



# SKANSKA

## ASC Student Competition

Sparks, NV

February 7-9, 2019

## Open Competition: Sustainability Problem Statement

Building  
What Matters



## Introduction

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Welcome to the 2019 ASC Open Competition Problem Statement focusing on Sustainable Building.

As one of the top Contractors of sustainable construction projects, Skanska USA has strived to create projects that have minimal, if any, impacts on the environment throughout their construction and lifecycle. Utilizing the programs set forth by the U.S. Green Building Council, the International Living Future Institute, the Institute for Sustainable Infrastructure and other green certification agencies, along with forward-thinking project teams and design partners, we have sought to move farther down the path of “green building” using any and all methods available. With your help and participation in this problem statement, we hope that you will gain understanding and appreciation of the green building methods that the construction industry can employ in our day-to-day operations. More than that, we hope that you will look to implement these ideas into your daily lives outside the workplace.

**No matter what you build, it can be built green**



**SKANSKA**

## Schedule

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The problem statement schedule is as follows:

- **Friday, January 18<sup>th</sup>, 2019**

- 2:00 p.m. – Pre-qualification submittal delivered to Skanska

- **Thursday, February 7<sup>th</sup>, 2019**

- 6:30 - 6:45 a.m. - Sustainable Building Problem Overview
- 6:45 a.m. - 8:59 p.m. - Preparation of written Problem Statement responses.
  
- 9:00 a.m. – RFI Session #1
- 2:00 p.m. – RFI Session #2
- 5:00 p.m. – Final RFI's due, no RFI's will be accepted after this time.
  
- 9:00 p.m. – Written responses to Problem Statement and documentation due.

- **Friday, February 8<sup>th</sup>, 2019**

- 6:00 a.m. - Turn in all oral presentation materials including handouts, electronic presentation media and other materials to specified room.
- 6:05 a.m. – Presentation of Oral Presentation Schedule.
- 8:00 a.m. - 5:00 p.m. - Oral presentations. (50 minutes each)
  - 5 minutes setup,
  - 30 minute presentation,
  - 10 minutes of feedback
  - 5 minute breakdown period.
- 6:00 p.m. - Problem Statement Recap
- 7:00 p.m. to 8:30 p.m. – Hospitality Event

- **Saturday, February 9<sup>th</sup>, 2019**

- 12:15 p.m. to 1:00 pm - Awards Presentation

## Project Description

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This year's problem statement is going to look at six different sustainability values; energy, carbon, materials, waste, water, and local impacts. Student teams will evaluate these values through a variety of projects spread around the continental United States, specifically three different projects; PDX Terminal Core, the Kendeda Building at Georgia Tech, and Seattle's 2&U. Some of the projects will be looking through a rating system filter; LEED 2009, LEED v4, Living Building and some will have components not tied to a rating system requirement at all.

Teams will provide a solution to a set of problems focusing on the different values. It is the hope of the judges that students will appreciate that green building strategies can be implemented in varying project conditions and can be contractor driven rather than an owner requirement or used simply as a means to comply with a rating system.

Cheers!



## Scoring

Point scales will be assigned to several elements of the written and oral presentations.

	Possible
Prequalification Statement	5
Problem Statement 1 – Energy	12
Problem Statement 2 – Carbon	13
Problem Statement 3 – Materials	13
Problem Statement 4 – Waste	12
Problem Statement 5 – Water	13
Problem Statement 6 – Local Impacts	12
Oral Evaluation:	20
<b>Total Points</b>	<b>100</b>

Awards will be provided to the three teams scoring the most overall points; 1st Place, 2nd Place and 3rd Place. The judge's may, additionally, award a Judge's Selection award to a fourth team at their discretion.



# Rules

- Students teams must comply with ASC Competition Rules (revised 8/17/18).
- Once the kick-off meeting concludes, and until a team's oral presentation is completed, only the students identified as being team members shall be present in the team's room(s) or shall collaborate on the team's response to the problem statement. No additional person(s) may perform as a helper, runner, or assistant for any team for either the regional or open competitions. Teams will be disqualified if any team has more than 6 members participating in the process of creating a competition solution in any way. This includes food and supply runs! The use of cell phones to contact outside persons is not permitted except in an emergency or as deemed appropriate by the problem sponsor. Faculty advisor(s) may not interact with their teams once the competition has begun.
- Use of the internet is allowable and may be necessary for certain components of the problem.
- No phone calls or emails may be made to the Owner, Construction Manager, Architect, Civil, or Structural Engineer, or any other design consultants listed on the Drawings. Similarly, no components of the problem may be sent to others outside the team for assistance in completing the problem.
- A one-half (1/2) point deduction will be taken for each minute that the solution statement is turned in past the time that it is due. Solution statements are due **Thursday at 9:00pm in Southern Pacific E&F**. Other deliverable items, if applicable, will be due as specified.
- No school's team member, team coach, other faculty members, registered students, or videographers may enter the problem presentation room or view a presentation in a problem category that their school is competing in until it is their team's designated time to present within that problem category. Violation of this rule shall be cause for immediate disqualification from the competition.
- An LCD projector, screen and a computer are available for the teams to use during the oral presentations. Any additional equipment required for a presentation is the responsibility of the team. If your presentation requires specific software you must provide your own computer or inquire as to its availability on the provided computer.
- While the judges will endeavor to administer the problem with all fairness and appreciation for the team's perspectives, the decisions of the judges shall be final when deciding conflicts and scoring.

# Problem Statement Guidelines

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## Requests for Information:

The excel worksheet titled 'ASC Sustainability RFI Log Example and Instructions' has been provided as an attachment for use in submitting questions to the judges. RFIs will be asked and answered using Google Sheets. All RFI's submitted and answered will be viewable by the project team

Two question and answer periods will be scheduled during the day for informal questions, but all teams must submit written RFI's if a formal response is requested. All RFI requests received and answered will be available to all teams.

## Supplemental Information:

Some of the problems have additional supplemental information, reference materials, drawings, etc. They can be located on the student USB in labelled folders.

## Supplemental Problems:

Supplemental Problems may be provided at miscellaneous times on February 7, 2019. Supplemental Problems may be additional information about a changing condition that needs to be incorporated into a team's final solution statement. A Supplemental Problem may also be requiring a response and/or solution to accompany the solution statement or may have an earlier deadline during the day. Student teams will need to make note of the conditions and requirements set forth in the individual supplemental problems issued and provide an appropriate response. Note: Supplemental Problems are not 'extra credit' and are accounted for in the total possible points related to their respective category.

A copy of all supplemental problem statements and responses should be included in the Appendix Section of the proposal and are exempt from project size restrictions.

## Solution Submission Guidelines:

In keeping with sustainable practices, all proposers will provide a "Paperless" submission. Solutions will be submitted on a flashdrive and are the only acceptable means of submitting materials. All electronic submissions must be in the form of a PDF, MS Imaging file, JPG, TIF or other electronic format. PDF is the preferred file format for submission.

Flash drives will be returned to student teams after their oral presentation.

## Format of Submission:

In addition to the requirements for electronic submission noted above, the following proposal formats must be adhered to:

1. 12-point Arial font
2. 1-1/4" border around all documents, left justified
3. Maximum submission of 25 pages, including cover page, cover letter, schedules or other documentation necessary to support your submission.

**A two (2) point deduction from the overall team score will be assessed for each page in excess of the page limit described above.**

## Project 1

**Project Title: Portland International Airport—Terminal Core**

**Project Location: Portland, OR**



Portland International Airport is planning a major renovation of the airport's central terminal. The renovation will include demolition of existing retail areas and roof, and expansion of the building an additional 150' west. Including new and renovated spaces, the project will affect 1,200,000 square feet.

The project is currently in pre-construction, and the owner and design team are relying on your firm for cost and constructability feedback to shape their design. The project has multiple sustainability goals, including reducing energy use, incorporating renewable energy, and lowering associated carbon emissions.

**Problem #1: Energy (12 possible points)**

**Problem #2: Carbon (13 possible points)**





## **Problem Statement 1: Energy**

12 Possible Points

**Project Title: Portland International Airport—Terminal Core**

**Project Location: Portland, OR**

The project has total construction budget of \$900 million. Because public funds will be spent, the port must spend 1.5% of construction cost on renewable energy. The total renewable energy budget is \$13.5 million. The owner is considering three options for spending that money:

1. Rooftop PV – Rooftop PV is the most common type of on-site renewable generation. Due to concerns about glare on PV panels affecting air traffic, only the areas indicated on drawings A0.261 and A.0262 in Attachment A are suitable for rooftop PV.
2. Ground mounted PV – The Port of Portland controls two additional offsite properties, and installing ground-mounted PV panels in these areas would be an acceptable way to meet the 1.5% for solar requirement. Ground mounted panels can be installed in either area shown in “Ground Mounted Site” plans in the supplementary materials. This PV would connect back into the electrical grid. Fewer electrical contractors can perform the infrastructure upgrades as compared to a rooftop PV installation. Electricity generated by this ground-mounted PV would not be directly used at the airport – instead it would be sold back to the utility at the wholesale power rate.
3. Building integrated PV Curtain Wall – PV Curtain Walls use a window film applied to an insulated glazing unit and integrated electronic components to generate electricity while still allowing light through a curtain wall. These curtain wall products have a tinted appearance from a distance, and from close-up the silicon cells are visible. They can be used to add renewable generating capability to a building when other areas are limited. At PDX, PV curtain wall is being considered to replace curtain wall types CW1 and CW2 on the west elevations shown in details 2-A3.103, 1-A3.104 and 2-A3-.104 . Please note that plan West faces north west, with azimuth of 300 degrees.

A solar subcontractor has provided you some information about each type of PV product. Differences between the three options are presented in “PV Technology Comparison” in the supplementary materials.

The design team has asked for your assistance on a strategy that delivers the most value to the client, which could include a combination of different technologies.

For your solution, identify where you will locate enough PV to meet the 1.5% spend requirement, the total amount of installed (both number of panels and system kW), the total amount in kWh and value in \$ of electricity produced, and any risks or benefits associated with your selected strategy. Provide marked-up plans where needed to illustrate your proposed solution.

See included supplemental information contained on student USB for additional material needed to complete the problem.



## Problem Statement 2: Carbon

13 Possible Points

**Project Title: Portland International Airport—Terminal Core**

**Project Location: Portland, OR**

See included supplemental information contained on student USB for additional material needed to complete the problem.

### **Part I. Calculate Embodied Carbon Baseline**

#### **A. Carbon Associated with Building Materials**

The owner is asking for your assistance in setting the embodied carbon baseline for your project. Using a quantities of building materials prepared by your estimating group and a list of material carbon coefficients from your green building team (see supplementary documents “2019 PDX Estimate Quantities” and “2019 Carbon Coefficients”), create a baseline carbon footprint for the building materials used in your project. Identify the total carbon emissions associated with the building materials for the project in tons of CO<sub>2</sub> as well as a graph or chart showing the breakdown between different building materials, and identify the gaps in the data where your green building team has not offered carbon coefficients.

#### **B. Carbon Associated with Worker Transportation**

The owner is also interested in carbon emissions due to worker commuting and wants to include this in the embodied carbon baseline. There are 1,000 craft workers onsite for the duration of the PDX T-Core Project, working 5 days per week. Their commuting distance, duration of work and means of transportation are provided in the supplementary excel document titled “Carbon Problem – Excel Supplementary Information”.

- The average gas fueled vehicle gets 24.3 MPG.
- The average Hybrid Electric Vehicle gets 44.4 MPG.
- There are 23.5 lbs CO<sub>2</sub> emitted / gallon of gasoline burned.
- Assume the average carpool size is 2.17 passengers in an average gas fueled vehicle.
- Public transportation results in 60% less carbon emissions than the average gas fueled vehicle.
- Typical energy consumption for biking is 42.3 kcal/mile, with the average American diet producing 2.6 g CO<sub>2</sub>e\*/kcal. (CO<sub>2</sub>e stands for CO<sub>2</sub> equivalent)

1. Calculate the emission factor (pounds of CO<sub>2</sub> emitted/passenger mile) associated with each transportation type based on the given assumptions, rounding to the nearest thousandths.

<b>Means of Transportation</b>	Single Occupant Vehicle	Hybrid Electric Vehicle	Multiple Occupant Vehicle	Public Transportation	Bicycle
<b>Emission Factor (lbs CO<sub>2</sub>/ passenger mile)</b>					

## **Problem Statement 2: Carbon (continued)**

### 13 Possible Points

2. Using the rounded emission factors calculated above, fill out the Dataset from tab 1 of the excel document and complete the Summary Table from tab 2, providing a breakdown based on means of transportation for count of worker, average commute distance, total miles traveled, emission factor, and total CO2 emissions (in tons), percentage of total trips and percentage of total emissions.

## **Part II. Analysis of Embodied Carbon Reduction Strategies**

### **A. Material Optimization Strategies:**

The design team has identified three potential ways for reducing embodied carbon associated with the project materials. The three options are:

#### **1. Using salvaged metal piles.**

The project's structural design includes 862 metal pipe piles. A project consultant has proposed using decommissioned oil pipeline piping instead of new material to reduce embodied carbon. Under the project's carbon accounting method, the carbon emissions related to the salvaged pile would be treated as zero.

	New Pile	Salvaged Pile
Cost Per Pile (material only)	\$19,687	\$9,843
Amount of Steel Per Pile (lbs)	5,300	5,300

#### **For Option 1:**

Provide an estimate of the cost impact and carbon reduction potential (in tons of CO2 avoided and as a percentage of the baseline materials embodied carbon) of using decommissioned oil pipeline.

Provide the owner with a preliminary procurement plan that outlines who would be responsible for finding potential suppliers, the time required for procurement of salvaged material versus new material, how quality assurance could be maintained while using salvaged materials, and any other relevant factors for the owner to consider. Compare the risks and benefits to using new high recycled-content steel piles, which are widely available at a 15% cost premium.

#### **2. Using a hybrid timber/steel roof structure.**

As a carbon reduction strategy, the project is planning on using 1.5 million board feet (126,000 cubic yards) of glulam beams. The project would like to source the wood as close to the project site as possible. There are three potential suppliers. These suppliers have provided preliminary pricing.

## **Problem Statement 2: Carbon (continued)**

13 Possible Points

### **Canadian Glulam Manufacturer**

350 miles from job site

All wood sourced from British Columbia (within 450 miles per project)

Meets Canadian Government Forest Management Standards

Preliminary pricing (material only): \$13 million

### **Oregon Glulam Manufacturer**

71 miles from job site

All wood sourced within 100 miles of project

Not FSC - Managed to Oregon Forest Practices Act

Preliminary pricing (material only): \$12.2 million

### **Washington Glulam Manufacturer**

120 miles from job site

All wood sourced within 250 miles of project

Can provide FSC Mix Credit wood

Preliminary pricing (material only): \$15 million for FSC Mix Credit wood, \$12 million for standard

Note: Assume all suppliers use diesel trucks (2.5 lbs CO<sub>2</sub>/mile) to deliver one 1,200 cubic foot load of glulam beams.

Present the owner with the cost and transportation carbon impacts of each option. Given the projects goals for carbon reduction, give the owner your recommendation on whether FSC wood offers any advantages over the other sourcing options. The project may also pursue LEED v4 certification, so identify the impacts on relevant credits, given an expected LEED materials cost of \$405 million, with \$162 million of that qualifying as structure and enclosure.



## **Problem Statement 2: Carbon (continued)**

13 Possible Points

### **3. Using optimized concrete mixes.**

Local concrete suppliers have provided information on the embodied carbon associated with different concrete mix designs (see supplementary document “2019 Alternate Concrete Mixes”). Based on the following concrete uses on the project, identify which if any of these mixes could be incorporated into the project.

<b>Application</b>	<b>Minimum Required Strength (psi)</b>
Footings/Foundations	8,000
Slab on Grade	8,000
Shear Walls	6,000
Slab on Metal Deck	3,000

Using the provided information above and the quantities from Part I.A, provide the owner with a comparison of both the lowest carbon and lowest cost combination of mixes. Clearly identify the potential carbon savings in total tons of CO<sub>2</sub> and as a percentage reduction of the baseline carbon associated with concrete identified in Part I.A.

### **B. Transportation Strategies**

In an effort to reduce transportation related carbon emissions, Skanska is investigating incentives to increase public transportation use for commuters. The PDX airport is part of the Metropolitan Area Express (MAX) Light Rail System, connecting neighboring cities of Gresham, Milwaukie, Beaverton and Hillsboro. MAX stops are easily accessed by TriMet buses or Portland streetcars. For \$100 a month, riders can get unlimited access to the Max, TriMet and streetcars.

1. What percentage of regular car commuters would need to transfer to transit based commuting to achieve a 30% reduction in transportation emissions?
2. What would the total cost of this incentive be over the lifetime of the project? What is the cost per ton of CO<sub>2</sub> reduced?
3. What other incentives could be given to encourage other lower impact transportation methods? What would the total cost and carbon reduction of these incentives be?
4. Beyond carbon impact, what risks or benefits could these incentives provide?

### **Part III: Analysis and Strategies for Carbon Reduction**

1. For each strategy evaluated in Part II, identify the cost of carbon reduction (in \$ / ton of CO<sub>2</sub>).
2. What package of embodied carbon reduction strategies would you recommend? Defend your proposed solution in terms of ability to meet owner goal, total cost, effectiveness, impact on schedule and productivity, and any other factors you deem relevant.
3. Provide qualitative insights on the total amount of embodied carbon generated and averted by reduction strategies, providing sources for any complementary statistics used. This should provide context to the scale of construction related emissions on this project compared to other emission sources and industries.

## Project 2

**Project Title: Georgia Tech, Kendeda Building for Innovative Sustainable Design**

**Project Location: Atlanta, GA**

Georgia Institute of Technology is developing a new facility that meets the Living Building Challenge to exhibit the viability of a net positive, urban and sustainable building in the Southeast. The Georgia Tech project is the first building in the Deep South seeking full Living Building Challenge certification to reach the design development phase.

At nearly 42,000 square feet, it's also one of the larger and more complex projects yet seeking full certification under the Living Building Challenge.

It is expected to become the most environmentally advanced education and research building ever constructed in the Southeast.

The building is expected to be completed in the first half of 2019.



**Problem #3: Material (13 possible points)**

**Problem #4: Waste (12 possible points)**



## Problem Statement 3: Materials

13 Possible Points

**Project Title: Georgia Tech, Kendeda Building for Innovative Sustainable Design**

**Project Location: Atlanta, GA**

You are the project team selected to build The Living Building @ Georgia Tech. Currently, the design team is wrapping up the Construction Documents to submit for permits. The estimating team has begun compiling the GMP. You are beginning to plan for construction—putting together the materials procurement plan and fine-tuning the schedule. We've provided you with the majority of the information, though additional reports—CSRs, EPDs, etc.—can be found online. **Part 1 must be submitted to Skanska's Google Drive no later than 1500.** Any late answers will carry a budget penalty. Note: for all submitted files, be sure to include school's name in the document (either in the filename or on the first page are acceptable).

### Part 1

1. First, you need access to the Google Drive folder the Problem Statement Team has set up for your team. Send an email to [skanska.asc@gmail.com](mailto:skanska.asc@gmail.com) an email address for your team that has Google Drive and Sheets access. Problems uploading will not be an acceptable excuse for late submissions.
2. In the "Materials Problem Submission Package" spreadsheet, use the Unit Prices tab to calculate your Concrete budget based on the quantities provided. The Budget should be incorporated into the Procurement Summary tab along with your selected subcontractors and their respective quotes.
3. Create a scoring matrix that you will use for selecting materials and enter it into the Procurement Estimate tab. Your team should include sustainability requirements in this matrix, see #4 below. This matrix will serve as backup for the product selections you choose for your materials procurement plan.
4. Create a materials procurement plan from the template you are given. Your team will select materials from the documents provided and include the appropriate information in your plan. The following are your sustainability requirements, provide the documentation with your submission package.
  - a. Comply with Red List (Imperative 10) and CDPH Standard Method v1.1 (Imperative 8)
  - b. 25% by cost are sourced within 500km\*
  - c. 3 Environmental Product Declarations (EPD)
  - d. 1 Declare product
  - e. 1 Corporate Sustainability Report (CSR)
  - f. \*For sourcing calculations, use the USGBC default of 45% to calculate the percentage of materials cost from sub quotes. For example, if a sub's quote is \$50,000, you would calculate the cost of materials to be \$22,500.



### **Problem Statement 3: Materials (continued)**

13 Possible Points

5. Develop your materials budget based on your procurement selections. Identify which area of procurement is most at risk of non-compliance and which area is most at risk of exceeding your allotted budget. Evaluate how much you are over or under budget and how you plan to recover or redistribute these funds.
6. If you are unable to maintain compliance with any LBC requirements provide a written exemption request, stating which requirements you are not in compliance with and the detailed strategy in which you plan to follow for this alternative approach. Outline what cost and schedule impacts are associated with this alternative strategy, keeping in mind this alternative may count against your final evaluation.

See included supplemental information contained on student USB for additional material needed to complete the problem.

Included Resources:

- 03 CIP Concrete – 3 files
- 05 Structural Steel – 5 files
- 06 Wood Structure – 4 files
- 07 Insulation – 3 files
- 09A Drywall – 6 files
- 09B Ceiling – 3 files
- 09C Interior Paint – 5 files
- 26A PV Inverter – 4 files
- 26B PV Battery – 2 files
- LBC Materials Petal Handbook and Healthy Interior Environment Imperative
- LEED v4 Building Product Disclosure Credits – EPD and Sourcing





## Problem Statement 4: Waste

12 Possible Points

**Project Title: Georgia Tech, Kendeda Building for Innovative Sustainable Design**  
**Project Location: Atlanta, GA**

You are on the project team selected to build The Living Building @ Georgia Tech (reference the Materials problem statement). The 47,000 sq. foot project is pursuing full Living Building Challenge (LBC) certification. The client also wants to explore LEED v4 BD+C certification. Georgia Tech has asked the project team to prepare the required plan for LEED and include relevant costs to meet the requirements for both rating systems in the budget.

1. **Waste Management planning:** Create a construction and demolition waste management plan that meets the requirements for the Construction and Demolition Waste Management Planning prerequisite in LEED v4 BD+C. Reference the template Waste Management Plan and the “Waste Estimate” tab of the “Materials Problem Submission Package” Excel file provided to the team.
  - a. Identify at least 5 material streams targeted for diversion. Assume that if the material is targeted for diversion, 100% of the waste for that material type will be diverted from landfill.
  - b. Estimate the total weight of each material stream
  - c. **\*Note:** reference the “Waste Estimate” tab of the submission package file for material quantities and waste % assumptions
  - d. **Hint:** reference the volume-to-weight conversion factors file provided to determine the weight of materials as needed.
  - e. Estimate the total waste and diversion rate for the project duration for both LEED v4 and LBC. Complete this on the excel file titled “Waste Summary for LEED v4 and LBC- Tab 1.” Copy the LEED specific information to the template Waste Management Plan and enter in the appropriate location.
  - f. **Note:** Remember to consider the requirements for both rating systems.
  - g. Complete all highlighted fields on the Template Waste Management Plan, referring to #2 below in order to complete the facility destinations.



## **Problem Statement 4: Waste (cont'd)**

12 Possible Points

**Project Title: Georgia Tech, Kendeda Building for Innovative Sustainable Design**

**Project Location: Atlanta, GA**

2. Based on the answer for #1 a-d above, optimize the cost for waste hauling services while meeting LEED v4 and LBC requirements and select a waste hauler for the project. Provide an explanation for your choices, and indicate the type and number of dedicated bins the project will need throughout the duration. Complete the final cost calculations on the Excel file titled "Waste Summary for LEED v4 and LBC- Tab 2." Once this is complete, add the name of the company as the destination on the template waste management plan for each material stream.

**Note:** You may want to consider selecting more or less than 5 material streams for diversion. If you decide that is a cost effective choice for the project, or better supports the diversion goals, remember to update the files associated with question #1. Consider the LEED v4 Construction and Demolition Debris credit requirements and the LBC Net Positive Waste imperative throughout this process.

3. Which option under the LEED v4 MR Construction and Demolition waste management credit should be targeted for the project based on projected waste quantities, waste diversion rates, and facility capabilities? Do you think the project can meet the requirements of Option 2 to generate less than 2.5 lbs of construction waste per square foot of the building's floor area, if so, why? If not, what strategies might help the project reduce the total amount of waste?

See included supplemental information contained on student USB for additional material needed to complete the problem.



## Project 3

**Project Title: 2&U**

**Project Location: Seattle, WA**

2&U is a high-rise office building under construction in Downtown Seattle, Washington. The 527-foot-tall, 38-story tower will be located at 2nd Avenue and University Street and is scheduled to be completed in 2019. The building will have 725,000 square feet of leasable space, including retail and public spaces on the lower levels. This project is owned by Skanska's Commercial Development group and built by Skanska USA Building and is targeting LEED Gold certification.

**Problem #5: Water (13 possible points)**

**Problem #6: Local Impacts(12 possible points)**



## Problem Statement 5: Water

13 Possible Points

**Project Title: 2&U**

**Project Location: Seattle, WA**

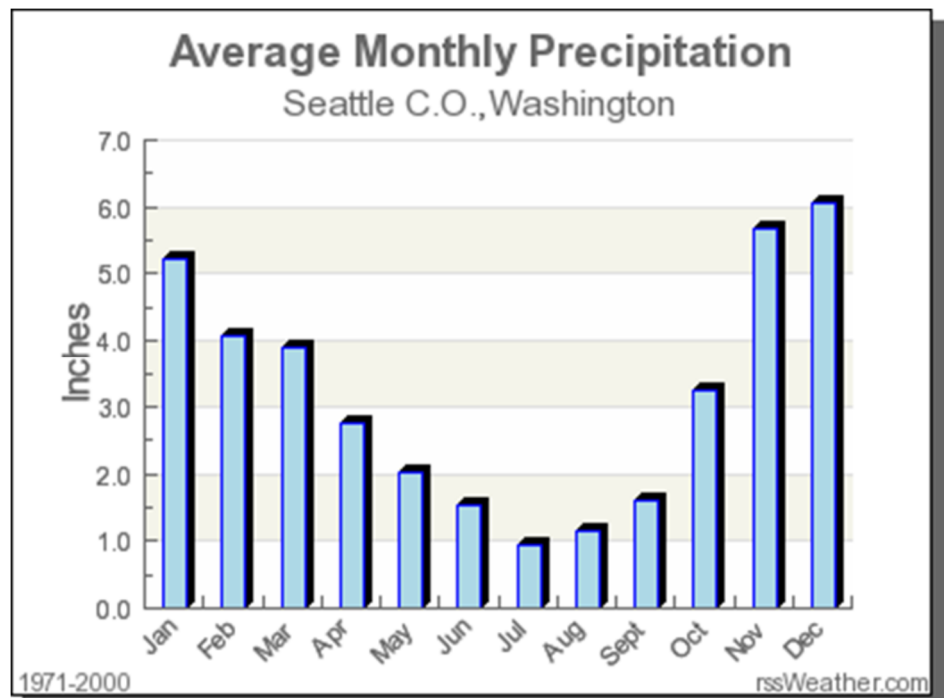
2&U's close proximity to the Seattle waterfront presents unique challenges in terms of water sustainability issues. The team wants to prevent Stormwater runoff from polluting the Puget Sound and use that water for construction uses.

The owner would like to reuse rain water collected during dewatering for dust control and other construction related water uses on site.

1. Determine the amount of rain water that accumulates on the 2&U site. Using a flow net approximation (or similar), what is the average expected gallons for the month of April that must be dewatered?
  - The cost to discharge into the sanitary sewer system is \$0.0015 per gallon and the monthly rental cost of settling tanks (required for the sewer discharge permit) is \$2,495/month. The discharge permit is a one-time fee of \$11,000.
  - The cost to purchase water from municipal hydrants is \$0.003612/gallon.
2. Make a plan for how the project could harvest rain water for construction use. Using the attached grading sheet provide a site plan that details the water collection plan. Calculate the cost and feasibility of this plan.
3. The project plans to use 1,000 gallons of water a month during excavation for dust control. Based on the average monthly precipitation Seattle receives will they be able to collect enough rainfall from April to June from them to use the water for dewatering? If the system is unable to support the demand of water needed during excavation suggest a date that the system should be installed.
4. What is the cost difference between using municipal water for construction use and using reclaimed water? What are the ecological considerations?

### **Supplemental Information:**

Monthly Precipitation:



## **Problem Statement 6: Local Impacts**

12 Possible Points

**Project Title: 2&U**

**Project Location: Seattle, WA**

One of the unique aspects of 2&U is that the tower is 85 foot above the ground floor plaza, which creates a welcoming and pedestrian-friendly urban village. This new ground space will offer direct access to the local arts community and features curated, seasonal pop-ups, events and entertainment along with a dedicated creative space for artists and creatives.



### **Part 1:**

The client wants to meet or exceed the LEED v4 guidelines on community impacts and needs some guidance truly understanding the impact of these guidelines on the 2&U project. Please prepare a report that outlines the following information:

- Promote Access to Neighborhood Completeness Resources. LEED v4 recommends that projects should “promote development patterns that support diverse, accessible and proximate location to vital services including employment, education, healthcare, healthy food, recreation, civic and public spaces, retail, and other basic services”.
  - ◊ Examples include proximity to diverse uses, community services and public transit, compact development patterns, mixed-use buildings, walkability, bike-ability, and proximity to open spaces and civic spaces.
- Develop a proposal to community leaders outlining how 2&U will positively affect the area. Provide a list of all the ways the 2&U project meets or exceeds those guidelines. Create a scorecard illustrating each aspect. Find creative ways to highlight this projects potential impact in the community. How will the community use 2&U? Does 2&U improve the area?

See included supplemental information contained on student USB for reference links.

## **Oral Evaluation**

### *OAC Meeting Presentation*

20 Possible Points

The Oral Presentation Format will be in the style of a Owner-Architect-Contractor (OAC) Meeting. Teams will be given a list of topics that due to the needs of the project will have to be discussed at your next progress meeting between the Owner, Architect and Contractor. Your team will be representing the Contractor needing to explain decisions or actions that have taken place on the project and justifying any impacts to cost or schedule as they impact the Owner's budget or the Architect's design.

Your team will be responsible for preparing the meeting agenda and any additional documents, etc that may be needed to illustrate your decision-making process. Unlike a presentation, the Owner and Architect may ask questions during the meeting topic. There is also a stiff time constraint on the OAC meeting, as the Owner is busy interviewing other Contractor's for another upcoming project. If a resolution cannot be reached, or if the owner is unsatisfied with your decision-making, the conversation may be tabled for further discussion at a later date in order to get through all of the equally important topics being covered in the meeting.

**Additional Details regarding content and format of the OAC Meeting will be provided at a later time.**

#### **Presentation Timeline:**

- Teams will be allowed a five (5) minute set-up period.
- Teams will be allotted thirty (30) minutes in which to; introduce their team, present their information, and explain the expected challenges. Judges will be able to ask questions during this period.
- A ten (10) minute period for feedback will follow the presentation.
- Five (5) minutes will be allowed for breakdown.
- A computer with MS PowerPoint, a projector, and screen will be provided for presentation to the committee.

Any other presentation materials required are to be provided by the team.

**ALL ELECTRONIC AND HARDCOPY PRESENTATION MATERIALS ARE TO  
BE DELIVERED AT 06:00 AM PST TO  
THE PRESENTATION ROOM (Southern Pacific E&F)  
ON THE MORNING OF FEBRUARY 8, 2019.**