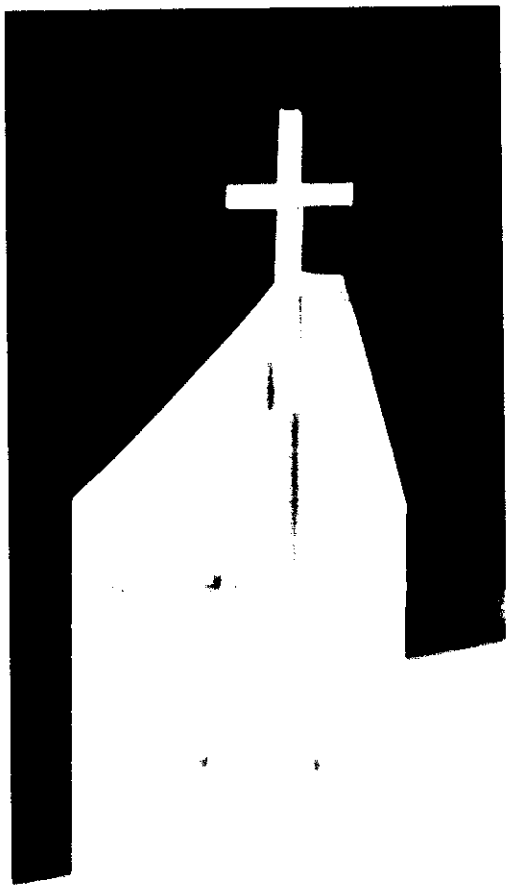
BEAUTY VS BUDGET

value ~~engineering~~ **designing**



architectural thesis report

jared a smith

BEAUTY vs BUDGET

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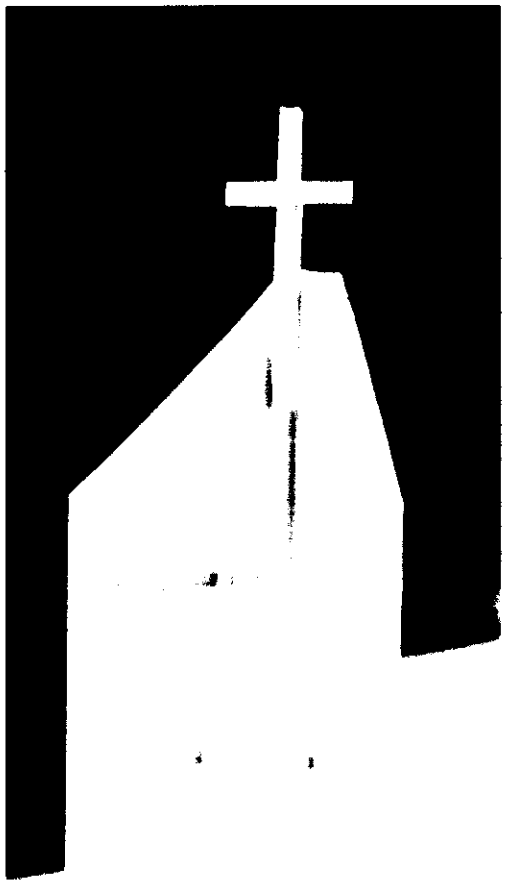


architectural thesis report
department of architecture
ball state university
jared a smith
2003 . april

ACKNOWLEDGEMENTS

I would like to take a moment to acknowledge and thank the persons that have been of great assistance to me throughtout not only the process of this project but also througthout the course of my life.

First and foremost, I would like to give the utmost thanks and gratitude to Jesus Christ for coming to God's creation and sacrificing himself for mine and every soul's sins. Without His divine assistance, I would not have the skills and means necessary to pursue such a grand career. He has been esssential in the creation of this project and I give Him all the glory for the results. Hebrews 11:10 states: "For he was looking forward to a city with foundations, whose architect and builder is God."

I would additionally take great joy in recognizing my parents. They have always been supportive of my desires to pursue a career in architecture and have provided a sound work ethic, foundations for a belief in a merciful God, and stature that is far above what I could ask or imagine.

My wife of three years, Sallie, has been exposed to the intense rigors of becoming an architect recently. She has adjusted to the change and has been extremely supportive and understanding in both times of need and in times of triumph. Thank you Sallie! You are the greatest gift from our Lord in Heaven...I love you!!

I would also like to thank and recognize my brothers and sisters in Christ (especially those at Grace Fellowship Church). They have additionally been a great encouragement and have been supportive throughout the years of my life. Thank you for your prayers and concerns regarding this and other projects that have crossed my path. Additionally, thank you for allowing me to pursue this project for my thesis project.

The faculty at Ball State University, College of Architecture and Planning have obviously been crucial to my growth and success as a student of architecture.

I would like to thank Professor Robert Fisher, my thesis studio professor, for challenging me to strive for something better. He knows as much as I do how difficult this project was for me to undertake. I will not forget the way that he constructively and effectively guided me through this process. Thank you also for being understanding and flexible with me and my schedule. I will never forget the words that he offered to the jury and to myself during my final critique. The words were both constructive and a great compliment all in one concise statement. He said, "Jared, throughout the course of the project, has been sitting on is own design hand. He has not allowed himself to do some of the really exciting designs as he has been known to do in the past." Thank you Bob and good luck in all you pursue.

Professor Anthony Costello has been a very influential person throughout my history at Ball State University. He has been more than just a professor to me, he has more importantly become a good friend and I consider him to be a mentor and someone who has influenced my work ethic and design quality. Mahalo Tony!

I would addtionally like to extend my thanks to Professor Brian Hollars. I have only known him for the past couple of years. However, he has become a person whom I can approach with multiple problems pertaining to means and methods. He also has much to offer in a refined desire to produce high quality design products. Thanks Brian!

"For he was looking forward to a city with foundations, whose architect and builder is God."

Hebrews 11:10

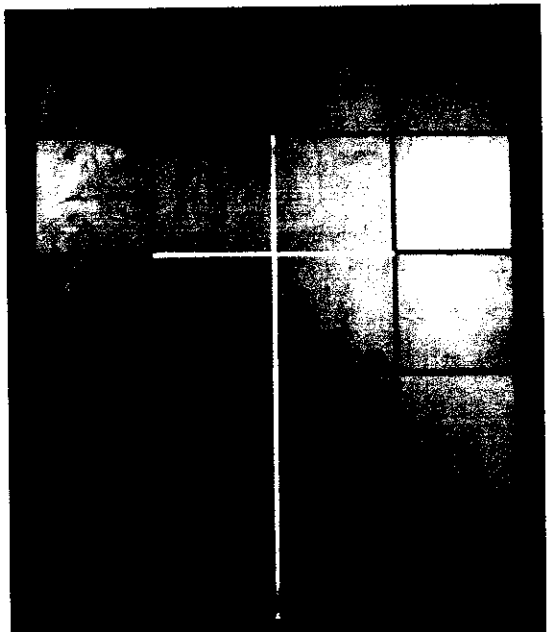
CONTENTS

EXECUTIVE SUMMARY

The majority of architects have adopted a type of practice that in many ways I believe to be harmful to the architect's design intentions, product, profit, and most of all the profession. The process or type of practice that I am referring to has been labeled in the profession as "value engineering". The current process of "value engineering" allows an architect to many times create a structure without a specific understanding of the boundaries that control his/her design. When this occurs, an architect begins by creating a form. Many times the architect then becomes fixed on that form and spends much of their time developing that form. The problem arises when the budget forces the architect to take the design through a series of "value engineering" techniques to come down to the proposed budget.

This thesis is directed toward exploring and challenging the process of "value engineering". One responsibility of an architect is to satisfy the client's needs. Many times this is very difficult to accomplish because a client's wants and/or needs are usually one issue, while many times the budget fails to meet these expectations and desires. However, this does not change the simple responsibility of an architect to satisfy the client's needs. Furthermore, an architect has his/her own desires and intentions for each project that is undertaken. My personal opinion about these two ideas is that they are rarely simultaneously met because of the simple reality of budget constraints. Moreover, I believe that many architects propose marginal designs and structures. I believe this is because few architects gather and maintain the knowledge to satisfy both their client's needs and their own intentions and desires.

Is it possible to propose a design process that aids in satisfying both?



"architecture can and should play an important role in the places we go to every day...too often, we settle for far too little...these cracker jack boxes where we shop and work - it's not always about the money, it's too often about the willingness to do it."

- carol ross -

PARAMETERS

Issues:

I challenge the term "value engineering" as a disquieting use of both words if you really consider their meaning. The word value, according to Webster's Third New International Dictionary means: "...to estimate or assign the monetary worth of something, in order to consider or rate highly (prize/esteem)."

It is vital to note that the definition says nothing to the effect of *value* being something that has been taken away from or reduced in any way, shape, or form. It seems difficult to imagine how using the word *value* in this situation is at all accurate. Most designs, before "value engineering" occurs, have *value*. By practicing "value engineering" the architect(s) and/or consultant(s) are in fact stripping *value* away from the design, its designer's intentions, the final product, and most of all, the perception of the architect. It is important to note that I am not arguing the fact that after "value engineering" takes place that the design does not have any *value*, but simply that "value engineering" does not, in most cases, add value. "Value engineering" removes some *value* that was previously established.

The second term, *engineering*, has, without explanation, its own connotations. This presents the age-old conversation about the difference between architect and engineer. While the architect, in most cases, has a creative bias, the engineer takes on a more rational/functional argument. My argument is arduous to make here because I have taken the stance that the term "value engineering" is wrong. The reason this is difficult is because I do in fact believe that the actions that occur during the process of "value engineering" are in fact rational/functional (engineering in likeness). The reason I have issues with this term is because I am not an engineer. However, I do make rational/functional design decisions based on what others and I believe to be creative solutions to a set of problems. However, I do not prefer to have the actions that I, or any architect, take to be considered a decision based on something that is so completely rational that it is considered to be *engineering*. (Sorry to all the engineers out there. I do not think that I am better than you are. We just have a different set of goals and thought processes on our agenda.)

Questions:

Is there a way to change the way architects design?

Is the current process of design faultered?

Can increased knowledge about the means, methods, and costs of construction create a greater understanding of our own designs? Allowing an architect to have more freedom to pursue his/her own design intentions creates a more enjoyable environment for the client and a greater respect for the profession.

Positions taken:

I believe very strongly that the term "value engineering" is heavily misplaced. I propose a process that, rather than being something that is activated towards the end of the design process, transpires at the forefront of the design process. From this period on, I will refer to the process as "value designing". I feel strongly that this term is much more accurate in its usage because of the words used, but more importantly because of the time in which the process is undertaken.

The process should begin in the early stages of the design. I also believe that it is vital that "value designing" not be something that is done in the beginning stages and not reviewed until the design has been finished. Instead, "value designing" is something that is executed early and is revisited at key junctures throughout the process in order to insure accuracy and to confirm that the design intentions are still established. It is a change in the design process and a new way of designing. I learned recently, and it is important to note, that a very prominent architect, Frank O. Gehry, currently practices a very similar approach to the process I propose. Gehry notes in a lecture at Archeworks in January 2000 that, "With our system...we know how much it's going to cost per square foot to build...because we've had the necessary experience. We can budget jobs in the earliest design phases...we can rationalize all these shapes in the computer and make a judgement about the quantity of each shape to be used." Experience is the most important thing to the achieving success in "value designing". Furthermore, Gehry notes that most people don't realize that architecture pays. They continue to ask for the ordinary without realizing that something better does not necessarily cost that much more. However, it does take longer to conceive. Gehry notes to this account that it took three years to solidify the Guggenheim in Bilbao. He states, "...it's an excruciatingly slow process ...it's like watching paint dry." However, with dedication to honing this process one can make it work very effectively and efficiently. Just glance at the complexity of Gehry's work. Knowing that he and his firm do not work on budgetless projects proves that "value designing" works.

PHYSICAL CONDITIONS

Site Information:

The proposed site is located in Avon, Indiana, and is currently governed by Grace Fellowship Church, which is a non-denominational Christian group of believers. More accurately, the site is located approximately sixteen miles west of downtown Indianapolis at 6121 East County Road 100 South. The seven-acre site is located on the north side of County Road 100 South. A baseball recreational park is located to the south of the site. A four acre dense wood lot and Whitelick Creek form the western edge of the property. The southern boundary is likewise bounded by a series of trees and a small tributary creek. And finally, the east edge of the site abuts the backs of four residential properties.

The congregation was granted ownership of the property approximately eight years ago. Two years later, a local architect proposed a marginally designed facility for the congregation. Four and one-half years after occupancy, early in the morning on January 5, 2003, the facility was dramatically consumed by fire (nearly to the foundation). Later, the insurance company and a group of investigators decided that the fire started through a series of both minor and major electrical defects. The flames spread quickly because the fire started in the attic space, which was not adequately protected. Furthermore, there was a design flaw in the roof construction and adequate draft stops were not correctly located and/or constructed in the attic space.

Existing conditions:

After nearly four months of investigation, the land was released to the congregation and the site was cleared of all debris, foundations, and footings that remained from the existing structure. The parking lot, lights, and signage remain on the seven acre site. Among the many physical features that remain on the site, there are many issues that engage the site. As noted previously, the site abuts Whitelick Creek, which places a majority of the site in a one hundred-year floodway and a floodway fringe. This was an immense problem that almost inhibited the construction of the first facility. Recently, there have been questions that surround the same issue. However, two reliable sources have informed us that this should not be an area of concern. Additionally, the site is covered to the west with many trees that gradually slice further and further into the site. DNR has restricted Grace Fellowship Church from positively engaging the beautiful scenery by building within the landscape. Additionally, DNR has restricted the clearing of the trees to allow for further development and expansion of the site and the edifice that resides within. The buildable area that remains is extremely constricted. Therefore, producing an innovative and exciting design solution becomes nearly unattainable.

image of site from the south west corner of the site

image of site from the north west corner of the site

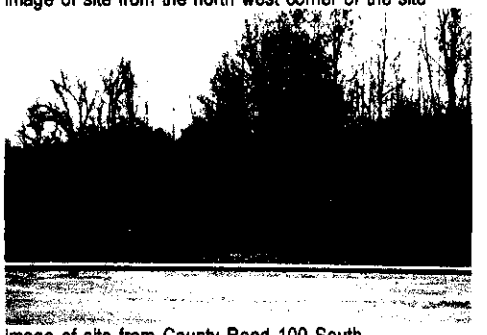
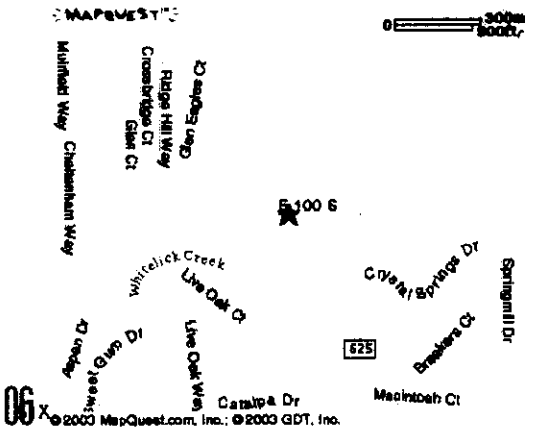


image of site from County Road 100 South

CULTURAL CONDITIONS



location map of site from mapquest.com

Avon | Indiana:

Avon, Indiana is located sixteen miles west of downtown Indianapolis. The town of Avon is a very young town. The major growth of Avon did not begin until about ten years ago.

Until about ten years ago, it would take a commuter approximately 15 minutes to get from the west side of Avon to downtown Indianapolis. Presently, the commute will take an average of forty minutes.

Furthermore, the scenery of Avon historically has been farmland. However, recently the town has been engaged in very intense growth. Everything from restaurants, to gas stations, to all types of shops and retail.

The specific site is not located directly on the main drag of Avon, which happens to be US 36 (Rockville Road). The area directly surrounding the site is mainly residentially zoned. The land directly to the north is the home of the local recreational football and baseball fields.

Client comments:

Most worship facilities, including our old one, appear from the road as walls behind which a passer-by may or may not know what occurs beyond. In many respects, even the most modest of structures present a physical barrier (at least to the eye). At the same time, I am not one for thinking or believing that we should shape our facility to be more palatable to the world by eliminating those beliefs that truly make us who and what we are. The question then becomes; how do we build in such a way that those passing by feel welcome past our doors and into our lives, while clearly saying, "Enter here and you'll never be the same."

Budget is only one reason for architectural limitations. More often, it is unwillingness on the part of the client to let the architect try something new, or let them think outside the box. Most of the churches here in central Indiana suffer from a total lack of design aesthetics. They may succeed in terms of function, but fail to accomplish some key goals.

One goal that I believe a church should have is for it to be a welcoming place for anyone, not just Christians.

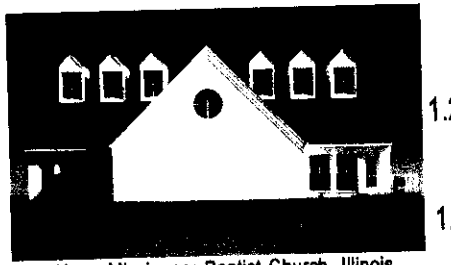
I feel that Christians have a real fear of imagery, or visual stimulus, whether it's something on the wall, like artwork, or architectural detail. I wrestle with this conflict when I tell myself that the church is not a building, it's the people. Nevertheless, people inhabit the building, and shouldn't that reflect our life in Christ?

SPACE PROGRAM SUMMARY

Program:

1.0 Facility Administration Suite — 1050 sq. ft.

This area should be clearly marked and/or visible to the visitors of the facility. This area should present itself at the edge of the Lobby/Foyer.



New Hope Missionary Baptist Church, Illinois

1.2 Information Desk — 100 sq. ft.

One secretarial station and counter space for informational purposes.

1.3 Senior Pastor Office — 150 sq. ft.

Should be private, but easily locatable. Used for study, phone calls, and small meetings. This space should provide the pastor with an area to store/shelf personal effects and important information. Should have outdoor access (window). Lastly, shall contain a fire-safe rated with a two-hour fire rating.

image from inside of sanctuary

1.4 Youth Pastor Office — 150 sq. ft.

Should be private, but easily locatable. Used for study, phone calls, and one-on-one meetings. This space should provide the pastor with an area to store/shelf personal effects and important information. Should have outdoor access (window). Lastly, shall contain a fire-safe rated with a two-hour fire rating.

1.5 Workspace — 150 sq. ft.

Used for production of bulletins, call lists, phone directories, etc... Should contain wall cabinets and base cabinets sufficient for storing materials useful in conducting such work. Shall contain a copy machine, fax machine, and personal computer

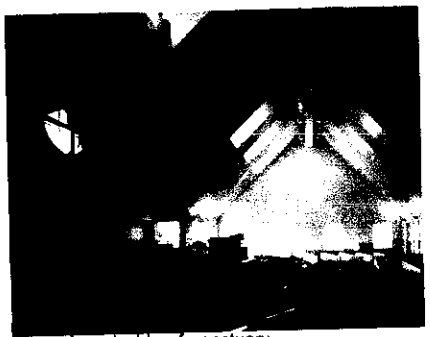


image from inside of sanctuary

1.6 Library/Conference Room — 500 sq. ft.

This room shall be used to house any and all books, videos, and/or cassette tapes that the leadership of GFC deem useful and supportive to the congregation. Additionally this will be a place of study and a place for small men's, women's, and/or any other type of Bible Study and or meeting. There shall be sufficient seating for 12 persons to occupy this space.

SPACE PROGRAM SUMMARY

2.0 Building Storage — **440 sq. ft.**

This space is specifically used for the storage of any miscellaneous items that the church deems useful and supportive to the functions of the church facility. This may be broken down into numerous rooms. May contain sports equipment, extra chairs and tables for the Community Gathering Suite, and/or items for yearly youth garage sale.

3.0 Community Gathering Suite (Multi-purpose Room) — **1330 sq. ft.**

Numerous participatory activities can take place in this space thus flexibility is important. This space should be designed and portray the activities for which they support.

3.1 Seating for 100 persons — 1000 sq. ft.

This is a support space that will aid the users of the facility. Such activities may include pitch-in lunches and dinners, special events, wedding receptions, youth activities, and other activities and events. Flexibility is of great importance for the success of this space.

3.2 Food Warming — 300 sq. ft.

This is a support space that will aid the users of the facility. Activities of this space will be limited to the warming of pre-prepared food and the storage of cups, plates, silverware, and other items useful for the Community Gathering Space.

3.3 Pantry — 30 sq. ft.

This is a support for the food warming area. It will aid in the storage of non-perishable items, utensils, and small appliances. The room should contain floor to ceiling shelving for storing these items.

FFA Headquarters: Ratio Architects, Inc.

SPACE PROGRAM SUMMARY

4.0	**Worship Space** **This area is dedicated to worship, singing, baptism, and prayer. This is the main gathering space for worship based activities.**	**4800 sq. ft.**
4.1	Seating for 270 persons Seating should be flexible and should allow for smaller groups to be formed.	4020 sq. ft.
4.2	Sound Booth Should contain components needed to control audio/visual capabilities of the worship space.	40 sq. ft.
4.3	Dressing Rooms (2 @ 100 sq. ft. each) Should be two rooms used for the preparation for baptism activities and should additionally serve as a staging area for plays and skits.	200 sq. ft.
4.4	Platform Will be used to hold choir (standing) musical instruments, a pulpit, and shall additionally be used for skits, plays, and other performances.	400 sq. ft.
4.5	Baptismal Should be located in an area where all persons can view baptism activities from seating area. Should be protected from small children.	100 sq. ft.
4.6	Cry Room This room shall be located at the rear of the worship space and shall contain a viewing window into the worship space. The room will also contain speakers so the occupants of the room can hear the message/ teaching, but activities that occur within the Cry Room will not be heard by other members of the congregation. The room can be used by parents of young children who wish to listen to the message, but do not wish to disturb the congregation and teachers.	40 sq. ft.

St. Irene Church, Illinois

SPACE PROGRAM SUMMARY

5.0 Classrooms **3770 sq. ft.**

The classroom shall be used for biblical instruction to children from infant to high school education. These spaces should contain, if possible, storage for classroom teaching products as well as a work-surface for a teacher.

5.1 Infants and Toddlers 325 sq. ft.

This room shall be used to care for infants and toddlers with the aid of Nursery workers, toys, books, and audio cassette tape capabilities. Additionally, this room shall be wired with speakers in order to hear the message from inside this particular room.

5.2 Sleeping Room 50 sq. ft.

This room shall be used to aid infants and toddlers with private sleeping quarters. It shall additionally be available for privacy for nursing mothers.

5.3 Two and three year old Classroom 350 sq. ft.

This room shall be used to teach two and three year old children Bible school lessons. A teacher, toys, books, and other capabilities shall be included within this room. Additionally, a work area shall be contained in this room for the storage and preparation for the Bible lesson.

5.4 Four and five year old Classroom 350 sq. ft.

This room shall be used to teach four and five year old children Bible school lessons. A teacher, toys, books, and other capabilities shall be included within this room. Additionally, a work area shall be contained in this room for the storage and preparation for the Bible lesson.

5.5 First and Second Grade Classroom 340 sq. ft.

This room shall be used to teach first and second grade children Bible school lessons. A teacher, books, and other capabilities shall be included within this room. Additionally, a work area shall be contained in this room for the storage and preparation for the Bible lesson.

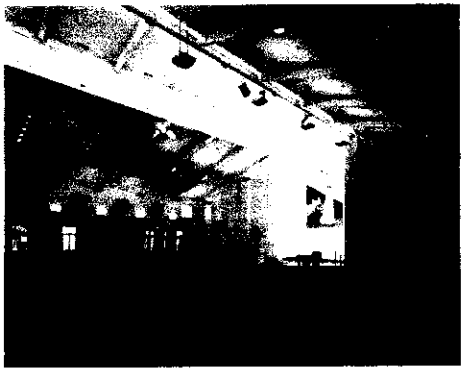


image from inside of sanctuary

exterior of St. Irene Church

SPACE PROGRAM SUMMARY

5.6 Third and Fourth Grade Classroom — 340 sq. ft.

This room shall be used to teach third and fourth grade children Bible school lessons. A teacher, books, and other capabilities shall be included within this room. Additionally, a work area shall be contained in this room for the storage and preparation for the Bible lesson.

5.7 Fifth and Sixth Grade Classroom — 340 sq. ft.

This room shall be used to teach fifth and sixth grade persons Bible school lessons. A teacher, books, and other capabilities shall be included within this room.

5.8 Junior and Senior High Retreat and Classroom — 1675 sq. ft.

This room shall be used to teach junior and senior high grade persons Bible school lessons. A teacher, books, and other capabilities shall be included within this room. Space shall be allotted in this room for items such as couches and chairs, musical instruments, and audio/visual capabilities should be provided within this space. It should be considered that this room should have the capabilities to divide into two separate spaces.

6.0 Water Cooler and Janitor Closet — 50 sq. ft.

These should be located in proximity to the toilets. The janitor's closet will be a 5' x 5' room with a janitor's sink, and areas to store cleaning equipment and building service supplies. The water cooler should be a wall mounted fixture and shall also be recessed into the wall.

7.0 Toilets — 550 sq. ft.

These toilets are intended to serve the users and visitors of the facility. One set of restrooms will be loctated on the main level of the facility and a second set will be located on the second level.

SPACE PROGRAM SUMMARY

7.1	Men's Restroom Two sinks, two stalls, and two urinals will be required in this restroom (one stall to be handicap accessible).		150 sq. ft.
7.2	Women's Restroom Two sinks and four stalls will be required in this restroom (one stall to be handicap accessible).		200 sq. ft.
7.3	Men's Restroom (second floor) One sink, one stall, and one urinal will be required in this restroom		100 sq. ft.
7.4	Women's Restroom (second floor) One sink and two stalls will be required in this restroom		100 sq. ft.
7.5	Preschool Restrooms (2 @ 50 sq. ft. each) Both restrooms should have direct access to the infants and toddlers classroom and the 2 & 3 and 4 & 5 year old classroom. There shall be one sink and one toilet in this restroom.		100 sq. ft.
8.0	**Lobby/Foyer** **This space shall be used to orient the visitor/user. Should also include a small vestibule.**		**400 sq. ft.**
9.0	**Mechanical**		**300 sq. ft.**
10.0	**Vertical Circulation** **One main stair for circulation two second floor. Two fire stairs located at opposite corners of the facility to provide fire egress to the exterior of the facility.**		**250 sq. ft.**
	Total Net Area of Programmed Spaces		**12940 sq. ft.**
	Grossage		**2655 sq. ft.**
	TOTAL AREA		**15595 sq. ft.**

PROCESS | METHODS

I began my short-cut thesis research and design process by collecting ideas about the church facility from the congregation and leadership. I received, suprisingly, about twenty pages of useful information. I was unable to conduct the initial brainstorming process in the way that I would have really preferred. Nevertheless, I received enough information to decide what was important to the members.

The next process was to put together a program of all the necessary spaces required for the facility. I began assigning each space a square-foot amount based on the old structure, the congregation's comments, and using some of my own knowledge.

I then began to research the possibilities for spaces to become multi-functional. This process definetly paid-off in the end. It allowed me to maximize the uses of the facility while at the same time minimize the square-foot requirements for the facility. In the end, this will save any client money.

Next I began to research existing church facilities. I looked at imagery, three-dimensions (heirarchy), functionality, and space planning.

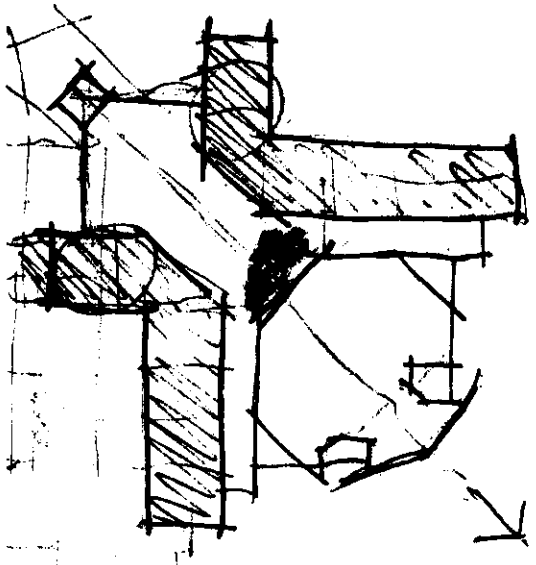
I then began to try to conceptualize a facility that encompassed all that I had been researching. I found this to be quite difficult, in that, my mind wanted to design some very meaningless and mediocre architecture. Through the convincing of Bob Fisher (thesis professor), I began to explore a more unique facility that functionally made sense, was pleasing to the eye, and would still be able to use some more conventional and less expensive materials.

I found it very difficult to follow even my own thesis idea, because I realized that I did not have the much needed knowledge to design a facility the way that I intended. If you recall, I state that I believe that construction costs should be understood and defined before the first line is drawn on a piece of paper. Unfortunately, I did not have the means or understanding to do this. However, as the semester progressed, I began to understand the relationships between the decisions that I was making to the design proposal. I additionally began to understand how one simple change will, in most cases, create a ripple effect down the chain of design.

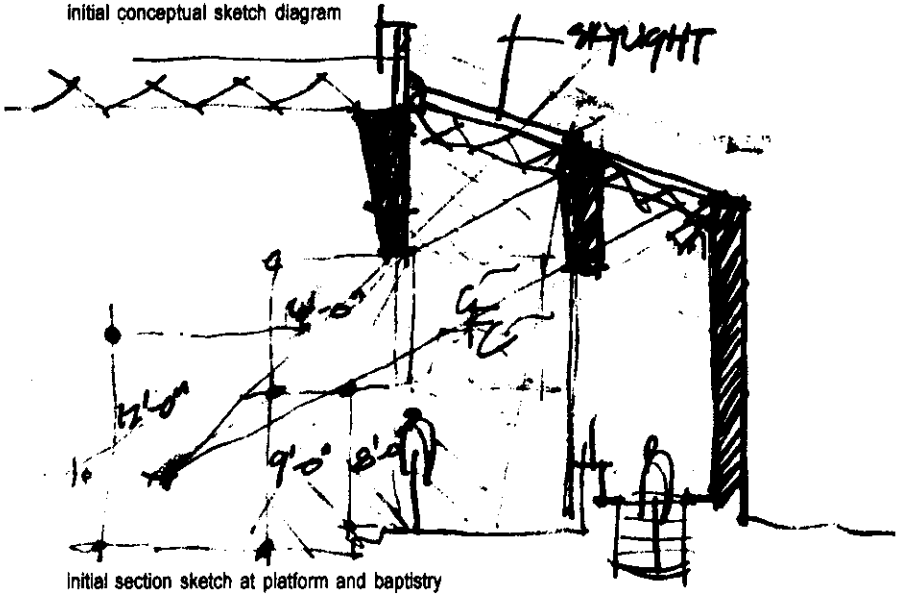
If I had the knowledge that I have now before the thesis design had undergone its first attempt, I believe that I would have designed a more comprehensive and exciting facility. I attribute this idea to the fact that I now have more information to be able to aid my design process. I do, however; believe that I have (with God's help) I designed a beautiful facility.

To begin the design process again would absolutely put my process, methods, and proposed design process into a more substantial and meaningful practice.

DESIGN STUDIES

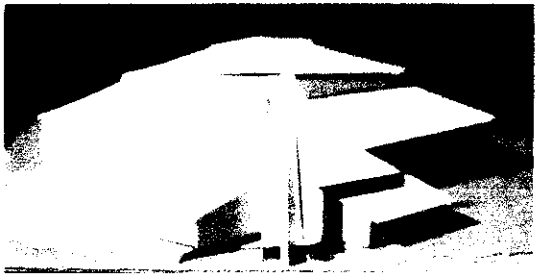


initial conceptual sketch diagram

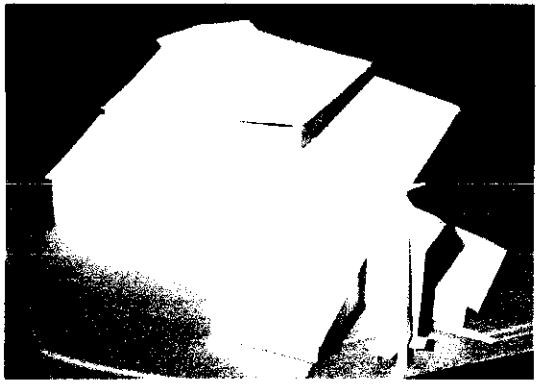


initial section sketch at platform and baptistry

structural exploration model



initial conceptual model



St. Irene Church, Illinois

INITIAL COST DATA

COMMERCIAL/INDUSTRIAL/INSTITUTIONAL | **M.090** | **Church**

Costs per square foot of floor area

Exterior Wall	S.F. Area	2000	7000	12000	17000	22000	27000	32000	37000	42000
	L.F. Perimeter	180	340	470	540	660	740	762	793	860
Decorative Concrete Brick	Wood Arch	166.55	125.25	116.15	109.40	106.85	105.25	102.05	99.95	99.00
	Steel Truss	162.65	121.30	112.25	105.45	102.95	101.30	98.10	96.00	95.10
Stone with Concrete Block Backup	Wood Arch	192.05	139.00	127.25	118.40	115.10	113.00	108.80	106.00	104.85
	Steel Truss	183.70	130.60	118.90	110.05	106.75	104.60	100.45	97.60	96.45
Face Brick with Concrete Block Backup	Wood Arch	185.05	135.25	124.25	116.96	112.85	110.85	106.95	104.35	103.25
	Steel Truss	176.70	126.85	115.85	107.55	104.50	102.50	98.60	95.95	94.90
Perimeter Adj., Add or Deduct	Per 100 L.F.	43.45	12.40	7.25	5.10	3.95	3.25	2.75	2.35	2.10
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	2.55	1.40	1.10	.90	.85	.80	.70	.60	.60

For Basement, add $ 20.60 per square foot of basement area

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from $ 80.35 to $ 202.35 per S.F.

Common additives

Description	Unit	$ Cost
Altar, Wood, custom design, plain	Each	3075
Deluxe	Each	10,700
Granite or marble, average	Each	8575
Deluxe	Each	26,900
Art, Prefabricated, plain	Each	7900
Deluxe	Each	91,000
Baptistry, Fiberglass, incl. plumbing	Each	3625 - 5600
Bells & Carillons, 48 bells	Each	550,000
24 bells	Each	220,000
Confessional, Prefabricated wood		
Single, plain	Each	2925
Deluxe	Each	7325
Double, plain	Each	5375
Deluxe	Each	16,400
Emergency Lighting, 25 watt, battery operated		
Lead battery	Each	289
Nickel cadmium	Each	655
Lectern, Wood, plain	Each	600
Deluxe	Each	2925

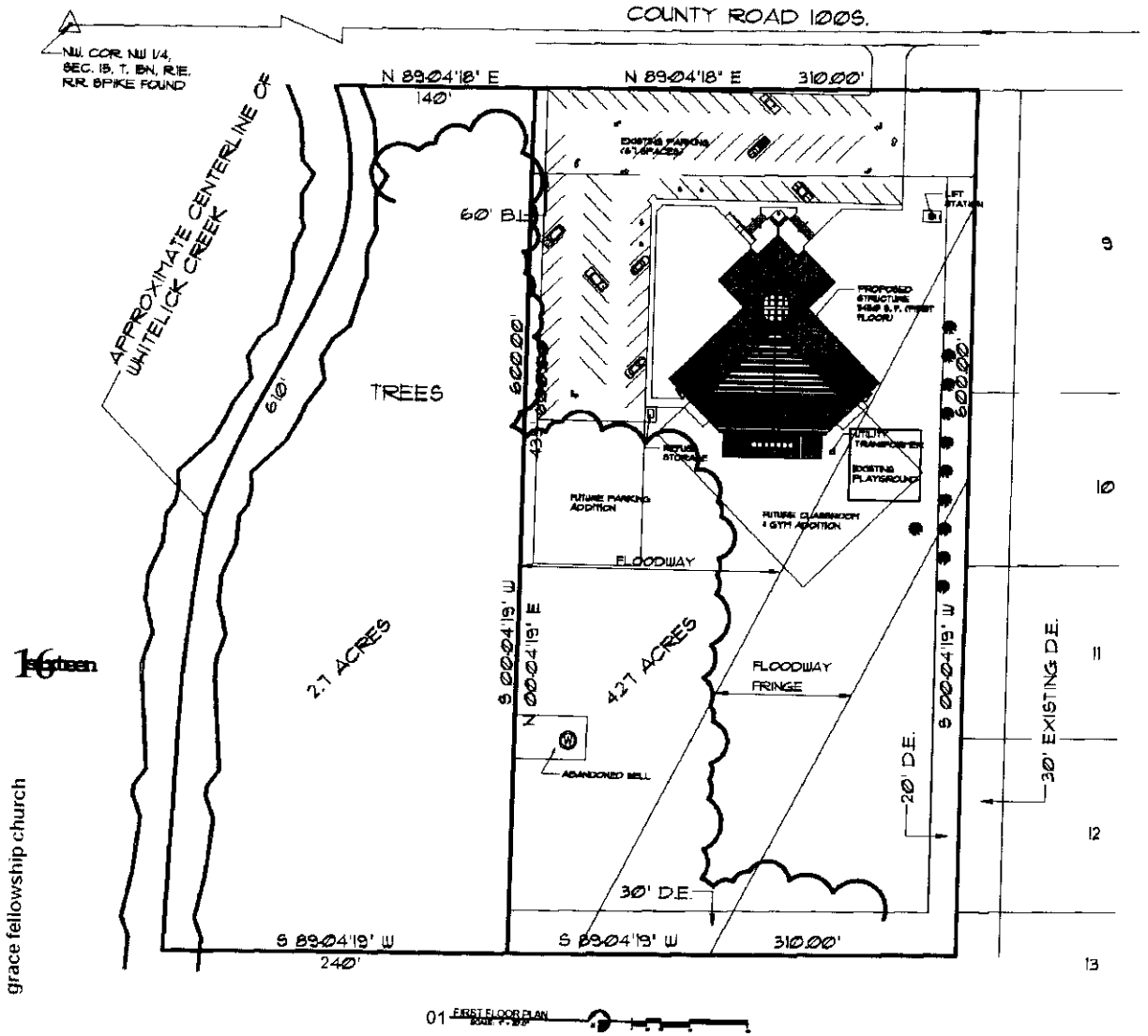
Description	Unit	$ Cost
Pews/Benches, Hardwood	L.F.	82 - 153
Pulpit, Prefabricated, hardwood	Each	1350 - 7925
Railing, Hardwood	L.F.	161
Steeples, Translucent fiberglass		
30" square, 15' high	Each	4700
25' high	Each	5425
Painted fiberglass, 24" square, 14' high	Each	4125
28' high	Each	4750
Aluminum		
20' high, 3'-6" base	Each	4650
35' high, 8'-0" base	Each	17,600
60' high, 14'-0" base	Each	39,700

Model costs calculated for a 1 story building with 24' story height and 17,000 square feet of floor area — **Church**

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
1.0 Foundations						
1	Footings & Foundations	Poured concrete: strip and spread footings and 4' foundation wall	S.F. Ground	5.00	5.00	7.3%
4	Piles & Caissons	N/A	–	–	–	
9	Excavation & Backfill	Site preparation for slab and trench for foundation wall and footing	S.F. Ground	1.08	1.08	
2.0 Substructure						
1	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	3.32	3.32	4.9%
2	Special Substructure	N/A	–	–	–	
3.0 Superstructure						
1	Columns & Beams	N/A	–	–	–	
4	Structural Walls	N/A	–	–	–	
5	Elevated Floors	N/A	–	–	–	17.4%
7	Roof	Wood deck on laminated wood arches	S.F. Roof	13.65	14.56	
9	Stairs	N/A	–	–	–	
4.0 Interior Closure						
1	Walls	Face brick with concrete block backup 80% of wall assumed for east walls	S.F. Wall	23	15.25	
5	Interior Wall Finishes	N/A	–	–	–	22.3%
6	Doors	Double hollow metal swinging, single hollow metal	Each	1078	.38	
7	Windows & Glazed Walls	Aluminum, top hinged, in swinging and curtain wall panels 20% of wall	S.F. Window	19.87	3.03	
5.0 Roofing						
1	Roof Coverings	Asphalt shingles with flashing	S.F. Roof	1.58	1.58	
7	Insulation	Polystyrene	S.F. Ground	1.18	1.42	3.9%
8	Openings & Specialties	Gutters and downspouts	S.F. Ground	.30	.30	
6.0 Interior Construction						
1	Partitions	Plaster on metal studs 40 S.F. Floor/L.F. Partitions	S.F. Partition	6.90	4.14	
4	Interior Doors	Hollow metal 400 S.F. Floor/Door	Each	534	1.34	
5	Wall Finishes	Paint	S.F. Surface	.20	.96	16.8%
6	Floor Finishes	Carpet	S.F. Floor	5.47	5.47	
7	Ceiling Finishes	N/A	–	–	–	
9	Interior Surfaces/Exterior Wall	Painted plaster 80% of wall	S.F. Wall	3.47	2.12	
7.0 Conveying						
1	Elevators	N/A	–	–	–	0.0%
2	Special Conveyors	N/A	–	–	–	
8.0 Mechanical						
1	Plumbing	Kitchen, toilet and service fixtures, supply and drainage 1 Fixture/2430 S.F. Floor	Each	2551	1.05	
2	Fire Protection	Wet pipe sprinkler system	S.F. Floor	1.69	1.69	
3	Heating	Oil fired hot water, wall fin radiation	S.F. Floor	5.81	5.81	18.4%
4	Cooling	Split systems with air cooled condensing units	S.F. Floor	6.75	6.75	
5	Special Systems	N/A	–	–	–	
9.0 Electrical						
1	Service & Distribution	400 ampere service, panel board and feeders	S.F. Floor	.51	.51	
2	Lighting & Power	Fluorescent fixtures, receptacles, switches, A.C. and misc. power	S.F. Floor	5.75	5.75	9.9%
4	Special Electrical	Alarm systems, sound system and emergency lighting	S.F. Floor	2.04	2.04	
11.0 Special Construction						
1	Specialties	N/A	–	–	–	0.0%
13.0 Site Work						
1	Earthwork	N/A	–	–	–	
3	Utilities	N/A	–	–	–	0.0%
5	Roads & Parking	N/A	–	–	–	
7	Site Improvements	N/A	–	–	–	
				Sub-Total	83.56	100%
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)			25%	20.89	
	ARCHITECT FEES			11%	11.50	
				Total Building Cost	116.00	

information from Mean's Cost Estimator 2002

DESIGN PROPOSAL

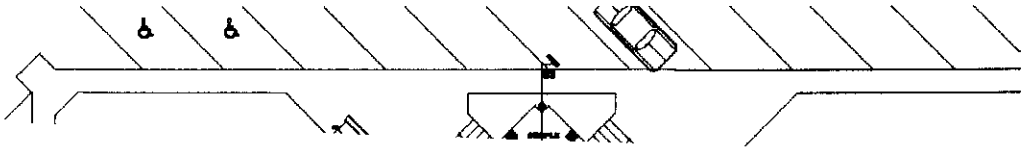


As stated before the facility is positioned on approximately seven acres of land in Avon, Indiana. The west of the site is bordered by many trees and Whitelick Creek. Trees are additionally to the south of the site. A recreational baseball and football park is to the north and residential properties are positioned to the east of the site. Parking exists on the site; as does signage and security lighting.

The actual structure is oriented differently than the historic facility. The first facility was entered from the west side of the site, however; now one enters through the north. The building is oriented in a north south direction and the entrance has a direct relationship to County Road 100 South.

Much of the site will remain the same. However, parking will most likely expand to the south of its existing location. Additionally, new landscaping is intended near the facility.

DESIGN PROPOSAL



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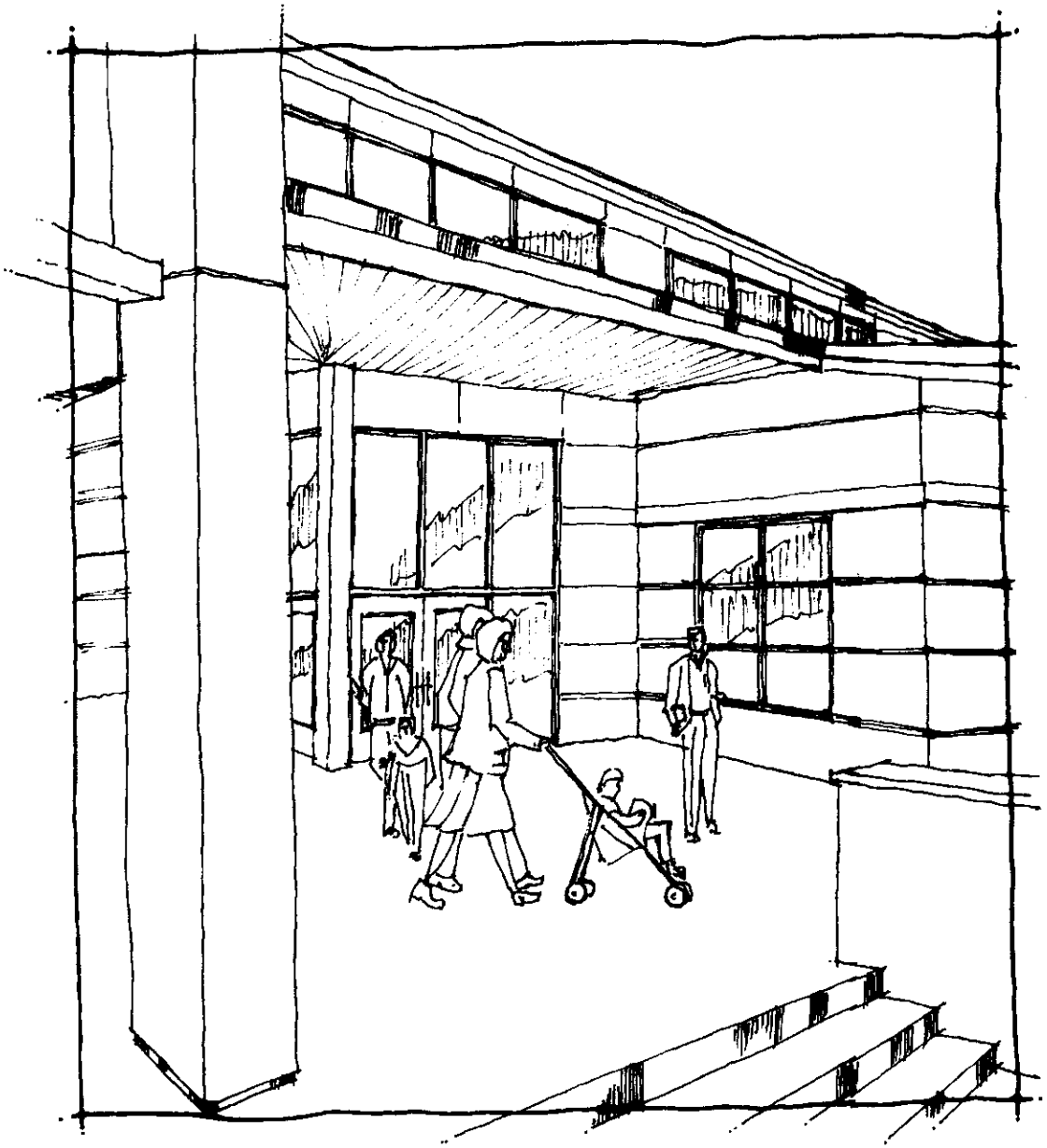

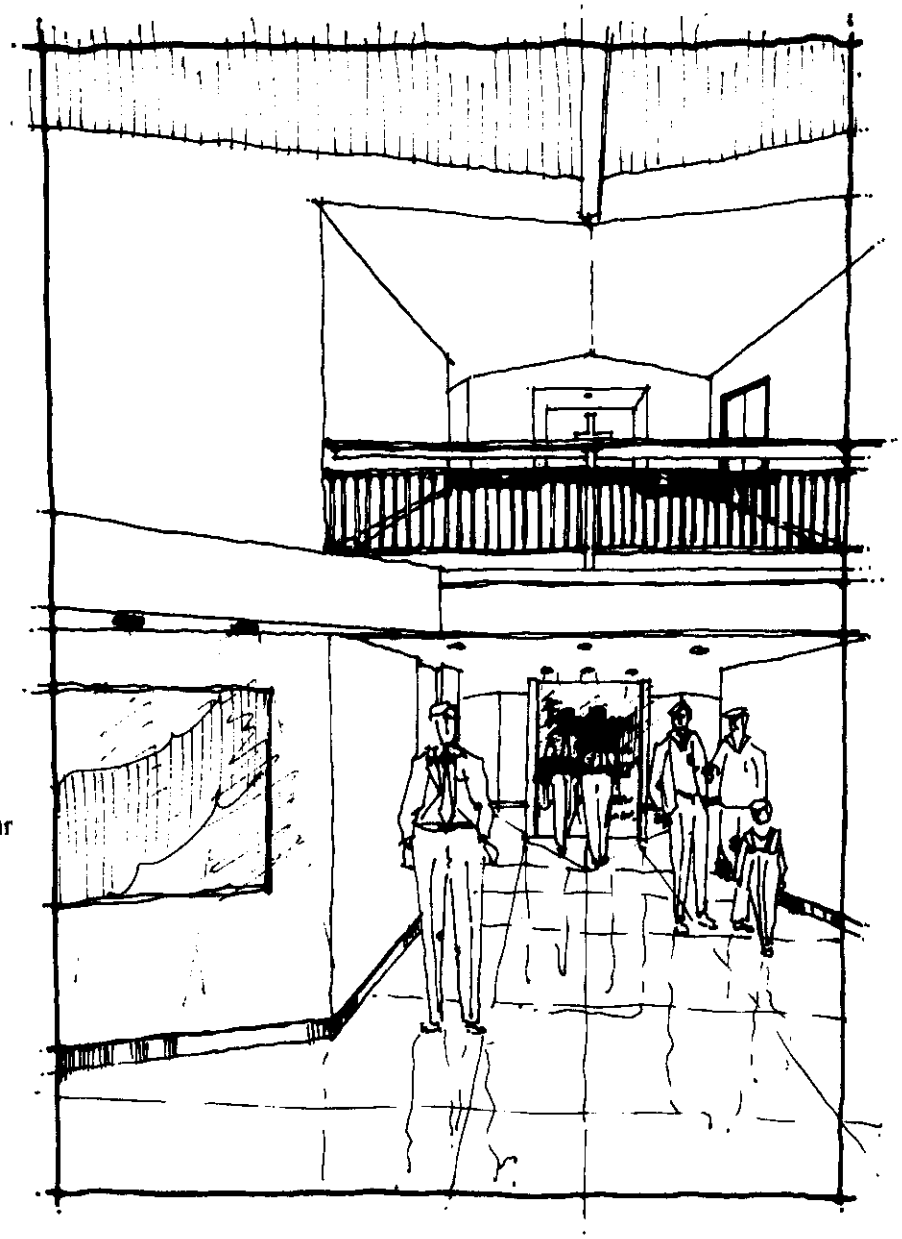

DESIGN PROPOSAL

The first perspective sketch (page 23) is a sketch that is taken at the north side of the facility as one would approach the entrance. The steeple is located to the left of the sketch and the handicap accessible ramp is located to the right. One can start to see the two story curtain glass wall that greets the visitor/user as you approach the entrance. The brick walls that extends to the left and right of the visitor/user encompass you and welcome you gently and slowly toward the entrance and into the facility. For one who is leaving the facility, the building gently and slowly releases the visitor/user back to the outdoors.

The second perspective sketch (page 24) is a sketch that is taken immediatly after completely entering the facility. The building is organization in plan and in three-dimensions aids in orienting the visitor/user. One can begin to immediatly understand the compostition and layout of the facility as soon as they cross the threshold. One main goal of the building was for it to be very self explanitory. The layout of the facility responds to my desire for the visitor/user to never have to make a ninety degree turn while moving through the main areas of the facility.

DESIGN PROPOSAL

The final model is constructed of white musuem board and balsa wood. It depects at 1/8" scale what the overall building form would look like. It contain much of the window mullion details and the face and split-face cmu detailing elements. The base of the model is constructed of maple and is stained with a fruitwood stain. The stain and wood are a proposal for the actual facility, however; actual colors and wood species will be decided by the client with the assistance of a registered architect.

image of final model looking at the front facade of facility

DESIGN PROPOSAL

image of final model: arial view

image of final model looking at side of facility

image of final model looking from bridge at County Road 100 South

COST DATA

Assumptions:

1. This estimate is based on 2002 Means Building Construction Cost Data and information from numerous reliable sources.
2. Cost estimate information is relative to March 2003 material and labor costs.

DESCRIPTION	QTY	UNIT	UNIT COST	EXT COST	DIV SUBTOTAL
ARCHITECTURAL DEMOLITION					**$14,720**
Remove existing building, footings, and slab	1	lot	$12,720.00	$12,720	
Remove all trash and debris	1	lot	$12,000.00	$12,000	
General Reductions (Insurance)	1	lot	$10,000.00	-$10,000	
FOUNDATIONS					**$38,687**
Excavation & backfill	15595	sf	$1.28	$19,962	
Spread footings,	27	ea	$600.00	$16,200	
Strip footings and foundations	500	lf	$5.05	$2,525	
SUBSTRUCTURE					**$51,775**
Concrete floor slab, 4" reinforced	15595	sf	$3.32	$51,775	
SUPERSTRUCTURE					**$201,176**
Concrete column piers	270	vlf	$38.30	$10,341	
Pre-manufactured structure	15595	sf	$10.00	$155,950	
Steel beams, bar joist, metal deck	15595	sf	$3.84	$59,885	
General Reductions	1	lot	-$25,000.00	-$25,000	
EXTERIOR CLOSURE					**$240,681**
3 5/8" Metal walls w/5/8" drywall	15595lf		$2.00	$31,190	
Face brick and aluminum composite panels	15595	lf	$10.00	$155,950	
Batt insulation, 3 1/2" (R13)	15595	sf	$0.54	$8,421	
Vapor barrier (6 mil)	15595	sf	$0.13	$2,074	
Ice and water shield	16500	sf	$0.60	$9,900	
Gutter (8" painted steel)	350	lf	$6.13	$2,146	
Downspouts (5" painted steel)	240	lf	$5.00	$1,200	
Aluminum Storgefront Entry System	1	lot	$10,000.00	$10,000	
Window, Casement	18	ea	$500.00	$9,000	
Steel ext. door (3x6'-8")	9	ea	$1,200.00	$10,800	

COST DATA

ROOFING					**$78,240**
Roof, standing seam steel 26 ga, colored	16500	sf	$4.06	$66,990	
Soffit	1500	sf	$7.50	$11,250	
INTERIOR CONSTRUCTION					**$270,130**
Stain and epoxy floor finish	2600	sf	$3.50	$9,100	
Carpet	1425	sy	$20.00	$28,500	
Vinyl composition tile	170	sf	$1.50	$255	
Cove base	2500	lf	$1.81	$4,525	
Lay-in acoustical ceiling (2x4)	9000	sf	$2.50	$22,500	
Drywall ceiling	6595	sf	$1.53	$10,090	
Concrete split-face block wall @ baptistry	100	lf	$12.00	$1,200	
3-5/8" Metal stud wall w/5/8" gyp. each side	12000	sf	$3.00	$36,000	
Paint, primer & 2 coats	15595	sf	$1.00	$15,595	
Moveable Partitions	6	ea	$2,000.00	$12,000	
Wood doors, 3'x6'-8" w/ HM frame, painted	42	ea	$1,000.00	$42,000	
Access door	2	ea	$130.00	$260	
Fire extinguishers 95# ABC on wall bracket)	4	ea	$40.00	$160	
Cabinets	50	lf	$350.00	$17,500	
Countertop	50	lf	$59.00	$2,950	
Partitions, painted, floor-mount, ovrhd brace	7	ea	$530.00	$3,710	
FF&E for furniture, chairs, and misc	1	lot	$50,000.00	$50,000	
Audio/visual equipment	1	lot	$25,000.00	$25,000	
Urinal screen, 2' wide	1	ea	$275.00	$275	
Pre-manufactured stair	2	ea	$5,000.00	$10,000	
Sanctuary doors	2	ea	$1,500.00	$3,000	
Millwork	5000	sf	$5.00	$25,000	
Interior Glazing	20	ea	$500.00	$10,000	
Main Stair (wood)	1	ea	$5,000.00	$5,000	
Guard rail	20	lf	$25.50	$510	
General Reductions (Insurance)	1	lot	-$15,000.00	-$15,000	
General Reductions	1	lot	-$50,000.00	-$50,000	
HVAC					**$100,616**
Sanctuary HVAC	4800	sf	$5.00	$24,000	
Classroom HVAC	10795	sf	$6.25	$67,469	
HVAC Sub Markup	10%		$91,468.75	$9,147	

COST DATA

PLUMBING					**$44,153**
Water closets	9	ea	$800.00	$7,200	
Urinals	3	ea	$1,000.00	$3,000	
Water Cooler	1	ea	$3,000.00	$3,000	
Sink	6	ea	$750.00	$4,500	
Drains	2	ea	$230.00	$460	
Piping	1	lot	$22,695.00	$22,695	
Baptistry	1	ea	$6,000.00	$6,000	
Gas Service	1	lot	$1,000.00	$1,000	
Electric Water Heater	1	ea	$1,000.00	$1,000	
General Deductions	1	lot	$8,350.00	-$8,350	
Plumbing Sub Markup	10%		$36,475.00	$3,648	
FIRE SUPPRESSION					**$27,291**
Wet-pipe sprinkler system	15595	sf	$1.75	$27,291	
LIGHTING					**$27,335**
2'X4' wide-beam diffuse lighting	80	ea	$100.00	$8,000	
Incandescent can light (I.C. rating)	80	ea	$80.00	$6,400	
Pendant Fixture	7	ea	$500.00	$3,500	
Exterior Building Lights	4	ea	$400.00	$1,600	
Mechanical Lights	10	ea	$35.00	$350	
Switches	1	lot	$5,000.00	$5,000	
Lighting Sub Markup	10%		$24,850.00	$2,485	
POWER					**$76,216**
Receptacles	1	lot	$10,000.00	$10,000	
Phone/data	5	ea	$40.00	$200	
Miscellaneous	1	lot	$15,000.00	$15,000	
Conduit/wire	15595	sf	$2.50	$38,988	
Panel	2	ea	$1,500.00	$3,000	
Feeder	100	lf	$21.00	$2,100	
Electrical Sub Markup	10%		$69,287.50	$6,929	

COST DATA

SITEWORK					**$41,500**
Earthwork	1	lot	$20,000.00	$20,000	
Utilities	1	lot	$2,500.00	$2,500	
Roads, parking, lighting	1	lot	$0.00	$0	
Steeple	1	lot	$15,000.00	$15,000	
Signage	1	lot	$0.00	$0	
Site improvements	1	lot	$10,000.00	$10,000	
General Reductions	1	lot	-$6,000.00	-$6,000	
GENERAL CONDITIONS					**$23,500**
Project Superintendent	9	mo	$2,000.00	$18,000	
Temporary Facilities (toilet, barracades)	1	allow.	$1,000.00	$1,000	
Dumpster	8	ea	$500.00	$4,000	
Permits & Inspections	1	allow.	$500.00	$500	
CONSTRUCTION SUBTOTAL					**$1,236,020**
Contractor Overhead & Profit (all except General Cond.)	10%	job		$121,252	
Construction Contingency (all except O&P)	10%	job		$123,602	
CONSTRUCTION TOTAL					**$1,480,874**
INDIRECT OWNER COSTS					**$71,442**
A/E fees	6.5%	const.	$1,480,873.65	$96,257	
General Reductions	1	lot	-$25,000.00	($25,000)	
State filing fees	1	est.	$185.00	$185	
TOTAL PROJECT COST					**$1,552,315**

REFLECTIONS | FURTHER STUDY

Reconciling Beauty and Budget: Grace Fellowship Church was neither my initial thesis topic or my original thesis building type. About a week after Christmas Break, I changed my thesis topic and building type because of the fire at the church. I was unable to concentrate on my original topic after the fire and thus cleared with both Bob Fisher (my professor) and Tony Costello (my adivisor) to change my thesis topic. They allowed me to undertake the new topic and I proceeded.

Unfortunately, I lost much of my initial research time to a topic which has not yet been explored in further detail. Therefore, I was unable to sufficiently research my actual topic to its fullest potential. Because this was the case, I was unable to fully understand and completely realize my topic and building type.

Despite all of the issues and difficulties that pertained to my specific topic, I really enjoyed exploring this topic. I additionally enjoyed having a "real" client and exploring real issues. I know that the information that I have gathered through this experience will only enhance and further my design career.

If I had addtional time and means to further my study on this topic; I believe that I would continue to explore and make decisions about my particular design proposal. There are some issues that in my opinion did not get the attention and closure that they needed. For example, I would like to continue to explore the different opportunities and types of "skin" that could enclose the facility. Moreover, there are a few issues pertaining to mechanical and structural issues that I would be interested in seeing further development. Unfortunately this would require the assistance of a professional engineer (in my opinion).

Additionally, now having some initial research and design exploration at my fingertips, I believe that I could use this information to further my study in a completely different way. Specifically, I believe that I could use my new knowledge to create a more exciting facility.

RECOMMENDED SOURCES

Steele, James. ***Architecture Today***. Phaidon Press Limited: London, 1997.

Boles, Daralice. ***American House Now: Contemporary Architectural Directions***. Universe Publishing: New York, 1997.

Sweet's Group. ***Sweet's General Building and Renovation Catalog***. McGraw- Hill Corporation: New York, 2002.

Susanka, Susan. ***Creating the Not So Big House***. The Taunton Press: Newton, Connecticut, 2000.

Stein, Benjamin. ***Mechanical and Electrical Equipment for Buildings: Ninth Edition***. John Wiley and Sons, Inc: New York, 2000.

Architectural Record. McGraw-Hill Corporation: New York, December 2002.

Mean's Building Cost Estimator, 2002.

"I'm sorry to say that at the end of the day most people still don't realize that architecture pays. they just go back and do the ordinary. They ask for something less without realizing that something better does not cost that much more in the end. It takes a little longer to conceive."

Frank O Gehry