Portfolio

2006

Winter

A Collection of Student & Professional Work by:

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Kent State University
School of Architecture and Environmental Design
Bachelor of Architecture

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2002
Spring/Summer

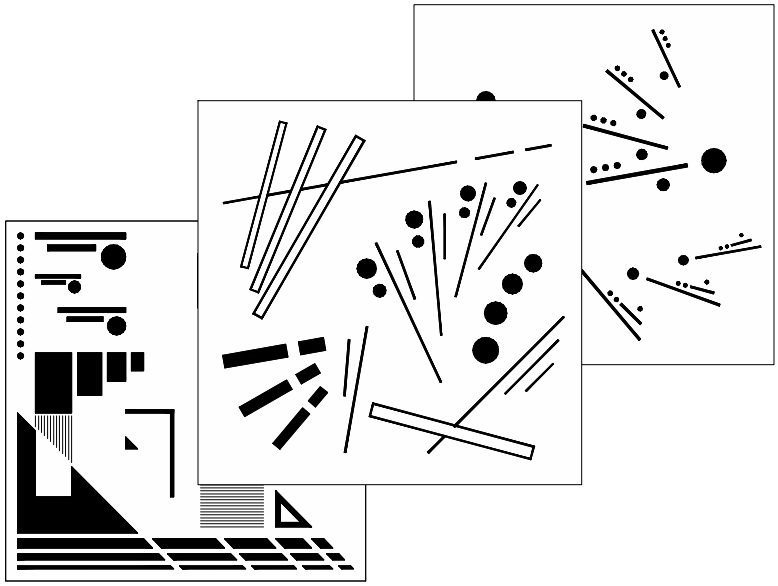
GEOMETRIC ABSTRACTS

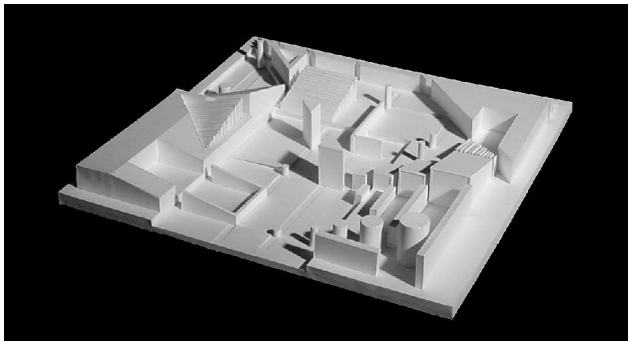
POINT, LINE, & PLANE COMPOSITIONS

Three exercises dealing with the creative investigation of the visual elements of point, line, and plane as the means of communicating visual organization concepts associated with a given set of visual vocabulary terms.

- Transition
- Sequence
- Rhythm
- Gradation
- Modulation
- Pattern
- Concentration
- Contrast
- Dominance
- Repetition
- Erosion
- Radiation
- Rotation
- Interpenetration
- Punctuation
- Interruption

(Final Presentation: Ink on board, measuring 10"×10")





POINT, LINE, & PLANE COMPOSITION IN RELIEF

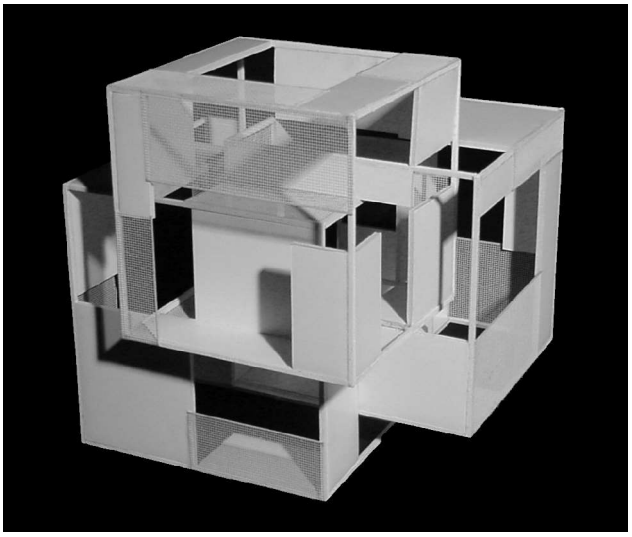
Three-dimensional spacial composition utilizing point, line, and plane as a limited volume/mass in a relief design. Involved formal expression or vocabulary intentions, enhancement of visual order, and closure through proximity, similarity, and continuity.

(Final Presentation: Model, measuring 15"×15"×2", constructed of foam core, museum board, and paper)

SOLID/VOID CUBIC COMPOSITION

Exploration of solid/void relationships in a three-dimensional spacial composition; utilizing the visual elements of point, line, plane, and mass; and the principles of proximity, essentialness, and closure in conjunction with the concepts of interpenetration and transparency.

(Final Presentation: Model, measuring 10"×10"×10", constructed of bass wood, foam core, and plastic screen)



Single Family Residence

1st Year

Second Semester

One of three projects designing single family residences, each with distinct emphases. Investigations based on the collection of five elements in four formal organizational types.

Five Elements

- Primary facade
- Loggia
- Expressed structural frame
- Primary Stair
- Free Roof

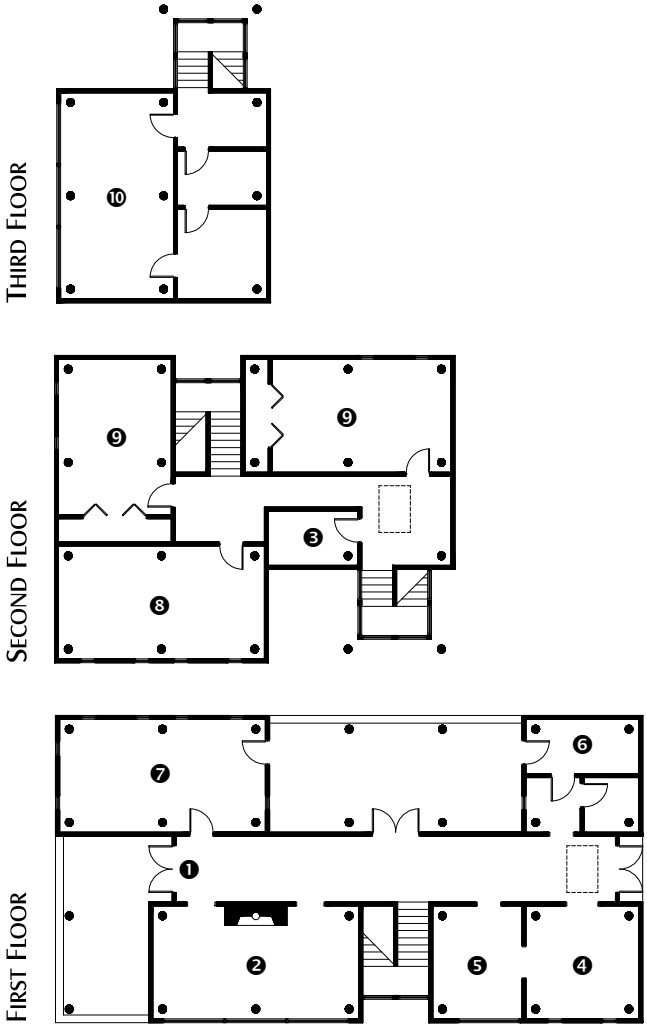
Four Formal Types

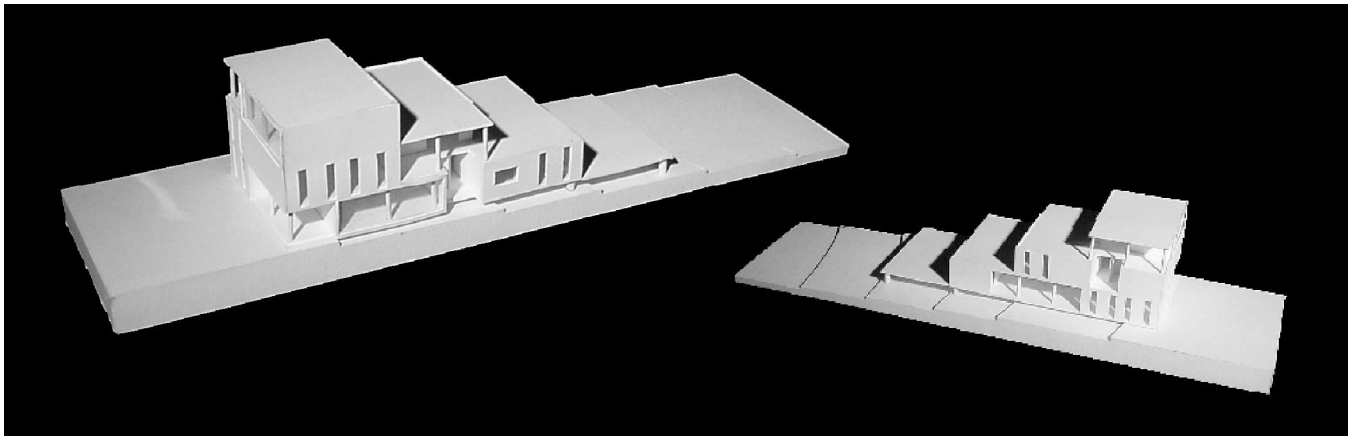
- Linear
- Clustered
- Modular
- Grid

Program of Spaces (3,000 sq.ft.)

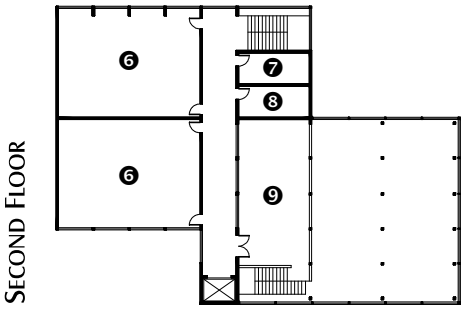
❶ Entry Foyer
❷ Living/Sitting Room
❸ Bathroom
❹ Kitchen
❺ Dining Room
❻ Utility
❼ Entertainment Room
❽ Library/Study
❾ Bedroom
❿ Master Suite

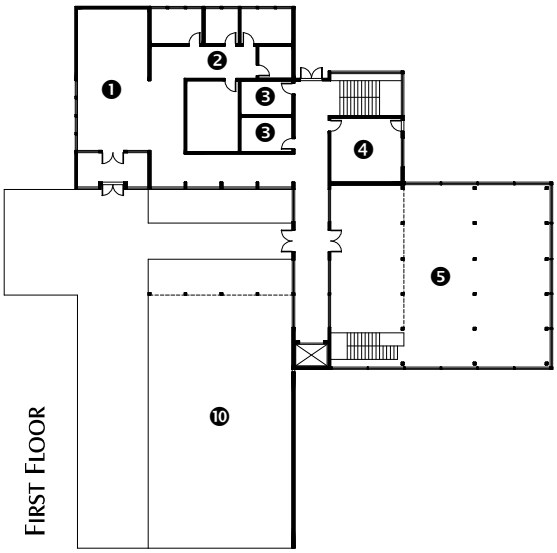
(Final Presentation: Model, measuring 6.5"×24"×5", constructed of museum board, chip board, and acetate; Drawings, ink on vellum)





BOTANICAL GARDEN





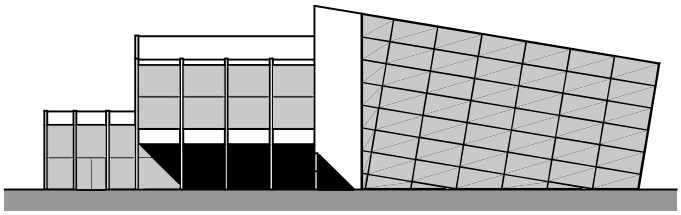
Design project to create a new building on the Kent State University campus for a greenhouse, lecture halls, and administration; further investigation of using the interpenetration of forms to create spaces.

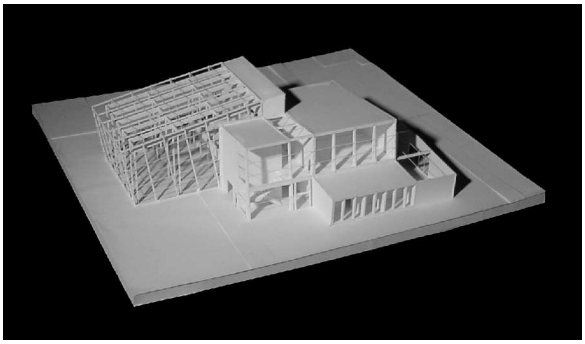
PROGRAM OF SPACES (12,000 SQ.FT.)

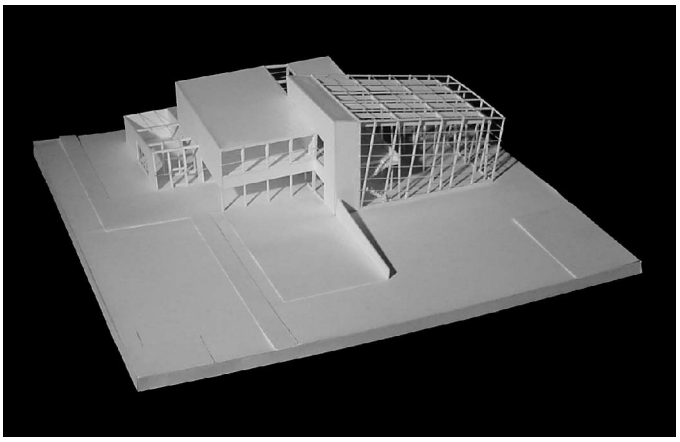
1. Lobby/Waiting
2. Administration
3. Toilets
4. Storage
5. Greenhouse
6. Classroom
7. A/V Room
8. HVAC
9. Balcony
10. Garden

(Final Presentation: Model, measuring 18"×18"×4½", constructed of museum board, basswood, and wire; Drawings, ink on board)

FRONT ELEVATION







Fine Arts Center

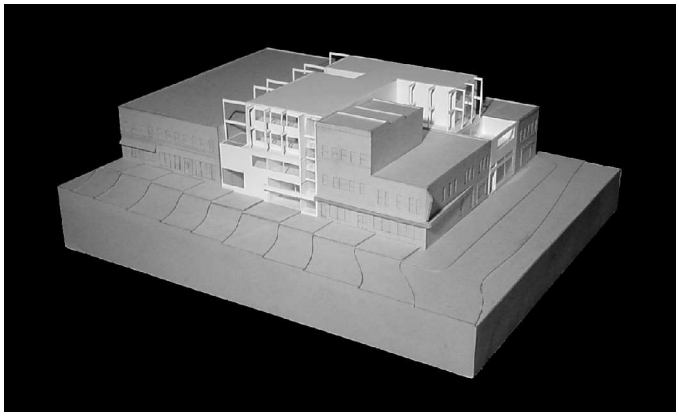
Second Semester

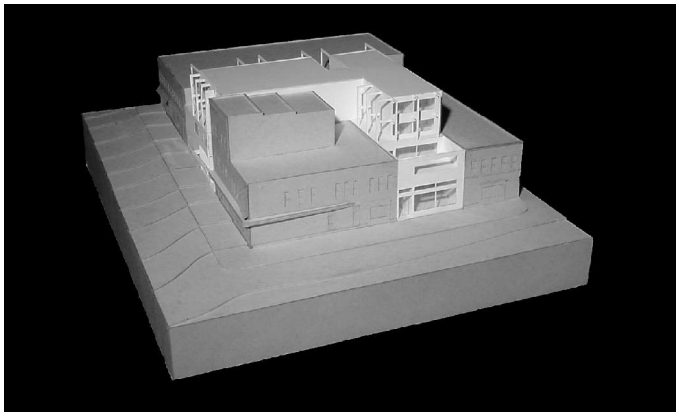
Closed site investigation to design a facility to house a small gallery for presentations and sales, working studios, and four living units for transient artists; as an demo/infill of the present Key Bank lot on the corner of E. Main and S. Water in Kent, OH.

Program of Spaces (24,000 sq.ft.)

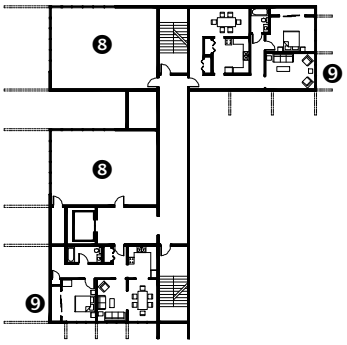
1. Art Gallery
2.
3.
4.
5.
6.
7.
8.
9.
10.

(Final Presentation: Model, measuring 19"×22½"×7½", constructed of museum board, chip board, and acetate; Drawings, created in AutoCAD)

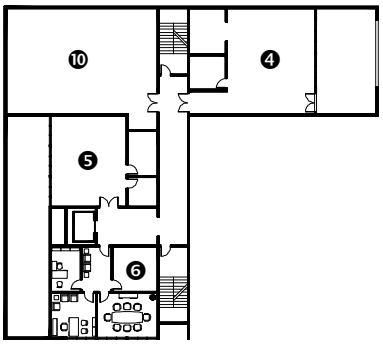




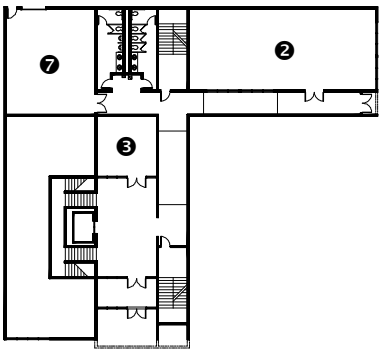
Thrid & Fourth Floors



Second Floor

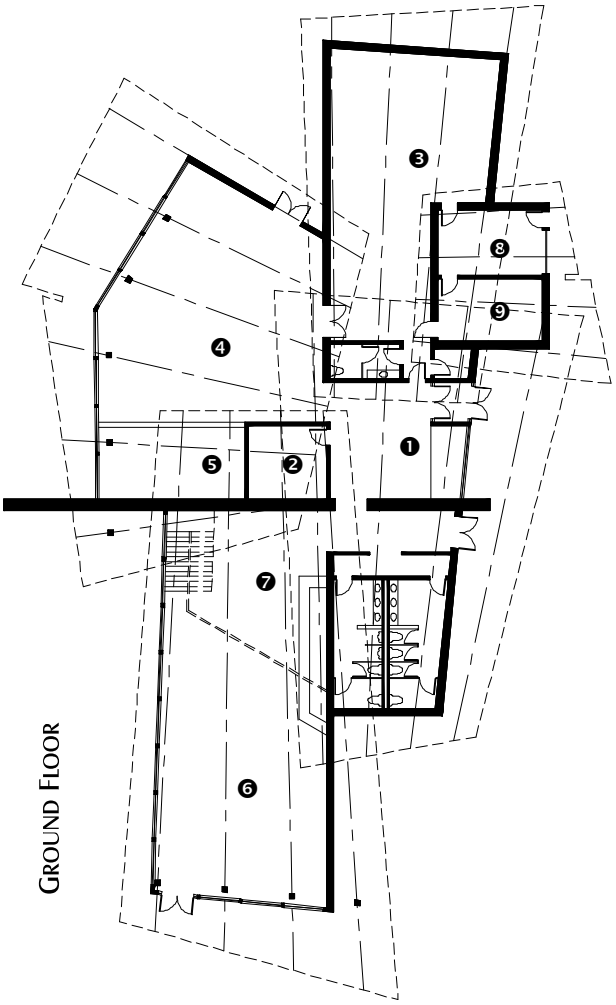


First Floor



Front Elevation

WHISKEY ISLAND



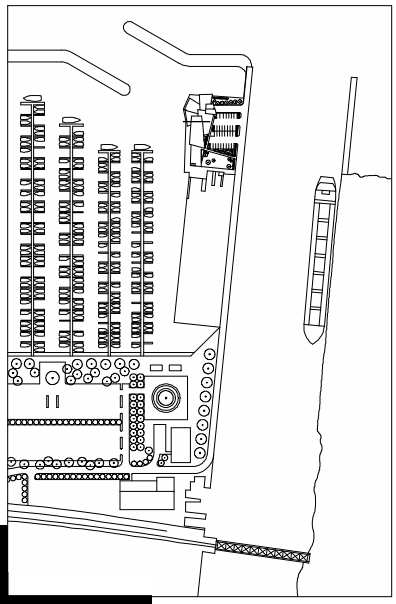
GROUND FLOOR

Design of a restaurant and nightclub for the proposed Whiskey Island Marina in Cleveland, OH on the pier of the abandoned Coast Guard station. Project requirements included the use of concrete block masonry as a primary material.

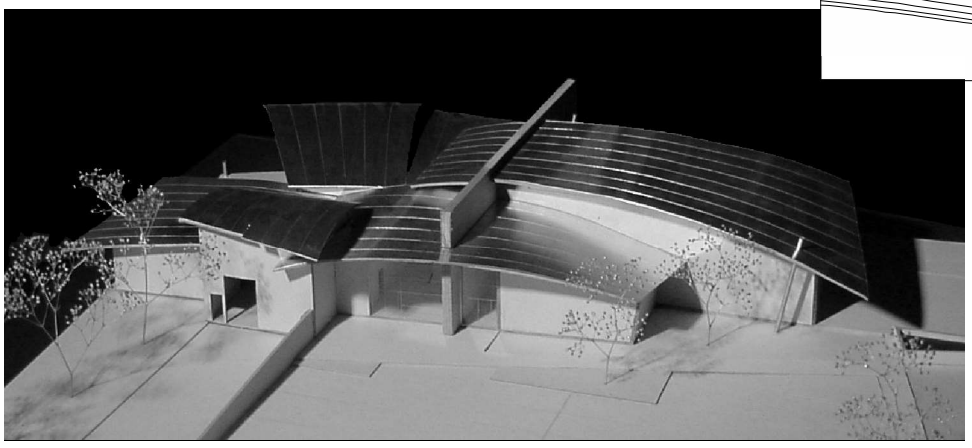
PROGRAM OF SPACES (6,500 SQ.FT.)

❶ Entry
❷ Office
❸ Kitchen
❹ Dining
❺ VIP Room
❻ Bar
❼ Lounge (balcony level)
❽ Receiving
❾ Mechanical
❿ Deck (not shown)

(Final Presentation: Model, measuring 32"×40"×6", constructed of chip board, foam core and acetate; Drawings, created in AutoCAD)



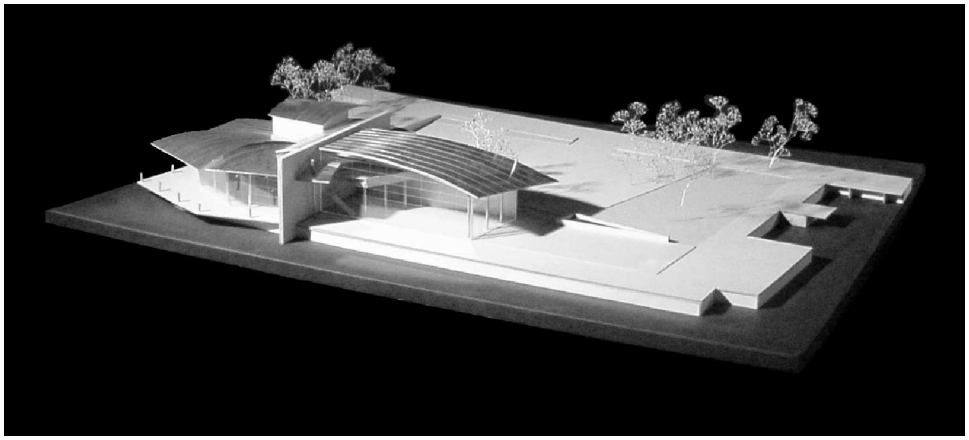
SITE PLAN

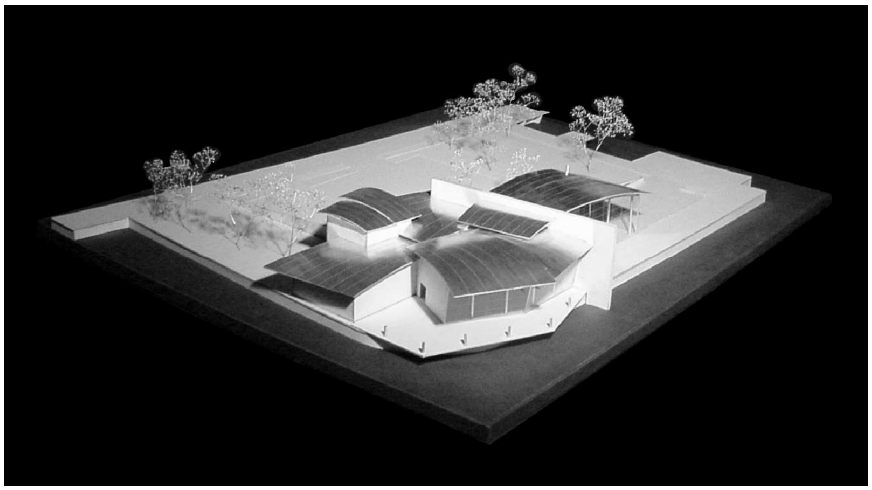


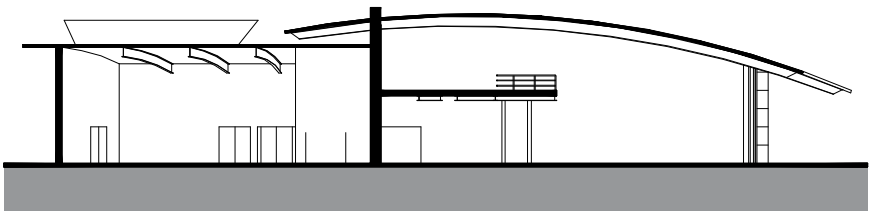
Restaurant & Nightclub

3rd Year

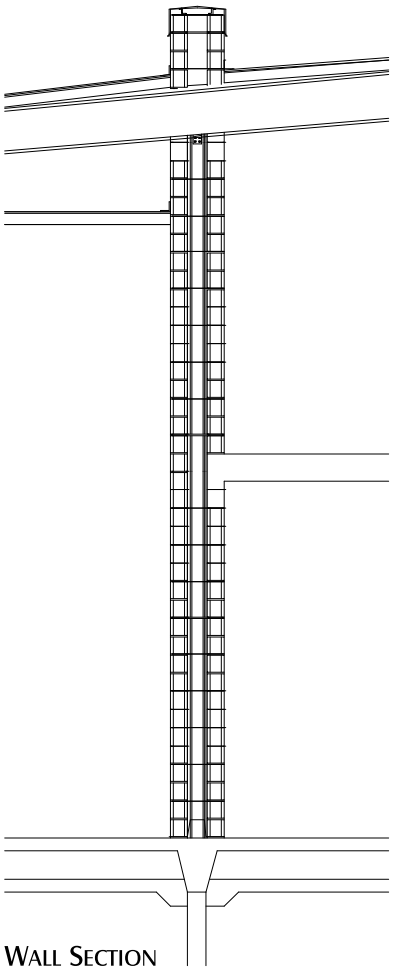
First Semester







Building Section

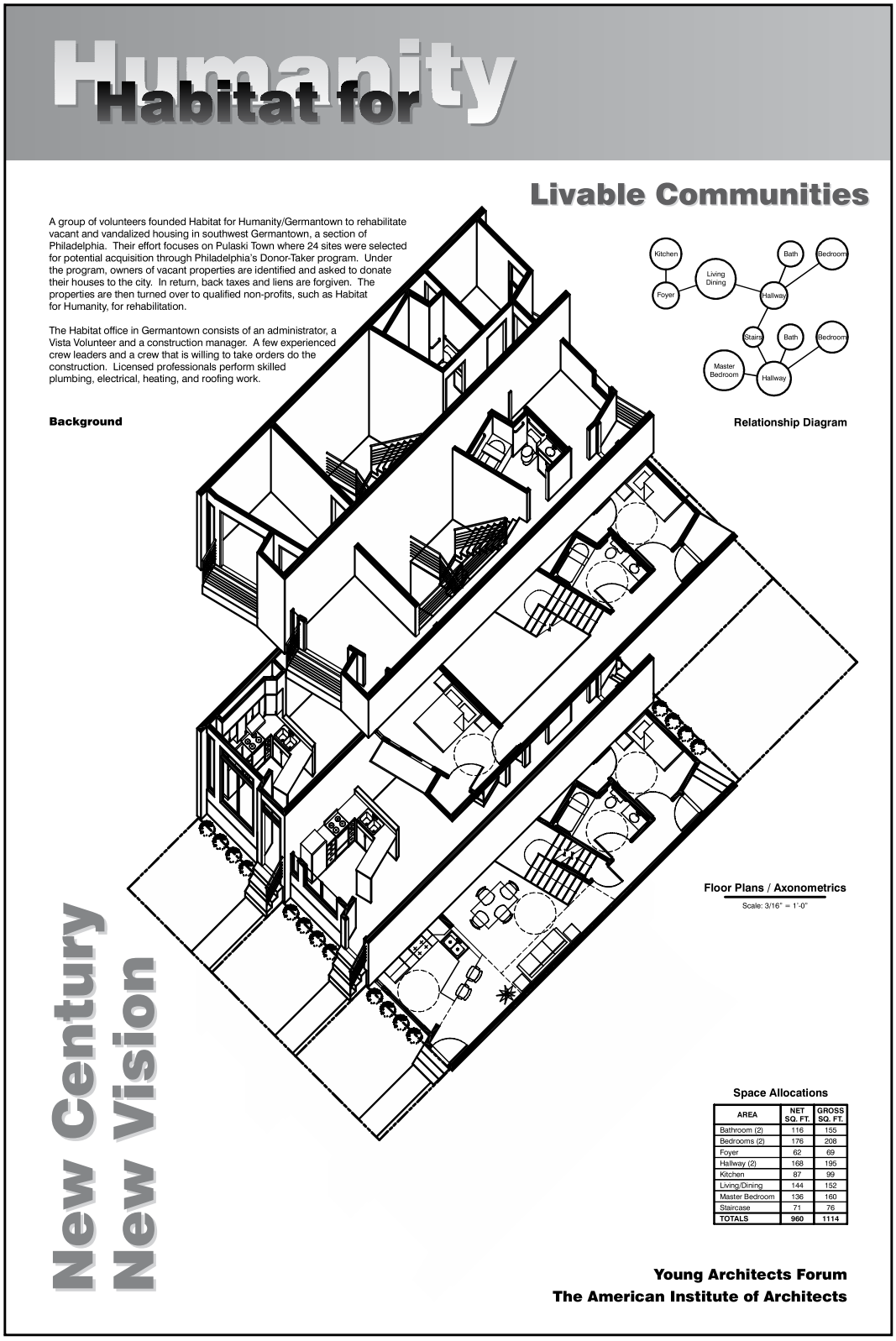


Wall Section

HABITAT FOR HUMANITY

National competition focusing on the design of a new urban housing prototype for Philadelphia, PA. The infill site is divided into three lots measuring 14'-3" by 81'-4", each to accommodate a typical 1040 square foot row house.

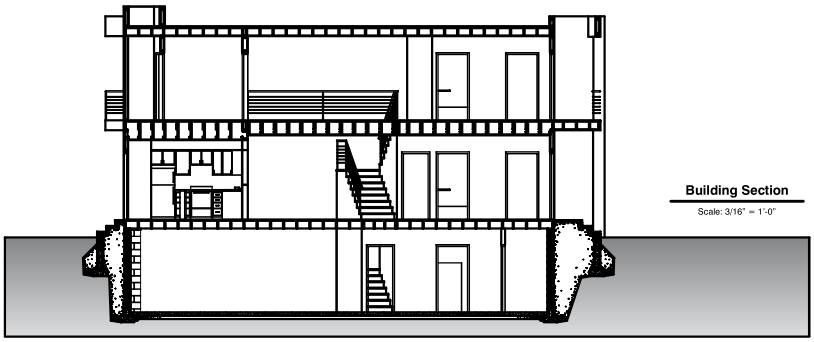
(Final Presentation: 2 Drawings mounted on board, measuring 20"×30", created in CorelDRAW!)



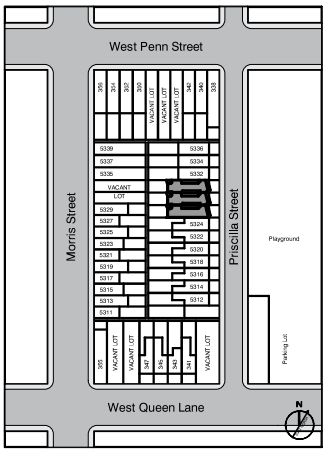
Prototype for the New Millenium

for America's Future

Philadelphia



Building Section
Scale: 3/16" = 1'-0"



Site Plan
Scale: 1" = 60'-0"

Front Elevaton
Scale: 3/16" = 1'-0"

Rear Elevaton
Scale: 3/16" = 1'-0"

Context

Pulaski Town is located in the Germantown section of Philadelphia, eight miles northwest of City Hall. Large single-family and semi-detached houses surround the ten-block area. The central commercial district of Germantown is a ten-minute walk to the northeast. Busses, commuter trains, and tree-lined streets provide ready access to other city neighborhoods.

Pulaski Town was built as a community of about 2,000 units of affordable housing owned by black freeman who largely built the houses themselves. Most neighborhood businesses were owned by families who did not live in Pulaski Town. Residential and neighborhood commercial construction in the area took place from the mid-nineteenth century to the mid-twentieth century.

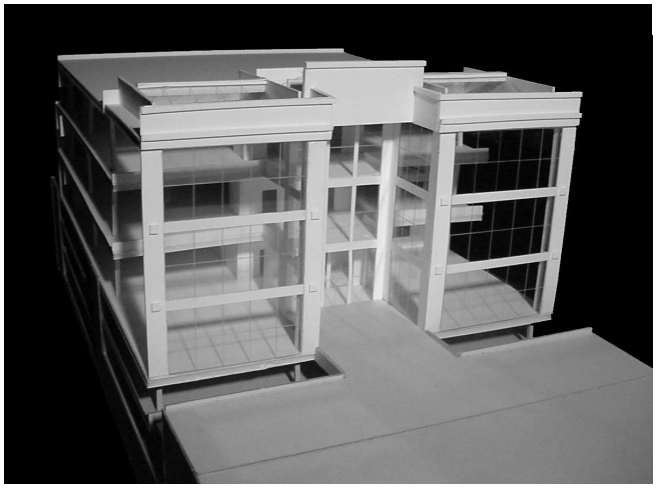
Philadelphia has over 25,000 vacant and vandalized properties. Many are brick row houses built in the nineteenth century, and most construction in Pulaski Town is two-story brick row housing. Masonry party walls two or three wythes

Habitat for Humanity

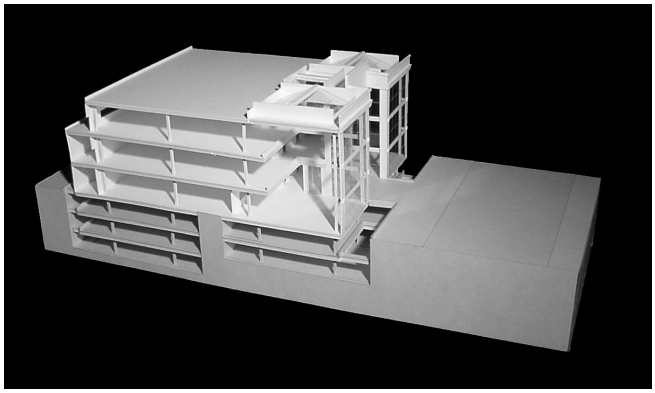
DESIGN ELEMENTS

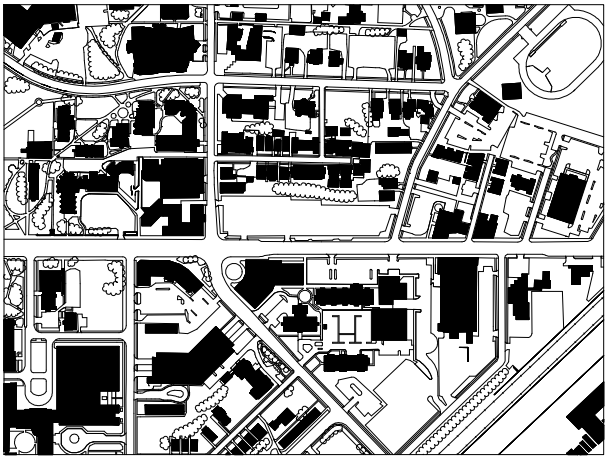
- Gross area: 1040 sf, ±10%
- Front yard: 12 ft deep
- Two story limit
- Common family area
- Two bedrooms: min 80 sf
  One bedroom: min 120sf
- Basement for furnace, water heater, storage
- Washer/dryer connections
- Natural convection cooling
- ADA standards

UNIVERSITY CIRCLE



The final design solution is a mixed-use development covering 80,000 square feet of a 3.3 acre site. It consists of 375,000 square feet of gross building area, with a floor area ratio of 4.5. The nine-story office structure has a 140,000 square feet of leaseable space with an additional 20,000 square feet on the lower two levels for retail use. The ninth floor was reduced to create a 10,000 square foot roof terrace. The three-story retail mall consists of 65,000 square feet. The third level is intended for private office use with a terrace off the rear. Food service is provided on the lower level near the 10,000 square foot plaza. A restaurant and café comprise the ground floor of the apartment complex. The remaining six stories are composed of 168 residential units of 430, 540, and 580 square feet. A terrace on the second floor covers the service areas of the restaurant and café. A two and a half-story parking garage is hidden below the site accommodating over 300 vehicles.

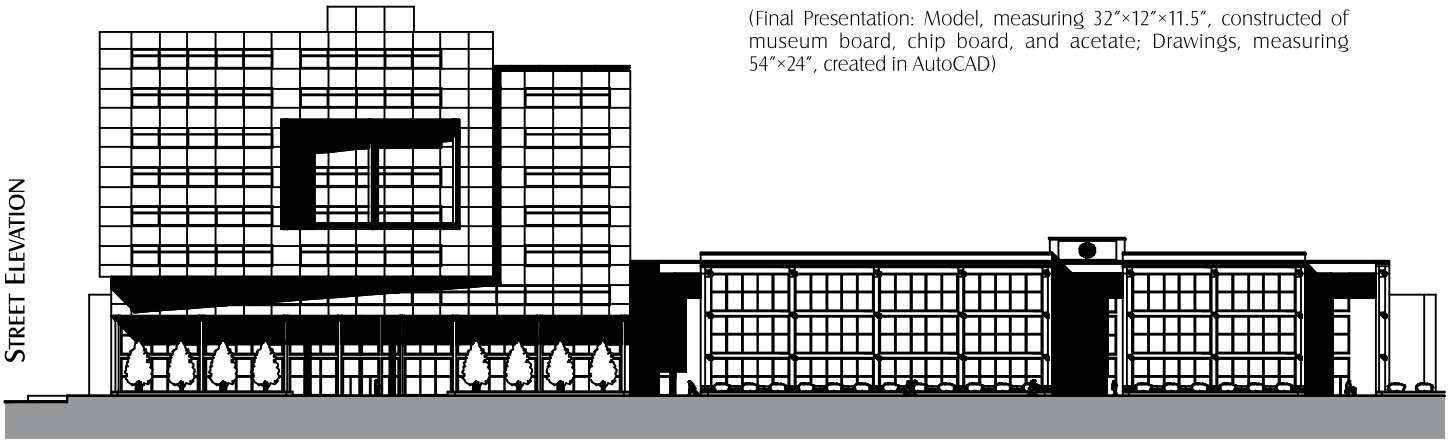




SITE PLAN

(Final Presentation: Model, measuring 32"×12"×11.5", constructed of museum board, chip board, and acetate; Drawings, measuring 54"×24", created in AutoCAD)

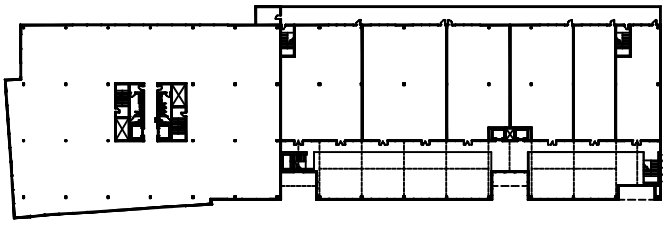
STREET ELEVATION

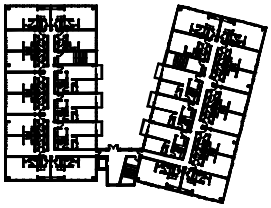


Development Project

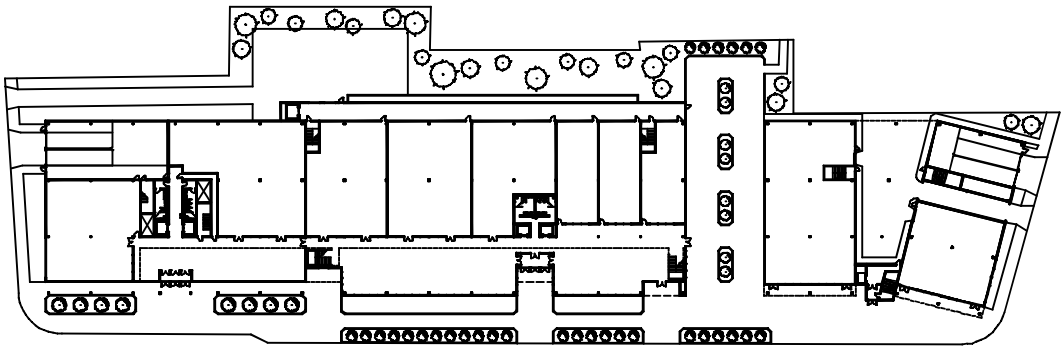
4th Year

First Semester

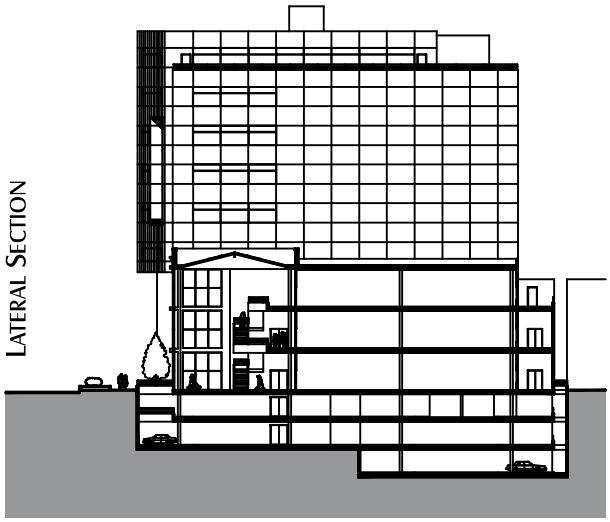




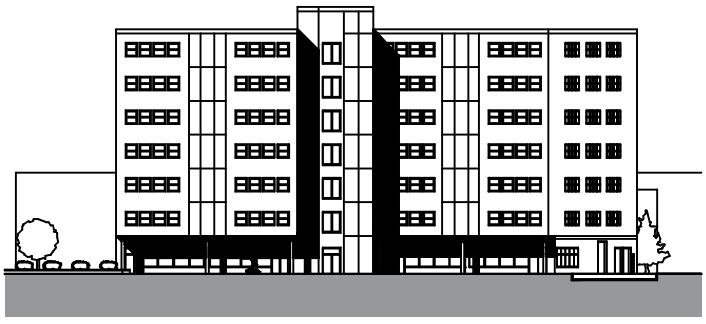
Upper Floors



Ground Floor



Lateral Section



FIRST ENERGY / OHIO EDISON

OFFICE BUILDING PROGRAM (NET AREA)

- Prime Tenants - 2 @ 45,000 sq.ft. each
- Lobby/Atrium - as required
- Receiving, Trash, and Storage - 1,000 sq.ft.
- Vehicle Drop-off & Temporary Parking (4 spaces)
- Security Office
- Parking for 20 cars (inside)

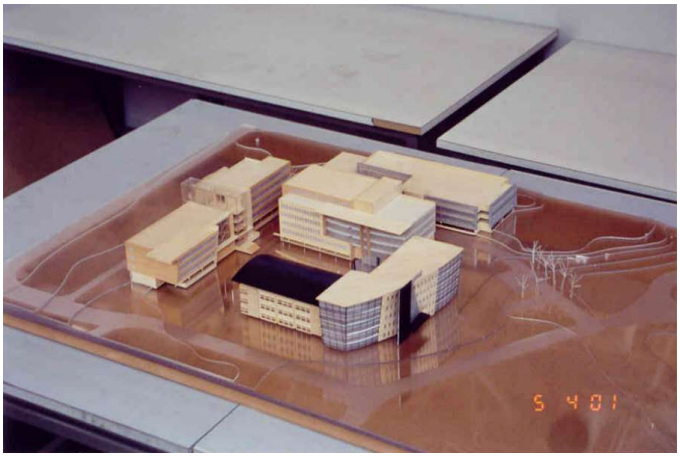
SHARED FACILITY PROGRAM (NET AREA)

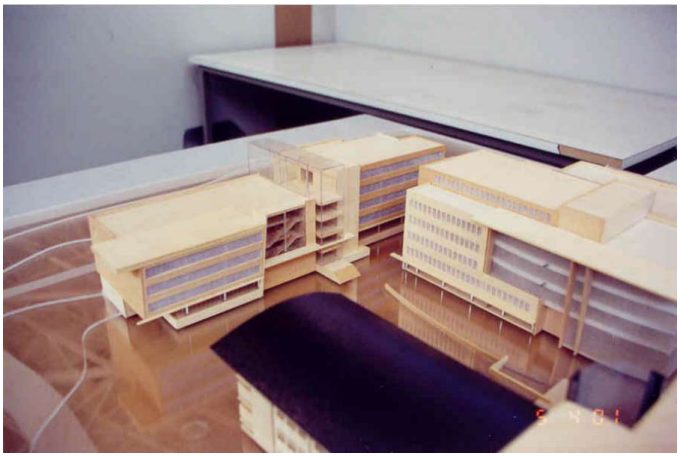
- Speculative Tenants - 2 @ 40,000 sq.ft. each
- Day Care Center - 2,500 sq.ft. (w/ exterior play area)
- Exercise Area - 2,500 sq.ft.
- Cafeteria - 12,000 sq.ft.
- Teleconference Area - 2,400 sq.ft.
- Auditorium - 2,000 sq.ft.
- Security Office - 120 sq.ft.
- Mechanical, Electrical, Fire Protection - as required

Spectulative tenant space to be designed to accomodate office sizes ranging from 1,000 sq.ft. to 8,000 sq.ft. w/ thorough space planning and design of one 4,000 sq.ft. office space layout

GENERAL DESIGN CRITERIA

- Zoning Restrictions:
  - Richmond Road Setback - 100 ft.
  - Spectrum Parkway Setback - 50 ft.
  - Minimum Green Space - 30%
  - Maximum Site Coverage Ratio - 66%
- Primary Tenants:
- Use Group B: Business (OBBC 304.0)
- Shared Facility
  - Use Group A-1: Assembly - Theaters (OBBC 303.2)
  - Use Group A-3: Assembly - Cafeteria (OBBC 303.4)
  - Use Group B: Business (OBBC 304.0)
  - Use Group E: Educational (OBBC 305.0)
  - Use Group S: Storage - Low-Hazard (OBBC 311.2)
- Construction Classification - Type 2B
- Height and Area Limitations
  - 5 Stories, 65 ft. High, 22,500 sq.ft.
- Maximum Floor Area per Occupant (OBBC 1008.1.2)
  - Assembly - 15 net or number of fixed seats
  - Business - 100 gross
  - Educational - 20 net
  - Parking - 200 gross
  - Storage - 300 gross

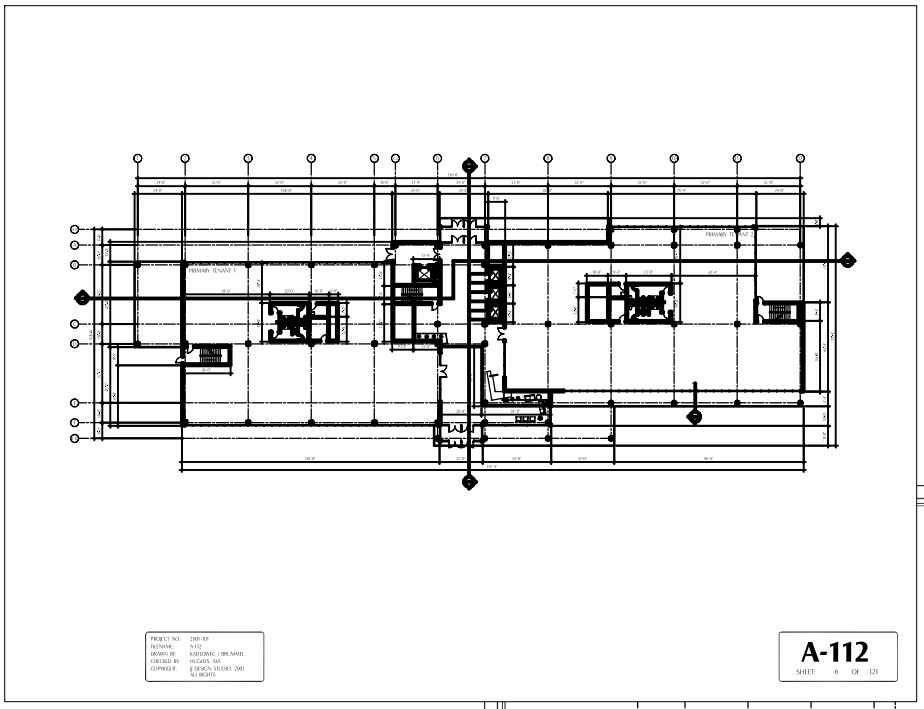




Design Competition

4th Year

Second Semester



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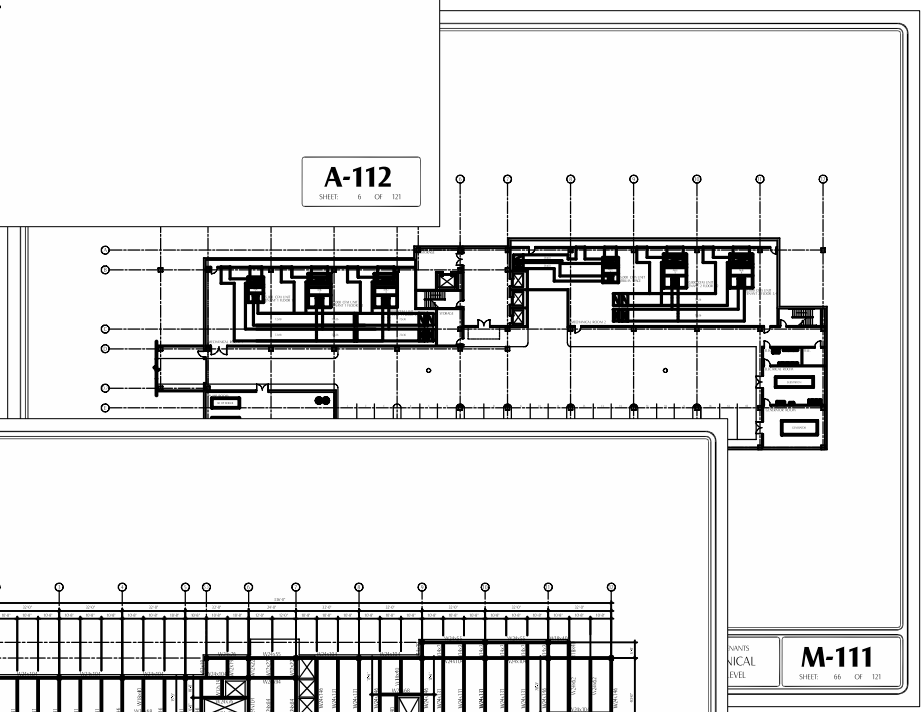

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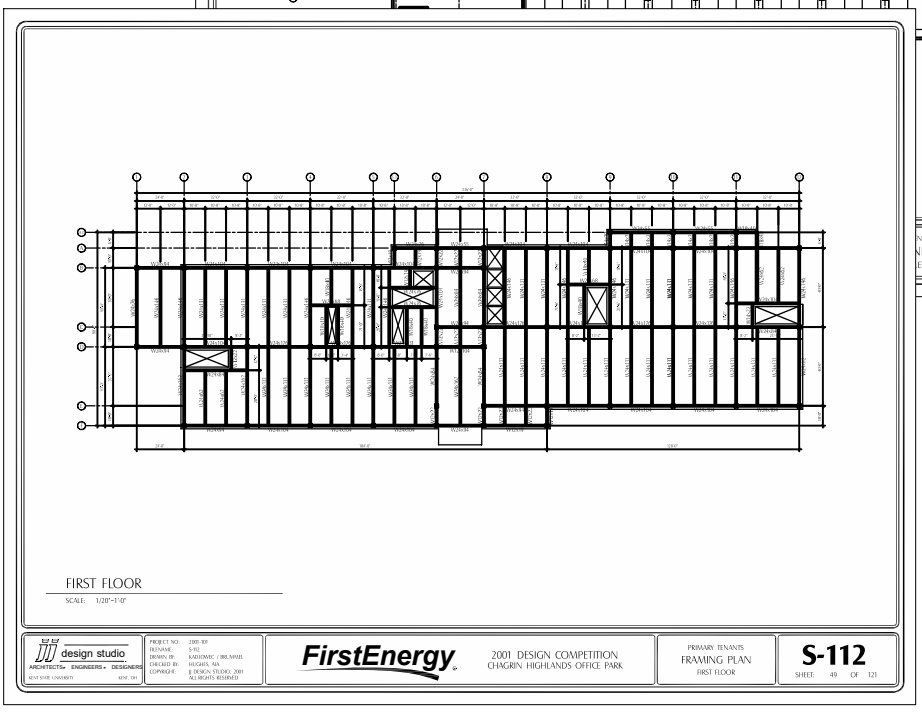


FIRST FLOOR

SCALE: 1/20"=1'-0"

design studio

FirstEnergy

2001 DESIGN COMPETITION
CHAGRIN HIGHLANDS OFFICE PARK

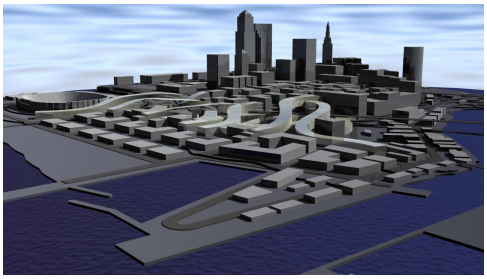
PRIMARY TENANTS
FRAMING PLAN
FIRST FLOOR

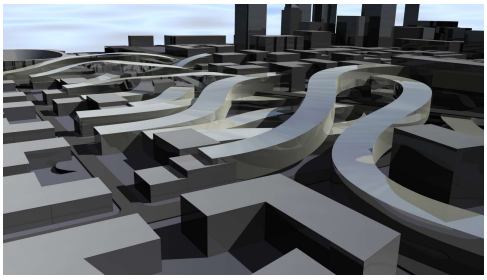
S-112

5TH YEAR

FIRST SEMESTER

WAREHOUSE DISTRICT AND



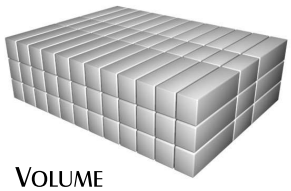


The form of the buildings began as simple rectangular volumes. These forms were then shaped through a series of horizontal bends. They were next interwoven through a process of vertical moves. The modular components were finally horizontally shifted to create depth.

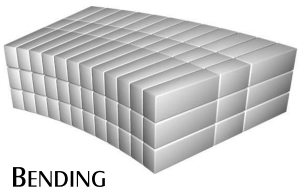
The exteriors of the buildings differed dependent upon their use. Retail consisted of a blank wall with central skylights. Offices were faced with a simple glazing system. Housing was created by the random dispersion of solids and voids.

The circulation system remained centralized. Multi-floor circulation in the retail and office buildings, which contained stacked units. Single hallways in the housing buildings, which contained interlocking units.

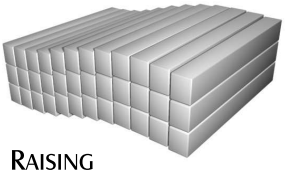
(Final Presentation: Model, measuring 30"×30"×5", constructed of chip board and dry foam; Drawings, measuring 18"×24", with computer images created with 3D Studio VIZ;)



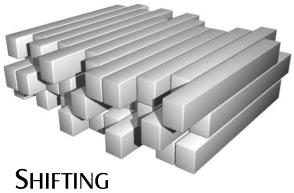
VOLUME



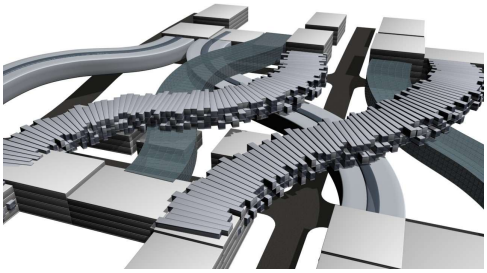
BENDING

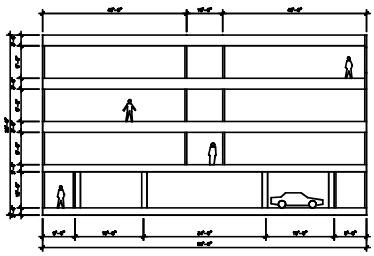


RAISING

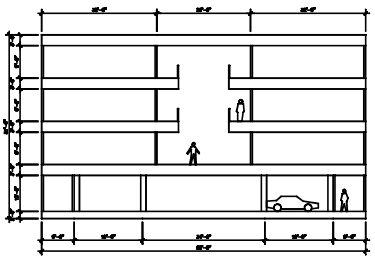


SHIFTING

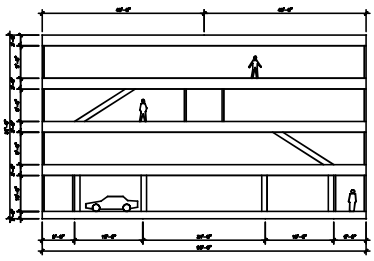




OFFICE



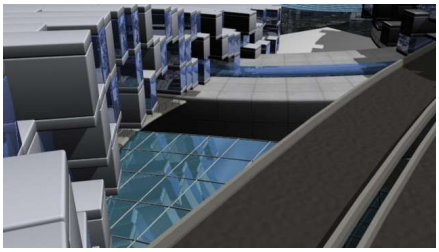
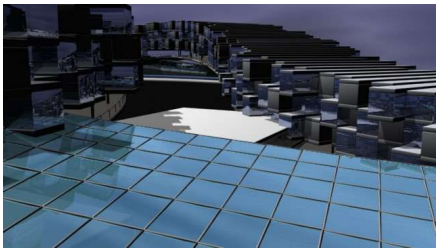
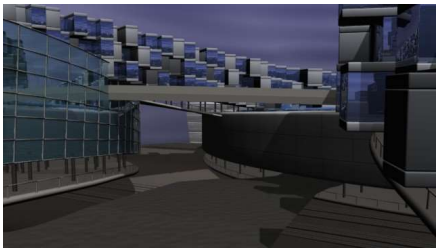
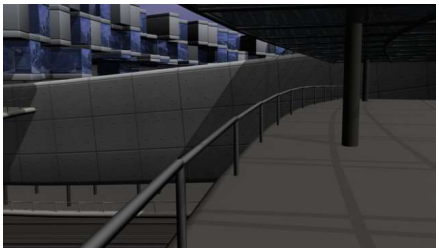
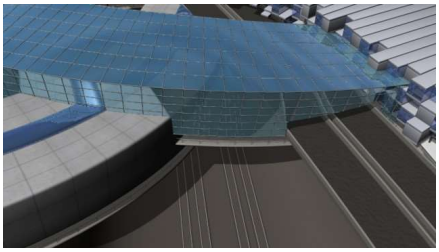
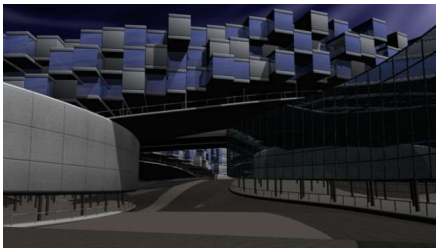
RETAIL

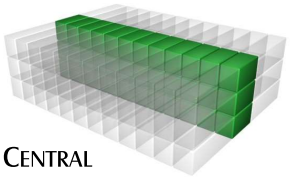


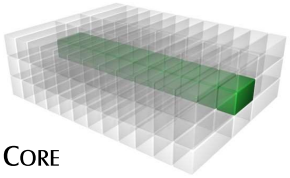
HOUSING

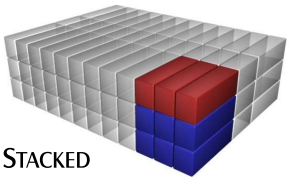
Lakefront Development

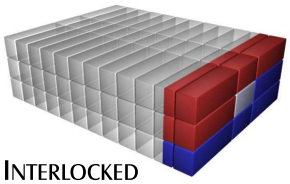
5th Year
First Semester

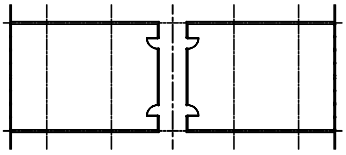







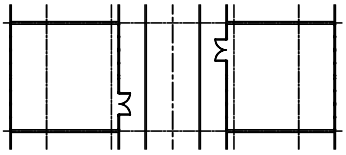

Central

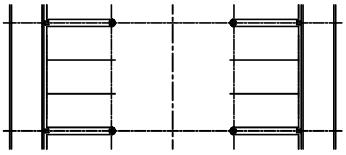

Core

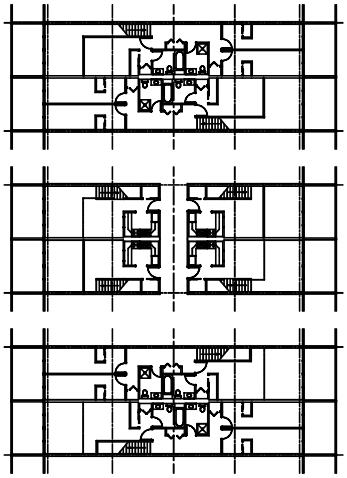

Stacked

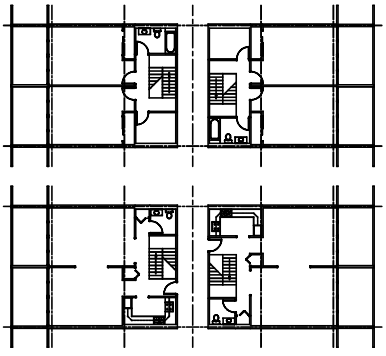

Interlocked

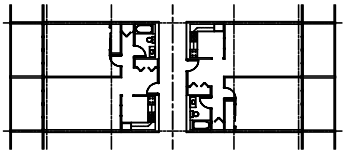

Office

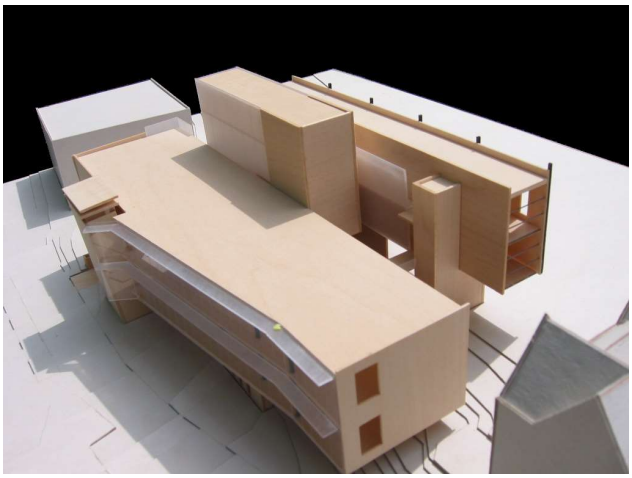

Retail

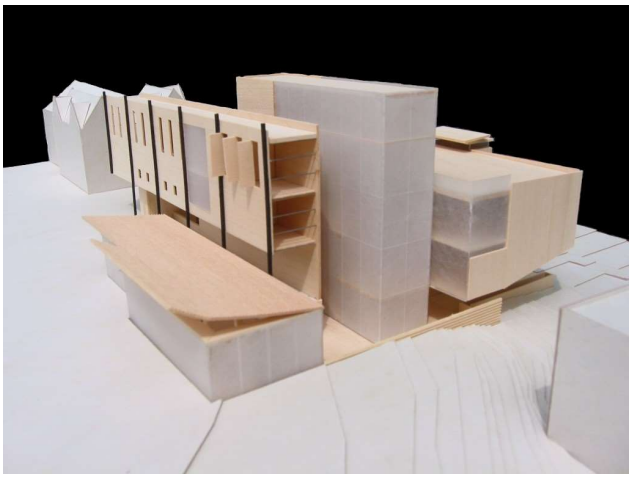

Parking


Housing









A New School of Architecture Building
Olgethorpe University (Atlanta, GA)

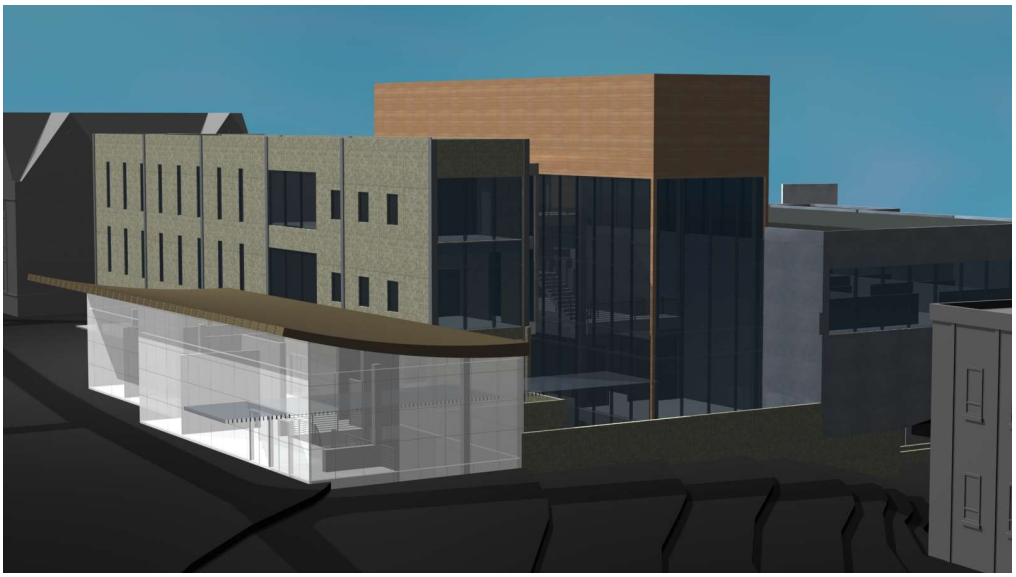
Design a modern state-of-the-art architecture school facility which meets the mission of the University and promotes and enhances the current level of educational distinction enjoyed by Oglethorpe University

Program Summary (36,000 sq.ft.)

- Administrative Offices and Support
- Faculty Offices
- Classrooms
- Gallery and Support
- Jury Area
- Studio and Support
- Shops and Labs
- Design/Build Yard

A school of architecture should itself be a learning tool, in a metaphorical sense, a textbook. But rather than pictures and words, it offers a physical, hands-on reference for the students.

(Final Presentation: Model, measuring 30"×20"×6", constructed of chip board, basswood, and acetate; Drawings, measuring 20"×20" with images created in AutoCAD and 3D Studio VIZ)

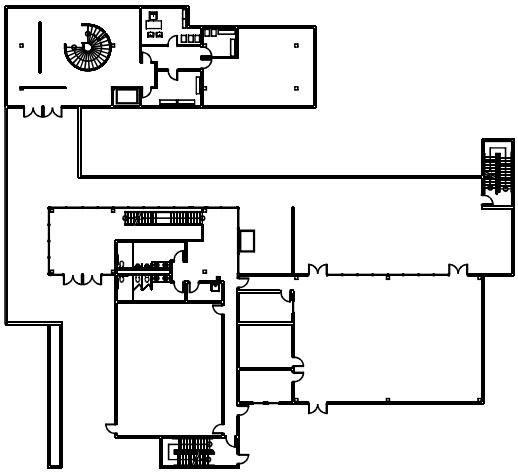


Design Competition

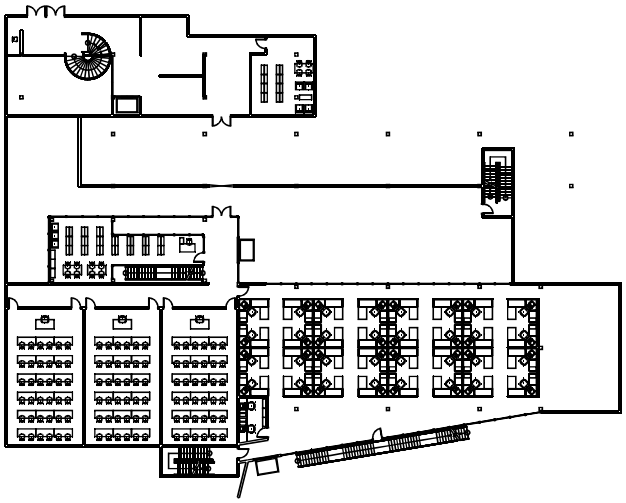
5th Year

Second Semester

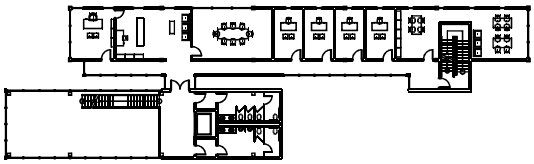
First Floor



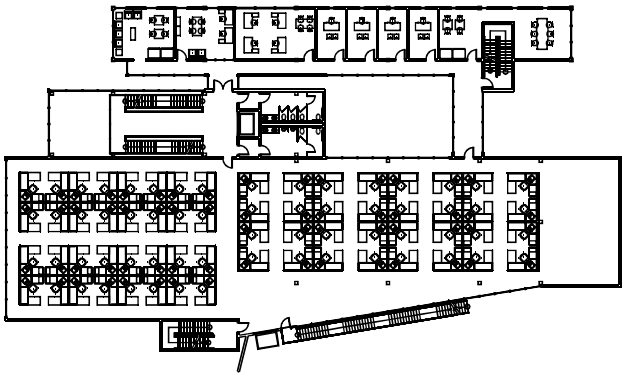
Second Floor

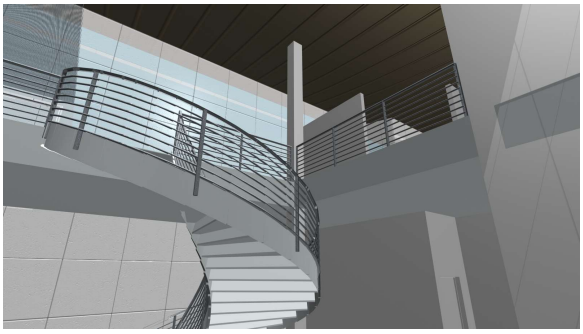


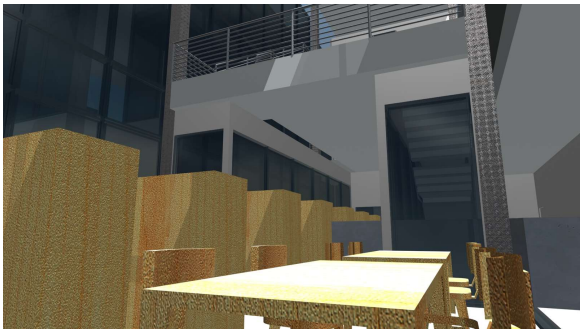
Fourth Floor



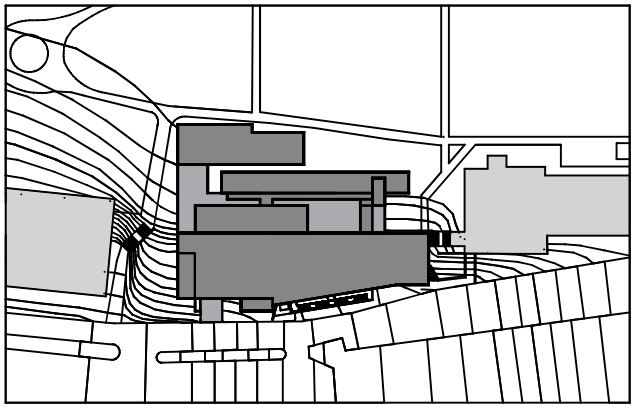
Third Floor







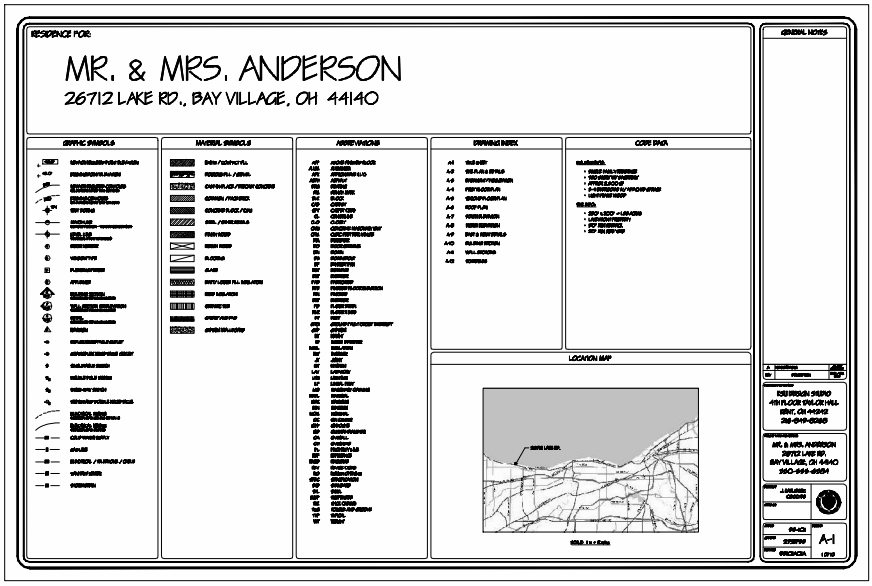
Site Plan

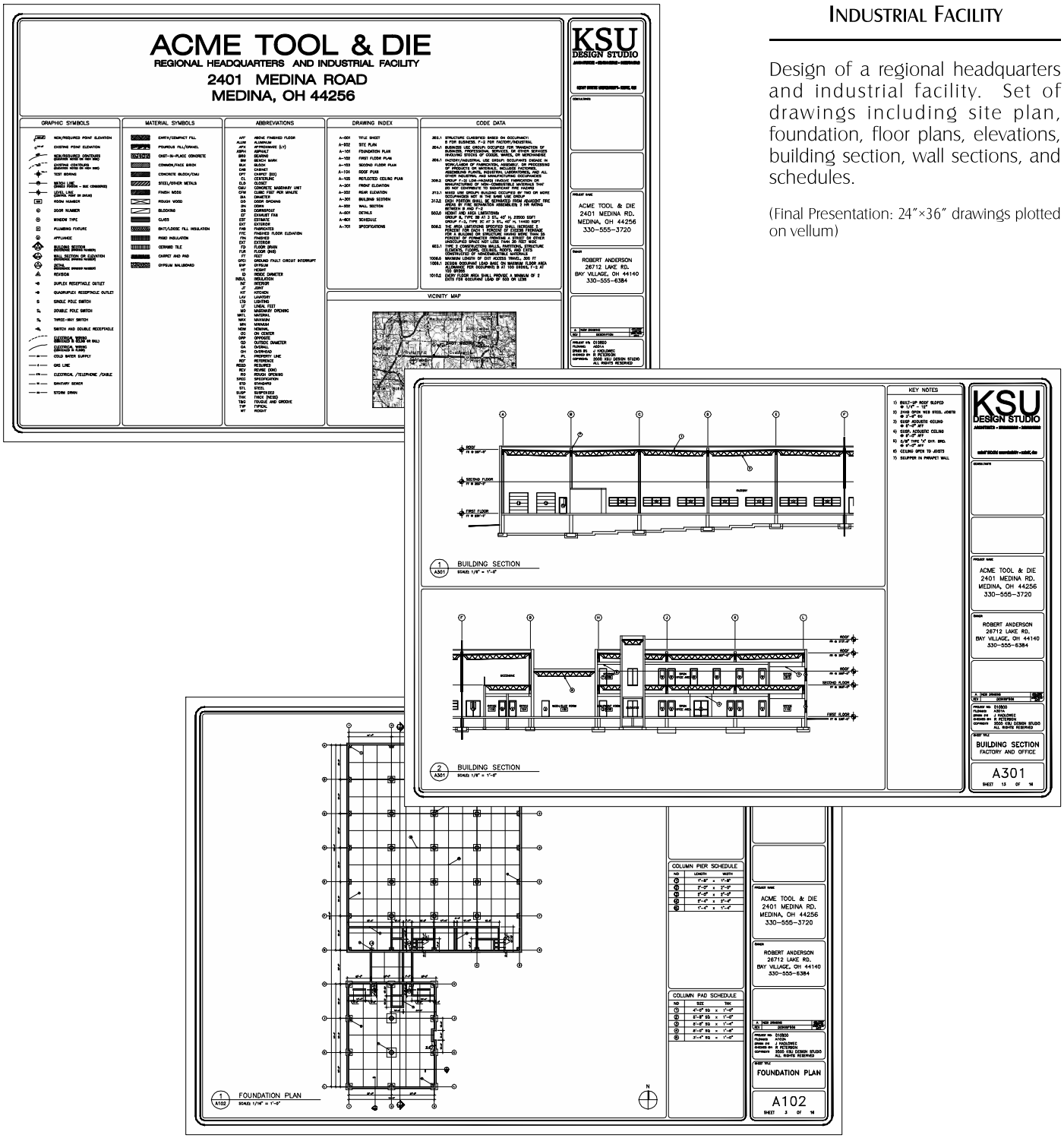


Single Family Residence

Design of a single family residence. Set of drawings including site plan, foundation, floor plans, elevations, building section, wall sections, and schedules.

(Final Presentation: 24"×36" drawings plotted on vellum)





INDUSTRIAL FACILITY

Design of a regional headquarters and industrial facility. Set of drawings including site plan, foundation, floor plans, elevations, building section, wall sections, and schedules.

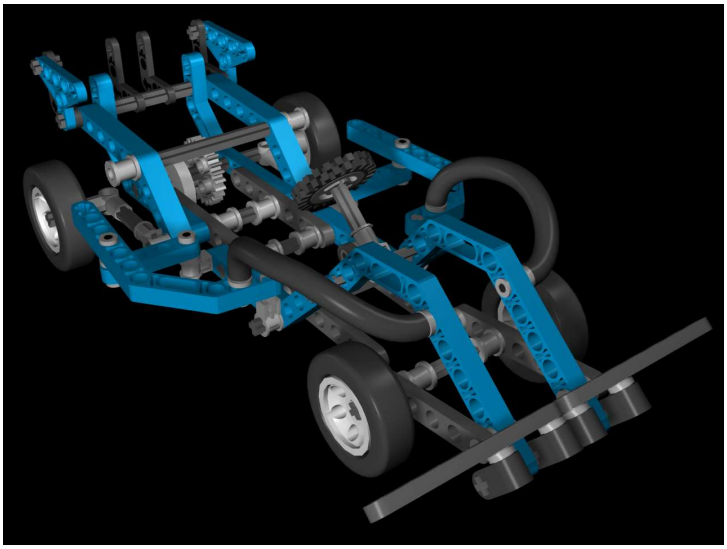
(Final Presentation: 24"×36" drawings plotted on vellum)

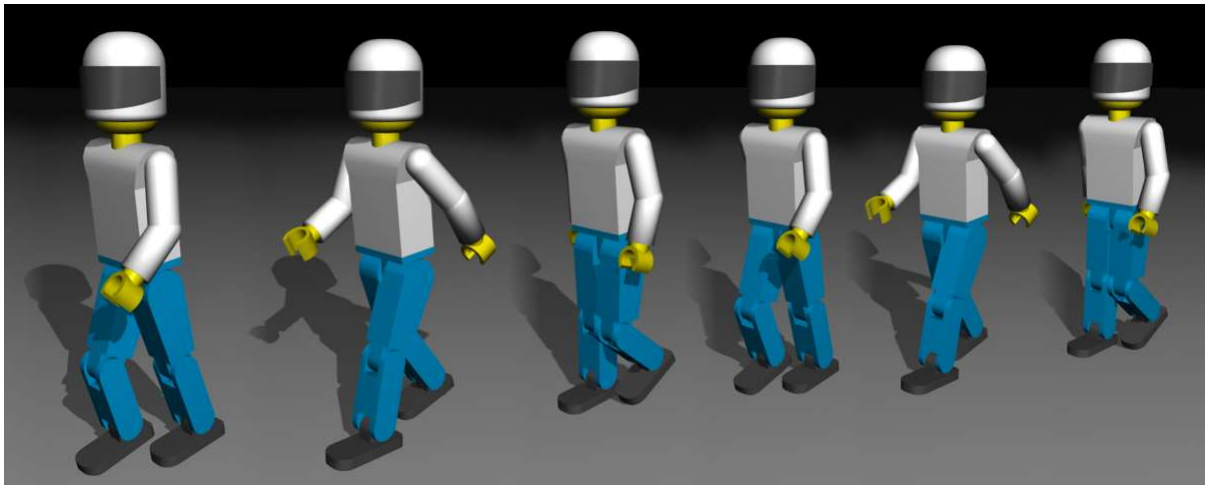
LEGO Models and Animations

- Two animations of the assembly of a race car built from LEGO pieces.
- LEGO character walking, utilizing both forward and inverse kinematics.
- The final animation consisting of the complete assembly and the character getting into the car and driving

Howard Branston Lighting Design Competition

The project consists of a renovation of an urban ethnic cultural center. It features an entrance lobby, book store, visitor center, and a two-story café and garden court. The second and third floors features lobbies leading to galleries. A grand staircase connects the floors vertically from the first basement to the third floor.





Sauna

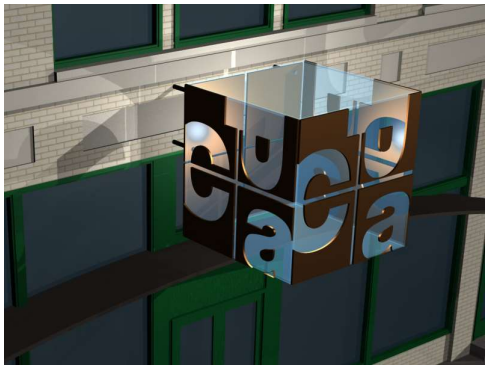
Renderings of a sauna featured in Architecture magazine, modeled in 3D Studio VIZ with texture maps created in PhotoPaint.

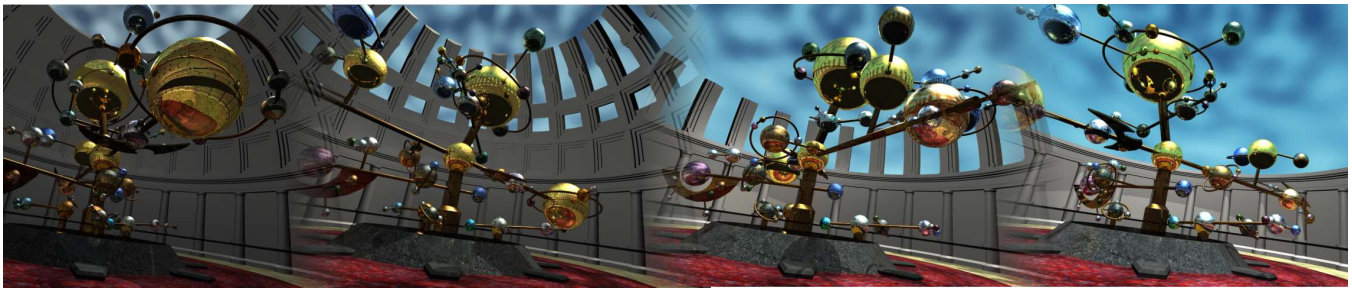
Mechanism

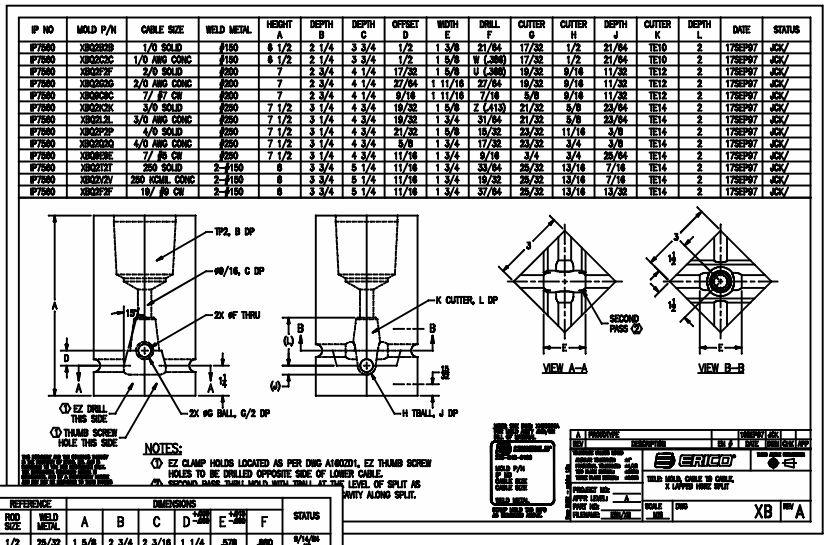
Project to create a mechanical device that exhibits "seasonal" changes. Pictured here are four frames of a two-minute animation of a solar system set inside a coffered-dome.

CPA Sign Competition

Design of a new sign and entrance canopy for the Cleveland Public Art gallery and office. The proposal consists of a lighted cube constructed of tinted glass and copper, featuring the CPA logo and a curved corrugated steel canopy.





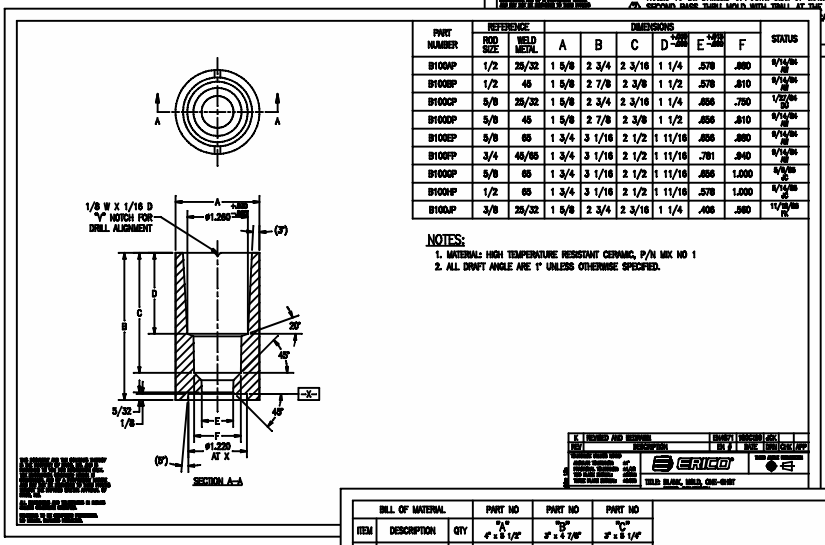


IP NO	MOLD P/N	CABLE SIZE	WELD METAL	HEIGHT A	DEPTH B	DEPTH C	OFFSET D	WIDTH E	DRILL F	CUTTER G	CUTTER H	DEPTH J	CUTTER K	DEPTH L	DATE	STATUS
IP7560	XB02B2B	1/0 SOLID	#150	6 1/2	2 1/4	3 3/4	1/2	1 3/8	21/64	17/32	1/2	21/64	TE10	2	17SEP97	JCK
IP7560	XB02C2C	1/0 AWG CONC	#150	6 1/2	2 1/4	3 3/4	1/2	1 5/8	W (.386)	17/32	1/2	21/64	TE10	2	17SEP97	JCK
IP7560	XB02F2F	2/0 SOLID	#250	7	2 3/4	4 1/4	17/32	1 5/8	U (.368)	19/32	9/16	11/32	TE12	2	17SEP97	JCK
IP7560	XB02G2G	2/0 AWG CONC	#250	7	2 3/4	4 1/4	27/64	1 11/16	27/64	19/32	9/16	11/32	TE12	2	17SEP97	JCK
IP7560	XB02K2K	7/ 7/ CN	#250	7	2 3/4	4 1/4	9/16	1 11/16	7/16	19/32	5/8	11/32	TE12	2	17SEP97	JCK
IP7560	XB02K2K	3/0 SOLID	#250	7 1/2	3 1/4	4 3/4	19/32	1 5/8	Z (.413)	21/32	5/8	23/64	TE14	2	17SEP97	JCK
IP7560	XB02L2L	3/0 AWG CONC	#250	7 1/2	3 1/4	4 3/4	19/32	1 3/4	31/64	21/32	5/8	23/64	TE14	2	17SEP97	JCK
IP7560	XB02P2P	4/0 SOLID	#250	7 1/2	3 1/4	4 3/4	21/32	1 5/8	15/32	23/32	11/16	3/8	TE14	2	17SEP97	JCK
IP7560	XB02Q2Q	4/0 AWG CONC	#250	7 1/2	3 1/4	4 3/4	5/8	1 3/4	17/32	23/32	3/4	3/8	TE14	2	17SEP97	JCK
IP7560	XB02R2R	7/ /0 CN	#250	7 1/2	3 1/4	4 3/4	11/16	1 3/4	9/16	3/4	3/4	25/64	TE14	2	17SEP97	JCK
IP7560	XB02T2T	250 SOLID	2-#150	8	3 3/4	5 1/4	11/16	1 3/4	33/64	25/32	13/16	7/16	TE14	2	17SEP97	JCK
IP7560	XB02V2V	250 KCMIL CONC	2-#150	8	3 3/4	5 1/4	11/16	1 3/4	19/32	25/32	13/16	7/16	TE14	2	17SEP97	JCK
IP7560	XB02Y2Y	19/ /0 CN	2-#150	8	3 3/4	5 1/4	11/16	1 3/4	37/64	25/32	13/16	13/32	TE14	2	17SEP97	JCK

NOTES:
1. EZ CLAMP HOLDS LOCATED AS PER DWG A180ZD1, EZ THUMB SCREW HOLES TO BE DRILLED OPPOSITE SIDE OF LOWER CABLE.
2. SECOND PASS TUBE MOLD WITH TBALL AT THE LEVEL OF SPLIT AS [illegible] CAVITY ALONG SPLIT.

TOOLS MOLD, CABLE TO CABLE, X LAYER HINGE STYLE

XB A

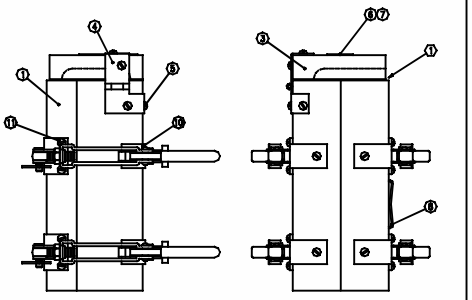


PART NUMBER	REFERENCE		DIMENSIONS						STATUS
	ROD SIZE	WELD METAL	A	B	C	D +.000 -.005	E +.010 -.005	F	
B100AP	1/2	25/32	1 5/8	2 3/4	2 3/16	1 1/4	.578	.880	9/14/05 JS
B100BP	1/2	45	1 5/8	2 7/8	2 3/8	1 1/2	.578	.910	9/14/05 JS
B100CP	5/8	25/32	1 5/8	2 3/4	2 3/16	1 1/4	.656	.750	1/27/06 JS
B100DP	5/8	45	1 5/8	2 7/8	2 3/8	1 1/2	.656	.810	9/14/05 JS
B100EP	5/8	65	1 3/4	3 1/16	2 1/2	1 11/16	.656	.880	9/14/05 JS
B100FP	3/4	45/65	1 3/4	3 1/16	2 1/2	1 11/16	.781	.940	9/14/05 JS
B100GP	5/8	65	1 3/4	3 1/16	2 1/2	1 11/16	.656	1.000	9/8/05 JS
B100HP	1/2	65	1 3/4	3 1/16	2 1/2	1 11/16	.578	1.000	9/14/05 JS
B100JP	3/8	25/32	1 5/8	2 3/4	2 3/16	1 1/4	.406	.560	11/28/05 RL

NOTES:
1. MATERIAL: HIGH TEMPERATURE RESISTANT CERAMIC, P/N MIX NO 1
2. ALL DRAFT ANGLE ARE 1° UNLESS OTHERWISE SPECIFIED.

ITEM	DESCRIPTION	QTY	PART NO "A" 4" x 5 1/2"	PART NO "B" 3" x 5 7/8"	PART NO "C" 3" x 5 1/4"
1	MOLD	1	SEE MOLD DWG	SEE MOLD DWG	SEE MOLD DWG
2	MOLD PINS	4	S2736	S678	S678
3	COVER	1	B30117	B30114	B30115
4	COVER HINGE	1	B163D	B163D	B163D
5	HINGE SCREWS	4	A6274025	A6274025	A6274025
6	MOLD TAG	1	B275F	B275	B275
7	TAG STAPLES	2	N/A	N/A	N/A
8	MOLD CLIP	1	S2713-1	S2713	S2713
9	IP	1	SEE MOLD TAG APPS	SEE MOLD TAG APPS	SEE MOLD TAG APPS
10	FRAMES	2	M2373A	M2372A	M2411
11	FRAME SCREWS	6	A6274025	A6274025	A6274025
12	FLINT IGNITOR	1	T320	T320	T320
13	FRAME SCREWS	6	A6270020	A6270020	A6270020

NOTE:
1. MAXIMUM 1/16 GAP BETWEEN MOLD & COVER, ANY SIDE
2. FOR MOLD WITH FRAME (PART NO) DET 1 TO 13
3. FOR MOLD ONLY (PART NO "B") DET 1 TO 9
4. FOR FRAME ONLY (PART NO "A") DET 10 TO 13



TOOLS MOLD, ASSY, 3 PC MOLD W/ BRIDGE PLATE

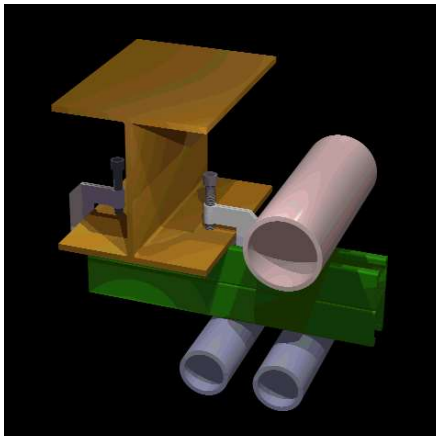
XXB0099 D

ELECTRICAL SURGE PROTECTION

Injection molded plastic cover for an aluminum bar connector used in distribution panels.

CADDY FASTENERS

Heat-treated steel fasteners supporting strut from a beam. Various other applications including cable and pipe.

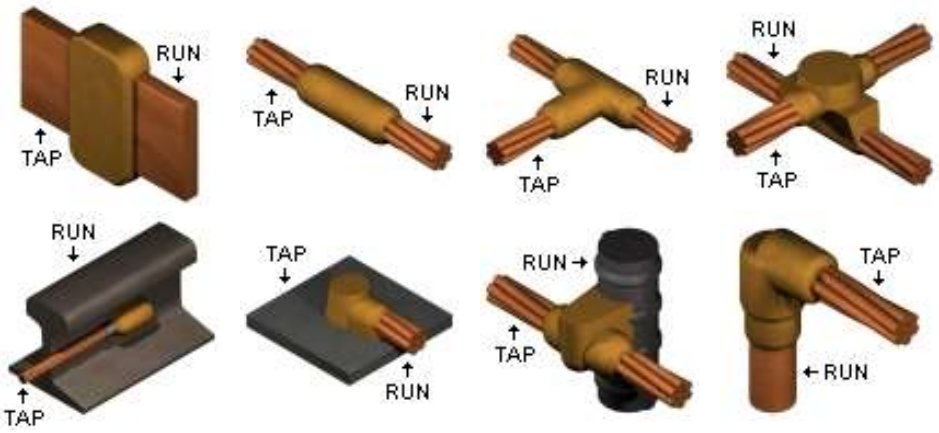


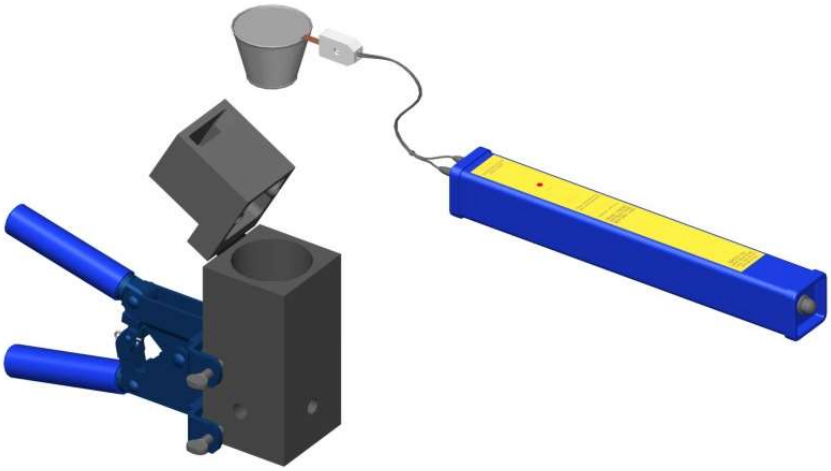
CADWELD CONNECTIONS

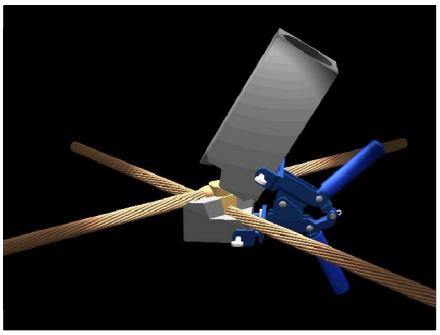
Rendered images created for an online catalog illustrating the variety of configurations available in exothermic welding applications.

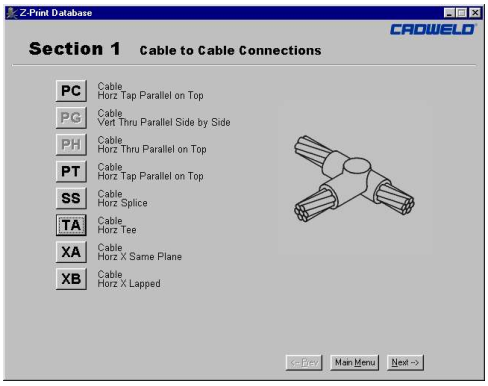
Conceptual drawing of new process of exothermic welding, utilizing a electric igniting system.

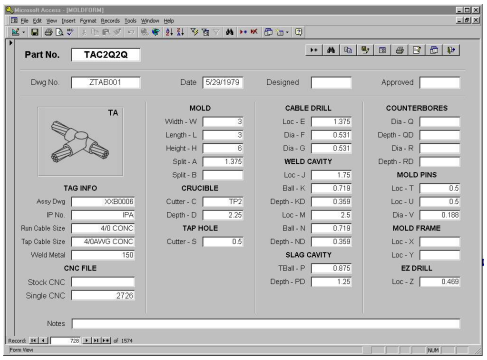
Animation of mold, weld, and toggle clamp for a lapped X connection.

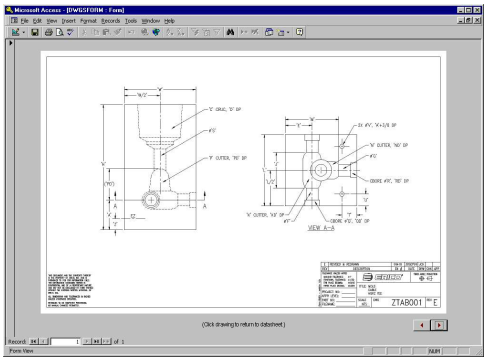












CNC DATABASE

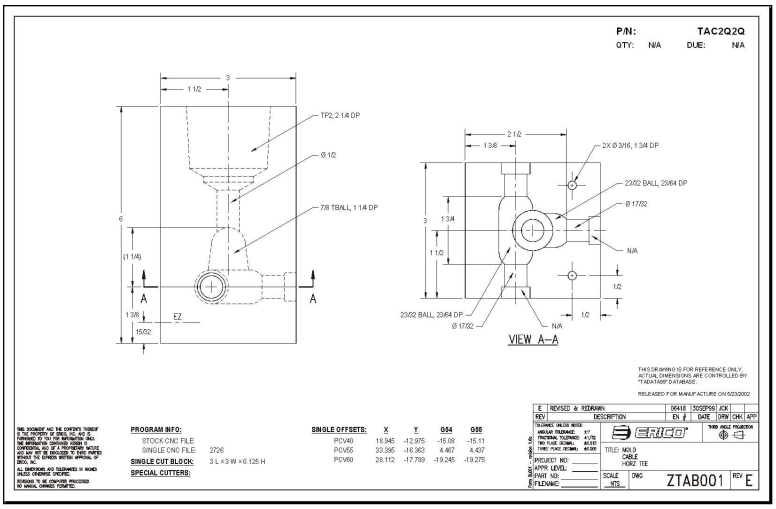
MS Access database developed for the design and machining of graphite molds for exothermic welding applications. Database contains dimensional data for thousands of configurations and sizes. Generates CAD-style drawing to be used by manufacturing.

```
Option Compare Database
Option Explicit

Private Sub Form_Load()
On Error GoTo Err_Form_Load

    DoCmd.Maximize

Exit_Form_Load:
    Exit Sub

Err_Form_Load:
    MsgBox Err.Description
    Resume Exit_Form_Load
    End Sub

Private Sub ADD_Click()
On Error GoTo Err_ADD_Click

    DoCmd.GoToRecord , , acNewRec
    PART_NO.SetFocus

Exit_ADD_Click:
    Exit Sub

Err_ADD_Click:
    MsgBox Err.Description
    Resume Exit_ADD_Click
    End Sub

Private Sub COPY_Click()
On Error GoTo Err_COPY_Click

    DoCmd.DoMenuItem acFormBar, acEdi
    DoCmd.DoMenuItem acFormBar, acEdi
    DoCmd.DoMenuItem acFormBar, acEdi

Exit_COPY_Click:
    Exit Sub

Err_COPY_Click:
    MsgBox Err.Description
    Resume Exit_COPY_Click
    End Sub

Private Sub SAVE_Click()
On Error GoTo Err_SAVE_Click

    DoCmd.DoMenuItem acFormBar, acRec

Exit_SAVE_Click:
    Exit Sub

Err_SAVE_Click:
    MsgBox Err.Description
    Resume Exit_SAVE_Click
    End Sub

Private Sub DWGS_Click()
On Error GoTo Err_DWGS_Click

    Dim stDocName As String
    Dim stLinkCriteria As String

    stDocName = "DWGSFORM"
    DoCmd.OpenForm stDocName, , , stL

Exit_DWGS_Click:
    Exit Sub

Err_DWGS_Click:
    MsgBox Err.Description
    Resume Exit_DWGS_Click
    End Sub

Private Sub FIND_Click()
On Error GoTo Err_FIND_Click

    PART_NO.SetFocus
    DoCmd.DoMenuItem acFormBar, acEdi

Exit_FIND_Click:
    Exit Sub

Err_FIND_Click:
    MsgBox Err.Description
    Resume Exit_FIND_Click
    End Sub

Private Sub PRINT_Click()
On Error GoTo Err_PRINT_Click

    Dim stDocName As String

    stDocName = DWG_NO.Value & "E"

    DoCmd.OpenReport stDocName, acVie
    DoCmd.PrintOut acSelection
    DoCmd.Close acReport, stDocName
```

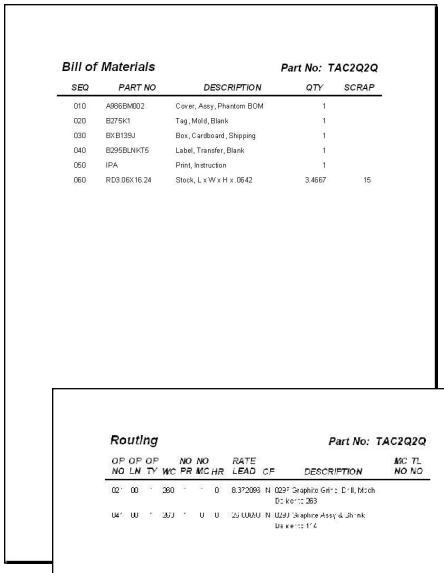
PART_NO	DWG_NO	ASSY_DWG	IP_NO	DESC1	DESC2	W/M	W	L	H	C	D	A	B	E	F	
TAC2Q2A	ZTAB001	XXB0006	IPA & IP656	4/0 CONC	1 RLAY W/S4292A	90		2.5	3	5.25	TP6	2.5	1.375		1.125	0.531
TAC2Q2B	ZTAB001	XXB0006	IPA	4/0 CONC	1/0AWG SOL	90		2.5	3	5.25	TP6	2.5	1.375		1.125	0.531
TAC2Q2C	ZTAB001	XXB0006	IPA	4/0 CONC	1/0AWG CONC	90		2.5	3	6	TP6	2.5	1.375		1.125	0.531
TAC2Q2CHQ	ZTAB001	XXB0006	IPA	4/0 CONC	1/0AWG CONC	90		2.5	3	6	TP6	2.5	1.375		1.125	0.531
TAC2Q2E	ZTAB001	XXB0006	IPA & IP656	4/0 CONC	1/0 RLAY W/S4292E16	65		2.5	3	5.5	TP2	2.25	1.375		1.125	0.531
TAC2Q2F	ZTAB001	XXB0006	IPA	4/0 CONC	2/0AWG SOL	90		2.5	3	6	TP2	2.25	1.375		1.125	0.531
TAC2Q2G	ZTAB001	XXB0006	IPA	4/0 CONC	2/0AWG CONC	90		2.5	3	6	TP2	2.25	1.375		1.125	0.531
TAC2Q2GHQ	ZTAB001	XXB0006	IPA	4/0 CONC	2/0AWG CONC	115		2.5	3	6	TP2	2.25	1.375		1.25	0.531
TAC2Q2GL	ZTAB002	XXB0006	IPA	4/0 CONC	2/0AWG CONC	90		3	3	7	TP2	2.25	1.375	3	1.375	0.531
TAC2Q2J	ZTAB001	XXB0006	IPA	4/0 CONC	3/0 CONC RLAY W/S429F2J16			3	3	6	TP2	2.25	1.375		1.438	0.531
TAC2Q2K	ZTAB001	XXB0006	IPA	4/0 CONC	3/0AWG SOL	115		3	3	6	TP2	2.25	1.375		1.438	0.531
TAC2Q2L	ZTAB001	XXB0006	IPA	4/0 CONC	3/0AWG CONC	115		2.5	3	6	TP2	2.25	1.375		1.125	0.531
TAC2Q2LL	ZTAB002	XXB0006	IPA	4/0 CONC	3/0AWG CONC	115		3	3	6.125	TP2	2.25	1.375		1.125	0.531
TAC2Q2N	ZTAB001	XXB0006	IPA & IP656	4/0 CONC	3/0 RLAY W/S429F2N36			3	3	5.5	TP2	2.25	1.375		1.313	0.531
TAC2Q2P	ZTAB001	XXB0006	IPA	4/0 CONC	4/0AWG SOL	150		3	3	6.25	TP2	2.25	1.375		1.375	0.531
TAC2Q2Q	ZTAB001	XXB0006	IPA	4/0 CONC	4/0AWG CONC	150		3	3	6	TP2	2.25	1.375		1.375	0.531
TAC2Q2QHQ	ZTAB001	XXB0006	IPA	4/0 CONC	4/0AWG CONC	150		3	3	6	TP6	2.5	1.375		1.375	0.531
TAC2Q2QL	ZTAB002	XXB0006	IPA	4/0 CONC	4/0AWG CONC	150		3	3	7	TP6	2.5	1.375	2.75	1.375	0.531
TAC2Q2S	ZTAB001	XXB0006	IPA & IP656	4/0 CONC	4/0 RLAY W/S429F2S36			3	3	5.5	TP6	2.5	1.375		1.313	0.531
TAC2Q2T	ZTAB001	XXB0006	IPA	4/0 CONC	250KCM SOL	150		3	3	5.75	TP6	2.5	1.375		1.313	0.531
TAC2Q2V	ZTAB001	XXB0006	IPA	4/0 CONC	250KCM CONC	150		3	3	6	TP6	2.5	1.375		1.313	0.531

BOM & ROUTING DATABASE

Secondary database developed in addition to the CNC database to generate bill of material and manufacturing routings based on size and style of molds.

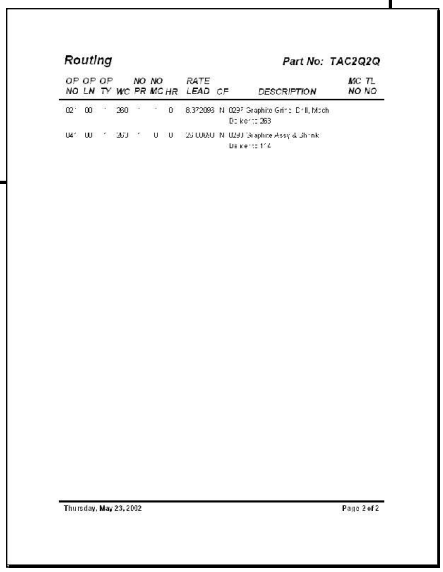



```
Option Compare Database
Option Explicit

Private Sub Form_Load()

    Dim oApp As Object
    Dim strPartNo, strDwgNo, strPrfx,
    Dim blnWPlt As Boolean
    Dim intLoc As Integer
    Dim strCnfg As String
    Dim sngLg, sngWd, sngHt, sngVol A
    Dim strWM, strRun, strTap, strSB,
    Dim sngWM, sngBxHt, sngCruc, sngD
    Dim strIP As String
    Dim strBOM(3, 10) As String
    Dim sngBOM(2, 10) As Single
    Dim strUser As String
    Dim dbs As Database
    Dim rstBOM, rstBOM2, rstRouting A
    Dim strSQL As String
    Dim strRptName As String

    'Reference mold database
    Set oApp = GetObject(, "Access.Ap
    'Get part no & dwg no
    strPartNo = oApp.Forms![MOLDFORM]
    strDwgNo = oApp.Forms![MOLDFORM]!

CheckType:

    'Set prefix and type
    strPrfx = UCase(Left(strPartNo, 2
    strType = UCase(Mid(strPartNo, 4,

    'Check for prefixes (CA, HD, PB,
    If strPrfx = "CA" Or strPrfx = "H
        strType = UCase(Mid(strPartNo
        strRun = UCase(Mid(strPartNo,
        strTap = UCase(Mid(strPartNo,

    'Check for GB-GR and GB-GT
    ElseIf strPrfx = "GB" And (strTyp
        strRun = UCase(Mid(strPartNo,
        strTap = UCase(Mid(strPartNo,
    'All other mold types
    Else
        strType = UCase(Left(strPartN
        strRun = UCase(Mid(strPartNo,
        strTap = UCase(Mid(strPartNo,
    End If
        MOLD_TYPE.Caption = strType

    'Check if template is valid
    If strType = "BA" Or strType = "G
        GoTo CheckPartNo
    Else
        strUser = MsgBox("Template no
        GoTo ReturnToDBase
    End If

CheckPartNo:

    'Check for wear plates
    If Right(strPartNo, 1) = "W" Then
        blnWPlt = True
        strPartNo = Left(strPartNo, L
    Else
        blnWPlt = False
    End If

    'Get pipe size
    If strType = "HA" Or strType = "H
        strPipe = oApp.Forms![MOLDFOR
        PIPE_SIZE.Caption = strPipe
        sngDp = DLookup("[DEPTH2]", "
    End If
    'Size of graphite
    sngLg = oApp.Forms![MOLDFORM]![L]
    sngWd = oApp.Forms![MOLDFORM]![W]
    sngHt = oApp.Forms![MOLDFORM]![H]
    If strType = "GT" And strDwgNo =
        sngWd = sngWd + 0.375
    End If

    'Weld metal
    strWM = oApp.Forms![MOLDFORM]![W/
    If strPrfx = "XL" Then
        sngWM = CSng(Mid(strWM, 3))
        If sngWM > 150 Then
            strPartNo = strPartNo & "
        End If
    Else
        If Mid(strWM, 2, 1) = "-" The
            sngWM = CSng(Left(strWM,
        Else
            sngWM = CSng(strWM)
        End If
    End If
        WELD_METAL.Caption = strWM

    'Crucible
    If sngLg > 3 Then
        sngCruc = oApp.Forms![MOLDFOR
    Else
        sngCruc = sngLg
    End If

    'Quantity of graphite
    If strCnfg = "Y" Then
        sngVol = ((sngLg + sngDp) * s
    ElseIf strCnfg = "H" Then
        sngVol = (sngLg * sngWd * (sn
    Else
        sngVol = (sngLg * sngWd * sng
```



Bill of Materials — Part No: TAC2Q2Q

SEQ	PART NO	DESCRIPTION	QTY	SCRAP
010	A866BM002	Cover, Assy, Phantom BOM	1	
020	B275K1	Tag, Mold, Blank	1	
030	BXB135U	Box, Cardboard, Shipping	1	
040	B295BLNKT5	Label, Transfer, Blank	1	
050	IPA	Print, Instruction	1	
060	RD3.06X16.24	Stock, L x W x H x .0642	3.4667	15



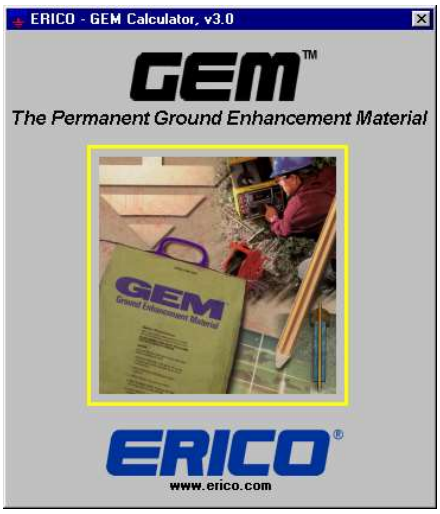
Routing — Part No: TAC2Q2Q

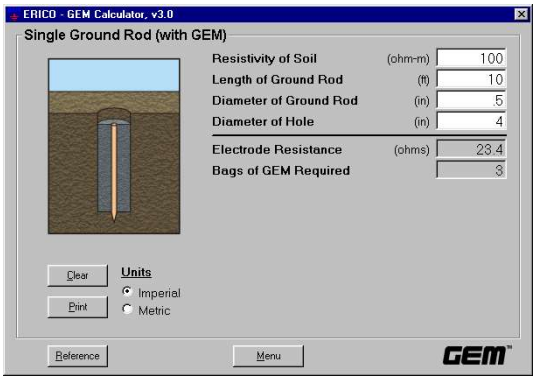
OP NO	OP LN	OP TY	OP WC	NO PR	NO MC	NO HR	RATE LEAD	CF	DESCRIPTION	MC TL NO NO
020	00		360			0	8.372093	N	029 Graphite Grind Drill, Mtch Dckets 263	
040	00		300			0	25.00000	N	0299 Graphite Assy & Shrink Dckets 174	

Thursday, May 23, 2002 — Page 2 of 2

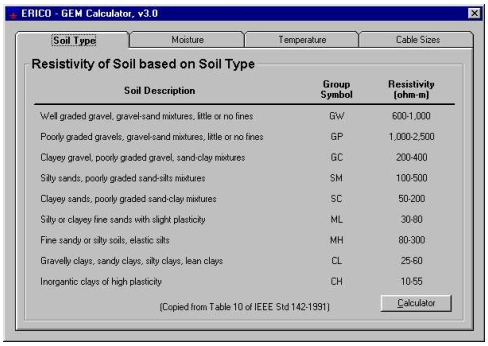
GEM CALCULATOR

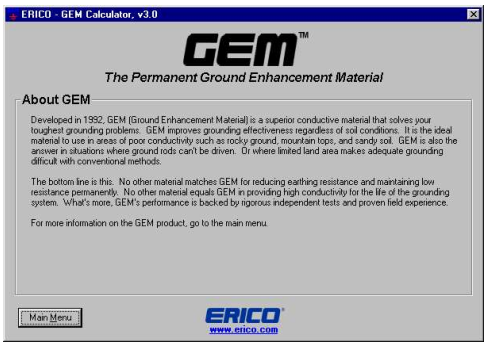
Application written in Visual Basic to calculate electrical resistivity of various grounding configurations, using the ground enhancement material. Program is includes Spanish, French, and German translations; imperial and metric units; reference tables from the IEEE standards; installation instructions; product specifications; and company info.

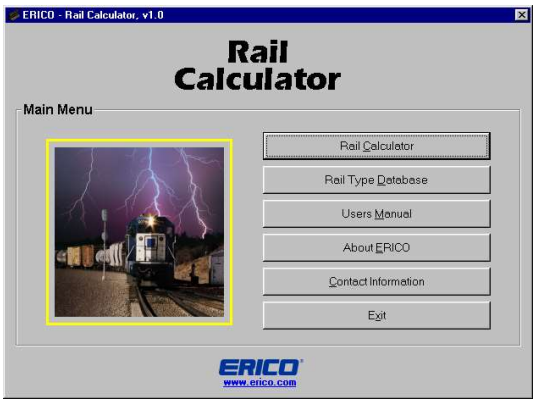


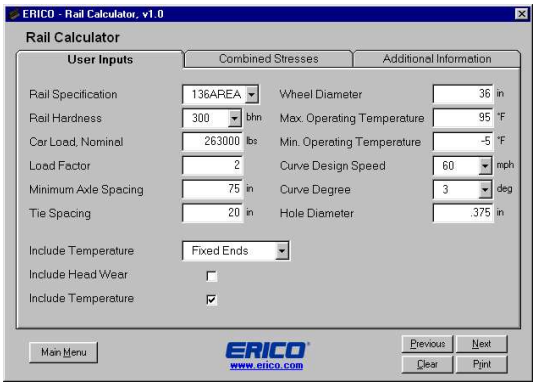



```
Dim intUnits As Integer
Dim sngCalc(3), sngStatus As
Single
Dim RsRod As Single
Dim VolHole, VolRod, Bags As
Single
Dim strResp, strErr As String
Dim strErrMsg(3) As String
Dim Soil, RodLg, RodDia, HoleDia
As
Dim pi, dens, wt, gem As Single

Private Sub Calculate()
On Error GoTo Err_Calculate

    'Put user inputs to array
    For i = 0 To 3
        sngCalc(i) =
tbxCalc(i).Tex
    Next i
    'Convert array to selected
unit
    If intUnits = 0 Then
        Call Conversion(1)
    End If

    'Get constants
    pi = frmCalc.pi
    dens = frmCalc.dens
    wt = frmCalc.wt
    gem = frmCalc.gem

    'Put data array to variables
    Soil = sngCalc(0)
    RodLg = sngCalc(1)
    RodDia = sngCalc(2) / 100
    HoleDia = sngCalc(3) / 100

    'Check hole diameter
    If Not HoleDia > RodDia Then
        strResp =
MsgBox(strErrMsg(
        GoTo Err_Calculate
    End If
    'Calculate and display
electrod
    RsRod = (1 / (2 * pi * RodLg))
    tbxResist.Text = Int(RsRod *
10
    'Calculate and display bags
req
    VolRod = pi * ((RodDia / 2) *
3
    VolHole = pi * ((HoleDia / 2)
*
    Bags = ((VolHole - VolRod) /
12
    tbxBags.Text = Int(Bags +
0.99)
    Exit_Calculate:
    Exit Sub

Err_Calculate:
    Resume Exit_Calculate
    End Sub

Private Sub cmdClear_Click()

    'Clear user input boxes
    For i = 0 To 3
        tbxCalc(i).Text = ""
    Next i
    'Clear output boxes
    tbxResist.Text = ""
    tbxBags.Text = ""
```









ERICO, Inc. - Solon, OH **6/6/2002**

Rail and Load Specifications:

Car Load, Nominal	263000 lbs
Load Factor	2
Design Load	526000 lbs
Wheel Load	65750 lbs
Load Eccentricity	0.7
Axle Spacing	75 in
Tie Spacing	20 in
Rail Specification	136AREA
Rail Hardness	300 BHN
Tensile Strength	145000 psi
Fatique Limit, 40%	58000 psi
Cross Sectional Area	13.41 in²
Rail Height	7.313 in
Web Thickness	0.688 in
Head to Neutral Axis	3.953 in
Vert Section Modulus to Head	24.142 in³
Horz Section Modulus of Web	5.917 in³

Continuous Welded Rail Temperatures:

Temperature, High Operating	95° F
Temperature, Low Operating	-5° F
Temperature, Avg Track Laying	82° F
Temperature, Max Delta	87° F

Rail Operating Load Stresses:

Rail Normal Bending Moment	164375 in-lb
Rail Lateral Bending Moment	43414 in-lb
Rail Normal Bending Stress	6808 psi
Rail Lateral Bending Stress	7337 psi
Rail Shear Stress	4903 psi
Rail Thermal Tensile Stress	16182 psi
Rail Head Combined Stress	21436 psi
Percent of Tensile Strength	14%
Rail Web Combined Stress	16664 psi
Percent of Tensile Strength	11%

Welded Bond and Drilled Hole Stresses:

Weld Edge Combined Stress	17529 psi0
Percent of Tensile Strength	12%
Drilled Hole Combined Stress	8442 psi
Percent of Tensile Strength	5%

Engineering References used in stress calculations:
Mark's Standard Handbook for Mechanical Engineering, 8th Ed., McGraw-Hill
Roark's Formulas for Stress and Strain, 6th Ed., McGraw-Hill

RAIL CALCULATOR

Application written in Visual Basic to calculate stress in train rail, based on various design parameters including car load, axle spacing, rail type, temperature, and curvature. Internal databases containing rail type and design data. Calculations compiled to a printable specifications sheet.

```
Dim intStatus As Integer
Dim intBeamEq As Integer

Dim sngMinRad, sngBankElev,
sngMaxS
Dim sngInbLoad, sngOutbLoad,
sngLat
Dim sngALoss, sngILoss, sngTemp,
sn
Dim sngMaxDelta, sngWNormBend,
sngS
Dim sngHNormBend, sngHLatBend,
sngH
Dim strType, strHardness As String

Dim arrSpec(20, 16) As Variant
Dim arrHardness(9, 2) As Variant
Dim arrTrackElev(15, 20) As
Variant
Dim arrLoadOutward(15, 20) As
Varia
Dim arrLoadInward(15, 20) As
Varian
Dim arrLoadSide(15, 20) As Variant

Const CoefExp = 0.0000062
Const ModElast = 30000000

Private Sub cmdMenu_Click()

    'Show Main Menu form
    frmMenu.Show
    frmCalc.Hide

End Sub

Private Sub cmdNext_Click()

    'Switch to next tab
    If sstCalc.Tab < 2 Then
        sstCalc.Tab = sstCalc.Tab
+
    End If

End Sub

Private Sub cmdPrev_Click()

    'Switch to previous tab
    If sstCalc.Tab > 0 Then
        sstCalc.Tab = sstCalc.Tab
-
    End If

End Sub

Private Sub Form_Load()
On Error GoTo Err_Form_Load

    'Set form caption
    frmCalc.Caption =
frmStart.strC
    'Populate cboSpec and arrSpec
    datRailCalc(0).Refresh

datRailCalc(0).Recordset.MoveFi

datRailCalc(0).Recordset.MoveLa
    For i = 0 To
datRailCalc(0).Rec
        For j = 0 To 16
            arrSpec(i, j) =
datRail
        Next j
        cboSpec.AddItem arrSpec(i,
        If
datRailCalc(0).Recordset

datRailCalc(0).Recordse
        Else

datRailCalc(0).Recordse
        End If
    Next i
    'Populate cboHardness and
arrHa
    datRailCalc(1).Refresh
    For i = 0 To 9
        For j = 0 To 2
            arrHardness(i, j) =
dat
        Next j
        cboHardness.AddItem
arrHard
        If
datRailCalc(1).Recordset
```