



Held in conjunction with the 2022 NAHB International Builders' Show

Problem Description Secondary Programs

Welcome to the 2022 NAHB Student Competition. Developed by the NAHB Student Chapters Advisory Board, the NAHB Student Competition is the highlight of the International Builders' Show (IBS) for student members. This year's problem will make for an exciting and challenging 2022 NAHB Student Competition.

The 2022 competition allows teams from Secondary Programs to compete in one of two tracks: Architecture or Construction Management. The Architecture track will follow the same rules as the traditional competition. The Construction Management track will not require a full set of working drawings but will place greater emphasis on the estimating and scheduling for a more complex problem.

The information that you will use to develop your project and presentation is listed below and can be accessed through the [NAHB Student Chapters web page](#) and selecting the corresponding competition (Secondary Architecture or Secondary Construction Management). The Rules and Guidelines document includes the sample grading summary that the judges will use to score your project and presentation. *Please read all documents thoroughly.* If you have problems viewing any of the provided items, **please contact Zach Riley at 202-266-8941/zriley@nahb.org:**

- Rules and Guidelines
- Problem Description (included in this document)
- Floor Plans – Cottage Fourplex Floorplan
- Elevation Views
- Site Plan – Highlighting Assigned Cottage Fourplex
- Specifications for the Cottage at Darby Crossing
- Cost Estimate Template
- Cost Estimate Example
- Sponsor website <https://www.kittleproperties.com>

After registering, teams that select the Construction Management (CM) track will have copies of additional drawings sent to them. These should be safeguarded and not provided to any other teams (Secondary or Associate).

Read and follow the instructions carefully, and fulfill all the required elements of the exercise. Going beyond the required elements of the exercise, while it may show initiative, may hurt the overall team score if the basic exercise is not executed well.

I. Problem

The project is located in the Town of Galloway, Ohio, in Kittle Properties' Darby Crossing Community. Your team is an

outside construction management contractor proposing to Kittle Properties to build the assigned fourplex on a pre graded lot within the Darby Crossing Community. You must develop a complete set of working drawings, a detailed cost estimate, and a complete construction schedule for the provided fourplex plan. In addition, your team will determine your overhead and percentage rate to determine your overall profit.

Teams on the Architecture track must develop a complete set of working drawings, a detailed materials and labor estimate, a complete construction schedule, and determine their total profit for the fourplex provided.

Teams on the Construction Management track will create the sketches specified below, a detailed materials and labor estimate, complete construction schedule, and determine their total profit for fourplex provided.

II. Design Criteria

The plan must allow for all items in the Specifications for the Cottage fourplex in the Darby Crossing Community. Easements and setbacks are shown on the site plan. The foundation is a 4" slab on grade with a 9" turndown on a 42" deep by 18" wide footing. The window sizes are W1 3050 SH and W3 4036 fixed. All utilities are stubbed 5' into the lot location for connection.

III. Problem Location

The project address is 6145 W. Broad St., Galloway, OH 43119. The lot is graded and the improvements are complete (streets, curb and gutter, and utilities to lot).

IV. Applicable Building Codes

The plans shall be prepared to meet applicable building codes for the City of Columbus (unincorporated community of Galloway, Prairie Township) and the State of Ohio.

V. Specifications and Finish Schedules (See Specifications provided)

VI. Deliverables

A. Drawings

1. Architecture Track

Each team must produce a complete set of working drawings which are sufficient to allow a building permit to be obtained. **Your team should not change the shape of the home or the size and layout of rooms. Points will be deducted if these are altered.**

Working drawings shall include the following:

- Cover Sheet
- Site Plan showing location of the Fourplex
- Foundation Plan(s) and Details
- Floor Plan(s) and Framing Details
- Elevations
- Area calculations for heated and non-heated floor space under roof
- Roof Plan and Details
- Building Sections (as required)
- Drawings for Electrical, Plumbing and HVAC are **not** required.

Drawings shall be drafted using the following architectural standards:

- Sheet Title Block: Title block design shall be the same for each sheet, and include the school name, address, phone number, drawn by, checked by, revision space, sheet number, date drawn, date checked, sheet name and plan name.
- Sheet Size 22x34: Ensure that if judges print 11x17 (HALF SIZE) copies of the plans, they print out to exactly one-half scale
- Dimensioning shall be consistent with industry practice
- Dimension and Annotation text height shall be 1/8" (minimum). Text on half-size drawings must be readable by judges
- Floor plans shall be drawn to a scale of 1/4" = 1'-0"
- Details shall be drawn to show complete information. Consider 1" = 1'-0" a minimum scale
- Do not dimension in increments less than 1/4" (except diagonal or squaring dimensions)

2. Construction Management Track

Each team must produce sketches and drawings to assist in developing the estimate, and documenting the quantities. **Your team should not change the shape or room configuration of the fourplex. Points will be deducted if these are altered.**

Drawings shall include the following:

- Site Plan showing the location of the home
- Exterior, Load-Bearing Wall Section from the footing to the roof describing all materials including the R-values
- Party wall section
- Window flashing detail
- Roof edge detail
- Other drawings to assist in developing and documenting the estimate, as required
- Drawings must be well organized, neat and legible. They may be drawn using a CAD program, other drawing software or by hand. Hand-drawn sketches should be created using a straight-edge and appropriate tools to ensure lines are perpendicular. Sketches should be drawn to scale with the scale indicated on the drawing.

B. Material and Labor Estimate

Each team must complete a detailed estimate of the required material and labor for their plan.

- The estimate must be market-based, i.e., adjusted to the market area.
- The estimate should include an allowance for Electrical, Plumbing and HVAC costs. This may simply be based on the square footage of the house.
- Establish your overhead and profit for the fourplex. Document your rationale. Other costs for the project include:
- Permit Fees: As required.
- Overhead and Profit:
 - Overhead = 2% of your total hard cost (budget estimate)
 - Profit = 6% of your total hard cost (budget estimate, permit fees, and general requirements)

- General Requirements: 6% of your total hard cost. Includes the following (trailer, security, general labor, misc. supplies, travel, etc.)
- What is your overall profit? (Total Overhead + Profit)
- The estimate will be judged on clarity, accuracy, and overall conclusion. Provide sufficient detail so that judges can check your calculations. For example, Framing Material should be listed by size, length and unit cost of each piece of lumber. List assumptions in the notes section of the estimate template.
- The estimate must be completed using sheets from the file *2022 NAHB Secondary Estimating Template.xlsx*. This is just a template and teams are expected to edit it as they see fit. Teams list individual items under each activity, then enter the quantity, units, unit price for labor, material, and total for each item. Add lines as needed for additional items and unit type for the quantities. Sum the total for each category and activity and the overall total for the project.
- Format the sheets with page breaks or blank rows before printing to provide a well- organized copy for the judges. All columns must print on one sheet. Each sheet MUST include the team/school name and page number. Some items listed in the template may only apply to the Construction Management track problem; Architecture track teams can ignore these.
- One page from an Example Estimate is provided. The items, quantities and prices used in the example are not related to the competition problem.
- Each team must justify that the quantities and pricing are reasonable for the problem. Document the sources used for this justification.

C. Construction Schedule

- Each team must produce a complete construction time schedule for the project showing a logical construction sequence (i.e., footings before trusses).
- The schedule shall include activity durations and dependencies.
- The schedule will be judged on clarity, accuracy and overall conclusion.
- Each team must justify that the schedule is reasonable for the solution to the problem. Justification sources must also be documented.
- Plan for construction to begin 3/1/2022.

D. Presentation

February 7-8, 2022: The 2022 Student Competition will be conducted in a hybrid format allowing for in person presentations in Orlando, FL at the Orange County Convention Center and virtual presentations using Zoom video conferencing. The schedule of presentations will consider team preferences that were selected through your Competition Entry application at the time of team registration. It will also consider teams presenting in-person versus virtually. Every effort will be made to schedule presentations according to the stated preference, but NAHB Student Chapters cannot guarantee a particular time slot. Teams will be notified of the preliminary schedule after the competition entry deadline.

Each presentation should include description and explanation of their drawings, estimate and schedule. The presentation will be made to a panel of industry professionals, including the project sponsor, Kittle Properties. The format will be 10-minute presentation followed by questions.

The following elements shall be included in the presentation to the judges:

- Introduction of your team members and school name

- Overview of how the working drawings meet the requirements of the problem
- Overview of cost estimate
- Overview of the schedule and possible issues or problems that may come up during this project

It is highly recommended that all team members participate in the presentation and answering the judges' questions.