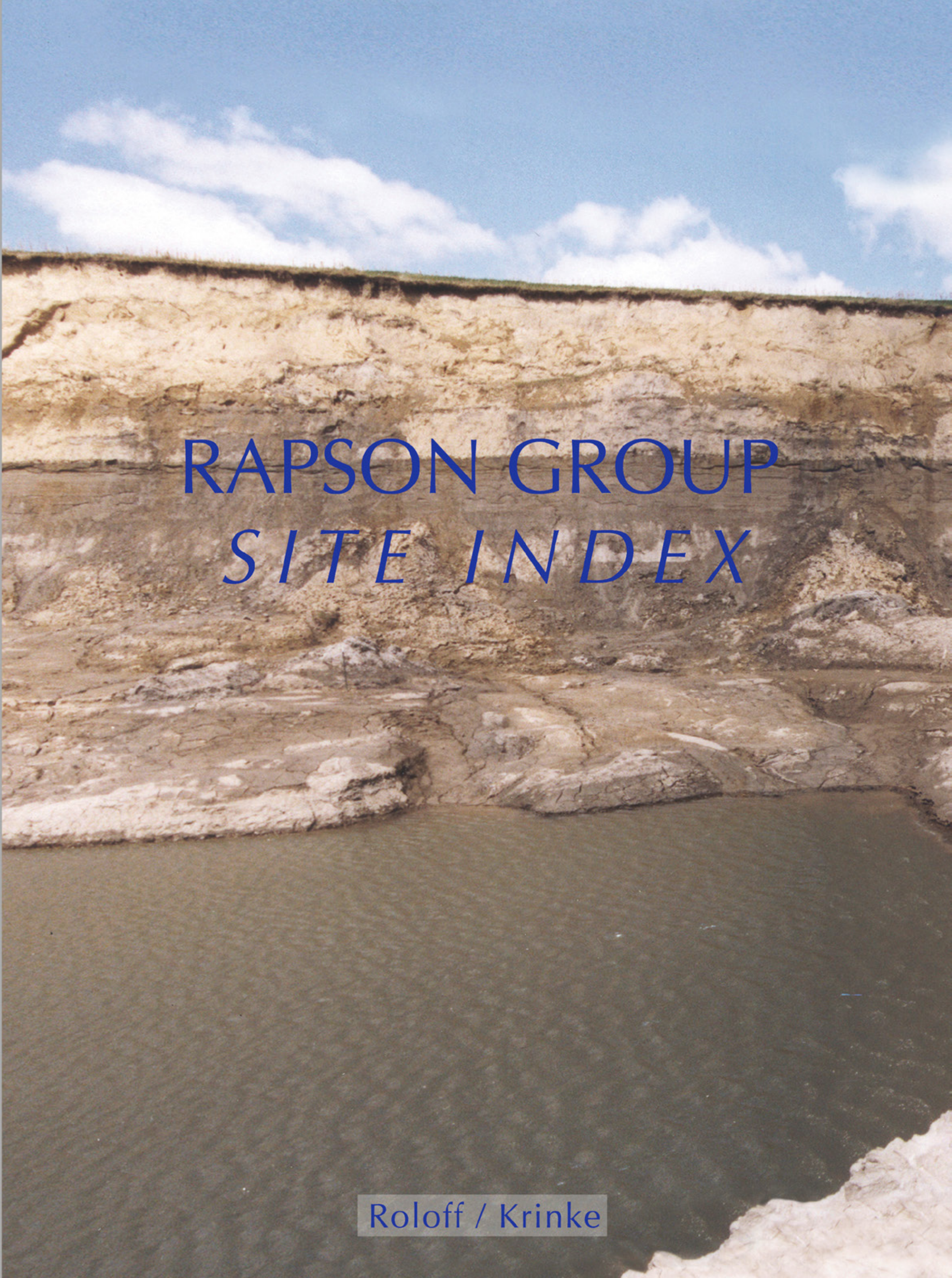


RAPSON GROUP
SITE INDEX

Roloff / Krinke

RAPSON GROUP
SITE INDEX

College of Design/Rapson Hall
University of Minnesota
Minneapolis, MN

John Roloff with
Rebecca Krinke

FractalTerror Press
2023

Fig. 1. Mesabi Black quarry, Proterozoic anorthositic gabbro, NW, Minnesota, three center foreground blocks quarried for *Site Index*, 2004.

This pdf is a slightly altered digital version of the 2023 edition of *Rapson Group/Site Index,*
ISBN 978-0-9913669-5-8

Cover image: Cretaceous, Windrow formation sediments, Ochs quarry, near Springfield MN.

Fig. 2. Dr. Paul Weiblen, Professor UMN Geology Department, research visit with artist John Roloff to Paleozoic strata along the Mississippi River near the UMN Campus, circa 2001. Dr. Weiblen met with the artist to begin conversations on the deep history of the UMN site, the state of Minnesota and surrounding area.

Rapson Group / *Site Index,* is a treatise on the research, developmental processes and realization of two related environmental works for the landscape of Rapson Hall, School of Design at the University of Minnesota, Minneapolis, MN, that took place between the years 2000 and 2013. *Rapson Group,* also known as *Rapson Group (Geology Text Panels),* is a work based upon the original research done by me as the public artist selected for the new Stephen Holl addition to Rapson Hall. *Site Index* is a companion project done in collaboration with Rebecca Krinke, Associate Professor of Landscape Architecture at UMN, also for the new Holl addition.

This document follows a rough chronological sequence from 2000 to 2013 of the development of both projects which are very inter-related conceptually and physically on the Rapson Hall site. The conceptual and design process for this project at Rapson Hall evolved in several interwoven stages. A time-line of the generative components of this project outlined on page 3-4 and compiled meeting notes by Shelly Willis, UMN Public Art Director, on pages 9-12, form a comprehensive view of this process. This is followed by examples of initial research and a series of alternate site concepts from which *Rapson Group* and *Site Index* emerged. The purpose of a series of provocative proposals, such as: *Study: Cala Site and Inversion²/ Dark Matter (Proterozoic/Holocene) I* and *II,* presented at this juncture, was to initiate a conversation with the School of Design (originally called the College of Architecture and Landscape Architecture - CALA) community to think conceptually and expansively about the site, and address the funding disparity of a budget (for many reasons) dominated by the new architectural addition at the expense of the surrounding landscape, theoretically to be resolved by my modest public art project and budget. The name CALA has been retained in documents created before the change to School of Design, part-way through this process.

Site research began with meeting Dr. Paul Weiblen, Professor, UMN Geology Department, to engage in conversations about the deep history of the Minneapolis area. We did a tour of the geology labs on campus and a site visit to the Paleozoic strata along Mississippi river that form the geologic foundation of the UMN campus. In addition to providing specific geologic information he also helped make connections with the Minnesota Geologic Survey to purchase geologic maps of the state and discuss with Minnesota Geologic Survey (MNGS) staff about any additional questions. Dr. Weiblen was in contact for much of the formative time of this project. As research gained momentum, the concept for *Rapson Group* was developed. Shelly Willis arranged several site visits to quarries along the Mississippi River, the source of the aggregates in the concrete used for the Rapson Hall annex. I made a site visit to the Ochs quarries in Springfield, MN, source of the sediments that became the bricks of the original Rapson Hall facade. Detailed geologic analysis, on-line and library research, assistance from the MNGS, Shelly Willis, others from the material industries, many phone calls and e-mails with many blind corners and dead ends, were encountered along the way in this endeavor. This process culminated in dialog with geologist, Carrie Jennings, of the MNGS, and her subsequent development of the paleogeographic material descriptions for the *Rapson Group* text panels.

(continued on pg. 2)

Continued from pg. 1

For *Site Index,* Rebecca Krinke and I collaborated on a plan for all four spaces ("gardens") formed by the cruciform Stephen Holl addition and the original Rapson Hall. Geologic site research, with assistance by Dr. Weiblen, was formative in selection of Proterozoic, anorthositic gabbro rock, geologically related to the CALA site, inscribed with the geographic coordinates of their origin in northern MN for the West Garden. Rebecca and I made a trip to the Mesabi Black quarry, near Ely, MN, to visit the extraction site of the large gabbro blocks the slabs were cut from at the Cold Spring Granite shop in central MN. Rebecca's research and knowledge of Minnesota flora and astute formal sensibility was instrumental in the development and final design of *Site Index*. We developed a comprehensive plan of geologic and botanical elements for all four gardens of the site and had an exhibition in Rapson Hall of the site studies in 2002. The West Garden part of *Site Index* and a few components of the East Garden were completed in 2004 under the guidance of Shelly Willis. Besides the North, South and parts of the East garden not being completed, an important element, *The Rosetta Stone*, a codex inscribed on another block of anorthositic gabbro that gave context and information for the conceptual replacement of the slabs of the same material to its original site in northern Minnesota. Three elements of *Rapson Group: Concrete, Copper and Glass,* were completed in 2013, directed by Craig Amundsen, also in the West Garden and western facade of Rapson Hall. Both *Site Index* and *Rapson Group*, were conceived as pedagogical works, as part of the learning environment for CALA/School of Design. In particular, I thought of the geologic elements of both works as being signifiers for the potential of research into natural and conceptual histories of earthen materials as a catalyst for enriched and revelatory design strategies by students of architecture and landscape architecture.

John Roloff, 2019/2023

University of Minnesota

College of Architecture and Landscape Architecture

Public Art and Site Development Time line

By: Shelly Willis, UMN Public Art Coordinator
2005-2014 Added by John Roloff

August, 2000: College of Architecture and Landscape Architecture (CALA) public art committee meets for the first time.

September 12,2000: 46 artists are recommended by the Committee and the Public Art on Campus Coordinator and reviewed by committee. Six semi-finalists are selected

December 7, 2000: Three finalists are selected to be interviewed: James Carpenter, Meg Webster, John Roloff. James Carpenter declines to be considered for project.

March 9, 2001: Meg Webster and John Roloff are interviewed.
John Roloff is Selected for project

April 25-26, 2001:John Roloff visits the campus for the first time and meets with CALA faculty and staff.

June, 7, 2001: John Roloff visits Steven Holl in New York City.

October 5, 2001: Rapson Hall opens. John Roloff gives public talk at the opening and exhibits design proposals.

October 23, 2001: John Roloff's first design review. Roloff presents 7 different designs for the project, many of which are integral to the landscape. Committee decides not to proceed ahead with the public art component until a landscape architect is secured.

June 5-6, 2002: John Koepke, Rebecca Krinke, and Vairajita Singh produce a 2-day workshop at CALA to generate concepts for the landscape design and give John Roloff an opportunity to share his ideas and conceptual approach to the project with faculty, students and staff at CALA. Dean Abbott also presents schematic designs for the gardens.

June 10, 2002: CALA Public Art Committee meets and is updated on the workshop and discusses how to proceed with the project. It is recommended by the committee that Rebecca Krinke and John Roloff work together..

June 14, 2002: The Landscape Architecture Department faculty recommends hiring Rebecca Krinke to collaborate with John Roloff to develop the gardens at CALA.

February 2003: CALA approves Rebecca Krinke to collaborate with Roloff.

March 20-21 2003: Krinke and Roloff meet for two days and begin generating the garden designs.

June 2, 2003: Krinke and Roloff present proposal to the CALA Public Art Committee. The Committee approves the proposal and makes recommendation to include Church street in design.

December, 2003: Project proposal presented to the University of Minnesota Board of Regents.

April 28, 2004: Ground breaking and West garden construction begins.

Summer, 2005: East, north, and south garden construction planned.

Summer 2009: Text for RAPSON GROUP *Geology Text Panels* completed by artist and Carrie Jennings, Minnesota Geologic Survey.

Summer 2013: 3 of 4 planned Geology Text Panels installed in West Garden. Project coordination by Craig Amundsen, text etching by Tate Viere.

October 2014: Roloff visits site and see the West Garden and Geology Text Panels for the first time. Roloff and Rebecca Krinke discuss future exhibitions related to the project.

Participants in the development of this project:

College of Architecture and Landscape Architecture

PUBLIC ART PROJECT COMMITTEE:

- Tom Fisher, College of Architecture and Landscape Architecture Dean
- Lance Neckar, Landscape Architecture Associate Dean
- Garth Rockcastle, Architecture Professor
- Regina Flanagan, Landscape Architect, recent graduate of Landscape Architecture Department
- Sue Danielson Bretheim, College of Architecture and Landscape Architecture Development Di rector
- Lyndel King, Public Art on Campus Committee Chair and Weisman Art Museum Director
- Vincent James, VJA Architects
- Pablo Castro Esteves, Steven Holl and Associates
- Don Hau, Facilities Management Department Owner's Representative
- Ken Almer, Facilities Management Department Owner's Representative

University of Minnesota

PUBLIC ART ON CAMPUS COMMITTEE

- Lyndel King, Public Art on Campus Program Chair and Weisman Art Museum Director
- Diane Katsiaficas, Art Department Professor
- Clinton Hewitt, Landscape Architecture Department Associate Professor
- Andrzej Piotrowski, Architecture Department Professor
- Todd Rhoades, Architecture Department Adjunct Faculty
- James Litsheim, Facilities Management Department Engineer and Architect
- Rebecca Krinke, , College of Architecture and Landscape Architecture Assistant Professor
- Jane Blocker, Art History Department Assistant Professor

John Roloff, artist, Professor, San Francisco Art Institute, San Francisco, CA

Shelly Willis, UMN Public Art Coordinator / to 2006

Craig Amundsen, Target Studio Director and Public Art Curator / 2006- Present

Dr Paul Weiblen, Professor, UMN Geology Department.

Carrie Jennings, geologist, Minnesota Geologic Survey

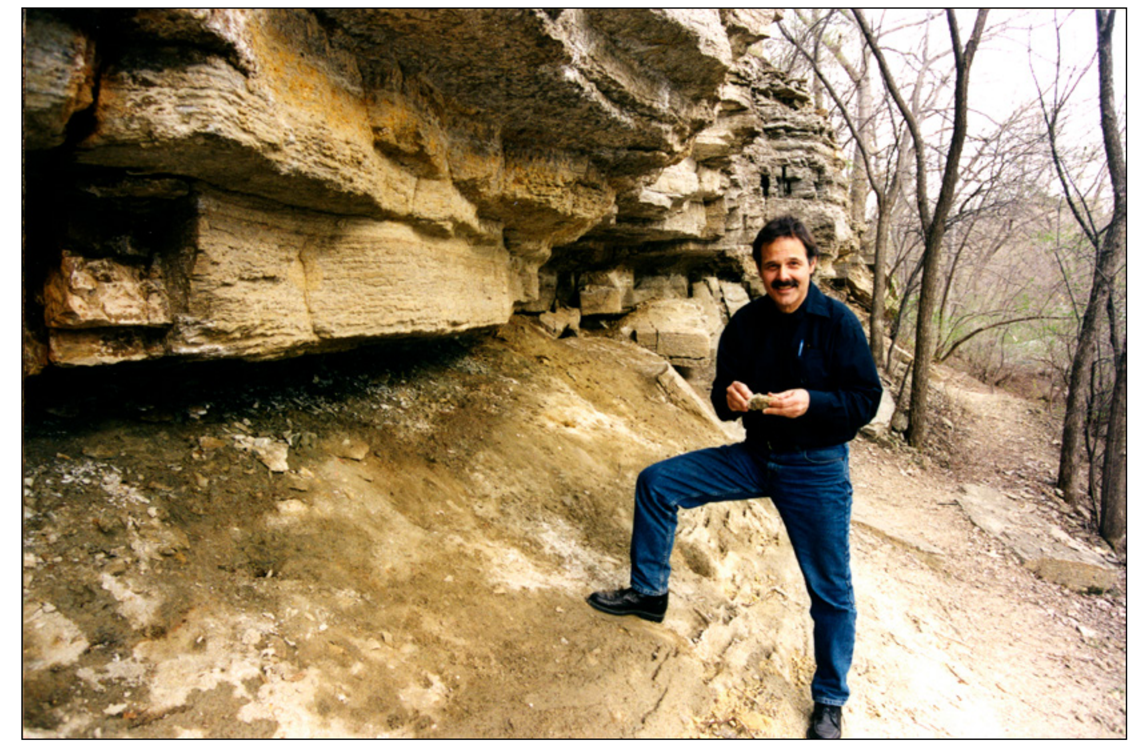


Fig. 3. Artist John Roloff on a research visit with Dr. Paul Weiblen, UMN Geology Department, to the Paleozoic strata along the Mississippi River near the UMN Campus, circa 2001

Fig. 4. Mississippi River, Minneapolis, MN.

University of Minnesota, Public Art on Campus Program
MINUTES
College of Architecture and Landscape Architecture
October 23, 2001

Members Present: Regina Flanagan, Rebecca Krinke, Tom Fisher, Lance Neckar, Don Hau, Lyndel King
Guests Present: John Koepke
Staff Present: Shelly Willis

Shelly Willis said the committee is charged with giving Roloff feedback on his conceptual ideas at this meeting and direction on how to proceed with developing the public art project.

John began his presentation. Because geology is both "of the landscape" and "of the building" and because of his background and understanding of geology, one of his primary goals is to "re-contextualize or contextualize architecture and landscape architecture". Conceptually, he approached the site in the following ways:

1. He considers the CALA site in plan to include not only the adjacent grounds and campus but also the regional geology and landscape in material, process and time.

2. He considers the CALA site in elevation from the atmosphere above to the geology below the building. The site also includes the concepts that architect Stephen Holl used in the development of the building.

3. He met with Steven Holl and had a discussion with him about the concepts relating to the building, particularly his study of light and the physics of light. Holl designed the new building as an "inversion" of the old building – outward reaching as opposed to inward focusing. Roloff thought it would be interesting to conceptually "invert Stephen Holl's inversion of the building". An example that Roloff arrived at through his research of both Steven Holl's approach and of the larger CALA site might be to use indigenous volcanic material, the darkest matter and the opposite of light, in his work at CALA.

4. He understood the site from the perspective of a geologist. The bedrock geology of Minnesota is understood primarily through geophysics because of the covering of glacially deposited sediments. Geologists discovered an ancient rift system in Minnesota. A billion years ago a lava flow was created that lies beneath the ground and it runs directly under the City of Minneapolis, including the CALA.

5. Roloff looked specifically at the site from the perspective of three buildings: CALA, and the adjacent Pillsbury Hall and Civil engineering buildings. He considered these three buildings in two different ways 1) geologically and 2)how they were made by man – that they are essentially Holocene Era (the current geologic time period) deposits with man as the depositional agent. For example Pillsbury Hall is constructed with sandstone, the CALA building is constructed of concrete, glass and copper, all refined geologic materials as well as both of the building are constructed underground, penetrating the terrace sand deposits left by the Mississippi River since the Ice Ages.

6. He considered the materials the building is constructed with from a geologists perspective, rather than a designers perspective. For example, he visited Cold Spring Granite Co. He was able to tour the grounds and look at the large variety of granite mined from the site. He analyzed the granite by how it was mined and its relationship to the landscape rather than looking at the granite as a designer might, paying attention to color and form.

7. He wants to create an awareness between the building and the land.

Roloff put together a book for the committee, which documents seven different concepts. Roloff said he did not design anything for a particular place. He also said some of these ideas are not possible within the current budget, but are meant to inspire a discussion about different ways to conceptualize the site.

1. SPACE PROJECTIONS: A proposal to activate the center of the building with projections of geophysical data relating to the dense volcanic material that makes up the buried rift system beneath the site.

The data could take different forms – this is an example of his inversion of Holl's interest in the physics of light – the presentation of the dark, buried matter discovered through another physics-related process.

2. LAVA LANDSCAPE: A proposal to fill the landscape surrounding the building with lava rock simulating the buried Proterozoic rift system over 3 km. beneath the site – the second example of inversion of Holl's concepts – a Holocene/Proterozoic inversion as well as a light/dark inversion. Any growth in the lava landscape would happen naturally, but with the aid of steam pumped through the rocks from existing steam lines – something like a new island formed in the ocean where a virgin volcanic landscape is populated by seeds and spores drifting in from oceanic and climatic currents. Roloff said the building is magnificent and he wanted to create a counterpoint to the elegant lines. He felt a self forming and primal landscape was a counterpoint to the building. Roloff also emphasized the use of chance or other systems in the placement of landscape elements or exterior artwork to avoid normal "placement' and 'aesthetic' strategies.

3. VIEW OF THE BUILDING FROM UNDERGROUND: A proposal to build a series of tunnels and viewing areas underneath the building. The tunnels would go deep enough to see the gap between a buried sedimentary layer that is 300 million years old and what we see everyday, which is only 0-20,000 years old. It would also be possible to view the bottom of the building - the basement of the building would become a ceiling, another example of an inversion and that it is a "ship" floating on a "sedimentary sea."

4. HEATED ROCK: A proposal to use existing steam lines (or another source of heat) to warm giant pieces of granite placed in the landscape outside of the building. An existing steam line would be diverted and run inside a giant piece of granite -- which (conceptually) has been cooling for over a billion years. The goal is to create a time capsule that is potentially still alive or a moment from the past, also during the winter the rock would melt snow and ice that landed on it accentuating the "island of time/climate" concept. This would also provide a contrast to Holl's use of horizontal "shelves' on the building's copper sheathing that would catch and hold horizontal lines of snow during the winter. The granite (except for a small area of geological information) would be as it came from the earth with vertical drill/blast markings from the quarry – a material mid-way between the landscape and its potential use as architecture or landscape ornament. Initial ideas for a site location for this project would be askew from normal "placement" strategies – using chance or other system to site it at CALA – the steam line's position would also have much to say about location.

5. TEXT PANELS: A proposal to trace the geological origin of specific materials that the building is made from (copper, glass, cement, brick). Samples would be taken and run through the same system used for the analysis of geologic samples (thin-section analysis, x-ray diffraction, etc.) to determine what they consist of in a geologic context, as well as the location (longitude, latitude, depth, etc.) of the materials origin in the earth. The orientation of where the material came from and what it consists of would then be arranged and etched directly into it in/on the building on each of the materials being examined.

6. TABLE: A proposal to take a large block of native rock, slice it into slabs and make tables from the slabs. The tables would then be installed throughout the building, but in a way that mirrors the orientation the rock had in the ground. The tables would be etched with data relating to their geological origin and their relationship to the "mother rock."

7. ABSTRACTION OF GEOLOGIC TIME: A proposal to document time along a wall, floor, ceiling or window in the building or its exterior, with 43,200 (the number of seconds in 12 hours) sequential video stills of a subtle geologic event like the erosion of a small rock or clod.

Roloff said the TEXT PANELS, TABLE, HEATED ROCK and GEOLOGIC TIME ABSTRACTION fit within the budget. He said the PROJECTION proposal might also work within the budget, but the design would have to be developed when the building is further along.

Roloff expressed his desire to work collaboratively with CALA to develop the site surrounding the building. He is more interested in the relationship of his work to the site and it's development, rather than making objects that would be placed into the site. He said he is not bound by any time restrictions and would be willing to work within CALA's time frame.

Lance Neckar was interested in the concept of "inversion". He specifically expressed his support of the LAVA LANDSCAPE proposal . He said he felt it needed to be more contained.

John Koepke commented that the way the lava is placed is very important and that it should break the containment of the building. He said whatever the landscape becomes, he hopes it has the quality of a "self forming natural system". He said the feeling of a landscape not being quite complete and out of control is interesting. He noted that the site is currently very disturbed and there are no funds for landscape architecture. He suggested their might be an opportunity to create mini ecology's in the courtyards. He is intrigued with the concepts that engage multiple vestiges and using the landscape as an opportunity for a process. He is interested in using John's ideas as a catalyst for the landscape design. He supports the idea of tracing the history of the building materials and documenting the data with text in the building.

Tom Fisher said the faculty has a strong interest in natural processes and sustainability. He said when we make buildings we erode and when we make landscapes we build up.

It was suggested that it might be interesting to tap the water source under the ground to heat the rock.

John Roloff said it is very important that the building be thought of as a part of the landscape and vice-versa, they are of the same conceptual "ecology." He said a Bay Area art administrator uses a computer program to investigate the "ecology of art", which examines all aspects of the art world in a particular area from primary art education to museum staffing and artists studio space as an ecological system, where changes in any aspect of the system has an effect on the other and the whole.

Lance Neckar said some of John's ideas are scientific and some of them are more about ceding control. Neckar is more interested in the concepts that cede control. He is interested in works that are more primal and the intersection where change and constants are visible.

Roloff said he is also interested in the psychology of change and the idea of questioning temporary and permanent landscape as well as pedagogical implication of any artwork he may produce.

Tom Fisher said he liked the lava proposal.

Rebecca's said she is concerned that if the landscape is developed naturally around the site (on the lava -- by seeds blowing in) the result will be a lot of weeds.

Regina Flanagan said there is a beautiful rock outcrop with plant growth on the way to Duluth. She said this same type of evocation needs to be expressed in John's work. She said the text pieces should be done. It will be a powerful and evocative artwork. She said whatever John Roloff does, the contrast between machine-made or man-made things and nature should be expressed.

Rebecca seconded Regina's comments. She said the text pieces should be done. She said Roloff's work is about the dialog between the inside and the outside of buildings. She likes his investigations between landscape architecture and architecture and the earth. She said he makes the poetics of science visible.

Tom Fisher said it would be possible to both donate material and to raise funds for the artwork.

Regina said there is a place called "The Farm" that allows artists to take away rejected materials mined from the quarries.

John Roloff said that it is critical to use materials from the original source quarry for any rock. All geologic elements for any of his proposals require knowledge of the exact origin of the rock and being able to see it in the ground and be able to measure accurately it's latitude, longitude, depth, geologic context, etc., on site.

Tom Fisher said one of the strengths of John's ideas are helping students understand where building materials come from and where they are going.

John Roloff said there could be a way of looking at the material sources in a visual way, for example taking video or photo documentation of the glass produced in Finland, its geologic site origin, mining, processing and shipment, etc. He is interested in text, but also the physicality of the objects and materials.

Rebecca recommended that John choose a courtyard at the building and design a work for that courtyard. She said the definition of “temporary landscape” needs to be explored further. She supports the idea of building something inside and outside the building, because it reinforces John Roloff's concepts about the connectives of the landscape and building.

Tom Fisher said he would keep John Roloff informed as the CALA staff moves through the process of deciding what to do with the landscape.

Don Hau noted that if steam was used in the lava piece, the steam would have to be treated. Existing steam would probably kill the plants. He said there are plans to hydro-seed the existing landscape at the site.

Shelly summarized the next steps John R. is to take in the project.

- Design a work of art for one or more of the courtyards.
- Explore the cost and process of developing the text piece
- Keep in contact with faculty/staff as they develop temporary landscapes in the spaces and the development of a larger vision by the faculty or dean, ie., fund-raising, hiring of a landscape architect or other major planning for the CALA site.

Research / Concepts / Proposals

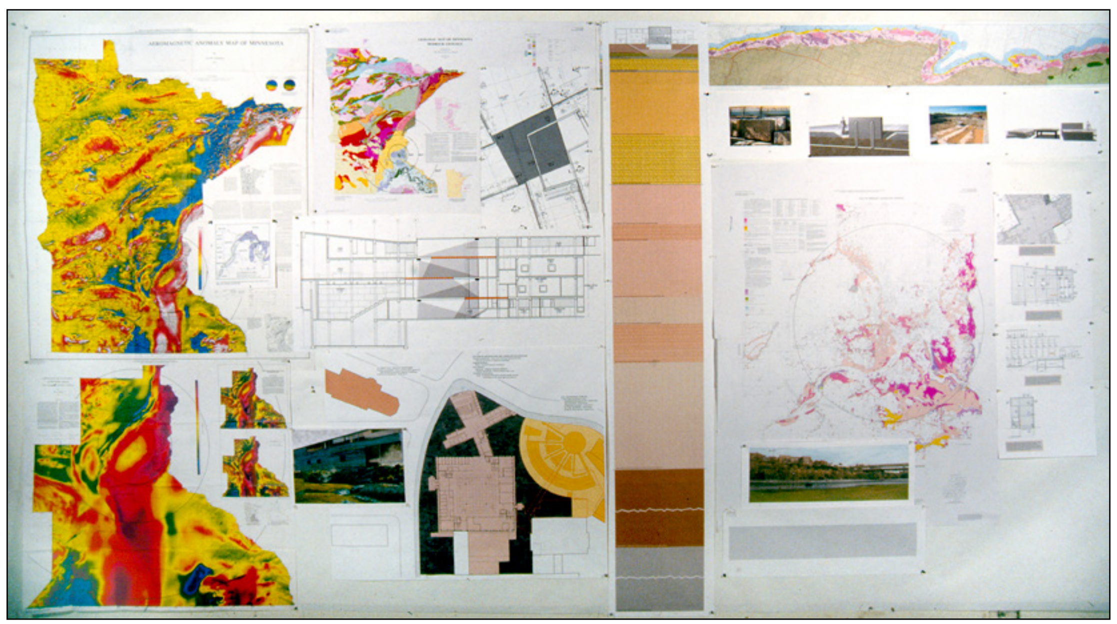


Fig. 5. Geology, aeromagnetic maps, building plans, elevations and sections, photos, concept and site studies, Oakland, CA studio, circa 2002.

Initial Concepts: University of Minnesota Architecture and Landscape Architecture Bldg.

"Brain-dump"/notes - John Roloff

Marble telephone pole / marble energy station

Columnar or stacked vitrine

Light pole/lighting structure – carbon arc (historical?)

Spiral staircases (one up, another inverted – one glass, another lead?)

Cast iron - erosion / cast aluminum

Water-filled table/pool

Process pipe – ice sculpture in winter (spray)

Heated water, steam (using campus heating system)

Landstat images of MN landscape – interior treatment?

Sonar scan of sub-surface geology – interior treatment?

Scan of bottom of Mississippi river – flags?

Mud from bottom of river

Research origin of river – *Minn. of the Mississippi* book

Quarries from which stone for umn buildings came – explore

3M – Minnesota mining and manufacturing – mines??

Casting, materials or artifacts from mines.

Deep core samples of MN landscape – column/vitrine

Erosion of core

Filigree carving of sandstone or granite

Erosion system creating filigree – artificial sandstorm.

Volcanic neck (with contact metamorphism artifacts?)

Made of basalt, or concrete, tall vertical column, dikes and other structure adjacent.

Study: UMN CALA Site Elevation (Surface to Mantle) & Ordovician (From the Holocene Through the Quaternary) / 2001

Section beneath Rapson Hall reveals Proterozoic volcanics, as inspiration for *Inversion2: Dark Matter (Proterozoic/Holocene) I and II*, and an extension of the rift system exposed as anorthositic gabbro at the Mesabi Black quarry in northern, MN, where material was excavated for *SITE INDEX*.

QUATERNARY: 35 feet Quaternary terrace sand, gravelly sand, silty sand 25 feet thick over 10 feet of till.

300+ million year unconformity (missing sediment/time) between Quaternary and Ordovician strata.

ORDOVICIAN: 5 feet Decorah Shale (mostly eroded): 30 feet Platteville Formation: Limestone and dolostone. 5 feet Glenwood Formation: Shale and sandstone. 165 feet St. Peter Sandstone: Fine- to medium grained sandstone with minor shale and siltstone. 125 feet Prairie du Chien Group: Dolostone and minor sandstone.

UPPER CAMBRIAN: 100 feet Jordan Sandstone: Fine-, medium- and coarse-grained sandstone. 40 feet St. Lawrence Formation: Dolomitic siltstone. 140 feet Franconia Formation: Very fine- to fine sandstone and siltstone,glauconitic. 65 feet Ironton and Galesville Sandstone: Fine- to medium grained sandstone. 95 feet Eau Claire Formation: Siltstone, shale, very-fine grained sandstone. 260 feet Mt. Simon Sandstone: Fine- to coarse-grained sandstone, minor shale

MIDDLE PROTEROZOIC: 2.7 - 4 km Solor Church Formation: Red-brown shale and lithic sandstone. (8860 -13125 feet). About 3 km Mid-Proterozoic volcanic rock. (9800 feet): 1065 feet to the base of the Paleozoic formations, 9925 to 14190 feet to the base of the Solar Church Formation.

Adapted from data supplied by: John Mossler, Minnesota Geological Survey

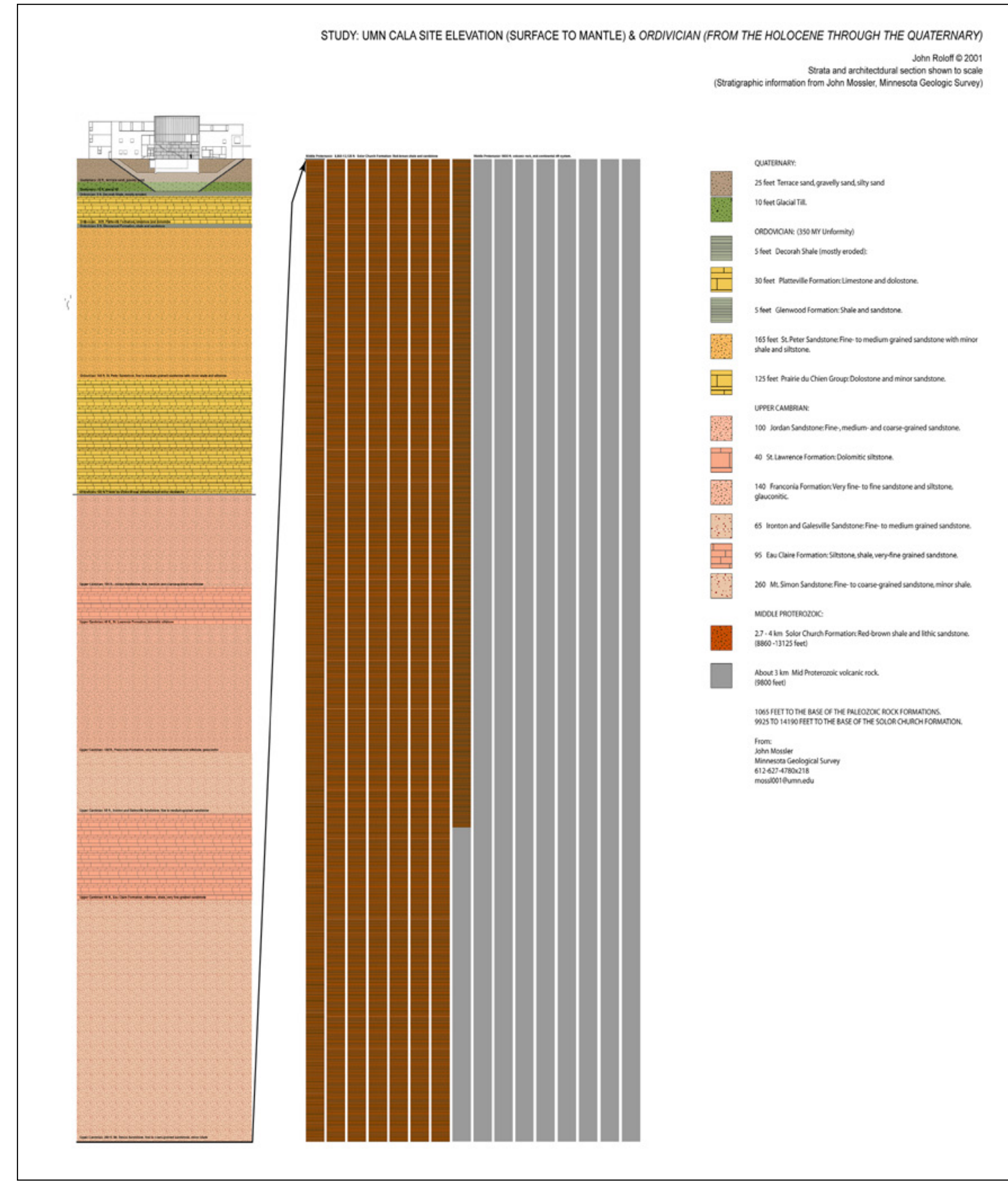


Fig. 6. Study: UMN CALA Site Elevation (Surface to Mantle) & Ordovician (from the Holocene through the Quaternary), based on information provided by John Mossler, MNGS, inkjet on paper, size variable, 2001.

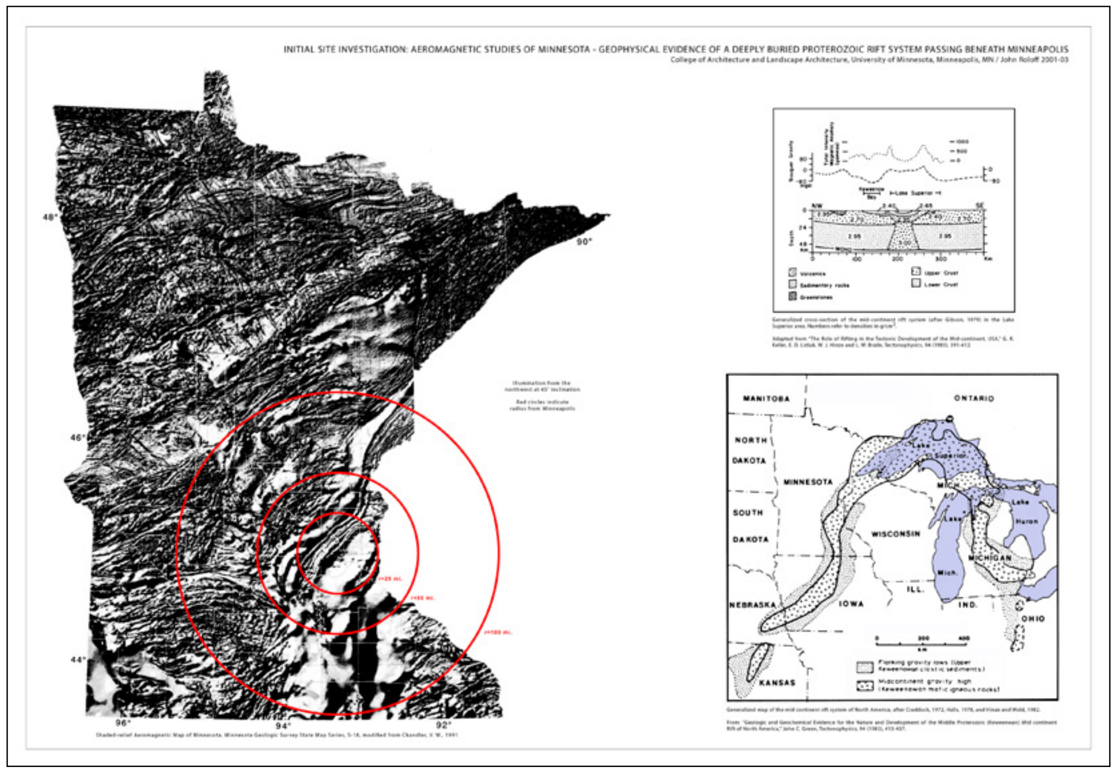


Fig 7. Initial Site Investigation: Aeromagnetic Studies Of Minnesota - Geophysical Evidence of a Deeply Buried Proterozoic Rift System Passing Beneath Minneapolis, inkjet print on paper, size variable, 2001-03.

Left Image: Shaded-relief Aeromagnetic Map of Minnesota, Minnesota Geologic Survey State Map Series, S-18, Modified from Chandler, V. W., 1991; concentric red rings on image: 25 mi., 50 mi., 100 mi., radius from Minneapolis.

Right/Top Image: *Generalized cross-section of the Mid continent Rift System (after Gibson, 1979) in the Lake Superior a*rea. Numbers refer to densities in g/cm3. Adapted from "The Role of Rifting in the Tectonic Development of the Mid continent, USA," G. R. Keller, E. D.Lidiak, W. J. Hinze and L. W. Braile, Tectonophysics, 94 (1983), 391-412.

Right/Bottom Image: *Generalized map of the Mid continent Rift System of North America,* after Craddock, 1972, Halls, 1978, and Hinze and Wold, 1982. From "Geologic and Geochemical Evidence for the Nature and Development of the Middle Proterozoic (Keweenwan) Mid-continent Rift of North America," John C. Green, Tectonophysics, 94 (1983), 413-437.

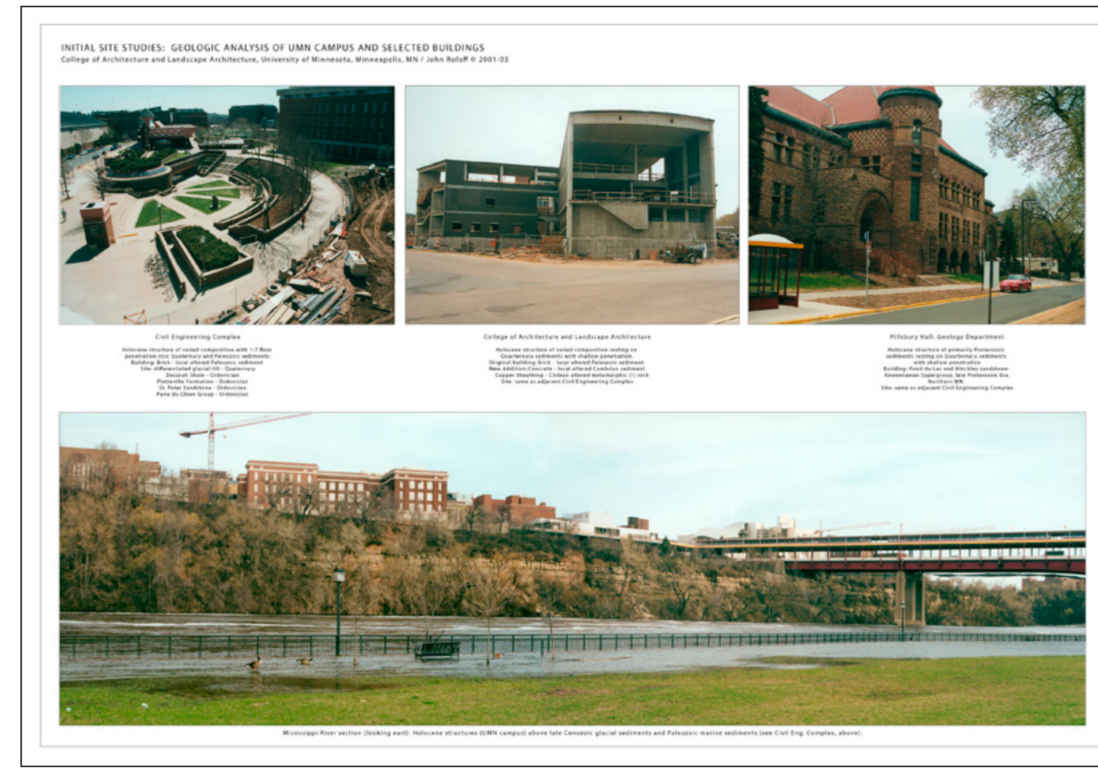


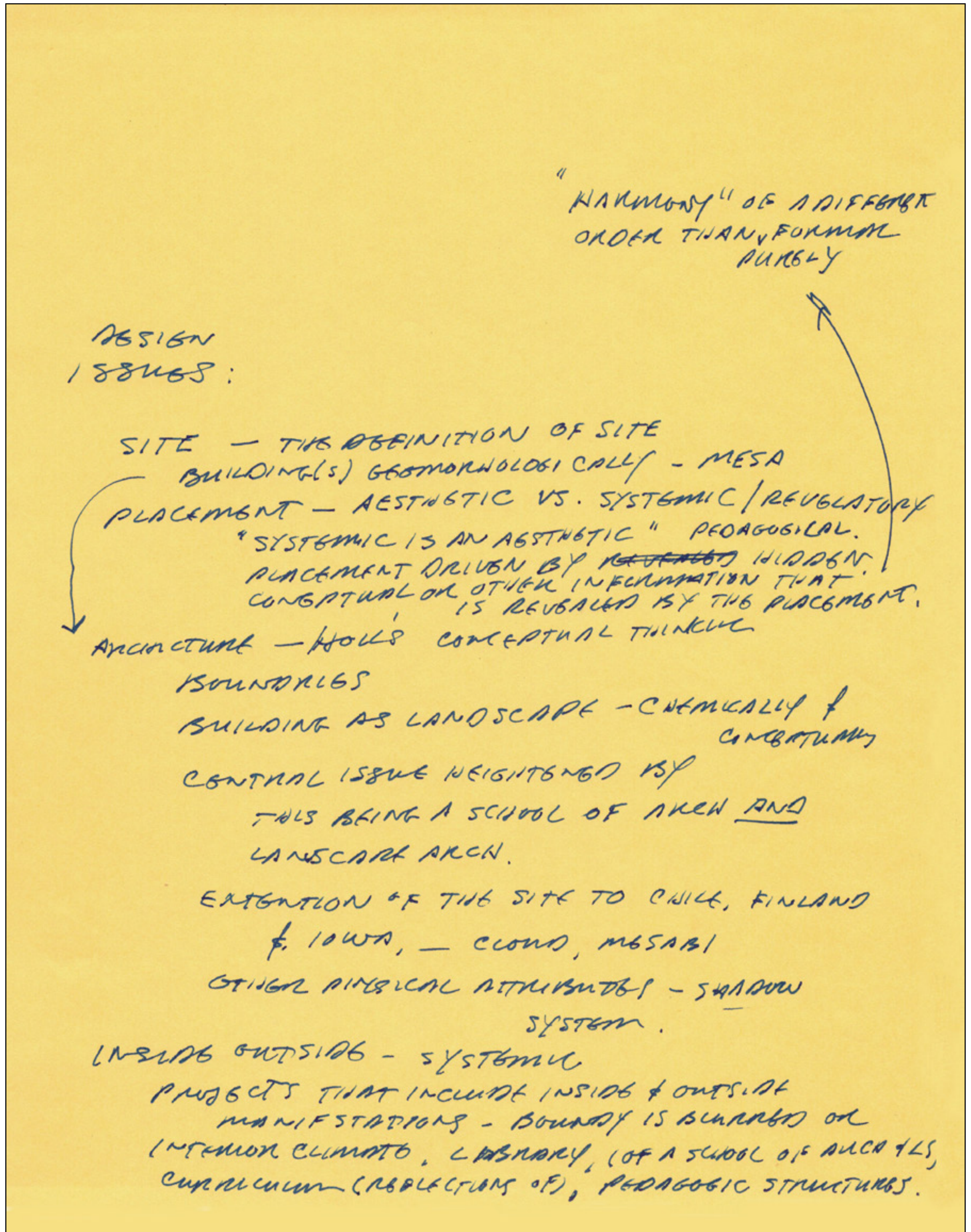
Fig 8. Initial Site Studies: Geologic Analysis of UMN Campus and Selected Buildings, inkjet print on paper, size variable, 2001-03.

Top Left Image: Civil Engineering Complex: Holocene structure of varied composition with 1-7 floor penetration into Quaternary and Paleozoic sediments: Building: Brick - local altered Paleozoic sediment. Site: differentiated glacial till - Quaternary; Decorah Shale - Ordovician; Platteville Formation - Ordovician; St. Peter Sandstone - Ordovician; Prairie du Chien Group - Ordovician.

Top Center Image: College of Architecture and Landscape Architecture; Holocene structure of varied composition resting on Quaternary sediments with shallow penetration. Original building: Brick - local altered Paleozoic sediment; New Addition: Concrete - local altered Cambrian sediment; Copper Sheathing - Chilean altered metamorphic rock; Site: same as adjacent Civil Engineering Complex.

Top Right Image: Pillsbury Hall: Geology Department Holocene structure of primarily Proterozoic sediments resting on Quaternary sediments with shallow penetration. Building: Fond du Lac and Hinckley sandstone: Keweenawan Supergroup, late Proterozoic Era, Northern MN. Site: same as adjacent Civil Engineering Complex.

Bottom Image: Mississippi River section (looking east): Holocene structures (UMN campus) above late Cenozoic glacial sediments and Paleozoic marine sediments (see Civil Eng. Complex, above).



"HARMONY" OF A DIFFERENT ORDER THAN FORMAL PURELY

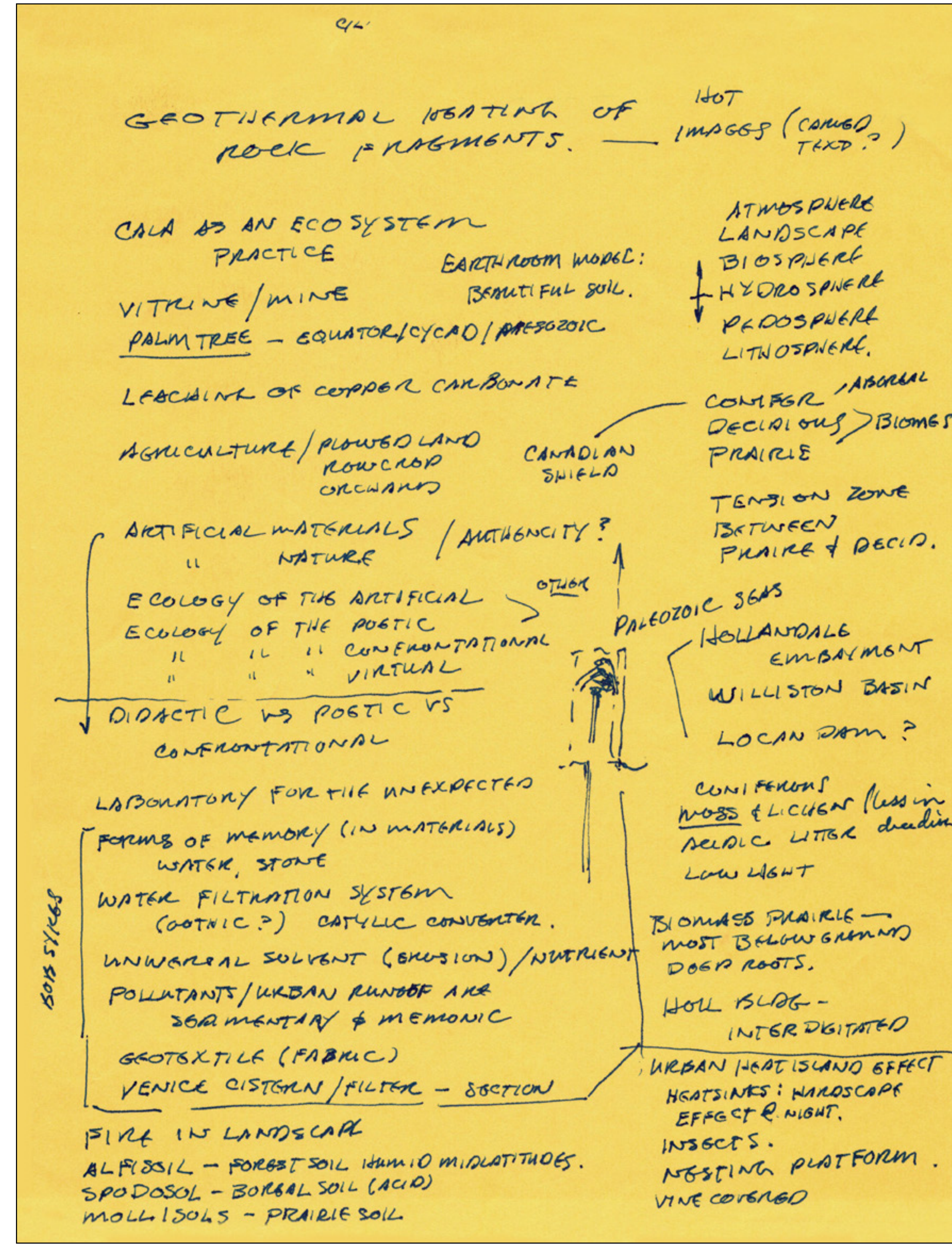
DESIGN ISSUES:

SITE — THE DEFINITION OF SITE
BUILDING(S) GEOMORPHOLOGICALLY — MESA
PLACEMENT — AESTHETIC VS. SYSTEMIC / REVELATORY
"SYSTEMIC IS AN AESTHETIC" PEDAGOGICAL.
PLACEMENT DRIVEN BY ~~[illegible]~~ HIDDEN, CONCEPTUAL OR OTHER INFORMATION THAT IS REVEALED BY THE PLACEMENT.

ARCHITECTURE — HOLL'S CONCEPTUAL THINKING
BOUNDARIES
BUILDING AS LANDSCAPE — CHEMICALLY & CONCEPTUALLY
CENTRAL ISSUE HEIGHTENED BY THIS BEING A SCHOOL OF ARCH AND LANDSCAPE ARCH.
EXTENSION OF THE SITE TO CHILE, FINLAND & IOWA, — CLOUD, MESABI
OTHER PHYSICAL ATTRIBUTES — SHADOW SYSTEM.

INSIDE OUTSIDE — SYSTEMIC
PROJECTS THAT INCLUDE INSIDE & OUTSIDE MANIFESTATIONS — BOUNDARY IS BLURRED OR INTERIOR CLIMATE, LIBRARY, (OF A SCHOOL OF ARCH & LS), CURRICULUM (REFLECTIONS OF), PEDAGOGIC STRUCTURES.

Fig. 9. Concept Notes, loose notebook page, pen on colored paper, 11 in x 8.5 in, circa 2001.



GEOTHERMAL HEATING OF ROCK FRAGMENTS. — HOT IMAGES (CARVED TEXT?)

CALA AS AN ECOSYSTEM
PRACTICE

EARTHROOM MODEL:
BEAUTIFUL SOIL.

ATMOSPHERE
LANDSCAPE
BIOSPHERE
HYDROSPHERE
PEDOSPHERE
LITHOSPHERE.

VITRINE / MINE
PALM TREE — EQUATOR / CYCAD / MESOZOIC
LEACHING OF COPPER CARBONATE
AGRICULTURE / PLOWED LAND
ROW CROP
ORCHARDS

CANADIAN SHIELD

CONIFER / BOREAL
DECIDUOUS > BIOMES
PRAIRIE

TENSION ZONE BETWEEN PRAIRIE & DECID.

ARTIFICIAL MATERIALS / AUTHENCITY?
" NATURE
ECOLOGY OF THE ARTIFICIAL > OTHER
ECOLOGY OF THE POETIC
" " " CONFRONTATIONAL
" " " VIRTUAL
DIDACTIC VS POETIC VS CONFRONTATIONAL

PALEOZOIC SEAS
HOLLANDALE EMBAYMENT
WILLISTON BASIN
LOGAN DAM?

LABORATORY FOR THE UNEXPECTED

BOIS SYSTEMS
FORMS OF MEMORY (IN MATERIALS)
WATER, STONE
WATER FILTRATION SYSTEM
(GOTHIC?) CATALYTIC CONVERTER.
UNIVERSAL SOLVENT (EROSION) / NUTRIENT
POLLUTANTS / URBAN RUNOFF ARE SEDIMENTARY & MEMONIC
GEOTEXTILE (FABRIC)
VENICE CISTERN / FILTER — SECTION

CONIFEROUS
MOSS & LICHEN (less in shading)
ACIDIC LITTER
LOW LIGHT

BIOMASS PRAIRIE — MOST BELOW GROUND DEEP ROOTS.
HOLL BLDG — INTERDIGITATED

URBAN HEAT ISLAND EFFECT
HEATSINKS: HARDSCAPE EFFECT @ NIGHT.
INSECTS.
NESTING PLATFORM.
VINE COVERED

FIRE IN LANDSCAPE
ALFISOIL — FOREST SOIL HUMID MIDLATITUDES.
SPODOSOL — BOREAL SOIL (ACID)
MOLLISOLS — PRAIRIE SOIL

Fig. 10. Concept Notes, loose notebook page, pen on colored paper, 11 in x 8.5 in, circa 2001.

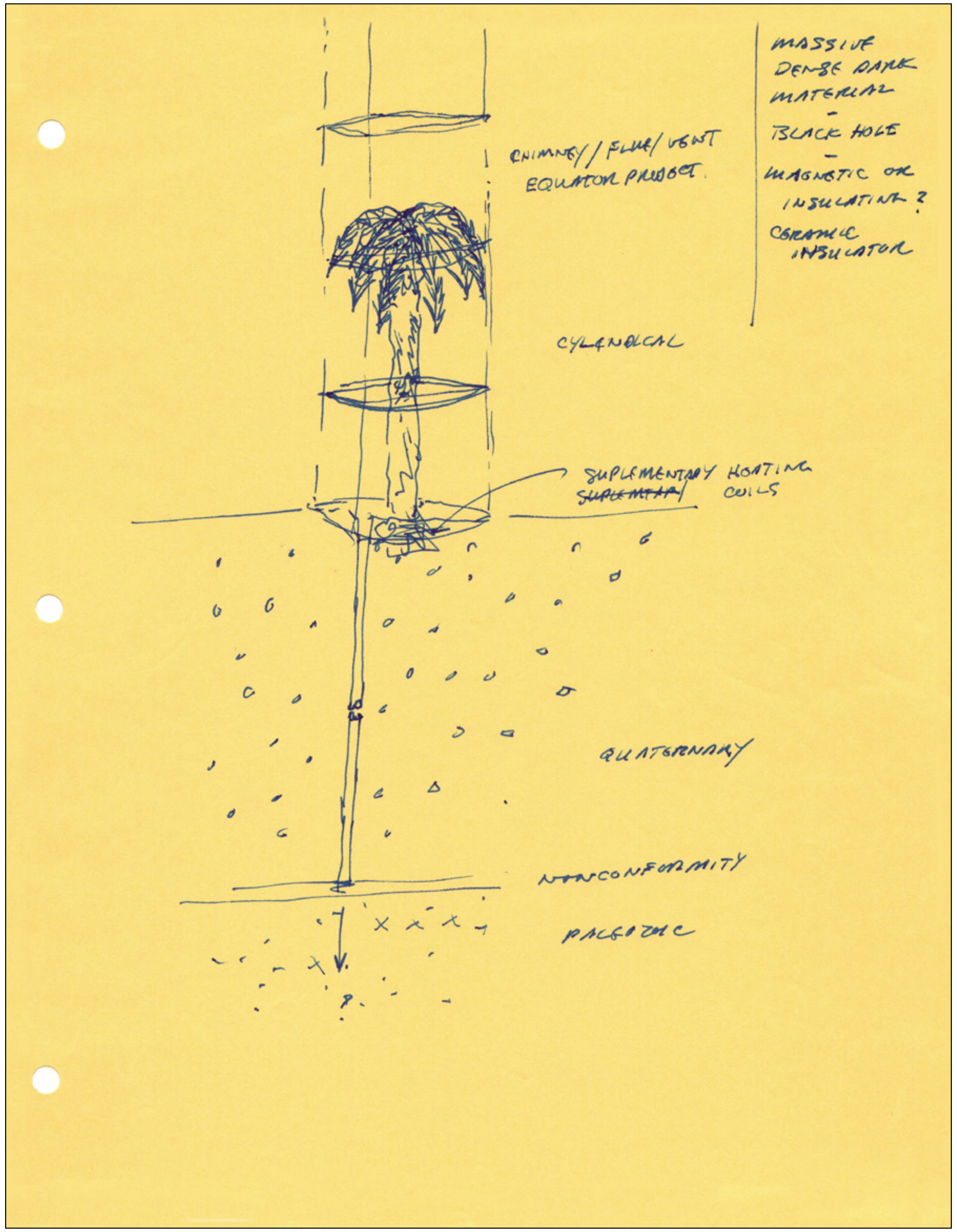


Fig. 11. Concept Notes, loose notebook page, pen on colored paper, 11 in x 8.5 in, circa 2001.

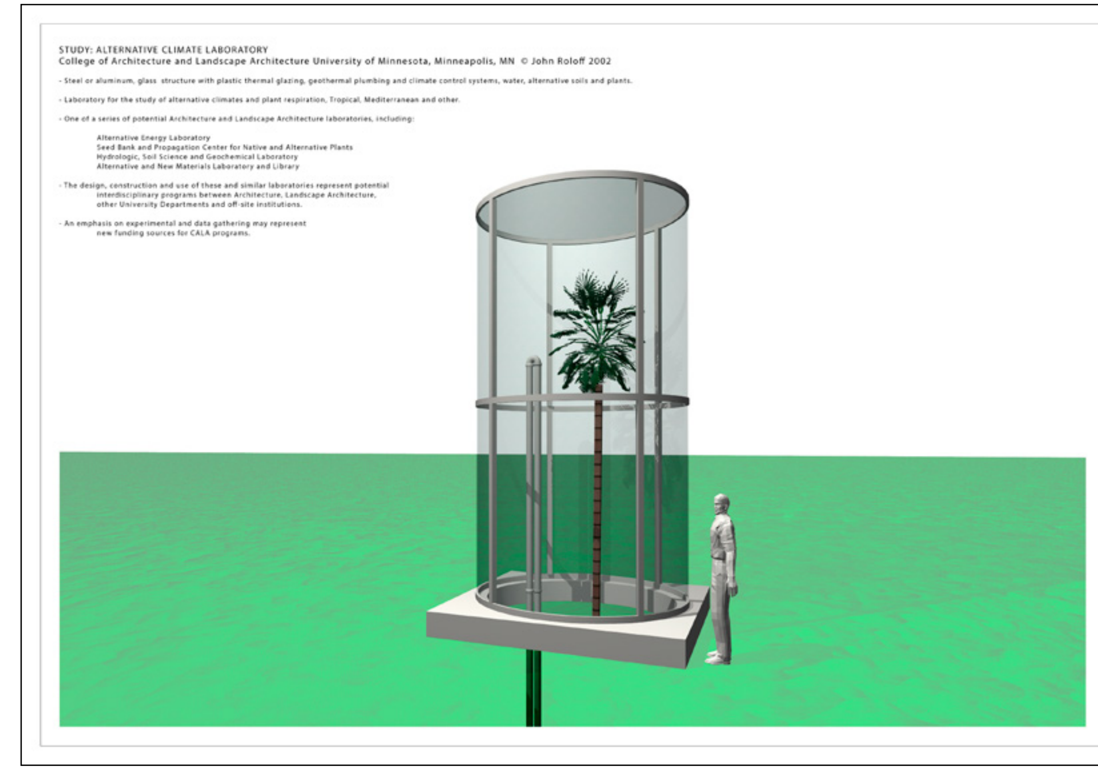


Fig. 12. Study: Alternative Climate Laboratory, inkjet print on paper, size variable, collection: Weisman Museum, UMN, 2002.

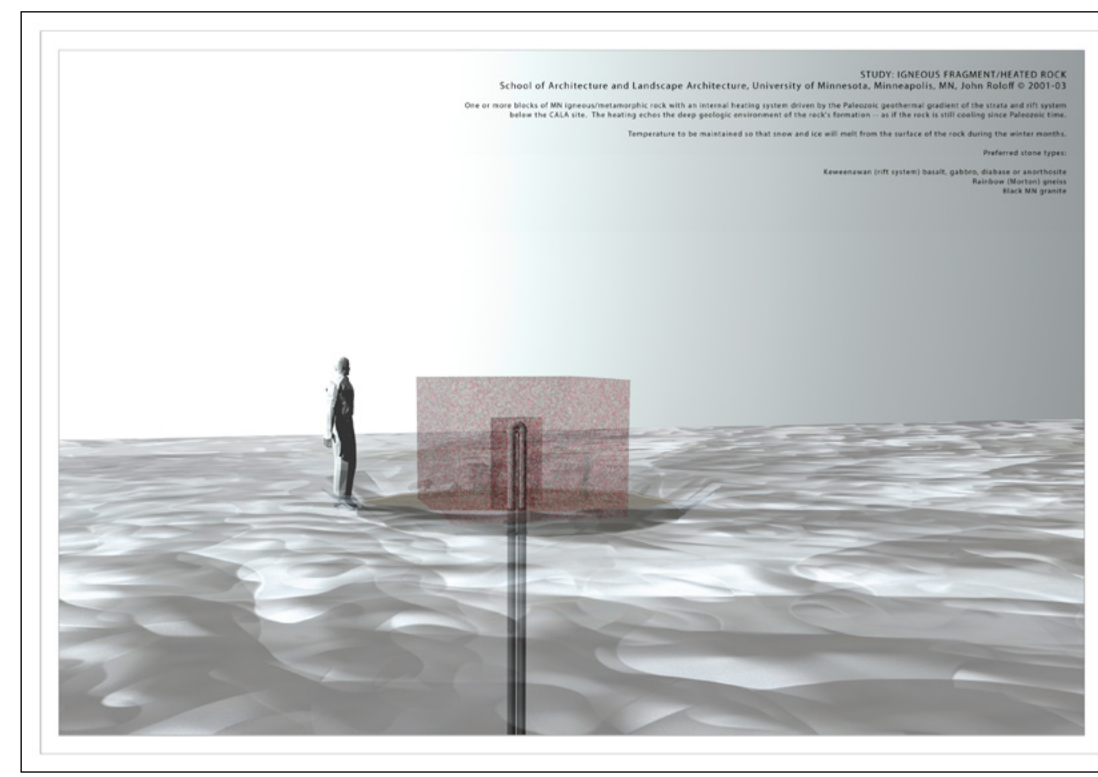


Fig. 13. Study: Igneous Fragment/Heated Rock, inkjet print on paper, size variable, collection: Weisman Museum, UMN, 2001-03.

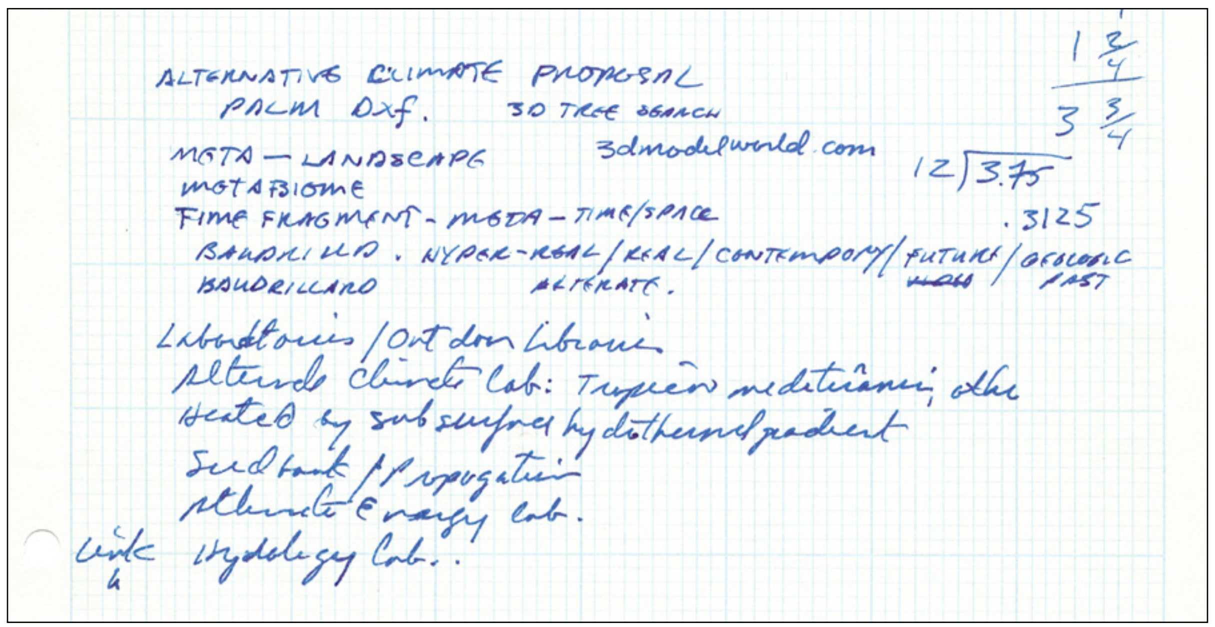


Fig. 14. Concept Notes, loose notebook page, pen on graph paper (detail), 11 in x 8.5 in, circa 2001.

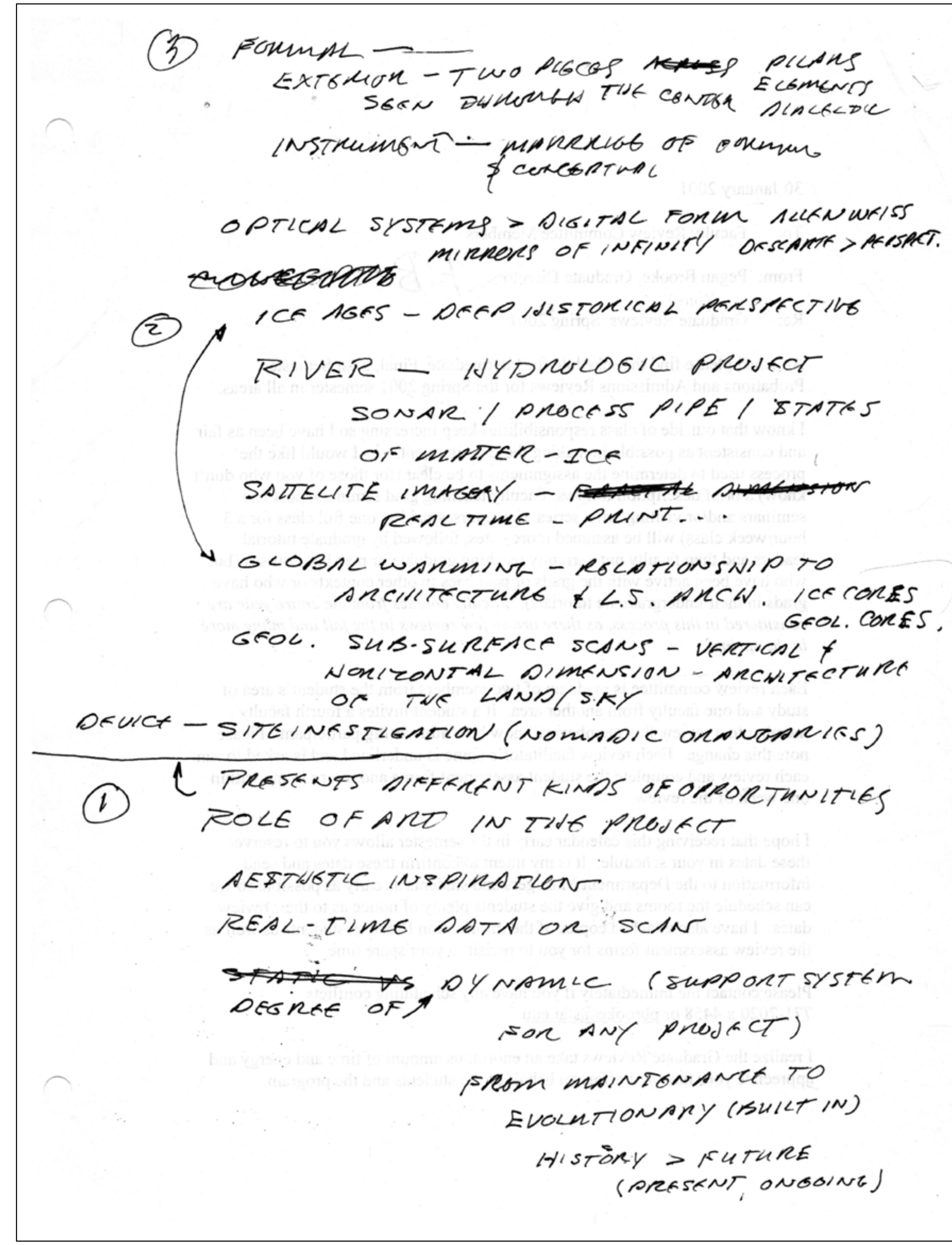


Fig. 15. Concept Notes, loose notebook page, pen on paper, 11 in x 8.5 in, circa 2001.

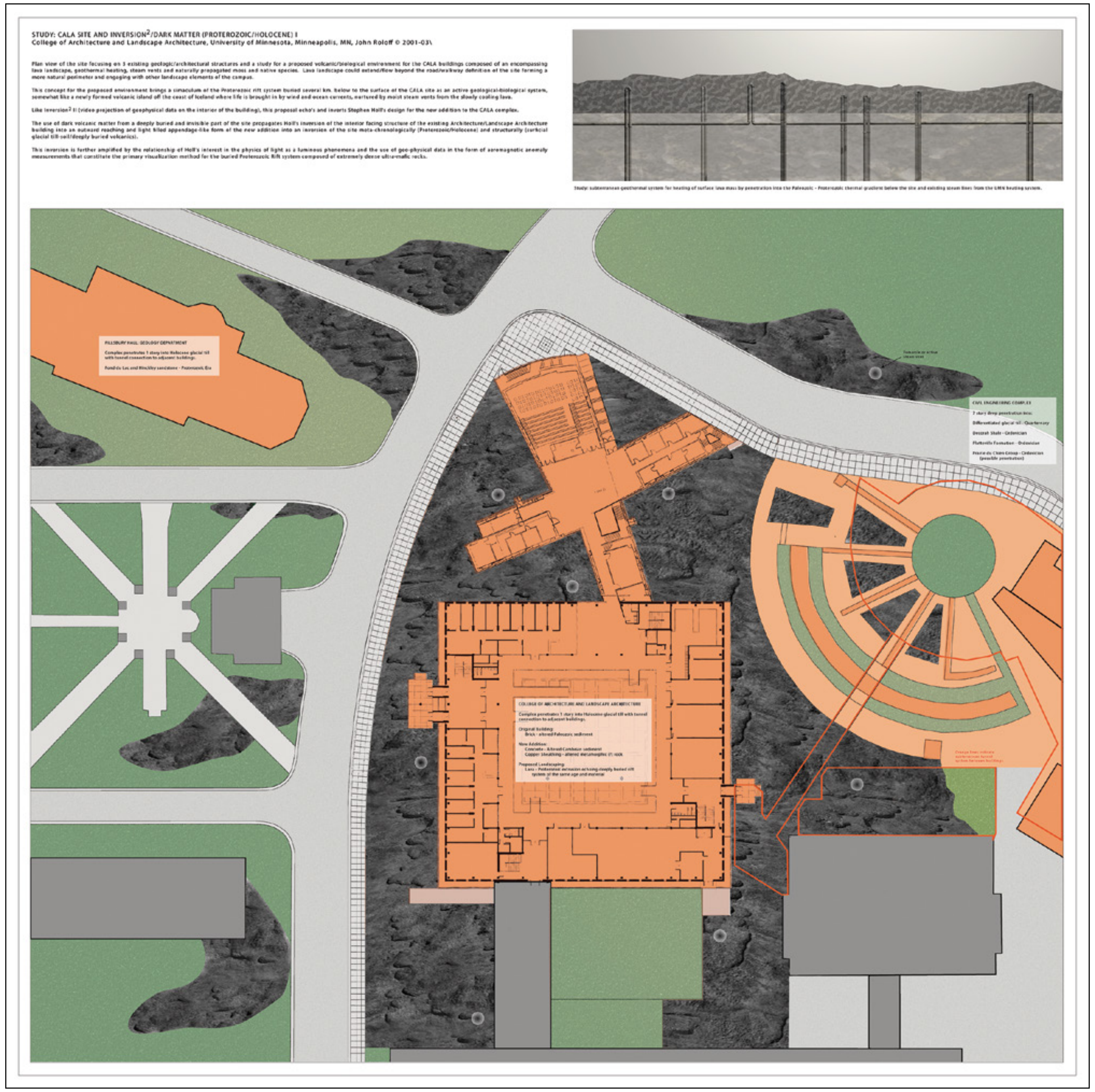


Fig. 16. Study CALA Site and Inversion^2/Dark Matter (Proterozoic/Holocene) I, inkjet print on paper, size variable, collection: Weisman Museum, UMN, 2001-03.

Fig. 16. Text.

STUDY: CALA SITE AND INVERSION^2/DARK MATTER (PROTEROZOIC/HOLOCENE) I
College of Architecture and Landscape Architecture, University of Minnesota, Minneapolis, MN
John Roloff © 2001-03
-

Plan view of the site focusing on 3 existing geologic/architectural structures and a study for a proposed volcanic/biological environment for the CALA buildings composed of an encompassing lava landscape, geothermal heating, steam vents and naturally propagated moss and native species. Lava landscape could extend/flow beyond the road/walkway definition of the site forming a more natural perimeter and engaging with other landscape elements of the campus.

This concept for the proposed environment brings a simaculum of the Proterozoic rift system buried several km. below the surface of the CALA site as an active geological -biological system, somewhat like a newly formed volcanic island off the coast of Iceland where life is brought in by wind and ocean currents, nurtured by moist steam vents from the slowly cooling lava.

Like *Inversion^2 II* (video projection of geophysical data on the interior of the building), this proposal echo's and inverts Stephen Holl's design for the new addition to the CALA complex.

The use of dark volcanic matter from a deeply buried and invisible part of the site propagates Holl's inversion of the interior facing structure of the existing Architecture/Landscape Architecture building into an outward reaching and light filled appendage-like form of the new addition into an inversion of the site meta-chronologically (Proterozoic/Holocene) and structurally (surficial glacial till-soil/deeply buried volcanics).

This inversion is further amplified by the relationship of Holl's interest in the physics of light as a luminous phenomena and the use of geophysical data in the form of aeromagnetic anomaly measurements that constitute the primary visualization method for the buried Proterozoic Rift system composed of extremely dense ultra-mafic rocks.

PILLSBURY HALL: GEOLOGY DEPARTMENT
Complex penetrates 1 story into Holocene glacial till with tunnel connection to adjacent buildings.
Fond du Lac and Hinckley sandstone - Proterozoic Era

Study: subterranean geothermal system for heating of surface lava mass by penetration into the Paleozoic - Proterozoic thermal gradient below the site and existing steam lines from the UMN heating system.

CIVIL ENGINEERING COMPLEX
7 story deep penetration into:
Differentiated glacial till - Quaternary
Decorah Shale - Ordovician
Platteville Formation - Ordovician
Prairie du Chien Group - Ordovician (possible penetration)

COLLEGE OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE
Complex penetrates 1 story into Holocene glacial till with tunnel connection to adjacent buildings.
Original Building:
Brick - altered Paleozoic sediment
New Addition:
Concrete - Altered Cambrian sediment
Copper Sheathing - altered metamorphic (?) rock
Proposed Landscaping:
Lava - Proterozoic extrusion echoing deeply buried rift system of the same age and material.

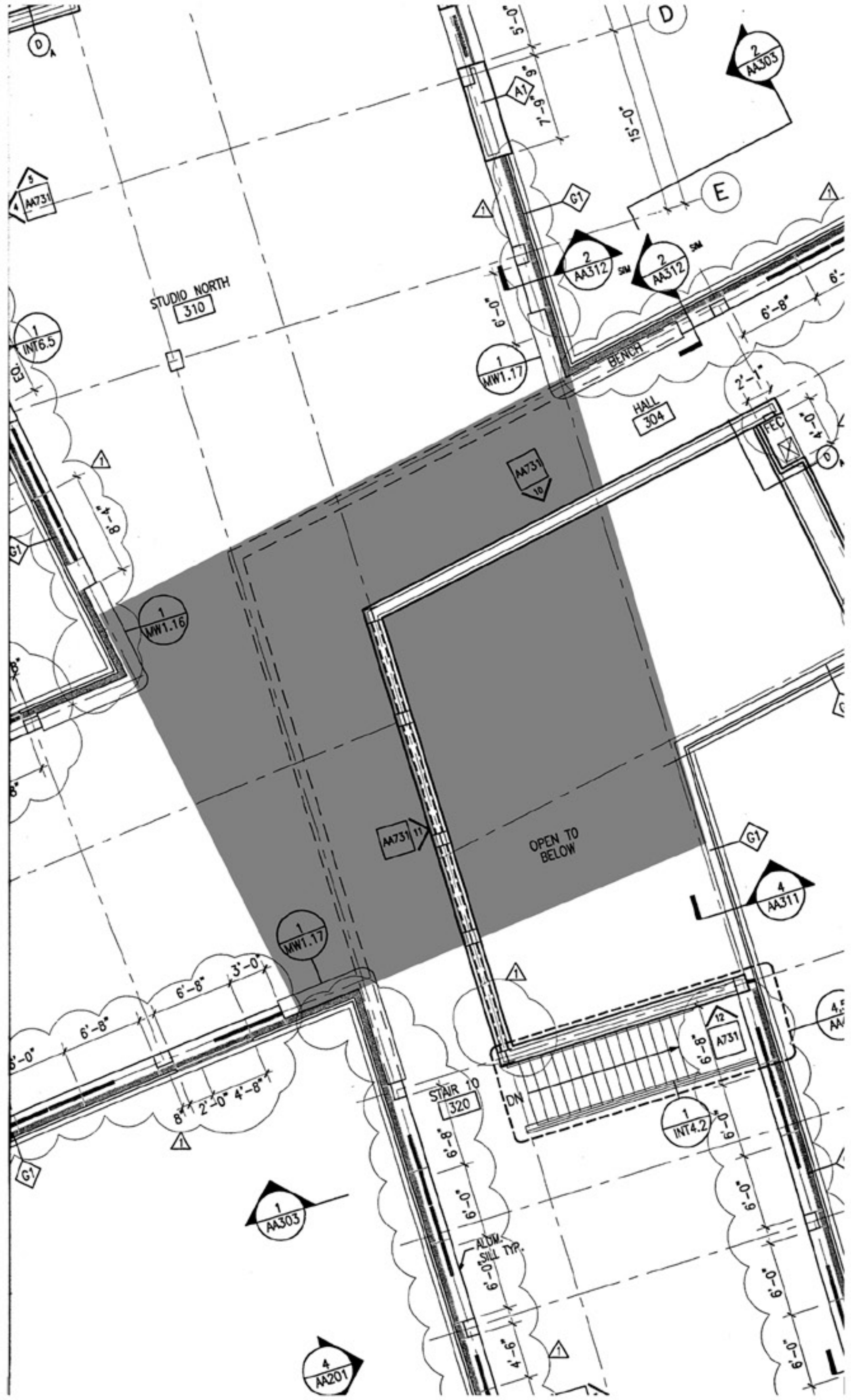
Orange lines indicate subterranean tunnel system between buildings.

Fumarole or active steam vent.

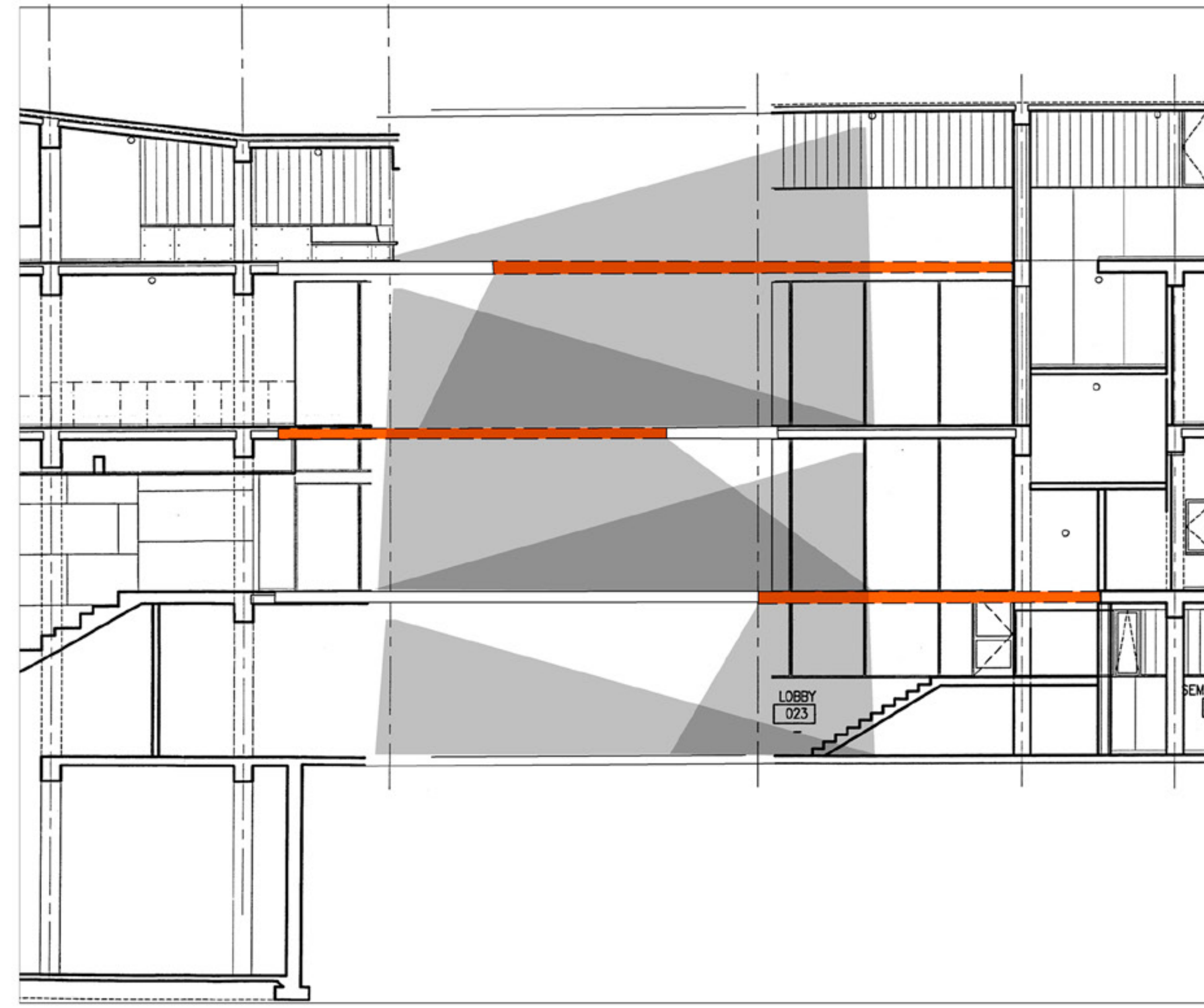
PRELIMINARY SITE STUDY: INVERSION^2/ DARK MATTER (PROTEROZOIC/HOLOCENE) I / School of Architecture and Landscape Architecture, University of Minnesota, Minneapolis, MN / John Roloff © 2001-03

View of exterior with encompassing lava flow, heated springs (steam) and naturally propagated moss, urban and native 'drift' species. As an inversion^2 of Stephen Holl's conceptual thinking for the CALA building, this proposal brings a simaculum of the Proterozoic rift system buried several Km. below to the Holocene surface of the site as an active geological-biological system. The effect is somewhat like a newly-formed volcanic island where life is brought in randomly by wind and ocean currents, nurtured by moist steam vents from the cooling lava.

Fig. 17. Preliminary Site Study: Inversion^2/Dark Matter (Proterozoic/Holocene), inkjet print on paper, size variable, collection: Weisman Museum, UMN, 2001-03.



Plan (detail): third floor



Section (detail): looking east
(openings between floors indicated by orange video projection areas in gray)

STUDY: INVERSION^2: DARK MATTER (PROTEROZOIC/HOLOCENE) II

College of Architecture and Landscape Architecture Project, University of Minnesota, Minneapolis, MN / John Roloff © 2001-03

A series of projection units (video, holographic, digital, etc,) operating in the central section of the CALA addition. The image being projected is derived from the aeromagnetic data of Minnesota bedrock geology below the CALA site -- the data that was used to discover the structure of the Proterozoic era rift system some 14.000 ft. below.

Like "Inversion^2 I," this concept echo's and inverts Stephen Holl's design for the new addition to the CALA complex. The use of data describing dark volcanic matter from a deeply buried and invisible part of the site propagates Holl's inversion of the interior facing structure of the existing Architecture/ Landscape Architecture building into an outward reaching and light filled appendage-like form of the new addition into an inversion of the site meta-chronologically (Proterozoic/Holocene) and structurally (contemporary building/deeply buried volcanics).

This inversion is further amplified by the relationship of Holl's interest in the physics of light as a luminous phenomena and the use of geophysical data in the form of aeromagnetic anomaly measurements that mathematically describe the buried Proterozoic Rift system composed of extremely dense ultra-mafic rocks.

Fig. 18. Study: Inversion^2: Dark Matter (Proterozoic/Holocene) II, inkjet print on paper, size variable, collection: Weisman Museum, UMN, 2001-03.

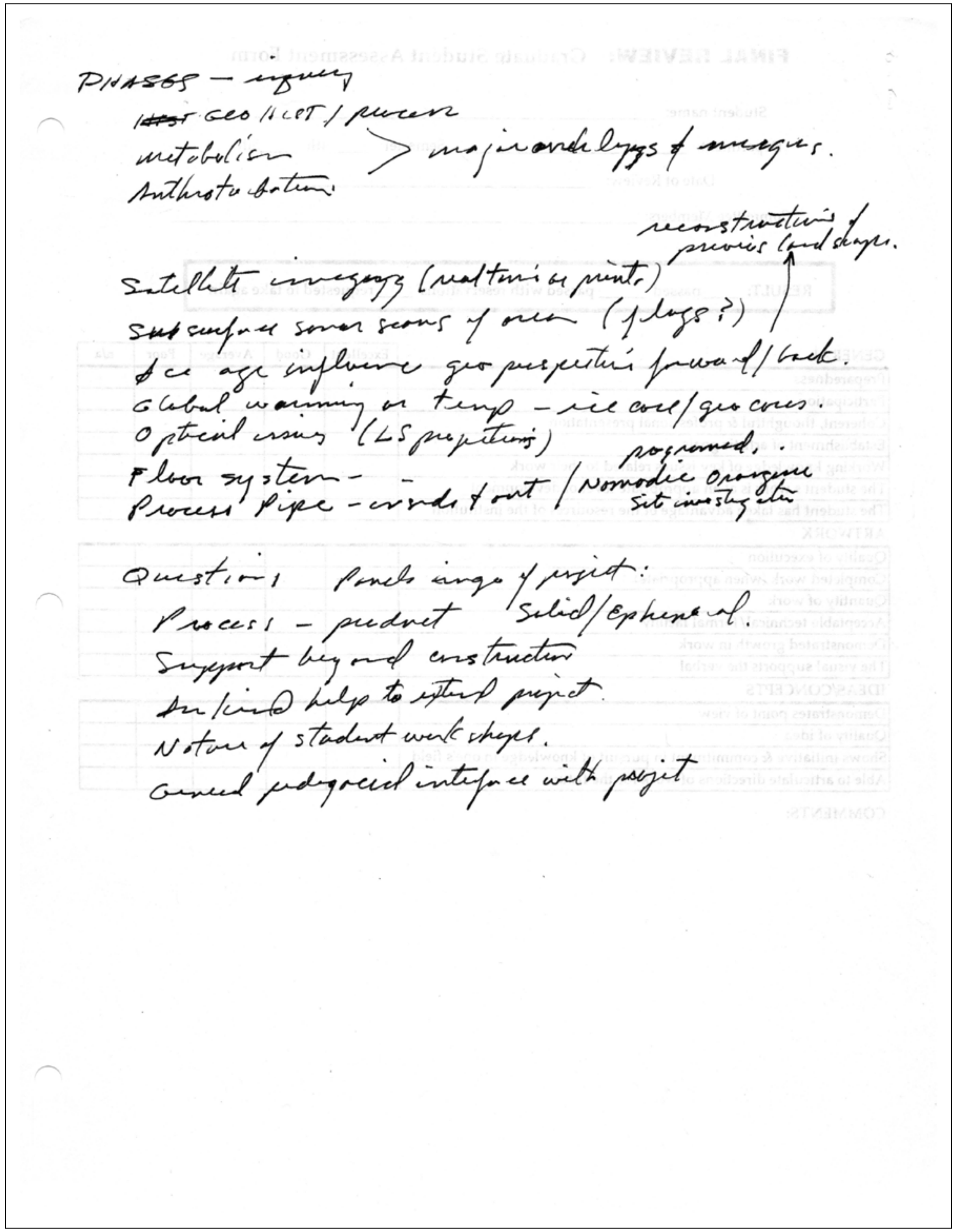


Fig. 19. Concept Notes, loose notebook page, pen on paper, 11 in x 8.5 in, circa 2001.

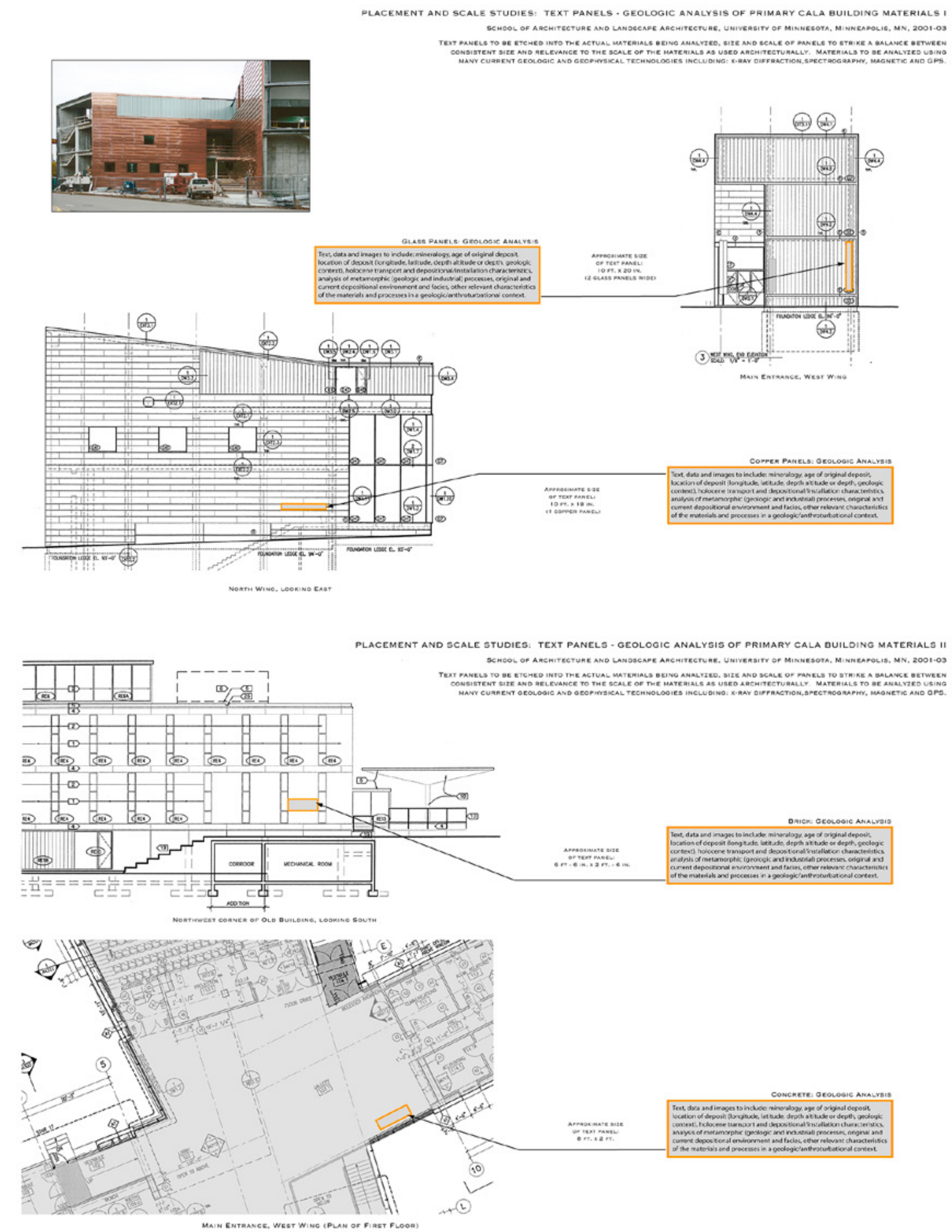


Fig. 20. Placement and Scale Studies: Text Panels - Geologic Analysis of Primary CALA Building Materials, inkjet on paper, size variable, 2001-03.

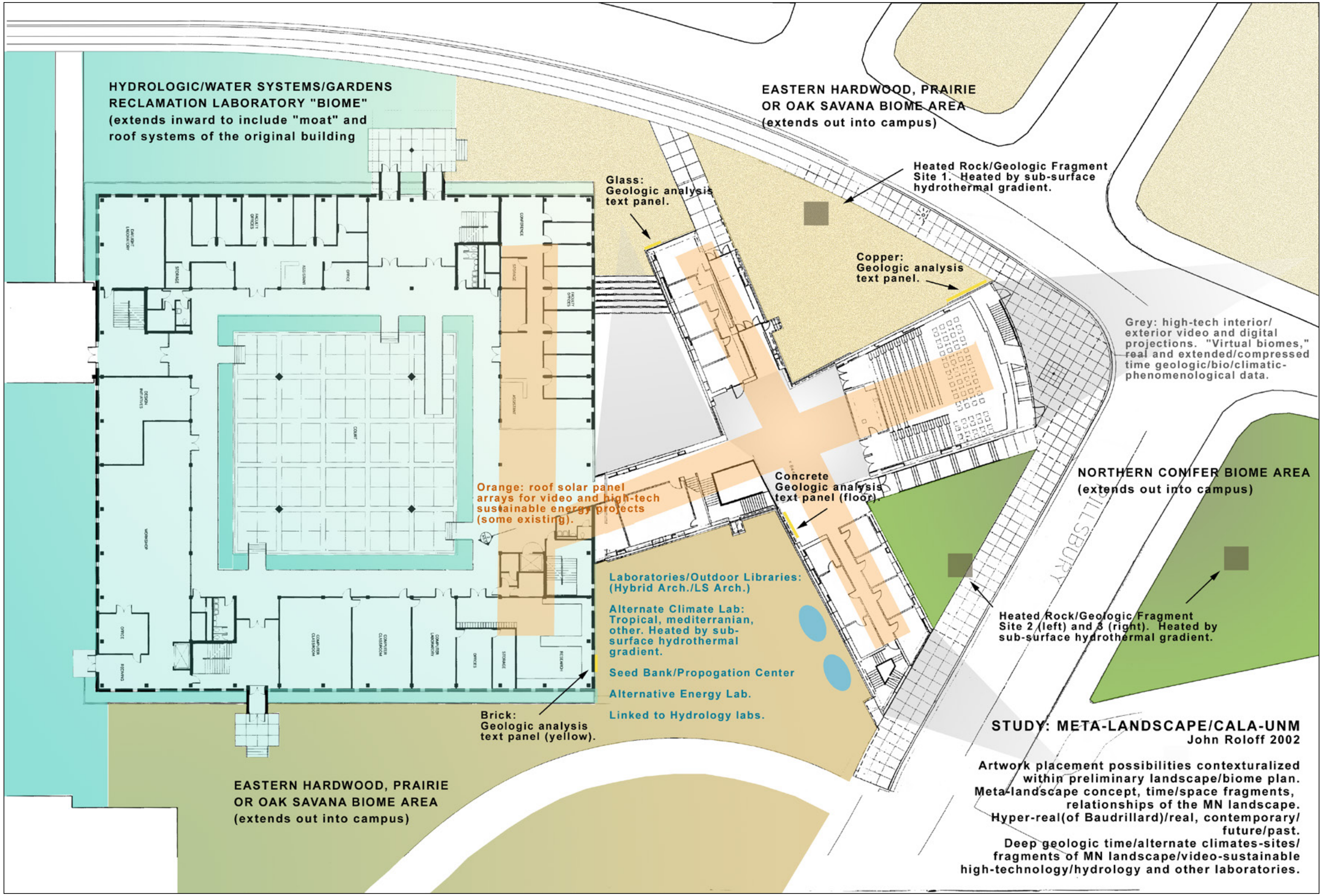
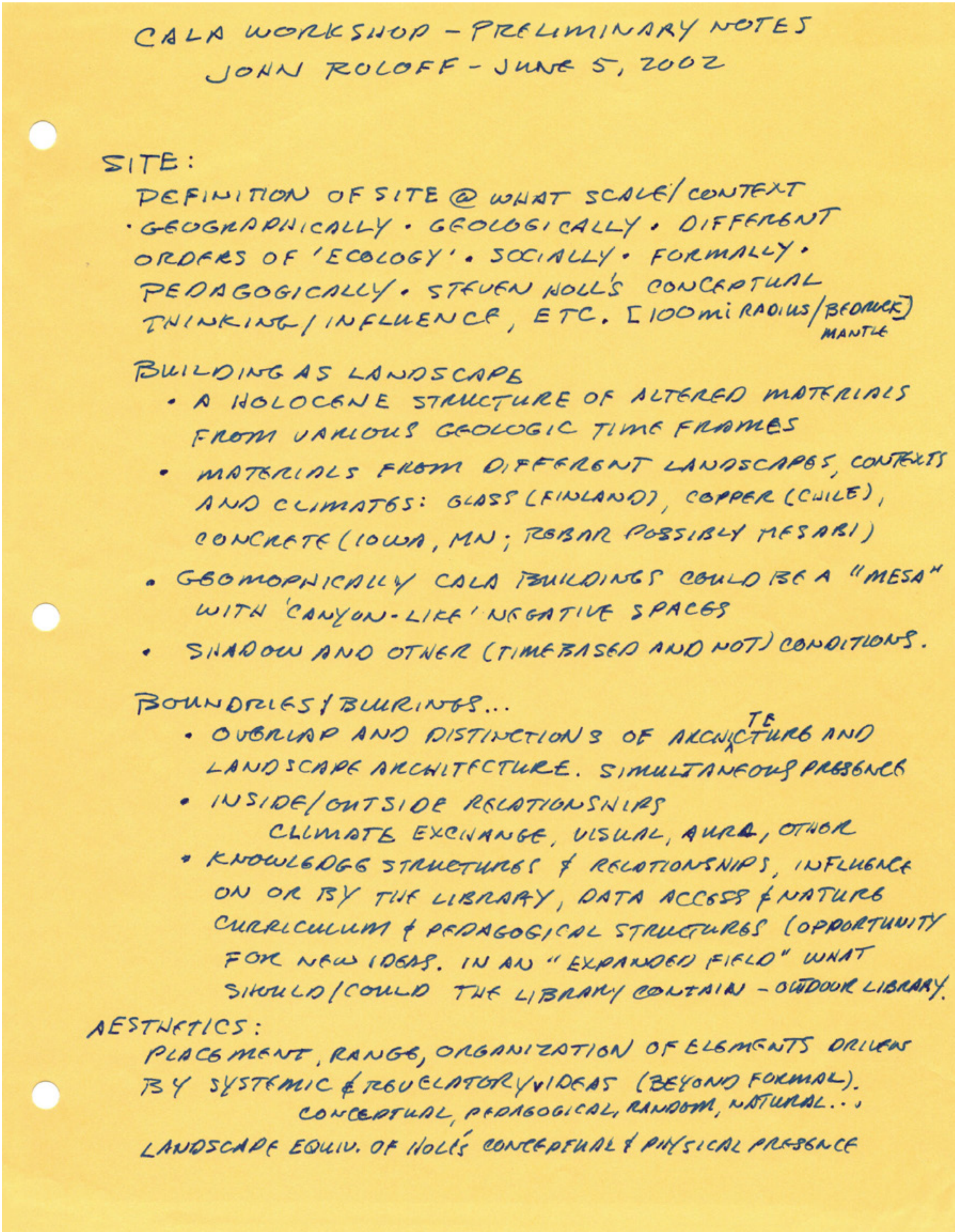


Fig. 21. Study: Meta-Landscape/CALA-UMN, inkjet print on paper, size variable, 2002.

CALA Public Art and Courtyards Workshop/Charette

June 5-7, 2002


CALA WORKSHOP - PRELIMINARY NOTES
JOHN ROLOFF - JUNE 5, 2002

SITE:
DEFINITION OF SITE @ WHAT SCALE/CONTEXT
• GEOGRAPHICALLY • GEOLOGICALLY • DIFFERENT ORDERS OF 'ECOLOGY' • SOCIALLY • FORMALLY • PEDAGOGICALLY • STEVEN HOLL'S CONCEPTUAL THINKING/INFLUENCE, ETC. [100mi RADIUS/BEDROCK MANTLE]

BUILDING AS LANDSCAPE
• A HOLOCENE STRUCTURE OF ALTERED MATERIALS FROM VARIOUS GEOLOGIC TIME FRAMES
• MATERIALS FROM DIFFERENT LANDSCAPES, CONTEXTS AND CLIMATES: GLASS (FINLAND), COPPER (CHILE), CONCRETE (IOWA, MN; REBAR POSSIBLY MESABI)
• GEOMORPHICALLY CALA BUILDINGS COULD BE A "MESA" WITH 'CANYON-LIKE' NEGATIVE SPACES
• SHADOW AND OTHER (TIME BASED AND NOT) CONDITIONS.

BOUNDARIES/BLURINGS...
• OVERLAP AND DISTINCTIONS OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE. SIMULTANEOUS PRESENCE
• INSIDE/OUTSIDE RELATIONSHIPS
CLIMATE EXCHANGE, VISUAL, AURA, OTHER
• KNOWLEDGE STRUCTURES & RELATIONSHIPS, INFLUENCE ON OR BY THE LIBRARY, DATA ACCESS & NATURE CURRICULUM & PEDAGOGICAL STRUCTURES (OPPORTUNITY FOR NEW IDEAS. IN AN "EXPANDED FIELD" WHAT SHOULD/COULD THE LIBRARY CONTAIN - OUTDOOR LIBRARY.

AESTHETICS:
PLACEMENT, RANGE, ORGANIZATION OF ELEMENTS DRIVEN BY SYSTEMIC & REGULATORY/IDEAS (BEYOND FORMAL). CONCEPTUAL, PEDAGOGICAL, RANDOM, NATURAL...
LANDSCAPE EQUIV. OF HOLL'S CONCEPTUAL & PHYSICAL PRESENCE

Fig. 22. Concept Notes, loose notebook page, pen on paper, 11 in x 8.5 in, circa 2001.

CALA Public Art and Courtyards Workshop/Charette / June 5-7, 2002

Workshop Committee:
John Koepke, Shelly Willis, John Roloff, Rebecca Krinke, and Virajita Singh.

Tentative Schedule/Agenda
Regular CALA faculty and staff invited to participate in the 2 day CALA Public Art Workshop. Student representatives invited to participate. Sign up complete by May 31. (Participants asked to RSVP.) JK and VS to coordinate.

Workshops on each day will be held from 9-4 (6 PM on the second day) in the CALA court and/or CALA classrooms. Food will be provided by CALA. Basic supplies of paper and pens will be supplied by CALA, but participants will be encouraged to bring their favorite media. (Dean's office and LA Administrative staff to coordinate art supplies and food.) 10 scale base maps of the building, and other pertinent drawings, such as elevations will be made available. Site plan of the building's larger context will be available. (VS to coordinate.)

Workshop, Day 1-June 5:
9 - 9:15:Tom Fisher to welcome all participants.

9:15 - 9:45: John Koepke, Landscape Architecture Dept. Head: Overview of the programmatic ideas for the courtyards generated by previous meetings (this includes the 3 biomes theme developed by Dean Abbott/ Lance Neckar and other LA Faculty.

9:45 - 10: Break, with snacks provided.

10 - 11: John Roloff, Public Artist for CALA, presents his proposals for CALA through slides and presentation/discussion. (Introduced by Shelly Willis)

Presentations by Resource Experts:
11 - 1: Geology field trip led by Prof. Weiblen (Prof. Emeritus, Dept. of Geology)

1 - 1:30: Lunch.

1:30 - 2:30: Ecology lecture (community structure) by Professor David Pitt

2:30 - 2:45: Break.

2:45 - 4: Steve Weeks, Professor of Architecture, CALA, leads Programming session, using techniques and strategies from the book on programming that he has co-authored. (JK, RK, SW, VS to help select exercises.) Workshop participants placed into teams of 3, 4, or 5 people to brainstorm programming ideas. (How teams will be organized needs to be determined-John Roloff may move from team to team?)

Workshop, Day 2-June 6:
Presentations by Resource Experts:
9 - 9:45: Hydrology context and storm water garden lecture by Prof. Bob Sykes, Dept. of Landscape Architecture, CALA.

9:45 - 10:30: Plant restoration/native plants in an urban context lecture by Peter MacDonagh, Adjunct faculty, Dept. of Landscape Architecture, CALA.

10:30 - 10:45: Break.

11 - 12: Programming session. Staying in the same teams as the day before, teams develop/modify their programming ideas based on data and inspiration from the additional resource experts.

12 - 1: Working Lunch

1 - 2:30: Using affinity-mapping techniques, John Koepke facilitates the selection of programming ideas for the teams to develop. JK discusses moving from program to conceptual ideas.

2:30 – 5: Staying in the same teams as the day before, teams and individuals within teams create concept diagrams, conceptual plans at 10 scale, and sketches.

5 – 6: Pin-up and Reception. Workshop participants and others informally discuss and view each other's work.

Workshop, Day 3-June 7:
1 - 3: John Roloff and Dean Abbott work session.

3-5: Debriefing/work session.
John Roloff, John Koepke, Shelly Willis, Rebecca Krinke, and Virajita Singh

Fig. 23. CALA Public Art and Courtyards Workshop/Charette, Rapson Hall, College of Architecture and Landscape Architecture, UMN, geologic and site research posted on back wall, 2002.

CALA Teaching Courtyards Programming Workshop

Basic Philosophy

It is our belief that all CALA spaces, including the exterior courtyards, the backyard/east entry, the front yard, the sandbox, the new gallery, and the Frederick Mann courtyard, can become places for learning, communication and social interaction. Furthermore, they can become living symbols of the integration of art and ecology as demonstrated through there use and design. By extension they will communicate what our professions' have to offer society-design which fully integrates functional requirements, natural systems thinking, and social spaces imbued with meaning that are capable of responding flexibly to changing use.

Workshop Objectives

1. To help provide John Roloff, the public artist commissioned to work with our facility, with a context for further developing his work here at CALA

2. To explain the 3 biome concept and communicate the intent of the idea to the CALA Community

3. Clarify the program for the 4 exterior courtyards and other CALA spaces in the context of the recently developed 3 biome concept

4. Suggest the location of specific activities and programmatic elements within the 4 courtyards and other CALA spaces

5. Offer design recommendations for the physical development of the 4 courtyards, other CALA spaces, and connections to the greater campus in the context of the 3 biome concept or other concepts that are generated during the workshop

6. To use the ideas and design sketches from the workshop as fund raising tools

A PROGRAMMING CHARRETTE for CALA

June 5 + 6, 2002

TEACHING COURTYARDS AND ART WORKSHOP

Issues to be Addressed

Scope of the Project — User needs, spaces, equipment; scale/size, character, material, connections, relationships

What are the Goals of a Design Education and how do these accommodate change?

Combine Program and Design in an Iterative Process
Change and Imagining A Future — PHILOSOPHY?
Interactions And Movement
Symbols For State And Profession
Spaces as Learning Tool
Behavioral and Social Issues

- ONE — alone; contained; silent; reflective; fleeting; H and V;
- FEW — several, brief, intense and productive; intimate and private; elements
- MANY — diverse, repetitive, multiple players, noisy; dynamic and animate; mass

TODAY's METHOD in WORKING GROUPS

1. LISTING QUALITIES — use post-it pads and trace; reference the site maps and the walk-through — 15-20 min
   Keywords or Phrases - wants and needs and resources and characteristics
2. CONNECT KEYWORDS TO VISUAL IDEAS — 25-30 min
   Use Keywords anticipate the Future respond to site and activity
   Diagram or Depict the condition; qualities and characteristics; a visual hypothesis
3. ASSOCIATE, CATEGORIZE or CLUSTER IDEAS to *SPACE or PLACE* — 10 min

METHODS

Groups Working Approach: INSIDE to OUTSIDE/OUTSIDE to INSIDE and BACK OUT

OUTSIDE to INSIDE

X# groups: Start with OUTSIDE & CAMPUS LINKS and move toward the SITE and INTERIOR SPACES for half the time then switch, starting form INSIDE to CAMPUS for remainder.

INSIDE to OUTSIDE

X# groups: Start with INTERIOR SPACES and SITE and move toward the CAMPUS LINKS for half the time then switch, starting form the CAMPUS to the INSIDE for remainder.

SOME THINGS TO COSNIDER

Light	Shade	Reflectance	Maintenance	Lighting	Drainage	Seasons
Water	Structures	Surfaces	Platforms	Plantings	Gathering	etc.

GROUP TOOLS and DOCUMENTS

MAPS CAMPUS Linkages
CALA Site plans (Ellerbe Planting Plan available)
18" and 36" Trace
Markers and scales
4 x6 Post-It Yellow Pads

ROUTINES

Customary, Predictable, Habitual, Standard and Regular

PLACES *What are the Linkages and the Differences?*

4 Gardens, 2 Interior Courts, 1 Sandbox, Church St Side, Backyard

CAMPUS LINKAGES - Wings as responses to Spaces and Passages

Long Term Campus Planning Vision: Geology Building + IT;
Link Knoll to Pillsbury to Scholars Walk and IT Walk along Church Street
Campus Entry @ University Avenue — Bell Museum-Armory-Nolte-Pillsbury
Mall and Northrup and Coffman and the River

RALPH RAPSON HALL — EXTERIOR SPACES

CALA SPACES

EAST — the BACKYARD Entry
The Ascending Ramp + Mound near Space Science Center
Platform serves as Smoking area and there is a path to Loading Dock on South

SOUTH — the SANDBOX
Experimental Construction Yard + Materials Storage; future walkway along ME.

FOUR GARDENS all gardens oriented from center of Addition Lobby

NORTH — Entry from Armory; (not ADA)
Small 'wedgey' space with Ascending Terraced steps; massive Copper cladding for edges.

EAST — Grassy Bowl w/ 1/2 level entry to Addition (not ADA)
Secondary Basement Egress from Original; Stair/door links to lobby and Drawing Labs; egress from East wing Studios and Library

WEST — Main Entry and Reception with elongated concrete bench at wall
Secondary entry into Vestibule from North grass plane.

IN-BETWEEN — Reflection - Cool Shade (not ADA)
Terraced "stepped seats" overlook future pond (now a gravel bed) Space is DCAUL

RALPH RAPSON HALL — INTERIOR SPACES

ADDITION LOBBY

Gallery, Lobby to Auditorium and stair to 2nd floor Library (scale sim. to Mann inner Court)

EXISTING COURT

The Courtyard (82x82 x 32) and the Future Fish

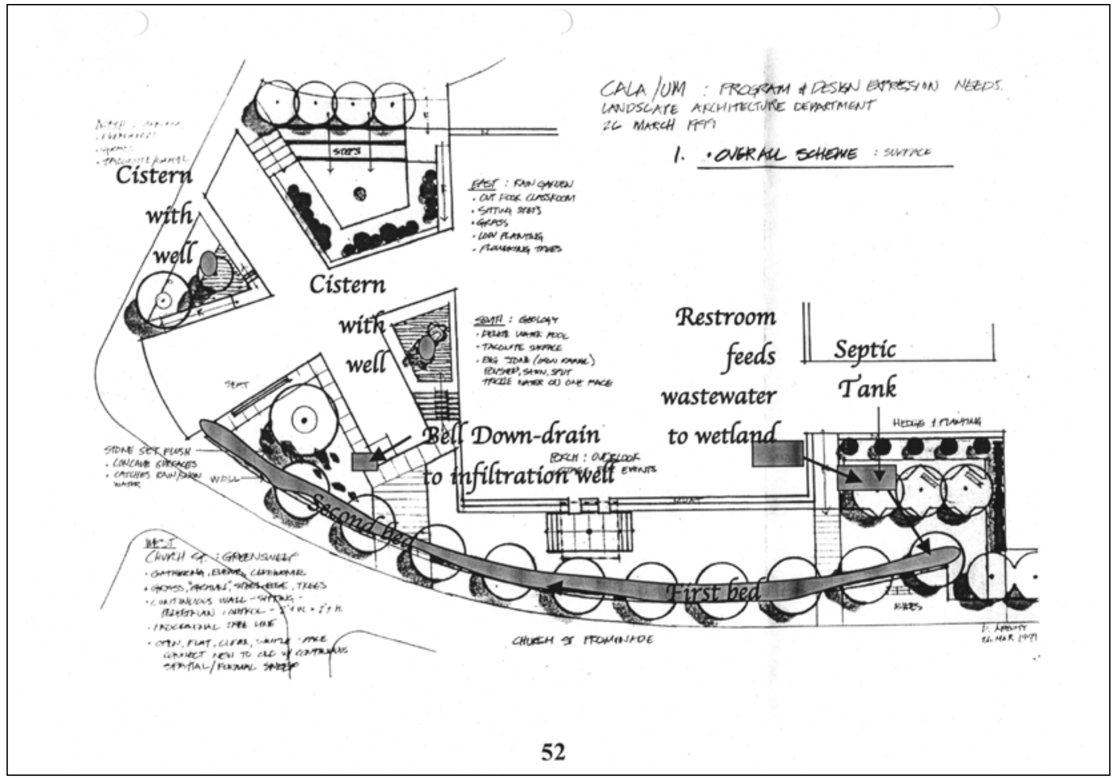


Fig. 24. CALA Workshop Information Sheet, ink on paper, 11 in. x 8.5 in., based on UMN Landscape Architecture Department study of 1999, used for workshop in 2002.

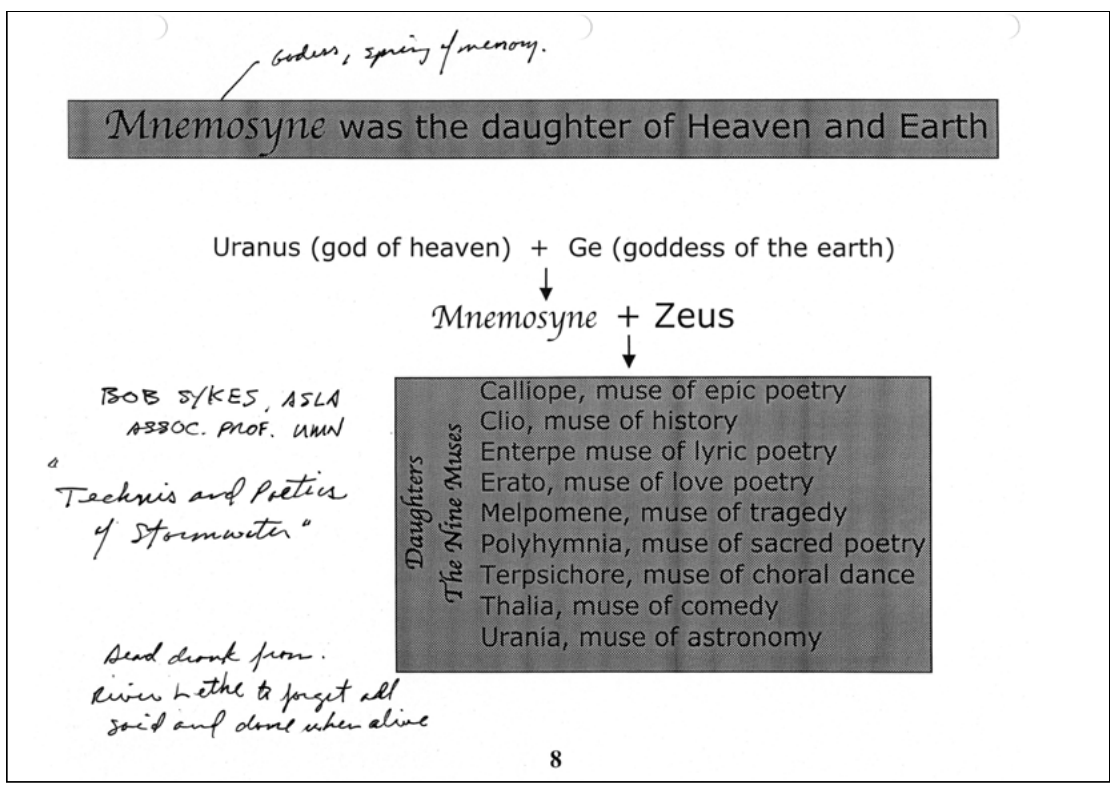


Fig. 25. CALA Workshop Information Sheet, ink on paper, 11 in. x 8.5 in., based on UMN Landscape Architecture Department study of 1999, used for workshop in 2002. Notes by John Roloff.

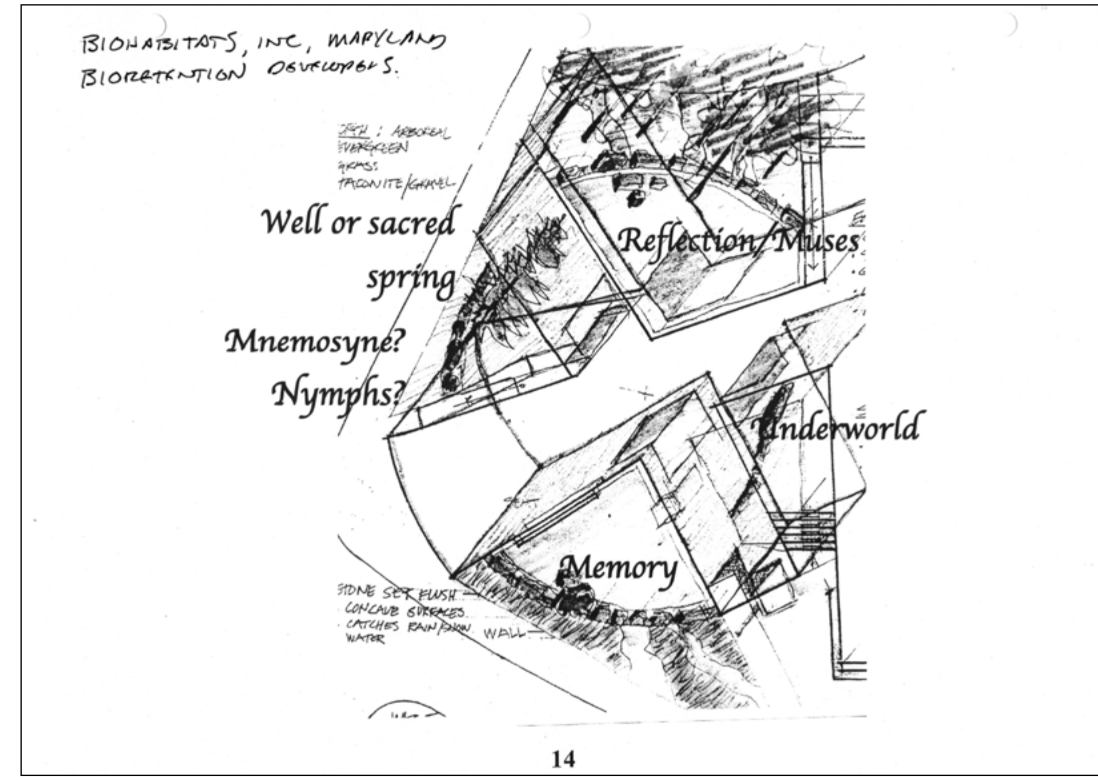


Fig. 26. CALA Workshop Information Sheet, ink on paper, 11 in. x 8.5 in., based on UMN Landscape Architecture Department study of 1999, used for workshop in 2002. Notes by John Roloff.

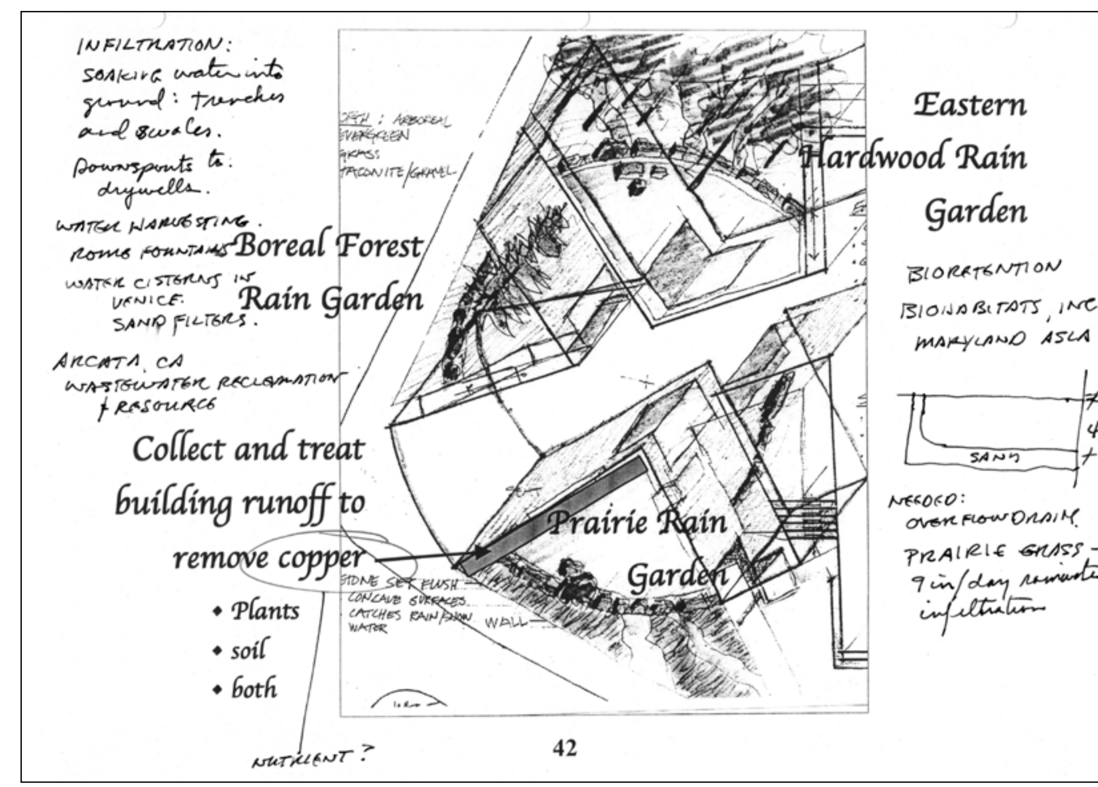


Fig. 27. CALA Workshop Information Sheet, ink on paper, 11 in. x 8.5 in., based on UMN Landscape Architecture Department study of 1999, used for workshop in 2002. Notes by John Roloff.

Fig. 28. Mississippi River and Quaternary -Paleozoic strata beneath the UMN campus.

DRAFT-Updated JUNE 13, 2003 by RK with input from JR, S D-B, SW

A Discussion of the Conceptual Site Design and Artworks for the College of Architecture and Landscape Architecture at the University of Minnesota

A Collaboration by: Rebecca Krinke, landscape architect and John Roloff, public artist

By Shelly Willis, UMN Public Art on Campus Coordinator

Site and Building
The site for the College of Architecture and Landscape Architecture (CALA) was once a primordial ocean and much later, land eroded by the glaciers. The site has been both underwater and frozen, thawed and remade. Tropical and tundra plants have existed on the site. More recently, before European settlement, the site was most probably an oak forest/oak savanna. The site may be described as occupying a prominent intersection on the Twin Cities campus, with the building's main entrance on Church Street, one of the campuses' main vehicular and pedestrian thoroughfares. In a much larger sense, the site can also been seen as extending infinitely into the atmosphere, and deep into the earth to its core. Both atmosphere and earth contain both water and air, and in section, the idea of where "the ground" is actually quite conceptual as air-water-soil-rock are interwoven and in constant flux. This permeability and malleability of the "site" is something the conceptual design explores on several levels. The design proposes that each courtyard work with the idea of the earth ("finish grade") differently. The West is a flat plane, the East contains a recessed space, the North contains a raised plane and the South is again recessed, but only occupiable visually. The conceptual design explores a different conceptual and physical expression of the three elements of "site": stone, water, and vegetation in each courtyard.

The original College of Architecture building, designed in the 1950's, was a cutting edge modernist work, square in form with a central interior courtyard. The recent addition by Steven Holl is its opposite: a cruciform building, characterized by the interpenetration of indoor and outdoor space. The strong masses, sharp edges and potent volumes of the architecture, with the juxtaposition of unusual materials: copper, glass (both transparent and translucent), and metal, along with the building's nighttime glow, create an exciting and confrontational architecture, befitting its role as a school for designers. The provocative nature and power of the new building was a force for the site design to respond to, enter a dialogue with, yet also provided the opportunity for the site design to raise its own questions.

Index (time, space, matter):
The site design explores different ways that the same three elements (stone, water, and vegetation) can be expressed conceptually and physically in each courtyard. This idea works with the site and the building (both materials and conceptual ideas) and the history of architecture and landscape architecture. The ways that the elements change and manifest differently in each courtyard reflects a strong understanding, questioning, and appreciation of the architecture and the site. The idea of the index is used to ask questions and reveal information about the materials and processes operating on the site. Indexing is central to both science and art and figures prominently in the life of a university.

Stone:
The deep history of the site revealed through geological research is referenced in the courtyards by the use of anorthositic gabbro from the Duluth Complex of Northern Minnesota from the same quarry (Cold Springs Quarry, near Lake County, MN) in different forms: slabs, remnants, or gravel. The gabbro slabs will be quarried as several contiguous large blocks. Three of these large "mother stones" will not be cut into smaller units. The location and timing of quarrying and cutting will be recorded by a Global Positioning System and other devices, and then inscribed into all the "mother stones" and cut slabs. Two of the "mother stones" will be located in the courtyards, while the third "mother stone" (the "Rosetta Stone") will be located in the CALA library. The "Rosetta Stone" will be inscribed with all the data to link together the information about the origins, locations, and temporal data of the granite used in the CALA courtyards.

Geological time and origins are indexed in two other ways in the artworks: a video projection units in the Lobby/Gallery space visualizes data from the aeromagnetic survey made of Minnesota bedrock geology, utilizing aeromagnetic anomaly mapping by the Minnesota Geologic Survey. This data reveals a Proterozoic (1.2 billion years before present) continental rift system buried several miles below Minneapolis that is linked geologically to the anorthositic gabbro used in the courtyard slabs and rock elements. The gabbro is a cooled remnant of a magma chamber that was feeding molten volcanic rock to the ancient rift system when it was active. The use of this system to conceptually drive the artwork echoes Steven Holl's design for the addition which inverts the interior facing and courtyard emphasized structure of the existing architecture building into an outward reaching and light filled appendage-like form. The rift system buried below suggests both an inversion of and a parallel to Holl's interest in the physics of light and its use in the building. The rift system is composed of extremely dense ultra-mafic rock and yet can only be known through its magnetic properties measured by aerial-borne instruments flown above the site.

Completing the geologic references to the CALA complex are geologic analyses of four different CALA building materials: copper, glass, reinforced concrete and brick that trace the materials globally back to their origin in the earth. The analysis of each material will be presented in the form of text panels etched into the actual materials being analyzed on the sides of the building; the size and scale of panels will strike a balance between consistent size and relevance to the scale of the materials as used architecturally. Materials to be analyzed will use many current geologic and geophysical technologies including: x-ray diffraction, spectrography, magnetic and GPS

Water:
Each courtyard will explore water in one or more manifestation. Water is essential to life on earth, and human beings are composed primarily of water. Human settlement is inextricably linked with water, and some of the earliest designed landscapes focused on wells, irrigation, and the symbolic expression of water as the source of life.

Rainwater, groundwater, and steam will be explicitly explored and indexed in the design, and snow will be a beautiful addition to the spaces. Groundwater at the CALA site is a constant 50 degrees, and provides a datum of temperature on the site that will vary more than a hundred degrees Fahrenheit. Groundwater and/or rainwater will be monitored on site. The visible system of steam geysers will be regulated and monitored.

Vegetation:
Indexing is central to working with plants: botanical classifications assemble and differentiate, and botanical gardens explore different ways of organizing, displaying, and studying plants. One courtyard explicitly explores the tensions that have existed for centuries between the ideas of introduced and native plants, by grouping/juxtaposing native and cultivars of the same species, while each courtyard will explore moss in different manifestations. (Note: The moss may be Irish Moss, which is not a true moss, or may be another similar "primordial material".) The moss will register microclimates- doing well in wetter, shadier places, and not found in sunny spots. It will be either be the featured plant or an opportunistic plant, allowing visitors to see plants as both aesthetic features and as an organic system constantly in flux.

The CALA landscape as a whole is being re-envisioned in this design as a setting with only a small intentional lawn panel. Planting the ground plane with a richer palette of vegetation will give CALA a unique identity on campus and a setting befitting a College of Architecture and Landscape Architecture – stimulating the senses as well as the intellect.

Four courtyards, three elements
Each of the four courtyards has different visual and spatial qualities, and different uses and microclimates. The West and East Courtyards were designed by Steven Holl as linked spaces, both visually and functionally – they are the social spaces that flow most readily from indoors to outdoors. The West and East Courtyards will each contain the gabbro "mother stones" described previously, as well as cut slabs of the same rock, although the material will be cut differently in each courtyard. Each "mother stone" will be visible from the Gallery/Lobby space. These two courtyards are also planned to have a relationship with strong

(but different) geometries of deciduous trees. The North and South courtyards have different expressions, but both are seen as primarily contemplative spaces. The following is a more detailed discussion of each courtyard:

The West Courtyard is the entrance courtyard, containing the main entrance into the new building from Church Street. It is a space that operates on several levels as both a social and symbolic setting. It is composed of two major elements – a stair/terrace of granite slabs and a grove of deciduous trees. The "mother stone" here has been cored to allow groundwater to bubble to the surface through it. Approximately twenty slabs of the gabbro at four inches thick by six feet by 8. 5 feet make up the stair/terrace that links indoors and outdoors, while also challenging and extending our usual understanding of what a "stair" or "terrace" looks like. It also has its own form order- one that does not relate orthogonally to the building - but rather has its' own strong expression, one that relates more to geologic or chemical processes.

The grove of trees is planted in a tight grid, becoming both a compelling, sculptural "object" as well as a compelling space to be near and traverse. The trees will cast dramatic patterns of light and shadow, provide the beauty of fall color and spring bud, and be lit provocatively at night. The quantity and spacing of the trees is designed to "wake the visitor up" to nature, and to the presence of trees, which are more generally seen as a green backdrop. Trees are potent both symbolically and actually as a key to life. Groves were among the first symbolic and productive landscapes.

The East Courtyard contains the other "mother stone" and also uses cut gabbro slabs, although these are more columnar in form. These stones may be used as places to sit. The "mother stone" is located in the lawn panel near the intersection of two lines of deciduous larch species trees. Each line of trees works with the architecture, located on the center-line of the voids between windows. The lines of trees are designed to explore one deciduous species- through both the native and cultivar forms – allowing visitors and students the opportunity to read the index and make their own comparisons and conclusions. One of these lines of trees extends back to the knoll space at the east entrance to the original building, strongly uniting the two eras of architecture and landscape. A feature of this courtyard is a recessed space that excavates eight feet below grade to expose the top of the "crane pad". This ten foot by ten foot concrete block was built to hold the crane that was necessary in the building process. Bringing this block to the viewer's attention underscores the process and materials of construction A glass "roof", the size of one of the windows on the west elevation, is used to allow visitors to safely view into the space. Light, snow, and rainwater will interact differently at different times of day and seasons both with this space and with the black gabbro slabs, some located in the sun, some in the shade. A square of lawn - the same size as the grid of trees in the West Courtyard – creates an informal social setting, and a meditation on cultural values of sustainability and beauty.

The architectural volume that creates the North Courtyard is quite inspiring- the building beautifully edges the sky and the copper walls create a deep V- shaped void. The space is small and in shade most of the time, but a staircase lines the side and the entrance is well used. A dramatic triangular, tilted plane of moss and gabbro chunks is planned as a landscape expression equally powerful, yet complementary with the architecture. The moss and rock garden would be a mixture of mosses and low growing ground covers contained by a low wall, built of gabion structures. Gabions are essentially metal cages for rocks, used to create walls. In this courtyard, the gabions are filled with the same gabbro as the other courtyards and moss garden, remnants from the cutting process in the quarry. The gabions containing these chunks of stone also enter into a dialogue with the more precisely cut stone of dimensional building material and the various other stones that humans can make and the stones that humans cannot make. The gabion wall is its own structure, independent of the architecture; it is proposed that the low portion along the sidewalk be a sitting wall. Water is explored in this courtyard via steam. The primordial spell that the moss garden casts is enhanced by the steam that rises from it. The steam is planned to be on a timer - not operating continuously - and when the steam plumes rise, the campus landscape will acquire a powerful landscape event. The steam vents are arranged to work with the window-void layout of the building and create compelling, ephemeral lines of white against the copper walls. The steam heightens one's sense of temperature, wind, light, season, etc. as it will vary quite intensely depending on atmospheric conditions.

The South Courtyard is a floor below grade and inaccessible to visitors except through sight – from both inside and outside the building. Here the stone is explored in two ways, through gabbro as the gravel ground plane and as the transformation of granite to silica, and silica to glass. Five cast glass sculptures (in the shape of trapezoids, inspired by the reflections off the windows) contain shallow depressions to catch light and shadow and rain. The number five relates to the number of windows in the main portion of the courtyard, and their position works with the window layout. Moss will be strategically planted to explore microclimatic differences.

The History of Landscape Architecture
The courtyards reference elements from the history of landscape architecture, particularly expressions of planted form.

The West Courtyard contains a deciduous grove of trees, or more precisely a bosque, defined as a small geometric woodland, generally implying the same species of trees planted equidistantly in a grid. According to landscape historian Christopher Thacker, groves found in nature were one of the first gardens, and were an archetype drawn upon to create the first symbolic and productive landscapes. It is also fitting that a grove stands at the entrance to CALA, recalling the groves at the academies of Ancient Greece.

The East Courtyard features a tapis vert, a swath of lawn usually rectilinear in shape, used to strengthen a visual axis or focus attention on an object. The rows of natives and cultivars make a reference the tradition of botanical gardens, where plants were grouped and planted in rows or other geometric order for ease of classification and study.

The North Courtyard contains a raised bed, a device found in gardens since the Middle Ages. This initially facilitated the tending of the plants, and has evolved into a device to allow different views of plants and a place (the edging or wall) that allows the visitor to sit closer to the plants.

In the South Courtyard are five cast glass basins to catch both light and rainwater. These objects recall the intertwined history of sculpture and water features in the designed landscape.

Coda (Vision)
The conceptual site design for the College of Architecture and Landscape Architecture references ideas and asks questions about landscape architecture/art/architecture/ecology and rewards the most prevalent visitor- the student of landscape architecture and architecture - with a beautiful and provocative landscape to stimulate their thinking and facilitate their dreaming.

REBECCA KRINKE
Rebecca Krinke is an Assistant Professor of Landscape Architecture at the University of Minnesota, where she teaches studios, technology courses, and seminars on contemporary landscape architecture. Prior to joining the Minnesota faculty, she taught studios at Harvard Design School, Rhode Island School of Design, and the Boston Architectural Center. Degrees in art (sculpture) and landscape architecture have provided the framework for her research and practice which has a focus on contemplative and commemorative space. A contemplative space she designed for the Minnesota Landscape Arboretum, Forest Transformation, has just been built. It is composed of a bench/room and a copper clad wall that catches light and shadows, inviting visitors to pause and see the forest in a new way. The Great Island Memorial Garden, in collaboration with architect Randall Imai, was constructed in Massachusetts in 1999. Krinke organized and participated in a ground breaking symposium: "Contemporary Landscapes of Contemplation" which was held at the University in October 2002. She has given invited lectures on her work at Harvard Design School, MIT, Rhode Island School of Design, Savannah College of Art and Design, the University of Florida, and Virginia Tech, among others. Her publications include essays on The Lightning Field, the Oklahoma Memorial, and articles on the design of the contemporary, post-industrial landscape. She has twice won Landscape Architecture magazine's "Visionary Landscapes" competition and has served as a juror for this event.

JOHN ROLOFF
John Roloff's work generally falls into two site-related categories: large-scale environmental projects and large-scale photographic images installed in an architectural context. Roloff consistently works with themes related to ecology, geology, climactic phenomena, processes and history of the site's region or specific locality. He is probably best known for his site-collaborative ceramic installations in which large, hollow, refractory cement sculptures are fired at night outdoors using propane gas. This results in artifacts analogous to those made by naturally occurring event. Roloff grew up on the Oregon coast and attended the University of California at Davis, with the idea of becoming a marine geologist, but ultimately turning his attention towards making art. His work has been included in exhibitions at the Whitney (1975) and the Smithsonian (1989). He was the recipient of a Guggenheim Fellowship in 1983, a Fellowship award from the California Arts Council (1990), and three Fellowship awards from the National Endowment for the Arts (1977), (1980), (1986). His work has been reviewed in the San Francisco Chronicle, Artforum, New York Times and Art in America, among others. Since 1974, Roloff has done more than 85 lectures, panels, and visiting artists positions. He has taught at numerous Collages and Universities from 1973-2003, and is currently a full-time professor at the San Francisco Art Institute.

About the University of Minnesota Public Art on Campus Program
The University of Minnesota established its Public Art on Campus Program in 1988, five years after Minnesota lawmakers declared that one percent of constructions costs for any state-funded building go toward the acquisition of artwork. The Public Art on Campus Program is managed by a committee of artists and professionals, architects, planners, landscape architects and engineers, chaired by the Weisman Art Museum's director, Lyndel King. They collaborate in each selection process with a committee composed of people who use the building where the artwork will be located. The public art budget was used for the design, fabrication and installation of the CALA public art and garden project.

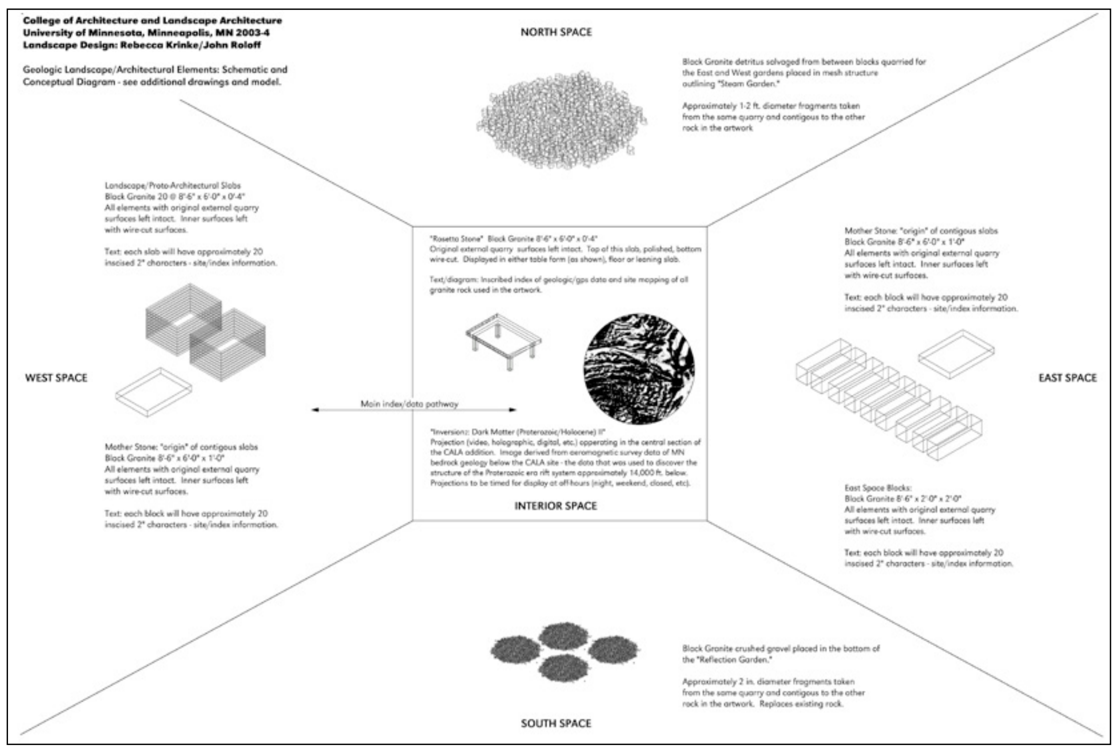


Fig. 29. Geologic Landscape/Architectural Elements: Schematic and Conceptual Diagram, concepts: Krinke/Roloff, graphics: Roloff, inkjet print on bond, 24 in. x 23 in., 2003-4.

Site Index

Collaboration with John Roloff, public artist / Rebecca Krinke's website
Client: University of Minnesota / http://www.rebeccakrinke.com/Projects/Site-Index

The recent addition to Rapson Hall by Steven Holl Architects created four new outdoor spaces – the locations of the Site Index project. The design for these four gardens, all very different from each other spatially, are linked materially. They all feature stone (the same stone, Mesabi Black Granite), water, and vegetation in different manifestations. The idea of the index is used to ask questions and reveal information about the materials and processes operating on the site. Only the West Garden has been constructed; the remaining three will be built when funding becomes available.

Research into the site revealed that deep underneath Rapson Hall, a rift system connects it to northern Minnesota – including the Mesabi black granite quarry. A trip to this quarry resulted in the selection of two quarry blocks used, and to be used, in this project. The West and East Gardens each use one block, cut into different shapes. The North and South Gardens use (respectively) remnants and crushed Mesabi Black.

The form order expressed by the arrangement of the slabs in the West Garden alludes to an organic process rather than a form order relating to the building or a pattern of human habitation. The slabs function as an unconventional set of stairs or "stair-terrace" for the building and to the side garden door. The West Garden's "Mother Stone" is a slab twice the thickness of the others on site, and a shallow depression was carved into it to collect rainwater.

The location of the granite was recorded by GPS, and inscribed into the slabs. Visitors read these coordinates and many are able to deduce that the location is north of where they are on site. This may lead to musings on the origin of the stone, the quarrying, and the construction process. Or it may be a complete mystery to passerby, which we also saw as an interesting result.

Another future aspect of this project involves the "Rosetta Stone" (a slab of granite the same as those in the West Garden) inscribed with all the data to link together the information about the origins, locations, and temporal data of the granite used in the courtyards. The intention is that the "Rosetta Stone" will be placed in the Rapson Library.

A grid of 18 trees provides vertical counterpoint, seasonal change, shade, and refers to ideas of human habitation such as groves or plantations. The trees are unusual - a hybrid of swamp white oak and English oak. They attract a lot of attention due to being an uncommon species and being planted closely together. Together these qualities provide for a unique experience on campus of walking through a grove as well as being able to admire the grove from afar as a kind of living sculpture. The ground covers are still knitting into place and increasingly provide a low textural mat, staying low enough to allow the stacked edges of the slabs to read. A "floor" of ground cover is very unusual in the sea of lawn that is campus.

There is a strong relationship between the building and the four garden spaces, especially between the West Garden and the main entrance, the lobby and exhibition space, and the relationship from the library on the second floor. The West and East Garden spaces are also linked through the center of the lobby, where one can see both gardens almost in their entirety.

Site Index: Rapson Hall Gardens highlights a very successful collaboration with the artist John Roloff. John's expertise in geology provided a line of investigation that had a deep impact on the project, while my interest in creating contemplative space of a quality I call the "urban primordial" was accomplished in this project. My research into the grove as an archetype of contemplative space was key to this project's final form as well as my ongoing interest in working with ephemeral materials and effects, exemplified by the "Mother Stone" being carved to collect rainwater.

Rapson Hall West Garden is a powerful example of a contemplative space for the 21st century, an "urban primordial" place that engages one physically and conceptually.

Fig. 30. SITE INDEX: Rebecca Krinke/John Roloff, exhibition view, research and site studies, material and planting samples, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

Fig. 31. Rebecca Krinke and Shelly Willis with research and site studies, inkjet print on paper, *SITE INDEX: Rebecca Krinke/John Roloff*, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004

Fig. 32. Research and site studies, material and planting samples, *SITE INDEX: Rebecca Krinke/John Roloff*, exhibition view, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

Fig. 33. SITE INDEX: Rebecca Krinke/John Roloff, exhibition view, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

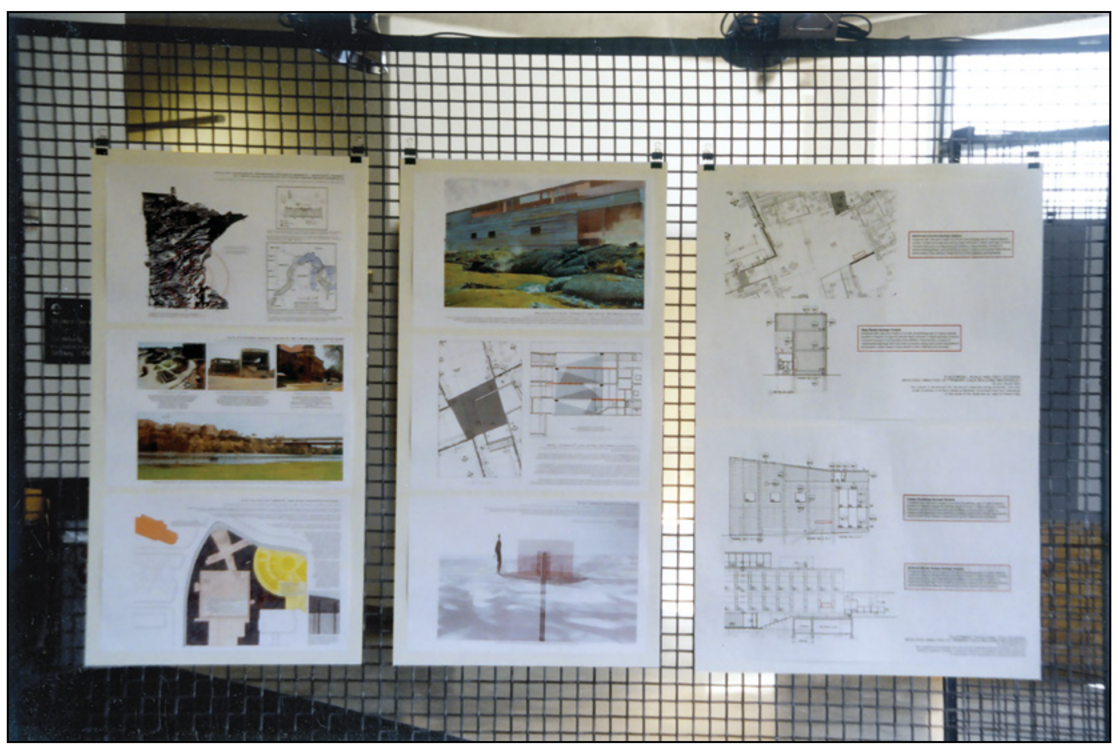


Fig. 34. Research and site studies, inkjet print on paper, *SITE INDEX: Rebecca Krinke/John Roloff*, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

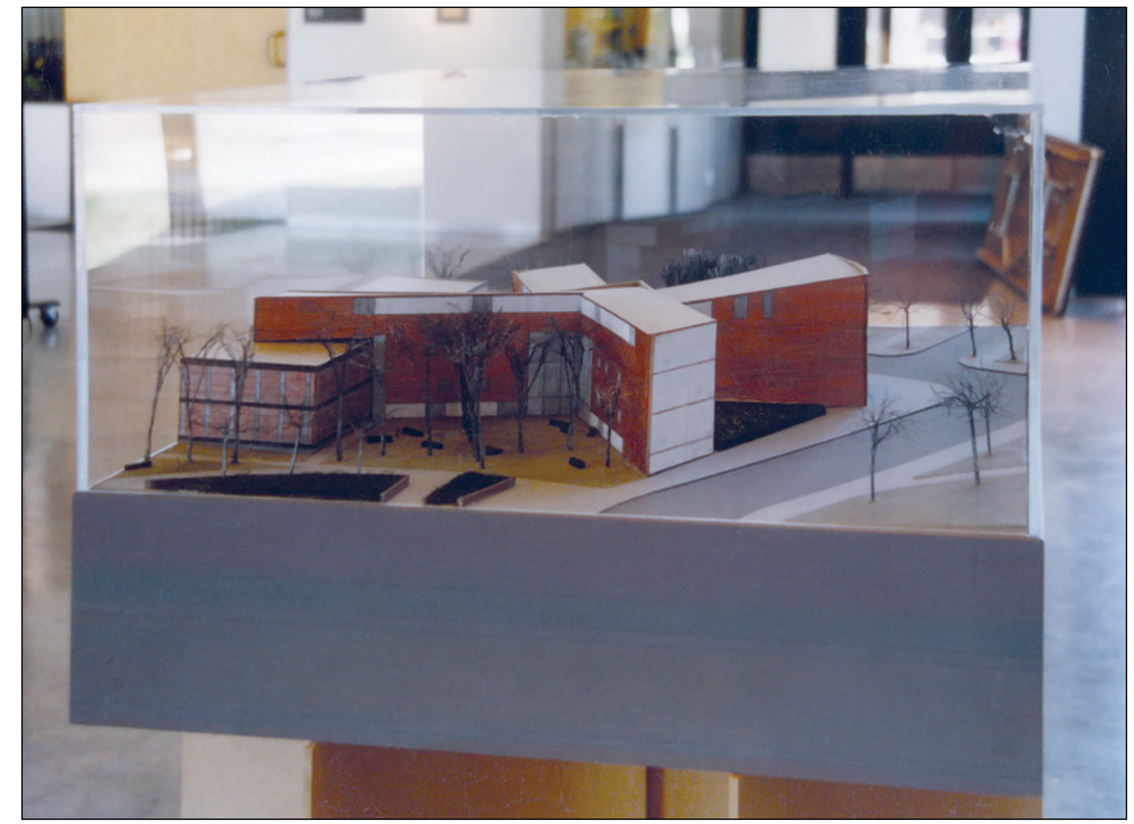


Fig. 35. Model showing Holl annex to Rapson Hall and landscape areas created by that relationship, *SITE INDEX: Rebecca Krinke/John Roloff*, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

Fig. 36. Material and planting samples, *SITE INDEX: Rebecca Krinke/John Roloff*, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

Fig. 37. Research and site studies, *SITE INDEX: Rebecca Krinke/John Roloff*, exhibition view, foyer gallery, Rapson Hall, CALA, University of Minnesota, Minneapolis, MN, 2004.

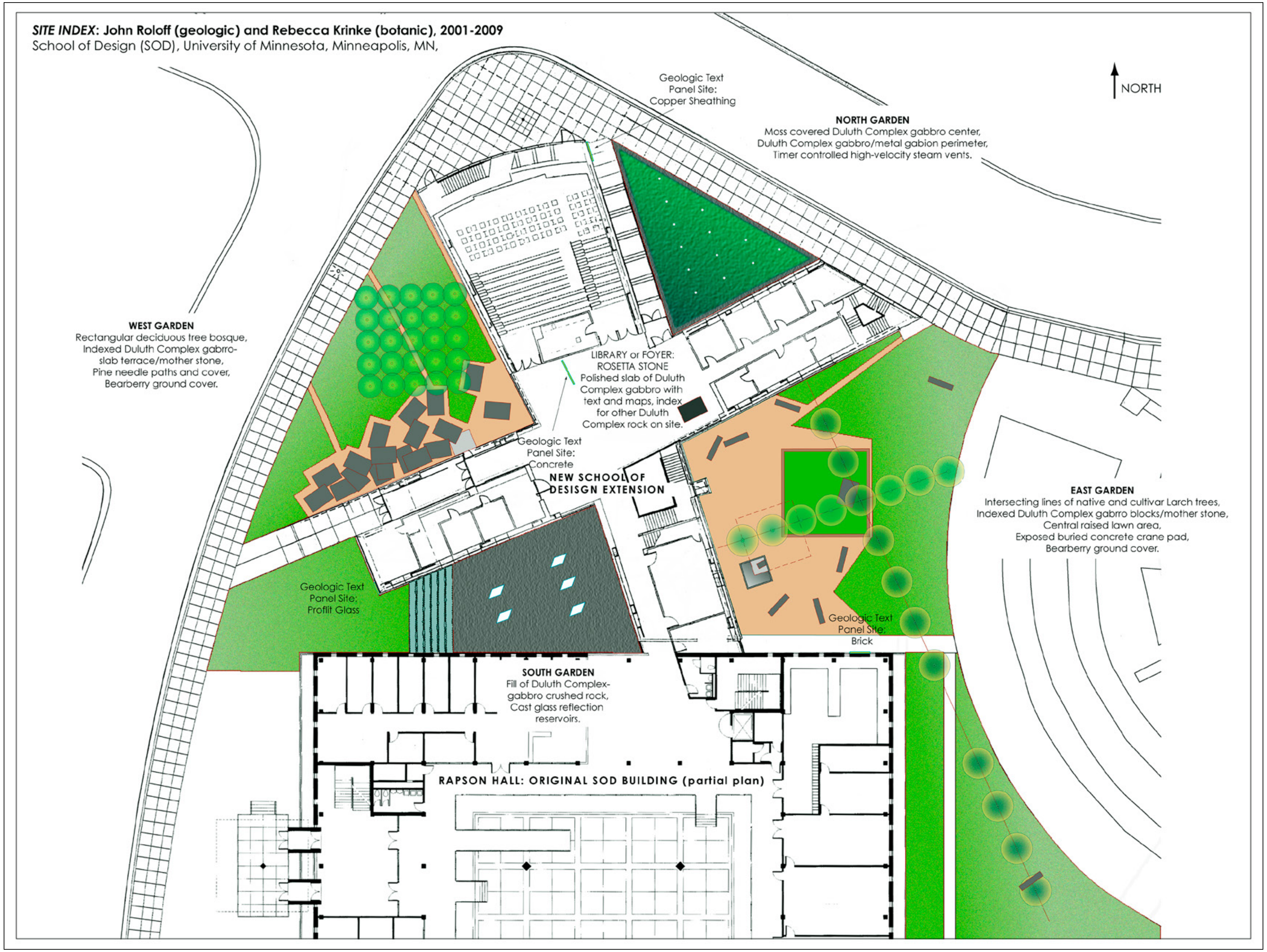
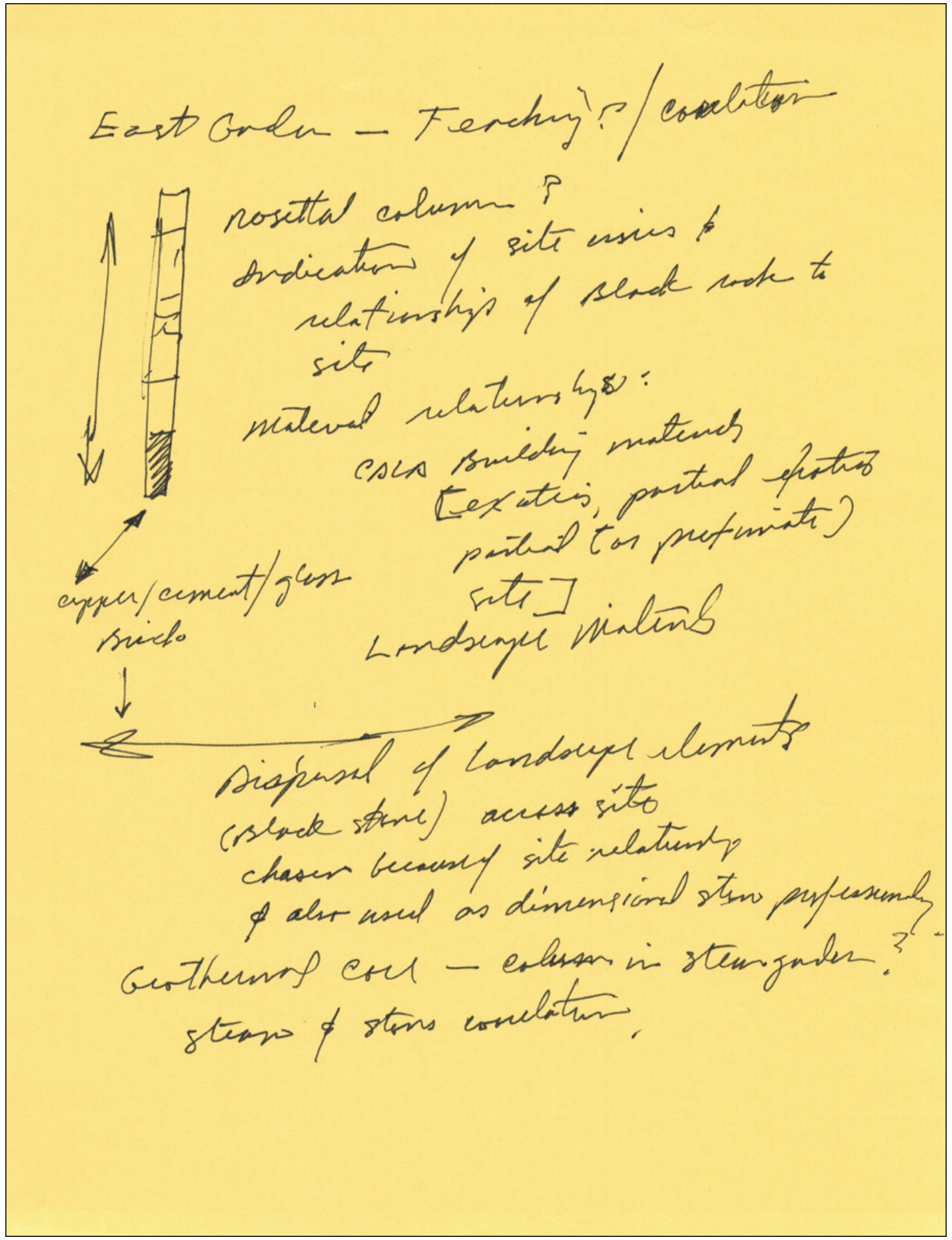


Fig. 38. SITE INDEX: John Roloff (geologic), Rebecca Krinke (botanic), 2001-09, inkjet on paper, size variable. Conceptual design for the West, North, East and South gardens created by the Holl Annex to Rapson Hall. Computer graphic by John Roloff on architectural site plan by Steven Holl Architects.



East Garden — Fencing?/correlation

rosettal column?
indication of site usess & relationships of black rock to site

material relationships:
CSCA building materials
[existing, partial photos
partial (or preferrably)
site]
Landscape Materials

copper/cement/glass
bricks

disposal of landscape elements
(black stone) across site
chosen because of site relationship
& also used as dimensional stone professionally

Geothermal cell — column in steam garden?
steam & stone correlation.

Fig. 39. Concept Notes, loose notebook page, pen on paper, 11 in x 8.5 in, 2001-03.

SITE INDEX: West Garden

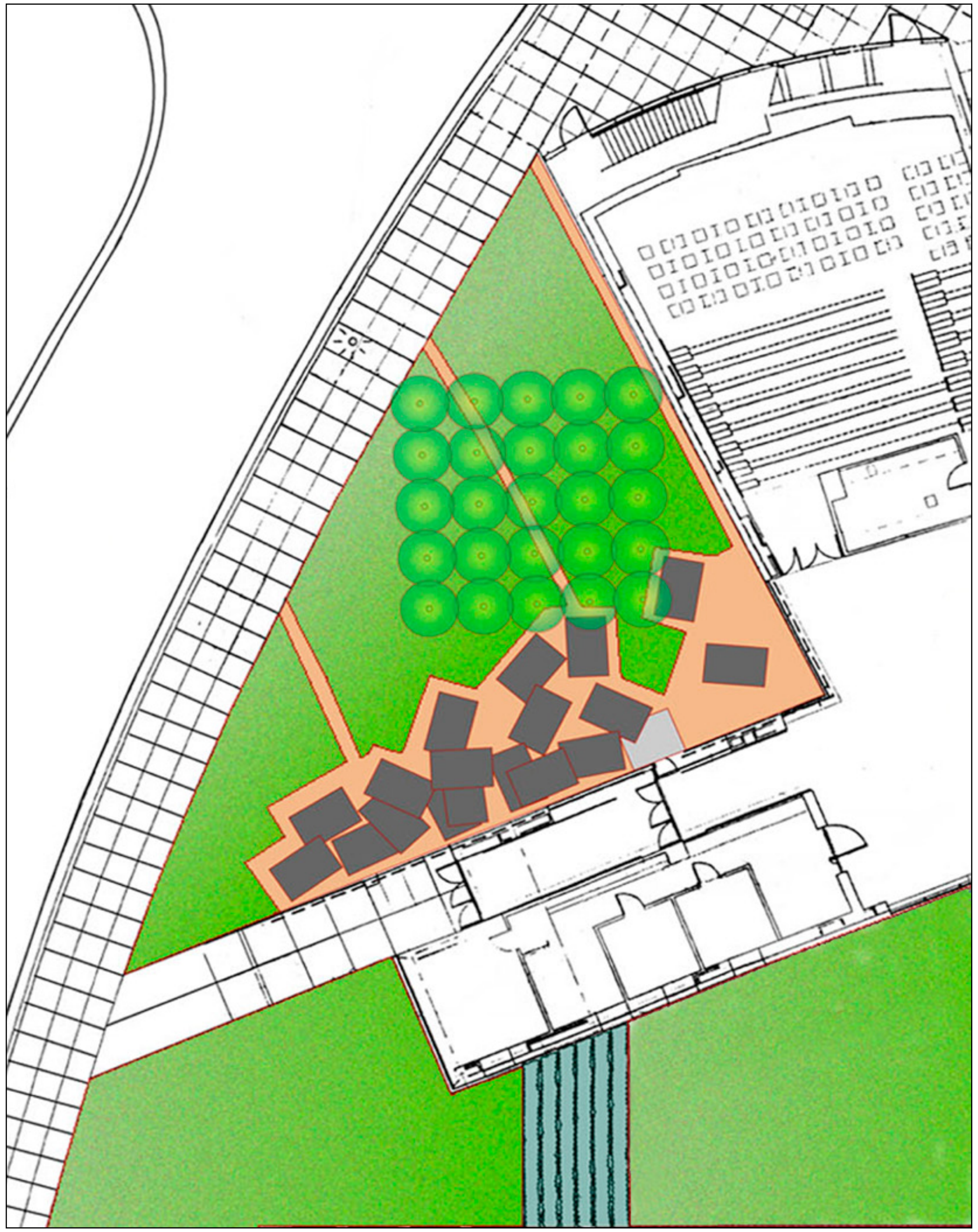


Fig. 40. West Garden, Rapson Hall, study for proposed, *Site Index*, installation of anorthositic gabbro elements bosque of MN oak trees. Computer graphic by John Roloff on architectural site plan by Steven Holl Architects, circa, 2004.

Fig. 41. West Garden, Rapson Hall, study for elements of proposed, *Site Index*, installation of anorthositic gabbro slabs, John Roloff, computer graphic, 2004.

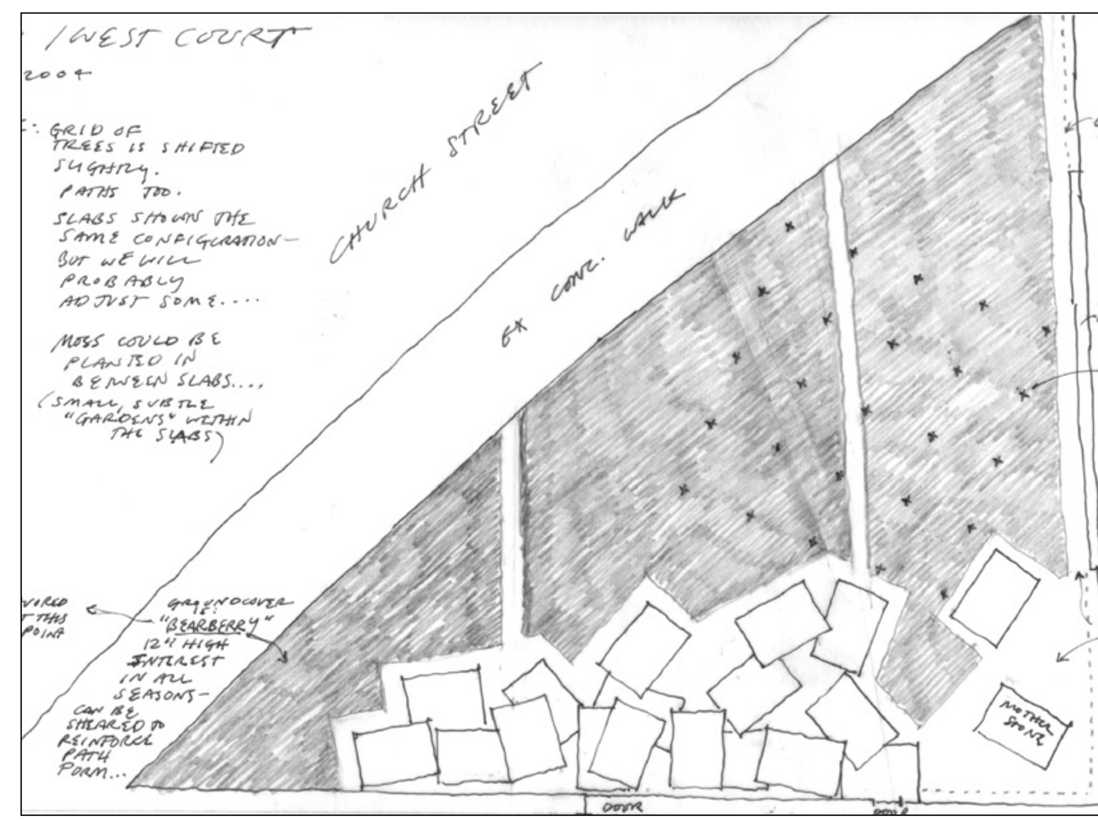


Fig. 42. West Garden, Rapson Hall, study for elements of proposed, *Site Index*, installation of anorthositic gabbro slabs and landscape elements, Rebecca Krinke, detail, pencil sketch, 2004.

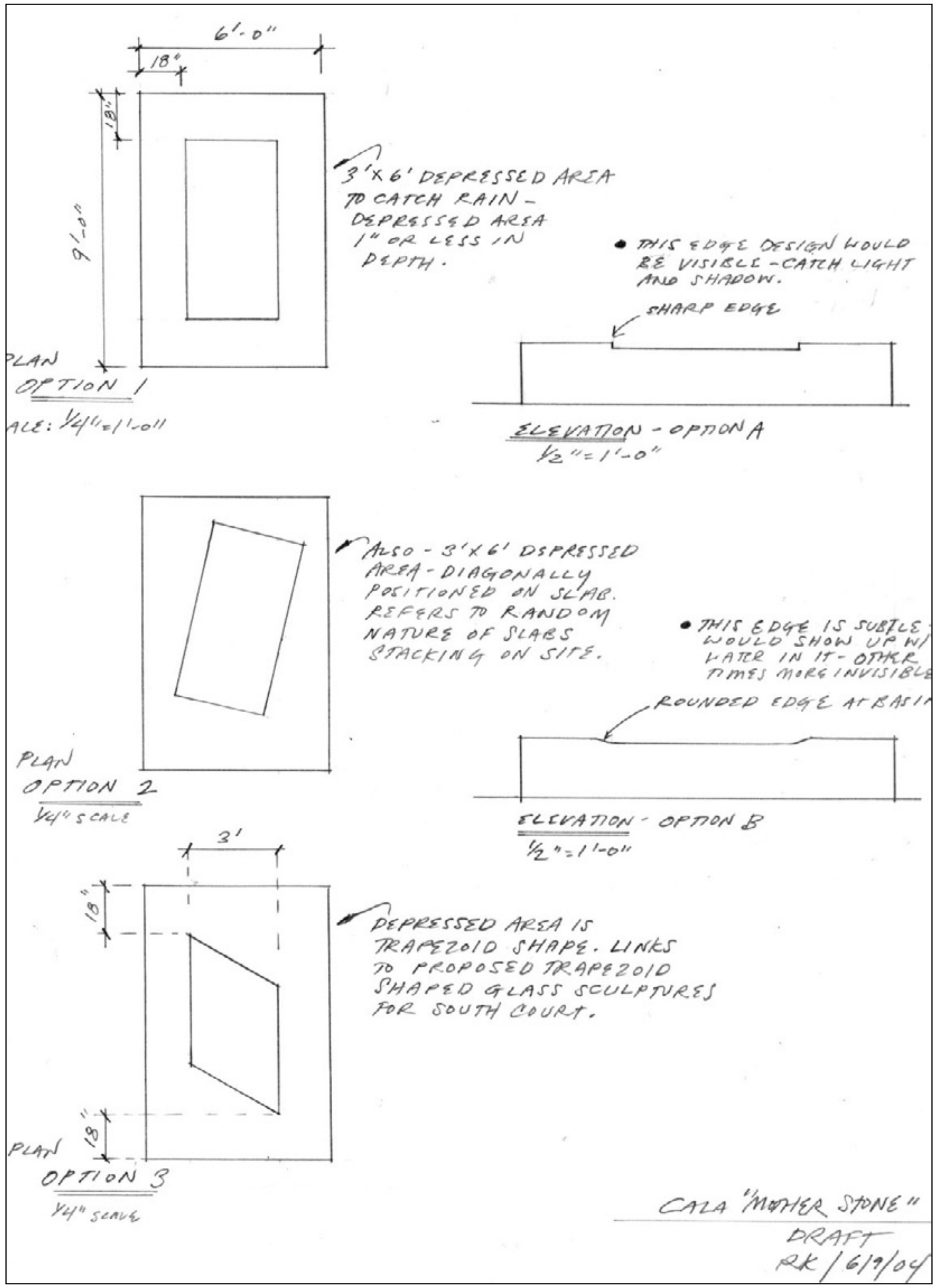


Fig. 43. West Garden, Rapson Hall, study for *Site Index*, "mother stone," anorthositic gabbro block, Rebecca Krinke, pencil sketch, 2004.

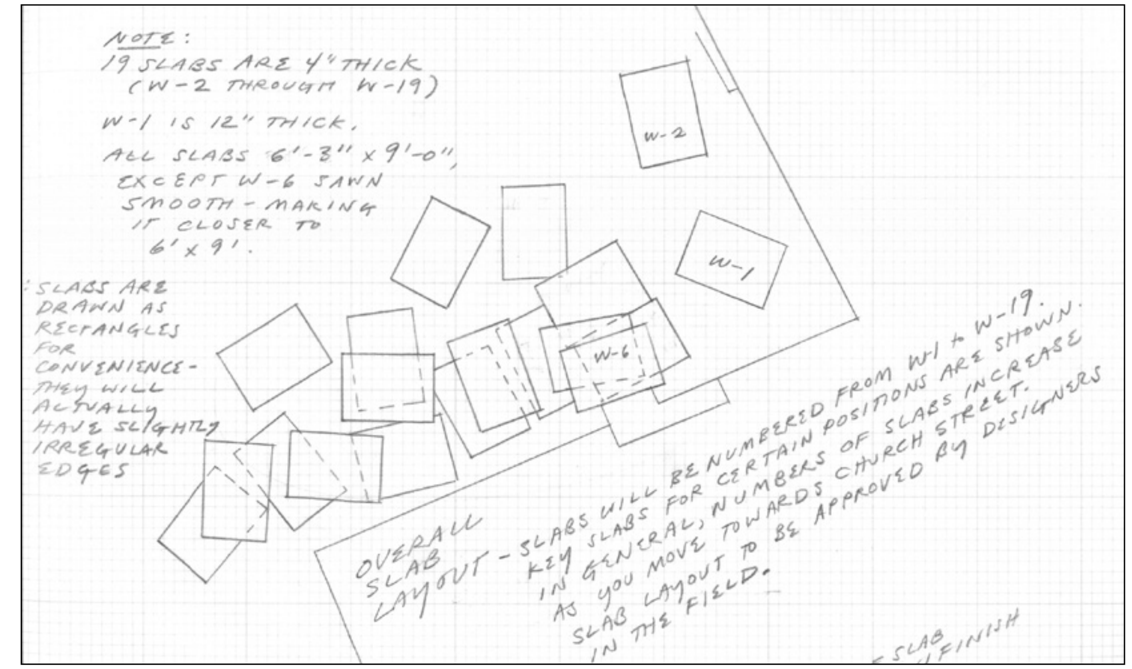


Fig. 44. West Garden, Rapson Hall, study for *Site Index*, placement of anorthositic gabbro slabs, Rebecca Krinke, pencil sketch, 2004.

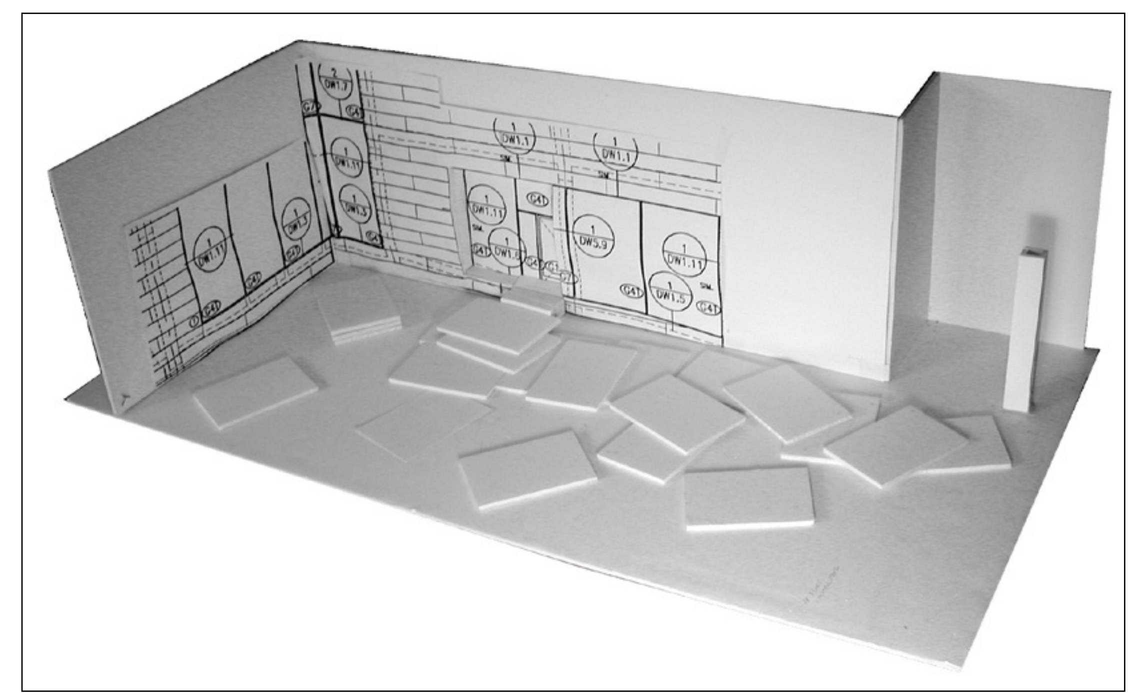


Fig. 45. West Garden, Rapson Hall, study for *Site Index*, placement of anorthositic gabbro slabs, Rebecca Krinke, foam core model, 2004.

Fig. 46. Panorama of the Mesabi Black quarry, Lake County, MN, May, 2004. The extraction site of the blocks for SITE INDEX are in the middle distance against the back wall, center.

Geologic description of Mesabi Black

From an e-mail exchange with Dr. Paul Weiblen, Professor Emeritus, UMN Geology Department

Mesabi Black is one of the varieties of coarse-grained (>2mm) igneous rocks that formed in magma chambers in the rift. These chambers formed at different depths >1-2 km deep in the rift. They were the source for the surface lava's. Feeders from the magma chambers to the lava's are called dikes when near vertical and sills when near horizontal. As magmas cooled in the deep chambers a variety of minerals crystallized and formed layers due to settling or flow giving rise to "layered gabbros". Because the Keweenawan rocks along the North Shore are tilted to the east, erosion has exposed a cross section of this system of rocks with lavas along the shore of Lake Superior and the underlying intrusive feeders and magma chambers away from the shore (the feeders are also found along the shore, Silver Cliff is an example).

The exposed section also includes sandstones that formed in shallow basins as rifting began, sandstones interbedded with the lava's which represent lulls in the volcanism during which sediments derived from the lava's were deposited, and sandstones which filled in the rift after volcanism ended. The brown and buff colored sandstones used for Pillsbury Hall across from CALA are an example of the latter.

Separation of different minerals during settling and flow in the magma chambers gave rise to a variety of igneous rocks including: anorthosites with >90% plagioclase and minor olivine, pyroxene, and iron-titanium oxides (mafic minerals), anorthositic gabbros with > 75% plagioclase and pyroxene dominated mafic minerals (Mesabi Black), troctolite with < 75% plagioclase and olivine dominated mafic minerals, gabbros with < 75% plagioclase and pyroxene dominated mafic minerals.

The anorthositic gabbro from Mesabi Black Quarry is related to the Proterozoic rift system that extends beneath the College of Design site at the University of Minnesota (see fig. 6, Middle Proterozoic: About 3 km Mid Proterozoic volcanic rock (9800 feet)). This relationship is the primary reason this rock was selected for use in *SITE INDEX*. Mesabi Black is the Cold Springs Granite's commercial name for the anorthositic gabbro quarried at this site.)

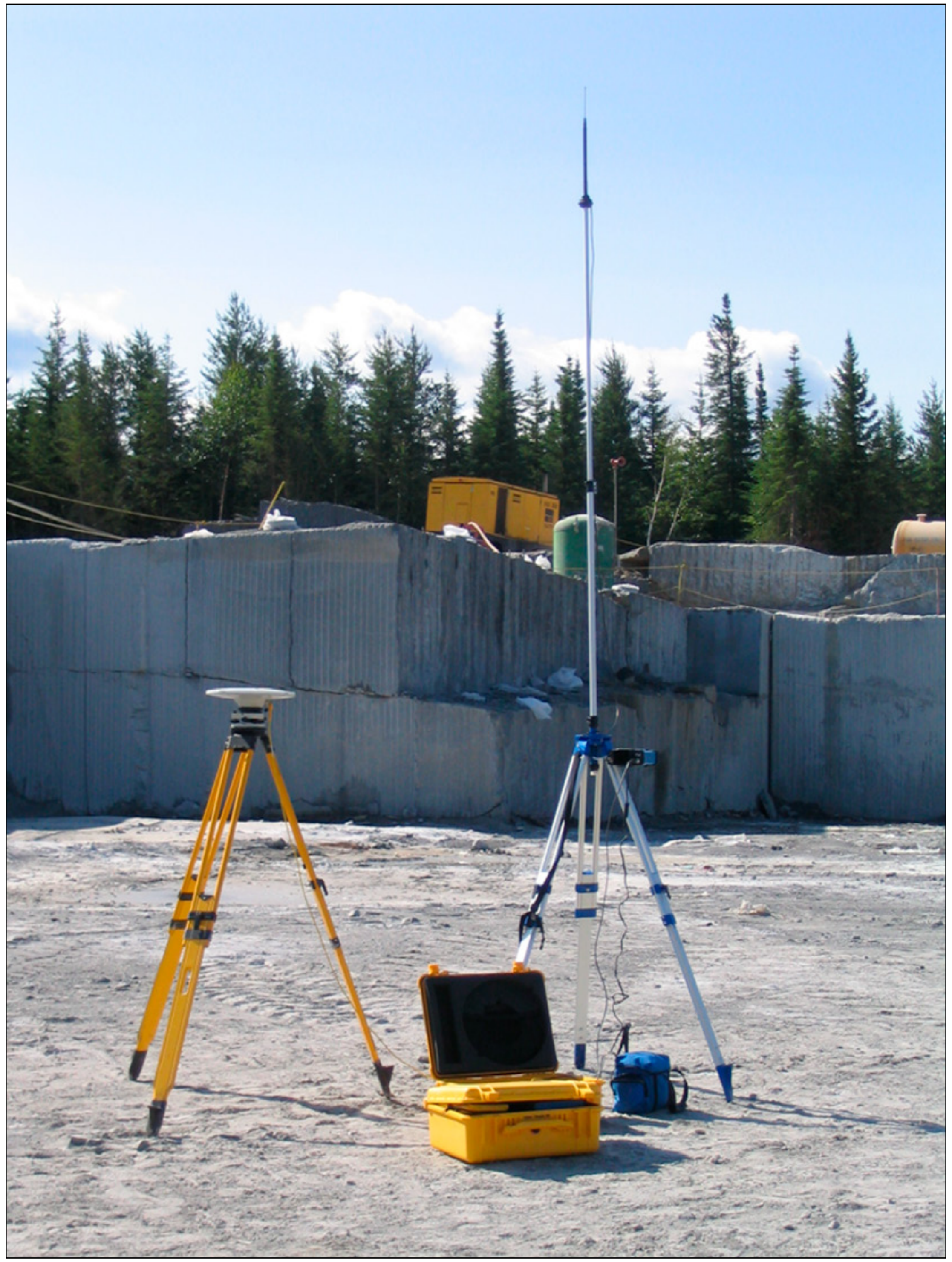


Fig 47. Instruments used for 6-Satellite GPS survey by Bear Island Surveying, Ely, MN, for Latitude, Longitude and Altitude of each slab or block to be installed as part of *SITE INDEX*, in the East and West Gardens and Rosetta Stone. Mesabi Black Quarry, Lake County, MN, May, 2004. Measurements were used to construct the Quarry Block Diagram and determine an accurate quarry site position to be etched into each block for *SITE INDEX*.

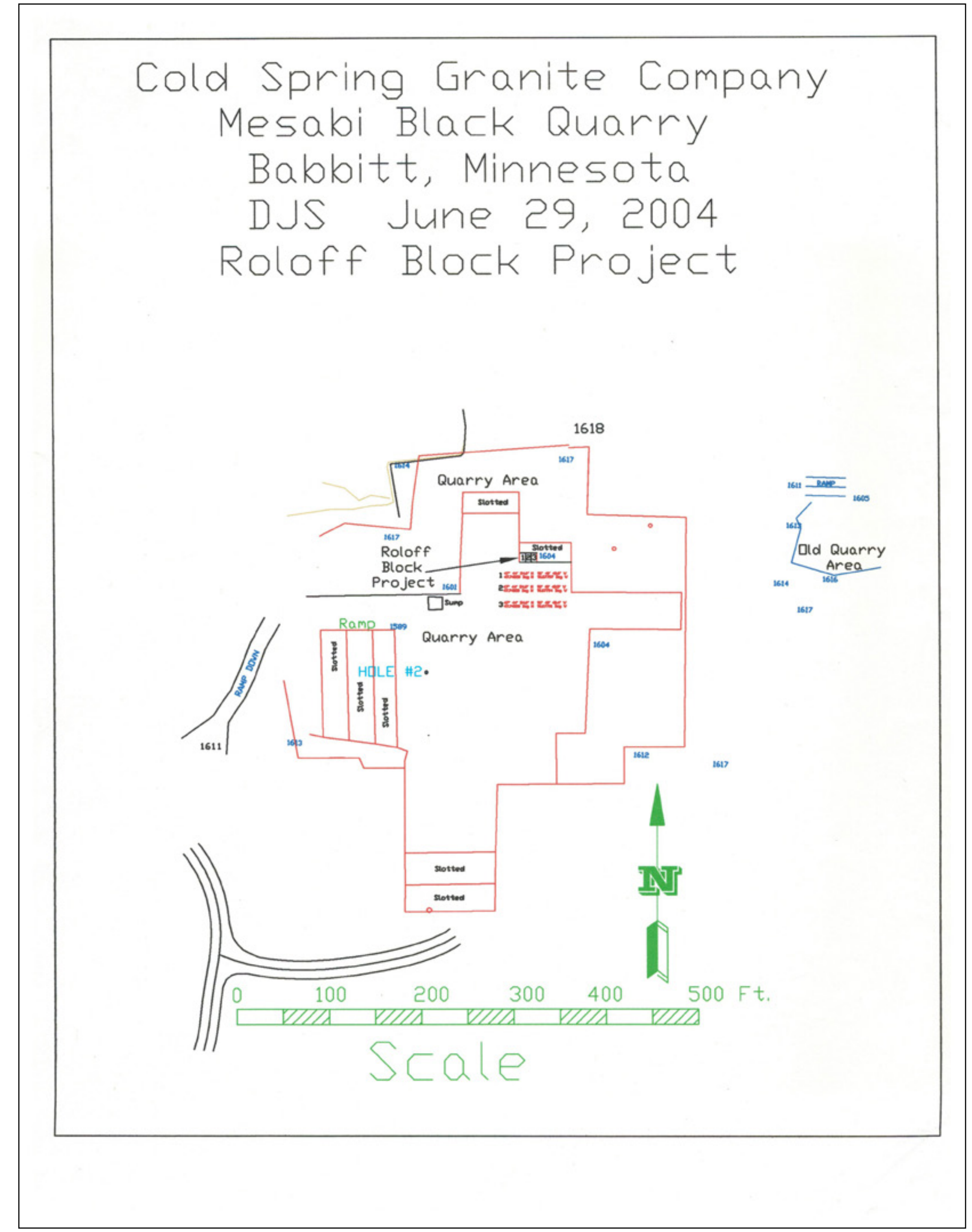


Fig. 48. Roloff Block Project, sketch by Cold Springs Granite staff, giving approximate location of gabbro blocks to be used for *SITE INDEX*, Rapson Hall gardens. Mesabi Black Quarry, Lake County, MN, 2004.

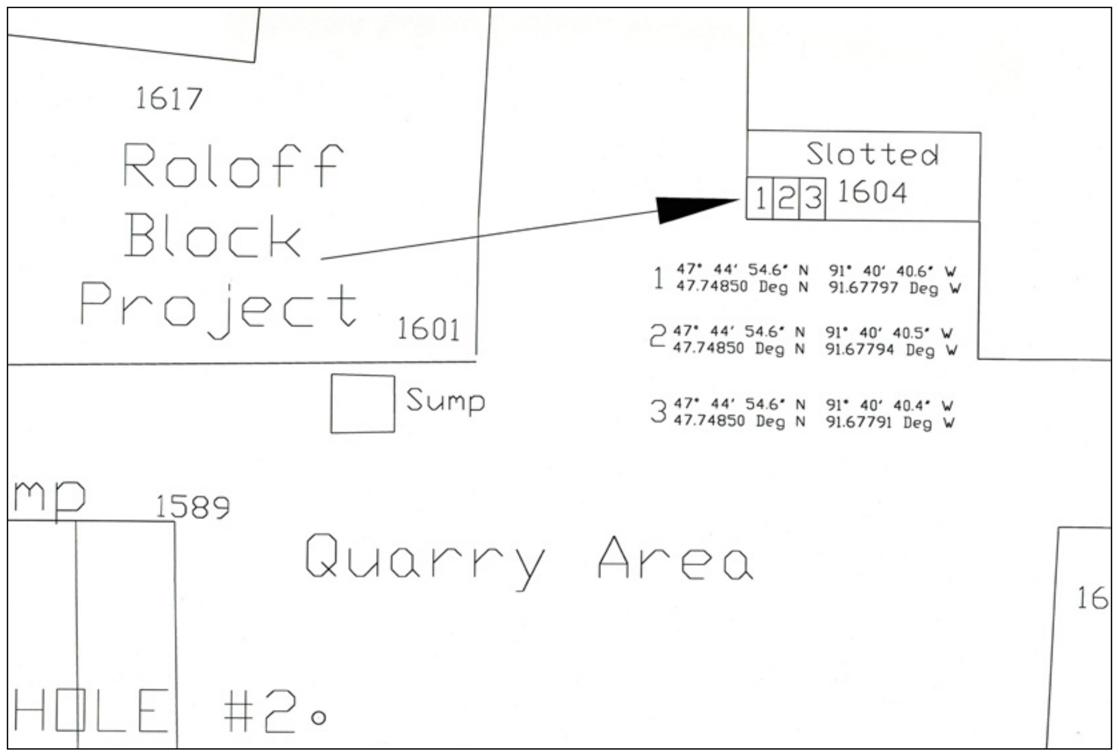


Fig. 49. Roloff Block Project, sketch by Cold Springs Granite based upon Bear Island Survey data, giving GPS location of gabbro blocks to be used for *SITE INDEX*, Rapson Hall gardens. Mesabi Black Quarry, Lake County, MN, 2004.

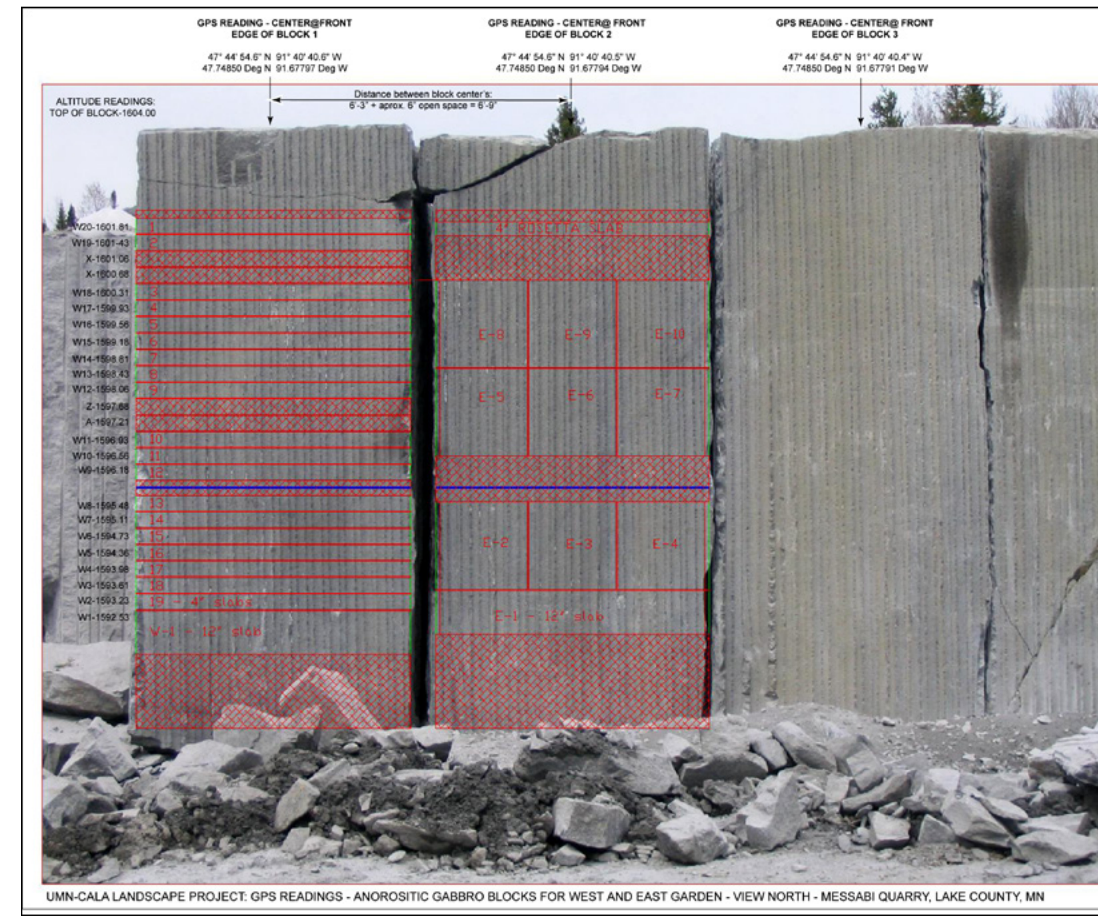


Fig. 50. Cutting diagram based on the GPS altitude, longitude and latitude readings for slabs of anorthositic gabbro to be used for the West Garden (Block I/W1-20), and East Garden and Rosetta Stone (Block 2/Rosetta and E1-10).

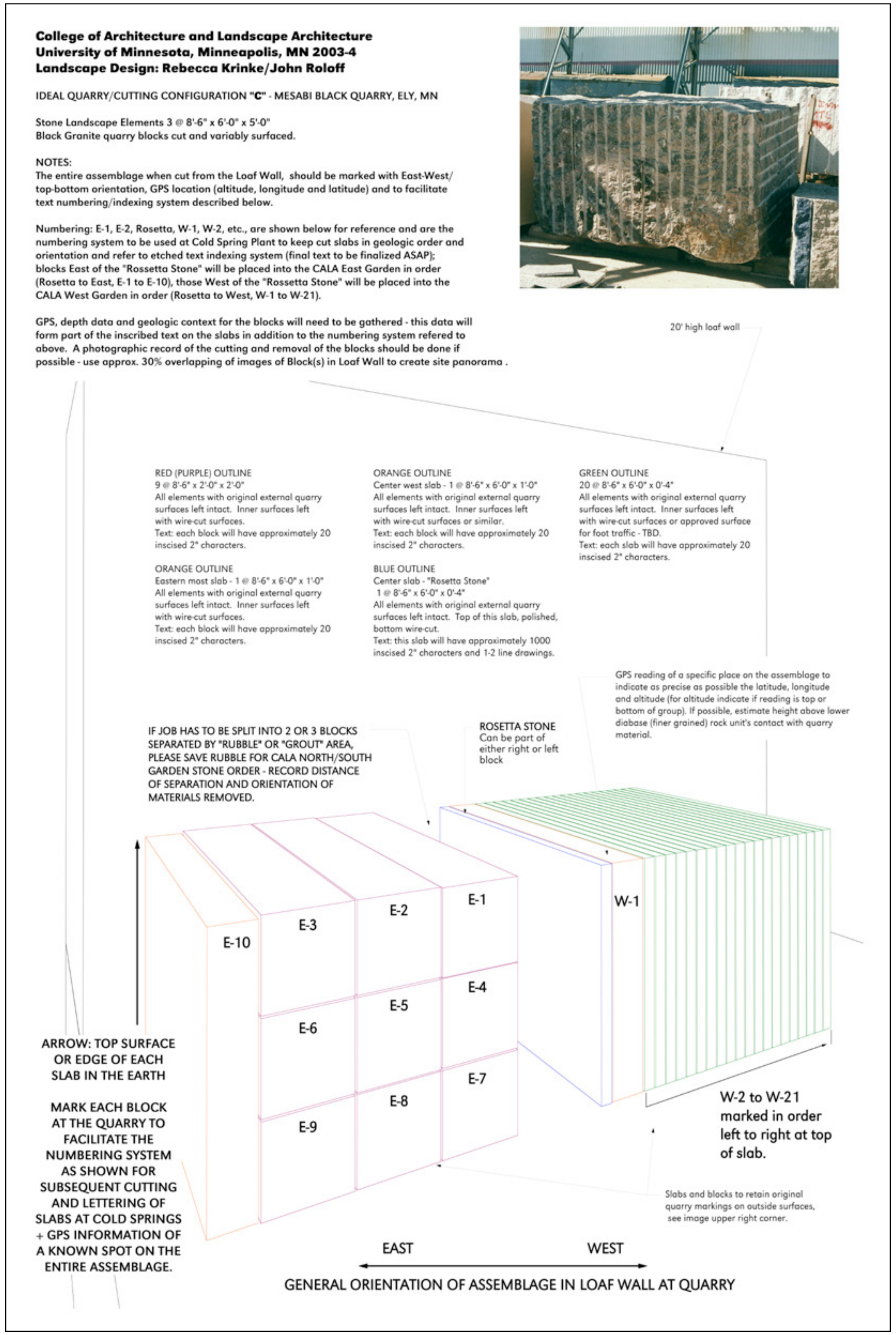


Fig. 51. Ideal Cutting /Quarry Configuration "C" - Mesabi Black Quarry, Ely, MN, one of several studies for the quarrying and cutting of the blocks of anorthositic gabbro for the West, East Gardens and Rosetta Stone.

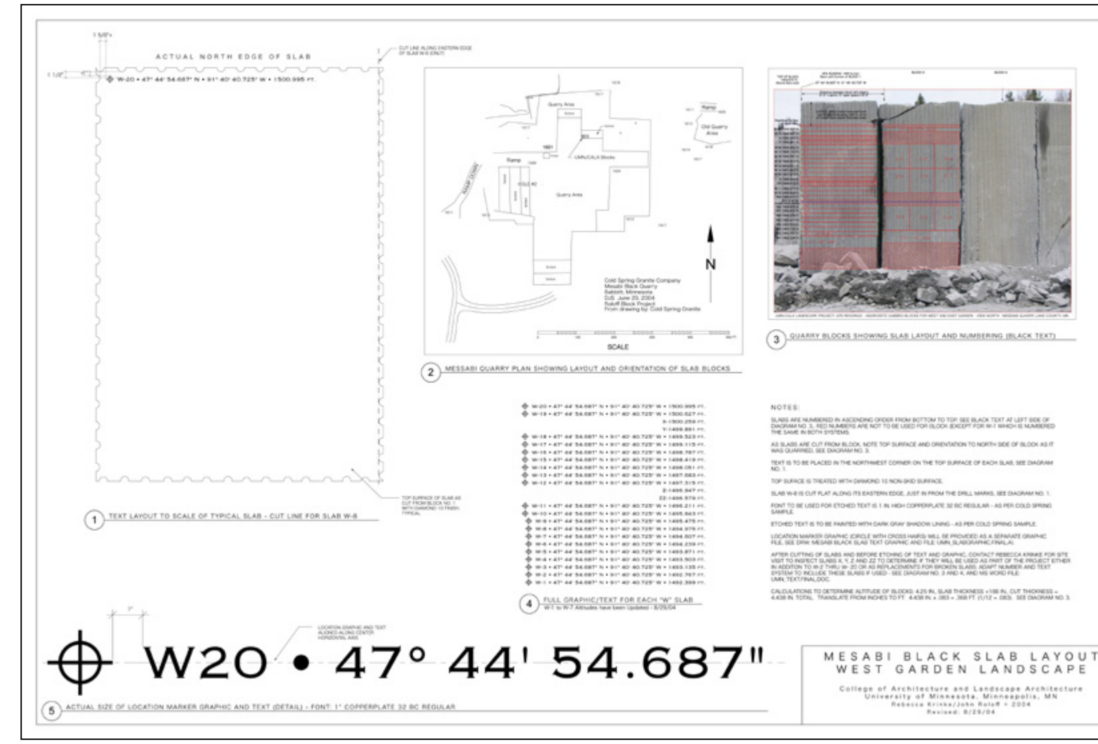


Fig. 52. Mesabi Black Slab Layout, West Garden Landscape. John Roloff computer drawing, 2004.

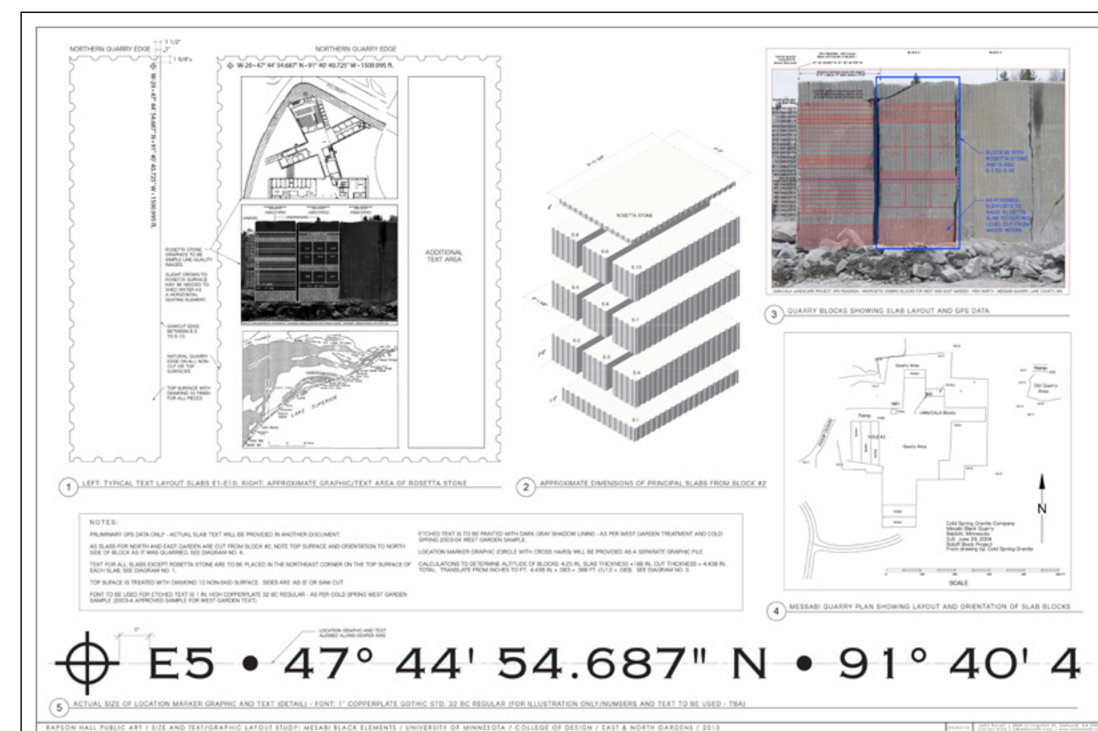


Fig. 53. Rapson Hall Public Art/Size and Text Graphic Layout Study: Mesabi Black Elements/University of Minnesota/College of Design/East & North Gardens/2013. John Roloff, computer drawing, 2013.

SUNDAY, APRIL 18 • 2004 STAR TRIBUNE • F11

ARCHITECTURE

Provided by the College of Architecture and Landscape Architecture

The West Garden near the entrance to Rapson Hall at the University of Minnesota will be the first of the three gardens to be completed.

Outdoor spaces taking shape at university's Rapson Hall

Ground will be broken April 28 for the first of three gardens planned for Rapson Hall at the University of Minnesota's College of Architecture and Landscape Architecture. Twin Cities landscape architect **Rebecca Krinke** and San Francisco-based public artist **John Roloff** collaborated on the design for the three wedge-shaped spaces outside the 2002 addition to the 1959 Architecture Building.

Each of the spaces, which are defined by the wings of the **Steven Holl**-designed addition, will combine stone, water and plantings in different ways. Elements of the design include Minnesota black granite, glass sculptures, a steam garden, a grove of trees and a square of lawn.

CALA dean **Tom Fisher** said the collaboration between Krinke and Roloff will become a model for making campus outdoor spaces more sustainable. A public reception from 5:30 to 7 p.m. will follow the private groundbreaking at 5 p.m. Both artists will give a talk at 6 p.m. in Rapson Hall's HGA Gallery, where an exhibit running through June 4 will document their design process. Rapson Hall is at 89 SE. Church St. in Minneapolis.

Linda Mack

Fig. 54. Star Tribune, Architecture section, Sunday, April 18, 2004.

Fig. 55. Ground breaking ceremony for the West Garden and *Site Index*, Rapson Hall, 2004.

Fig. 56. Site Index installation, West Garden, Rapson Hall. "Mother Stone" being placed, 2004.

Fig. 57. Site Index installation, West Garden, Rapson Hall. Anorthositic gabbro slabs with GPS data, 2004.

Fig. 58. Site Index installation, West Garden, Rapson Hall. Native oak bosque, 2004.

Fig. 59. Site Index installation, West Garden, Rapson Hall. Native MN ground cover, 2004.

Fig. 60. Site Index installation, West Garden, Rapson Hall. Anorthositic gabbro slabs with GPS data, "Mother Stone" with shallow water element in foreground, native oak bosque in the middle distance, 2004.

Fig. 61. Site Index installation, West Garden, Rapson Hall. Anorthositic gabbro slabs with GPS data, "Mother Stone" in the background, 2004.

Fig. 62. Site Index installation, West Garden, Rapson Hall. Detail of one of the anorthositic gabbro slabs with GPS latitude and longitude of excavation site at the Mesabi Black quarry and altitude relationship with other slabs on site, 2004.

Fig. 63. SITE INDEX, West Garden, Rapson Hall, "Mother Stone" in foreground, image from site visit in 2014.

SITE INDEX: North/South/East Gardens / Rosetta Stone

Fig. 64. North Garden, Rapson Hall, 2014.

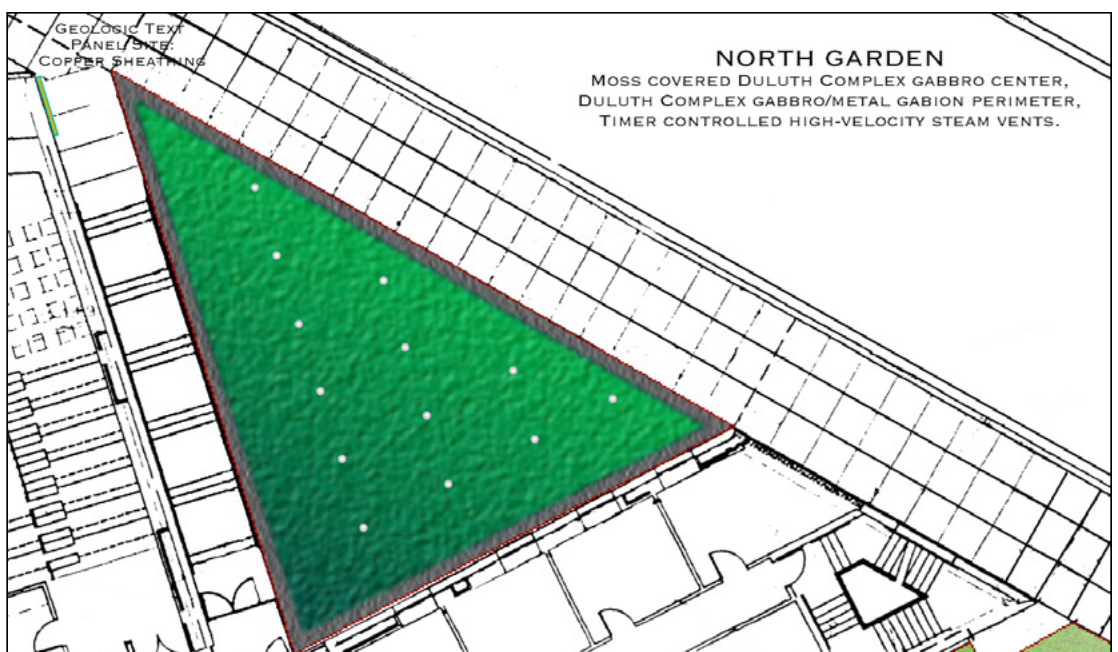


Fig. 65. North Garden, Rapson Hall conceptual study/plan view, moss, crushed gabbro center, gabbro gabion perimeter, steam vents, timer system. Computer graphic by John Roloff on architectural site plan by Steven Holl Architects, 2004.

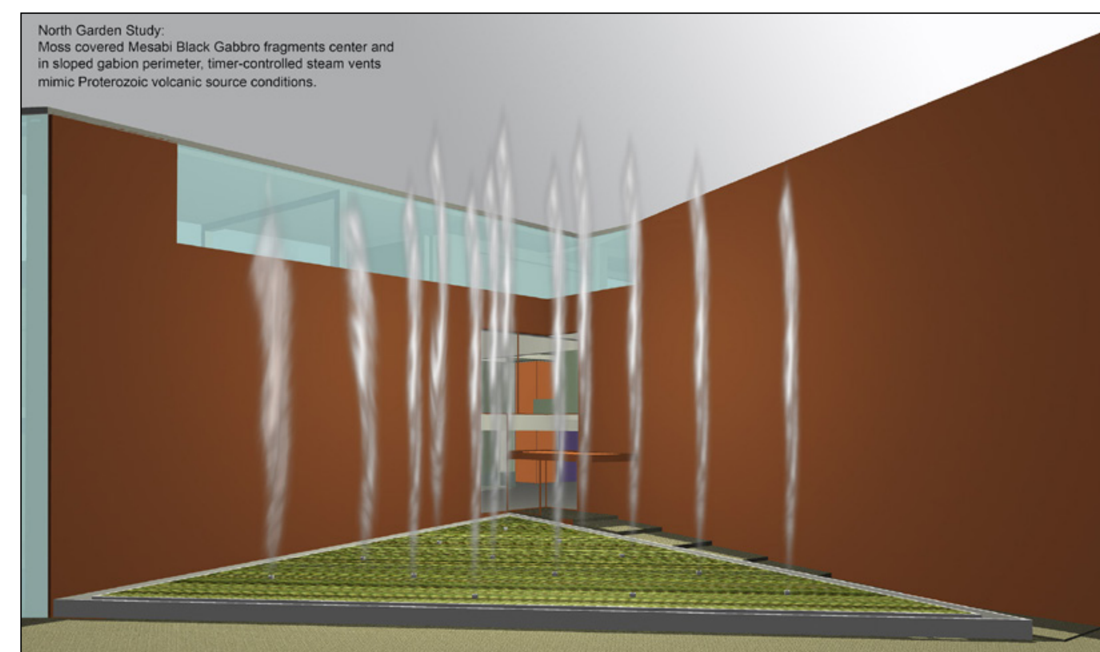
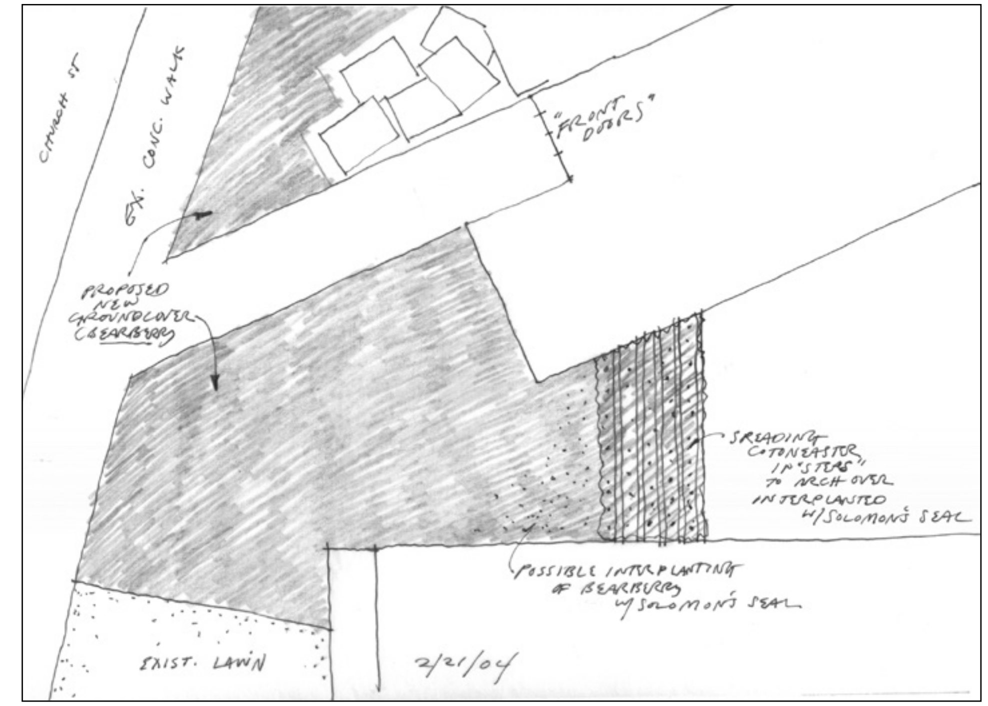


Fig. 66. North Garden Study, conceptual study/elevation view south, moss, crushed gabbro center, gabbro gabion perimeter, steam vents, timer system. Computer rendering, John Roloff, 2004.

Fig. 67. South Garden, Rapson Hall, circa 2004.



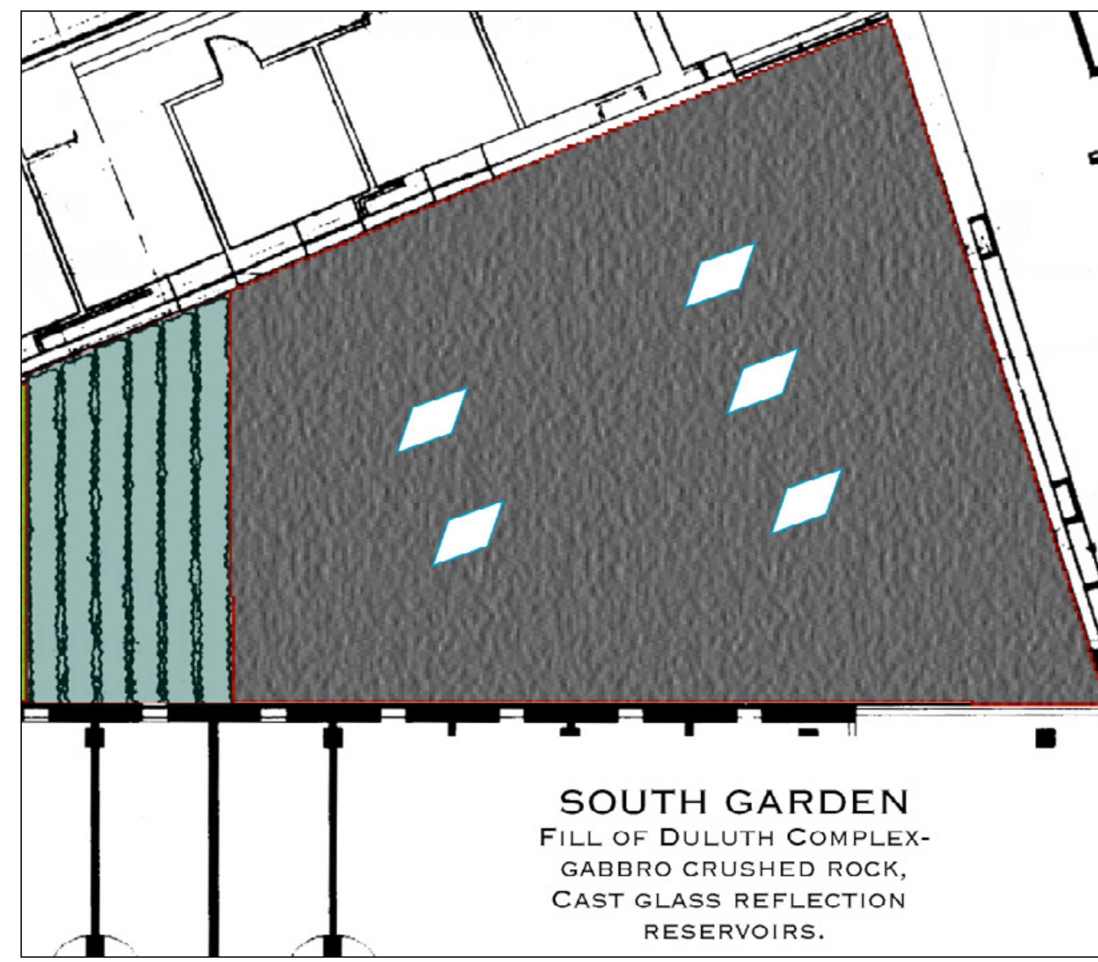


Fig. 68-69. South Garden, conceptual sketches, top: by Rebecca Krinke, bottom: Computer graphic by John Roloff on architectural site plan by Steven Holl Architects, 2004.

Fig. 70. East Garden, Rapson Hall, partial installation of proposed pieces of anorthorsitic gabbro, 2004. Simulation of *Brick: Rapson Group* (Geology Text Panels), shown in orange to represent direct etching on the brick wall of the original Rapson Hall, center left background. Text planed but not installed as of the date of this publication.

Fig. 71. East Garden, Rapson Hall, study for proposed, *Site Index*, installation of anorthositic gabbro elements and cultivar and native larch tree plantings. Computer graphic by John Roloff on architectural site plan by Steven Holl Architects, 2004.

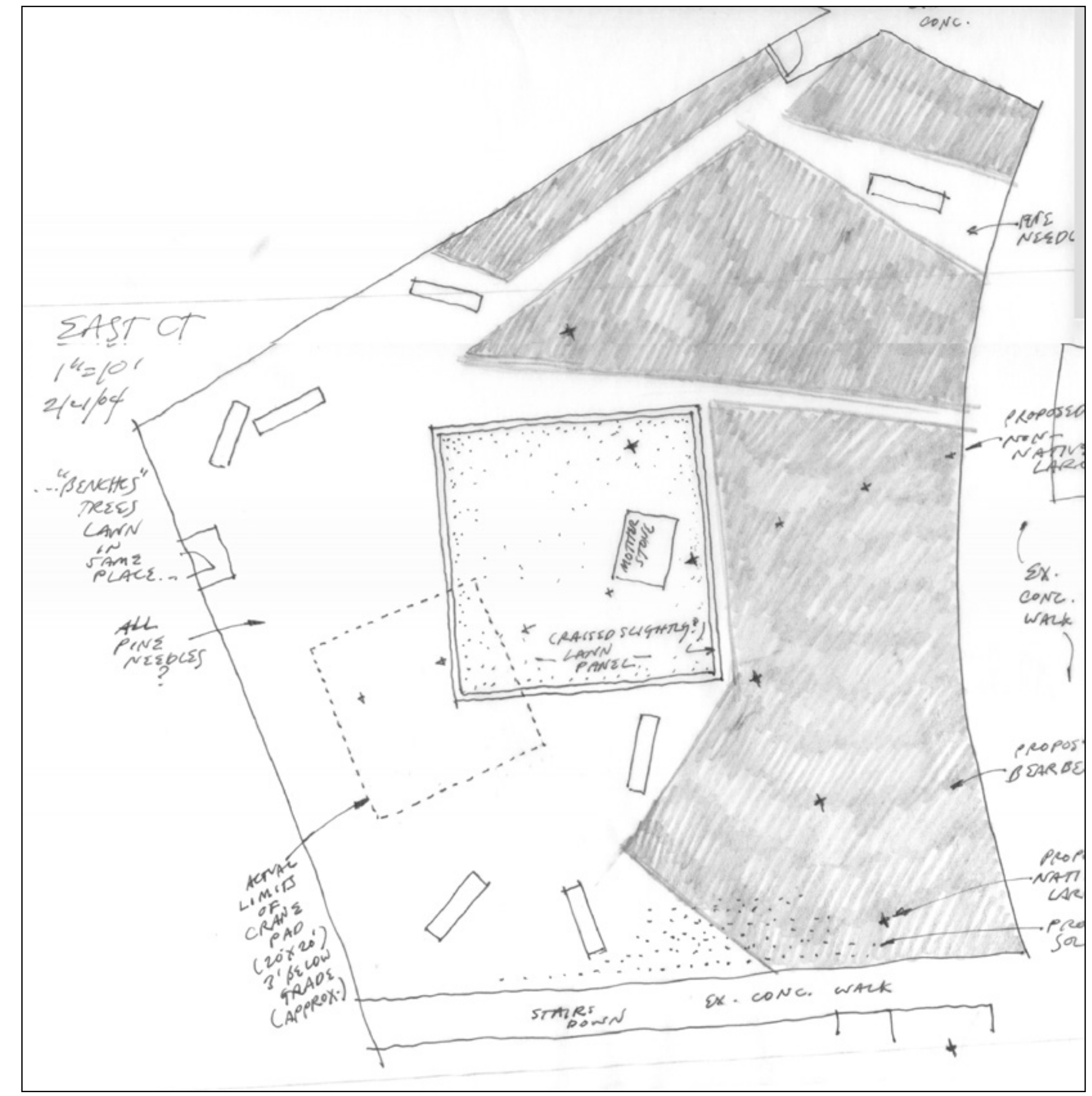
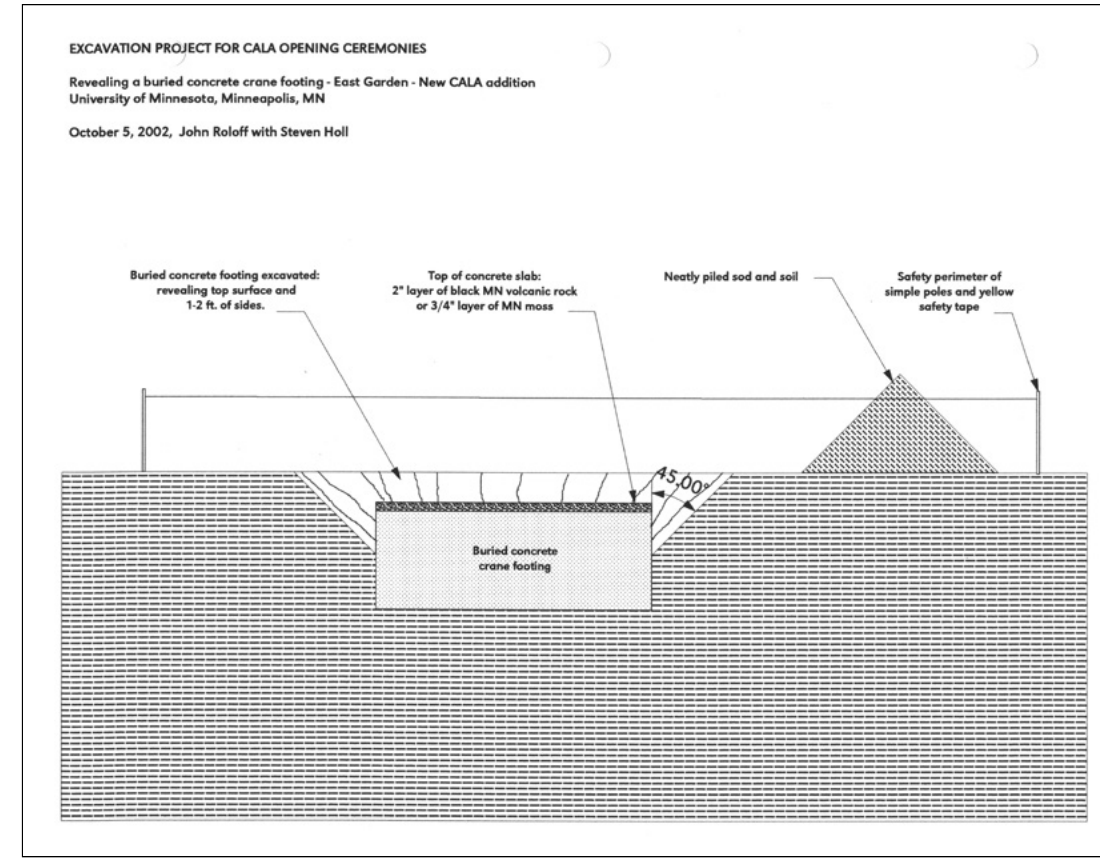


Fig. 72. East Garden, Rapson Hall, study for elements of proposed, *Site Index*, installation of anorthositic gabbro benches and cultivar and native larch tree plantings. Rebecca Krinke, detail, pencil sketch, circa, 2004.

Fig. 73. East Garden, Rapson Hall, study for proposed, *Site Index*, location of buried concrete crane pad used in the construction of the Holl Annex, John Roloff computer study, circa, 2004.



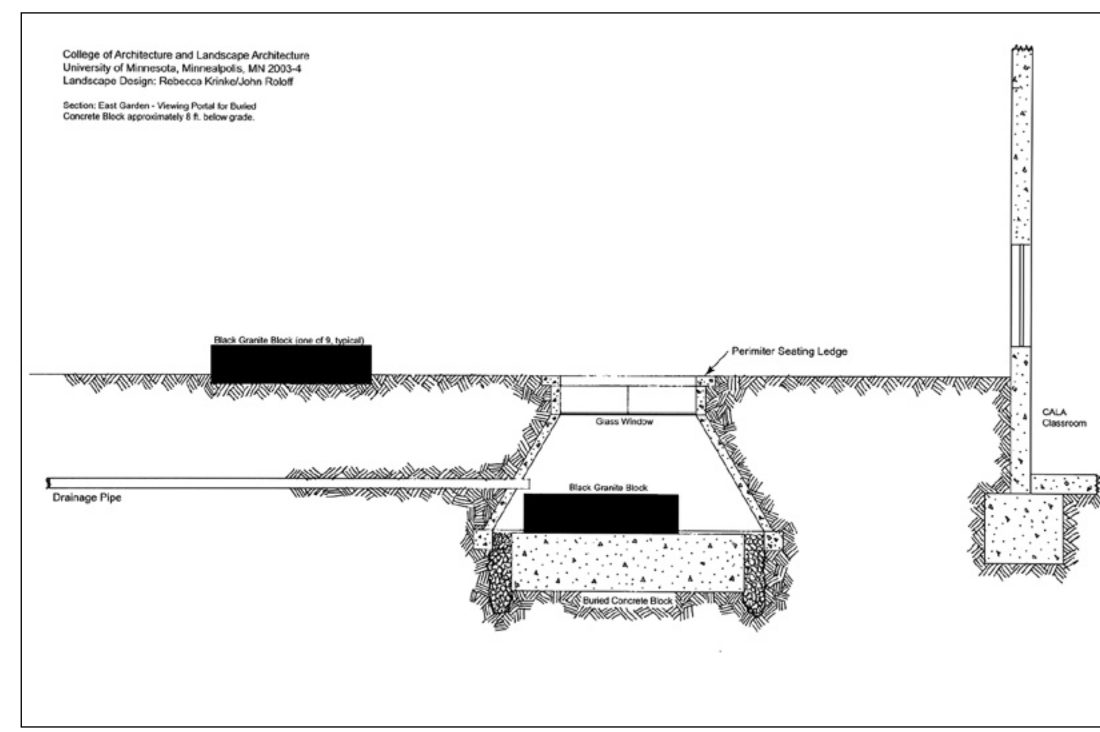


Fig. 74-75. East Garden, Rapson Hall, studies for proposed, *Site Index*, studies for uses of the buried concrete crane pad used in the construction of the Holl Annex. John Roloff computer drawings, 2002-04.

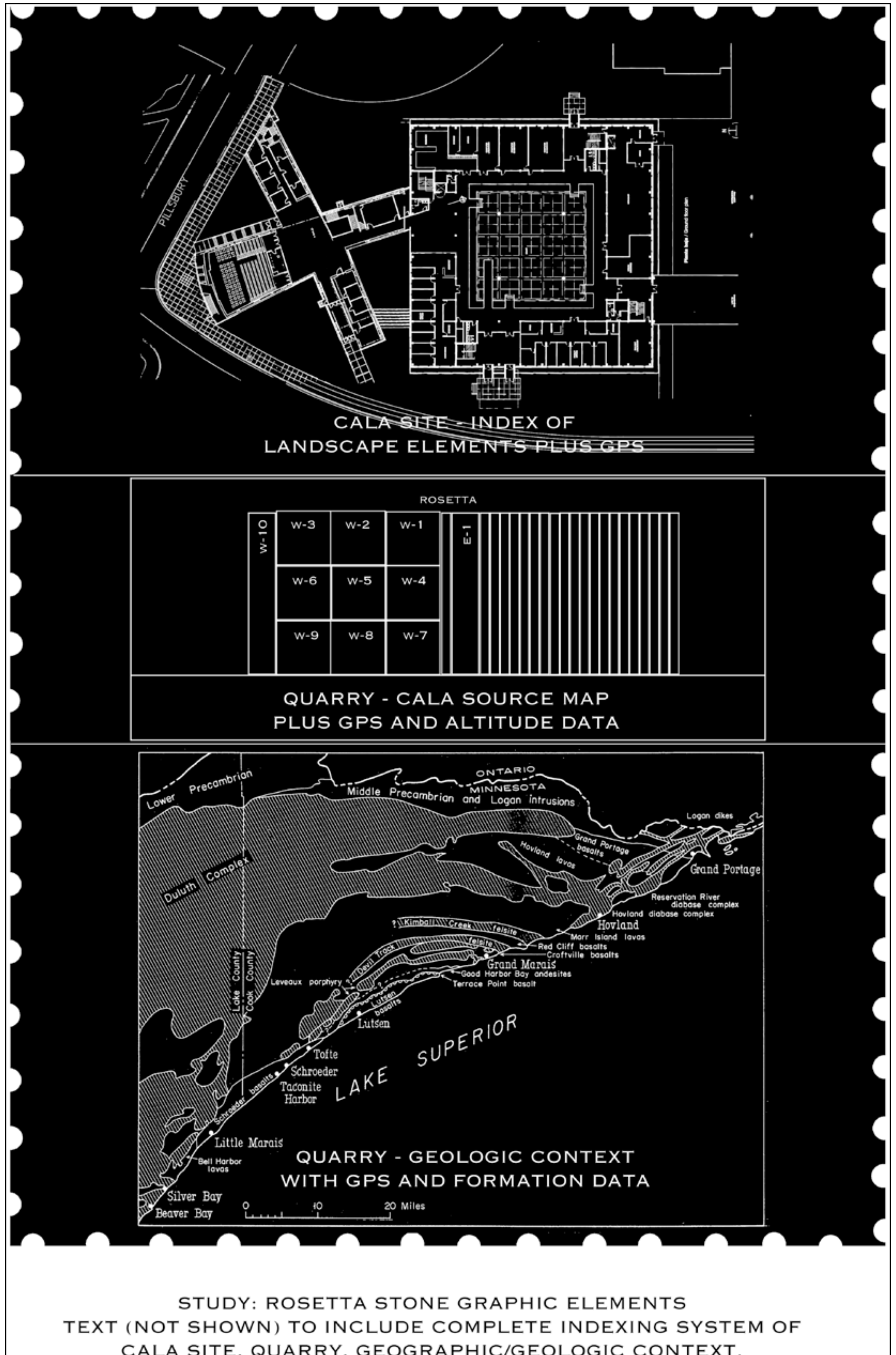


Fig. 76. Rosetta Stone study. Computer graphic by John Roloff on architectural site plan by Steven Holl Architects and map by Minnesota Geologic Survey.

Fig. 77. Rosetta Stone Placement Study: UMN-CALA Library. John Roloff, computer graphic, 2004

Subject: CALA art/design/eng. meeting synopsis (1-15-04)

Date: Tuesday, January 20, 2004 at 7:35 AM
From: RJKrinke@aol.com To: <franc032@umn.edu>, <jroloff@sfai.edu>, <rjkrinke@umn.edu>, <willi296@tc.umn.edu>
Meeting: Structural Engineering of the CALA Public Art and Site Design, held in the LA conference room, CALA. January, 15, 2004
Present: Bruno Franck, Shelly Willis, Rebecca Krinke

1) Rosetta stone in library: Stone measures 6 feet x 8.5 feet x 4 inches thick. Weight is 2400 pounds. CALA elevator holds 3500 pounds. Elevator doors open 3.5 feet (40 inches) and have a height of 7 feet. Interior dimensions of elevator are 5 feet x 6.5 feet x 7 feet height. Discussion centered first on how to get the stone into the library: Option A) via a dolly or other carrying device, or machine and using the elevator with stone on its side/angled. Option B) via a dolly or other carrying device into CALA's interior atrium, then lifted by cable/crane to the second floor. Option C) removing a window from the library and bringing the stone in via crane from outside. ACTION ITEMS: SW noted that she would check with Les Potts of U of MN Facilities about possible equipment to move the stone. SW and BF both recommended a meeting with Dean Yerrigan, a local contractor who specializes in art installations. SW to set meeting - a Monday or Wednesday preferred for Bruno's schedule.

Placement and securing of stone in library: SW and RK concur with John Roloff that the leaning stone option is the most compelling. The stone is shown leaning at an approximately 10 degree angle. John's drawing notes that it could go vertical if desired/necessary. BF noted that the stone will need to be pinned from the floor, but could rest against the wall. ACTION ITEMS: RK to talk with Steve Weeks (CALA) about the library wall construction. John Roloff to supply the exact angle the stone leans at - helpful for calculations. RK to continue to communicate with Joon Mornes, CALA librarian about the stone. BF and SW will complete document required by Code office when appropriate. When ready, BF will send SW signed drawings for leaning stone installation and west court stone installation. Note (1/21/04): Cold Spring may have ideas about how to get the stone into the library too. RK to contact Todd Olson of Cold Spring.

2) Granite slabs in West Court: Preference of RK and JR at this point is to keep the door and have the slabs function as a stair/terrace. Code requires foundation at stair area, and Bruno suggested that we may have 2 areas of the slabs-one area functioning as stairs with a foundation and one area without. ACTION ITEMS: RK and JR to discuss and move the slab design (including "stair " and handrail aspect) forward. BF, RK, and SW will complete document required by Code office when appropriate.

3) Steam/moss sculpture in North Court: BF suggested that the portion of the sculpture at the building edges (the tallest parts of the sculpture) would probably need footings to frost. Most of the sculpture could probably sit on gravel and a compacted sub-grade. ACTION ITEMS: RK and JR to move the design forward.

4) Excavated crane pad in the East Court: BF suggested that a precast tube be used to create the shaft that would surround the crane pad, as it would be cheaper and easier to install. BF suggested a system for the cover: glass with a mesh inside it, supported by a cable system. BF suggested that the crane pad was in a slightly different location and not buried as deep. ACTION ITEMS: RK to research crane pad location with Steve Weeks and others as appropriate. RK and JR to discuss design/construction ideas.

5) Glass sculptures in the South Court: BF suggested that the Owatonna, MN firm of Viracon could manufacture the glass sculptures at larger sizes than our previous research indicated. (This company made all the windows for CALA .) SW and RK discussed a preference that the sculptures be pinned to a slab, (or other solution) in order to keep the sculptures in place. (Bull sculptures on St. Paul Campus are moved and they weigh over 1500 pounds each.) ACTION ITEMS: RK and JR to move the design forward.

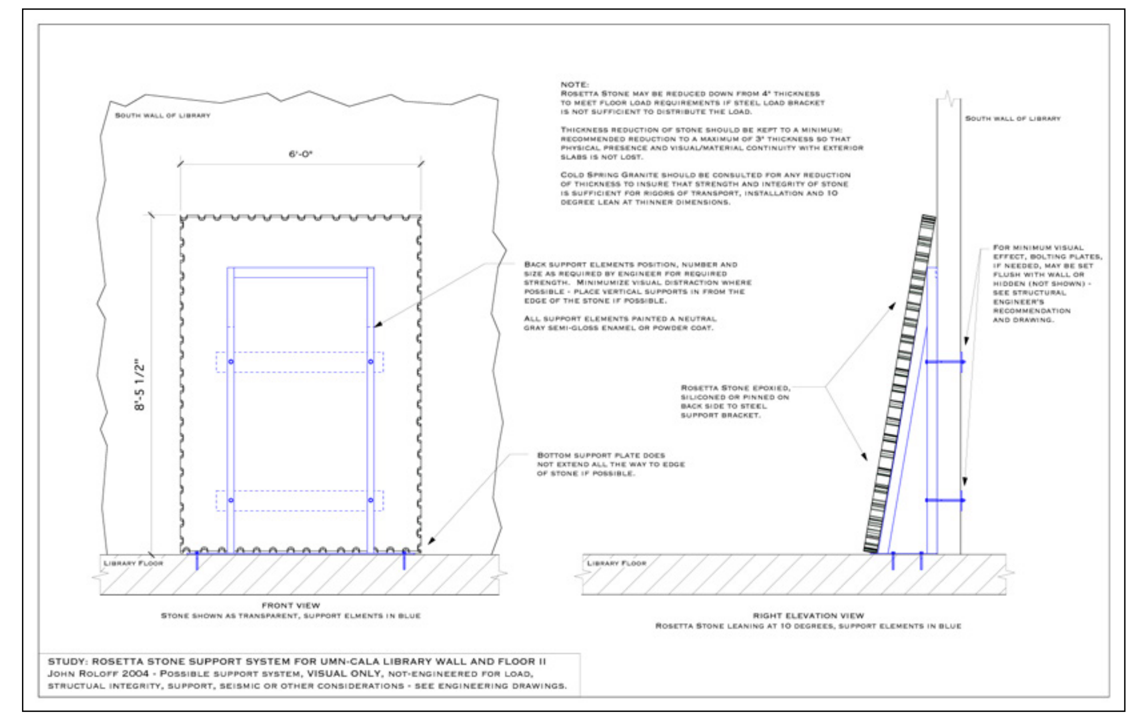


Fig. 78. Study: Rosetta Stone Support System for UMN-CALA Library Wall and Floor II.
John Roloff, computer graphic, 2004.

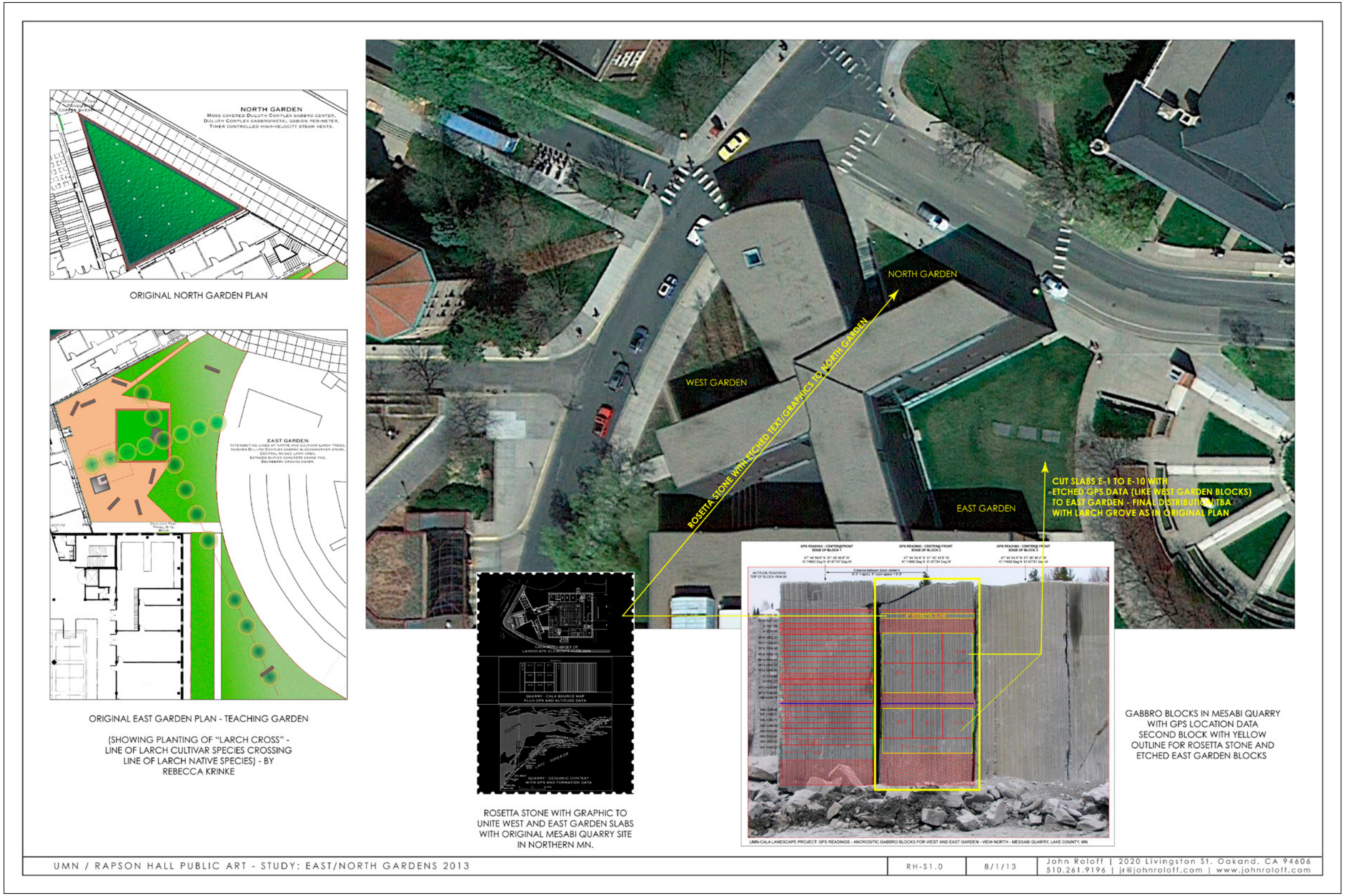


Fig. 79. UMN / Rapson Hall Public Art - Study: East/North Gardens 2013, inkjet on paper, size variable, unrealized study for the completion of the North and East Gardens and siting of the Rosetta Stone. Computer graphic by John Roloff, aerial image by Google, other images as described elsewhere in this document, 2013.

Fig. 80. RAPSON GROUP, exposure detail, mid-deposition, concrete, copper, glass, brick (not shown).

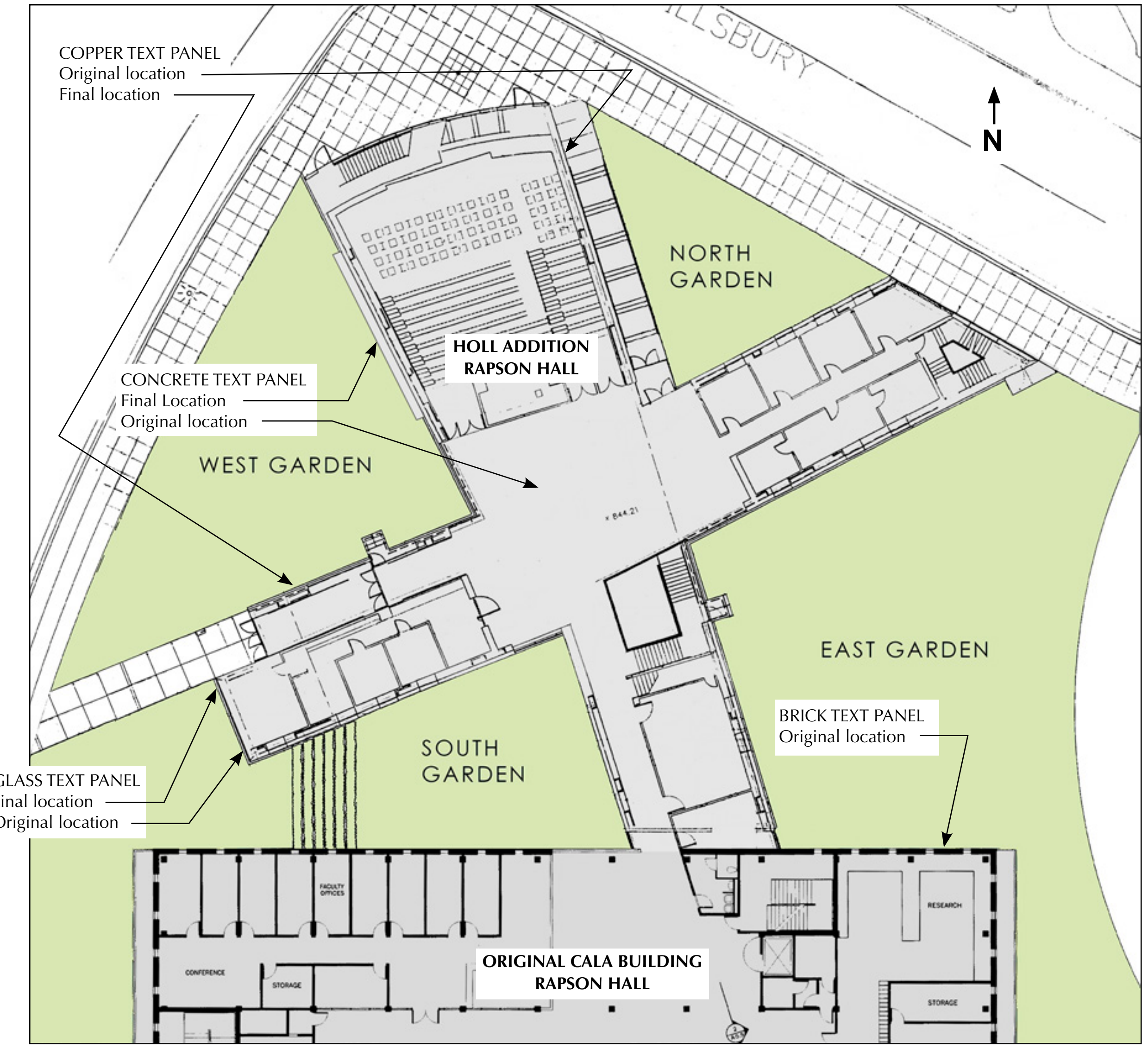


Fig. 81. Rapson Hall Annex, designed by Stephen Holl, plan view, showing initial and final location of *Rapson Group/Geology Text Panels*, north end of Rapson Hall. Computer graphic by John Roloff on architectural site plan by Steven Holl Architects,

Rapson Group (Geology Text Panels)

Rapson Group (Geology Text Panels), 2001-2013, is conceived as an allegorical vision of Rapson Hall as a Holocene/Anthropocene geologic "formation" whose geomorphology is that of the Rapson Hall architecture. In this sense Rapson Hall is seen as a geologic structure or "landscape" constructed of a series of other, earlier, geologic landscapes each with their own embedded materiality, history and unique environment/context on or below the earth. Beyond the natural processes that formed the raw materials of *Rapson Group*, the applied materials were eroded, processed and "deposited" by human activity, a process which may be termed "anthroturbation."[1] The term "Anthropocene," is used to denote the human geologic epoch for the processes and deposition of the *Rapson Group*.

The *Rapson Group* (Geology Text Panels) concept was developed by research and analysis of occasionally conflicting and inconsistent material about the industrial, geologic and paleogeographic history of the four primary materials used in the construction of the full Rapson Hall structure: brick, concrete, glass and copper. The wording in geologic language for each text panel, of appropriate geophysical and geochemical information, as well as paleo-geographic context for each material was created with the help of Carrie Jennings of the Minnesota Geologic Survey. The panels were then etched directly into each representative material, in-situ, at Rapson Hall by Tate Viere under the direction of Craig Amundsen. The original planned sites for the panels were developed and approved in 2004 as a holistic installation relating to the new form of Rapson Hall and the full implementation of *Site Index* in all four gardens around the Holl annex. The final installation of three of the panels: concrete, copper and glass, were re-located in 2013 to the West Garden, the only completed garden of *Site Index*. The brick text panel, designed for placement on the original brick-clad Rapson Hall structure, facing the East Garden, was not installed as originally planned. The term "Rapson Group," was suggested by Carrie Jennings as the proper geologic category and name for a formation of this type. The previous name for the Rapson Hall program, CALA (College of Architecture and Landscape Architecture), is retained in certain text of this document, as the conceptualization of the project occurred while that naming was in place. The basic concept for *Rapson Group* has been explored in other forms by works from the 1990's and has influenced works since then. Examples of which are shown under the *Antecedents/Propagations/Acknowledgements/Credits* segment at the end of this document.

The text for each *Rapson Group* geology panel was distilled from research into each material's: source, mineralogy, tectonic and metamorphic history, paleogeography, paleo-depositional environment, Holocene/Anthropocene, transformation, transport and depositional/installation characteristics. Numerous papers from appropriate geologic and industrial literature were consulted as well as personal communication with geologists, contractors and manufactures of the *Rapson Group* materials. In this document, under "References/Bibliography" for each material, are listed the primary geologic references used in the research as well as additional materials for further reading. Copies of the reference and some ancillary documents are included in a separate container as part of a boxed set of documents for this project at the Architecture Library at UMN and selected other educational institutions. Geologic laboratory analysis was performed on samples of each material by Katherine Waring and associates at the UC Davis Geology Department (thin sections) and Mineral Labs, Inc., Lakewood, CO. All the samples were subjected to Scanning Electron Microcopy (SEM) and Energy-Dispersive X-ray Spectroscopy (EDS) analysis, the brick and concrete also underwent X-ray Diffraction (XRD) analysis and the glass was also analyzed using X-ray Fluorescence (XRF) technology. The results and graphics from this part of the research are included under each material in this document. The sections under each material: "Preliminary Research/Notes/Questions," represent early and mid-stage research and questions under discussion with Carrie Jennings for the Geology Text Panels.

[1] A term developed in conversation with Paul Spudich, geophysicist at USGS, Menlo Park, CA, circa 1998.

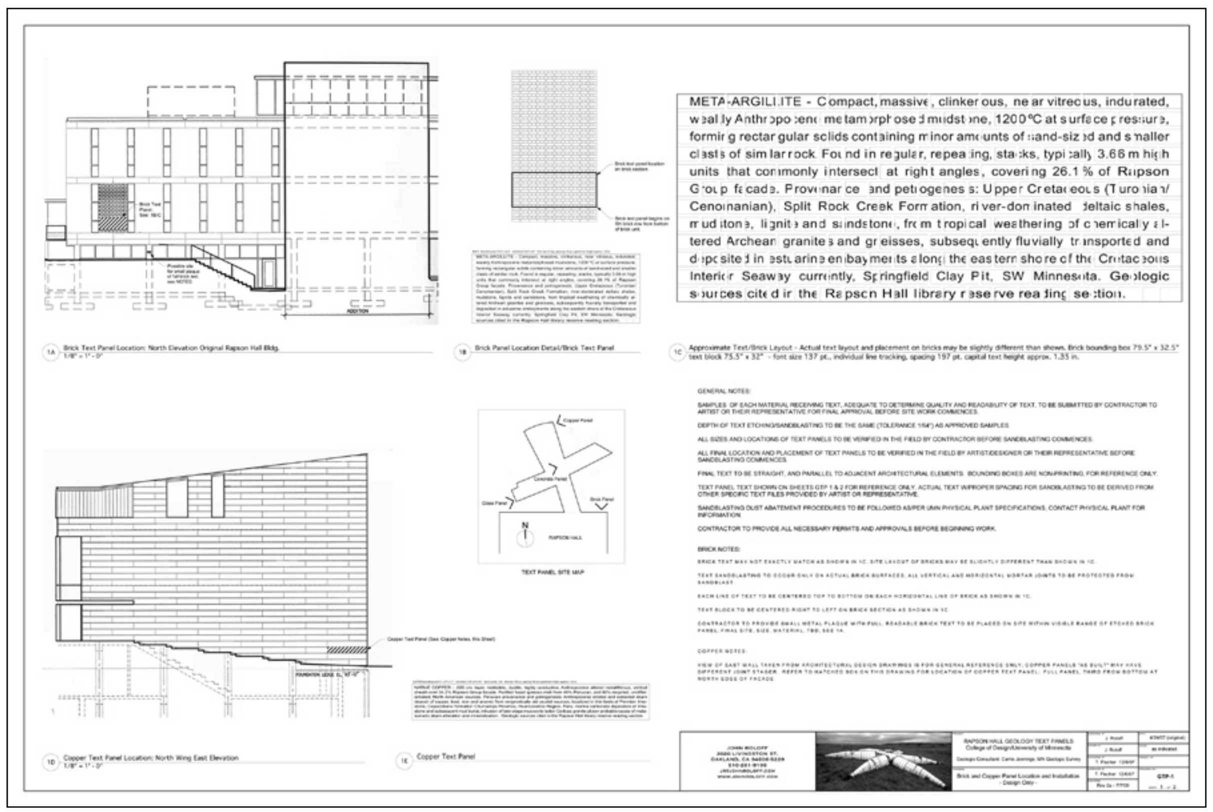


Fig. 82. Rapson Hall Geology Text Panels / Brick and Concrete Panel Location and Installation / GTP-1/Rev 2a, repo-graphic print on drafting film, 24 in. x 36 in. Computer graphic by John Roloff on architectural elevations by Steven Holl Architects, 2007-09.

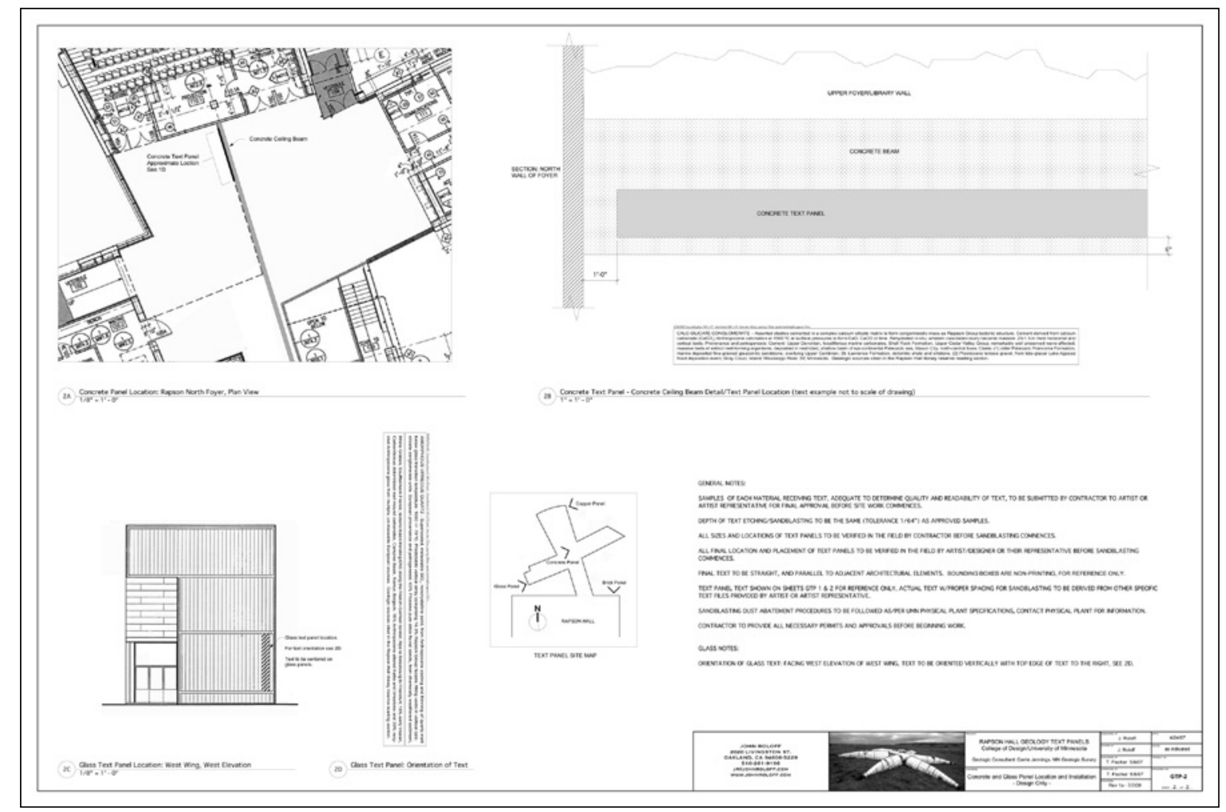


Fig. 83. Rapson Hall Geology Text Panels / Concrete and Glass Panel Location and Installation / GTP-2/Rev 1a, repo-graphic print on drafting film, 24 in. x 36 in. Computer graphic by John Roloff on architectural plan and elevation by Steven Holl Architects, 2007-09.

The Mineral Lab, Inc.
2700 Youngfield Suite 105
Lakewood, CO 80215
(303) 232-8708

June 3, 2005
Lab no. 205310

Mr. John Roloff
2020 Livingston Street
Oakland, California 94606

Dear Mr. Roloff:

Enclosed are x-ray fluorescence (XRF) and x-ray diffraction (XRD) and scanning electron microscopy (SEM) with energy-dispersive x-ray spectroscopy (EDS) results for samples labeled, "Brick, Cement, Glass and Copper" received May 24. This report will be mailed and emailed to you as requested.

A representative portion of the glass sample was ground to approximately -400 mesh in a tungsten carbide swing mill and then analyzed by our standard XRF procedure for 31 major, minor and trace elements. The relative precision/accuracy for this procedure is ~5–10% for major–minor elements and ~10–15% for trace elements (those elements listed in ppm) at levels greater than twice the detection limit in samples of average geologic composition. A replicate sample and a standard reference material ("SY3", a CANMET standard rock) were analyzed with the sample to demonstrate analytical reproducibility for your sample and analytical accuracy for a geologic standard, respectively. The accepted ("known") values for the quality control standard are listed with the XRF results. W and Co are omitted due to contamination by the tungsten carbide mill.

A representative portion of the brick and concrete samples were packed into a well-type plastic holder and then scanned with the diffractometer over the range, 3-61° 2θ using Cu-$K\alpha$ radiation. The results of the scans are summarized as approximate mineral weight percents on the enclosed table. Estimates of mineral concentrations were made using our XRF-determined elemental compositions, the relative peak heights/areas on the XRD scans and comparison to XRD data for mineral standards. These samples appear to contain "amorphous" (noncrystalline) material. Amorphous material appears only as a broad elevation in the background of the XRD scan so its composition cannot be determined and the estimate of its concentration must be considered an educated guess based on the difference between the total mineral concentration and 100%. The detection limit for an average mineral in these samples is ~1-5% and the analytical reproducibility is approximately equal to the square root of the amount. "Unidentified" accounts for that portion of the XRD scan which could not be resolved and a "?" indicates doubt in both mineral identification and amount.

J. Roloff
Page 2

June 3, 2005
Lab no. 205310

The samples were mounted in vise-type holder for SEM imaging and elemental analysis by EDS. The surface areas of the brick, cement and glass samples were examined in LV (low vacuum) mode to prevent charging. Images of the samples are shown in Figures 1 - 12. EDS spectra for the analyzed areas are shown in Figures 3a, 6a, 9a and 12a. Approximate elemental compositions determined from the spectra are given in Tables 1 - 4. Elemental map data is given in Maps 1 and 2.

Thank you for the opportunity to be of service.

Sincerely,

Joy Maes

enclosed: CD

Preliminary Study: Text Panel Content/Example Text

Name of rock-type of formation, including any reference to industrial processes critical to its current material nature; mineralogy. Tectonic structure/context of formation at CALA and relationship to the CALA Group. Provenance of primary geologic(pre-industrial) constituents: current latitude, longitude, altitude, geologic age, rock type, formation, depositional environment, geologic context. Industrial alteration/processing. Total of about 80-90 words, 550 characters. including spaces/panel.

Discussion - Information Categories for each Formation/Material:

Name of Rock Type:

A geologically correct (as possible) rock name, that considers industrial process in its formation, e. g:

Rapson Group concrete: Brecciated, Meta-Limestone... (?)
The 'breccia' referring to the aggregate size and angularity; the 'meta,' referring to the calcining/sintering of the limestone/clay mixture (a 2800 degree F. degree crystallization and regrinding process) during production; and limestone (perhaps) as the actual rock-type as evidenced by the mineralogy (calcium/silicate), density, texture and deposition (it was deposited somewhat in layers – floors of the building - albeit massive for each pour). Would the re-hydration and chemical-exothermic reaction (curing) that sets the concrete matrix at the time of placement/deposition have a geologic analog - similar to the growth of calcite crystals in the lithification of limestone? Internal ferro/carbonate rebar structure?

Rapson Group Material Formation Name (?):

Not sure if this is needed, when tried, it sounded a little pretentious as part of the text panel, I was originally hoping to name each formation after the sea of deposition of the primary material, to create a vivid image of the depositional environment, e. g., for the Raspon Group concrete: Rapson Group Kaskaskian Sea Formation, Rapson Group brick: Rapson Niobararian Sea Formation (Western Interior Seaway Formation didn't' sound very good), etc., I also now realize there is a North American Stratigraphic Code as well to consider.

Tectonics/Site Relationship of Each Formation:

Naming of how the formation is situated/deposited on the Rapson Hall site, relationship to other Rapson Group formations, eg:

Rapson Group concrete: rests unconformably(?) on Quaternary Mississippi R. outwash and Pleistocene (?) glacial till, vertical fault (?) contact with earlier CALA structure, etc.

Derivation: Provenance of Original Material/Industrial Processes:

Latitude, longitude, altitude of the geologic origin of major components at the time of removal/quarrying; original depositional environment and age; processes of geologic alteration/lithification (metamorphic facies, etc.), processes of industrial alternation, refinement (secondary metamorphic facies, as in brick firing, cement sintering, etc.)

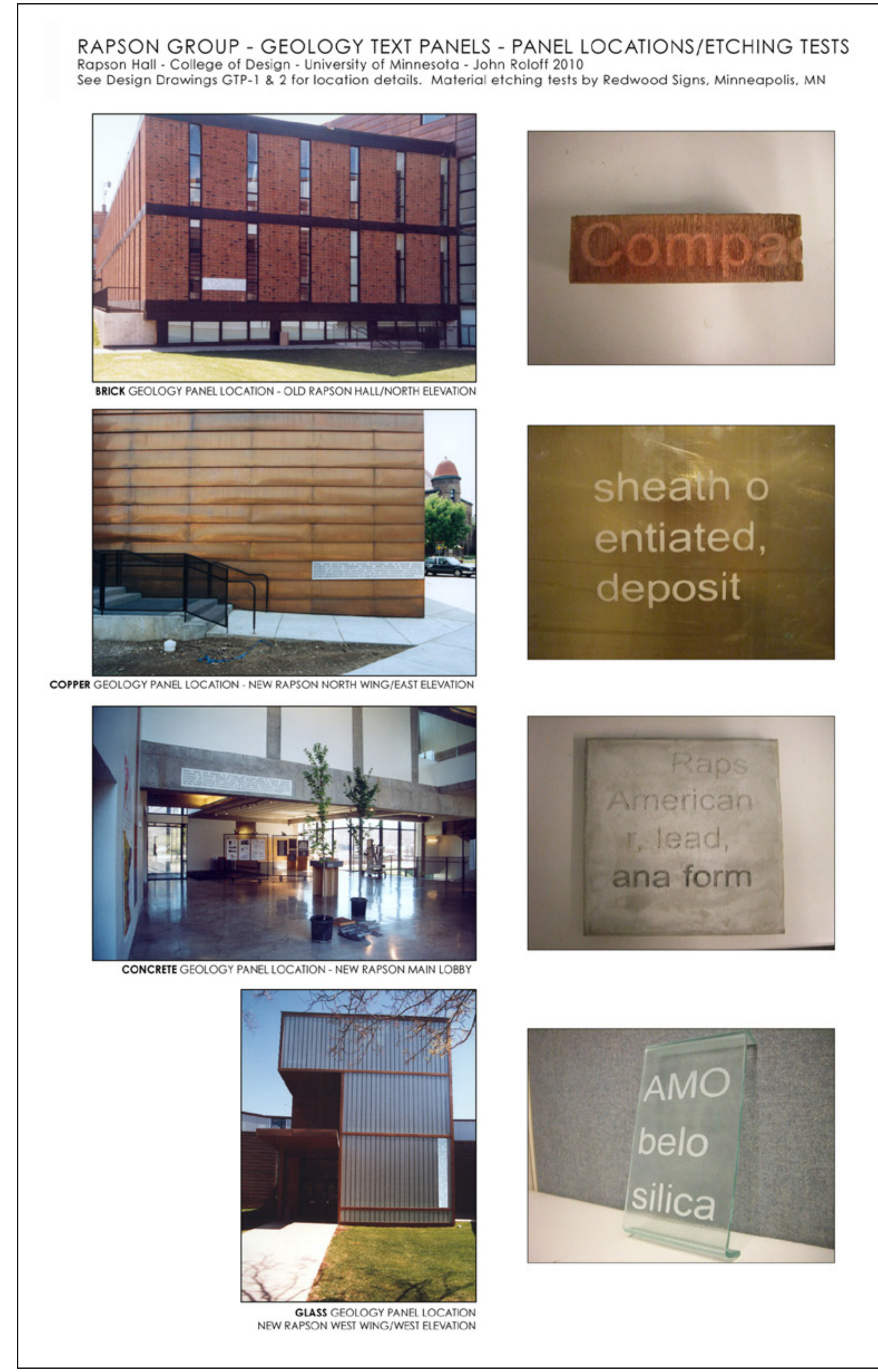


Fig. 84. Preliminary material and etched text samples for each of the Rapson Group materials, 2010.

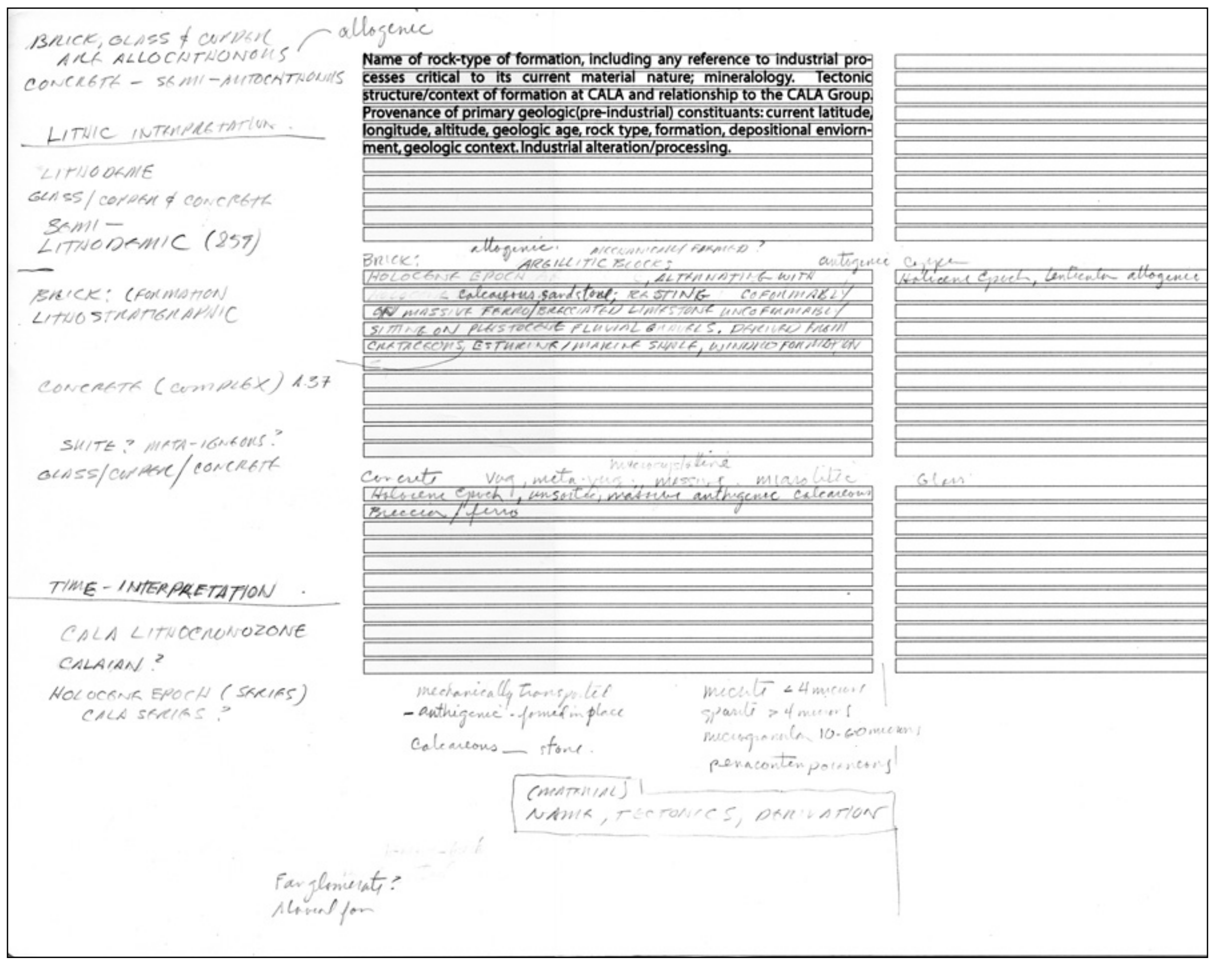


Fig. 85. Preliminary study for Rapson Group, geology text panel content, circa 2003.

Rapson Group: *Brick*

RAPSON GROUP BRICK: PRELIMINARY RESEARCH NOTES/QUESTIONS

Name of Rock Type:

Low grade metamorphic (high temp/low pressure metamorphic facies - zeolite? - kaolinite to mullite?) pelitic, phaneritic, schistos? agrillite? allochthonic, formed under pressure before metamorphism (clay extrusion - foliation? - see thin section) and fired to approximately 2200-2300 degrees F.

It is understood that the same shale was used for each brick type and that variations in processing and firing account for the range of color and styles of brick used at the Rapson Hall site.

Brick Formation Name:

Raspon-Niobrarian Sea Formation (?), shale was deposited near the shore and is probably estuarine.

Tectonic/Site Relationship:

Forms the facade of the older, original CALA building, resting conformably on an un-named concrete foundation,

Derivation: Provenance of Original Materials/Industrial Processes:

The Rapson Group Holocene brick facade is made by A. C. Ochs, Co., and is a mixture of: 700 OCHS Egyptian "0" flashed Modular, 700 OCHS Egyptian 65 Modular, 50 OCHS Egyptian 70 Modular, 50 OCHS Egyptian 90 Modular. Shale was processed in the Ochs brick plant by mixing with water, high-pressure extrusion and firing at approximately 2200-2300 degrees F. It is understood that the same shale was used for each brick type and that variations in processing and firing account for the range of color and styles of brick used at the CALA site.

The brick is made from a Cretaceous, probably nonmarine shale of the Windrow Formation, Ostrander Member, quarried outside of Springfied, MN at approximately 44° 15′ 00″ N, 95° 00′ 00″ W, 1200 ft.. Depositional environment may be transitional from nonmarine, perhaps estuarine conditions to near shore marine environments. The Middle Cretaceous Interior Seaway (also Western Interior Seaway), one source gave the name of Niobrara Sea.

META-ARGILLITE - Compact, massive, clinkerous, near vitreous, indurated, weakly Anthropocene metamorphosed mudstone, 1200 ºC at surface pressure, forming rectangular solids containing minor amounts of sand-sized and smaller clasts of similar rock. Found in regular, repeating, stacks, typically 3.66 m high units that commonly intersect at right angles, covering 26.1% of Rapson Group facade. Provenance and petrogenesis: Upper Cretaceous (Turonian/Cenomanian), Split Rock Creek Formation, river-dominated deltaic shales, mudstone, lignite and sandstone, from tropical weathering of chemically altered Archean granites and gneisses, subsequently fluvially transported and deposited in estuarine embayments along the eastern shore of the Cretaceous Interior Seaway currently, Springfield Clay Pit, SW Minnesota. Geologic sources cited in the Rapson Hall library reserve reading section.

Rapson Group Brick: Provenance, Paleo-landscape and Research

Embedded in the materials, Rapson Group Brick, the primary material of the facade of the older portion of Rapson Hall is the product of varied, paleo-landscapes of supercontinents, Columbia, Rodinia, Pangaea, the paleo-continent, Laurasia and North America. Ancient cratonic rock from the interior of what is now Minnesota made from a Cretaceous, probably nonmarine shale of the Windrow Formation, Ostrander Member, quarried outside of Springfield, MN at approximately 44° 15′ 00″ N, 95° 00′ 00″ W, 1200 ft.. Depositional environment may be transitional from nonmarine, perhaps estuarine conditions to near shore marine environments. The Middle Cretaceous Interior Seaway (also Western Interior Seaway), one source gave the name of Niobrara Sea. Travels of the continents through a wide range of geographic positions in geologic time, tropical (Permian) to glacial (Carboniferous glacial period) climates.

Exposures of the shales and mudstones of the Cretaceous, Windrow Formation were seen during a visit to the Ochs Brickwork in Springfield, MN, where the clays are being actively mined and processed into Anthropocene architectural brick.

Measurement of the building helped create the percentage of surficial coverage of the Rapson Group Brick in relationship to the Group as a whole.

Fig. 86. View of Rapson Group Brick, Anthopocene depositional structure, from East Garden, showing location of paper text panel mock-up and site study, approved by CALA Dean, Tom Fisher and the Public Art on Campus Committee, 2003.

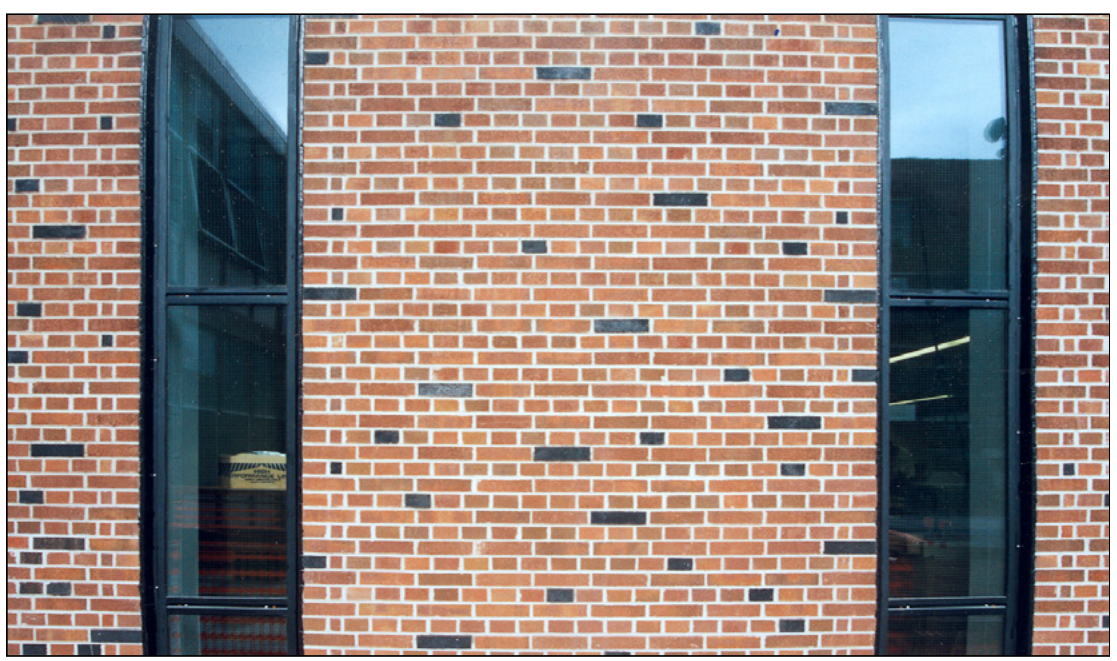


Fig. 87. Detail view of Rapson Group Brick, Anthopocene depositional structure.

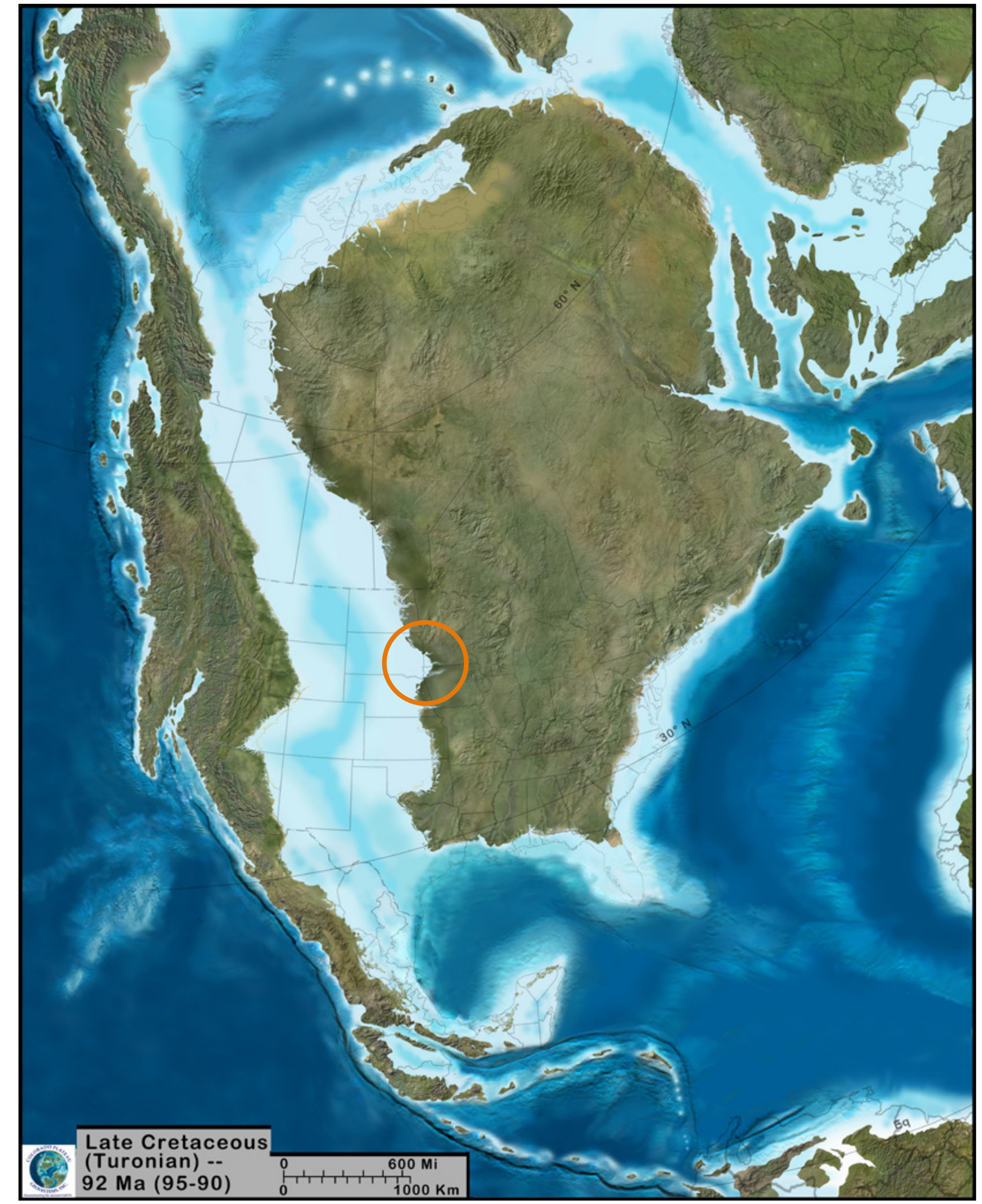


Fig. 88. *Rapson Group Brick,* Split Rock Formation depositional environment, estuarine, deltaic systems,east coast, Western Interior Seaway, upper Cretaceous (Turonian).

Fig. 89. Upper Cretaceous shale and mudstone, Split Rock Creek Formation, Ochs Brick and Tile Co. quarry, Brown County, MN.

Fig. 90. Upper Cretaceous mudstone, Split Rock Creek Formation, Ochs Brick and Tile Co. quarry, Brown County, MN.

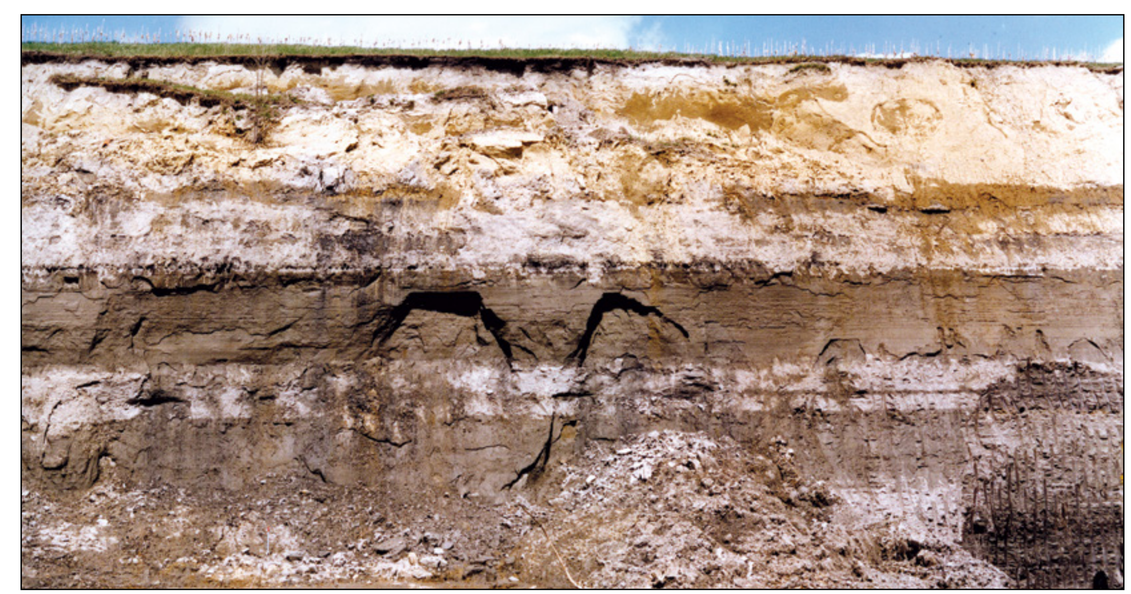


Fig. 91. Upper Cretaceous shale and mudstone, Split Rock Creek Formation, Ochs Brick and Tile Co. quarry, Brown County, MN.


Fig. 92. Transformation of Upper Cretaceous shale and mudstone, Split Rock Creek Formation, into Anthropocene Rapson Group Brick, agrillite components, Ochs Brick and Tile Co. factory, Brown County, MN.

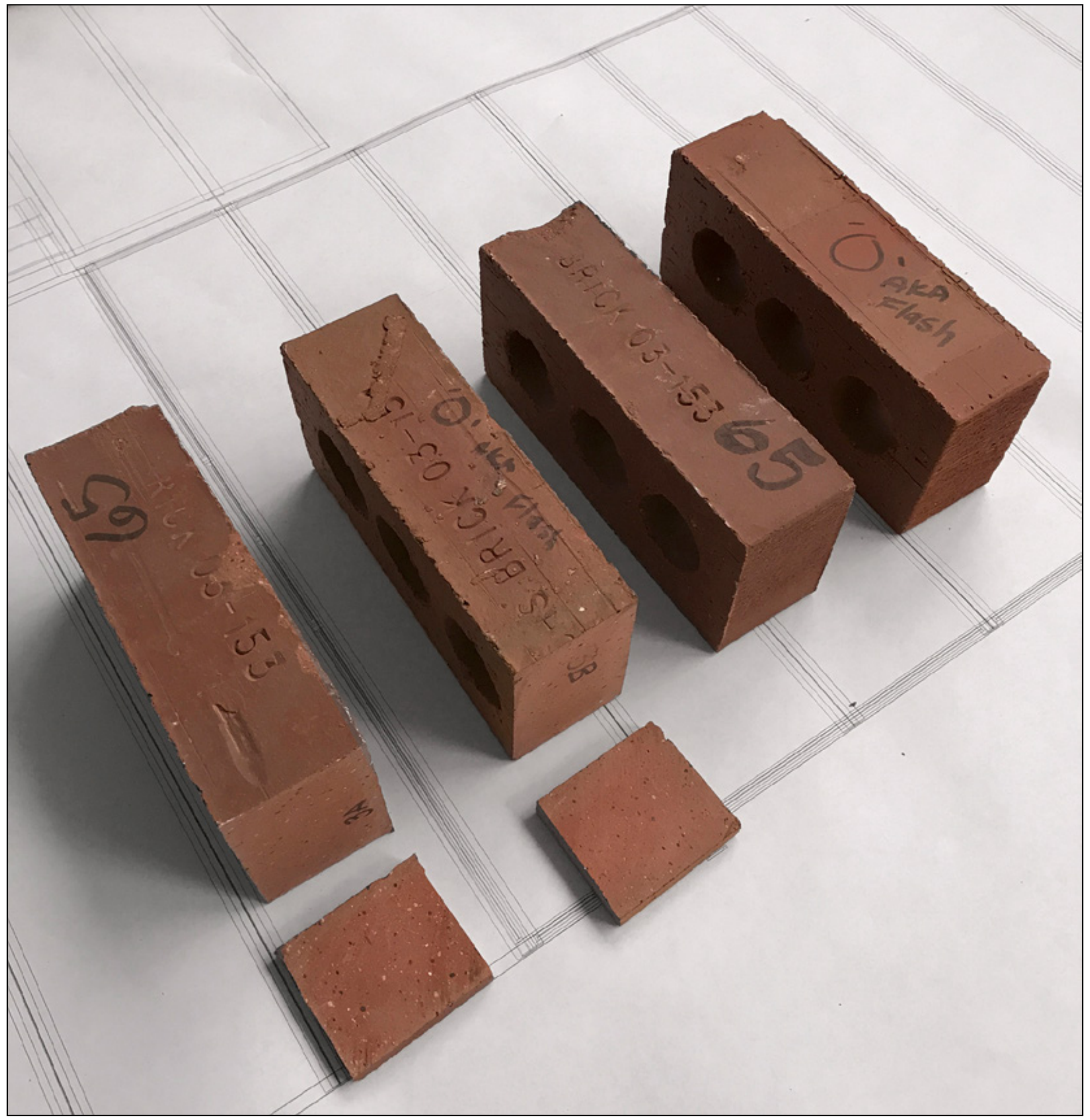


Fig. 93. Anthropocene "Brick" Samples of indurated Upper Cretaceous shale and mudstone, Split Rock Creek Formation, Ochs Brick and Tile Co., 3A and 3B used for testing. Lab no. 20531. Mineral Lab Report, June 3, 2005.

Fig. 1a - Thin section: Ochs Egyptian Brick

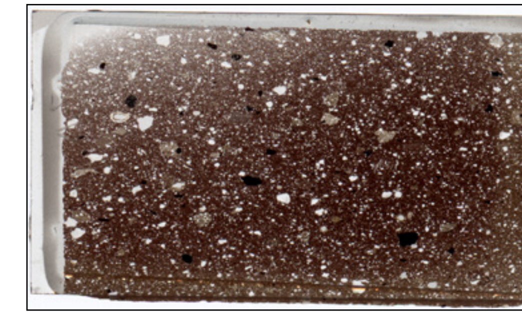


Fig. 1b - SEM 55X Enlargement of Brick sample

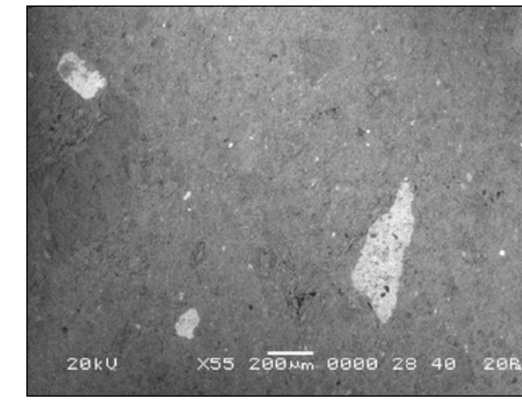


Fig. 1c - SEM 500X Enlargement of Brick sample

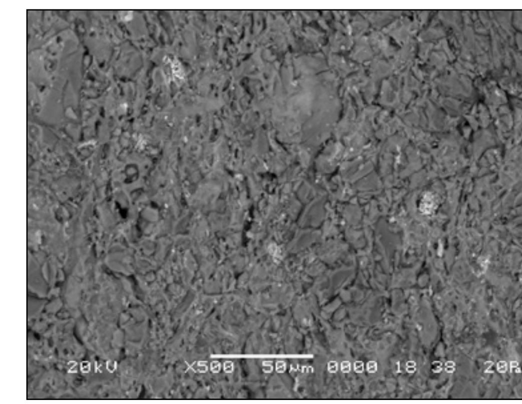


Fig. 1d - SEM 2000X Enlargement of Brick sample

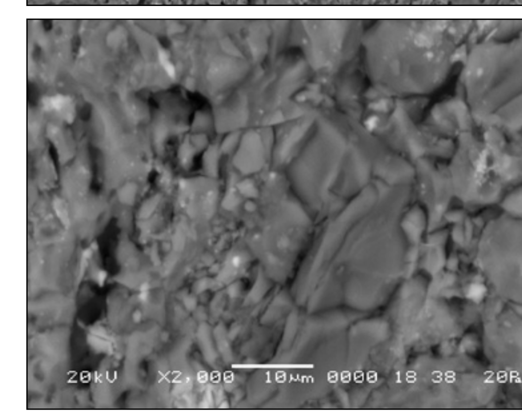


Fig. 94. Thin Section and Scanning Electron Microscopy (SEM) imagery of "Brick" Sample. Mineral Lab Report 20531, June 3, 2005.

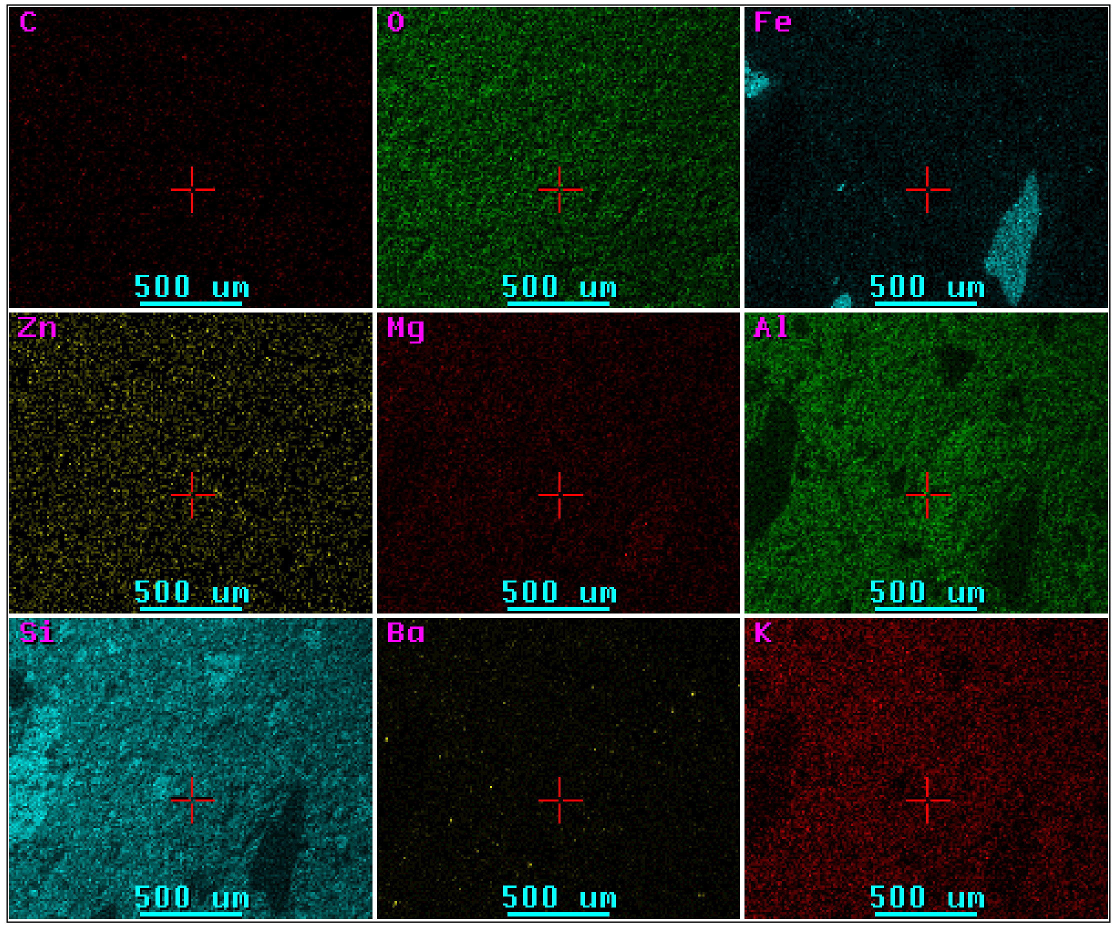


Fig. 95. Brick Elemental Map Data, Fig. 1b: Accelerating Voltage: 20 KeV - Magnification: 55 - Resolution: 512 x 512 - Pixel Size: 3.50441 microns. Mineral Lab Report 20531, June 3, 2005.

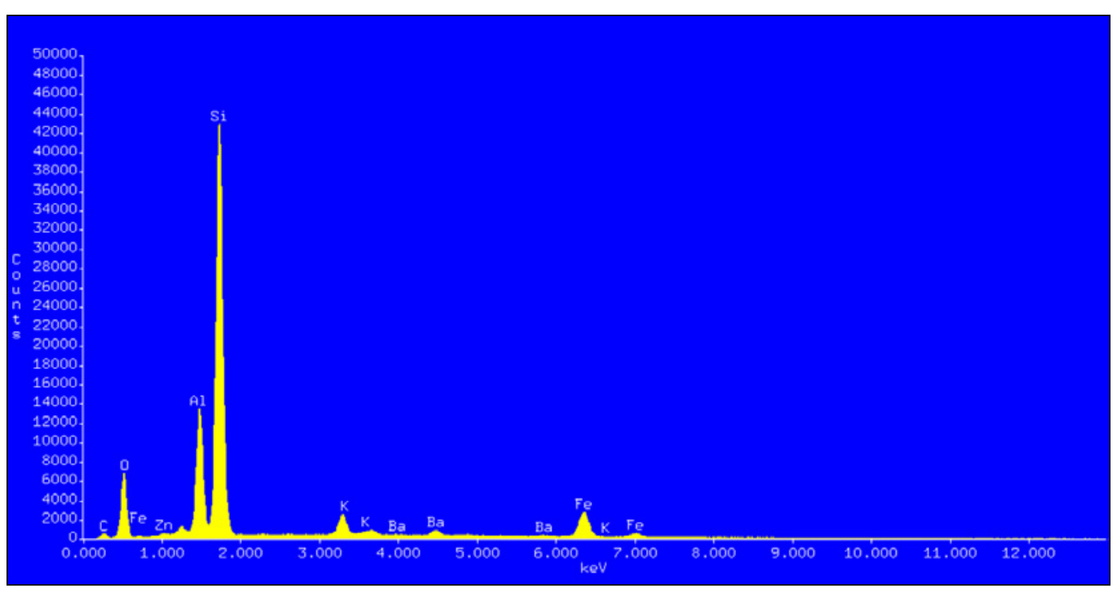


Fig. 96. Brick EDS Data: Accelerating Voltage: 20 KeV - Take Off Angle: 51.3303∞ - Live Time: 120 seconds - Dead Time: 53.2. Mineral Lab Report 20531, June 3, 2005.

XRD Results for "Brick" Sample - Lab no. 20531

Mineral Name	Chemical Formula	Approx. Wt % Brick
Quartz	SiO_2	30
Cristobalite	SiO_2	<3
Mullite	$Al_6Si_2O_{13}$	10
Hematite	Fe_2O_3	<5
Rutile	TiO_2	<2
Bredigite	$Ca_{14}Mg_2(SiO_4)_8$	<3?
K-feldspar	$KAlSi_3O_8$	—
Plagioclase feldspar	$(Na,Ca)Al(Si,Al)_3O_8$	—
Larnite	Ca_2SiO_4	—
Mica/illite	$(K,Na,Ca)(Al,Mg,Fe)_2(Si,Al)_4O_{10}(OH,F)_2$	—
Chlorite	$(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH)$	—
Portlandite	$Ca(OH)_2$	—
Calcite	$CaCO_3$	—
"Amorphous"	?	>45
"Unidentified"	?	<5

Fig. 97. XRD Results for "Brick" Sample - Lab no. 20531. Mineral Lab Report, June 3, 2005.

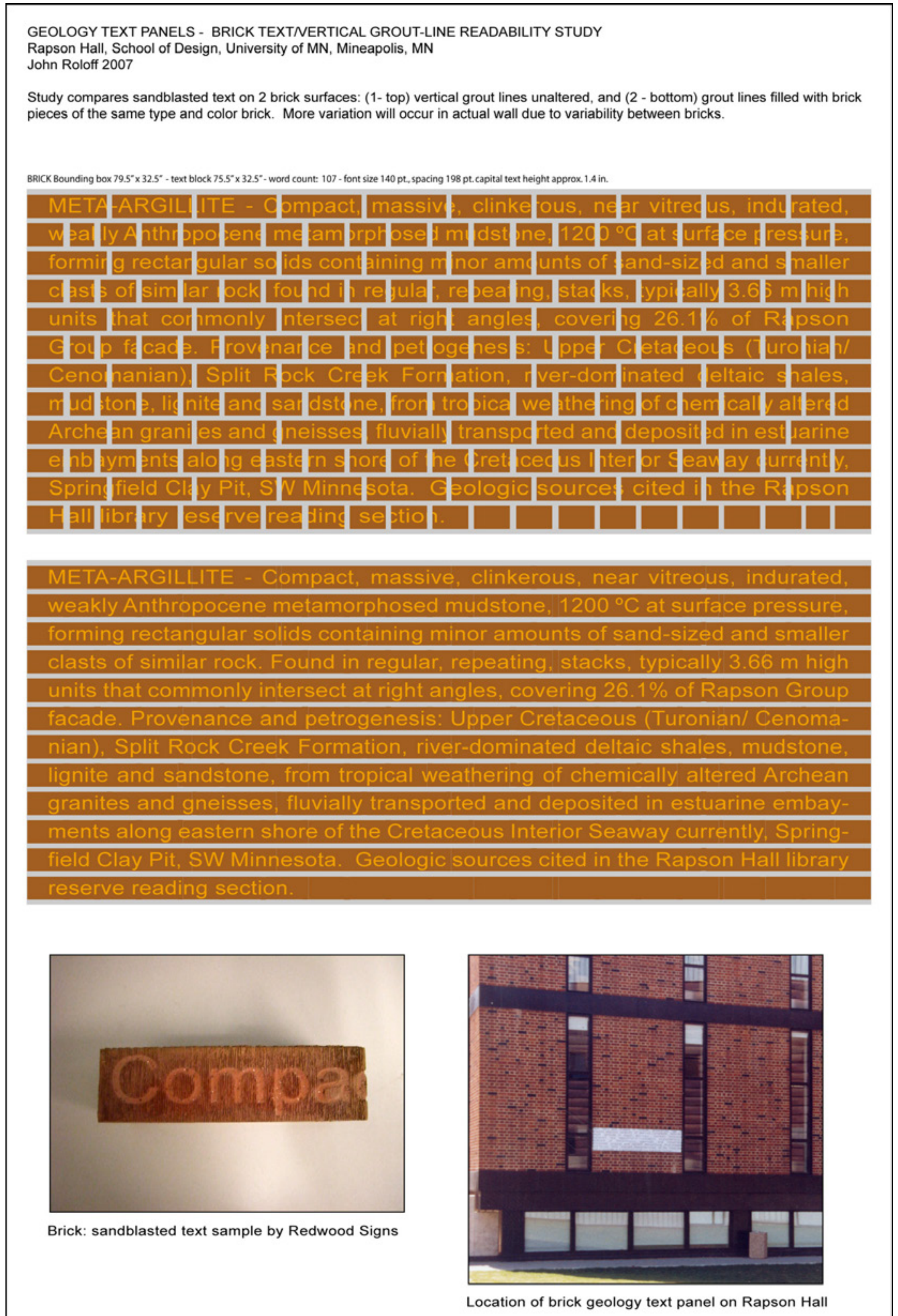


Fig. 98. Geology Text Panels - Brick Text/Vertical Grout-line Readability Study, inkjet on paper, size variable, 2007.

RAPSON GROUP BRICK: REFERENCES/BIBLIOGRAPHY

From: "John Mossler" <mossl001@umn.edu>
Subject: Ochs clay pit, Springfield, MN
Date: September 13, 2004 at 2:43:28 PM PDT
To: <jr@johnroloff.com> Cc: "Lori Day" <dayxx006@umn.edu>

Sept. 13, 2004

Dr. Roloff:

Re: Inquiry about the Ochs clay pit at Springfield, Minnesota: The source of the clay for brick at Springfield is Cretaceous claystone and shale.

The following references may be useful to you:

R. E. Sloan, 1964, *The Cretaceous System in Minnesota: Minnesota Geological Survey Report of Investigations 5*, 64 p., 2 pls. (Out of print but if you can't find it at the library you could ask the survey for a Xeroxed copy) This publication has a list of the fossils found in the pit and a description of the strata in the pit.

Schurr, G. W., Gilbertson, J P., Hammond, R. H., Setterholm, D. R., and Whelan, 1987, *Cretaceous rocks on the eastern margin of the western interior seaway: A field guide for western Minnesota and eastern North Dakota:* in Balaban, N. H., ed., *Field trip guidebook for Quaternary and Cretaceous geology of west-central Minnesota and adjoining South Dakota*, Minnesota Geological Survey Guidebook Series No. 16, p. 47-84. (Out of print)

Setterholm, D. R., and Heine, J. J., 1992, *Kaolinitic clays of the Minnesota River valley and southwestern Minnesota*, Minnesota Geological Survey Guidebook Series No. 19, 12 p. (Out of print)

Hauck, S. A., Heine, J. J., Zanko, L., Power, B., Geerts, S., Oreskovich, J., and Reichoff, J., 1990, *LCMR clay project: NRRI summary report: University of Minnesota, Natural Resources Research Institute Technical Report NRRI/GMIN-TR-89-12A, 201* p., 7 plates.

Hauck, S. A., and Heine, J. J., 1991, *Regional and local geologic, mineralogic, and geochemical controls of industrial clay grades in the Minnesota River Valley and the Meridian aggregates quarry, St. Cloud, Minnesota*: University of Minnesota, Natural Resources Research Center Technical report NRRI/TR –91/15

Dale Setterholm is the Cretaceous expert at the Survey however he is out of the office until September 20.

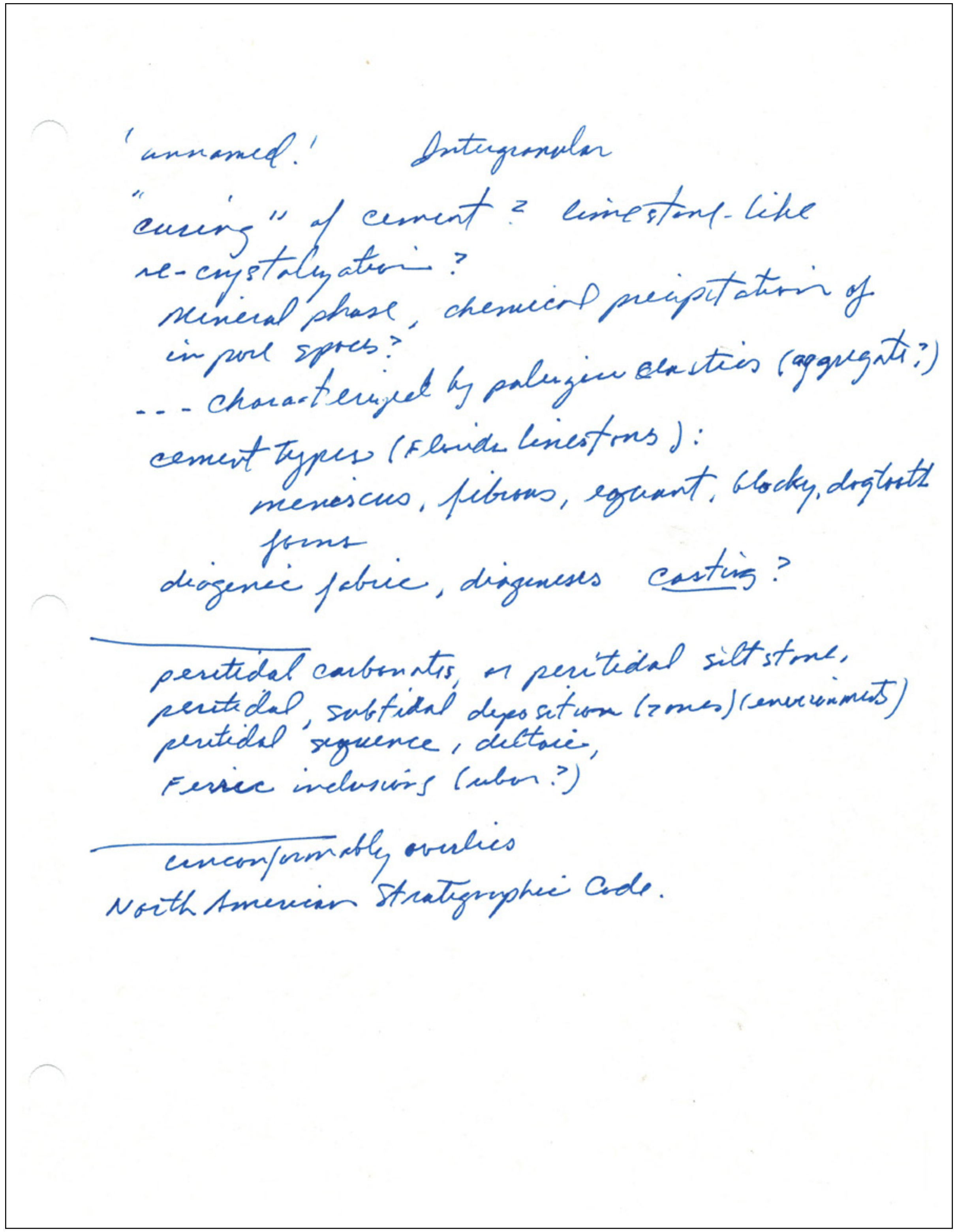
If you need copies of out-of –print MGS publications contact Lori Day (dayxx006@umn.edu or 612-6274780 ext 204). There is a nominal charge for copying.

You may not need the entire publication copied, the part about the claypits may suffice.

Our web site is http://www.geo.umn.edu/mgs

If I can be of further help please e-mail me.

John Mossler Minnesota Geological Survey 2642 University Ave. W. St.Paul, MN 55114 mossl001@umn.edu (612)627-4780x218.



'unnamed.' Intergranular

"curing" of cement = limestone-like

re-crystalization?

mineral phase, chemical precipitation of

in pore spaces?

... characterized by paleozoic clastics (aggregate?)

cement types (Florida limestones):

meniscus, fibrous, equant, blocky, dogtooth

forms

diagenetic fabric, diagenesis casting?

peritidal carbonates, or peritidal siltstone,

peritidal, subtidal deposition (zones)(environments)

peritidal sequence, deltaic,

Ferric inclusions (color?)

unconformably overlies

North American Stratigraphic Code.

Fig. 99. Concept notes: concrete, loose notebook page, pen on paper, 11 in x 8.5 in, 2001-03.

Rapson Group: *Concrete*

CALC-SILICATE CONGLOMERATE – Assorted clastics cemented in a complex calcium silicate matrix to form congomleratic mass as Rapson Group tectonic structure. Cement derived from calcium carbonate (CaCO3) Anthropocene calcination at 1500 ºC at surface pressures to form CaO, CaCO or lime. Rehydrated in situ, wherein clast-laden slurry became massive .25-1.5 m thick horizontal and vertical beds. Provenance and petrogenesis: Cement: Upper Devonian, fossiliferous marine carbonates, Shell Rock Formation, Upper Cedar Valley Group, remarkably well preserved wave-affected, massive beds of extinct reef-forming organisms, deposited in restricted, shallow basin of epi-continental Paleozoic sea, Mason City, north-central Iowa; Clasts: (1) older Paleozoic Franconia Formation, marine deposited fine-grained glauconitic sandstone, overlying Upper Cambrian, St. Lawrence Formation, dolomitic shale and siltstone, (2) Pleistocene terrace gravel, from late-glacial Lake Agassiz flood deposition event, Gray Cloud, Island, Mississippi River, SE Minnesota. Geologic sources cited in the Rapson Hall library reserve reading section.

RAPSON GROUP CONCRETE: PRELIMINARY RESEARCH NOTES/QUESTIONS

Name of Rock Type:

Brecciated Meta-Limestone, 'breccia' referring to the aggregate size and angularity; 'meta,' referring to the calcining/sintering of the limestone/clay mixture (a 2800 degree F. degree crystallization and regrinding process) during production; and limestone (perhaps) as the actual rock-type as evidenced by the mineralology (calcium/silicate), density, texture and deposition (it was deposited somewhat in layers – floors of the building - albeit massive for each pour). Would the re-hydration and chemical-exothermic reaction (curing) that sets the concrete matrix at the time of placement/deposition have a geologic analog - similar to the growth of calcite crystals in the lithification of limestone? Internal ferro/carbon rebar structure?

CALA Formation Name:

CALA Kaskaskian Formation, based on the name of the Devonian epi-continental sea the Shell Rock Limestone was deposited in. (not used).

Tectonics/Site Relationship:

Massive, articulated lithosome castings (geologic term?) forming primary tectonic structure of CALA (Rapson) Group, rests uncomformably on Pleistocene glacial till and Quaternary Mississippi River outwash deposits. Bounded on south edge by a geo-suture accreting to the CALA (Rapson) Niobrarian Formation (brick).

Derivation: Provenance of Original Material/Industrial Processes

Rapson Concrete Cement - The cement used in the CALA concrete is produced by Lehigh Cement Co. of Mason City, Iowa, primarily from local Upper Devonian Shell Rock formation limestone, local (age unknown) blue clay (limestone and clay approx. W 93 14' 00", N 43 10' 00"). Devonian Shell Rock formation deposited in the Kaskaskia epicontinental sea in waters that are generally less than 150 feet deep. Exact depositional environment of this segment of the Shell Rock Formation unknown. Minor additional components are: industrial fly ash, mill scale, St, Peter sandstone sand, foundry sand. Primary cement constituent of limestone paleogeography/environment of shallow mid-continental tropical sea.

Two aggregates were used in the CALA concrete:

I) A Paleozoic limestone (to be confirmed) from the Larson Quarry on Gray Cloud Island, Washington County, MN (approximately, W 93 00' 30", N 44 48' 00") probably from: either the Mt. Simon, Ironton–Galesville, Jordan Sandstones, St. Lawrence, Franconia, early Paleozoic (Ordovician), Oneota Formation, Prairie du Chien Group, dolostone, or EauClaire Formations. Paleogeography/environment: shallow mid-continental tropical sea.

II) Surficial terrace and Mississippi outwash gravels from the Nelson Plant south east of Gray Cloud Island, Washington County, MN (approximately, W 92 59' 00", N 44 47' 00"). Paleogeography/environment: glacier ice, glacial scour and moraine, temperate to frigid atmosphere .

Inquiry into the origin/provenance of the rebar used to reinforce the concrete, is reserved for future research.

Fig. 100. Anthropocene post-depositional structural system of Rapson Group Concrete with secondary materials filling voids.

CEMSTONE
CONCRETE SOLUTIONS
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Fax Transmittal

TO:	Shelly Willis	FR:	Jeff Claude
CO.:	Weisman Art Museum	FAX:	651.688.0726
FAX:	612.625.9630	PH:	651.686.4216
CC:		Email:	jclaude@cemstone.com
DATE:	June 4. 2002	TOTAL NUMBER OF PAGES: *Including this Cover Page*	**[12]**
RE:	Concrete Mix Design Materials for School of Architecture @ U of M		

Shelly, I have noted some materials used in the concrete mix designs used for the project. Additionally, I have enclosed some technical information on these materials taken from the Portland Cement Associations Design and Control of Concrete Mixtures publication, one of the industry's best references.

Materials: *Lehigh Type I (one) Portland Cement*, manufactured in Mason City, Iowa (see enclosed pages on cement manufacturing, mineral composition etc) under "Portland Cements" (4) pgs. encl.

Flyash distributed by ISG Resources, Inc. (see enclosed "Technical bulletin from ISG). The flyash used on the project was produced at the Coal Creek Station in North Dakota run by Energy River Power. The processes and composition of this material is noted in the enclosed (2) pg. enclosure.

Aggregates were mined and processed by Aggregate Industries out of their Grey Cloud Island facility in the south Metro area. The coarse aggregates were primarily a river gravel, the fine aggregate used was a concrete sand. The source of these aggregates is an outwash deposit from the glaciers as they traveled from northern Minnesota to the deposit's current location at Grey Cloud Island carrying materials from north to south with it. The composition of this deposit for both the coarse and fine aggregate used in the concrete mixes is an amalgam of metamorphic, sedimentary and igneous rocks. These aggregates are mined, washed and graded for their eventual use in ready mix concrete. If you would like additional geologic information on this material you may contact Jamie Langdon w. Cemstone at 952.846.0688. (2) pgs.encl.

Chemical Admixtures of a wide variety were used on this project: air entraining, accelerators, superplasticizers, water reducers. I have enclosed some highlighted information on composition of these materials as well as their benefit to the concrete. If you have further questions, call me on this. (3) pg encl.

Water for the concrete has no other requirement than to be potable, water may be heated to increase concrete temperatures for cold weather placements. — WATER OF HYDRATION PART OF FINAL MATERIAL

Let me know if this information w. the enclosures is appropriate for your needs.

Jeff Claude
Sales Manager, Commercial
Cemstone Products Company
T: 651.686.4216

Fig. 101. Concrete Mix Design Materials for School of Architecture @ U of M, fax transmission from Jeff Claude to Shelly Willis, cover page, 2002.

JUN-04-2002 10:14 P.10

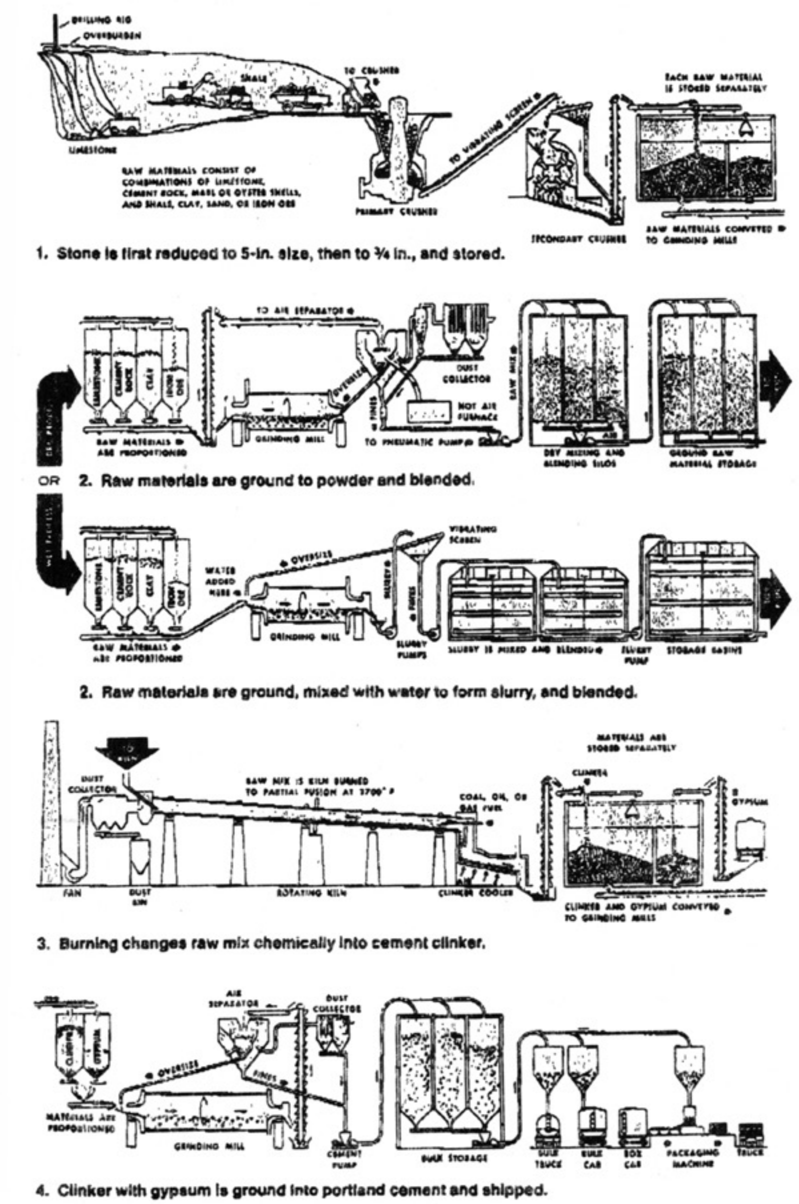

Fig. 2-2. Steps in the manufacture of portland cement.

Fig. 102. Concrete Mix Design Materials for School of Architecture @ U of M, fax transmission from Jeff Claude to Shelly Willis, pg. 10, 2002.

XRD Results for “Concrete” Sample - Lab no. 205310

Mineral Name	Chemical Formula	Approx. Wt % Concrete
Quartz	SiO_2	40
Cristobalite	SiO_2	—
Mullite	$Al_6Si_2O_{13}$	—
Hematite	Fe_2O_3	<5
Rutile	TiO_2	—
Bredigite	$Ca_{14}Mg_2(SiO_4)_8$	—
K-feldspar	$KAlSi_3O_8$	12
Plagioclase feldspar	$(Na,Ca)Al(Si,Al)_3O_8$	15
Larnite	Ca_2SiO_4	<3
Mica/illite	$(K,Na,Ca)(Al,Mg,Fe)_2(Si,Al)_4O_{10}(OH,F)_2$	<3
Chlorite	$(Mg,Fe,Al)_6(Si,Al)_4O_{10}(OH)$	<3
Portlandite	$Ca(OH)_2$	7
Calcite	$CaCO_3$	<3
“Amorphous”	?	<15
“Unidentified”	?	<5

Fig. 103 . XRD Results for “Concrete” Sample - Lab no. 205310.
Mineral Lab Report, June 3, 2005.

Fig. 2a - Thin section CALA concrete

Fig. 2b - SEM 55X Enlargement of concrete sample

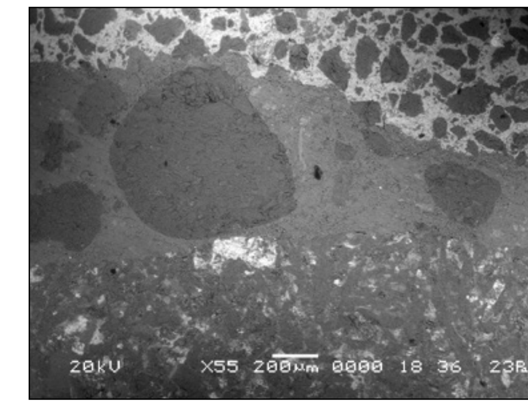

Fig. 2c - SEM 200X Enlargement of concrete sample

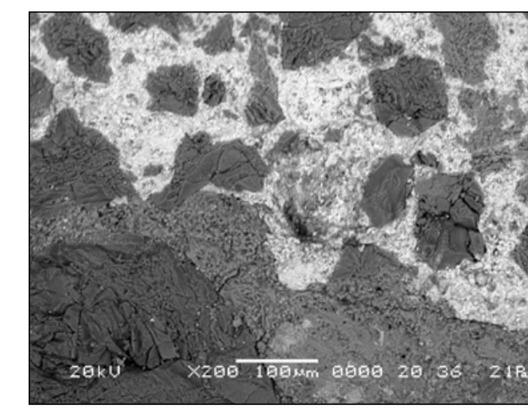

Fig. 2d - SEM 600X Enlargement of concrete sample

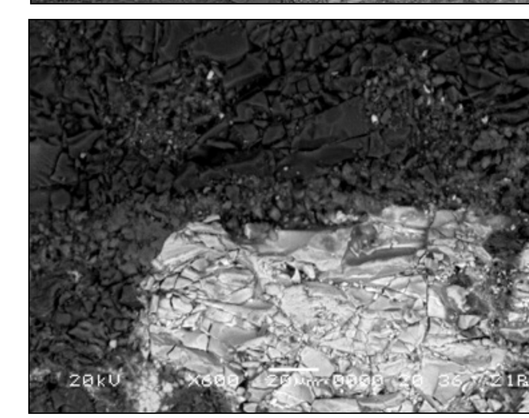

Fig. 104. Thin Section and Scanning Electron Microscopy (SEM) imagery - “Concrete” Sample.
Mineral Lab Report 20531, June 3, 2005.

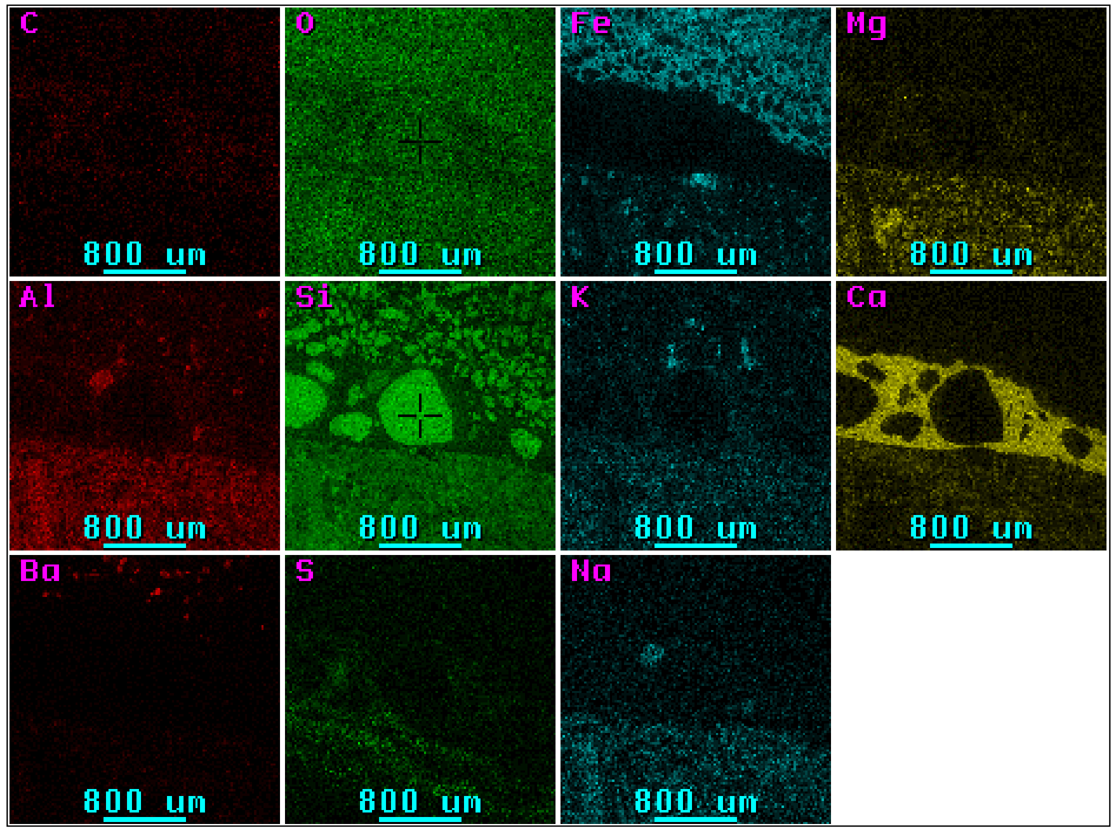

Fig. 105. Concrete Elemental Map Data, Fig. 2b:Accelerating Voltage: 20 KeV - Magnification: 37 - Resolution: 512 x 512 - Pixel Size: 5.20926 microns. Mineral Lab Report 20531, June 3, 2005.

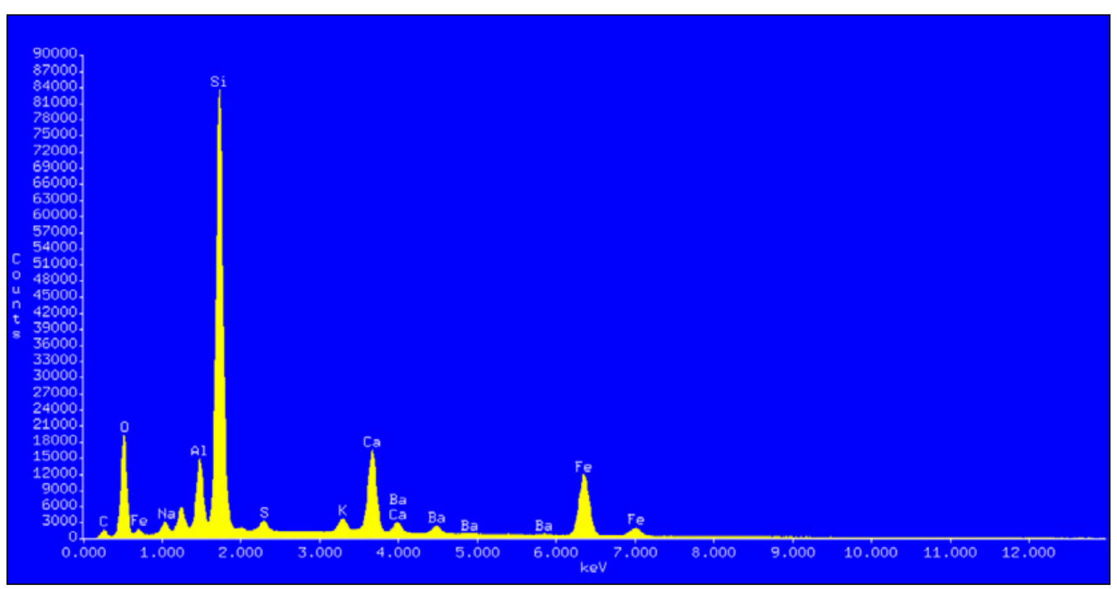

Fig. 106. Concrete EDS Data:Accelerating Voltage: 20 KeV - Take Off Angle: 53.29∞ - Live Time: 120 seconds - Dead Time: 165.614. Mineral Lab Report 20531, June 3, 2005.

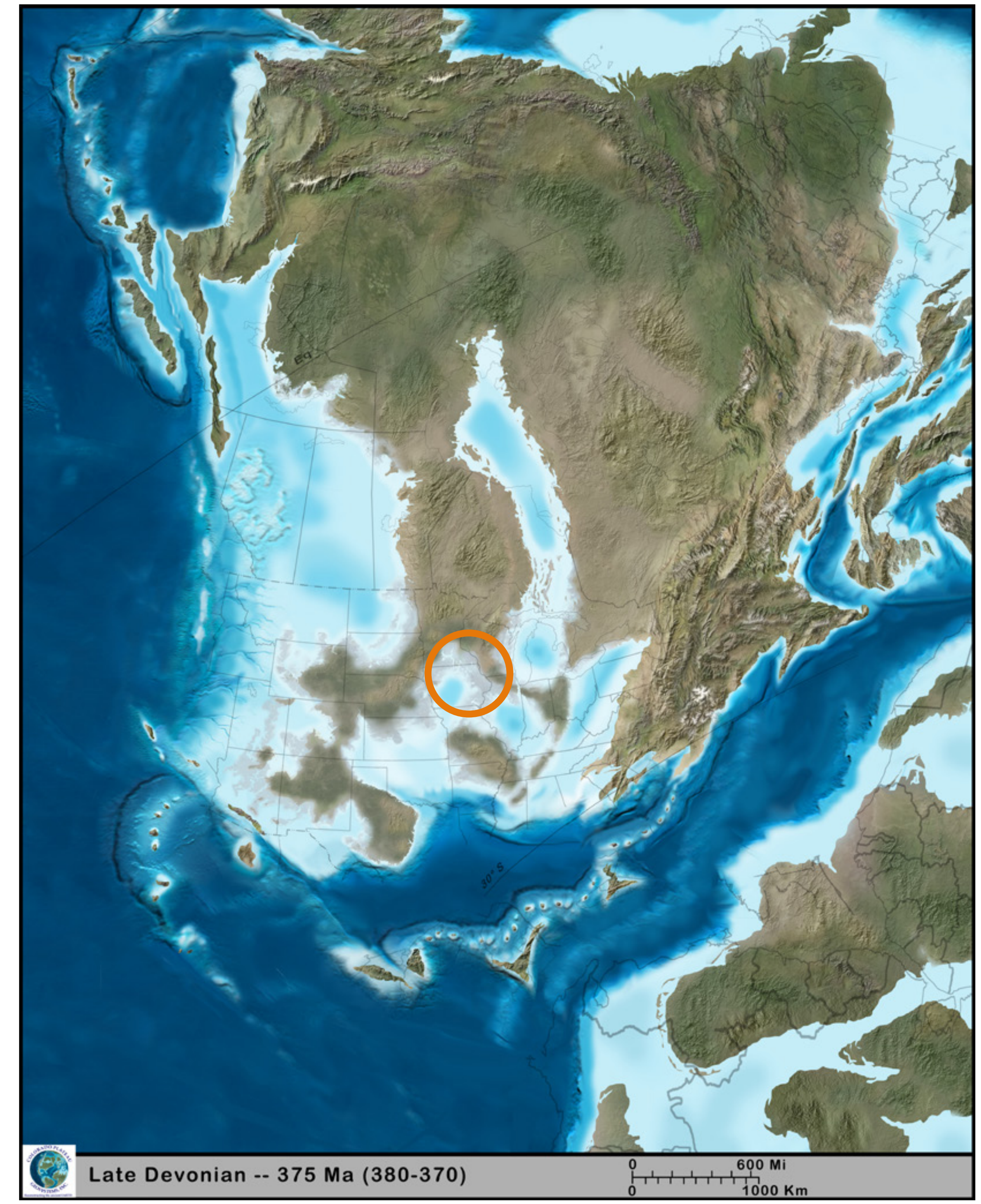

Fig. 107. North America (Late Devonian): tropical, marine depositional environment of Shell Rock Formation, carbonates, reef systems, Devonian Mid-continental Sea.

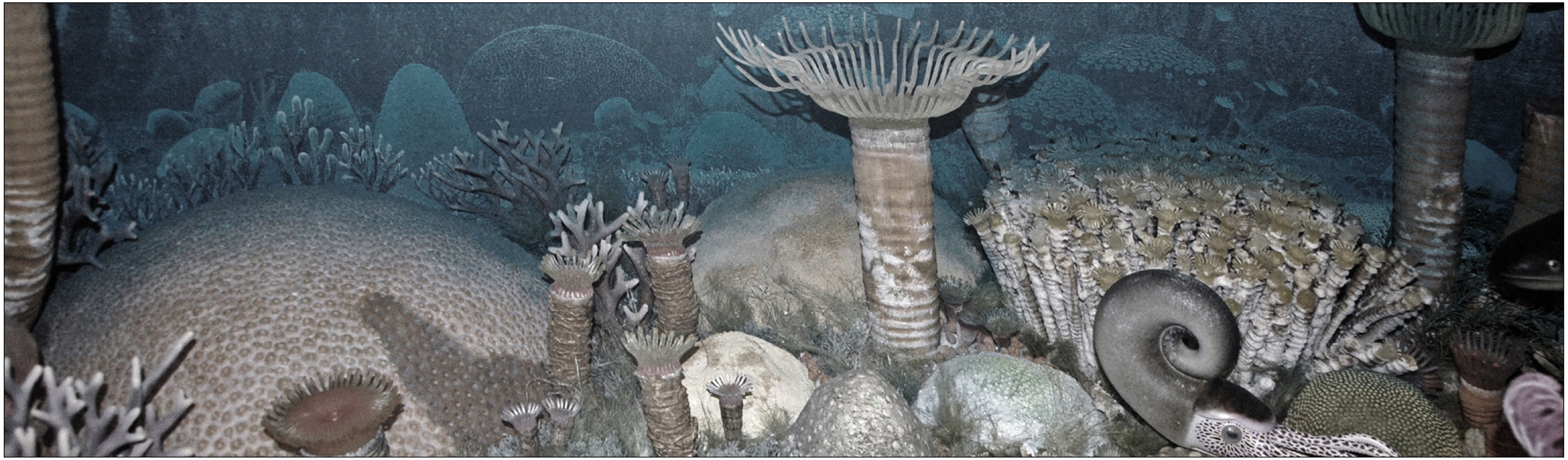

Fig. 108. Simulated Devonian Period seafloor, the paleogeographic/environmental context and depositional environment of the Shell Rock Formation.

Fig. 109. Devonian limestone exposure, mid-North America.

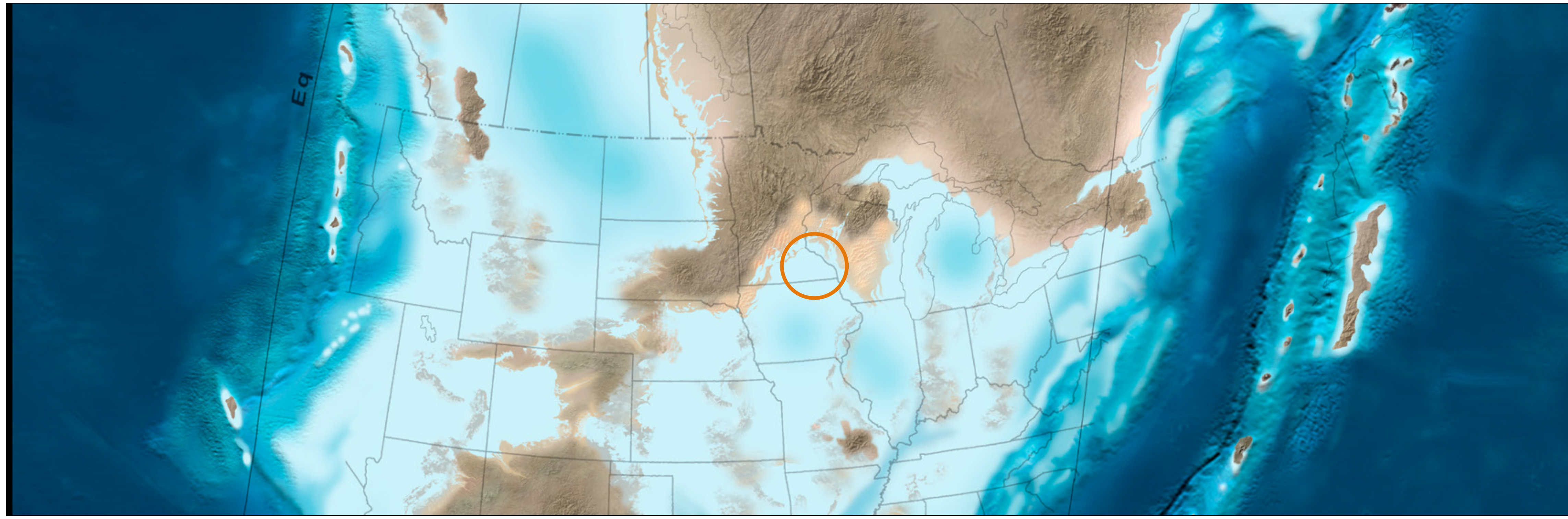

Fig. 110. Early Paleozoic North America: tropical, marine depositional environment of Rapson Group Concrete aggregate I.

Fig. 111. Anthropocene erosion of Rapson Group Concrete aggregate I, Larson Quarry, Grey Cloud Island, Washington County, MN.

Fig. 112. North America, Pleistocene glaciation and glacial lakes including Lake Agassiz in Minnesota, Dakota and Southern central Canada. Circle indicates depositional environment for Rapson Group Concrete aggregate II.

Fig. 113. Anthropocene erosion of Quaternary surficial terrace and Mississippi out-wash gravels, Rapson Group Concrete aggregate II, Nelson Quarry, Cottage Grove, Washington County, MN.

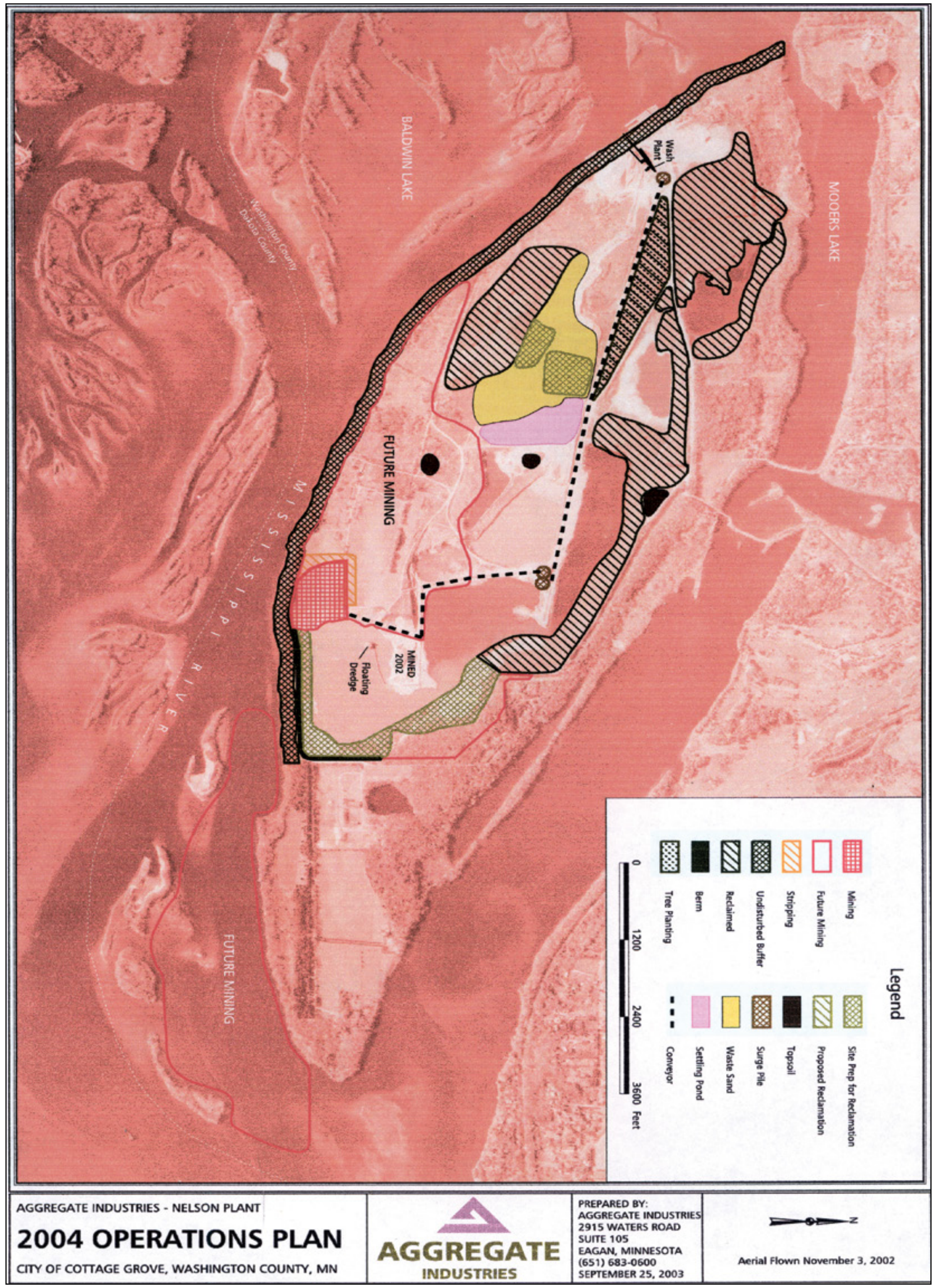

Fig. 114. 2004 Operations Plan, aerial map of Anthropocene erosion of Quaternary sediments, Nelson Quarry, Cottage Grove, Washington County, MN

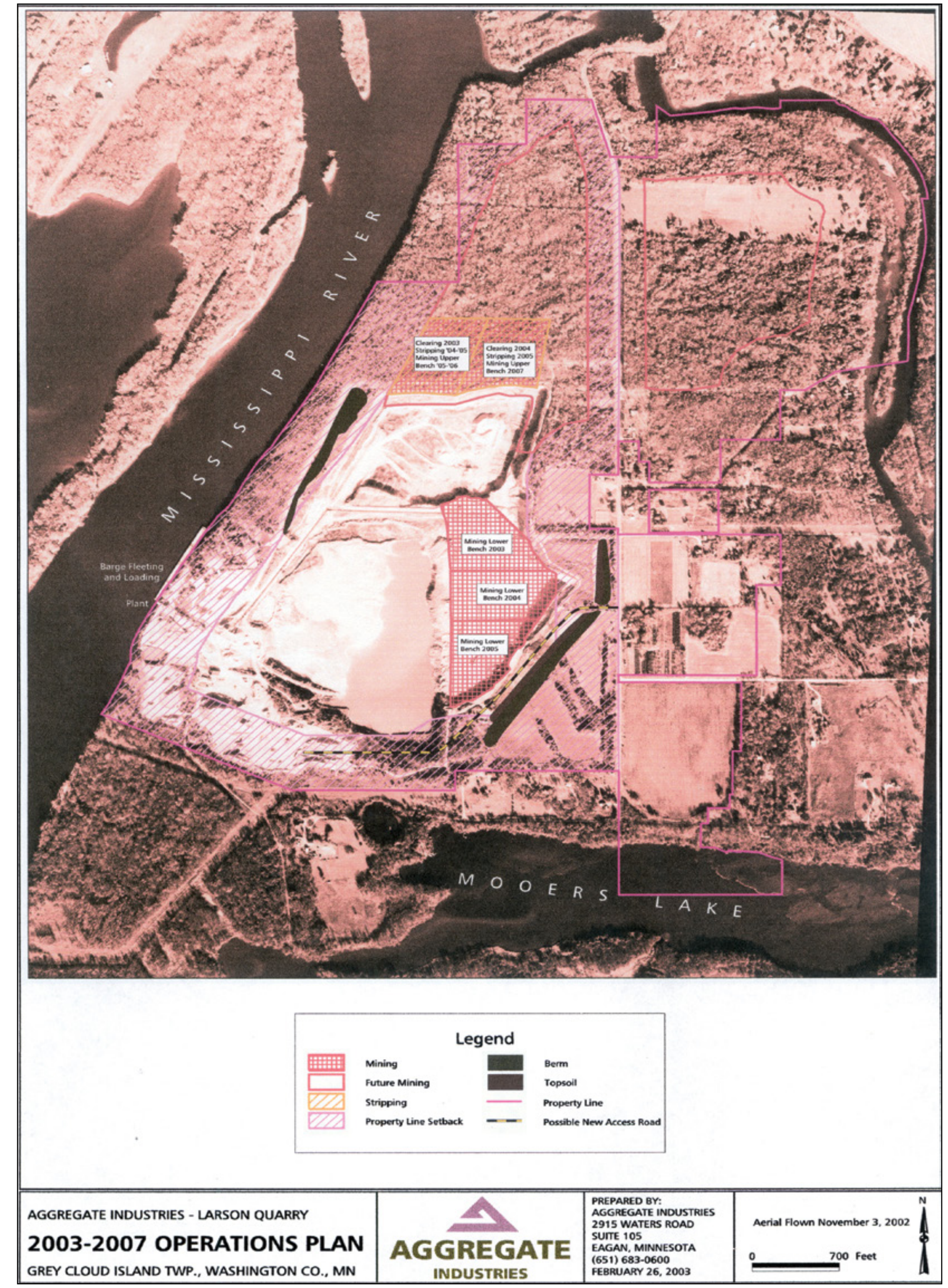

Fig. 115. 2003-2007 Operations Plan, aerial map of Anthropocene denudation, Larson Quarry, Grey Cloud Island, Washington County, MN.

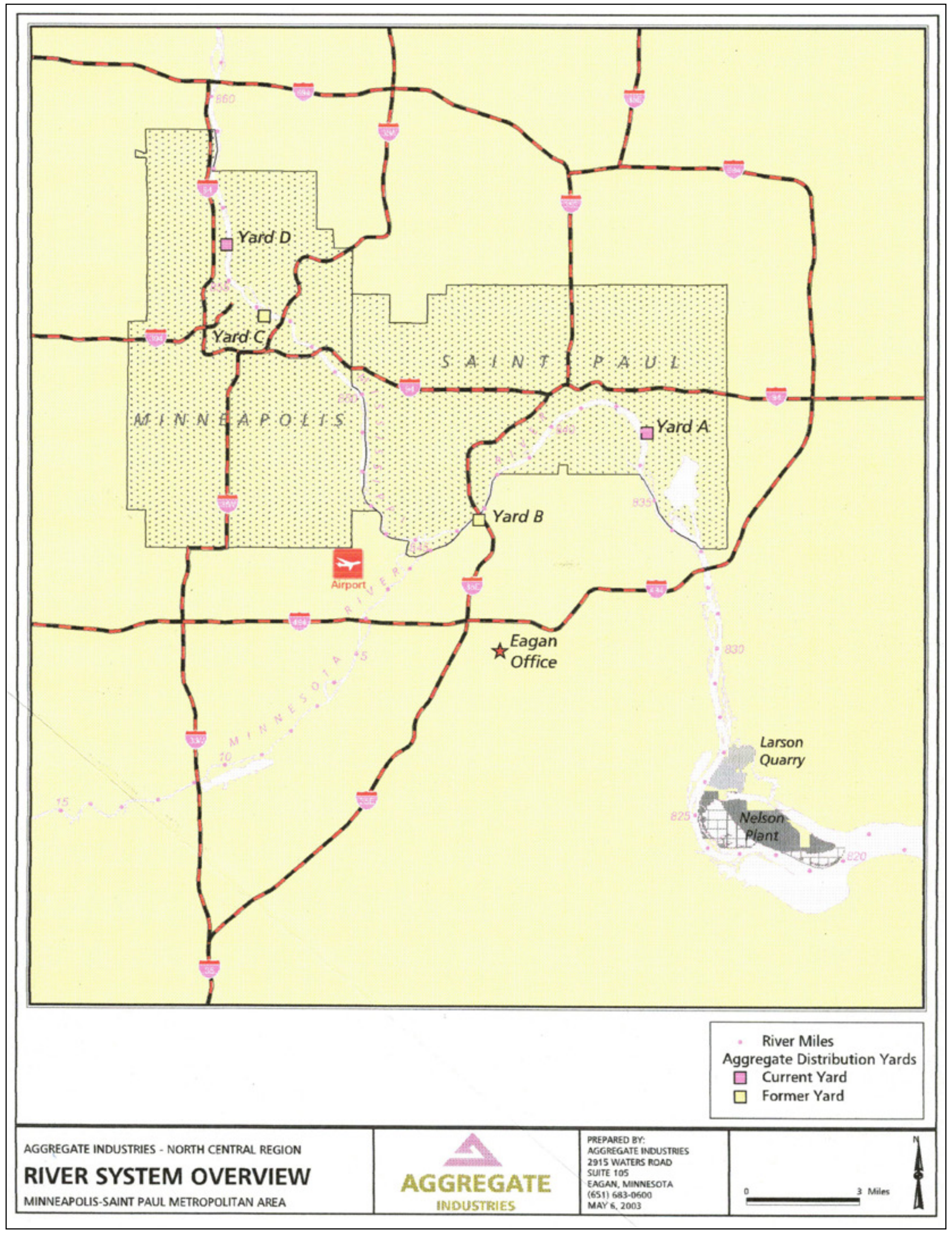

Fig. 116. River System Overview, location of Anthropocene denudation, Larson Quarry and Nelson Plant, Grey Cloud Island and Cottage Grove, Washington County, MN.

RAPSON GROUP CONCRETE: REFERENCES/BIBLIOGRAPHY

Anderson, W., *Geology of Iowa, Over Two Billion Years of Change*, 1983, University of Iowa Press.

Runkel, A.C., Tipping, R.G., Alexander, E.C., Jr., Green, J.A., Mossler, J.H., and Alexander, S.C., *Hydrogeology of the Paleozoic bedrock in southeastern Minnesota,* Minnesota Geological Survey Report of Investigations 61, 2003.

Taylor, Samantha S., Mahoney, Brian J., *Stratigraphic and Structural Interpretations of the Prairie du Chien Group, Western Wisconsin and Eastern Minnesota,* University of Wisconsin - Eau Claire Eau Claire.

Witzke, Brian J., *Devonian Carbonate Strata in the Mason city Area, stop 2A: Holnam Limestone Quarry,* in: Anderson, Raymond, R., Bunker, Bill, J., ed., *Fossil Shells Glacial Swells, Piggy Smells, and Drainage Wells: The Geology of the Mason City, Iowa, Area*, Geologic Society of Iowa Guidebook 65, April, 26, 1998

Brian J. Witzke, *Bedrock Geologic Map of North-Central Iowa*, Iowa Department of Natural Resources, Geological Survey Bureau, July 2001

Rapson Group: *Glass*

AMORPHOUS VITREOUS QUARTZ - Supercooled, metastable SiO_2, noncrystalline solid, from Anthropocene cooling and thinning of quartz melt below glass transition temperature: 1650 +/- 70 ºC. Predictable vertical array comprising 16.3% Rapson Group facade, filling voids in vertical calc-silicate conglomerate units. European provenance and petrogenesis: 40% Pliocene pure silica fluvial sands, from chemically weathered sediment,

Rhine Graben, Soufflenheim France, tectonic basin trending ENE along the French-German border, Alps to Strasbourg to Frankfurt; 15% early Visean, Carboniferous dolomitized reef-mound carbonates, Campine Basin, Namur, Belgium; 15% Anthropocene altered halite and limestone and 30% recycled Anthropocene glass from multiple, un-traceable European sources. Geologic sources cited in the Rapson Hall library reserve reading section.

RAPSON GROUP GLASS: PRELIMINARY RESEARCH/NOTES

Name of Rock Type:
Igneous, transparent, felsic, amorphous, sodium/calcium silicate rhyolitic glass, no apparent phenocrysts or vesicles, conchoidal fracture.

Rapson Group Name (?):
Rapson Tethys Sea (?) an extremely broad and theoretical generalization, that the source of the silica in the glass is from a marine sand/sandstone/quartzite deposited in some relationship to the European Tethys sea.

Tectonics/Site Relationship:
Individual extruded, u-shaped elements deposited vertically (columnar?), vertical joints are filled with organic-silicone mixture. Multi-unit assemblages are anthro-intruded conformably (?) (laccoliths-like?) between previously deposited brecciated meta-limestone of the Rapson Group Kaskakian Formation?

Derivation: Provenance of Original Material/Industrial Processes:
The Holocene Era, Rapson Group glass, whose industrial name is Profilit Glass, is manufactured by Pilkington Bauglasindustrie GmbH in Schmelz, Germany. (approximately N 49 26’ 00’’, E 6 51’ 00’’). The raw materials, primarily: sand, dolomite, limestone and soda ash are of European origin, whose provenance is still being researched and may ultimately need to be generalized for the text panel as specific information has been very difficult to acquire.

Manufacturer’s analysis of glass composition (Pilkington Engineering Data sheet), by mass:
SiO_2 - 69 to 74%; CaO - 5 to 12%; Na_2O - 12 to 16%; MgO - 0 to 6%; Al_2O_3 - 0 to 3%

The quartz sands of Soufflenheim are of fluvial (river transport) origin. Soufflenheim is located in the Rhinegraben, a tectonic basin that is bordered by normal faults on each side. The river Rhine deposited the sands of Soufflenheim in Pliocene (1.806 - 5.332 Ma b.p.) times. Therefore, the sands were deposited before the ice age(s) (Pleistocene). Before the Pleistocene when the sands accumulated, the climatic conditions in the Rhine area differed significantly, it was warm and humid. Warm and humid climatic conditions favour the alteration and decay of feldspar minerals within the sand. Feldspar weathered to kaolin and was easily washed away. Therefore, the white sands of Soufflenheim are very pure and have a high quartz content. The overlying loess strata represent the ice age(s), it is a fine grained eolian (wind transported) sediment that accumulated in the cold glacial maxima. Information provided via email by: PD Dr. Stefan Götz, Geologisches Institut I, Universität Karlsruhe, Kaiserstraße 12, D-76131 Karlsruhe

The Namêche quarry is a large exploitation of dolomite rock of Lower Carboniferous age along the Meuse river, north of Namur. Dolomite genesis is a troublesome and complex issue but this one is to all probability related to the infiltration of Mg rich evaporitic brines from a evaporitic basin which developed over the whole area in the Early Visean (the dolomite is earliest Visean) Information provided via email by: Noël Vandenberghe, Professor of Regional Geology, Katholieke Universiteit Leuven, Redingenstraat 16, B-3000 Leuven, Belgium.

Fig 117. Primary Landscape: Glass Carbonate Flux: Early Visean, marine sedimentary, reef-mound depositional environment (later dolomitized) Proto-Tethys Sea, Campine Basin, Namur, Belgium

Fig. 118. Examples of Rapson Group Glass, Anthropocene depositional structure, Rapson Hall, circa 2004.

Fig. 119. Example of Rapson Group Glass, Anthropocene depositional structure, and glass text panel site study, Rapson Hall, circa 2004

The quartz sands of Soufflenheim are of fluvial (river transport) origin. Soufflenheim is located in the Rhinegraben, a tectonic basin that is bordered by normal faults on each side. The river Rhine deposited the sands of Soufflenheim in Pliocene (1.806 - 5.332 Ma b.p.) times. Therefore, the sands were deposited before the ice age(s) (Pleistocene). Before the Pleistocene when the sands accumulated, the climatic conditions in the Rhine area differed significantly, it was warm and humid. Warm and humid climatic conditions favour the alteration and decay of feldspar minerals within the sand. Feldspar weathered to kaolin and was easily washed away. Therefore, the white sands of Soufflenheim are very pure and have a high quartz content. The overlying loess strata represent the ice age(s), it is a fine grained eolian (wind transported) sediment that accumulated in the cold glacial maxima. The Pliocene sediments of Soufflenheim (sands, clays and even coals) are well known for their plant and vertebrate fossil. See also the attached Figures, Geological overview and detailed geological map.

the name used most frequently is “Weisssand-Formation” (white sand formation). Since this is not a valid name for a formation I would prefer the name “Riedseltz-Formation”. In Riedseltz there are the biggest and even public accessible resources of this Pliocene sands.

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goetz@stratigraphy.net
http://www.rz.uni-karlsruhe.de/~de57/Geo/Staff/Goetz/
http://www.rz.uni-karlsruhe.de/%7Ede57/Geo/Staff/Goetz/>

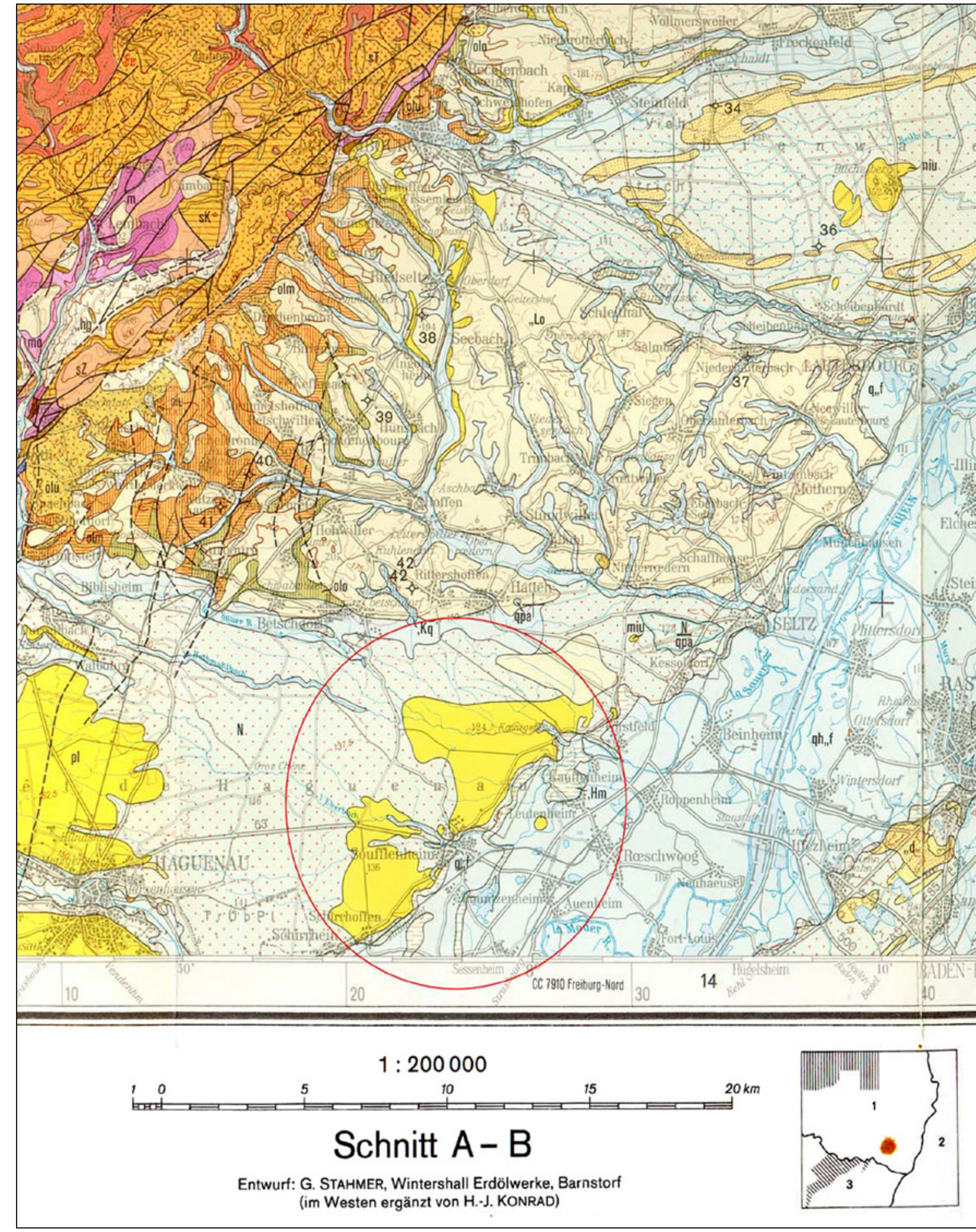


Fig. 120. Rapson Group Glass Silica/quartz Component: Pliocene depositional environment of pure silica fluvial sands, from chemically weathered sediment, Rhine Graben, Soufflenheim France. Provided by: Dr. Stefan Götz, Geologisches Institut, Universität Karlsruhe, Karlsruhe, Germany.

21-FEB-2006 10:42 Von:FRIEDRICH GMBH 0049721783288 An:+49 6887 30345 S.4/6

0049721783288

SABLIERES DE QUARTZ

FRIEDRICH

QUARZSANDWERKE

F

ALSACE

Für das Vorkommen in Soufflenheim wird der Querschnitt des Geländes wie folgt beschrieben:

- die Deckschicht aus Loess, die direkt auf dem Pliozensand liegt, hat eine Mächtigkeit von 2 bis 4 Meter.
- von der oberen Sandschicht bis zum Bohrpunkt haben die Quarzsande eine Mächtigkeit von 15 Meter.
- die Bohrungen, die in bis zu 26 Meter Tiefe gingen, weisen eine weitere Schicht von Quarzsand mit einer Mächtigkeit von 21 Metern aus.

Die gesamte Schicht (ca. 40 Meter) ergibt abbaubares Material auf ca. 35 Meter, davon 15 Meter unter dem „Pliozenwasserspeicher".

Außerdem liegt unter diesem Quarzsandgebiet als sicherer Schutz die sehr dicke, wasserdichte Miozentonschicht.

Das heisst, Quarzsand kommt in verschieden gelagerten Schichten mit unterschiedlichen Mächtigkeiten und Qualitäten vor.
Um die Qualität eines Vorkommens zu beurteilen, werden Bohrproben gemacht, die einen Eindruck von der Mächtigkeit des Vorkommens, den verschiedenen Schichtungen, den Verunreinigungen und der zu erwartenden Qualität vermitteln.

Die chemische Zusammensetzung und Qualität des Quarzsandes wird durch die natürliche Zusammensetzung des Vorkommens bestimmt und kann durch eine Aufbereitung nur minimal verändert bzw. beeinflusst werden.
Der Abbau erfolgt gemäß Abbauplan im Nass- oder Trockenabbau.

Fig. 121. Fur das Vorkommen in Soufflenheim wird der Quersnitt des Gelandes wie folgt beschriben, fax transmission from Friedrich Quarzsandwerke, with stratigraphic information of the quartz sand used in the Rapson Group Glass. 2006.

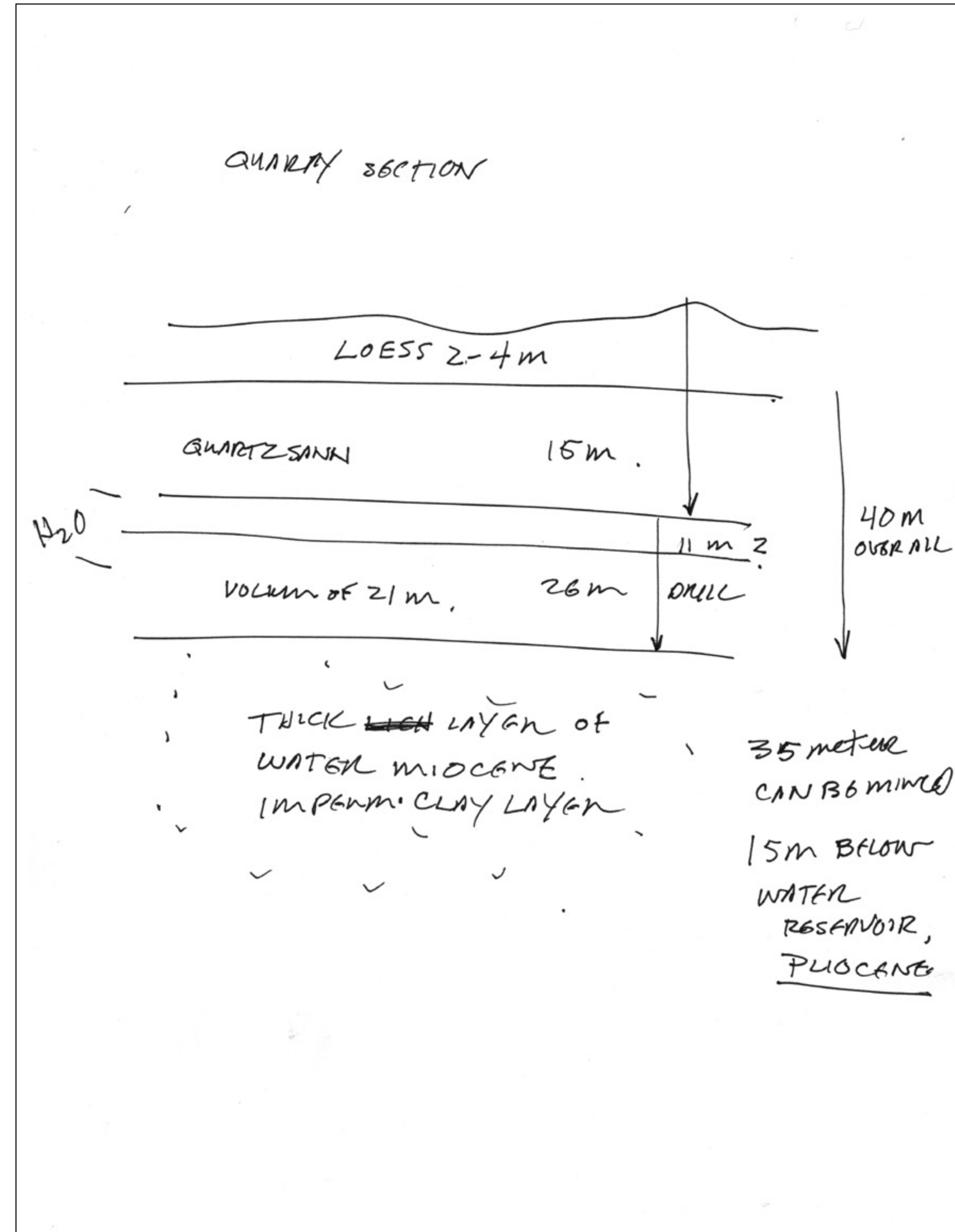


Fig. 122. Sketch of the with stratigraphic information of the quartz sand used in the Rapson Group Glass based upon a fax transmission from Friedrich Quarzsandwerke, Soufflenheim, Germany, *fig. 117*. John Roloff, 2006.

Subject: Re: University of Minnesota project
Date: Sunday, June 25, 2006 at 10:50 AM
From: Noël Vandenberghe <Noel.Vandenberghe@geo.kuleuven.be>
To: john roloff <jroloff@sfai.edu>

Dear John,
From the top of my head : the Namêche quarry is a large exploitation of dolomite rock of Lower Carboniferous age along the Meuse river, north of Namur. Dolomite genesis is a troublesome and complex issue but this one is to all probability related to the infiltration of Mg rich evaporitic brines from a evaporitic basin which developed over the whole area in the Early Visean (the dolomite is earliest Visean). There exists literature on this dolomitisation but I do not know how relevant this detailed geological models are of importance to your subject. Just let me know what you are exactly after , so I can get more focused after it.

friendly greetings

Noël Vandenberghe

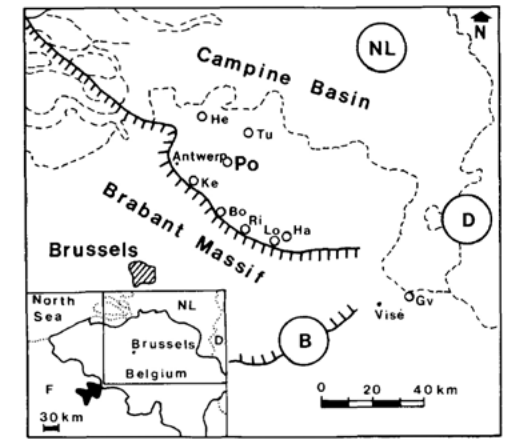


Fig. 1. Location of the boreholes, which penetrated Visean limestones in northern Belgium. The Dinantian strata are present to the north and south of the Brabant Massif (Bo: Booischot; Gv: 's Gravenvoeren; Ha: Halen; He: Heibaart; Ke: Kessel; Lo: Loksbergen; Po: Poederlee; Ri: Rillaar; Tu: Turnhout; NL: Netherlands; D: Germany; B: Belgium).

The Visean sediments in the Poederlee borehole are represented by five alternations of microbial boundstones and bioclastic packstones and grainstones (Fig. 3) reflecting the stacking of five successive reef mounds. The boundstones contain an open marine fauna and stromatactoid cavities in a peloidal and clotted micrite. They have been interpreted as the core of a reef mound, which developed below and near wave base (Muchez *et al.* 1987*a*, 1990). The bioclastic packstone and grainstone lithofacies contain a fully marine biota of crinoids, brachiopods, bryozoa and corals. These sediments occur above the boundstones and form the flank and top facies of the reef mound. They were deposited above wave base.

The Visean strata underwent almost continuous burial during the Upper Carboniferous but Permian, Triassic or Jurassic sediments are not encountered in the area and it is not known if they were deposited there. During the Cimmerian phase of tectonic uplift (150 Ma), a major part of the Westphalian and any Mesozoic strata were eroded (Patijn 1963; Van den Haute & Vercoutere 1989). However, the uplift history is poorly constrained and erosion of the Upper Carboniferous may already have started at the end of the Carboniferous and may have continued during the Early to Mid-Jurassic.

Diagenesis of the limestones took place throughout the burial history. Primary intergranular porosity in the packstones and grainstones, and large irregular interconnected pores and stromatactoid cavities within the microbial framework were cemented by syndepositional marine cements (stage A fibrous and inclusion-rich calcites) and

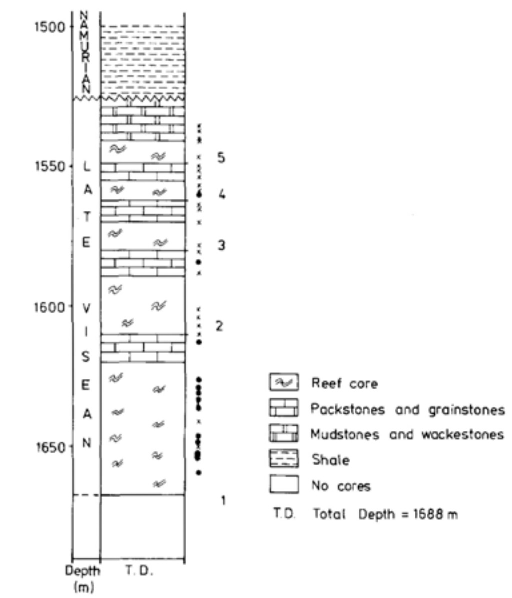


Fig. 3. Log of the Visean limestones in the Poederlee borehole. Superimposed reef mounds are numbered 1 to 5. Black dots next to the log indicate the samples analysed petrographically and geochemically. The crosses indicate samples which have been studied only pretrographically.

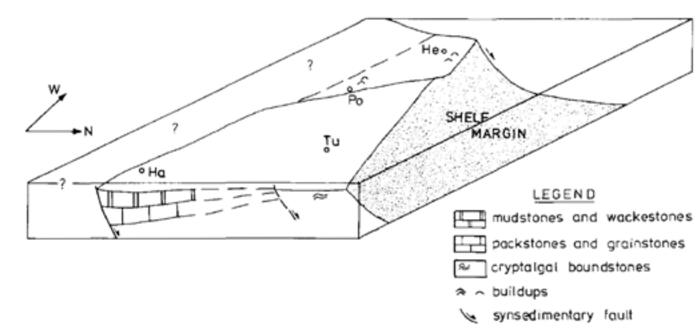


Fig. 2. Palaeogeography of the Campine Basin during the Late Visean (abbreviations: see Fig. 1).

Fig. 123. From, Muchez,P., Viaene, W. A., Keppens, E., Marshall., & Vandenberghe, N., *Vein Cements and the Geochemical Evolution of Subsurface Fluids in the Visean of the Campine Basin (Poederlee borehole, Belgium),* Journal of the Geologic Society, London. Vol 148, 19991, pp 1005-1117.

Subject: Re: University of Minnesota project
Date: Sunday, June 25, 2006 at 2:26 AM
From: Andreas Schaefer <schaefer@uni-bonn.de>
To: john roloff <jroloff@sfai.edu>

Dear John Roloff, in reply to your kind letter I will try to help you.

Last year, 2005, in the International Journal of Earth Sciences (Geologische Rundschau), volume 94 (4), there was published a compilation of articles concerning the Upper Rhine Graben. Christian Derer and Jean-Pierre Berger in their articles both show up with stratigraphic tableaus showing its Tertiary stratigraphy. They relate to the graben fill but can be also taken to give information what might be relevant in its close vicinity. Specialist on the Tertiary stratigraphy of the alpine molasse as a whole is Jean-Pierre Berger at the University of Fribourg in Switzerland (jean-pierre.berger@unifr.ch).

As Soufflenheim is located in France at the western graben shoulder or even a little outside of it to the west, more regional stratigraphic tables should be inquired. For this I recommend to look to official French geological maps (all being published in a scale of 1:80,000 from the BRGM at Orleans). They come along with rich explanations either alongside the map itself or in an accompanying booklet. More informations on this area in and around Soufflenheim can only be given by French colleagues. At the University of Strasbourg in France I have a friend, Uli Achauer (ulrich.achauer@eost.u-strasbg.fr), who might be so kind to bring you further onward to one of his guys working in this region. In addition, articles of Wim Sissingh from Utrecht come with rich informations on the Upper Rhine Graben:

Sissingh, W. (1997): Tectonostratigraphy of the North Alpine Foreland BasIn: correlation of Tertiary depositional cycles and orogenic phases.- Tectonophysics, 282, 223 - 256.

Sissingh, W. (1998): Comparative Tertiary stratigraphy of the Rhine Graben, Bresse Graben and Molasse Basin: correlation of Alpine foreland events.- Tectonophysics, 300, 249 - 284.

Sissingh, W. (2003) : Tertiary paleogeographic and tectonostratigraphic evolution of the Rhenish Triple Junction.- Palaeogeography, Palaeoclimatology, Palaeoecology, 196, 229-263.

I guess, for the first moment you are rich in informations. If you need more I will be back home from July 17th onward (just leaving for family vacation).

Best regards, Andreas Schaefer

Prof. Dr. Andreas Schaefer, Geological Institute, University of Bonn, Nussallee 8, 53115 Bonn, Germany; tel: +49 (0)228 73-2461, bureau -2397, fax: +49 (0)228 73-9037, e-mail: schaefer@unibonn.de, home page: www.geologie.uni-bonn.de

RAPSON GROUP GLASS: REFERENCES/BIBLIOGRAPHY

Boulvain, Frédéric, da Silva, Anne-Christine, *Frasnian reefs and mounds from Belgium*, Pétrologie sédimentaire, B20, Université de Liège, Sart Tilman, B-4000 Liège

Debout, Laurent, Denayer, Julien, *Palaeoecology of the Upper Tournaisian (Mississippian) crinoidal limestones from South Belgium*, Geologica Belgica ,Volume 21 (2018) / number 3-4.

Kombrink, Hendrik, *The Carboniferous of the Netherlands and surrounding areas; a basin analysis*, 2008.

Muchez,P., Viaene, W. A., Keppens, E., Marshall., & Vandenberghe, N., *Vein Cements and the Geochemical Evolution of Subsurface Fluids in the Visean of the Campine Basin (Poederlee borehole, Belgium)*, Journal of the Geologic Society, London. Vol 148, 19991, pp 1005-1117.

Poty, Edouard, Hance, Luc, *Livian*, Geologica Belgica (2006) 9/1-2: 133-138

Preusser, F., *Characterisation and evolution of the River Rhine system*, Netherlands Journal of Geosciences, Geologie en Mijnbouw, 87 – 1, 7 - 19, 2008.

Van Hulten, F.F.N, *Devono-carboniferous carbonate platform systems of the Netherlands*, Geologica Belgica (2012) 15/4: 284-296.

October 30, 2005

Thomas Braun,
Pilkington Bauglasindustrie GmbH
Hüttenstraße 33
D-66839 Schmelz, Germany
Tel. +49 (0) 6887/303 21
Fax +49 (0) 6887/303 48

Dear Mr. Braun:

I am writing on behalf of John Roloff, an artist who was commissioned by the University of Minnesota, Minneapolis, to produce a public artwork for my addition to the College of Architecture and Landscape Architecture on the UMN campus. Mr. Roloff is a Professor and Chairman of the Sculpture Department at the San Francisco Art Institute, in San Francisco, CA. he is a recipient of a John Simon Guggenheim Fellowship in 1983 and Visual Artist Fellowships from the National Endowment for the Arts in 1977, 1980 and 1986 and has exhibited his work internationally in such venues as the Venice Architectural and Art Biennales as well as having completed major commissions for prestigious institutions through out the United States.

Since January of this year, Mr. Roloff and Shelly Willis, the University of Minnesota Public Art on Campus Coordinator, have been in contact with Christoph Claesges, Pilkington Bauglasindustrie GmbH, in an effort to learn the geologic sources for the materials used in the production of the Pilkington Profilit Glass used extensively in my addition to the College of Architecture and Landscape Architecture building. For a reason not clear to us, the information that Mr. Claesges was very generously interested in providing to us for this project has not been forthcoming. Mr. Roloff and Ms. Willis have asked Mr. Claesges for updates on when the information might be available, and have not gotten a response in several months. Most recently, a friend of Mr. Roloff's, Alf Löhr, from Bochum, Germany has tried to contact Mr.. Claesges, to speak in German, in case there was a problem with communication or translation in the understanding of Mr.. Roloff's request. Others have tried as well and, as I understand it, have spoken with you, wherein you asked that Mr.. Roloff's interest be supplied in a written form.

Mr. Roloff, using geologic and geographic language, is proposing to etch descriptions of the natural origin of the four primary materials used for the construction of the CALA building. Pilkington Profilit glass is one of those materials, the others are, copper cladding, reinforced concrete and brick. The manufactures of the other materials, Hussey Copper, of Leetsdale, PA, Lehigh Cement from Mason City, IA and Ochs Bricks from Springfield, MN have, thus far, been able to supply Mr.. Roloff with enough geologic information to complete those descriptions. As CALA is a school of Architecture and Landscape Architecture, describing the materials and their natural origin creates a special dialog between the two practices as well as informing students that nature is present in everything we do and use, for example, that a sand that may have been used as a source of silica in the Profilit glass could have once been a sea shore or a desert and is now in a new form as part of their building.

For additional information on the project and to see how the Profilit glass was used on the building, please look a the web page : http://www.johnroloff.com/umn-cala_geoltext_page1.html

Examples of the geologic information Mr.. Roloff is seeking for the glass:

Sand, quartzite or similar source of silica dioxide – source location in the earth (latitude/longitude/altitude), geologic age, geologic history, types of rock/minerals in the sand.

Dolomite - source location in the earth (latitude/longitude/altitude), geologic age, geologic history, type of dolomite.

Limestone - source location in the earth (latitude/longitude/altitude), geologic age, geologic history, type of limestone.

Salt cake (to make soda ash) - source location in the earth (latitude/longitude/altitude), geologic age, geologic history, name of rock/minerals the salt cake was derived from.

Other important materials.

If such detailed information is not available or proves to be too difficult to obtain, Mr.. Roloff is confident he can find the geologic information, if you could provide the quarry or mine location and rock type of each material used for the Profilit Glass production.

I am very hopeful that you will see the merit in Mr.. Roloff's project and knowledge it will provide students about the relationships of architectural materials and the natural world.

Sincerely,

Steven Holl

Fig. 3a - Thin section: Profilit Glass

Fig. 3b - SEM 33X Enlargement of Glass sample

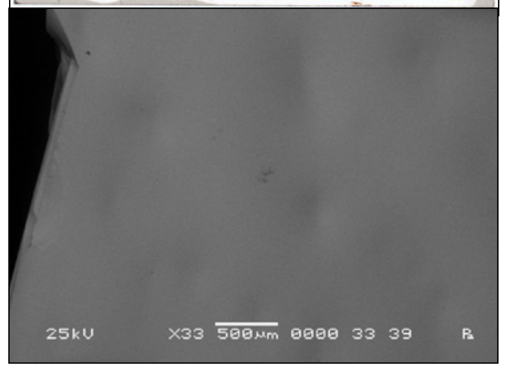


Fig. 3c - SEM 55X Enlargement of Glass sample

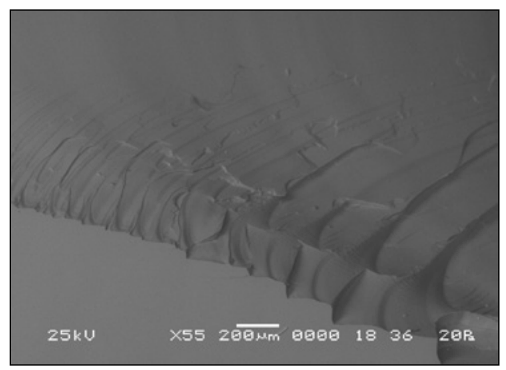


Fig. 124. Thin Section and Scanning Electron Microscopy (SEM) imagery - "Glass" Sample. Mineral Lab Report 20531, June 3, 2005.

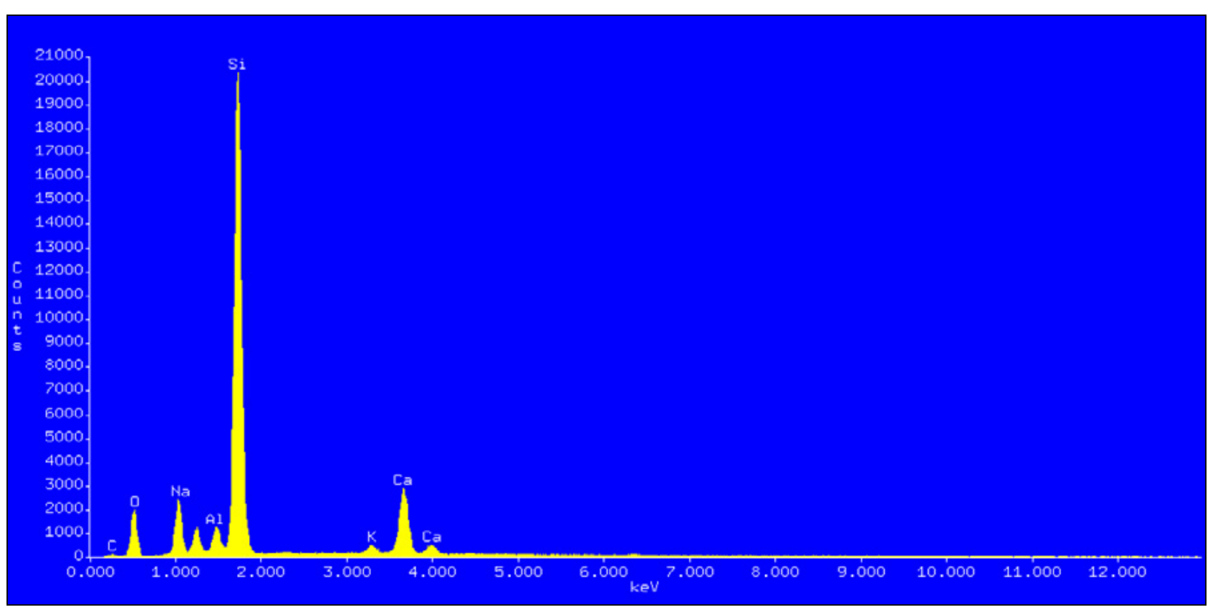


Fig. 125. Glass EDS Data: Accelerating Voltage: 25 KeV - Take Off Angle: 54.504∞ - Live Time: 120 seconds - Dead Time: 19.157. Mineral Lab Report 20531, June 3, 2005.

XRF Results for Glass Sample - Lab no. 205310

--- Wt % ---

Ident	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	S	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	BaO
GLASS	13.7	5.28	1.32	69.7	<0.05	0.11	<0.02	0.74	7.99	0.05	0.01	0.16	0.15
Quality Control - Replicate (R) sample and standard reference material (SY3) analyzed with sample													
GLASS(R)	13.7	5.28	1.31	69.5	<0.05	0.11	<0.02	0.74	7.97	0.05	0.01	0.16	0.14
SY3-XRF	4.33	2.47	12.8	60.2	0.86	<0.05	<0.02	4.11	8.54	0.14	0.33	6.78	0.04
SY3-known	4.15	2.67	11.8	59.7	0.54	0.05	0.014?	4.20	8.26	0.15	0.32	6.45	0.05

------------------------------------ PPM --

Ident	V	Cr	Ni	Cu	Zn	As	Sn	Pb	Mo	Sr	U
GLASS	<10	<10	<10	<10	15	<20	<50	17	<10	82	<10
Quality Control											
GLASS(R)	<10	<10	<10	<10	15	<20	<50	17	<10	80	<10
SY3-XRF	47	16	<10	18	289	<20	<50	144	<10	311	644
SY3-known	51	10	11	16	250	20	--	130	--	306	650

-------------- PPM ------------

Ident	Th	Nb	Zr	Rb	Y
GLASS	<10	<10	70	19	<10
Quality Control					
GLASS(R)	<10	<10	68	20	12
SY3-XRF	1094	201	362	219	786
SY3-known	990	145	320	208	740

Fig. 126. XRD Results for "Glass" Sample - Lab no. 205310. Mineral Lab Report, June 3, 2005.

PILKINGTON
PROFILIT GLAZING SYSTEM

ENGINEERING DATA

PROFILIT GLASS SPECIFICATION

WESTCROWNS INC.

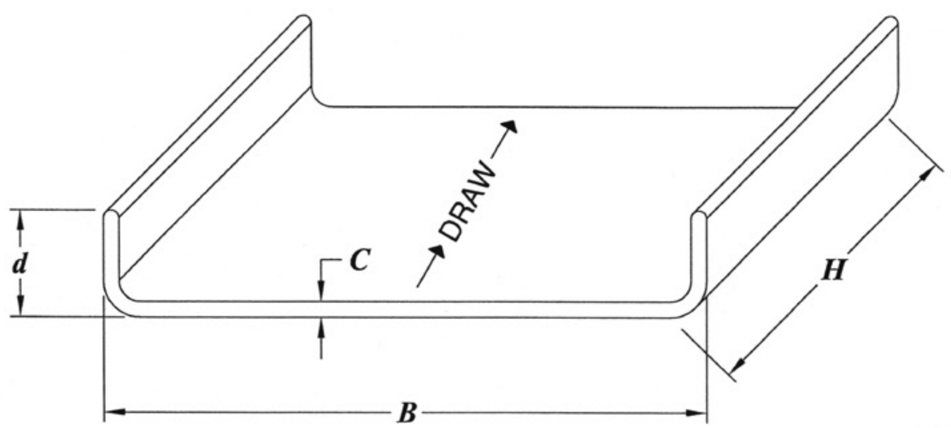


Figure 1. Relationship between U-Channel dimensions and direction of draw.

3. Detailed Specification

The detail of the specification for the Pilkington **Profilit**™ product is given below.

3.1 Glass Composition
This is a soda lime silicate glass whose proportions by mass of the principal constituents is as follows:

Silicon Dioxide	(SiO_2)	69 % to 74%
Calcium Oxide	(CaO)	5 % to 12%
Sodium Oxide	(Na_2O)	12 % to 16%
Magnesium Oxide	(MgO)	0% to 6%
Aluminum Oxide	(Al_2O_3)	0% to 3%

RAW MATERIALS ? — GEOLOGIC ROCK OR MINERAL TYPES ?

3.2 Dimensional Requirements
3.2.1 Method of Measurement
3.2.1.1 Width *B*, and height of flange *d*
These are measured at both cut ends of the piece using a vernier caliper with an accuracy of .004" (0.1mm)

SECTION: 1	INTRODUCTION	
REVISED 2/02		PAGE: 1.4.1

Fig. 127. Rapson Group Glass, 11 in. x 8.5 in., ink on paper, engineering data from Pilkington Glass about the chemical composition and specifications for Profilit glass, used on at Rapson Hall.

Rapson Group: *Copper*

NATIVE COPPER - .055 cm layer, malleable, ductile, highly conductive, altered metalliferous, vertical sheath over 34.2% Rapson Group facade. Purified, fused, igneous melt from 40% Peruvian, and 60% recycled, undifferentiated, North American sources. Peruvian provenance and petrogenesis: Anthropocene eroded and extracted skarn deposit of copper, lead, iron and arsenic from enigmatically old crustal sources, localized in thin beds of Permian limestone, Copacobana Formation, Churcampa Province, Huancavelica Region, Peru; marine carbonate deposition of limestone and subsequent mud burial, intrusion of late-stage muscovite-laden, Cobriza granite pluton probable cause of metasomatic skarn alteration and mineralization. Geologic sources cited in the Rapson Hall library reserve reading section.

RAPSON GROUP COPPER: PRELIMINARY RESEARCH/NOTES

Name of Rock Type:

Allochthonous, tabular (blanket?), igneous copper metal (geologic term?) of high elemental purity, post-melt elongation (glacial metaphor, micro-striations that Carrie noted?), folded (has a shallow u-shaped configuration) structure.

CALA Formation Name:

CALA Copacobana Formation, the name of the Central Andean Pennsylvanian sea the Copacobana limestone was deposited in is unknown at this point.

Tectonic/Site Relationship:

Deposited vertically (desert varnish analog?) as a coating (cladding) structure, interlocking fold structures unite individual horizontal elements.

Derivation: Provenance of Original Material/Industrial Process:

The Holocene/Anthropocene. copper facade on the CALA Addition was produced by Hussey Copper of Leetsdale, PA, from 2 primary sources, copper ore from Peru and recycled processed copper. Fourty percent of the CALA production lot was from ore mined and concentrated at the Doe Run Peru, Co., Cobriza Mine in Cobriza Peru, (approximately W 74 29′ 45″, S 12 30′ 10″, 2100-4100 meters) in the Cordillera Oriental of South Central Peru, to the southeast of Hunacayo and north of Ayacucho. The ore was processed into cathodes at the Doe Run plant in La Oroya, Peru to the north and sent to Hussey for further processing. The Corbiza deposit is a skarn type caused by mineralization from a Permian granitic intrusion into the Pennylvanian limestone of the in-situ Copacobana Formation. The other sixty percent of the CALA copper was produced from recycled copper of primarily untraceable North American sources. Description (?) of industrial smelting and electro-depositional process (anode/cathode electrolysis deposition from a solution - is this sedimentary?)

The Corbiza deposit is a skarn type caused by mineralization from a Permian granitic intrusion into the Pennsylvanian limestone of the in-situ Copacobana Formation.

The other sixty percent of the CALA copper was produced from recycled copper of primarily untraceable North American sources. How to describe this in generic terms - multi or meta-allochthonous?)

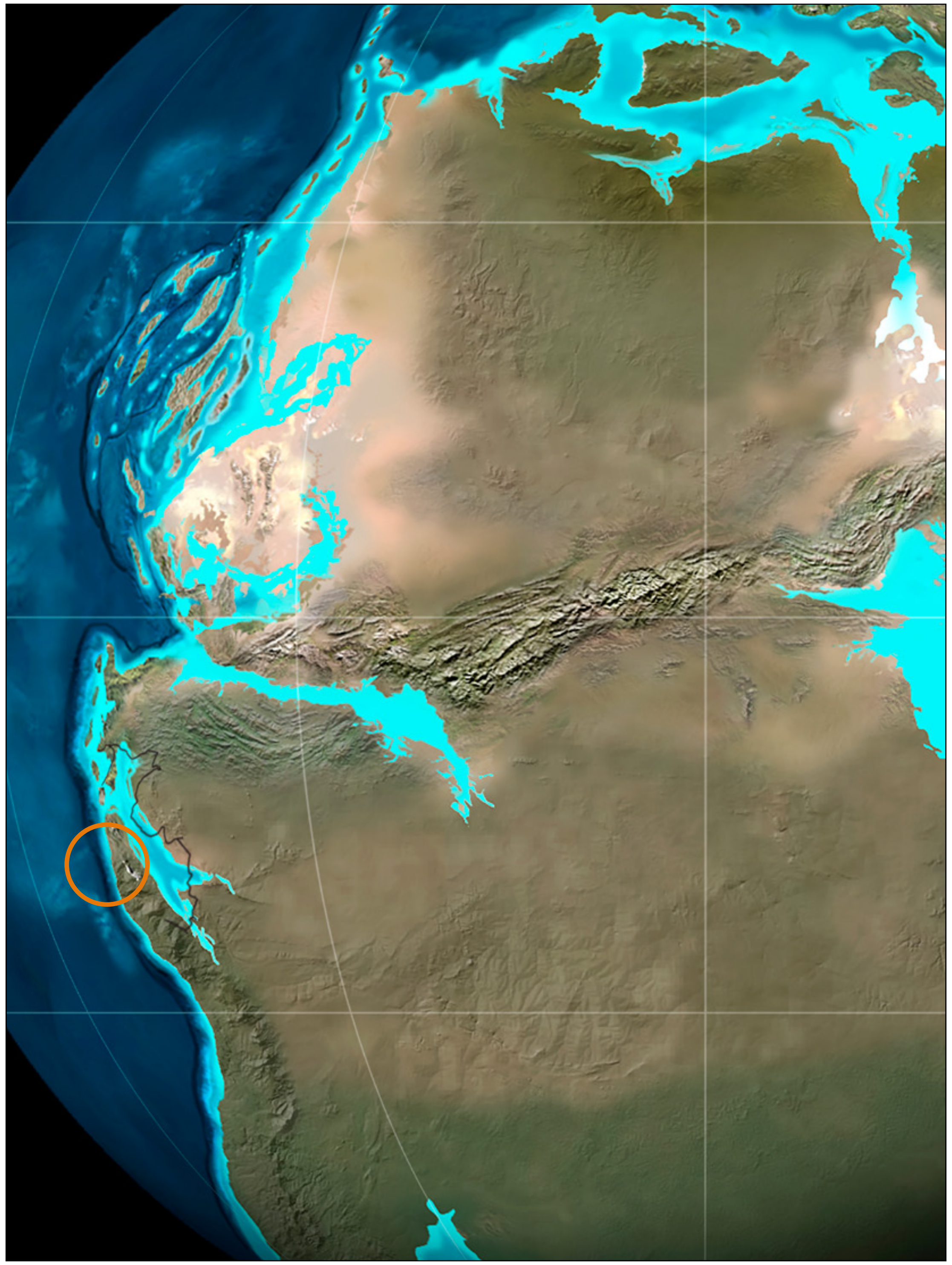
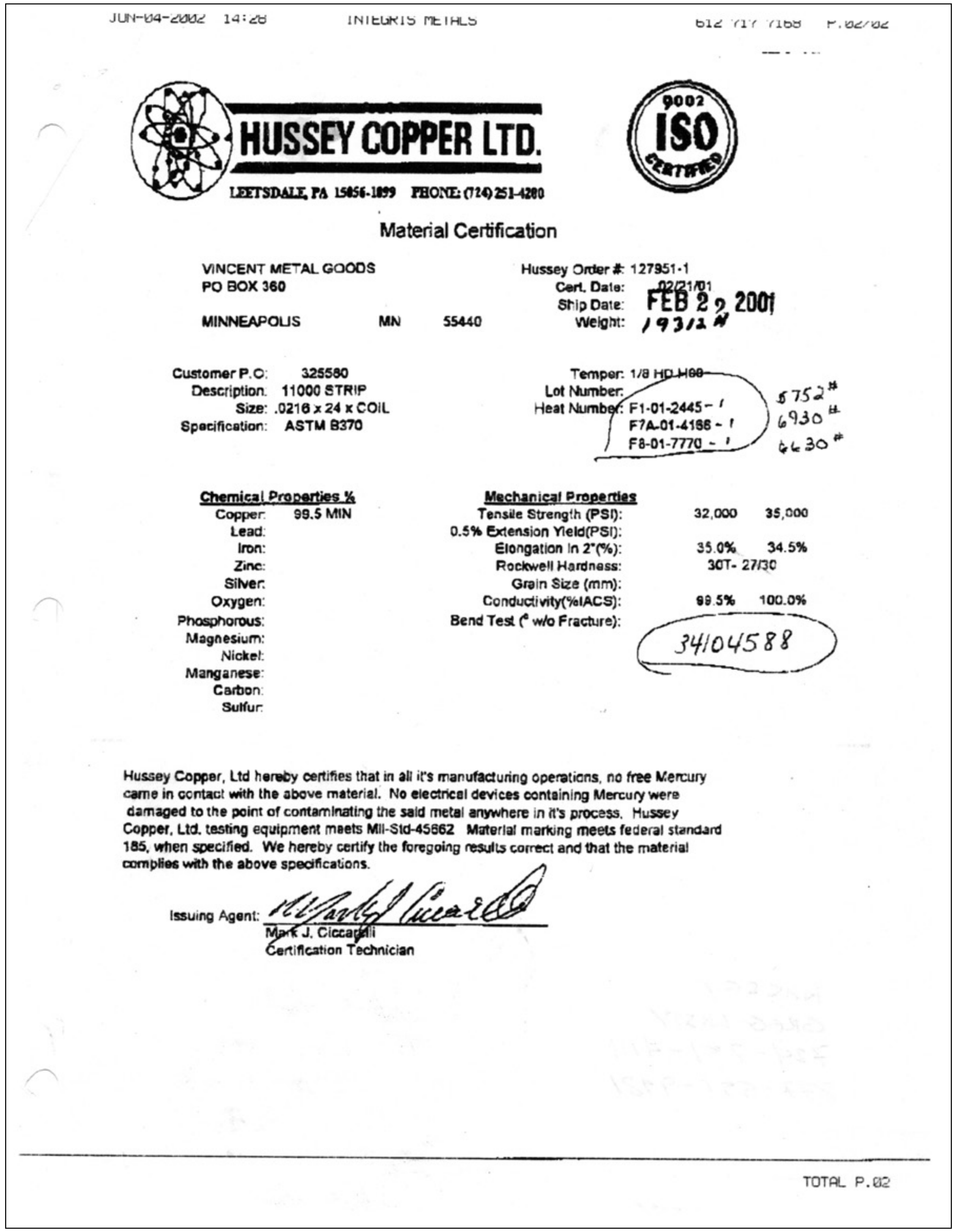


Fig. 128. Primary Landscape: Copper : Permian, marine, tropical carbonate depositional environment, limestone, west coast of Pangaea, preceding the breakup into Laurentia and Gondwanaland, convergent plate tectonic margin, subduction zone, developing granitic and volcanic sources of the copper skarn deposit. Copacobana Formation, Churcampa Province, Huancavelica Region, Peru.

Fig. 129. Example of the Rapson Hall Copper, Anthropocene depositional structure

Fig. 130. Rapson Hall, North Garden entrance, showing location of paper text panel mock-up and site study, first choice of site, approved in 2003.



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Customer P.O: 325560
Description: 11000 STRIP
Size: .0216 x 24 x COIL
Specification: ASTM B370

Temper: 1/8 HD H00
Lot Number:
Heat Number: F1-01-2445 - 1 5752 #
F7A-01-4166 - 1 6930 #
F8-01-7770 - 1 6630 #

Chemical Properties %	
Copper:	99.5 MIN
Lead:	
Iron:	
Zinc:	
Silver:	
Oxygen:	
Phosphorous:	
Magnesium:	
Nickel:	
Manganese:	
Carbon:	
Sulfur:	

Mechanical Properties		
Tensile Strength (PSI):	32,000	35,000
0.5% Extension Yield(PSI):		
Elongation In 2"(%):	35.0%	34.5%
Rockwell Hardness:	30T- 27/30	
Grain Size (mm):		
Conductivity(%IACS):	99.5%	100.0%
Bend Test (° w/o Fracture):		

34104588

Hussey Copper, Ltd hereby certifies that in all it's manufacturing operations, no free Mercury came in contact with the above material. No electrical devices containing Mercury were damaged to the point of contaminating the said metal anywhere in it's process. Hussey Copper, Ltd. testing equipment meets Mil-Std-45662. Material marking meets federal standard 185, when specified. We hereby certify the foregoing results correct and that the material complies with the above specifications.

Issuing Agent: Mark J. Ciccardli
Certification Technician

TOTAL P.02

Fig. 131. Material Certification, Hussey Copper, LTD. Document certifying the industrial lot number of the Anthropocene copper layer of the Rapson Hall Group, 2002.

Fig. 4a - SEM 500X Enlargement of Copper sample

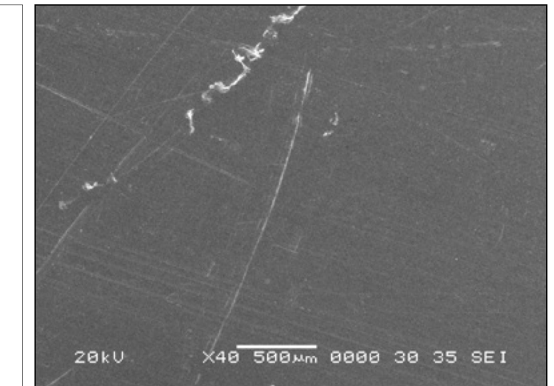

Fig. 4b - SEM 2000X Enlargement of Copper sample

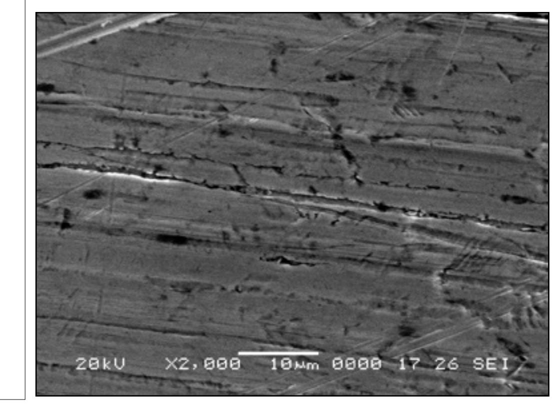

Fig. 132. Scanning Electron Microscopy (SEM) imagery - "Copper" Sample.
Mineral Lab Report 20531, June 3, 2005.

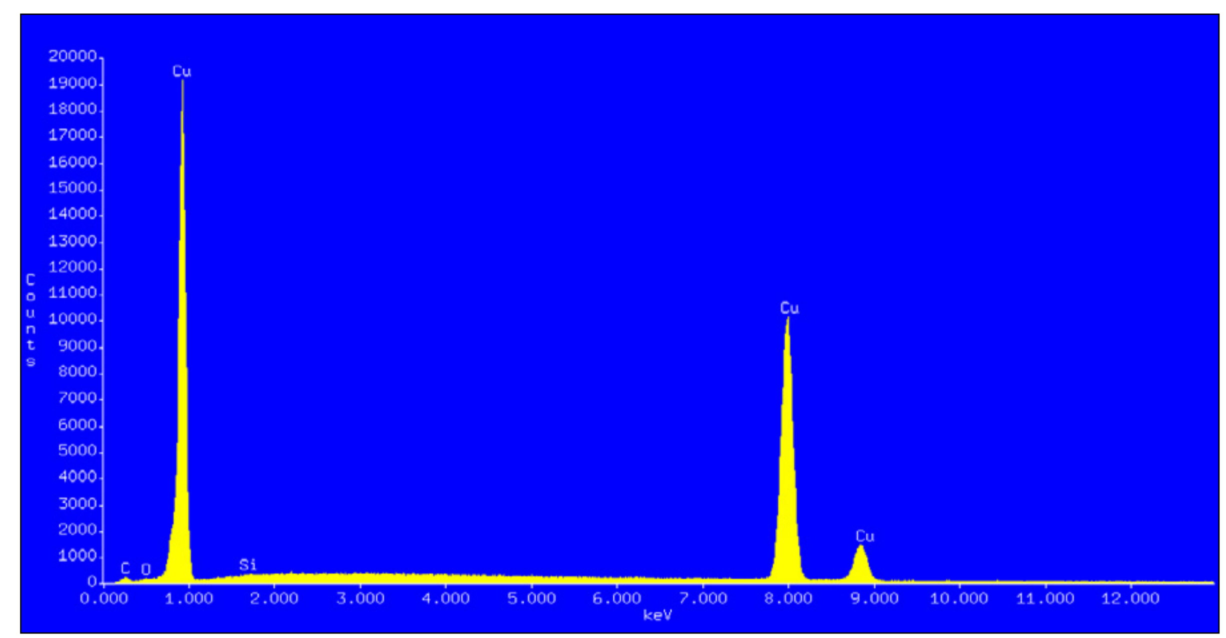

Fig. 133. Copper EDS Data: Accelerating Voltage: 20 KeV Take Off Angle: 52.6559∞ Live Time: 120 seconds Dead Time: 30.789.
Mineral Lab Report 20531, June 3, 2005.

on 5/12/05 8:16 AM, Jim Wise at jimxoso@yahoo.com wrote:

Dear John,

I will forward your message to Dr. Noble. He was my Ph.D. advisor and we still keep in contact. His email direction is:

dcn@kori.reno.nv.us

I have not been out to Cobriza, but do have a copy of Noble's 1995 paper. It seems that at the time the paper was written Cobriza was operated by Centromin Peru. When the copper was supplied by Doe Run may be important for its source. The smelter at La Oroya was purchased by Doe Run not too long ago. Large smelters like this process ore concentrates from many different mines. Some times concentrates from different mines are blended, or stock piled and processed later.

I looked up Cobriza on a geology map, the Huanta 1:100,000 scale quadrangle by INGEMMET, and estimated its coordinates at 74 degrees 29 minutes 45 seconds West and 12 degrees 30 minutes 10 seconds South. The mine lies in the Cordillera Oriental of south central Peru, to the southeast of Hunacayo and to the north of Ayacucho. Noble dated the plutonic rock there at 264 million years before present, crystallizing during the Permian. I believe the deposit type at Cobriza are skarns...replacement of the wall rock intruded by the pluton from silica and metals carried by fluids sweated out from the cooling magma. Although it would be best to ask Noble since he has been out to the mine.

Introductory geology classes emphasize the use of minerals and rocks to students. Metals, such as gold, silver, and copper at first glance seem more productive or valuable, but the concrete, sand, and stone used in buildings and construction generally account for greater economic value within individual states.

Good luck with your project.

Jim Wise

--- john roloff <jroloff@sfai.edu> wrote: Dear Dr. Wise:

I have been commissioned by the University of Minnesota, for a public art project at the College of Architecture and Landscape Architecture (CALA) on the University?s Minneapolis campus.

In my research for this project, I ran across your name searching for contact information for Dr Donald Noble in relationship to his article on The Cobriza Copper Skarn Deposit in Sociedad Geologica del Peru - VOLUMEN JUBILAR N?3 ALBERTO BENAVIDES - OCTUBRE 1995. I am hoping either you can help me or can connect me with Dr. Noble.

Pg. 2

A part of this project, using geologic and geographic language, I am seeking to describe the natural origin of the 4 primary materials used for the construction of the CALA building. A major portion of the building is sheathed in copper supplied by Hussey Copper in Pennsylvania. The descriptions will be etched on each of the materials at selected sites on the building, A special book of more information about the materials with maps, images, etc., will be included in the CALA library. I have so far been able to work with other industrial companies, technical staff and geologists to find similar information on the concrete, glass and brick materials, the 3 other main architectural constituents. As CALA is a school of Architecture and Landscape Architecture, describing the materials and their natural origin creates a special dialog between the two practices as well as informing students that nature is present in everything we do and use ? that the copper ore used refined to make the copper sheathing may have once been a lava flow or metamorphosed sediment and is now in a new form as part of their building, etc.

Please see the web page: http://www.johnroloff.com/umn.cala_index1.html for more information about the whole project ? clicking on ?Geology Panels? will take you to a page specifically about this part of the project.

Sources at Hussey Copper have indicated that about 40% of the specific lot numbers used in the UMN CALA construction was supplied by Samsung who?s cathode supplier at that time was Doe Run Peru, headquartered in La Oroya, Peru. Doe Run mines copper ore and produces copper concentrates from their copper mine in Corbiza, Peru, to be smelted in La Oroya into cathodes. I have been unable to find much about the ore from the Corbiza mine or even its precise location.

The information I am looking for regarding the ore is the rock type, its geologic age and history, geologic context, mineralogy and depositional environment.

Any information or suggestions are greatly appreciated.

Sincerely,

John Roloff

John Roloff Professor, Chair, Sculpture Dept. Co-Coordinator, Center for Science & Art San Francisco Art Institute 800 Chestnut St. San Francisco, CA 94133 http://www.sfai.edu

RAPSON GROUP COPPER: REFERENCES/BIBLIOGRAPHY

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U. Peterson, Regional Geology and the Major Ore Deposits of Central Peru, Economic Geology, vol. 60, May, 1965, pg. 407-477.

G. W. Grader, P. E. Isaacson, B. Mamet, V. Davydov, *Late Carboniferous To Middle Permian Copacabana Formation In Bolivia: Cyclic Carbonate-Clastic Successions In A Back-Arc Setting,* AAPG Search and Discovery Article #90012©2003 AAPG Hedberg Conference, Vail, Colorado, July 21-26, 2002 (2003).

N.A. Rakotosolofo a,*, J.A. Tait a, V. Carlotto b, J. Cardenas , *Palaeomagnetic results from the Early Permian Copacabana Group, southern Peru: Implication for Pangaea palaeogeography,* Tectonophysics 413 (2006) 287–299.

RAPSON GROUP (Geology Text Panels)

Installation / 2013

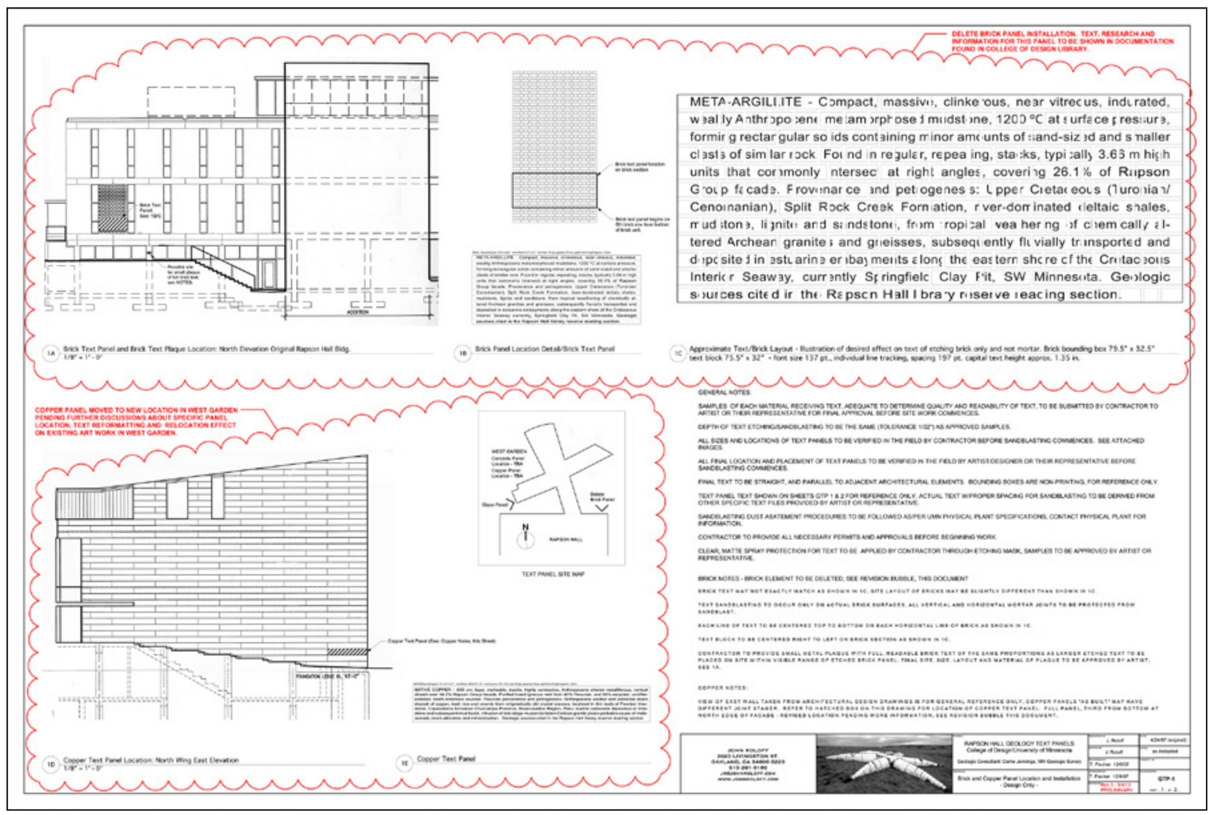

Fig. 134. Rapson Hall - Geology Text Panels, College of Design, University of Minnesota, MN / Brick and Copper Panel Location and Installation - Design Only. Preliminary Revision 3. Revised text panel location, 2013.

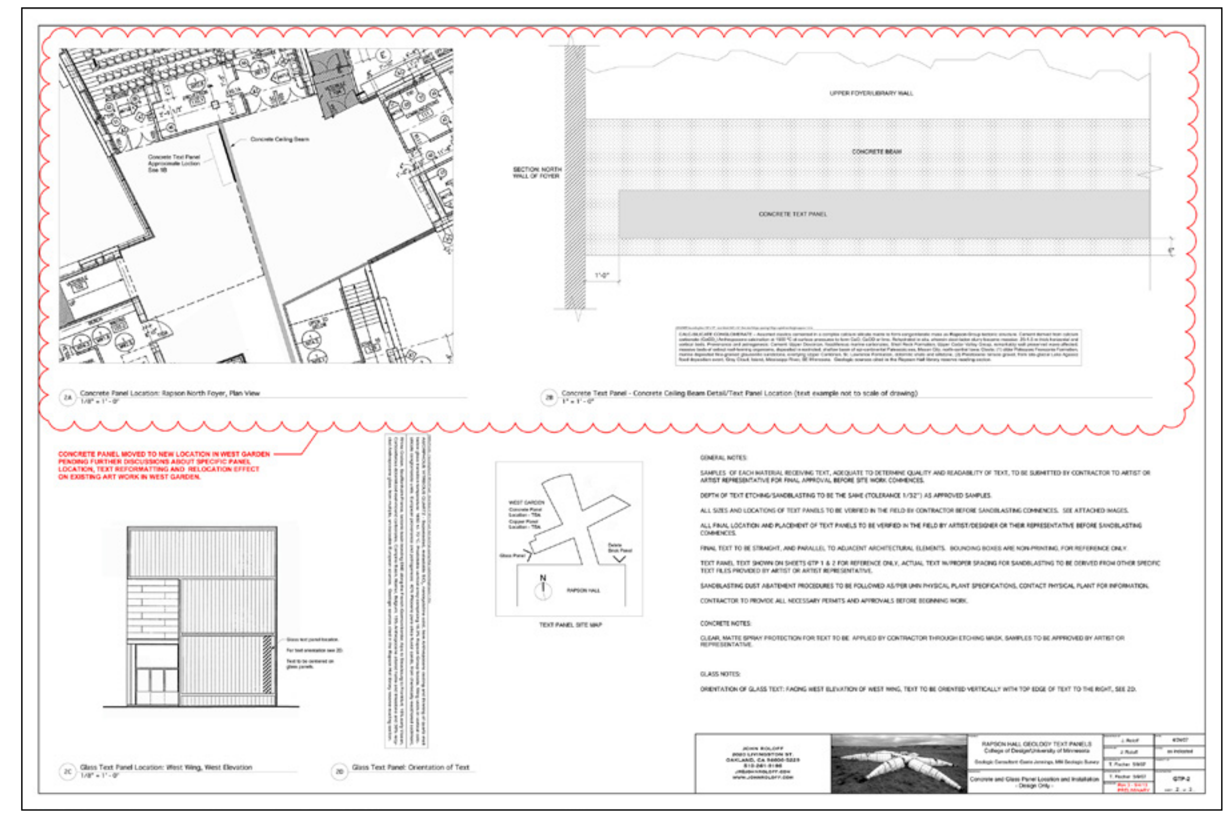

Fig. 135. Rapson Hall - Geology Text Panels, College of Design, University of Minnesota, MN / Concrete and Glass Panel Location and Installation - Design Only. Preliminary Revision 3. Revised text panel location, 2013.

COPPER TEXT - ORIGINAL FORMAT (MAY NEED ADJUSTMENT?) TEXT CLEAR LAQUER COATED

NATIVE COPPER - .055 cm layer, malleable, ductile, highly conductive, altered metalliferous, vertical sheath over 34.2% Rapson Group facade. Purified, fused, igneous melt from 40% Peruvian, and 60% recycled, undifferentiated, North American sources. Peruvian provenance and petrogenesis: Anthropocene eroded and extracted skarn deposit of copper, lead, iron and arsenic from enigmatically old crustal sources, localized in thin beds of Permian limestone, Copacobana Formation, Churcampa Province, Huancavelica Region, Peru; marine carbonate deposition of limestone and subsequent mud burial, intrusion of late-stage muscovite-laden, Cobriza granite pluton probable cause of metasomatic skarn alteration and mineralization. Geologic sources cited in the Rapson Hall library reserve reading section.

GLASS TEXT - ORIGINAL SITE AND LAYOUT (ROTATE 90 DEGREES)

AMORPHOUS VITREOUS QUARTZ - Supercooled, metastable SiO_2, noncrystalline solid, from Anthropocene cooling and thinning of quartz melt below glass transition temperature: 1650 +/- 70 ºC. Predictable vertical array comprising 16.3% Rapson Group facade, filling voids in vertical calc-silicate conglomerate units. European provenance and petrogenesis: 40% Pliocene pure silica fluvial sands, from chemically weathered sediment,

Rhine Graben, Soufflenheim France, tectonic basin trending ENE along the French-German border, Alps to Strasbourg to Frankfurt; 15% early Visean, Carboniferous dolomitized reef-mound carbonates, Campine Basin, Namur, Belgium; 15% Anthropocene altered halite and limestone and 30% recycled Anthropocene glass from multiple, un-traceable European sources. Geologic sources cited in the Rapson Hall library reserve reading section.

CONCRETE TEXT - ORIGINAL FORMAT FOR FOYER BEAM - REFORMAT FOR BENCH CENTER LINE?

CALC-SILICATE CONGLOMERATE – Assorted clastics cemented in a complex calcium silicate matrix to form congomleratic mass as Rapson Group tectonic structure. Cement derived from calcium carbonate ($CaCO_3$) Anthropocene calcination at 1500 ºC at surface pressures to form CaO, CaCO or lime. Rehydrated in situ, wherein clast-laden slurry became massive .25-1.5 m thick horizontal and vertical beds. Provenance and petrogenesis: Cement: Upper Devonian, fossiliferous marine carbonates, Shell Rock Formation, Upper Cedar Valley Group, remarkably well preserved wave-affected, massive beds of extinct reef-forming organisms, deposited in restricted, shallow basin of epi-continental Paleozoic sea, Mason City, north-central Iowa; Clasts: (1) older Paleozoic Franconia Formation, marine deposited fine-grained glauconitic sandstone, overlying Upper Cambrian, St. Lawrence Formation, dolomitic shale and siltstone, (2) Pleistocene terrace gravel, from late-glacial Lake Agassiz flood deposition event, Gray Cloud, Island, Mississippi River, SE Minnesota. Geologic sources cited in the Rapson Hall library reserve reading section.

RAPSON GROUP/GEOLOGY TEXT PANELS - COLLEGE OF DESIGN / UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MN | STUDY: REVISED LOCATION OF CONCRETE AND COPPER PANELS | 05/04/13 | John Roloff | 2020 Livingston St. Oakand, CA 94606 | 510.261.9196 | jr@johnroloff.com | www.johnroloff.com

Fig. 136. Rapson Group/Geology Text Panels - College of Design / University of Minnesota, MN / Study: Revised Location of Concrete and Copper Panels, 2013. A second revision of the Glass Text to the left side of the larger glass panel shown above was made after this diagram was submitted to the etching contractor.

Fig. 136. Rapson Group (Geology Text Panels) / Copper, West Garden, west wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, clear lacquer, copper.

Fig. 138. Rapson Group (Geology Text Panels) / Copper, West Garden, west wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, clear lacquer, copper.

Fig. 139. Rapson Group (Geology Text Panels) / Copper, West Garden, west wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, clear lacquer, copper.

Fig. 140. Rapson Group (Geology Text Panels) / Concrete, West Garden, north wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, painted, cast concrete.

Fig. 141. Rapson Group (Geology Text Panels) / Concrete, detail, West Garden, north wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, painted, cast concrete.

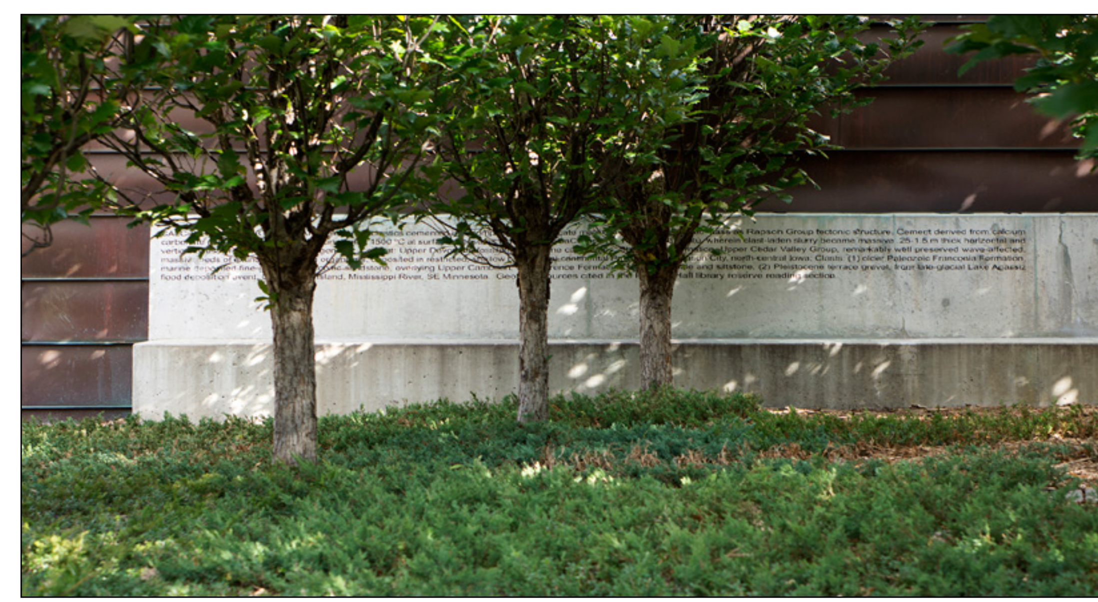

Fig. 142. Rapson Group (Geology Text Panels) / Concrete, detail, West Garden, north wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, painted, cast concrete.

Fig. 143. Rapson Group (Geology Text Panels) / Glass, west wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, Proflit glass.

Fig. 144. Rapson Group (Geology Text Panels) / Glass, detail, west wing, Holl annex, Rapson Hall, approximately, 11 ft. x 16 in. etched, Proflit glass.

Fig. 145. West Garden, Rapson Hall, University of Minnesota, Minneapolis, MN, May, 2014.

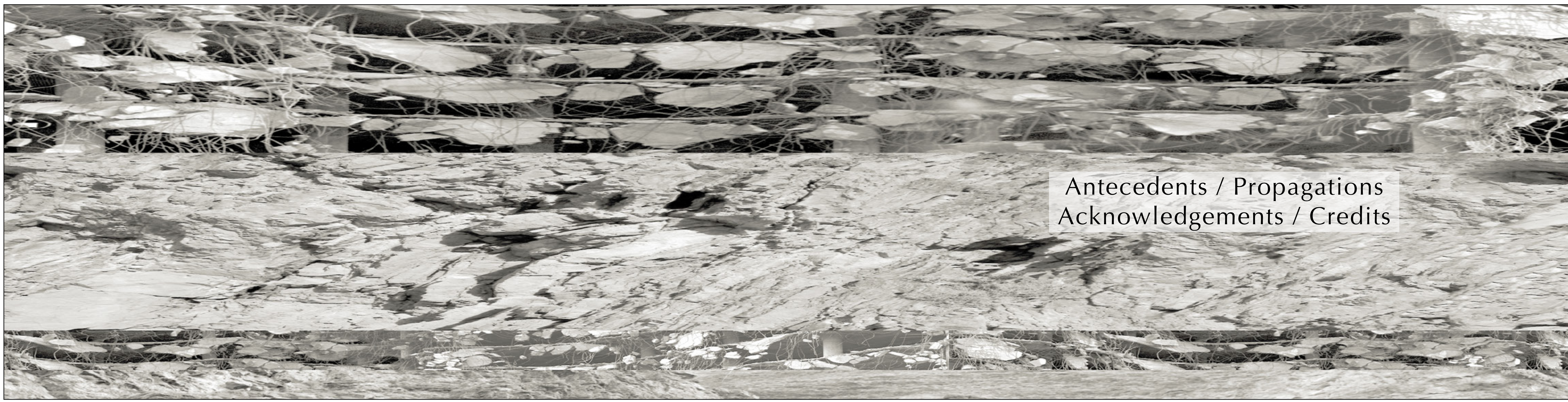

Fig. 148. Stratigraphic Column I, map/detail, digital print on paper. Digitally compressed (lithified) architectural and natural geologic structures.
Full-scale installation: column 24 ft.. h., 101 California St., San Francisco, CA 2002.

Exemplary Antecedents/Concepts for *Rapson Group*

The concept, central to the *Rapson Group*, of geologic analogs between human and natural processes, may also be found in my work such as: *Metafossil (Pinus: Ponderosa, Radiata, Balfouriana)*, 1992, *Deep Gradient/Suspect Terrain..*, 1993, *Ocean Scan/Eastern Atlantic/Canary Islands >> Spain / Broadway Canyon Scan/NYC // Environmental/Urban / Sea/Land / Multi-beam Sonar Scan Concepts,* 1998-99, *Holocene Terrace*, 1999, *Original Depositional Environment*, 2001 and *Holocene Passage*, 2002. A newer project, *San Francisco Wharf Complex*, 2008-15, is deeply indebted to this concept. Shown examples, *Holocene Terrace, Ocean Scan/Eastern Atlantic/Canary Islands >> Spain / Broadway Canyon Scan/NYC // Environmental/Urban / Sea/Land / Multi-beam Sonar Scan Concepts,* and *San Francisco Wharf Complex/ American Industrial Center/Towards a Geologic Narrative, 2015,* pages 198-203.
See: http;//www.johnroloff.com for additional information.

Holocene Terrace

Lance Fung Gallery
New York, NY, 1999

The Holocene Epoch, the latest interval of the Earth's geologic history, is the younger of the two epochs that comprises the Quaternary Period at the end of the Cenozoic Era. The Holocene Epoch follows the Pleistocene Epoch, and it constitutes the last 11,000 years to the present. It follows the last glacial stage of the Pleistocene and is characterized by relatively warm climactic conditions. The sediments of the Holocene Epoch, both continental and marine, cover the largest area of the globe of any epoch in the geologic record. The Holocene Epoch begins with the late and post-Stone Age history of mankind and ends with contemporary time.

Cities, architecture, roads and other civic constructions made by mankind of earth materials during our Epoch (the Holocene) may be considered in a geologic context as forms of 'anthroturbation.'1 This term describes the disturbance, dislocation and restructuring of geologic formations and materials by human agencies into new forms. These processes have analogies in the natural world, such as: mining as erosion, transport as flow and construction as sedimentation. Likewise, the built topography of a city can be understood in geomorphic terms: streets as canyons, buildings as plateaus, sewers as caves and plazas as playas.

Installed in the one-person exhibition, *Morphology of Change*, at the Lance Fung Gallery, New York, NY, *Holocene Terrace*, is a transparent wood-framed construction, lined on its 3 vertical, interior sides with clear acrylic panels. The structure extends the opening of one of the gallery's street-facing windows into the center of the exhibition space. Within the chamber is a horizontal field of living moss from California and Massachusetts. For the length of the exhibition the moss was subjected to the environmental conditions of New York City; on dry days the moss is a dormant grayish color, on rainy days -- to the extent that weather can reach within the structure -- a vibrant green. *Holocene Terrace* is a climate-activated niche in the canyon wall of Soho's Broadway.

John Roloff, 1999

1. A term developed in conversation with Paul Spudich, geophysicist at USGS, Menlo Park, CA, circa 1998.

Fig. 146. Broadway, New York City

Fig. 147. Grand Canyon, AZ

Fig. 148. Holocene Terrace, 6 ft.. x 5 ft.. x 18 ft.., wood, moss, acrylic, sheetrock, weather, Lance Fung Gallery, New York, NY, 1999.

Fig. 149. Ocean Scan/Eastern Atlantic/Canary Islands >> Spain / Broadway Canyon Scan/NYC // Environmental/Urban / Sea/Land / Multi-beam Sonar Scan Concepts, 1998-99.
Pen on paper, inkjet on paper, size variable, aerial images by Google Earth, 1998-2016

The unrealized projects of *Ocean Scan/Eastern Atlantic/Canary Islands >> Spain / Broadway Canyon Scan/NYC // Environmental/Urban / Sea/Land / Multi-beam Sonar Scan Concepts*, 1998-99, were developed before and during *Holocene Terrace*, as an extension of the 'Anthroturbation' concepts and exploring land and sea relationships in geologic time, considering paleo-sea levels and marine depositional systems of future landscapes. The use of multi-beam sonar was a valid technique for the Canary Island, underwater portion of the concept, further research indicated that lidar (using a laser instead of sound) would be needed for the subaerial mapping of currently above sea-level environments.

Fig. 150. San Francisco Wharf Complex/American Industrial Center/Towards a Geologic Narrative (Data Reservoir/Sheared), 40 in. x 96 in.,inkjet print on paper, HD video, "Data Clay," Museum of Craft and Design, San Francisco, CA, 2015.

San Francisco Wharf Complex/American Industrial Center/Towards a Geologic Narrative

San Francisco Wharf Complex/American Industrial Center/Towards a Geologic Narrative is a work conceived for "Data Clay, Strategies for Parsing the Earth," Museum of Craft and Design, San Francisco, CA, 2015, as an extension of *San Francisco Wharf Complex*, 2008-present. This work is composed of an untitled video study and a graphic component, *Study: San Francisco Wharf Complex/American Industrial Center/Towards a Geologic Narrative (Data Reservoir/Sheared)*. This project presents a spatiotemporal and material study of the ceramic exhibition's physical space and site. This study suggests a geologic/performative envelope and a geochemical/paleogeographic interpretation of ceramics for the data-driven materiality of the exhibition - ceramic objects exhibited within a geo-ceramic, site-generated narrative. Exploring an uber-set of material origin and transformation of the museum's site and architecture from calcium and other ions of Cretaceous seawater, their depositional construct and transport, to Anthropocene displacements and sedimentations, *San Francisco Wharf Complex/American Industrial Center/Towards a Geologic Narrative*, suggests an isomeric context of the site's materiality and its constituents. Several players are at work topologically in this meta-narrative: a central column of the exhibition space, phantom ships and ortho/topographic data of the site and structure are interwoven protagonists. This project is also considered part of the larger, *Felsic/Mafic/Carbonate Facies* series, 2005-present.

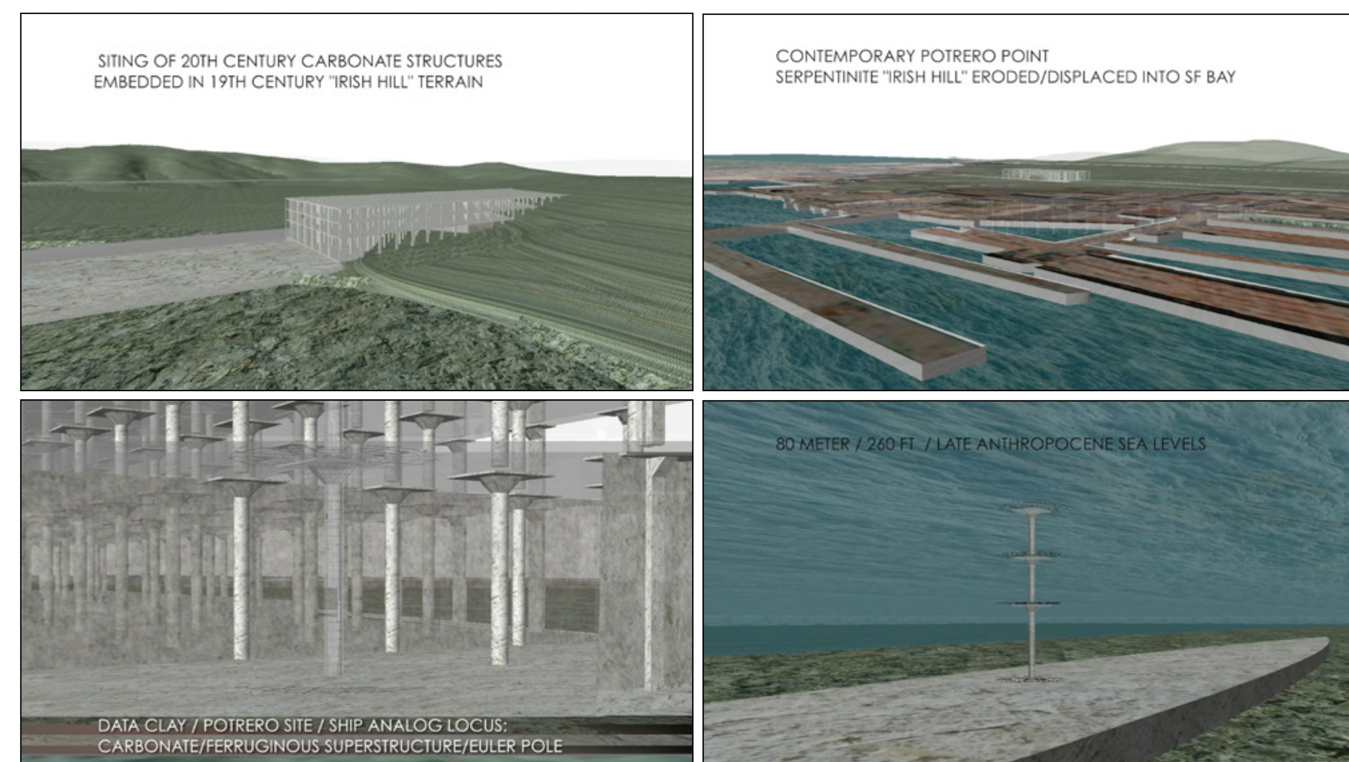

Fig. 151 A-D. San Francisco Wharf Complex/American Industrial Center/Towards a Geologic Narrative, HD video stills, 2015.

Acknowledgements

John Roloff and Rebecca Krinke would like to acknowledge the numerous scientists, institutions and individuals who have assisted in the research and assembly of information essential to this project and in many other ways, physically, conceptually and as inspiration. Below is a partial (and expanding), non-hierarchical, list:

Dr. Paul Weiblen, Professor Emeritus, Geology, UMN, Minneapolis, MN.
Tom Fisher, Dean, College of Design, UMN, Minneapolis, MN.
Shelly Willis, ex-Director, Campus Public Art Program, UMN, Minneapolis, MN.
Carrie Jennings, Geologist, Minnesota Geological Survey.
Katherine Waring, artist/geologist, Sacramento, CA.
Philip R Weller, Vice President, Production, Ochs Brick Co., Springfield, MN.
Raymond Heizer, professional researcher, Orinda, CA.
Tim Wahl, Minnesota Geologic Survey, UMN, Minneapolis, MN.
Jon Ellingson - Industrial Minerals Geologist, MN/DNR - Division of Lands and Minerals.
John Mossler, Minnesota Geological Survey.
Lori Day, University of Minnesota, Minnesota Geological Survey.
Dennis Persinger, Technical Department, Hussey Copper Ltd., Leetsdale, PA.
Phil Theobald, Manager-Metal Procurement, Hussey Copper, Ltd, Leetsdale, PA.
Jeff Claude, Sales Manager, Commercial, Cemstone Products.
David Eckhardt, Lehigh Cement, Mason City, IA.
Verne Stuessy, Leghigh Cement, Mason City, IA.
Ray Pestrong, Professor, Geology, California State University, San Francisco.
Jim Wise, Professor, Geology, University of Nevada, Reno.
Joy Maes, The Mineral Lab.
Deborah Ultan, Arts & Architecture Librarian, Rapson Hall Library.
Laura Boles Faw, artist, San Francisco, CA.
Page Rohman, Assistant to the Dean, College of Design.
Christoph Claesges, Pilkington, Bauglasindustrie GmbH, Schmelz, Germany.
Thomas Braun, Pilkington, Bauglasindustrie GmbH, Schmelz, Germany.
Afred Löhr, artist, London, England and Melbourne, Australia.
Stephen Holl, Architect, New York, NY.
Noël Vandenberghe, Professor of Regional Geology, Katholieke Universiteit Leuven, Leuven, Belgium.
PD Dr. Stefan Götz, Geologisches Institut I, Universität Karlsruhe, Karlsruhe, Germany
Craig Amundsen, Target Studio Director and Public Art Curator, UMN, 2006+.
Todd Olson, Cold Springs, Granite, Cold Springs, MN.
Tate Viere, Viere Granite Carving, Inc

Illustrations: Sources/Credits

Images not otherwise credited elsewhere in this document:

Fig. 1.	Staff, Cold Springs Granite.
Fig. 3.	Dr. Paul Weiblen
Fig. 5.	Maps courtesy of the Minnesota Geologic Survey, Architectural plans and elevations: Steven Holl Architects.
Fig. 16.	Architectural plan: Steven Holl Architects.
Fig. 18.	Architectural plan and elevation: Steven Holl Architects.
Fig. 20-21.	Architectural plan and elevation: Steven Holl Architects.
Fig. 24.	Image: D. Abbott.
Fig. 25-27.	College of Architecture and Landscape Architecture.
Fig. 47.	Bear Island Survey, Co.
Fig. 50.	Cold Springs Granite staff.
Fig. 52, 53.	Quarry map, block diagram, Cold Springs Granite staff; architectural plan, Steven Holl Architects.
Fig. 54.	College of Architecture and Landscape Architecture.
Fig. 56-62.	Rebecca Krinke
Fig. 88, 107.	Ron Blakely and Colorado Plateau Geosystems
Fig. 108	Adapted from: James St. John, Diorama of a Devonian seafloor, wikipedia creative commons attribution 2.0 generic.
Fig. 110, 112.	Ron Blakely and Colorado Plateau Geosystems
Fig. 117, 128.	Ron Blakely and Colorado Plateau Geosystems
Fig. 147.	Ron Blakely and Colorado Plateau Geosystems
Fig. 134-135.	Architectural plan and elevation: Steven Holl Architects.
Fig. 147.	Adapted from Drenaline, Nankoweap, Grand Canyon, wikipedia creative commons attribution 2.0 generic.

Other images by John Roloff

Fig. 150. Rebecca showing GPS data from site visit to the Mesabi Black quarry, Lake County, northern MN, Nov. 1, 2003.

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