



**Work-Based Learning Project  
Surf View Village  
Newport, OR**

**Industry Overview**

Even as our world becomes more and more connected with technology, we need roads, highways, and parking areas to get around and to deliver goods and services. Everything in our homes – from the food to the materials used in the building – at some point traveled over a road and highway to get to where it is.

Everyone uses roads, highways and parking lots, but few people think about how they were built or who built them. That’s where the asphalt pavement industry comes in. The asphalt pavement industry employs thousands of workers in every state and uses large and complex equipment to build our pavements. The industry employs:

- **Civil Engineers:** Among other things, civil engineers design and oversee the construction of roads, bridges, buildings, and water and wastewater systems.
- **Estimators:** Every construction company has at least one estimator who determines how much it will cost to complete a project.
- **Managers:** Construction managers run the day-to-day activities on a construction project. Some consider the “project manager” to have one of the most exciting jobs on the construction team because they are constantly dealing with changing conditions.
- **Field Crew Workers & Equipment Operators:** Although people sometimes think field crew workers are the lowest level workers in a construction company, field crew workers often earn more than \$40 per hour and have high job satisfaction.
- **Field Supervisors:** Every team needs a leader, just like the “captains” for sports teams. Supervisors ensure that everyone is safe and performing in their roles.
- **Marketing Staff:** They answer the question – why should I hire your company?
- **Business Development Specialists:** Companies want to be sure they are prepared for the future and these specialists forecast where the needs will be and predict how the company can prepare to meet those needs.
- **Accountants:** Companies have income (payments from customers) and expenses (payments for paychecks, equipment purchases, taxes, vehicles, and other things). Accountants ensure that the right amount comes in and goes out. It may sound easy, but it’s not.
- **Human Resources Professionals:** People are the industry’s greatest asset (compare that to a software or manufacturing company where computers and equipment may be the primary asset). Human resources professionals select the team members and ensure that the other employees have the tools they need.
- **Safety Experts:** Safety experts review work practices, create policies, lead trainings, are a sounding board for issues, and advocate for safer work zones.
- **Laboratory Workers:** Highway, road, and bridge construction requires materials such as asphalt pavement and concrete. Those materials are made from large rocks broken into smaller rocks (aggregates) and binders that hold the aggregates together. The ingredients are mixed together at plants that need to be located close to project locations. Because there is variation in the ingredients, the materials and the resulting asphalt pavement or concrete must be tested while it is being made, which is done in on-site laboratories.

## **Work-Based Learning Project**

### **Surf View Village Project Information & Problem Statement**

**Project Overview:** This project introduces students to real-life transportation and construction issues that matter to local communities. Students will prepare a written and oral proposal for a project that will include a proposed price, project timeframe, communications plan, and marketing plan, modeling those done by actual construction companies. Proposals will be evaluated for accuracy, creativity, and communication effectiveness.

#### **Necessary skills:**

- Collaboration/Coordination
- Mathematics
- Analysis Mindset
- Creativity
- Entrepreneurial Mindset
- Written and Oral Communication
- Time Management

#### **General Proposal Requirements:**

- To **determine the cost of the work**, students will need to read plans and perform calculations that require an understanding of geometry, the relationship between area and volume, and how to convert units.
- To **prepare a schedule**, students must consider the available workers and equipment, the length of shifts, and determine the amount of work that can be done in a shift to the total amount of work that needs to be completed.
- Student Project Teams must also develop a **Communications Plan** to inform neighbors and the surrounding community about the project, which should address expectations about interference with neighboring businesses, delays, detours, and other community considerations.
- Student Project Teams should also create a **Marketing Plan** to highlight why they believe the owner or client should select their company over other companies.

**Problem Statement:** Surf View Village in Newport, Oregon is accepting proposals to construct the parking and transportation facilities for its development (see below) (“Project”). The Project includes reconstructing an abutting street and connecting to the Oregon Coast Highway. Proposals must address the following:

- (1) Propose a price to complete the asphalt pavement and concrete work for the parking areas, walkways, bus stop, concrete pads, and the abutting asphalt pavement street.
- (2) Propose a schedule specifying the time necessary to complete the work.
- (3) Propose a communications plan that will be used to inform neighbors and the surrounding community about the project.
- (4) Provide a marketing plan and an explanation of why the owner should select your team.

Proposals should be submitted in writing and include a cover page, table of contents, and separate sections for each of the sections described above. Teams should also prepare an oral presentation to be presented to the owner, which should include PowerPoint slides or the equivalent.

## **Detailed Project Information & Proposal Requirements**

### **(1) Materials Cost**

Asphalt Pavement: Teams should use their geometric knowledge to calculate each section's area and the volume of asphalt pavement needed to complete the work. Proposals should identify the price for each area of work.

- The asphalt pavement for the walkways must be at least 2 inches thick,
- 4 inches thick for the parking areas, and
- 5 inches thick for the roadway.

The local asphalt pavement producer makes asphalt with a unit weight of 145 pounds per cubic foot, and sells it for \$75 per ton. The producer is 15 miles from the project site and the truck cycle time (loading, travel to project, delivering load, and travel back to plant) is about 1 hour. The trucking cost is \$100 per hour per truck.

Concrete: Teams should use their geometric knowledge to calculate each section's area and the volume of concrete needed to complete the work. Proposals should identify the price for each area of work

- The concrete for the walkways and the patio must be 4 inches thick.
- The concrete at the bus stop and dumpster pad must be 6 inches thick.

The local concrete producer sells concrete for \$125 per cubic yard. The producer is also 15 miles from the project site and the truck cycle time (loading, travel to project, delivering load, and travel back to plant) is about 1 hour. The trucking cost is \$100 per hour per truck.

See the Materials Quantity and Price Worksheet for additional information on quantities and pricing.

### **(2) Schedule and Field Crew Costs**

Scheduling requires creativity. Teams should:

- 1) determine the work tasks and select the order in which they propose to perform the work tasks;
- 2) calculate the amount of time each work task will take to complete;
- 3) consider how shift length and trucking availability affect the work task durations;
- 4) consider if any of the work tasks can be performed concurrently or if they should be performed independently of other work tasks; and
- 5) create a bar chart schedule that shows the major tasks and the overall Project duration.

Scheduling programs available from Microsoft, Google, and other platforms are particularly helpful.

Available shift lengths are: 8 hours; 10 hours; and 12 hours. Labor and equipment costs for the paving crew total \$610 per hour for regular time and \$750 per hour for overtime. Overtime must be paid for all hours over 40 in a week. Labor and equipment costs for the concrete crew total \$300 per hour for regular time and \$450 per hour for overtime.

The following shift production factors apply to the asphalt pavement work:

- Starting Prep and Cleanup: After a shift starts, it takes about 1.5 hours to set up the work zone before the paver starts and 1 hour to put everything away and adjust fencing and signs at the end of a shift (for example, for an 8-hour shift, the paver will be paving for about 5.5 hours).
- Paver Production: When paving, the paving crew can place about 45 tons per hour for walkways and parking areas, and about 200 tons per hour for streets.

The following shift production factors apply to the concrete work:

- Starting Prep and Cleanup: After a shift starts, it takes about 0.5 hours to set up the work zone and 1 hour to put everything away and adjust fencing and signs at the end of a shift.
- Production: When placing concrete, the concrete crew can place about 20 cubic yards per hour.

### **(3) Communications Plan**

Communications are essential to every construction project. The Communications Plan should include

- A mission statement for the project team/company that describes the team's approach to this Project and possible future projects.
- A general explanation of the plan to inform neighbors and the surrounding community about the Project and what they should expect with respect to delays, detours, and any other important considerations.
- To what extent, if any, the Project Team will provide a forum (e.g., an open house) to explain the Project to neighbors and the local community before starting work. If the Project Team intends to provide such a forum, the Team should explain how it will be organized, where it will occur, and how it intends to respond to questions and suggestions.
- Examples of any written letters and/or emails that would be used.
- Descriptions of any oral communications (e.g., phone conversations or face-to-face visits) that would be used.
- Descriptions of how questions and concerns will be addressed during construction.

### **(4) Marketing Plan**

Provide a written and oral explanation of why the owner should select your proposal. Explanations should include but not be limited to:

- A general explanation of why the owner should trust your team with the project.
- The availability of important personnel during the project.
- General team experience in successfully finishing important and complex projects.
- Specific examples of how team members have paid attention to details and demonstrated follow-through on important projects/tasks in other contexts.
- Any other considerations the project team would like the owner to consider in the selection process.