



# ASSOCIATED SCHOOLS OF CONSTRUCTION

ROCKY MOUNTAIN REGION  
REGION VI  
AK, AZ, CO, ID, MT, NV, NM, UT, WY

FAR WEST REGION  
REGION VII  
CA, HI, OR, WA

## Open Problem Preconstruction Services February 9 – 10, 2012

### Problem Statement Phase II: Preconstruction Services

#### Residential Project Colorado

This problem is provided as a representative example of what a problem can look like but does not limit the type of future problems to the same format, requirements, or topic of focus

#### Problem Sponsor:



#### PCL Construction Services, Inc.

2000 S Colorado Blvd  
Tower Two, Suite 2-500  
Denver CO 80222

Associated Schools of Construction Competition  
Preconstruction Services Open Problem  
February 9 – 10, 2012

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**I. PRECONSTRUCTION PROBLEM TIME TABLE**

**THURSDAY, FEBRUARY 9, 2012 - CENTRAL PACIFIC ROOM ABC**

Turn in Phase I RFO.....	7:00 AM
Phase II Pre-Proposal Conference.....	7:00 AM
Written Questions (RFI's) Due.....	9:00 AM - 10:00 AM
Visits to Student Rooms.....	10:30 AM -11:30 AM
Group Meeting to Discuss RFI's.....	12:00 PM
Visits to Student Rooms.....	4:00 PM – 5:00 PM
Phase II Preconstruction Services Due.....	9:00 PM

**FRIDAY, FEBRUARY 10, 2012 - CENTRAL PACIFIC ROOM ABC**

Presentation Start Times Posted.....	7:00 AM
Presentation Materials Due (All Teams).....	7:00 AM
Presentations Start.....	8:00 AM
Project Debriefing.....	6:00 PM - 6:45 PM
Reception.....	7:00 PM - 9:00 PM

**SATURDAY, FEBRUARY 11, 2012**

Career Fair.....	8:00 AM - 12:00PM
Awards Banquet.....	12:00 PM

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## **II. PREFACE**

Welcome to the 2012 ASC Student Competition. PCL Construction Services, Inc. is proud to be the sponsor of the Preconstruction Services Open Problem at the 2012 Competition in Sparks, NV. PCL Denver is one of 28 operating districts of PCL Construction Services, Inc.

We believe this problem will enhance each student's experience to the everyday occurrence of preconstruction services in today's construction environment. Clients require varying levels of preconstruction services including design coordination, budget development and construction planning.

The problem proposed will be typical to the services provided to a client including the proper selection of your construction team, and subcontractor team. Other services include risk analysis, contracts, estimating, value engineering, quality management logistics planning, constructability review, resource requirements, budgeting, scheduling, purchasing, safety and contracting.

This competition is an invaluable tool for your career development. It is designed to enhance and expose each team member to different facets of the construction industry. Each team member's technical knowledge of estimating, scheduling, planning, leadership, and communication skills will be put to the test during the next two days.

PCL hopes every team benefits from this 'real-life' experience. We are here to support the ASC and its members, so please ask questions after the competition is complete or at any time throughout the school year.

Understand there are many dynamic elements to every project whether in design or under construction, including this actual project recently completed by PCL. Please keep an open mind to the challenges that are presented during this event. Learn from our own project experience, as well!

At the end of the day, only three teams are awarded a placement and these teams will be recognized at the ASC Awards Ceremony on Saturday. Regardless of your final overall placement, each competitor is truly a winner when you combine the experience of the competition, coupled with the industry exposure you have gained throughout the event.

We look forward to great thinking, fellowship and sportsmanship throughout the week. We are proud to serve our great industry with this problem and advancing construction education to all the member schools, faculty and students of the Associated Schools of Construction.

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### **III. PROBLEM SCENARIO**

Congratulations! The selection committee of PRIHD Resorts (PRIHD) has selected your firm to provide a preconstruction services proposal based upon your response to the Phase I RFQ. We are excited to get the preconstruction underway as quickly as possible, and look forward to your input in making this project a success. The next step in the process will be Phase II Preconstruction Services submission. Your team will develop the Phase II Preconstruction Services submission based upon the design drawings and specification documents prepared by the Owners' design consultants.

Your team will be asked to establish a project budget, prepare a preconstruction schedule and provide various other deliverables as defined in the succeeding portions of this Problem Statement. You must submit your documentation to the selection committee by 9:00 PM on February 9, 2012 and be prepared to present your work to them on February 10, 2012 at 7:00 AM.

An interim progress meeting is scheduled for 12:00 PM on February 9, 2012. Any questions should be delivered in writing on the Request for Information (RFI) form provided to the selection committee in the Central Pacific Room ABC between 9:00 and 10:00 AM. Do not include multiple unrelated questions on the same RFI. Utilize a separate RFI for each unrelated question. Each team is limited to five (5) RFI's. Responses to these RFI's will be provided at or before the 12:00 PM meeting. The RFI form is provided in Section 0 – RFP of the supplemental documents.

For the oral presentation on Friday, all teams shall include students representing your Construction Manager, Project Manager and Project Superintendent. Other presentation members you might include are; Safety Manager, QA/QC Manager, MEP Manager or Estimator. You will be allowed 20 minutes for the team presentation and 10 minutes for questions and answers from PRIHD.

At a minimum, your presentation should cover the following areas:

- Safety
- Quality
- Budget
- Schedule
- Site Utilization
- Constructability
- Team Differentiators

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**PROJECT INFORMATION**

The Mountain Division Project is located in Colorado on the west side of the Continental Divide at an altitude of over 8800'. The building will be a signature structure, housing high end condominiums. Several other comparable projects are being constructed in the area. The ownership group wants to set the quality standard for high-end-living units being delivered to the market.

The structure is a complex design and constructed from precast lower levels, transfer girders post tension slabs, flat post tension slabs and steel. Exterior finishes are a combination of stucco and stone, wood clad windows and doors with a concrete tile roof. Interior finishes are drywall with a skip trowel finish, Knotty Alder wood millwork, granite countertops and tile bathrooms. MEP system is a central plant providing chilled and hot water to the entire building. Each unit is heated and cooled by its own Fan Coil Units system.

The building will consist of over 100 condominiums and has an estimated value between \$185 and \$205 million. Building amenities include: underground parking, skier services, spa, workout facility, pool, private lounge and library. Condominium Unit prices range from a low of \$1.7 million to a high of over \$10 million for the penthouse unit.

For the purposes of this problem, you can assume the design firms and consultants have completed the Design Development stage and have produced Contract Documents to 20%. The Owner now wishes to engage a Contractor to provide preconstruction services including: design coordination, constructability review, budget development and construction planning prior to moving into the completion of the construction documents. The Owner has a history of selecting Contractors who have experience with residential properties. Due to the high profile nature of this project, the Owner is looking for a Contractor that is experienced with complex facilities and is very familiar with post tension slabs.

Your firm has a strong relationship with PRIHD Resorts and has completed two successful projects together in the past in a similar delivery method with another district. Your competitors have also worked for the Owner in the past.

The Owner has decided that they will use a best-value based procurement process based on the fee and general conditions estimates, ability to plan, find constructability issues and qualifications of the Contractor. In order to gain early knowledge of the project cost, the delivery method will be Guaranteed Maximum Price (GMP) and the fee should be commensurate with this delivery. The form of contract will be a GMP based on the AIA111-2007 (Owner modified) with A201 General Conditions contract documents.

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**IV. PROBLEM OUTLINE**

Organize and tab your progress submittal according to the following outline. Include only the information requested in **Section V, Submission Requirements**. Remember to be as brief as necessary to convey your points.

1. Opening Statement
2. Safety Activities and Plan
3. Quality
4. Risk
5. Site Project Logistics
6. Conceptual Estimating
7. Conceptual Scheduling
8. Building Information Modeling
9. Constructability Review

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## V. SUBMISSION REQUIREMENTS

The appearance and organization of proposals and reports is important in our industry, as it is often our first opportunity to interact with a new client and/or impress the upper management in a company. We want to portray a professional image, therefore present information that is easy to find and is understandable. Points will be awarded in this section based upon appearance and organization, as well as the clear and concise responses to the following requirements. **Five (5) copies of your Phase II documents are to be submitted, font 11.**

If you utilize a new company logo for your submission, include it on the cover of the proposal book. Also, include the school logo in the lower left hand corner of the proposal cover. This assists the judging team with identifying your team's submission.

A flash drive has been included with some of the forms referenced so you do not have to recreate them.

*Always, check formulas to ensure that proper extensions are made.*



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## **1. Opening Statement**

### **A. Cover Letter Exercise**

#### **Exercise Narrative:**

A Cover Letter is an important component to any submission. The Cover Letter complements the Executive Summary by reinforcing your key messages to the Client. It also serves to fulfill mandatory requirements to acknowledge addendum issued during the proposal process.

Acknowledgement of addenda (multiple addendum) issued assures the Client your proposal is compliant with the latest information and can be adequately analyzed. Lack of compliance to this request by your team can cause your submission to be deemed non-responsive and could lead up to disqualification.

#### **Exercise Process:**

Based on the information given in this handout, create a cover letter for your proposal.

Include the following:

- Limit to two (2) pages
- Acknowledge addendum received (i.e.: Our team acknowledges receipt of Addenda 1, 2, and 3.)
- Reinforce key messages
- Include company logo
- Sign the letter
- Refer to example cover letter on flash drive for sample

#### **Deliverables:**

Cover Letter

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**B. Executive Summary Exercise**

**Exercise Narrative:**

An Executive Summary is an important part of your proposal. It identifies, in summary fashion, the key benefits and features you want an Owner to know about your Company and why they should choose you over others for their project. It is an important sales and communication tool. It lets you be creative and points out your most important differentiators from your competition. It should focus on what you have learned from your research of the Owner's "hot buttons" (most important factors of the project) and how you will make sure those "hot buttons" are addressed. Your response to a Request for Proposal should always include an Executive Summary.

**Exercise Process:**

Based on the information given in this handout, create an Executive Summary for your proposal. Include the following:

- 1<sup>st</sup> Page – Include a key message and a simple theme statement
- 2<sup>nd</sup> Page – Include a theme statement and the key reasons PRIHD should choose you, and not your competition
- **Be creative.**

**Deliverables:**

Executive Summary

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### **C. Preconstruction Project Approach**

**Exercise Narrative:**

Describe your firm's capabilities for budgeting/estimating, scheduling, value engineering, constructability reviews, quality management, BIM and document control during the Preconstruction Phase of this project. Describe any value-added services your firm may have that distinguish your qualifications and capabilities from others.

The Project Approach shall be a maximum of 2 pages in length.

**Deliverables:**

Written Preconstruction Services Narrative

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## **2. Safety**

### **Exercise Narrative:**

Safety always needs to be at the forefront of any project planning. Decisions made regarding site logistics, hoisting, and means and methods can have significant impacts to overall safety. For instance, when selecting a location for a crane, factors such as traffic flow, pedestrians, sight lines, access, etc., need to be considered to ensure that what may appear as the best location for one reason does not mean that the safety of others is compromised.

During preconstruction it is important to identify potential hazards that may be encountered on the project for each trade. Once again it is important that the hazard potential is analyzed in the context of the planned project approach. As preconstruction progresses, these hazards need to be re-visited as changes in the approach are considered.

1. Using the Construction Hazard Analysis HSE-03-05 worksheet provided, assess the potential hazards that may develop during this project for each trade on the project.
  
2. Snow removal from the project will be the General Contractor's responsibility until substantial completion of the project. The roof structure is not designed to contain a full winter season of snow loading. The roof must have the snow removed when a depth of 32 inches accumulates. Using the Job Hazard Analysis (JHA) HSE-03-04 worksheet provided, assess the potential hazards that may develop during this project for the task of removing snow and provide controls that will be used to reduce the risk to workers.
  
3. In 2009, the Bureau of Labor Statistics (BLS) reported that 816 construction workers died on the job, with 34 percent of those fatalities resulting from falls. The project during construction will have many trades working near the leading edge. From concrete formwork to metal wall framing to decorative metal rail balcony installation, all these trades' people and more will be exposed to falls on this project. Prepare a Fall Protection Plan outlining how your firm will address this leading edge/fall hazard and what actions you will take on this project from the moment a worker arrives on site to project completion. Give specific examples of the policy and procedures for this Site Specific Fall Protection Plan.

### **Deliverables:**

1. Construction Hazard Analysis Worksheet, HSE-03-05
2. JHA worksheet, HSE-03-04
3. Site Specific Fall Protection Plan

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### 3. Quality

**Exercise Narrative:**

As projects become increasingly complex in today's world, new methods of construction aided by modern technology are becoming more common. The drive for the latest technology exists everywhere, and in construction this is no different. Today, highly complex structures are being built all around the world, including Boston's "Big Dig" tunnel project, the Hong Kong International Airport, Palm Island and the Burj Tower in Dubai. Newer technologies enable designs that would not have been achievable a decade ago. How does a Contractor manage complex projects like these? Furthermore, how can a Contractor incorporate higher quality on complex structures when he may have little or no experience in the building systems that he will be expected to control?

The Owner has been developing numerous projects in this area for the last twenty years. During this time the mentality has shifted from quality to delivering the product to the market for consumers as quickly as possible. The project is being constructed along with two other projects of similar size and complexity; all three projects will be competing for skilled staff and craftsmen. The Owner has demanded that quality will be at a higher level than the last three projects they have delivered. They will not accept this lack of quality on this project and will employ a Third Party Inspector to be a watchdog over the Contractor selected to construct the project.

Your firm states that your dedication to Quality sets it apart from the other firms competing for this project. In fact a portion of the employee's Performance Bonus is now based on how well your project scores on semi-annual Quality Reviews and Project Audits.

1. Develop a pre-drywall inspection process/plan for the residence areas of the project. The following list of topics should be specifically addressed, but the plan does not need to be limited to just these items:
  - How will units be signed off for drywall to be installed
  - What will be done in order to track all deficient items until they are closed
  - Leaks and squeaks do not occur
2. The individual unit owners will be able to select options/packages for various finishes inside the units such as flooring, paint, millwork and electronics. Address how these will be tracked on a unit by unit basis so that the right finishes are installed only once.
3. Develop a plan for the punch list process with the Owner. Cover such items as:
  - How will the punch list process be set up
  - Ensuring a Zero deficiency unit is delivered to the Owner
  - Who will be on the walks and how will the items be closed
  - How many people will be involved in each phase of the punch list
4. Due to the nature of the project, it may be necessary to complete work on the exterior balconies after units are completed. How will this be monitored/tracked to ensure the interiors are not damaged?

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**Deliverables:**

1. Completed Quality Control/Quality Assurance Plan for a residential unit
2. Develop a plan to ensure finishes are correct
3. Completed Punch List Process Plan
4. Develop a plan on how to complete a balcony after a unit is punched by the Owner

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#### **4. Risk**

**Exercise Narrative:**

As part of the preconstruction process, it is necessary to review the contract agreement, plans, specifications and supplemental information in order to determine whether there are conflicts or ambiguities that pose risk for either the Owner or Contractor. Some refer to these clarifications as a “basis of budget” while others identify the clarifications within a contract exhibit. This document is used to identify requirements within the contract documents that may add unjustifiably costs to the project with no benefit to the Owner or may put your firm at risk for not completing an action as required in the contract.

**Deliverables:**

Provide any assumptions, clarifications, qualifications, etc., involved with development of this proposal. It is anticipated that the deliverable will become an exhibit to the contract agreement.

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## **5. Site Logistics Plan**

### **Exercise Narrative:**

As part of the city's permitting process, public works requirements, fire department regulations, easement permitting and FAA permitting; a detailed logistics plan is required.

### **Deliverables:**

Provide logistics plans and any relevant narratives necessary to accurately depict the Contractor's plans for:

1. Staging of materials
2. Proposed size, type, locations and height of cranes being utilized
3. Temporary utility plan
4. Fencing locations
5. Temporary toilets and dumpsters
6. Traffic control plans, including roadway maintenance and cleanup
7. Planned preconstruction conditions surveys, along with control measures for boundaries and adjacent properties
8. Snow removal efforts, for the site
9. Employee parking and access
10. Construction offices
11. Concrete pumping locations
12. Excavation efforts (including placement of ramps, soil shoring, etc.)
13. The plans are to include any modifications anticipated as construction progress is carried out
14. Short interval schedule with the level of detail necessary to provide city agencies with planned durations, start and finish dates for each item listed above
15. Any other relevant information necessary to complete the site logistics plan

### **Assumptions**

Project site is located at an elevation of 8,800 feet and adjacent to a large ski resort. A major interstate highway is located directly adjacent to the property and serves the entire valley, including material deliveries and for commuting employees to access to the project. Typical annual snow fall is between 100" and 200".

Soils are sandy with rubble rock ranging in size from 3" diameter to large boulders.

Pedestrian and traffic are of the utmost importance to the town officials. Roads must be kept clean. Traffic cannot be interrupted in the east bound direction and only limited interruptions to traffic can occur in the west bound direction.

Lower portions of the building are precast with terrace through 5<sup>th</sup> levels being post tensioned concrete. The 6<sup>th</sup> level consists of steel framing. Precast "T's" weigh up to 35,000 lbs. and are up to 60' long. Precast columns are up to 45,000 lbs. each and are up to 70' long. Assume that all tractor / trailer lengths are 80' long. Precast is trucked in from Colorado Springs to Vail, Colorado.



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The entire property is surrounded by properties and easements that do not allow for sloping back the upper grades. Therefore, shoring is necessary and is installed at a rate of 150 sf/day, but no useable shoring area will be available for the first 2.5 weeks.

Building excavation depth ranges from 36' deep at the northern area to 24' deep at the southern elevation. In addition to the above, there is an underground parking structure running parallel to the southern elevation of the building. The existing parking structure extends downward 18' from the existing grade and is 17' away from the property line. We are allowed to shore the existing soils but cannot connect to or remove any part of the existing parking structure. In addition to the above, there is a 30" storm drain running directly adjacent to the existing parking structure and is to remain in service throughout construction.

Structural excavated materials are to be removed from the site and are to be trucked approximately 30 miles to the west of the site. A productivity rate of 700 cy /day of export is to be utilized.

An existing four-star hotel is located directly east of the project and will remain in service throughout construction. There is an existing fire hydrant directly to the southwest side of the hotel and it must remain accessible to the fire department at all times. The alleyway separating the new project from the existing hotel is 19' wide and a minimum fire truck access width of 17' must be maintained at all times. Failure to do so will bring about an instant suspension of work.

Due to FAA requirements, no crane, structure, etc., can extend more than 12 feet above the highest point of the building. The local Flight For Life route is directly above the new project.

Water and power are provided to the building's property line and readily accessible. Gas service is also within the property boundary, but requires early coordination and minor modifications prior to service being granted.

During winter months, no employee parking is available within the town limits. During the summer, employee parking is free. Because the project is starting concurrently with three other major projects within the valley, securing workers will be difficult. Because there are no workers in the local community, most employees will commute from the next county, some will require temporary housing within neighboring communities and some will commute from Denver on a daily basis.

***Building constructability plans are to be provided elsewhere in the proposal submission.***

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## **6. Conceptual Estimate**

### **Exercise Narrative:**

The Owner has requested a budget estimate as part of your preconstruction services proposal. A conceptual estimate summary worksheet with several missing line items is attached. Work from the subsequent sections of the Section 6 Budget Exercises will need to be completed and the information transferred to this Conceptual Estimate Summary. You will also need to complete the schedule in Section 7 to complete the estimate.

- Complete Exercise 6a, to determine the input value for the Construction Services and General Conditions (both staff and overhead/equipment) line items in the Conceptual Estimate Summary.
- Complete Exercise 6b, to determine the input value for the Concrete Forming, Placing and Finishing Estimate line item in the Conceptual Estimate Summary.
- Complete Exercise 6c, to determine the input value for the Steel Recap line item in the Conceptual Estimate Summary.
- Input the Mechanical and Electrical contract costs that were selected in the Phase I problem into the appropriate cells.
- Calculate the Total Cost line item with the above inputs.
- Insert your Firm's Proposed Fee Percent and Amount.
- Provide Construction Contingency to handle design issues and missing information at this early stage. Assume drawings are at 100% DD stage.
- Calculate the Total Estimate.

### **Deliverables:**

Completed Conceptual Estimate Summary

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## **6a. Construction Services Estimate**

### **Exercise Narrative:**

- Use the Conceptual Schedule developed Section 7 to determine the timeframes and durations for each proposed team member who will be needed during the various phases of the project.
- Use the rates listed in the resumes from the Phase I Problem and from the 2012 Unit Rate Sheet to develop an estimate for the project staff. Remember that staff size may vary throughout the project and may include additional staff not listed (add at your discretion).
- Modify the 2012 Construction Services Worksheet to reflect the correct duration shown in the Conceptual Schedule.
- The Owners have requested that, should your firm be selected as the General Contractor, the preconstruction services cost (calculated in the Phase I Problem) be deducted from the overall project staff costs. Include the costs from the 2012 Precon Staff Costs worksheet from the RFQ as a deduction on the Construction Services Worksheet.
- Use a flat rate of \$130,000 per month for general construction overhead (trailers, copiers, etc.). Use the durations from the Conceptual Schedule to determine the total amount of overhead. Input this on the correct line in the Conceptual Estimate Summary.

### **Deliverables:**

Completed 2012 Construction Services Worksheet

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## **6b. Concrete Beam & Girder Estimate**

### **Exercise Narrative:**

In this exercise your team will complete and estimate for a concrete beam and girder section of the building. The total formwork square footage and concrete volume need to be taken off in order to determine accurate pricing. Pricing involves forming and placing the concrete. Include the total cost in the Conceptual Estimate Summary where noted. Reinforcing can be ignored.

- The area to be taken off is highlighted on drawing S1.21 – Terrace Level West. Highlighted and unedited PDFs have been included for your use.
- The beam and girder schedules can be found in the 6b Details Attachment.
- Consider the highlighted area as standalone (take off formwork for all sides).
- Some information in the worksheet and drawings has been provided and you may assume this information is correct.
- All concrete to be a minimum of 5000 psi.
- Use rates listed on the 2012 Unit Rate Sheet in 6 – Conceptual Estimate to complete the estimate.

### **Deliverables:**

Completed Concrete Beam & Girder Estimate

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## **6c. Steel Recap**

### **Exercise Narrative:**

- In this exercise your team will review 4 steel bids and complete the Steel Recap Worksheet.
- Determine the lowest and most complete responsive bidder and include the low steel budget total from the recap worksheet in the Conceptual Estimate Summary where noted. Information in one or more of the steel bids may be incomplete. You may need to include some estimated costs on the worksheet in order to complete the overall scope. Note any assumptions on the bottom of the Steel Recap Worksheet.
- Some information in the Steel Recap worksheet has been provided and you may assume this information is correct.
- Exclude Alternates from your Steel Recap.

### **Deliverables:**

Completed Steel Recap Sheet – Include final selection of steel subtrade bid on the Conceptual Estimate Summary

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## 7. Conceptual Scheduling

### Exercise Narrative:

As part of your review with management, you will be required to present a complete, workable Critical Path Schedule (CPM) to plan the work within the guidelines prescribed below. As this is a preconstruction services problem, upper management is equally interested in the activities and your thought processes in the preconstruction phase as in the construction phase. Schedules created during the preconstruction phase of the project start out at a very summary level and expand as the preconstruction work progresses. Since the preconstruction work in this problem is at the 20% Contract Document development stage, the schedule will have more detail than a summary level schedule; however it will not be a complete detailed schedule that would be ready to issue to construction. The schedule is to convey your team's plan to fully execute the project from cradle to grave and for use by the sales team on when units will be ready for Owners to review.

A Suretrak, P3.1 and Microsoft Project format schedule has been provided for you on the flash drive. Some portions of the schedule are filled in while others are blank and will need to be developed and completed by your team.

The following criteria explain the background information and requirements of the CPM schedule your team will present:

1. General Schedule Criteria:
  - a. Presentation Criteria:
    - i. Format:
      1. The template has the minimum formatting required: Activity ID, Activity Description, Original Duration (OD), Early Start (ES), and Early Finish (EF). Other columns can be added as your team sees fit.
      2. At a minimum utilize the organizational structure as already established in the template. Additional activity codes can be added as your team sees fit.
    - ii. Activity Count: 140-200 activities
    - iii. Show the logic between activities
    - iv. Clearly show the critical path of the schedule
    - v. Organize activities so they are easy to read, activities are grouped intuitively and the schedule flows well
  - b. Contractual Criteria / Weather / No work days
    - a. Project Start Date for Preconstruction (Notice to Proceed): February 20, 2012
    - b. Preconstruction period: 6 Months
    - c. Town does not allow work the following days;
      - i. Bike race the third week of August on Thursday/Friday

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- ii. Vintage car race the 2<sup>nd</sup> week of July on Monday, except in 2013 it will be a 2 day event
    - iii. Food and Wine Festival last weekend in September starting on Friday
  - d. Assume the following calendar holidays:
    - i. January 1 - New Year's Day
    - ii. 3rd Monday in February - Presidents' Day
    - iii. Last Monday in May - Memorial Day
    - iv. July 4 - Independence Day
    - v. 1st Monday in September - Labor Day
    - vi. 4th Thursday in November - Thanksgiving
    - vii. December 25 - Christmas Day
  - e. Set up calendar #1 in the template with these dates and parameters
  - f. Weather impacts
    - i. Project is located at 8800 feet above sea level
    - ii. Location receives up to 300 inches of snow from November to May
    - iii. Project is located along a major interstate and some workers and most materials have to travel over a 10,000 foot high pass to the project
    - iv. Set up calendar #1 with these weather dates
- 3. Preconstruction Phase Assumptions:
  - a) The Architect and consultants are currently 100% complete with the design development documents.
  - b) The permitting agency will allow phased permitting for demolition, mass excavation and construction.
  - c) Control estimates will be required at 75%, and 100% construction document milestones.
- 4. All other work criteria:
  - a) Original durations for construction activities shall be derived on a rough quantitative basis. You may use RS Means or other productivity data resources to help if needed. The format of durations is work days.
  - b) Scheduling of all work should support the assumptions made by the Site Logistics Plans drafted in Section 5.
  - c) Review the plans thoroughly. Ensure that your schedule encompasses as much of the work possible in the limited number of activities you are required to provide.

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**General comments:**

1. Do not resource load or cost load your schedule.
2. Remember preconstruction period encompasses all project activities prior to the actual commencement of work in the field and may overlap the initial construction phases of the project.
3. When it comes to scheduling, there is no right or wrong answer. Ensure that your team can substantiate and explain all of the assumptions and decisions made in the process of developing your schedule.

**Deliverables:**

Provide a schedule with assumptions, clarifications, qualifications, etc., involved with development of this proposal. It is anticipated that the deliverable will become an exhibit to the contract agreement.

1. Using sheet G0.0.0, find the gross square footage of each floor and use the production rates provided in **SUPPLEMENTAL INFORMATION section 7**. Use the following assumptions:
  - a. Lower basement level is slab on grade
  - b. Upper basement level is precast toppings
  - c. Garden level is transfer slabs
  - d. All other levels are flat slabs
2. HVAC ductwork rough-in durations, using sheet G0.0.5 find the number of units and how many bedrooms each unit has on each floor and use the production rates provided below to determine durations per floor for HVAC rough-in.
  - a. Use the following lineal feet of ductwork in a unit:
    - i. 2 bedroom – 300 LF
    - ii. 3 bedroom – 400 LF
    - iii. 4 bedroom – 500 LF
    - iv. 5 bedroom - 550 LF
    - v. 6 bedroom – 600 LF
    - vi. Add 2 additional days if a unit is two stories
  - b. A crew can install 75 LF of ductwork a day
  - c. Mechanical subcontractor plans on having 3 HVAC Ductwork crews
3. Use the parameters described in Section 5 Site Logistics to determine the duration for Mass Excavation and inset into schedule.
4. The Owner believes duration for construction is 29 months. Provide a one page narrative on the project schedule on why or why not your firm can achieve this request, providing information on:
  - a. How many holiday and no work days per year as mandated by the city, are in calendar #1.
  - b. How many weather days did your project have per year and why.
  - c. Construction duration in months from site mobilization to final completion.



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## **8. Building Information Modeling**

### **Exercise Narrative:**

Building Information Modeling (BIM) is being used throughout the construction industry as a tool to discover constructability issues prior to the fabrication and installation of the scopes of work, and for planning of complex structures. BIM takes construction coordination to a new level from the hand drawn sketches used to determine if "it all fits" to building virtually prior to building it physically.

Once the building is built in the virtual world, the software will run a clash detection program to find and locate these clashes. Clashes found in the model, if not solved by minor relocation, can then be sent to the design team for re-design prior to the scope being constructing, thus eliminating building it twice.

Another benefit to building it in the virtual world is that the components can be turned to CAD drawings and then be shop built or pre-assembled and be delivered to the project. This minimizes the amount of skilled trade workers required to install the work on site. Waste will be minimized on-site and products can be stored off site and can be delivered when needed and not stock piled on-site.

### **Deliverables:**

1. Review and identify a minimum of 5 clashes on the Level 6 model and provide pictures with a brief narrative of the clash.
2. Review and identify a minimum of 5 clashes on the Level 5 model and provide pictures with a brief narrative of the clash.
3. Review and identify a minimum of 5 clashes on the Terrace Level 5 model and provide pictures with a brief narrative of the clash.
4. Provide only one clash per picture.
5. Any recommendations on how to better coordinate the project.

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## **9. Constructability Review**

### **Exercise Narrative:**

The Owner has requested that the Teams provide a constructability review of the drawings. The goal of a constructability review is to identify and resolve issues in the pre-construction phase that the BIM will not capture when clash detection software is run, due to the level that the model is detailed to. Constructability reviews usually require careful examination of the drawings and cross-referencing back to several different details and adding up dimension strings to ensure that the work can be constructed and installed as drawn.

On past projects, the Owner has faced constructability issues between millwork details, including standing, running and casing details not coming together with clean intersections, and not enough room for the details to fit. Doors not fitting into hallways and appliances not opening fully are other examples of problems on other projects.

### **Deliverables:**

Provide a description of the constructability issues related to any millwork details, appliance operability issues and any other issues you find. Limit Deliverable to no more than two pages, not including sketches/details of these issues for units 101 and 405.

### **Bonus Points**

Unit 405 is a signature unit and the Owner wants to be assured that the ceiling heights are maximized. Prior to the BIM being fully completed, the Owner would like a preliminary review structure and verify ceiling heights are at the maximum height. Confirm ceilings as drawn are at their maximum height; if they are not, provide sketch showing recommended reconfiguration.

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VI. SCORING

<u>Description</u>	<u>Points</u>
Phase I Request for Qualifications (RFQ)	20
Phase II Preconstruction Services	50
Phase III Presentation	30

Time Adherence Scoring for Phase Submittals

It is critical to submit materials on time. For those who do not adhere to the published times, points will be deducted according to the following schedule:

- On Time – 0 point deduction
- Up to 1 minute late: 1 point deduction
- More than 1 minute and less than 10 minutes late: 4 point deduction
- More than 10 minutes late: 8 point deduction

**All teams submitting late on Phase II will be disqualified from winning the competition, but will be able to participate in the Phase III presentations.**

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VII. JUDGES

Jim Waugh  
(303) 365-6500  
*Acting as PRIHD Director of Development*

Denver District / Mountain Division  
275 Main Street  
Unit G-005  
Edwards, CO 81632

Mike Krickbaum  
(303) 365-6500  
*Acting as Town's Community Liaison*

Denver District  
2000 South Colorado Blvd  
Tower Two Suite 2-500  
Denver, CO 80222

Ryan Odell  
(303) 365-6500  
*Acting as PRIHD Manager of Marketing*

Denver District  
2000 South Colorado Blvd  
Tower Two Suite 2-500  
Denver, CO 80222

Trevor Gallagher  
425-454-8020  
*Acting as PRIHD Project Manager*

Seattle District  
15405 SE 37th Street  
Suite 200  
Bellevue, WA 98006

Scott Viola  
425-454-8020  
*Acting as PRIHD Facilities Manager*

Seattle District  
15405 SE 37th Street  
Suite 200  
Bellevue, WA 98006

Lourdes Lopez  
480-829-6333  
*Acting as PRIHD Safety & Risk Manager*

PCL Civil Constructors, Inc.  
Water Infrastructure Group Phoenix  
1711 W. Greentree Drive  
Suite 201  
Tempe, AZ 85284

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## **VIII. RULES**

The rules for the competition are designed to provide each team with an equal opportunity to apply their knowledge in developing their respective solutions and an equal opportunity to present their problem solutions to the judges. The following rules apply to the Preconstruction Services Open Problem and supplement the ASC Competition Rules:

1. **Teams will be disqualified for having an advisor observing presentations prior to their University presenting.**
2. Five (5) copies of the proposal must be turned in at the prescribed time. **Proposals will not be returned to the teams.** If you require some of the material in your proposal for your oral presentation, please make the appropriate copies prior to your submission of the written problem for your use.
3. The use of the Internet is permitted.
4. Once the presentations begin, only the teams who have presented their solutions may be present at the presentations of subsequent teams. This will mean that the first team up gets to see them all, while the last team does not get to see any of the others. The purpose of this rule is to prevent those participating in later sessions from gaining an advantage to the contents of previous sessions.
5. Presentation materials for all teams are to be turned in to the judges prior to the first interview, by 7:00 AM on Friday, February 10, 2012. No other presentation material will be allowed into the presentation that is not turned into the judges by this time. **NO EXCEPTIONS.**
6. All decisions of the judges are final.
7. The problem presented was an actual project built by PCL. To avoid any conflict of interest or unfair advantage, any student who may have potentially worked on the project in any way shall identify themselves to PCL immediately. This issue will be reviewed, and if appropriate we may request that an alternate be assigned to the project. PCL shall make the final decision as to equity in such a case.
8. No phone calls, emails, or communication of any kind shall be made to the Owner, Architect, Engineer or design consultants that may be listed in the documents provided for this competition. They are aware that no team is to contact them and have been notified to contact the judges if any contact occurs. **Contact with any of the above shall disqualify your team from the competition.**
9. Do not submit any extraneous materials with your written proposal, including company profiles, marketing materials, etc. Please limit your response to the information requested. Be brief, clear and concise.
10. Any information concerning the size and scope and timelines provided in previous correspondence has been superseded by the information provided in the written problem statement and is not to be used in response to Phase II.
11. The last and most important rule: Have fun, learn, and develop new relationships.

**Violation of any of these rules will be grounds for disqualification from the competition.**

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**IX. EVALUATION FORM**

Please complete the evaluation form that will be e-mailed to your team captain prior to the 6:00 PM project-debriefing meeting on Friday February 10, 2012. Your feedback is important to our team as we strive to continually improve the problem in years to come. Please be honest and forthright with your responses.

**X. SUPPLEMENTAL INFORMATION**

<u>Description</u>	<u>Electronic Information / Form on Disk</u>
0. <b>RFP</b>	
A. RFP Document	X
B. RFI Form	X
1. <b>Opening Statement</b>	
A. Cover Letter Sample	X
B. Executive Summary	X
2. <b>Safety Activities and Plan</b>	
A. Construction Hazard Analysis Worksheet, HSE-03-05	X
B. JHA worksheet, HSE-03-04	X
3. <b>Quality</b>	<b>None</b>
4. <b>Risk</b>	
A. AIA 111	X
B. AIA 201	X
C. Specifications	
i. 01000, 01039, 01050, 01200, 01310, 01410, 01500	X
ii. 01700, 15250	X
D. Plans	
i. C000A, C000B, C001, C002	X
5. <b>Site Project Logistics</b>	
A. C008 Erosion Control Plan	X

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- 6. **Conceptual Estimating**
  - A. Conceptual Estimate
    - i. 6 - Staff Unit Rates X
    - ii. 6 - Conceptual Estimate Summary Spreadsheet X
  - B. 6a - Construction Services
    - i. 6a –Construction Staff Spreadsheet X
  - C. 6b – Concrete Beam / Girder Estimate Spreadsheet
    - i. 6b – Concrete Beam / Girder Estimate Spreadsheet X
    - ii. 6b – Details X
    - iii. 6b – S1.21 Plan, 6b – S1.21 Plan X
  - D. 6c – Steel Bid Recap
    - i. 6c – Steel Sub Quotes X
    - ii. 6c – Steel Recap Worksheet X
  
- 7. **Conceptual Scheduling**
  - A. Concrete Production
    - i. Concrete Production Rates X
    - ii. G0.0.0 Plan X
  - B. HVAC Production
    - i. G0.0.5 Unit Bedrooms X
  - C. Schedule Templates
    - i. P3, Surtrack Microsoft Project templates X
    - ii. Schedule Template in PDF X
  
- 8. **Building Information Modeling**
  - A. Terrace Level Model X
  - B. 5<sup>th</sup> Level Model X
  - C. 6<sup>th</sup> level model X
  
- 9. **Constructability Review**
  - A. Unit 101 plans, details and cut sheets X
  - B. Unit 405 plans, details and cut sheets X