

# LATHROP ENGINEERING

Name: \_\_\_\_\_

## UNIT 4: HABITAT HOUSE #2

Civil Engineering & Architecture

Unit Due Date: **November 8, 2019**

Welcome to the fourth unit of *Civil Engineering & Architecture*! In this unit, you will continue to work on your Habitat for Humanity House by adding in various features and fixtures. Complete residential designs need to include plumbing plans, electrical plans, furniture, and site plans before they are totally complete. Here you'll get to investigate these different options and use Revit to complete your home design before getting final approval from your client! In the end, the expectation is that you learn the following:

- How to create a concrete foundation for your building in Revit
- How to add electrical components and annotate wiring in Revit
- How to create a simple site plan in Revit
- How to add various plumbing plans and water features in Revit
- How to plan for and calculate wastewater runoff and drainage

As we move through this unit, you are responsible for making adequate progress through the assignments, and for being done by the Unit Due Date (**November 8, 2019**). You are also responsible for completing each part before moving on to the next. Our unit is broken up into three main parts:

<b>Part 1: Foundation &amp; Electrical</b> (40 pts) Approx. 3 days	
The first part of our unit has us adding to the affordable home we began putting together last unit. Here, you'll start by adding a concrete footing to the foundation of your home. After that, you'll focus on adding some furniture to your home and planning for the electrical system in your home. You'll get to place outlets, lights, and switches to your home as you start to finalize the details of your home.	 Foundation Notes
	 Affordable Home Foundation
	 Electrical Notes
	 Affordable Home Electrical
<b>Part 2: Site, Water &amp; Plumbing</b> (40 pts) Approx. 3 days	
Next we'll look at the site the house will be built. Revit will let us make some basic landscaping decisions as well as identify the location and orientation of our structure, walkways, driveways, etc. After that we'll turn our attention to water fixtures as we furnish bathrooms and the kitchen, and plan for plumbing to run throughout the house to all the necessary locations. This will let us annotate one of the last groups of details in our home.	 Site Plan Notes
	 Affordable Home Site Plan
	 Plumbing Notes
	 Affordable Home Plumbing
<b>Part 3: Wastewater &amp; Drainage</b> (50 pts) Approx. 3 days	
Finally, we'll look at wastewater removal from the home. Our home will be attached to a city sewer system, so all we need to do is plan for the wastewater lines to leave the building. We'll also take a look at stormwater runoff and think about what other considerations must be taken into account in the design of our residential home. Before everything is totally finished up, we'll create some renderings of the home and put them together into a poster showcasing your design.	 Wastewater Notes
	 Wastewater Assignment
	 Stormwater Runoff Notes
	 Stormwater Runoff Assignment
	 Take the Unit 4 Quiz!
	 Showcase Poster



(40 pts) Approx. 3 days

This unit is all about finishing up some of the details and utility-specific systems in our Habitat for Humanity house. This part of the unit will start with a focus on different kinds of foundations used in residential design, as well as the creation of a foundation on your own Habitat for Humanity House. After that, you'll turn your attention to furniture and components related to the electrical system. This means that you'll get to plan and add wall outlets, light fixtures, and switches to your design.



1. Start by watching the two presentations *Residential Foundations* and *Foundations in Revit*. Take a full page of notes on these ideas, and be sure to add to those notes as you keep designing and building in Revit.
2. Next, use the information provided to add a concrete footer and concrete pad to your Habitat for Humanity House.
3. Return to the class website and watch the videos *Planning for Electrical* and *Electrical in Revit*. Take another page of notes on these ideas, including information about the different components available in Revit for various electrical fixtures. Also make sure you learn how to make annotations on your floorplan to represent the wiring in the house.
4. Now, add furniture and fixtures to your design to meet the electrical needs of the home. Make sure that you add at least the following components (likely in the following order):
  - a. Wall outlets
  - b. Wall-mounted light fixtures
  - c. Ceiling-mounted light fixtures
  - d. Lamps & any corresponding tables
  - e. TVs, refrigerators, or any other electrical devices
  - f. Finally, all the wiring for the house as a proper annotation

Part 1: Tasks	5 points	4-3 points	2-1-0 points
Foundation Notes	+ You took a full page of notes on the ideas presented in the <i>Residential Foundations</i> and <i>Foundations in Revit</i>	- Your notes are less than a page or missing important information	- Your notes are severely lacking
	<b>15-10 points</b>	<b>9-5 points</b>	<b>4-0 points</b>
Affordable Home Foundation	+ You added a concrete footer to your Habitat for Humanity house + Your footer matches the parameters	- Your footer does not match the parameters from the video	- Your footer is missing
	<b>5 points</b>	<b>4-3 points</b>	<b>2-1-0 points</b>
Electrical Notes	+ You took a full page of notes on the ideas presented in the <i>Planning for Electrical</i> and <i>Electrical in Revit</i>	- Your notes are less than a page or missing important information	- Your notes are severely lacking
	<b>15-10 points</b>	<b>9-5 points</b>	<b>4-0 points</b>
Affordable Home Electrical	+ You added all the appropriate electrical fixtures to your home + You annotated all the wiring needed in your home	- Your wiring is incomplete	- Your wiring is missing



(40 pts) Approx. 3 days

The second part of our unit turns our attention to site planning and water needs for our Habitat Home. The first job will be understanding what needs to be considered when planning out the site and landscaping for a residential construction. Then, you'll get to actually design that in Revit for your Habitat for Humanity home. After that, you'll get to look at plumbing needs and how to add plumbing fixtures into your Revit design. You'll also use annotations to design the flow of water into your Habitat for Humanity house.

1. The first thing to do is watch the three presentations on site planning: *Site Plan Considerations*, *Site Plan Requirements*, and *Site Plans in Revit*. Take a full page of notes on these ideas and think about how these concepts will impact your Habitat for Humanity design.
2. Then, following the procedure presented in the video, use the downloadable site plan from our website to complete the site plan for your Habitat for Humanity Home. As you do this, consider adding the following elements:
  - a. Walkways & Driveways
  - b. Patios & Decks
  - c. Trees, Bushes & Landscaping
3. Next, watch the three videos on plumbing concepts: *Water Supply*, *Plumbing*, and *Plumbing Plans in Revit*. Take a full page of notes on these ideas.
4. Finally, add the furniture and plumbing fixtures necessary to complete your bathrooms and kitchens. Plan properly for the following items:
  - a. Toilets, sinks, bathtubs, showers
  - b. Sinks, refrigerators, garbage disposals
5. Then, use the annotation tool as shown in the *Plumbing Plans in Revit* presentation to plan out where the incoming water pipes should go throughout your house.

<b>Part 2: Tasks</b>	<b>5 points</b>	<b>4-3 points</b>	<b>2-1-0 points</b>
 <b>Site Planning Notes</b>	+ You took a full page of notes on the ideas presented in the three different Site Planning presentations	- Your notes are less than a page or missing important information	- Your notes are severely lacking
	<b>15-10 points</b>	<b>9-5 points</b>	<b>4-0 points</b>
 <b>Affordable Home Site Planning</b>	+ You created a site plan for your Habitat for Humanity House + You used the downloadable site plan to start your site plan work.	- Your site plan does not have much detail	- Your site plan is missing many/most elements
	<b>5 points</b>	<b>4-3 points</b>	<b>2-1-0 points</b>
 <b>Plumbing Notes</b>	+ You took a full page of notes on the ideas presented in the <i>Water Supply</i> , <i>Plumbing</i> , and <i>Plumbing Plans in Revit</i> presentations	- Your notes are less than a page or missing important information	- Your notes are severely lacking
	<b>15-10 points</b>	<b>9-5 points</b>	<b>4-0 points</b>
 <b>Affordable Home Plumbing</b>	+ You added all the appropriate plumbing fixtures to your home + You annotated all the plumbing needed in your home	- Your plumbing is incomplete	- Your plumbing is missing



(50 pts) Approx. 3 days

The final part of our unit wraps up the Habitat for Humanity design project by looking at wastewater and stormwater drainage before making some nice renderings of your home to display in a poster. The first thing you'll need to do is take some notes on wastewater before completing the *Wastewater Assignment* and adding wastewater (sewer) lines to your Habitat for Humanity home. Next, you'll look at stormwater runoff; you'll complete the *Stormwater Runoff Assignment* before calculating the runoff for your own residential design. To show off your hard work, you'll finish the project by making some nice renderings of your home and completing a poster of your design for display.

1. Start by watching the *Wastewater* presentation and taking a page of notes on the ideas. In particular, make sure you get some clear notes on how to calculate the slope of a home's wastewater sewer line.
2. Next, get the *Wastewater Assignment* and complete it. Make sure to record your work and calculations in your engineering notebook.
3. Take some time to return to your Revit design and annotate the wastewater sewer line on your site plan. This annotation doesn't need to be perfect, but should illustrate the length of pipe defined by your calculations in the assignment.
4. Next, watch the *Storm Water Runoff* presentation and take a page of notes. Make sure that your notes include information on how to approximate the areas of stormwater runoff, as well as the volume of water that needs to be accounted for.
5. Get the *Stormwater Runoff Assignment* and complete it. Be sure to copy the essential calculations into your engineering notebook.
6. Create at least four (4) 3D renderings of your Habitat for Humanity house. Choose renderings that showcase the main areas and views of the house. Give the house a title, and create a poster (20"x30") in Photoshop to showcase the house.

Part 3: Tasks	5 points	4-3 points	2-1-0 points
 Wastewater Notes	+ You took a full page of notes on the <i>Wastewater</i> presentation.	- Your notes are less than a page or missing important information	- Your notes are severely lacking
	<b>10-8 points</b>	<b>7-4 points</b>	<b>3-0 points</b>
 Wastewater Assignment	+ You completed the <i>Wastewater Assignment</i> , including parts that needed to be recorded in your notebook. + You added your sewer line annotation to your Revit design	- You did not complete all the parts of the <i>Wastewater Assignment</i> - You did not add your sewer line to your Revit design	- You did not finish your <i>Wastewater Assignment</i> - Your assignment is missing
	<b>5 points</b>	<b>4-3 points</b>	<b>2-1-0 points</b>
 Stormwater Runoff Notes	+ You took a full page of notes on the <i>Wastewater</i> presentation.	- Your notes are less than a page or missing important information	- Your notes are severely lacking
	<b>10-8 points</b>	<b>7-4 points</b>	<b>3-0 points</b>
 Affordable Home Stormwater Runoff	+ You completed the <i>Stormwater Runoff Assignment</i> , including parts that needed to be recorded in your notebook.	- You did not complete all the parts of the <i>Stormwater Runoff Assignment</i>	- You did not finish your <i>Stormwater Runoff Assignment</i>
	<b>5 points</b>	<b>4-3 points</b>	<b>2-1-0 points</b>
 Showcase Poster	+ You created a 20" x 30" poster in Photoshop illustrating your house + You included at least 4 3D renderings in your poster	- Your poster has fewer than 4 renderings - Your poster does not show much detail	- Your poster is missing
	<b>5 points</b>	<b>4-3 points</b>	<b>2-1-0 points</b>
 Take the Unit 4 Quiz!	+ You took the Unit 4 Quiz before the due date + Your grade is based on the number correct	N/A	- You did not take the Unit 4 Quiz by the due date

