

**NAWIC & NEF**  
***Building Design Program***



***The Commercial Project***

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## ***About NAWIC (National Association of Women in Construction)***

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The National Association of Women in Construction (NAWIC) is an international organization founded in 1955 to promote women employed in the construction industry, which continues to be NAWIC's main goal. The Richmond Chapter #141 was organized in 1967. The Richmond chapter consists of over 70 women actively working in the Central Virginia construction industry.

Education is a fundamental component of promoting the construction industry and women's roles within it. Each year, NAWIC sponsors the following NEF (NAWIC Education Foundation) K–12 Programs:

- Block Kids—Students are given interlocking blocks, cardboard, string, aluminum foil, and a rock and are instructed to design and build a model of an object, and to describe their process.
- Work It to Learn It Project—Middle school students participate.
- The Shed, The Garage, and The Commercial Projects—Middle and high school students participate.
- The Drafting Project—High school students are given a NAWIC-sponsored design problem to draw using CADD.
- Postsecondary and Career and Technical Education (CTE) scholarships—Each year, NAWIC awards more than \$5,000 to students majoring in construction-related fields or who are entering a construction-related CTE program.

The NAWIC Building Design program started with one school in 1997. Over the years, students from Henrico, Chesterfield, and Hanover public schools have participated. Through the 2009 school year, more than 6,500 students have worked in this program. Please go to the Richmond chapter of NAWIC to discover more:

[www.nawic-richmondva.com](http://www.nawic-richmondva.com)

## ***About AGC (Associated General Contractors)***

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### **“The Voice of Virginia’s Commercial Construction Industry”**

The Associated General Contractors (AGC) of Virginia, Inc., holds the largest membership and is the most influential construction trade organization in the state. It comprises more than 740 member firms including general contractors, subcontractors, material suppliers, and service providers.

### **A History of Leadership in the Construction Industry**

The AGC of Virginia was founded more than 80 years ago. It is divided into 11 districts across the state, each of which works with a regional director to plan activities including workshops, meetings, seminars, networking opportunities and events in that area.

### **The Power to Help Construction-Industry Businesses Grow**

The AGC of Virginia has the experience, resources, and expertise to address the critical industry issues that affect construction businesses. Its goal is to provide effective solutions for issues that directly impact Virginia firms and to help them grow their businesses through networking, educational and legislative programs, and activities. Visit the AGC Web site <<http://www.agcva.org/>> to find out about the many benefits of becoming a member of the AGC of Virginia.

## ***Introduction***

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The NEF (NAWIC Education Foundation) Commercial Project is part of a versatile NEF Building Design Program that can easily be incorporated by Technology Education and Trade and Industrial Education instructors into their current curricula. Also included in this program are the Shed Building Project, the Garage Building Project, and the Work It to Learn It Project. When supported by a local NAWIC (National Association of Women in Construction) chapter or other construction industry sponsor, the program may be offered as a national building-design competition. Local winners would advance to a regional competition, and one semi-finalist from each region would be entered in the national program competition.

The construction industry faces a workforce shortage that poses a serious problem for the national economy. In order to meet the demand for construction and construction-related jobs and careers, the industry needs to annually attract, educate, and train new workers.

The NEF Building Design Program introduces students to the construction industry in an effort to create an awareness of and to promote personal interest and a connection to essential professional knowledge and skills. In addition, the program helps immerse students in career exploration by exposing them to pathways within the Architecture and Construction Career Cluster.

The program is nondiscriminatory and, as such, is open to all secondary level students. All eligible students must participate through a recognized program sponsor to be considered for participation in any occurring national program competition.

Go to <<http://www.nawiceducation.org>> to determine current competition status.

## ***Section 1: The Project***

## ***The Problem***

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You are a building design contractor. You have decided that you want to build a commercial space on the site included in this project. You are to select the type of commercial project for the site and design and meet the needs of the client who will be occupying the space after completion; however, the following criteria must be followed:

- Determine the optimum square footage required for your project.
- Determine a **base bid amount**, based on the pricing structure indicated on your *Project Cost Worksheet*.
- Research **add amounts** for any special project requirements.
- Meet the following design specifications:
  - Space to meet the client's needs
  - Space for storage
  - Handicapped accessible entry and egress
  - Elevator(s), if required
  - Handicapped accessible bathroom(s)
  - Lighting for entire space
  - Electrical for entire space
  - HVAC for entire space
  - Fire protection for entire space (e.g., sprinklers, fire extinguishers, cabinets)
  - Any special rooms, utilities, finishes, required to meet client's needs
- Meet special requirements if requested by the client, for items such as
  - kitchen equipment
  - serving counters
  - nail stations
  - beauty stations
  - changing booths
  - tables and seating (e.g., theatre seating)
  - projectors and/or projection screens
  - special flooring
  - computer hookups
  - special wiring (e.g., for medical needs).
- Create a commercial space that can be used in a variety of ways.

**Note:** This is your design, so, make it reflect your talents and personality. Be creative in the use of the space and sectioning off the building for different uses. Research your project choice thoroughly. Give consideration to all four systems of technology when envisioning your project: construction, communication, transportation and production (where applicable).

## ***Project Elements***

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### **Project Visioning/Brainstorming**

- Must have a brainstorming session by each student team to
  - establish the business title and description
  - determine type of client they will be serving
  - determine the type of commercial building they will create
- Must document session
- Must list special requirements of the client's use of the space

### **Daily Job Log**

- Must create an entry for each class period spent working on the project
- Must be legible and thorough

### **Floor Plan**

- Must be drawn to 1/8" = 1' scale
- Must be dimensioned
- Must label all areas of the project
- Must show location of exterior and interior walls, doors, windows, storefront, plumbing and lighting fixtures, electrical outlets/receptacles, major appliances, any required furnishings and/or special requirements

### **Elevations: Front/Facade**

- Must be drawn to 1/8" = 1' scale
- Must be labeled
- Must have one elevation per page if drawing more than the required front elevation/facade
- Must show location of all exterior doors and windows
- Must incorporate rendering on front elevation to identify building's purpose

### **Project Cost**

- Must determine total cost based on given pricing structure
- Must be accurate according to floor plan
- Must detail add amounts for special project requirements

### **Career Report**

- Must be legible, may be handwritten or typed
- Must be written about a construction related career—either a management position or a tradesman position
- Must be approximately one page long

### **Project Report**

- Must be legible, may be handwritten or typed
- Must describe the students' experience with this project from the design phase to the construction of the model
- Must be approximately one page long

**Model**

- Must be built to 1/8" = 1' scale
- Must be accurate compared to floor plan and elevations
- Must have base size no larger than 24" x 24"
- May be embellished as desired

## ***Element 1—Project Visioning/Brainstorming***

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Students meet with teammates to assign tasks, determine company name, formulate a business plan, and set goals. Students begin to create a portfolio of the team's progress by accurately recording the minutes of its first organizational meeting. Documentation within the portfolio is crucial. When selecting its client type and the type of commercial building they envision on the site provided, students should consider the following:

- Will the client pull business and/or traffic from the same customer base?
- Does the proposed square footage of the building give the flow and circulation the client needs? Is there enough room for storage?
- Is the property on which the site is located zoned properly for the intended use of the proposed commercial building? Does the municipality in which the site is located have any special requirements for permits or fees? Are there any special programs available that will promote tax credits? Are there any waivers required?
- Is there adequate parking space available to accommodate the client's requirements?
- Does the site provide opportunities for handicapped-accessible entry and egress?

## ***Element 2—Daily Job Log***

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The daily job log is a factual record of the group's activities each day they work. Student teams must select an administrative assistant to keep this record. Much like a real construction project log, administrative assistants must record the following:

- **Date:** each day you work on your project
- **Weather:** approximate temperature; sunny or cloudy, rainy or clear
- **Attendees:** those members of the firm that were "at work" each day
- **Project Activity:** the tasks accomplished during the day and problems or obstacles encountered

Logs can be kept in a spiral-bound notebook or on loose-leaf paper. However, they must be authentic, and an accurate recording should be logged after each work day. The log must be legibly handwritten or typed.

Job logs are an integral part of today's construction industry. They are standard on all projects, no matter the size. They provide a written record of each day's construction activities for future reference.

Both the construction team and the client rely on accurate records. Once a project is finished, if items in the original project specifications are questioned by the client, the contractor can review the log and verify whether or not the task was completed.

Contractors can also use this record effectively when

- dealing with disputed work performed by subcontractors
- trying to justify that additional work outside of the specifications has been performed
- proving that inclement weather or other unforeseen problems delayed the project progress
- charting solutions, best practices, efficiencies, and obstacles overcome
- defending the contractor's case in a legal dispute.

## ***Element 3—Floor Plan***

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### **Project Criteria**

- The optimum square footage required
- The base bid amount and any add amounts
- The building must provide
  - space to meet the client's needs
  - space for storage
  - handicapped accessible entry and egress
  - elevator(s), if required
  - handicapped accessible bathroom(s)
  - lighting for entire space
  - electrical for entire space
  - HVAC for entire space
  - fire protection for entire space (e.g., sprinklers, fire extinguishers, cabinets)
  - any special rooms, utilities, finishes, required to meet client's needs, such as
    - ◆ kitchen equipment
    - ◆ serving counters
    - ◆ nail stations
    - ◆ beauty stations
    - ◆ changing booths
    - ◆ tables and seating (e.g., theatre seating)
    - ◆ projectors and/or projection screens
    - ◆ special flooring
    - ◆ computer hookups
    - ◆ special wiring (e.g., for medical needs).

### **Flow (Circulation)**

Circulation is the movement from one area to another. Successful circulation means that there are convenient pathways between areas that have the most connecting traffic. You may need to consider some of the following design issues:

- Storage requirements near entry/exit
- Accessible path between and around furnishings
- Proper lighting and ventilation
- Proper electrical outlets and receptacles near work areas
- Benefit of natural lighting/sun

## ***Element 4—Elevation/Facade***

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Building elevations are pictorial representations of how buildings will appear from the outside. Elevations typically show

- exterior doors
- exterior windows
- exterior finish (e.g., vinyl siding, brick)
- roof slope
- roofing material (e.g., shingles, metal).

Students must include the front/facade elevation in their final project documentation and incorporate rendering on front elevation to identify the building's purpose.

### **Directions and Decisions**

1. From the floor plan, students should draw lines from outside edges, exterior doors, windows/storefronts, canopies, and lighting.
2. Students should determine the height of the building, typically one story or two.
3. Door heights are typically 7' in commercial applications.
4. Door widths are typically 3' or more in commercial applications.
5. Windows/storefronts/curtain wall heights vary.

## ***Element 5—Project Cost***

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Use the unit designations and pricing listed in the *Project Cost Worksheet* for the various typical construction divisions and specification sections to determine the base bid amount. Remember to add the square footage for each floor.

Research any add amounts required for special project requirements.

Show the following:

- Base bid amount
- Subtotal
- Add amounts and/or deduct amounts, if any
- Overhead
- Profit
- Total project cost

## ***Element 6—Career Report***

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The Career Report is designed to provide students the opportunity to research a construction-related career of their choice. The report should highlight any job title within the Virginia Architectural and Construction Career Cluster (<http://www.doe.virginia.gov/VDOE/Instruction/CTE/careerclusters/Arch-portal.html>).

The report should be approximately one half page in length. Report should include

- job description
- education required
- salary expectations.

Helpful Web sites include

- Know How Virginia (<http://www.knowhowvirginia.org/>)
- Trailblazers ([http://www.ctetrailblazers.org/live\\_data/live\\_site\\_page.php](http://www.ctetrailblazers.org/live_data/live_site_page.php))
- Virginia Career VIEW (<http://www.vacareerview.org/>)
- Virginia's Career Planning System (<http://va.kuder.com/>)
- The Career Planning Guide (<http://www.cteresource.org/cpg/>)
- O\*NET (<http://online.onetcenter.org/>).

## ***Element 7—Project Report***

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The *Project Report* is designed to provide students the opportunity to write a summary report of their experience with the project, just as construction firms often do. The report should include

- any problems encountered in the design process
- the process of determining the design
- what was learned during the project
- things the student might have done differently.

## ***Element 8—The Model***

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Models are typically constructed using foam core. Students must be very careful when cutting this material. The model will be based on the final floor plan. The model base is to be no larger than 24" x 24". The model must be in 1/8" scale. The parking lot, roadways, and/or pathways to access the building should be included. Students may embellish the model with interior finishes, siding, roofing, and landscaping. However, any additional effort put into the model will not help in the overall project evaluation, though it may score points in the bonus category. (Refer to *The Commercial Project Evaluation Form* for a detailed rubric.)

## ***Section 2: Project Forms***

## ***Project Checklist***

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- Project visioning/brainstorming
  
- Daily job log
  
- Floor plan
  
- Elevations: front
  
- Project Cost Worksheet*
  
- Career Report*
  
- Project Report*
  
- Model

School \_\_\_\_\_

Teacher \_\_\_\_\_

Company name \_\_\_\_\_

Team members \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NAWIC representative \_\_\_\_\_

## ***Brainstorming Session Guidelines***

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Date \_\_\_\_\_

What are the client's basic needs and special requirements?

Team members

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What type of commercial building is envisioned for this site to meet the client's needs?

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Company name

Describe the available parking space.

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Business plan

What is the available square footage?

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What types of buildings surround the property?

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Mission statement

How have you verified that the site is properly zoned?

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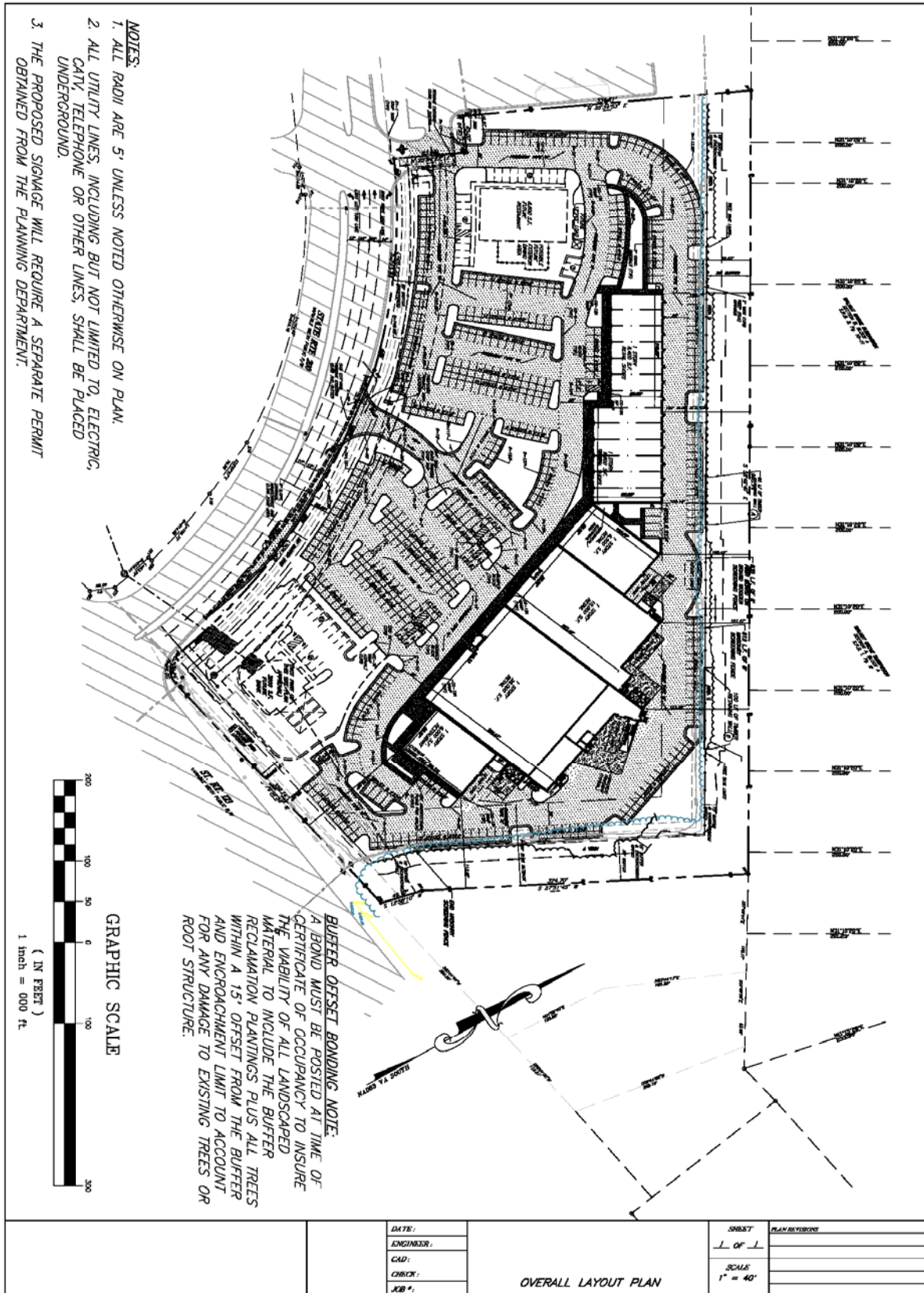
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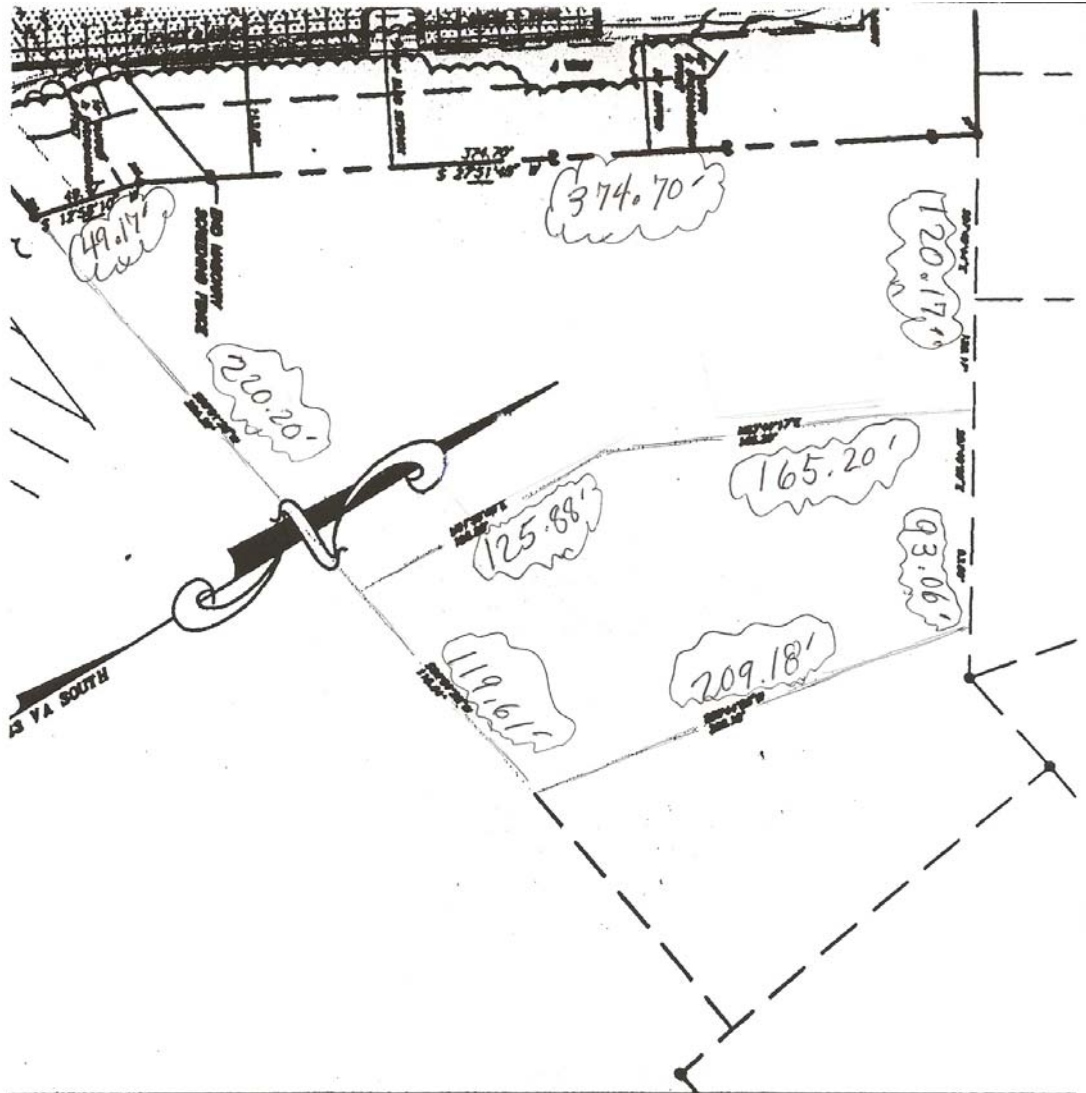
Name of recorder

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# Overall Layout Plan



## Layout Plan of the Available Lots for New Construction



DATE:		SHEET	PLAN
ENGINEER:		1	OF 1
CAD:		SCALE	
CHECK:		1" = 40'	
JOB #:			

## Project Cost Worksheet

School \_\_\_\_\_ Company Name \_\_\_\_\_

	DESCRIPTION	COST	QUANTITY	TOTAL
<b>Division 1: General provisions</b>				
	Design cost—civil, architectural, engineering structural, mechanical, electrical	12% of total cost of construction		\$ -
<b>Division 2: Site work</b>				
	<b>Clearing and grubbing</b>	\$10,000.00/acre		\$ -
	<b>Site utilities:</b>			
	Water	\$30.00/lf		\$ -
	Sanitary	\$30.00/lf		\$ -
	Storm	\$50.00/lf		\$ -
	Roof Drains	\$35.00/lf		\$ -
	Paving	\$35.00/yd <sup>2</sup>		\$ -
	<b>Landscaping:</b>			
	Sod	\$3.50/yd <sup>2</sup>		\$ -
	Tree	\$250.00/ea		\$ -
	Medium shrub	\$50.00/ea		\$ -
	Small shrub	\$35.00/ea		\$ -
	Potted plants	\$15.00/ea		\$ -
<b>Division 3: Concrete</b>				
	Curbs	\$18.00/lf		\$ -
	Cast-in-place	\$5.00/ft <sup>2</sup>		\$ -
	Precast	\$35.00/ft <sup>2</sup>		\$ -
<b>Division 4: Masonry</b>				
	Stone	\$20.00/ft <sup>2</sup>		\$ -
	Brick	\$14.00/ft <sup>2</sup>		\$ -
	Block	\$12.00/ft <sup>2</sup>		\$ -
<b>Division 5: Metals</b>				
	Structural steel	\$15.00/lf		\$ -

	DESCRIPTION	COST	QUANTITY	TOTAL
<b>Division 6: Woods and plastics</b>				
	Rough carpentry	\$3.50/lf		\$ -
	Finish trim	\$5.00/lf		\$ -
<b>Architectural casework:</b>				
	Base cabinets	\$150.00/lf		\$ -
	Wall cabinets	\$125.00/lf		\$ -
	Countertops	\$50.00/ft <sup>2</sup>		\$ -
<b>Division 7: Thermal and moisture control</b>				
	Roofing	\$7.50/ft <sup>2</sup>		\$ -
	Building insulation	\$1.00/ft <sup>2</sup>		\$ -
	Joint sealers	\$1.50/lf		\$ -
<b>Division 8: Doors and windows—storefronts, frames, hardware</b>				
	Hollow metal frame	\$175.00/ea		\$ -
	Hollow metal door	\$325.00/ea		\$ -
	Wood door	\$475.00/ea		\$ -
	Hardware	\$275.00/ea		\$ -
	Glass entry door	\$1,500.00/ea		\$ -
	Windows	\$35.00/ft <sup>2</sup>		\$ -
	Glazing	\$18.00/ft <sup>2</sup>		\$ -
<b>Division 9: Finishes</b>				
	Metal studs and gypsum board	\$6.00/ft <sup>2</sup>		\$ -
	Ceramic tile	\$10.00/ft <sup>2</sup>		\$ -
	Acoustical ceiling	\$2.75/ft <sup>2</sup>		\$ -
	Drywall ceiling	\$5.00/ft <sup>2</sup>		\$ -
	Carpet	\$30.00/yd <sup>2</sup>		\$ -
	Vinyl tile	\$2.50/ft <sup>2</sup>		\$ -
	Painting	\$1.00/ft <sup>2</sup>		\$ -
	Wall covering	\$30.00/yd <sup>2</sup>		\$ -
<b>Division 10: Specialties</b>				
	Visual display boards	\$5.00/ft <sup>2</sup>		\$ -

NEF The Commercial Project

	DESCRIPTION	COST	QUANTITY	TOTAL
	Toilet partitions	\$400.00/ea		\$ -
	Toilet and bath accessories	\$80.00/ea		\$ -
	Fire extinguishers	\$125.00/ea		\$ -
<b>Division 11: Equipment</b>				
	Library	Research—Add/ea		\$ -
	Security and vault	Research—Add/ea		\$ -
	Theatre and stage	Research—Add/ea		\$ -
	Medical	Research—Add/ea		\$ -
	Kitchen	Research—Add/ea		\$ -
<b>Division 12: Furnishings</b>				
	Furnishings and accessories	Research—Add/ea		\$ -
	Window treatment	\$4.00/ft <sup>2</sup>		\$ -
<b>Division 13: Special construction</b>				
	Kennels and shelters	Research—Add/ft <sup>2</sup>		\$ -
	Athletic rooms	Research—Add/ft <sup>2</sup>		\$ -
	Swimming pools and equipment	Research—Add/ft <sup>2</sup>		\$ -
<b>Division 14: Conveying systems</b>				
	Elevators	\$20,000.00/stop		\$ -
<b>Division 15: Mechanical</b>				
	Mechanical	\$25.00/ft <sup>2</sup>		\$ -
	Plumbing	\$10.00/ft <sup>2</sup>		\$ -
<b>Division 16: Electrical</b>				
	Electrical	\$20.00/ft <sup>2</sup>		\$ -
	Sound and video	\$5.00/ft <sup>2</sup>		\$ -
	<b>Building permit</b>	2% of construction cost	1	\$ -
<b>Subtotal</b>				\$ -
<b>Add for any special project requirements</b>				\$ -
<b>Overhead and profit, 10%</b>				\$ -
<b>TOTAL</b>				\$ -
<b>NOTE:</b> Pricing listed herein is arbitrary and given for estimating purposes on this project only.				

## ***Supply List***

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- 3/16" foamcore (for modeling): one (1) 24" x 36" sheet
- 3/16" 4'0" x 8'0" tempered hardware cut in 24" x 24" pieces for bases
- 1/8" graph paper for floor plan and elevations
- Lined paper for handwritten reports
- Plain paper for printed reports
- Embellishments as desired
- Mechanical pencils
- Architectural scales
- Razor-sharp knives (e.g., X-ACTO)
- Glass or mirror surface on which to cut foamcore (to protect other surfaces and provide a clean, straight cut)
- Low temperature glue guns, glue sticks for guns, glue dots
- Straight pins, colored pencils, scrapbooking paper, construction paper, acrylic paints, and other incidentals

## ***The Commercial Project Evaluation Form***

School \_\_\_\_\_ Group Name \_\_\_\_\_

CATEGORY		Points Possible	Points Given	Notes
<b>Project Vision</b>		4		
<b>Portfolio</b>		8		
<b>Daily Job Log</b>				
	Neatness	2		
	Content	4		
<b>Drawings</b>				
	Floor plan	15		
	Front elevation	7		
	Rear elevation	0		
	Left elevation	0		
	Right elevation	0		
<b>Project Cost</b>				
	Mathematical accuracy	2		
	Accurate per floor plan	2		
<b>Career Report</b>				
	Neatness	2		
	Contains one career/job title	2		
	Content	4		
<b>Project Report</b>				
	Neatness	2		
	Originality	2		
	Content	4		
<b>Project Model</b>				
	Construction	25		
	Follows floor plan and views	5		
	Detail	10		
<b>Bonus Points (max of 10)</b>		0		
<b>TOTAL (without bonus points)</b>		<b>100</b>		
<b>Evaluator's (name)</b>				

## ***ADA (Americans with Disabilities Act) Requirements***

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Visit the ADA Web site <<http://www.ada.gov>> and click-on "[ADA Standards for Accessible Design](#)."

### **4.1.2 Accessible Sites and Exterior Facilities: New Construction**

- Ground Surface
- Parking
- Site Toilet Facility
- Signage
- Passenger Loading Zone

### **4.1.3 Accessible Buildings: New Construction**

- Entries and Egress
- Accessible Route
- Ground and Floor Surfaces
- Toilet Facilities
- Telephones
- Shelves and Displays
- Controls/Switches
- Emergency Warning System
- Signage
- Drinking Fountains
- Elevators/Ramps
- Built-In Seating/Tables
- Assembly Area
- ATM
- Dressing or Fitting Room