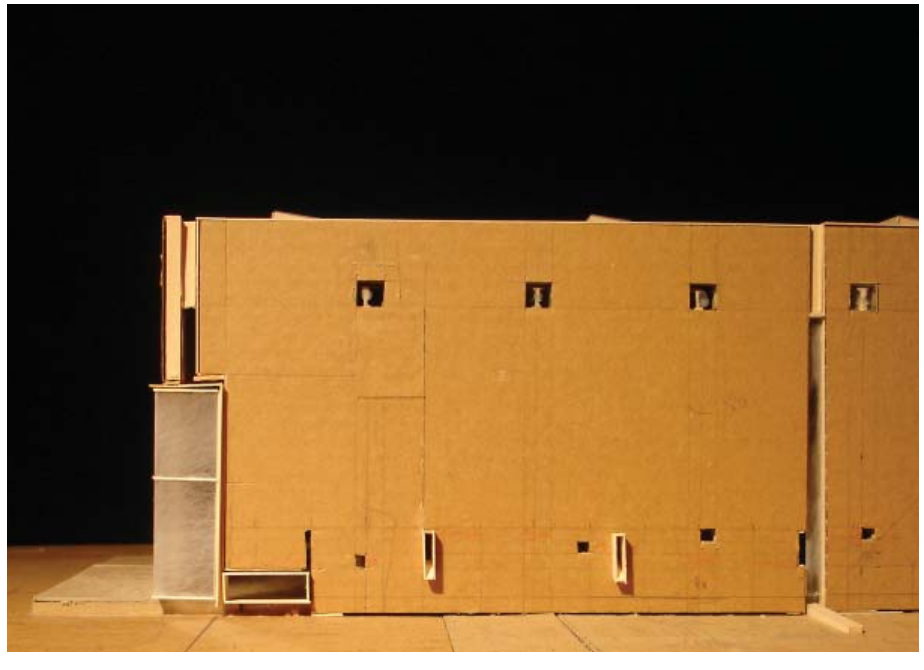
“the large room and the small room, the tall room and the low room, the room with the fireplace and the room without, all become great events in your mind. you begin to think, not what are the requirements, but rather what are the elements of architecture that you can employ to make an environment in which it is good to learn, good to live, or good to work.” [6]

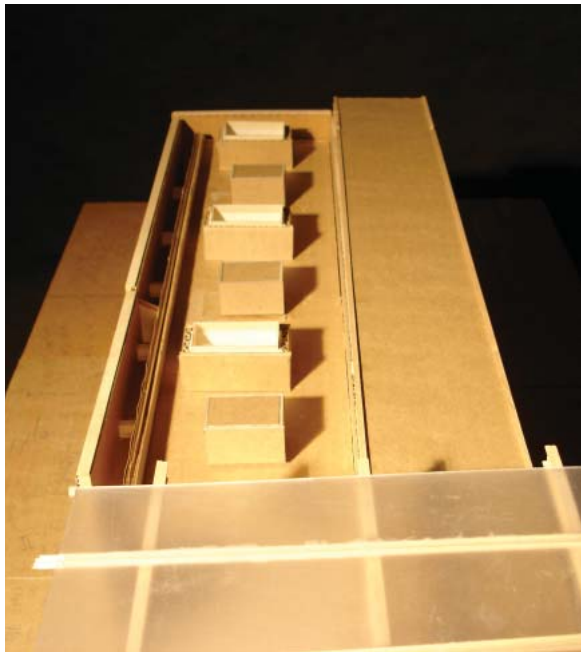
Louis I. Kahn

pivoting glass wall panel



ordering of room exterior: openings for structure, viewing, and joining





ordering of the roof scape: light wells and hvac roof-top units

ordering of room interior: coupling of columns, layering of ceiling, rhythm of skylights, panel joints, and wall openings

the search

“of all things, i honor beginnings. i believe, though, that what was has always been, and what is has always been, and what will be has always been. i do not think the circumstantial play from year to year, from era to era, has anything to do with what is available to you. the person of old had the same brilliance of mind that we assume we have now. but that which made a thing become manifest for the first time is our great moment of creative happening.” [7]

Louis I. Kahn

UNTABLES - COMES FROM THE UNDERSTANDING OF PLACE. VS. DWELLING..

THE PROCESS OF MAKING
BRINGS AWARENESS TO
THE PLAY OF FORM, SITE, [& MEASURE], PROGRAM
ORDER. GEOMETRY ....
[CREATING OR (RE) ACTING]

MAKING AND CRAFTSMANSHIP
. ACTS OF MAKING ARE THE
SITE WHERE CHOICES ARE MADE
AND KNOWLEDGE CONSTRUED..
A LOCUS WHERE DISTINCTIONS
SUCH AS THEORY PRACTICE,
MIND | BODY, SUBJECT | OBJECT
CAN BE BOTH SHARPENED AND
BLURRED.

TRADITION OF BLDG.
QUESTION: INTERIOR | EXTERIOR
QUESTION: HOW IS NATURAL & CULTURAL ENGAGED?
QUESTION OF LOCAL BUILT. CULTURE
WHAT IS IT? HOW CAN IT BE DEFINED?
"THE DEEPER PROJECT?"

. QUALITATIVE ASPECTS: ECONOMY EFFICIENCY & THEORY .. PERMANENT
. QUANTITATIVE : FAST CHEAP & REPLICA .. TEMPORAL
RESPONSE TO CLIMATE [NATURE] . INFLUENCES CONSTRUCTION ASSEMBLY . . . LIFESPAN = DISPOSABLE

[PRINCIPLES OF MY WORK]
(RE) DEFINE MY PRACTICE
FRAMEWORK FROM
WHICH TO BUILD.

ARCHITECTURE OF ENGAGEMENT

BOUNDARIES
NATURAL LIGHT ↔ TECTONICS

SCALES LEVELS OF ENGAGEMENT.
CHILD - INSTITUTION - CITY
CHILD - MONTESSORI - HOUSTON

CHILD ↔ CITY
BUILDING

[IDEATIONS] INFORMS
[MODIFICATION OR ELIMINATION]
[MAPPING OF QUALITIES]
[GESTURES]

NATURE ILLUMINATED
TRANSLATED

- INFINITE, MEASURED, REFLECTED
FILTERED. MANIPULATED.

- ANALYSIS
- SYNTHESIS OF THE [ARTIFACTS, CULTURE & NATURE] PHYSICAL & BUILT WORLD
THAT COMPRISE THE LANDSCAPE
1. CULTURE - ARTIFACTS - PROGRAM [LOGIC HOR. CROP]
2. NATURE - TOPO CLIMATE NATURAL LIGHT VEGETATION

INFORMS HOW ~~IT IS~~ AND THE PROPERTIES & QUALITIES ..... HOW TO ADDRESS, WHAT ISSUES TO ADDRESS...

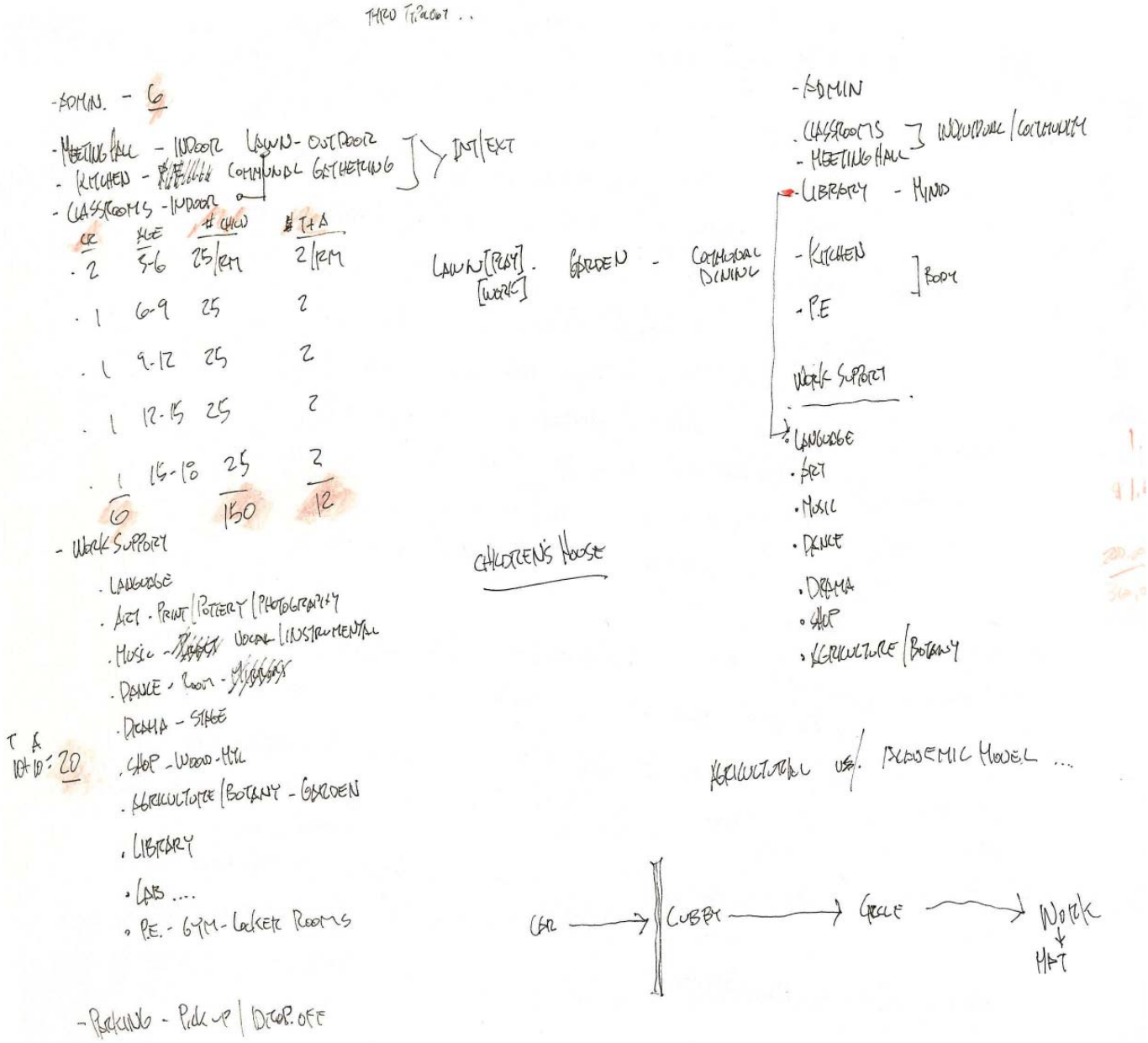
PRINCIPLES

06 | 14 | 06

ARCHITECTURE OF ENGAGEMENT

- BRINGS AWARENESS TO PLACE (OF) [LANDSCAPE]
THROUGH ARCHITECTURE.....

1. BOUNDARIES [SPATIAL (PERCEPTUAL/CONCEPTUAL) AWARENESS & MEASURE]
- OPACITY, TRANSPARENCY, TRANSLUCENT
- PROMENADE - MOVEMENT, PAUSE, TRANSITION
2. TECTONICS
- MATERIAL, STRUCTURE, JOINING
- SENSORY SENSUAL AWARENESS. [TACTILE]
3. NATURAL LIGHT



the wall

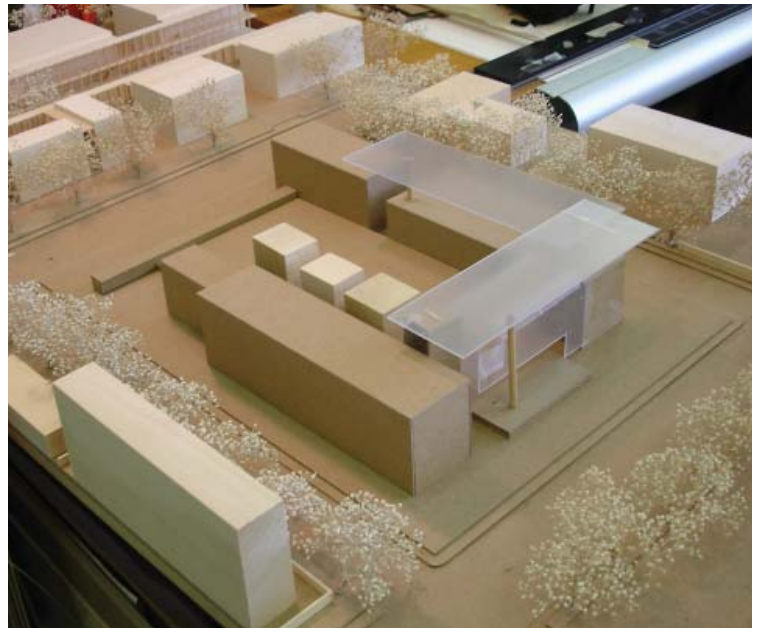
the search begins by pushing the building massing to the edges of the site, using the walls and rooms of the school to create a physical boundary and define the street edge.

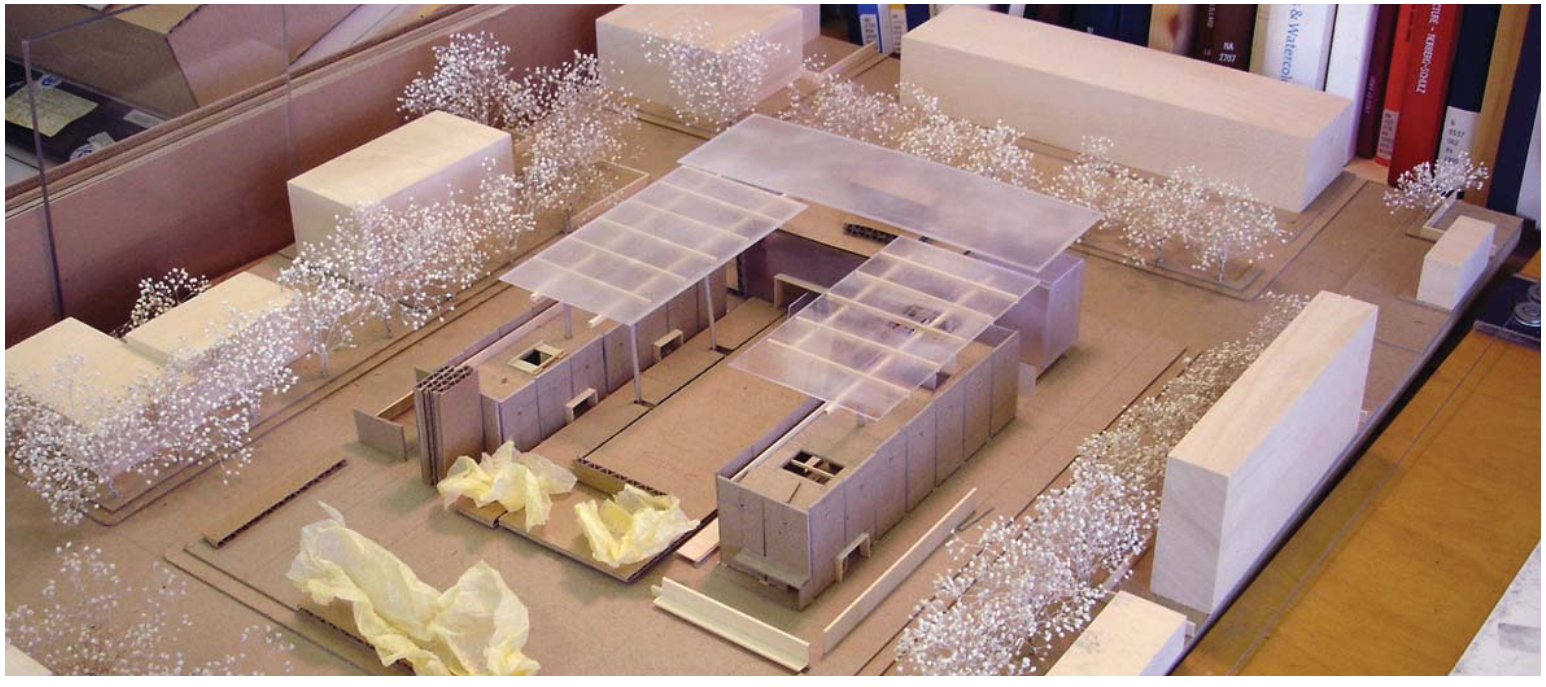
this is done with the intention of establishing a spatial continuity of order, rhythm and scale within the existing built environment.

the school's role, seen in the larger urban fabric of Houston, is to anchor and bring structure to the surrounding built conditions by mending the fragmentary and weak edges created by adjacent parking lots, *ad hoc* building placement, and autonomous box like buildings that have eroded the physical edges of the city.

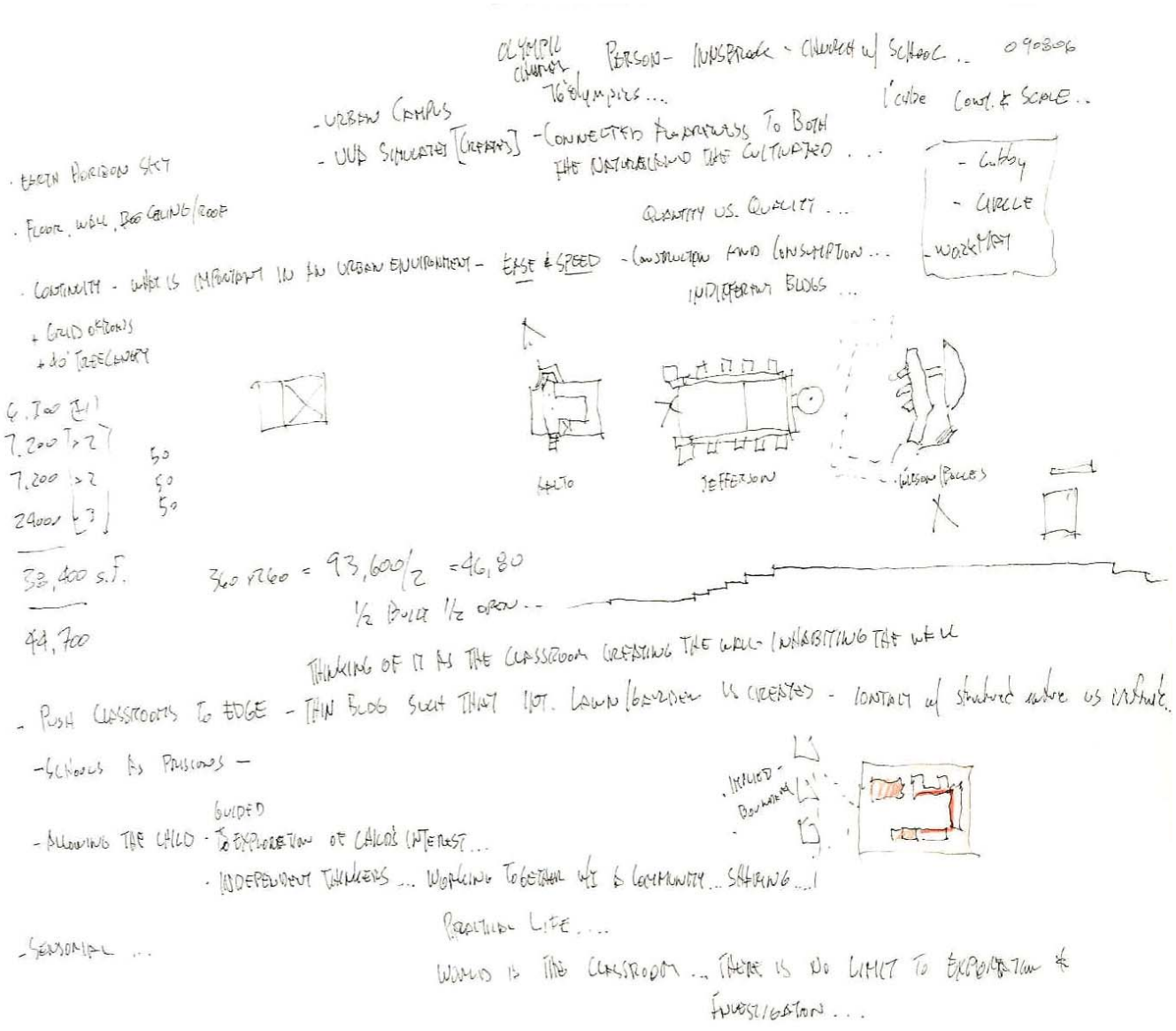
august 2006
initial [re]action to the situation of the school's massing and place within the city

september 2006
refinement of the building massing focusing on opacity and transparency





october 2006
articulation of structure, joints, and openings within the building massing



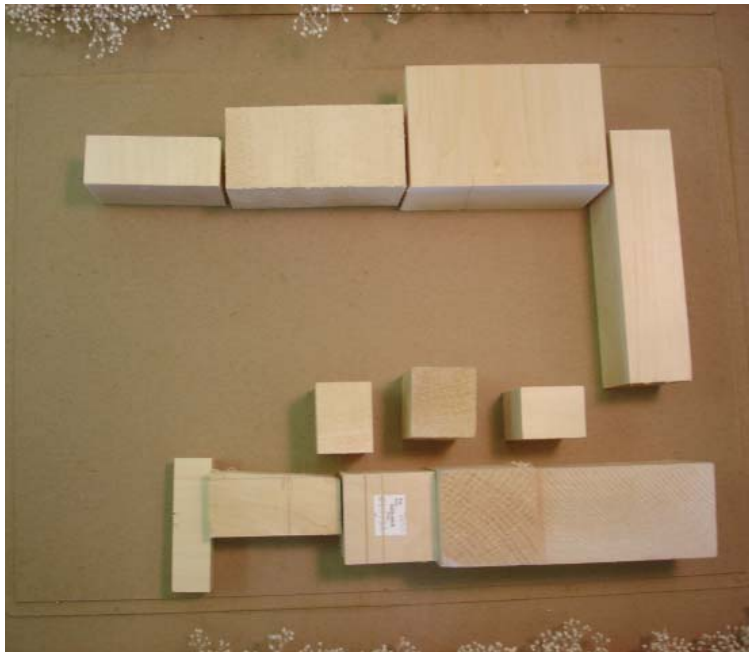
the garden

pushing the building massing to the edges of the site creates an opportunity to develop a series of exterior gardens within the school.

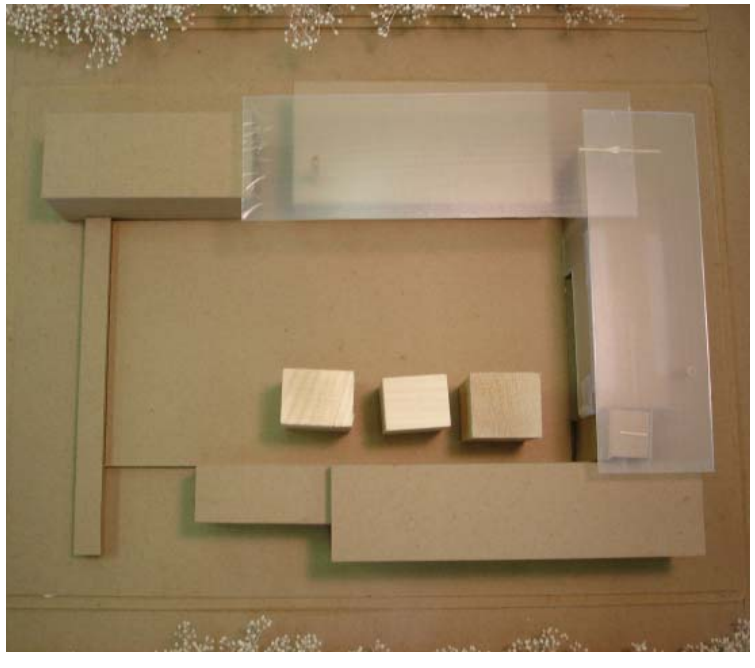
a large garden comes to define the school's center serving as both a shared gathering place as well as an entry. smaller private gardens are developed for use by the individual classrooms.

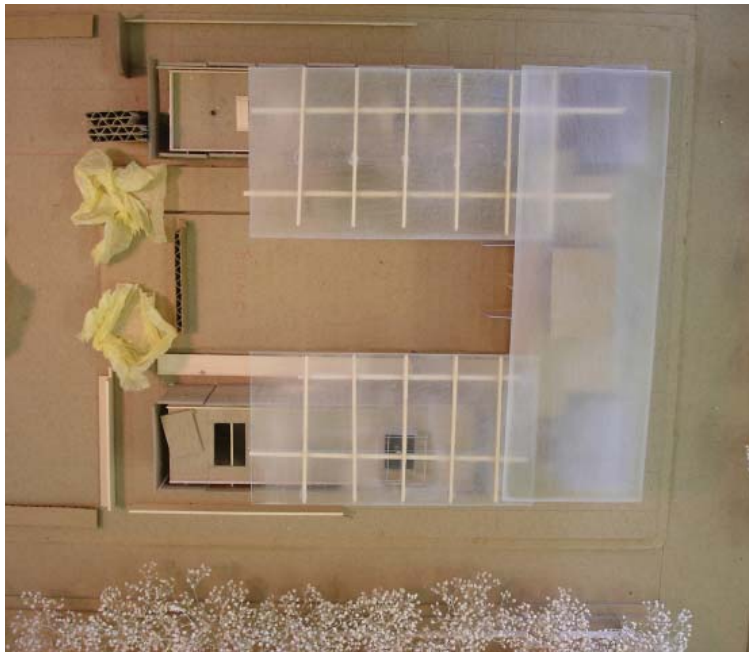
a dialogue of interior and exterior spatial relationships are developed allowing the physical presence of the classroom to extend beyond it's interior confines and into the exterior environment.

august 2006
a shared garden is created by the initial building massing

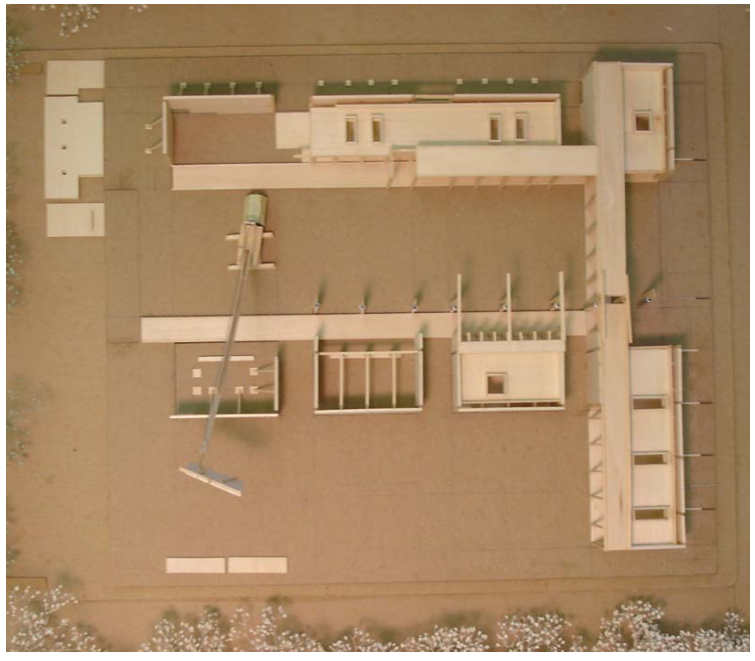


september 2006
the garden is physically elevated to further define the ‘floor’ of the school. translucent canopies are incorporated to define the ‘ceiling’ of the school.

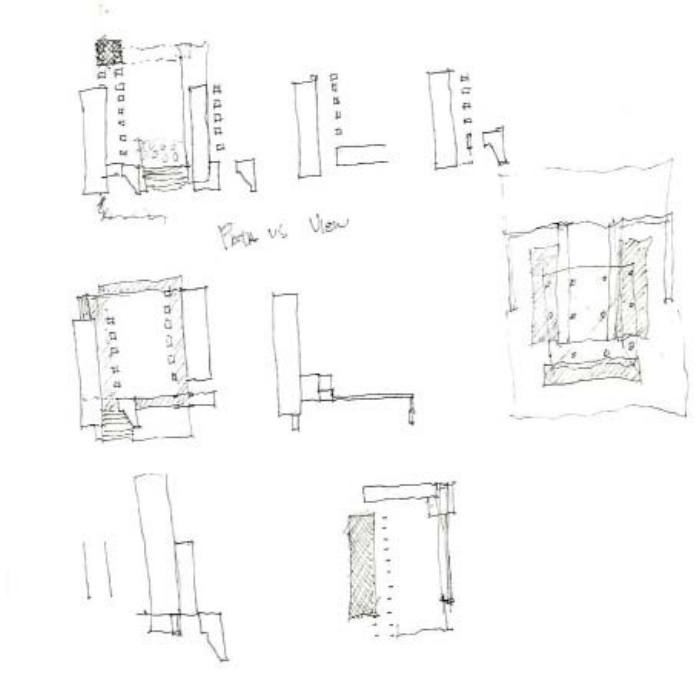




october 2006
the shared garden establishes the entry into the school, providing a transition from the parking lot to the school



april 2007
the building massing is adjusted so that multiple gardens are defined within the school. these gardens provide a place for the casting beds and the crane during the construction of the school.

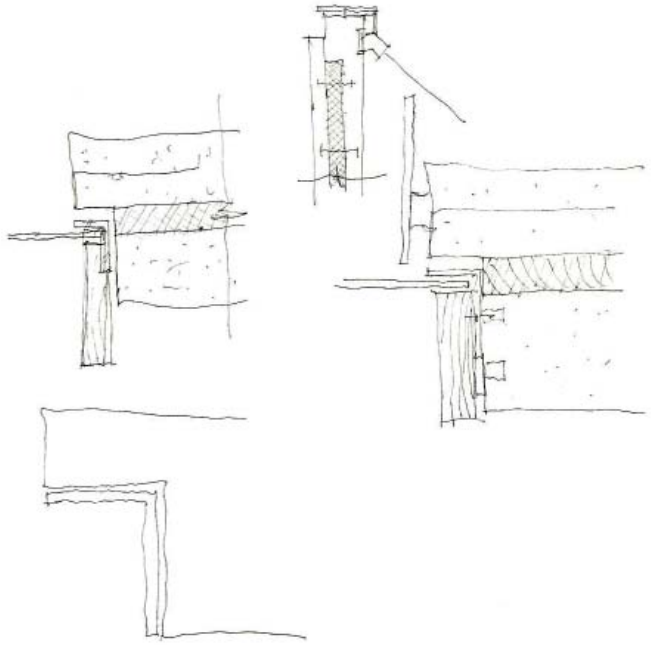


continuity of thought

throughout the search, larger-scaled sketch models were developed in conjunction with the smaller-scaled sketch models.

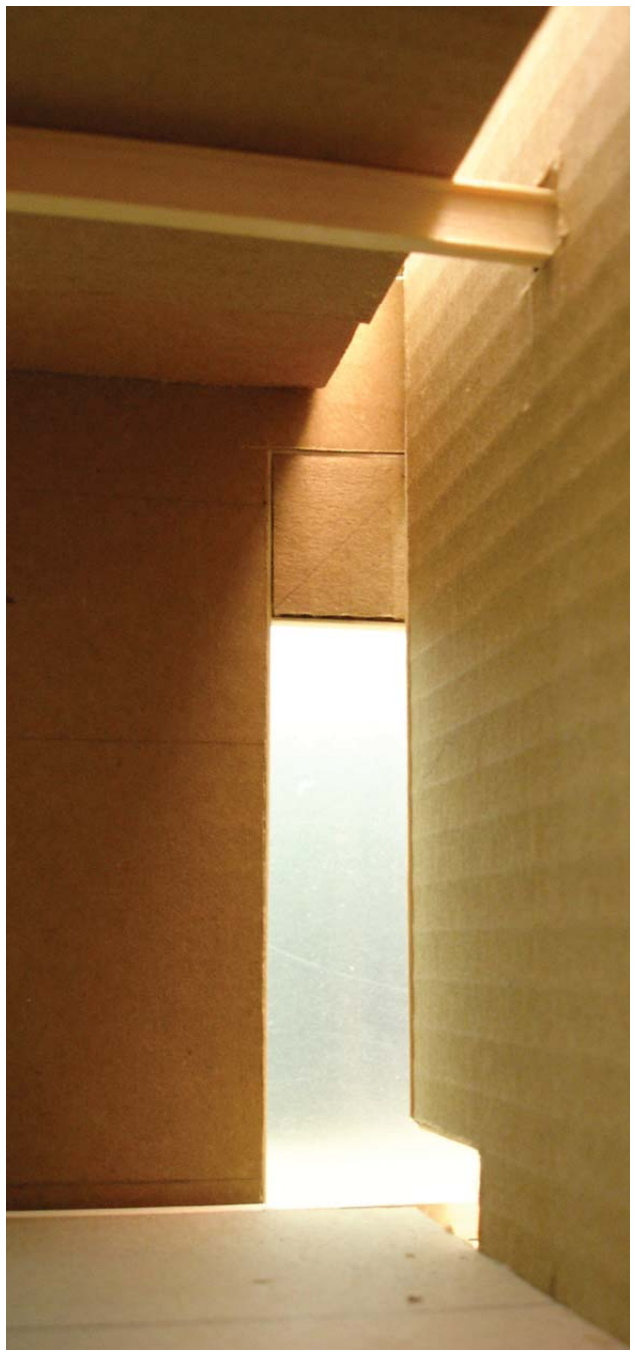
these larger models bring into focus the measure and scale of spatial, tectonic, and qualitative aspects of the individual rooms within the school, while the smaller models explore the building's relationship and place within the site and surrounding urban context.

a continuity of thought is established between the play of scales that helps to inform Architectural decisions from larger urban contextual issues to the refinement of building details.

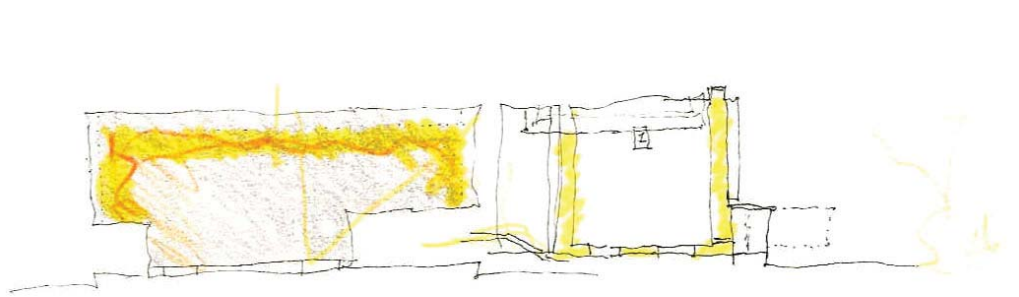


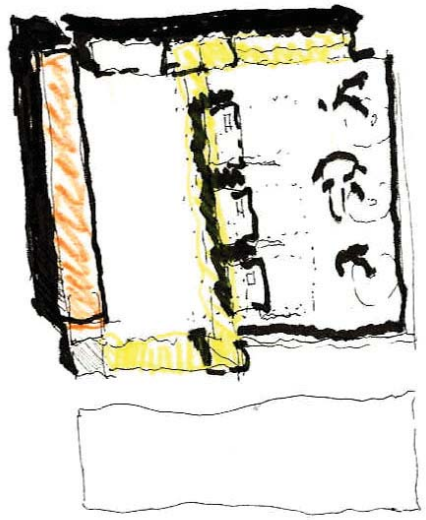
room study: development of structural relationships between columns, beams and wall panels

building elevation: the rhythm of wall panels, joints and openings that form the street edge



room study: natural light enters the room through panel joints and openings in the roof structure





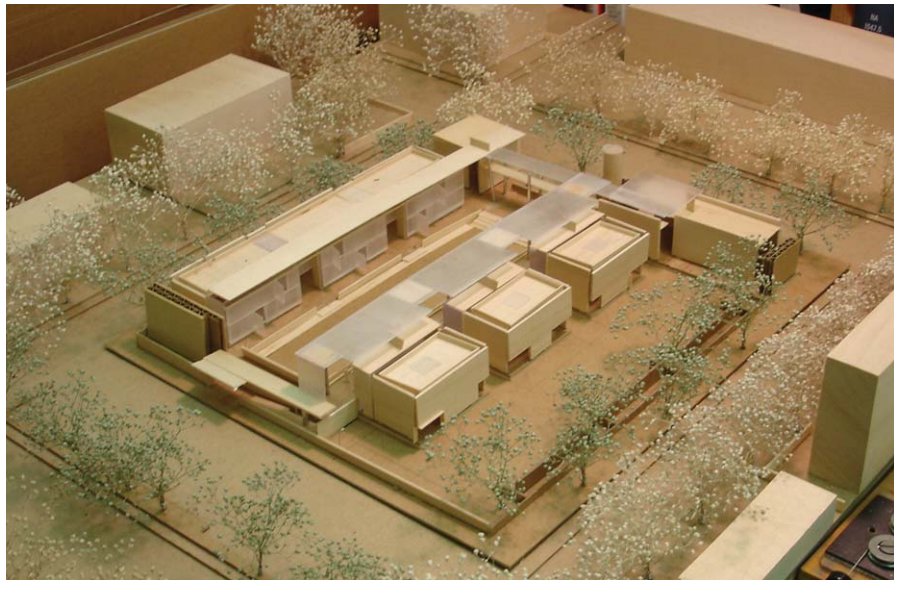
. EXTERIOR LAB.
. SCALE OF ROOM
. FURNITURE - HORIZON - LITTLE TO MAKE HORIZON
. CHALLENGE VERTICALLY
. PROGRAM - BRING FUN THE BACK
K-5?

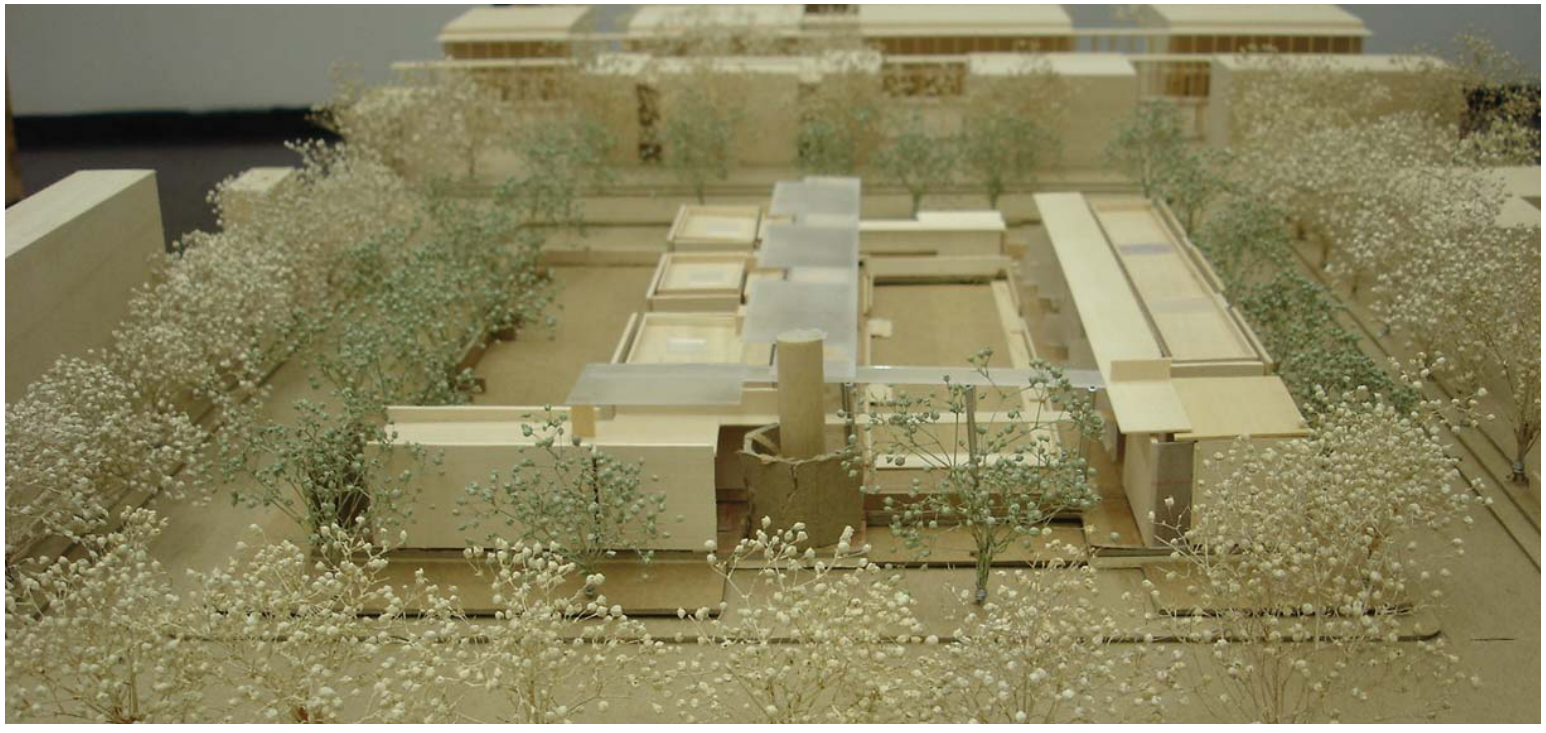
formal realization

each successive iteration of the work brings a level of refinement and clarity to the search, reinforcing initial actions and thoughts, strengthening the proposition.

west elevation: formal school entry

sequence of spaces: parking lot, school entry, gardens and school rooms





east elevation: formal school elevation

sketch model: december 2006

intentions of an Architect

listen to intuition
honor process
edit with sensitivity and objectiveness
design and build from conviction, not opinion
seek quality over quantity
make a commitment to explore, challenge, and TAKE risks
‘solve the problem’
draw when in doubt
draw to ‘SEE’
look for the questions, not answers
seek the extraordinary from the ordinary
seek out people and places that inspire passion
empower colleagues, students and clients
share, critique, and listen
understand the nature of materials
value the importance of past experiences
BUILD
practice with integrity
be assertive
experiment and test
embrace the ‘mistake’
strive for the poetic

> “. . . the Architect who combines in his being the powers of vision, of imagination, of intellect, of sympathy with human need and the power to interpret them in a language vernacular and true - is he who shall create poems in stone . . .” [8]
>
> Louis H. Sullivan

notes

1 see ‘appendix a: notes on the plan for a school’
the following books were used as resources for developing the program of the school:
Montessori Today by Paula Polk Lillard and Dr. Montessori’s Own Handbook by Maria Montessori.

2 see ‘appendix b: a place within the city’
for additional information on the Architecture of Houston see the Houston Architectural Guide
by Stephen Fox.

3 ‘Architecture’ (Lobell, p. 48)

4 The Concrete Tilt-Up Design and Construction Manual by Hugh Brooks provides a very
thorough and detailed explanation of concrete tilt-wall construction.

5 ‘Materials’ (Lobell, p. 40)

6 ‘The Garden and the Room’ (Lobell, p. 38)

7 ‘Time Beyond Time’ (Lobell, p. 54)

8 this quote [that appears on the frontice page of Bush-Brown’s book] is an excerpt taken from
Sullivan’s essay, “Concerning the Imperial Hotel, Tokyo,Japan”
Architectural Record, April, 1923, p. 333. (Bush-Brown, n. pag.)

n. pag. - no pagination given

sources

bibliography

Brooks, Hugh. The Concrete Tilt-Up Design and Construction Manual. 5th edition. Tilt-Up Concrete Association: Mount Vernon, Iowa, 2000.

Bush-Brown, Albert. louis sullivan. George Braziller, Inc.: New York, 1960.

Fox, Stephen. Houston Architectural Guide. 2nd edition. The American Institute of Architects / Houston Chapter and Herring Press: Houston, 1999.

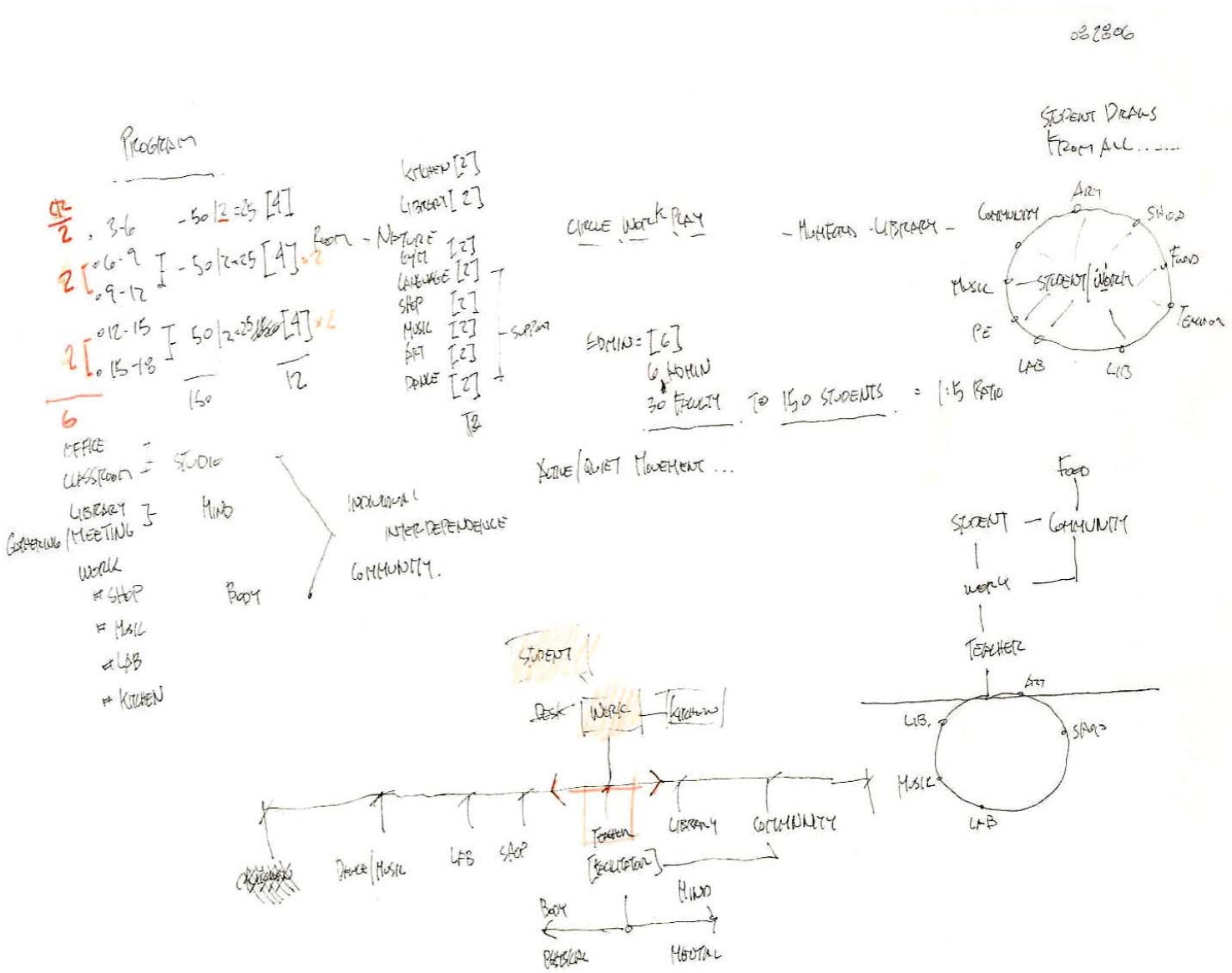
Lillard, Paula Polk. Montessori Today: A Comprehensive Approach to Education from Birth to Adulthood. Schocken Books, Inc.: New York, 1996.

Lobell, John. Between Silence and Light: Spirit in the Architecture of Louis. I Kahn. Shambhala: Boston, 1985.

Montessori, Maria. Dr. Montessori's Own Handbook: A Short Guide to Her Ideas and Materials. Schocken Books, Inc.: New York, 1965.

media and illustrations

all photographs, drawings, sketches, and models by author


PROGRAM
KITCHEN [2]
LIBRARY [2]
GYM [2]
LANGUAGE [2]
SHOP [2]
MUSIC [2]
ART [2]
DANCE [2]
- SUPPORT
- NATURE
- ROOM
OFFICE
CLASSROOM
LIBRARY
GATHERING / MEETING
WORK
= SHOP
= MUSIC
= LAB
= KITCHEN
STUDIO
MIND
BODY
INDIVIDUAL
INTERDEPENDENCE
COMMUNITY.
CIRCLE WORK PLAY
- MUSEUM - LIBRARY -
ADMIN = [6]
6 ADMIN
30 FACULTY TO 150 STUDENTS = 1:5 RATIO
ACTIVE / QUIET MOVEMENT ...
STUDENT DRAWS FROM ALL ....
ART
SHOP
FOOD
TECHNOLOGY
LAB
GYM
PE
MUSIC
COMMUNITY
STUDENT / WORK
STUDENT
DESK
WORK
KITCHEN
TEACHER
LIBRARY
COMMUNITY
DANCE / MUSIC
LAB
SHOP
BODY
MIND
PHYSICAL
MENTAL
FOOD
STUDENT
COMMUNITY
WORK
TEACHER
ART
LAB
SHOP
MUSIC

Nick - Cell ...

11th 6pm .... THESIS DEFENSE

PROPOSITION / GEOMETRIC FIGURE ... 082906

- ENCOURAGE PLAY -

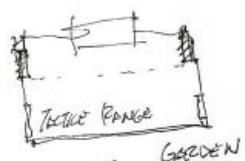
KAHN
The Room AND THE GARDEN

RELATIONSHIP OF CULTIVATED & NATURAL 'WORLD'

ASSIMILATE EVENTS / EXPERIENCES - GATHER FOR A POSITION...

PLAY & MEASURE

SENSE OF MEASURE TO THE INFINITE ...



TACTILE SKY SPACE

- TREEHOUSE
- SKY HOUSES

* PROMENADE

CODE - GRADUATE REFINED

PRIMARY

INVESTIGATION OF THE CORNELL & THE REFINED IN THE DESIGN FOR A MONTESSORI SCHOOL..

TABLE OF THE WALL AND FLOOR

PLANE
- YOUNG CHILDREN'S ENVIRONMENT COMMUNITY [SENSORIAL EXPLORERS] 0-3
- CHILDREN'S HOUSE [SE] 3-6

KEYS TO THE WORLD - PRESENTED THRU MATERIALS ON SHELVES [1 BOOK - 10 WORKS] p.56

2ND PLANE
- LOWER ELEMENTARY [REASONING EXPLORERS] 6-9
- UPPER ELEMENTARY 9-12

- FIRE WATER METAL WOOD

KEYS TO THE UNIVERSE - STORIES TO THE UNIVERSE - WORK IS DISPLAYED p.58
1. CREATION OF THE EARTH
2. THE BEGINNING OF LIFE
3. THE COMING OF HUMAN BEINGS
4. TOOLS OF HUMAN COMMUNITY - LANGUAGE / MATHEMATICS

5. LAW & ORDER OF UNIVERSE EVENTUALLY BECOME CLEAR THROUGH EACH SUCCESSIVE STORY

SECONDARY

3RD PLANE
- ADOLESCENTS [HUMANISTIC EXPLORERS] 12-15
15-18

FOUR PRINCIPLES EST. AT THE ELEMENTARY LEVEL - INTERLINKED SUBJECTS RATHER THAN SEP. DIVIDED CATEGORIES..

SEMINAR - TEACHER TO GUIDE AND EVALUATE ... MORE WIDELY STUDY.... STRUCTURE

4TH PLANE 18-21

... STEP UP TO CITY ... - TERMINUS ...

- LAWN - PLINTH
- WALL - PODIUM
- ROOF - GARDEN

- PRIVATE
- PUBLIC REALM

- TREE CANOPY / SUN
- WALL

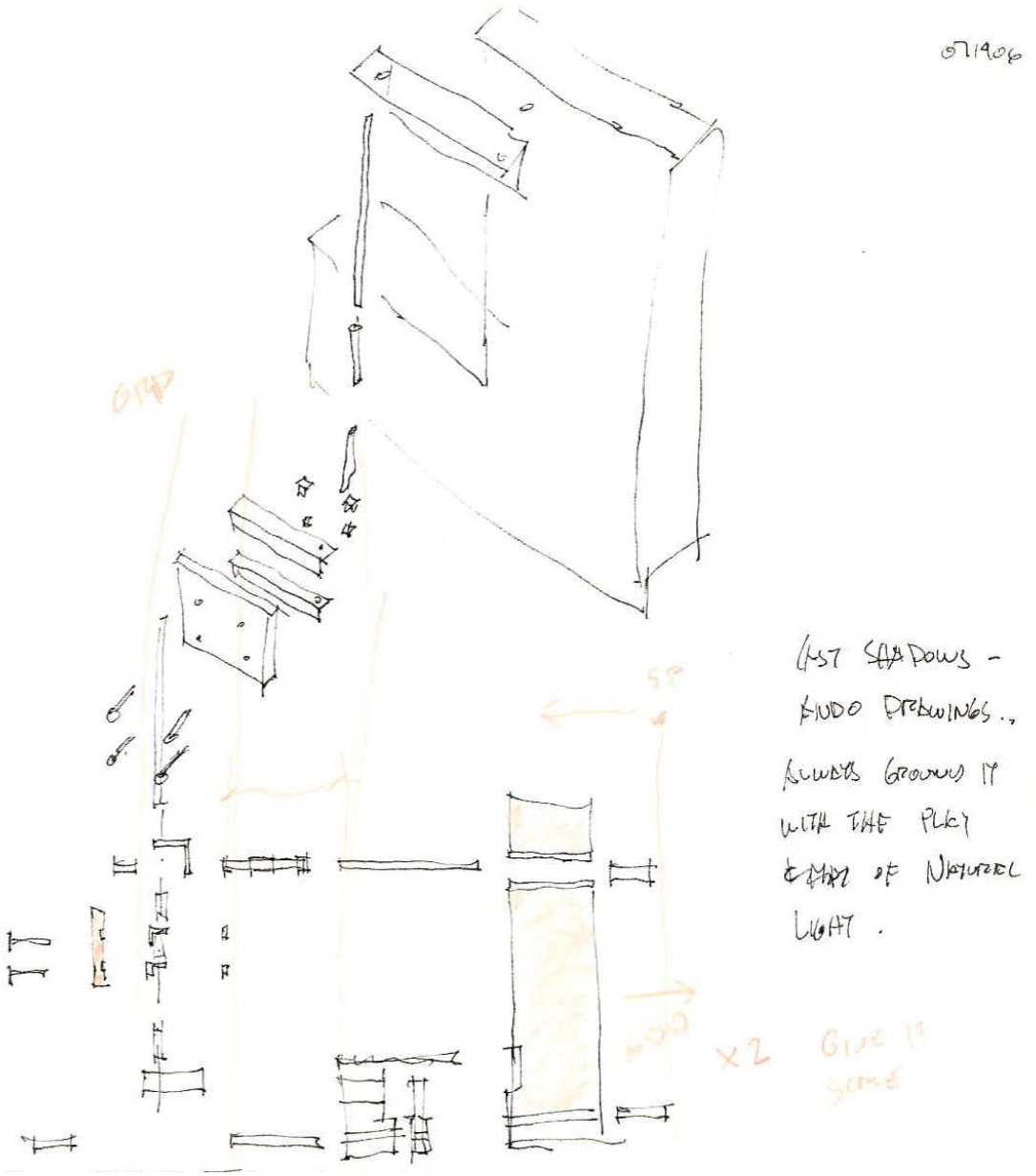
DOWNTOWN
3 MILES
MONTROSE
HOUSTON
1 THE MENIL COLLECTION
2 THE CONTEMPORARY GALLERY
3 ROTHKO CHAPEL
4 UNIVERSITY OF ST. THOMAS
5 PROPOSED TREES SITE
NORTH
123006

Cy Twombly Gallery [1995]
Architect: Renzo Piano

The Menil Collection [1987]
Architect: Renzo Piano

Rothko Chapel [1971]
Architects: Howard Barnstone and Eugene Aubry

University of St. Thomas [1958]
Architect: Philip Johnson



engagement

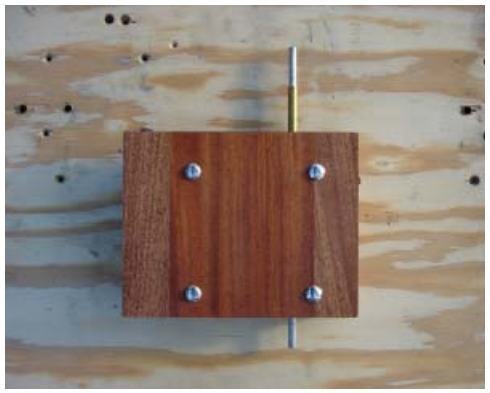
too often the lines drawn on paper are just lines. they lack the embodiment and knowledge of the material and its joining.

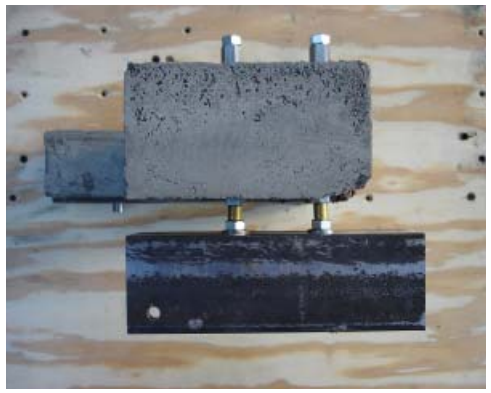
to draw as an Architect one often has to abandon drawing as the primary way of searching and go directly to the material itself.

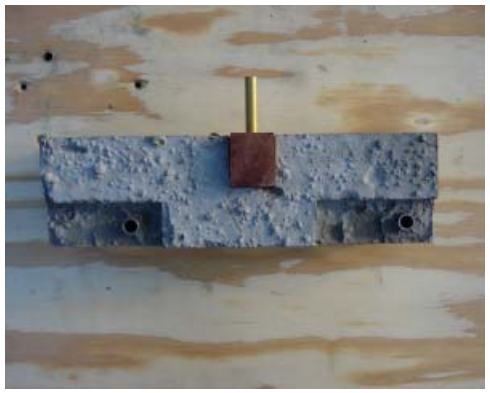
build the formwork
mix the concrete
mill the wood
cut the steel

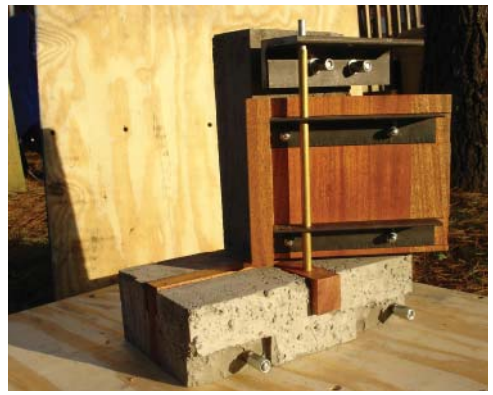
feel the material in hand, struggle with its assembly and craft in order to learn and appreciate both its limitations and potentials.

sketchbook: 19 july 2006
hinge assembly









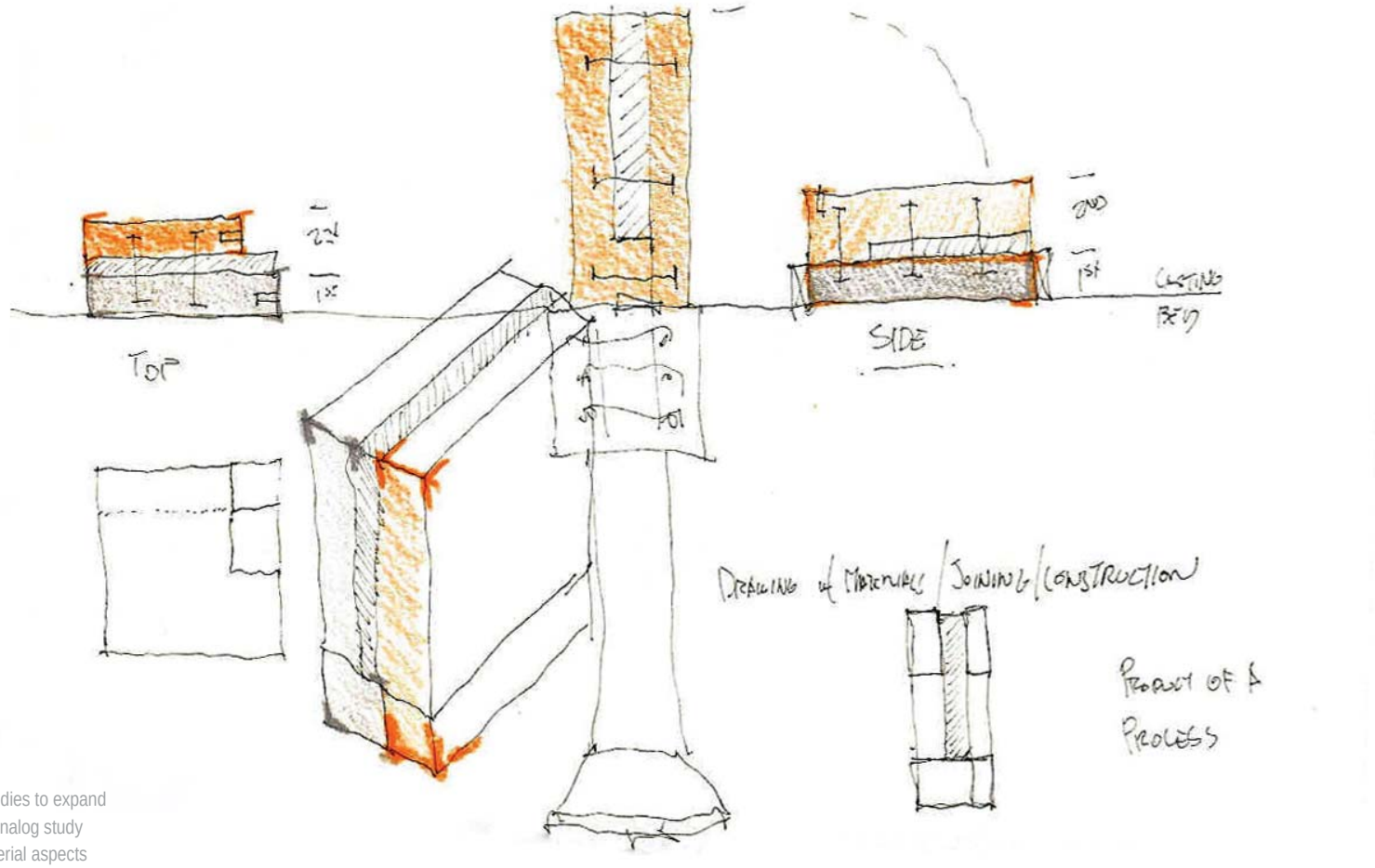
the crafted precision of wood
the machined precision of steel
the cast coarseness of concrete
joined together through layering and separation / gesture and extension / shadow and light

resistance

the material studies introduce a form of resistance into the work that brings awareness to the act of making.

assumed or expected constructed outcomes are often and immediately put into question by the limitations of the material chosen.

how and why a material is being used begins to structure and focus the study providing a critical voice that informs Architectural decisions based on constructive and material realities.



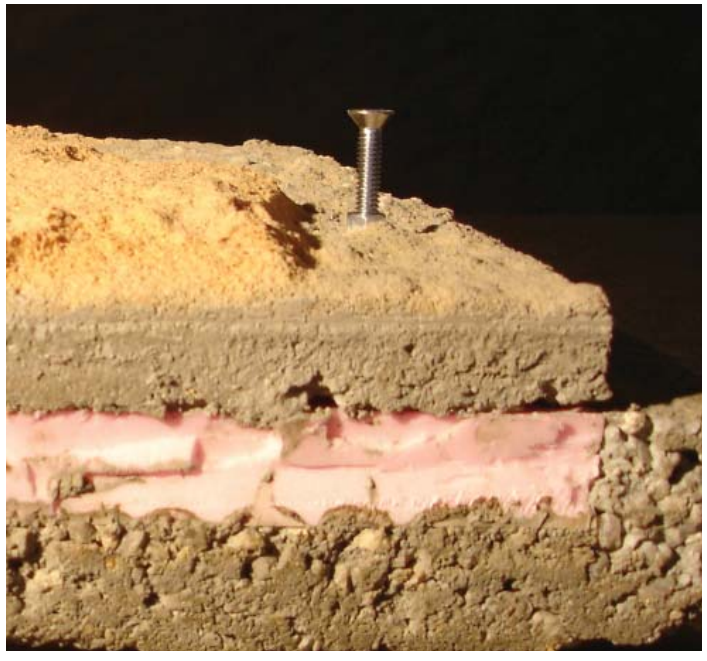
materiality

the search allows the material studies to expand beyond the limitations of scaled analog study models and address specific material aspects such as texture, joining, and edge conditions.

an appreciation, understanding, and respect for the material is brought back and integrated into the work, strengthening and energizing the Architectural proposition.

embedded wall hardware assists in the fastening of wall finishes

the play of wall textures brings awareness to surface and shadow



a thermal barrier is created with the placement of rigid insulation within the wall panel

the use of contrasting building materials accentuates the unique qualities of each

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recommendations

books

For An Architecture of Reality - Michael Benedikt
After the City - Lars Lerup
Letters to a Young Poet - Rainer Rilke
Beginnings: Louis I. Kahn's Philosophy of Architecture - Alexandra Tyng
Learning From Las Vegas - Robert Venturi, Denise Scott Brown, Steven Izenour
Thinking Architecture - Peter Zumthor

places

Chinati Foundation: Marfa, Texas
www.chinati.org

DIA: Beacon: Beacon, New York
www.diabeacon.org

The Kimbell Art Museum: Ft. Worth, Texas
www.kimbellart.org

The Menil Collection: Houston, Texas
www.menil.org

The Rothko Chapel: Houston, Texas
www.rothkochapel.org

Storm King Sculpture Park: Mountainville, New York
www.stormking.org

The University of Virginia: Charlottesville, Virginia

architects

Louis Kahn
Carlo Scarpa

artists

Richard Diebenkorn
Donald Judd
Agnes Martin
Barnett Newman
Mark Rothko

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