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ASSOCIATED SCHOOLS ASC OF CONSTRUCTION

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Region 7- Commercial Building Division

February 5-8, 2020

Problem Statement

University of California, Riverside Multi-Disciplinary Research Building (MRB)

ANSWER PACKET

Riverside, CA

Problem Sponsor:

HENSEL PHELPS
Plan. Build. Manage.

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I. COMMERCIAL DIVISION TIMETABLE

THURSDAY, FEBRUARY 6TH

Opening Conference / Distribute Problem / Establish Presentation Order ..... 6:00 AM
First Progress Meeting / RFI's Due ..... 10:00 AM
Lunch Delivered to Rooms ..... +/-12:00 PM
Second Progress Meeting / Question Session ..... 2:00 PM
Subcontractor Interviews (10 min. / team) ..... 3:00 – 7:00 PM
Dinner Delivered to Rooms ..... +/-5:30 PM
Proposals Due ..... 10:00 PM

FRIDAY, FEBRUARY 7TH

Interview Materials Due (all teams) ..... 6:45 AM
Interviews Start ..... 7:00 AM
Team Activities ..... 5:45 PM
Project Debriefing ..... 6:30 PM

SATURDAY, FEBRUARY 8TH

Career Fair ..... 8:00 AM -12:00 PM
Awards Ceremony ..... 11:00 AM

II. PREFACE

WELCOME to the 2020 ASC Student Competition. All participants are to be commended for the personal time and financial commitment made in preparing for and attending this competition. The construction industry has noted these sacrifices and the premier student population that is competing here. This is evident in the quantity and quality of companies attending the Career Fair.

The student competition is designed to challenge each team to different facets of the construction industry. Each team's estimating, scheduling, organization, leadership, productivity, and communication skills will be tested and enhanced while participating in this competition.

The competition will present each participant with construction industry exposure that may not otherwise be experienced until after working in the industry. It is Hensel Phelps' desire to present each team member with real life situations through this competition. Some of these "experiences" may seem uncomfortable and/or appear to contain no logic. Be aware the real world is very often not kind, fair, or logical! The construction industry will present situations where people are less than pleasant, and pressure is applied to the extreme, but it will also provide great feelings of accomplishment and team camaraderie. Some questions, both in real life and in this competition, may have multiple answers and some questions may have no correct answer. The superior level of the student competitors attending the competition should embrace these challenges and recognize the value of these lessons.

The judges in the interview portion of this competition may seem to "put you through the wringer" with tough questions and references to deficiencies in your written proposal. Although it is human nature to "take it personal", please understand that these lessons are for the good of your development and excellence. It is not the intent of the judges to frustrate and alienate you, yet the spirit of competition places a duty on the judges to ask the hard questions that will allow team rankings to occur. At the end of the competition each team member should reflect on the knowledge and experience gained, and hopefully the judges can become mentors and friends to you.

As a driven team member, realize that all teams have come to the competition with the main goal of WINNING! However, with so many competitors, also realize that there can only be one winner announced. As an intelligent, driven, and committed individual, you should recognize the vast knowledge, industry exposure, and experience gained in competing and finishing this problem. This is the real reason all teams and individuals are competing. Yes, it is true, every person competing is a winner, regardless of the final overall placement. Make sure you, and your team, understand this; it does make a difference!

Determination of the Winner is based on a uniform grading scale for the written portion of the competition coupled with the oral presentation, judged by a seasoned multi-member judge panel. The combination of these two components, in the scoring ratios listed, determines the overall team placement. Overall team placements will not be posted, but feedback will be provided after the competition.

Congratulations for participating and Good Luck!

III. PROBLEM SCENARIO (Eric Freedman)

A few months ago, the Southern California District was awarded the Multi-Disciplinary Research Building (MRB) project on the University of California, Riverside (UCR) campus. This is our first project with UCR, and we are excited to contribute an essential project to the University's campus. As a University focusing largely on scientific research, Hensel Phelps will be delivering a Design Build project that will provide graduate level students and outside researchers the ability to conduct specialized testing to accommodate the emerging research demands over the next several decades.

Hensel Phelps has an extensive history of leading successful Design-Build projects for the University of California schools across the state, specifically in science-based research laboratories, and intends on making this project another success story. Your upper management assembled a strong team to successfully lead the procurement effort. The project was awarded on a 2-Phase (RFQ/RFP) Best Value selection process including a technical proposal with a cost element and an interview with the Hensel Phelps Design-Build team. The RFP included a Not-to-Exceed upset price of $116 Million (including seven Owner controlled allowances), and Hensel Phelps was selected as the 'Best Value' Design-Builder by the University's selection panel based on our overall credentials, team experience and design concept.

Your team is working through the Preconstruction and Design phase of the project and has completed the first milestone, Construction Start. Major components of the design and buyout are complete, and you have reached the point of inflection where critical decisions need to be made. Hensel Phelps prides ourselves on our ability to drive the project schedule through self-performed work and this project may be a prime opportunity to utilize our skills. However, there are limitations to available craft in the District as there are multiple projects utilizing these resources. In addition, with construction underway, the team shall evaluate remaining risk items against overall contingency and review any margin enhancement options.

Upper Management has requested a Third Point meeting to review the current status of design, buyout and remaining project risks. The review meeting will be your team's opportunity to present the current project strategy, overall risk mitigation measures and report back on the financial strength of the project. Your written overview is due by **10:00 PM tonight**, and you will be asked to present your findings during the Third Point meeting tomorrow. Interim progress meetings are scheduled for 10:00 AM and 2:00 PM today (Thursday, February 6th).

Any questions should be delivered, in writing, on the Request for Information form (RFI) to the senior management team at the 10:00 AM meeting. Response to these RFI's will be provided at or before the 2:00 PM meeting. The RFI form has been provided in the Supplemental Information (X.0.3). The 2:00 PM meeting will be for verbal questions and answers only.

Please note that some of the written questions occur later or earlier than the Third Point meeting, at some future or past point in the project. Consider these a "Time Warp" and answer them with that understanding. This is to challenge the team on the full realm of construction issues.

For the oral presentation on Friday, all teams shall include students representing the company's Project Manager, Superintendent, Estimator and Scheduler; other roles will be at the team's discretion. The 30-minute presentation should allow for 20 minutes of team presentation and 10 minutes of questions and answers. Your presentation should focus on the following topics: Cost, Schedule, Site Utilization, Construction Planning, Quality and Safety. Creativity and innovation are encouraged, **shallow marketing pitches are not.**

IV. PROJECT INFORMATION (Eric Freedman)

The Multi-Disciplinary Research Building (MRB) is a 5-story building consisting of testing labs, research offices and a lower level vivarium. Located in Riverside, California, the MRB is to be constructed on campus property owned by the University. The facility will support multiple themes of research including Life Sciences, Chemical Sciences, Medicine and Engineering. In addition to expanding UCR's research capabilities, the flexible laboratory and support spaces will promote scientific collaboration and cross-discipline research in an atmosphere that stimulates academic scholarship and provides opportunities for intellectual discourse.

This building consists of four testing lab / office levels totaling 142,000 SF and a lower level vivarium totaling 37,000 SF. The upper levels contain laboratory equipment, fume hoods, equipment cleaning racks along with support spaces for students and researchers to record their findings. The lower level vivarium contains holding rooms, equipment cleaning racks and two shelled spaces for future buildouts. All spaces will be used for high level research for graduate students and outside researchers. Included in the project is a café, located outside of the building, which will provide students and staff a place to get bites and refreshments throughout the day. The complexity and aesthetics of the exterior façade emphasize the importance of the University's commitment to provide optimal performance while not sacrificing appearance, and to create a landmark structure for the campus.

The building is set on the edge of the campus adjacent to the gymnasium and track. Construction will be conducted while classes are in session which creates additional coordination and safety concerns that must be assessed. The project site is also located in the middle of an arroyo which creates drainage and SWPPP (storm water pollution prevention plan) challenges. The MRB will be the first LEED Platinum building on the UCR campus and there is much excitement from the University to become a leading campus in Green Building practices.

The Design-Build Team must consider not only the RFP requirements that have been stipulated by the Owner but must also work with the future end users to ensure the design meets their expectations. Hensel Phelps' previous experience in leading Design-Build projects similar in nature provides your team with confidence in its ability to deliver this project on time and within budget.

The Contract Time allocated for Substantial Completion is two months of Conceptual Design Development and twenty-six months to complete the rest of Design and Construction. A set of project requirements were given to the Design-Build Team, as part of the RFP, which outlined the requirements for each specified space within the building. Such design requirements included laboratory equipment, occupancy expectancies, space uses, etc. Our team showcased several renderings and preliminary layout concepts during the interview process to communicate the vision for the building and will use these to kickoff Design Development process.

V. PROBLEM OUTLINE

Structure and tab your documentation according to the following outline. Include only the information requested in **Section VI. Submission Requirements.**

1. FINANCIAL STATUS REPORT 10
2. ESTIMATE 12
3. GENERAL CONDITIONS 15
4. PROPOSAL SUMMARY (TAB ANALYSIS) 18
5. SCHEDULE 21
6. COORDINATION OF WORK 27
7. CHANGE MANAGEMENT 31
8. PERSONNEL ISSUES 34
9. SAFETY 38
10. SITE UTILIZATION 41
11. QUALITY CONTROL 43
12. TEAM MEMBERS RESUMES 45

VI. SUBMISSION REQUIREMENTS:

Please note that some of the following questions do not fit into the time frame of the Problem Scenario described earlier (i.e. they occur earlier or later in the construction phase), consider these a "Time Warp" and answer them with that understanding.

0.1 EARLY DELIVERABLE - BIOGRAPHIES

Although this item has past, as a requirement of the Pre-Problem Statement, your team's final score may reflect a small point deduction if you failed to comply with this item in a timely and professional manner.

0.2 QUALITY OF SUBMITTED PROPOSAL

The appearance and organization of proposals is important in the construction industry as it is often our first opportunity to interact with a new Owner and/or impress the upper management in our company. We want them to see the professional image we are trying to portray and be able to find and understand the information we are presenting. Points will be awarded in this section based upon the appearance and organization of your team's submitted response to the following problems.

0.3 TIMELINESS OF PROPOSAL

Unless stated otherwise, one (1) hard copy and two (2) electronic copies of your proposal are due at **10:00 PM,** as per the Timetable in Section I. A ½ point penalty will be deducted from the team's score for each minute the proposal is turned in late.

1. FINANCIAL STATUS REPORT (FSR)

Written by Eric Freedman

During your Third Point review with upper management, you are responsible for providing a status on the financial strength of your project. You have had months of intensive design efforts while also buying out critical subcontractors. This is a great opportunity to show your Team's efforts to this point in the project, along with acknowledging potential risks that the Team is trying to mitigate. You will need to use the Financial Status Report to track buyout gains and losses to communicate to upper management the financial health of the project, along with identifying any potential for additional margin.

PART A: Financial Status Report

Use the FSR spreadsheet included (X.1.1) to identify buyout gains and losses from the original bid versus current contract values. Use the values given along with the final amounts as determined within Section 2 (Estimate), Section 3 (General Conditions) and Section 4 (Proposal Summary) to complete the summary spreadsheet. Your Team will need to explain the overruns of each scope and how these will affect the overall project budget. Be sure not to unlock cells within the excel file and only input to the yellow highlighted sections.

ANSWER: Reference FSR X.1.1.a.

PART B: Contingency

The initial contingency included in the proposal was 6.0% and was added to the initial budget for buyout risks and construction issues that will arise. Your team has made significant strides to complete subcontractor buyout which now allows you to evaluate the need for remaining contingency. Your task is to accurately determine if contingency should be increased, decreased or remain the same based off the results from your procurement efforts.

If your team has decided that a revised contingency percentage is required, populate it in the Financial Status Report spreadsheet (X.1.1). Be prepared to discuss your decision as to why contingency was increased, decreased, moved to margin or maintained.

ANSWER: Reference FSR X.1.1.a.

PART C: Fee

Included in our initial proposal was a fee of 4.0% which upper management felt would help us win the project. After reviewing your Financial Status Report, your team needs to determine if you can meet this fee or if adjustments need to be made (up or down) to cover additional risks or realize additional margin. It is important to note that adjustments made at this time will be tracked by your upper management and it will be your responsibility to make the agreed upon fee.

If your team has decided that a revised fee percentage is required, populate it in the Financial Status Report spreadsheet (X.1.1). Be prepared to discuss with your upper management why you decided to add, subtract or maintain your margin at 4.0%.

ANSWER: Reference FSR X.1.1.a.

PART D: Final Financial Status Report

After all the information has been gathered and complied into the Financial Status Report, your team will need to provide a written narrative (X.1.2) that indicates the current project budget, current project buyout status (listed as a percentage), contingency changes and what the final project margin will be. Please keep this write up brief and concise as your upper management needs a snapshot in time for the financial status of the project.

FSR Deliverables:

1. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of FSR (X.1.1).
2. Submit one (1) hard copy and two (2) electronic copies of narrative for Part D (X.1.2).

ANSWER: Reference FSR Narrative X.1.2.a.

2. ESTIMATE

Written by Isaac Gilles & Alina Vo

(Time warp to mobilization)

The UC Riverside Multidisciplinary Research Building construction is commencing. Your Senior Estimator has met with several trades throughout the early procurement process – including concrete subcontractors. She has a couple of quotes from subcontractors but wants to remain open to the idea of self-performing the concrete work.

Hensel Phelps continually strives to increase the quantity of self-performed work and ultimately create more opportunity for our craft as well as to augment project fees. Self-performing the concrete scope would give us a unique opportunity to control our destiny by driving the schedule, enhancing profit, and providing a quality product to the end users.

You are the Project Engineer fresh off your second successful self-performed concrete project with Hensel Phelps. You are bringing a wealth of experience and knowledge in the self-perform concrete arena. Moreover, you have a high-performing crew available from your last job. Thanks to your experience, your Project Superintendent has asked you to connect with the Senior Estimator on this project to do an analysis and determine whether it is profitable to self-perform this job.

PART A: Concrete Estimate

The estimate is comprised of formwork, concrete material, place and finish, labor, equipment, and associated general conditions. Additional crew members and general condition costs will be required to self-perform the concrete scope. Therefore, all associated general conditions for the concrete work shall be integrated into the total concrete value. Typically, for a concrete project this size, one additional Area Superintendent and two Field Engineers would be added to manage the concrete scope, alongside several foreman to run the self-perform craft crews.

Use the provided contract drawings to quantify the value of cast-in-place concrete to be installed on the UCR MRB, specifically:

- Continuous Footings
- Spread Footings
- Pile Caps
- Slab on Grade
- Columns
- Slab on Decks
- Concrete Beams
- CIP Structural Stairs (at Atrium)
- CIP Egress Stair

Supplemental Information:

- Concrete Estimate Spreadsheet (X.2.1) – This spreadsheet has been formulated for your use in compiling data, all teams will use the same format. Please fill in the quantities, unit costs, tax, and fee on this spreadsheet.
- Cost Data Sheet (X.2.2) – Resource for labor, material, and equipment unit costs.

Clarifications and Exclusions
In order to keep all teams' estimates consistent, please follow the guidelines below:

- Do NOT modify the Estimate Spreadsheet.
- Do NOT include additional material to account for concrete waste.
- Do NOT include additional material or labor to account for patching of exposed concrete.
- Do NOT include reinforcing bar in your estimate, as it is included in the FSR
- Do NOT provide any other concrete components other than the items listed above, i.e. Site Concrete, Exterior Stairs, Site Seat Walls, etc.
- Do assume excavations for footings are neat dug
- For General Conditions, please round up to the nearest whole number to get total months.

Estimate PART A Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of your Concrete Estimate (X.2.1).

ANSWER: Reference Concrete Estimate X.2.1.a.

PART B: Formwork

You have been asked by your Senior Estimator to determine whether you should rent or purchase formwork. It is your responsibility to evaluate the cost difference and determine the most economical and efficient option for the formwork procurement. Please use the two provided formwork vendor quotes to make your decision. The value chosen should be included in the overall concrete estimate.

Use the provided contract drawings in section X.0.1 and your project schedule (reference Section 5) to analyze the formwork quotes and determine if the formwork to be used on the UCR MRB should be rented or purchased for the following items:

- Slab on Grade
- Slabs on Deck and Concrete Beams
- Columns and Shear Walls

Clarifications and Exclusions

- Assume formwork quotes include quantities to account for cure time
- Include an additional month in the rental analysis
- Round up to the nearest whole number to get total months

Supplemental Information

- Estimate Spreadsheet (X.2.1) – This spreadsheet has been formulated for your use in compiling data, all teams will use the same format. Please fill in the quantities, unit costs, tax, and fee on this spreadsheet.
- Cost Data Sheet (X.2.2) – Resource for labor, material, and equipment unit costs.
- Formwork Quotes (X.2.3) – Two formwork quotes from vendors have been provided for your use to evaluate your cost of formwork.

Estimate PART B Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies of a narrative describing final decision whether to rent or purchase formwork.

ANSWER: For this project formwork can be rented at a monthly rate of $3,775 compared to the $5,000 one time purchase. For SOG it makes more sense to purchase formwork due to the duration. However, for the rest of the formwork it makes sense to rent due to the cost of monthly rental (and associated durations) vs. one time purchase. To purchase formwork would approximately be 3-4 times more expensive. Since the company is focused on attaining more self-perform work at this time, it would more cost efficient to rent the formwork. Hensel Phelps would select Flexiwoodworks because they had a more complete bid as well as a better price.

PART C: Fee

While understanding the extent of self-perform work on this project, determine what fee percentage will be allocated to your estimate. The proposed fee percentage shall be populated in the Estimate Spreadsheet (X.2.1) on Tabs A and B. A short narrative (500 word maximum) shall be submitted describing why the percentage was selected. If the concrete scope of work is performed by a subcontractor, the fee may be around 15-20%. Keep this in mind when proposing a fee percentage on self-perform work. The goal of self-perform is to provide a competitive price and enhance additional fee on the project.

Estimate PART C Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies of a narrative describing determination of fee percentage used for overall concrete estimate.

ANSWER: A 12% Fee was applied to Tab A for the self-performing concrete scope. Keeping in mind the status of the growing economy and limited work force, we applied a 12% fee to cover increased labor, material and equipment rates to mitigate our risks.

3. GENERAL CONDITIONS

Written by Alexa Watanabe

General Conditions (GC's) are real construction costs that are not immediately quantifiable by the untrained eye and are associated with on-site management, supervision and contract administration. GC's are the costs incurred during a construction project that typically are not directly related with labor or materials for construction, but are integral to the success, efficiency, and safety of the project. GC's are a critical component to risk and cost management and afford the contractor the ability to forecast costs, staffing, and project needs.

At the outset of the job, a GC Estimate is required to forecast the associated project costs. The GC Estimate along with a supporting staffing matrix and staffing organizational chart will be reviewed at the Third Point meeting with upper management. In preparation for the Third Point meeting, upper management has requested that you create an organizational matrix of the project staff at the project's peak point in construction, the beginning of exterior framing while building structure is still ongoing. Hensel Phelps is performing at a high level across all districts, so it is imperative that the project's staffing needs are communicated to upper management early on. This projection will not only aid upper management in their ability to forecast staffing needs for your project, it will also identify future opportunities for staff to grow and develop into new positions. A Staffing Plan Matrix has been provided, see attached X.3.1. Using the Staffing Matrix, develop an organizational chart that will summarize the responsibilities of each member of the staff based on the project needs at its peak in construction.

PART A: Staffing Organizational Chart

(Note: the General Conditions budget from this part should be carried into the FSR section)

Using the staffing member numbers shown in the staffing plan provided in X.3.1, develop a staff organizational chart that depicts the various roles that will be required for the project to run smoothly and efficiently. An example of a staffing organizational chart has been provided in X.3.2. Note that this serves as an example of how an organizational chart should be arranged; the scopes and responsibilities for each staff member should be developed through your own breakdown of the staffing plan and understanding of the scopes required for the project. Include the position, role (interiors, MEP, etc.) and general responsibilities of the staff member in each box of the matrix. Descriptions of each positions' responsibilities have been provided in X.3.3.

Through your evaluation of the staffing plan and allocation of roles and responsibilities, provide an evaluation to upper management as to whether or not you believe the project is overstaffed, understaffed, or sufficiently staffed. If you believe the project is overstaffed or understaffed, provide an explanation for your reasoning as well as proposed solutions as to how the staffing can be adjusted in order to ensure the project is staffed for success. Update the GC Estimate Matrix provided in X.3.4 and reflect these revisions in your final staff organizational matrix. The revised GC's budget number should be carried into the FSR section.

General Conditions PART A Deliverables:

2. Submit one (1) hard copy and two (2) electronic copies (PDF) of your Staff Organizational Chart.
3. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of your revised Staffing Plan.
4. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of your revised General Conditions matrix.

ANSWER: Reference Staff Organizational Chart X.3.1.a, Revised Staffing Plan X.3.2.a and Revised GC Matrix X.3.3.a.

Staffing evaluation to upper management:

Based on the development of this organization matrix, it is apparent that the staffing plan is insufficient in several areas. The current staffing plan shows two Office Engineers for the duration of the project. Due to the high volume of scopes involved in the project, it is recommended to provide an additional Office Engineer to aid with processing submittals and RFI's. This will allow for the individual Office Engineer to also be able to focus on reviewing drawings and specs to identify any potential RFI's before they become issues in the field.

In addition, it is recommended to add two additional Field Engineers to the staff. Currently, only two Field Engineers are shown. This will make it difficult for the Field Engineers to be diligent with layout and QC of work being put in place when one or both of them are called upon for other tasks around the project. This could also provide an opportunity for a more seasoned Field Engineer to train newer Field Engineers and their replacement. There also needs to be more Field Engineers to support the Area Superintendents in their coordination of various scopes.

The staffing plan was also able to be adjusted to more strategically bring staff in and out to support the major milestones of the project (structure, exterior framing, interiors, etc.). By designating staff to specific roles on the project and bringing them in as that scope of work is about to commence, we can lower our staffing costs while still providing full coverage on the project.

Lastly, two interns were added to the staff during the summer months of the project. Due to Hensel Phelps' strong internship program and the valuable experiences that would be gained at this large-scale and complex project, it would be extremely beneficial to provide exposure to students interested in construction who could possibly be part of the Hensel Phelps team in the future.

PART B: Extended General Conditions

(Time Warp to 6 months prior to substantial completion. Consider this section independent of other sections unless noted otherwise. ***Do not*** *carry GC value forward to FSR Section.)*

Your team is 6 months away from substantial completion of the project and the Owner has requested that the Vivarium Shell and Imaging Core areas of the lower level be built out with various holding and procedure rooms. For the purpose of this exercise, the buildout will consist of a three (3) month design/procurement duration and an eight (8) month construction duration. For this exercise, assume the design/procurement for the Vivarium Shell/Imaging Core buildout will take place three (3) months prior to substantial completion of the main MRB project, and construction for the Vivarium Shell/Imaging Core buildout will begin immediately after substantial completion of the main MRB project. Similarly, to the GC's provided (X.3.4) for the main project, create a GC estimate for the Vivarium Shell/Imaging Core Buildout using the template provided (X.3.5). Only modify the values highlighted in yellow of the template to create your estimate, which will be used as a tool to evaluate if Hensel Phelps can complete the scope within the specified GC budget of $650,000. Because this work will be closely related to contract work, provide

justification for your assumptions in the appropriate column provided in the template. The drawings for the Vivarium Shell/Imaging Core buildout are provided (X.3.6).

In addition to this GC estimate review, prepare a Staffing Plan to reflect the staffing needs for the Vivarium Shell/Imaging Core buildout shown in your GC's. Create this Staffing Plan using the provided template (X.3.7). Each staff member's total dedicated duration on the project should be included on the matrix to accurately project staffing costs, as these durations are pulled into the GC estimate.

As you complete the Staffing Plan spreadsheet take note of your assumptions and justifications for staffing recommendations that you feel are abnormal or require justification. Grading will be based on logic and reasoning of your staffing recommendations. Any pertinent information to justify your matrix should be written in the assumptions and justifications section of the spreadsheet.

Please Note:

- General Conditions include all the operating costs and expenses for your on-site salaried supervision.
- Project Executives are to be carried by District overhead and not included in GCs.
- Home-office overhead is not included in GCs. However, satellite project office and relocation costs will be billed to the project.
- Supervisory staff positions should be allocated to the project as the team sees fit to complete the work and closeout.
- All General Conditions associated with direct work such as subcontracts and specific costs of work are carried within the specific scope budget; therefore, those costs are not to be included in the overall General Conditions breakdown.
- The number of interns allowed at each project is up to your team's discretion. All costs associated with the moving and housing of interns are provided by the jobsite.
- Assume Material Sales Tax of 8.75%
- Permit Fees are carried by the Owner
- Contractor's Fee is not carried within the General Conditions, see FSR in Section 1
- Bonding and Insurance Fees are not carried within the General Conditions, see FSR in Section 1
- For the purpose of this exercise, do not add or delete line items from the GC Estimates provided

General Conditions PART B Deliverables:

1. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of your General Conditions Estimate for the lower level Vivarium Shell/Imaging Core buildout.
2. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of your Staff Plan for the lower level Vivarium Buildout.

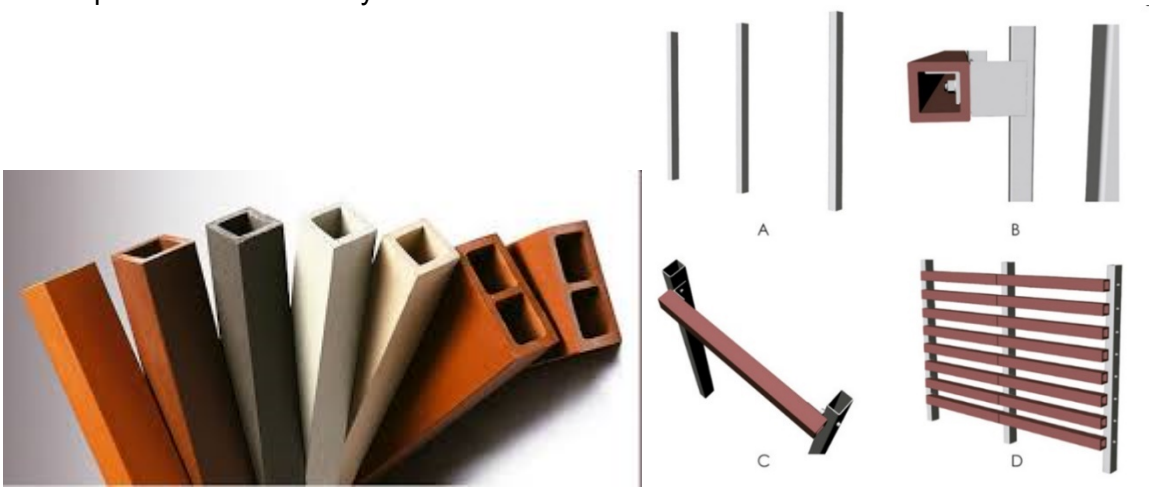
ANSWER: Vivarium Shell/Imaging Core Buildout General Conditions Estimate and Staffing Plan Reference X.3.4.a and X.3.5.a.

4. PROPOSAL SUMMARY (TAB ANALYSIS)

Written by Matt Rickert

In preparation for the Third Point review with your upper management, final selections of a few key trade partners need to be made. Bid tabs have been set up to help you compare each of the trades' proposals. In addition to seeking the lowest price, you will evaluate how well they understand and account for the scope they bid upon. Your final selections should hopefully inspire a feeling of confidence.

The following scopes will be your focus for making your bid tab selections. First, the Owner is asking that this MRB feature some specialty materials from overseas which will be incorporated into the building envelope. The terracotta baguettes pictured below have been selected. You will want to ensure that the correct supply chains are open for procuring these materials and ensure that a qualified crew is ready to install.



(Photos of Baguettes, courtesy of http://terracottafacadepanels.sell.everychina.com/)

Second, the MRB features some plumbing and mechanical systems that are not generally found in standard buildings but are critical for the laboratories and vivarium to function. Early on, a plumbing and mechanical trade partner was brought into the team to help with the design of this building. However, it was agreed to leave some of the specialty systems on the table to be bid later after the scope was better understood. You will now be evaluating and selecting the award of these specialty systems. This scope will also be critical for attaining LEED Platinum, which is a firm goal for the owner. We need at least 10 LEED points from this scope to achieve that goal.

Third, this project has a healthy amount of Miscellaneous Metals that will need to be accounted for. This scope offers visual appeal as well as functionality to the project. You will need a capable trade partner who works well with the other trades and is persistent with completing this integral scope.

Fourth, glass railings add a contemporary aesthetic to the entrance hall. This beautiful glass will allow light to flow and it will draw the eye to the many intricate details of the building. The glass will demand that the contractor pay full attention to detail in order to get it right.

In addition, the project has a goal of awarding 25% of scope to small or locally owned businesses. To meet this goal across these four scopes we will need to award at least $2,150,000 to small or local businesses. A fifth tab has been set up to help you evaluate this.

Your awarding of scope to a strong trade partner will help bring together the key details that make this a unique building. On the other hand, choosing the wrong trade partner could cause a lot of headache. If the latter were to happen, your team would likely have to step in to pick up the slack in coordinating these specialty systems. You may find certain scopes will require an intense coordination effort from your team, regardless of which trade partner you select. If you believe that to be true, your project manager has given you leeway to self-perform portions of the scope. If you find that self-performing a portion of scope would be the best option for the project, be prepared to explain to upper management why you made that decision and what your plan will be to make it successful.

After analyzing each subcontractor's proposal, do not hesitate to contact them. You will have an opportunity during the in room interviews this afternoon. If there is any suspicion of double ups between other bid tabs, scope gaps, or other discrepancies, then raise the question to them. Each bid tab needs to be accompanied with the appropriate check questions to ensure the subcontractor's scope is whole. Your estimator has assumed several necessary check questions, but as you review the scope you may deem it necessary to expand your check question list. Sometimes it takes multiple conversations to effectively gauge a subcontractor's intended scope.

The estimator has calculated a budget in the Scope Desired column based on what they believe the complete scope is worth. Be aware that the values for these line items are projected estimates based off historical data and trends. It is not uncommon for actual values to vary due to market conditions, escalation, labor rates, level of difficulty, etc.

As you are comparing subcontractor bids on the Proposal Summary, keep the following contract requirements in mind:

- The prime contract requires 25% of Local or Small Business participation.
- Company policy requires payment and performance bonds on all contracts over $50,000
- The specifications require LEED Platinum certification

In summary, you are tasked with finding a fully comprehensive trade partner. The lowest bidder is not always the right answer, so if you aren't familiar with them, sometimes it's prudent to seek out a reference. It is your job to compare complete scopes to determine the correct value to carry. If a contractor has not included a certain cost/scope use Blue Numbers. Blue Numbers are estimated values derived by your estimating team (budget column). These numbers can be plugged into other bidders quotes to complete the scope. Red Numbers (Negative Plug Numbers) can be used for the opposite of a Blue Number when a subcontractor includes too much scope and a deduction is needed to get to the right scope to accurately compare bids.

If a portion of the bids are prefilled in, then assume they are correct and do not edit those cells. These have been prefilled to help guide you and take away any ambiguity. In addition, be aware of formulas especially at the bottom of each bid column that are meant to sum up the values. These are meant to help you, but you are allowed to modify them, which you may need to do in order to sum up the correct values. Just be careful with formulas as you will be awarded points for getting the correct total bid value summations for each bid.

The subcontractor proposals have been provided (X.4.1). Carefully read through each proposal and fill in the missing line items on the Proposal Summaries provided (X.4.2), using blue and red numbers where necessary. Once you have completed your review, select a trade partner and indicate the total cost by circling the complete value of the required scope of work.

You will be allowed to briefly interview each subcontractor "by phone" to ask general scope questions not already included in their proposals or to clarify inclusions or exclusions within their proposals. A representative for each trade will visit your room between 3:00 PM and 7:00 PM. Each trade will be represented by a separate member of the Hensel Phelps team, giving you the opportunity to interview multiple subcontractors at once. You will be allotted ten (10) minutes to conduct all your interviews. Please note that this is intended to be a realistic exercise. Your subcontractors may be rude or evasive; but keep in mind, this is not an attempt to frustrate the team, but rather to represent the real difficulties encountered in real-life purchasing scenarios.

Proposal Summary Deliverables:

1. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of each proposal summary with all subcontractor cells filled in and the selected subcontractors total value circled.
2. Submit one (1) hard copy and two (2) electronic copies with a brief narrative for each of the (4) scopes (500 or less words in total) explaining why the subcontractor for each scope was chosen.

ANSWER: Reference Proposal Summaries X.4.2.a.

5. SCHEDULE

Written by Lissette Flores

(Time warp to procurement phase prior to the initial CPM submission.)

The Construction Schedule serves as the "road map" as to how you are planning to build your project. It assures adequate planning, scheduling, and reporting during execution of all construction activities so they may be prosecuted in an orderly and expeditious manner, within the Contract Time and the Milestones stipulated by the Contract. The contract schedule also assures coordination of the work between the Contractor and the various subcontractors. It also assists in detecting problems for the purpose of taking corrective action and to provide a mechanism or tool for determining and monitoring such actions.

As the Project Superintendent you have been tasked to develop a schedule that accurately reflects your plan for building the project. Using the drawings and specifications provided you are to submit a proposed Detail Design/Construction Schedule in CPM format for your review with management. The schedule is to effectively communicate your plan. In turn, your schedule presentation, written and oral, will be comprised of:

1. Building a CPM Schedule to support a final completion of a maximum of 26 months from Notice to Proceed.
2. Developing a Work Breakdown Structure for the Design portion of the schedule.
3. Identifying the Critical path and justifying it.
4. Incorporating key milestones

The following criteria explains the background information and requirements of the CPM schedule your team will present.

Part A: Construction Schedule

General CPM Schedule Criteria:

a. Presentation Criteria:

i. Column Format:

1. At a minimum show the following columns to the left of the timescale (Gantt Chart): Activity ID, Activity Description, Original Duration, Early Start, Early Finish, and Total Float (see Figure "A" example below).:

Figure A:

Activity ID	Activity Name	OD	Early Start	Early Finish	Total Float
⊟	UCR - MRB1 CPM Schedule Reno 2020	0			0
	Milestones	0			0
⊞	Design	0			0
⊞	Preconstruction	0			0
	Mobilization	0			0

i. Activity count: No less than 500 and no more than 1000 activities.

ii. There should be a continuous logic flow of critical path activities from the Notice to Proceed through to Final Project Completion.

iii. Organize your activities so they are easy to read, grouped intuitively and follow proper sequence to present a nice schedule "flow."

b. Work Breakdown Structure (WBS):

In order to maintain flow and composition, schedules are typically organized by a WBS. The WBS is the outline of a schedule, and acts as an umbrella to capture the theme or specific nature of an activity set. A WBS can contain multiple layers and subsets to aid in the organization of the activities, or it can be simply based on the structure and complexity of the schedule.

The following (i.- ix.) is the base WBS provided by your Project Superintendent. There are Maximum Working Days (MWD) shown after certain WBS for assistance, which you are not required to match to the exact day; but they serve as a duration guide. Each WBS should contain a breakdown of activities which will demonstrate your knowledge of the entire project. The Main WBS subcategories have been provided to assist in building your schedule, you will need to further detail the WBS as necessary and most importantly incorporate the activities required to show the full flow of work from start to finish.

i. Milestones (Constrained Dates)
   a. Contract Award – December 5th, 2019
   b. Notice to Proceed Design Development (December 5th, 2019)
   c. Notice to Proceed Construction Document Development & Construction to Substantial Completion (February 6th, 2020) (557 WD)
   d. Substantial Completion (April 22nd, 2022)
   e. Project Completion (May 20th, 2022)

ii. Design (See Part B)

iii. Preconstruction
   a. Subcontracts-Submittals-FAB
      i. Subcontracts
      ii. Submittals Preparation & Review
      iii. Material Procurement & Fabrication

iv. Mobilization
      i. Construction Trailer Set Up
      ii. Site Set Up

~~v.~~ Early Site Work
      i. Demolition
      ii. Grading – Excavation – Caissons
      iii. Site Utilities

vi. Building Structure (191 MWD)
      i. Foundations
      ii. Elevator Pits
      iii. Shotcrete Lower Level Exterior Walls
      iv. Columns and Interior Walls
      v. Slab on Grade
      vi. Elevated Deck
         1. Deck
         2. Columns & Walls
      vii. Stairs
      viii. Exterior Skin
         1. Exterior Glass
         2. North Elevation
         3. East Elevation
         4. South Elevation
         5. West Elevation
         6. Roof & Terraces
      ix. Interiors

x. Site Improvements

c. Start-up & Commissioning CPM Schedule Body Breakdown
   i. Milestones:
      1. Contract Award Notice to Proceed Design Development – This milestone marks the date that the project has been awarded and the owner has issued a contract to begin design. This will be the date utilized for the start of the contractual durations.
      2. Notice to Proceed Construction Documents & Construction - The NTP Construction Documents & Construction marks the date in which the second contract with the owner has been issued. This contract acknowledges the acceptance of the design intent and allows Hensel Phelps to begin developing the construction documents for permitting as well as actual work on the project such as buyout, preconstruction, and mobilization for construction.
      3. Substantial Completion – Defined as "the building can be used for its intended purpose." To satisfy this requirement, all construction activities shall be substantially complete, the building systems must be energized and operational.
      4. Final Completion – Designates the date that trainings, close out documentation, and final billings (Subcontractor and Owner) have been completed and submitted to the Owner.

   ii. Calendar
      1. Rain Days. (45 WD)
      2. University Holidays: The following is a list of University holidays. No work is to be performed during these dates.
         a. New Year's Day
         b. Martin Luther King Day
         c. Presidents' Day
         d. Memorial Day
         e. Independence Day
         f. Labor Day
         g. Veteran's Day
         h. Thanksgiving Day (and day following)
         i. Christmas Eve Day
         j. Christmas Day
         k. New Year's Eve Day
      3. The schedule should be on a standard 5-day work week calendar.

   iii. Bid Packages & Scope Buyout
      1. Hensel Phelps will need to sign up subcontractors to perform various scopes of work and will need to ensure that this subcontractor is capable to perform the work needed.
      2. Assume the estimating department cannot buyout all scopes of work during the same time.
      3. Assume 20 workings days to allow for Buyout scopes noted below. You may need to add additional scopes to facilitate any submittal requirements.
         a. Elevators
         b. Design-Build Mechanical
         c. Design-Build Electrical / Low Voltage
         d. Design-Build Fire Protection

e. Design-Build Plumbing
f. Laboratory Casework / Equipment
g. Framing & Drywall
h. Metal Stairs
i. Window Wall Systems
j. Caissons/Shoring
k. Structural Concrete & Reinforcing
l. Waterproofing
m. Curtain Wall
n. Doors & Hardware
o. Flooring

iv. Submittal Preparation, Review & Approval:
1. Submittal preparation and review allows time for your subcontractors to provide you with the product data (PD) and shop drawings (SD) related to their material and scope of work that they plan to utilize on the project. This time is also utilized for Hensel Phelps, the Design Team and Owner to review the submittal information for design compliance and acceptance.
2. Assume a period of 5 working days for subcontractors to create submittals, 5 working days for internal review of submittals, 5 working days for submission and review to Architect/Engineer, and 10 working days for submission and review by the Owner.
3. Provide Submittal activities for the following scopes:
a. Structural Concrete and Reinforcing
b. Emergency Generator
c. Mechanical Equipment
d. Electrical Systems
e. Elevators
f. Curtain Wall
g. Cage Rack/Wash
h. Laboratory Casework
i. Laboratory Equipment
j. Framing Shop Drawings
k. Metal Stairs
l. Waterproofing
m. Flooring

v. Material Procurement:
1. Material procurement is a very important aspect of any Project. In many cases, the material can't get on site fast enough to facilitate the Schedule. Before a Subcontractor can even start material procurement, you need approved submittals. In some cases, only the Architect/Engineer need to review/approve those submittals prior to the Subcontractor proceeding with material procurement. Similarly, to other sections, utilize the best activity as a predecessor to the Subcontracting procuring material. The schedule should depict material procurement (fabrication and delivery) of the following items:
a. Air Handling Units (AHU's) – (120 WD)
b. Elevators – (100 WD)
c. Metal Stairs – (50 WD)

d. Curtain Wall – (50 WD)
e. Doors and Hardware – (40 WD)

Notes: Material Procurement activities cannot begin until its associated Buyout and Submittal activities have been completed. You need to track its release. Do not forget to show an Owner activity for this. You are not limited to only these material deliveries, add additional as you deem necessary.

vi. Commissioning Schedule Build-out:
    1. Electrical System Start-up & Commissioning
    2. Fire Protection System Commissioning
    3. Mechanical System Start-up & Commissioning
    4. Plumbing System Start-Up & Commissioning

Schedule PART A Deliverables:

1. Submit one (1) electronic copy of the Full Baseline CPM Schedule in Native File Format (i.e. XER file).
2. Submit one (1) hard copy and two (2) electronic copies (PDF) of the following:
    a. Full CPM with WBS: Earliest start date.
    b. Primary Critical Path with no WBS: Sorted by start date.
    c. Full CPM with no WBS: Filtering all activities sorted by start.

ANSWER: Reference X.5.A.2.a, X.5.A.2.b and X.5.A.2.c for the CPM Schedule and CPM Reports

PART B: Design Increments and Design Schedule (Early Deliverable 11 AM)

As the project scheduler, you work closely with the Design Manager in developing a series of design increments and design packages that removes design from the critical path as soon as possible, supports the overall construction schedule, proactively engages the Owner, sub-consultants and stakeholders for design reviews and feedback and helps set the foundation for the establishment of mutually accepted review procedures.

Hensel Phelps will have a phased Design Management approach that prioritizes work based on the critical path for the project, taking into consideration elements that may require added stakeholder involvement to fully vet out the proposed design and assure all operational needs are addressed.

The UCR MRB1 building was split into two phases that allowed the Hensel Phelps team to finalize the Design Development two months prior to beginning of construction. During the Third Point review you will explain to management how your phasing will align with construction to ensure the team has a permitted set of drawings to move forward with their work. At 11 am you will turn in the Work Breakdown Structure for Design. Your Project Superintendent will review and provide feedback to ensure your logic is correct prior to your presentation. This early submission will not count towards the overall grading of schedule, however your final Design schedule included within the CPM will be graded as well as your understanding of phased permitting during your presentation.

Please use the following guides to develop your WBS:

a. Presentation Criteria:
    a. Use the same schedule criteria as Part A
    b. Activity count: No less than 30 and no more than 60 activities

b. WBS
   Design Package #1 –Demolition & Site Utilities
   Design Package #2 – Structure and Foundations
   Design Package #3 – Building Envelope
   Design Package #4 – Building Interiors & Landscape

Schedule PART B Deliverable due at 11 AM:

NOTE: Feedback will be provided after this section is submitted. You must incorporate the feedback comments into your final schedule submission for final grading of this section.

1. Submit one (1) electronic copy of your Design CPM with WBS Report at 11:00 AM to **HPCCRENO2020@gmail.com** to receive feedback. Please use the following as subject reference: *"School Name"* – Schedule Deliverable.
   a. Design CPM with WBS sorted by start date.

ANSWER: Reference Design CPM with WBS X.5.B.1.a.

6. COORDINATION OF WORK

Written by Tasha Niesen

PART A: Coordination of Roofing Parapets

(Time warp to roofing preparation. Consider this section independent of other sections.)

You are the Superintendent responsible for the installation of the roofing systems. One of the activities that needs to be complete prior to the start of roofing install is understanding the construction of the roofing, parapets, and other associated aspects. Currently the CPM schedule is vague: waterproof followed by parapet install and ending with coping cap install. The CPM does not provide an adequate breakdown for you to schedule the multiple different Subcontractors that will be required to complete the work. As you can see from Drawing A4.0.0 and A2.6, there are many different parapet installation details and the sequence of construction will be critical in ensuring the systems gets installed correctly, the correct Subcontractors are on site with the materials required, and construction occurs in a timely manner.

1. Utilizing the contract documents, provide a construction sequence list that includes roof edge, parapet, coping caps, etc. for the south edge of the roof (see X.6.1 for boundaries). This should include each construction activity in chronological order. The sequence list should start after the roof decking and structural slab is placed. Due to the varying parapet details on the roof, attachment X.6.1 has been provided to show the (4) areas that require separate sequence lists. Please include specific contract drawing details utilized to develop each construction sequence list.

Coordination of Work PART A Deliverables:

1. Submit one (1) 8 ½" x 11" hard copy and two (2) electronic copies (PDF) of the construction sequence list (utilizing attachment X.6.1).

ANSWER: Reference Coordination of Roofing Parapets X.6.1.a.

Construction Sequence List

1. ***GL C-J.1 (Detail 20/A5.9.1, 34/A5.3.1, 43/A5.5.2, 36/A5.3.1, 48/A5.5.2, 20/A5.0.2)***
    - ***042000 CMU***
    - ***061053 Blocking***
    - ***075419 Air and Vapor Barrier (Interior of wall)***
    - ***081513 Clear Concrete Coating***
    - ***Taped Termination Joint***
    - ***071800 Reinforced Waterproofing System***
    - ***072726 Fluid Applied Air Barrier (Outside of wall)***
    - ***076200 Stainless Sheet Metal Flashing***
    - ***072726 Bed of Sealant***
    - ***072726 Fluid Applied Air Barrier (on top of metal flashing)***
    - ***042000 Drainage Mat***
    - ***042613 Brick Veneer (with 042613 Brick Seismic Ties)***
    - ***075419 Lightweight Insulating Concrete***
    - ***076200 Aluminum Flashing (One section exterior of wall at coping cap)***
    - ***075419 PVC Roofing Membrane***
    - ***076200 Painted Aluminum Sheet Metal Coping***
    - ***076200 Two Piece Aluminum Flashing***

2. ***GL J.1-J.4 (Detail 11/A5.3.16, 66/A5.3.1, 24/A5.0.1, 34/5.3.1, 43/A5.5.2, 20/A5.0.2)***
    - ***042000 CMU***
    - ***061053 Blocking***
    - ***075419 Air and Vapor Barrier (Interior of wall)***
    - ***051200 Steel Ledger***
    - ***072726 Fluid Applied Air Barrier (Outside of wall)***
    - ***076200 Stainless Sheet Metal Flashing***
    - ***072726 Fluid Applied Air Barrier (on top of metal flashing)***
    - ***042000 Drainage Mat***
    - ***042613 Brick Veneer (with 042613 Brick Seismic Ties)***
    - ***075419 Lightweight Insulating Concrete***
    - ***076200 Aluminum Flashing (One section exterior of wall at coping cap))***
    - ***075419 PVC Roofing Membrane***
    - ***076200 Painted Aluminum Sheet Metal Coping***
    - ***076200 Two Piece Aluminum Flashing***

3. ***Bump-In - GL J.4-K (Detail 14/A5.3.16, 24/A5.5.2, 43/A5.5.2, 20/A5.0.2, 19/A5.3.5, 11/A5.3.15, 38/A5.3.16, 22/A5.6.5, A5.3.18)***
    a. ***042000 CMU***
    b. ***Install Back Wall Panels***
        - ***051200 Structural Steel Tube (imbedded in CMU)***
        - ***074213 Panel Clips***
        - ***074213 Formed Aluminum Panel***
        - ***076200 Painted Aluminum Sheet Metal Coping***
    c. ***061053 Blocking (On CMU)***
    d. ***Front Parapet Install***
        - ***054000 Cold Metal Framing***
        - ***061600 Sheathing – Gypsum Board***
        - ***075419 Cover Board (with hat-channel)***
        - ***076200 Stainless Sheet Metal Flashing (Front parapet to side wall transition)***
        - ***061053 Blocking (on front parapet)***
        - ***072726 Fluid Applied Air Barrier (upper portion of CMU)***
        - ***2" Fire Safing***
        - ***Curtain Wall Clips***
        - ***084413 Glazing Aluminum Curtain Wall (with 084113 Shadow Box with Aluminum Back Pan and Insulation Panel)***
        - ***076200 Painted Aluminum Sheet Metal Coping***
    e. ***075419 Air and Vapor Barrier***
    f. ***075419 Lightweight Insulating Concrete***
    g. ***075419 PVC Roofing Membrane***
    h. ***076200 Stainless Sheet Metal Flashing***
    i. ***079200 Sealant Fillet***
    j. ***079200 Sealant and Backer Rod Between Coping and Flashing (Transition)***
    k. ***072726 Fluid Applied Air Barrier (finish exterior of CMU wall from roofing)***
    l. ***042000 Drainage Mat***
    m. ***042613 Brick Veneer***
    n. ***076200 Painted Aluminum Sheet Metal Coping***

   o. ***076200 Two Piece Aluminum Flashing***

4. ***GL K-R - With Scupper Install (Detail 51/A5.3.20, 50/A5.3.3, 54/A5.5.3, 52/A5.0.1, 20/A5.0.2, 24/A5.5.2, 34/A5.3.1, 43/A5.5.2, 26/A5.3.11, 30/A5.3.11)***
   a. ***092400 Plaster Corner Bead (build out plaster face)***
   b. ***092400 Plaster Termination Bead***
   c. ***092400 Bond Coat***
   d. ***092400 3/8" Brown Coat***
   e. ***092400 Base Coat/Reinforcing Layer***
   f. ***092400 Acrylic Plaster Coating***
   g. ***075419 Air Vapor Barrier (under CMU/scuppers)***
   h. ***042000 CMU***
   i. ***055000 Metal Lintel***
   j. ***042000 CMU***
   k. ***061053 Blocking Fire Rated (Treated)***
   l. ***072726 Fluid Applied Air Barrier (Exterior face of CMU)***
   m. ***076200 Stainless Sheet Metal Flashing***
   n. ***079200 Sealant Fillet***
   o. ***072726 Fluid Applied Air Barrier (Finish detail on exterior face of CMU)***
   p. ***075419 PVC Coated Flashing (CMU)***
   q. ***075419 Lightweight Insulating Concrete (roofing)***
   r. ***076200 Aluminum Flashing (One section interior of wall)***
   s. ***075419 PVC Roofing Membrane***
   t. ***075419 PVC Coated Flashing (exterior parapet)***
   u. ***076200 Painted Aluminum Sheet Metal Coping***
   v. ***079200 Sealant Joint***
   w. ***075419 PVC Roofing Membrane (Finish exterior parapet and run up interior face of CMU)***
   x. ***042000 Drainage Mat***
   y. ***042613 Brick Veneer***
   z. ***076200 Painted Aluminum Sheet Metal Coping***
   aa. ***076200 Two Piece Aluminum Flashing***

PART B: Coordination of Roofing Heights

(Time warp to roofing installation. Consider this section independent of other sections.)

You are the Office Engineer working with the Roofing Subcontractor. Roofing install is currently ongoing, and you get a call from your Superintendent wanting to know what the heights of the roofing crickets along the east side of the building. When you look at the "Accepted as Noted" Roofing Shop Drawings (X.6.2), you notice this area was missed with the original submittal and the Architect stated, "follow Contract minimums". After email/calling your correspondent at the Roofing company, you realize the person who can track down this information is on vacation for two weeks and not reachable. In order to keep the schedule on track, the Superintendent needs this information by the end of the day to verify the roofers install.

Use the Contract Documents and fill out the missing values on table X.6.3. State any assumptions made to finalize the minimum roofing build-up heights.

Coordination of Work PART B Deliverables:

1. Submit one (1) 8 ½" x 11" hard copy and two (2) electronic copies (pdf) for the missing roof cricket heights (attachment X.6.3).

ANSWER: Reference Coordination of Roof Heights X.6.3.a.

7. CHANGE MANAGEMENT

Written by Elijah Elliott

(Time Warp to First Floor Specialties & Finishes)

The lower level vivarium is nearing completion with more finishes progressing each day. The ceiling trade partner is rolling through and dropping ceiling tiles while the specialties contractor wraps up casework throughout the floor. Following an Owner's Meeting at the other end of the trailer, you see the project engineer making a beeline for your desk. He sits down in the chair next to you beaming ear to ear and says, "They're doing the Vivarium".

The owner confirmed in the meeting that they were ready to go on the Vivarium buildout. The Owner then explained the change order for this work needs to be in his hands today so he can allocate funds. When the possibility of a buildout was discussed at the front end of the project the team got ROMs from all the subcontractors. The MEP trades are being confirmed by your project engineer and will be shared with you for the final change order request. The framing, specialties, and flooring subcontractors submitted the following Rough Orders of Magnitude (ROMs):

Front Avenue Framers (Framing) - $600,000

Nicholas Spencer & Yrslov Novotny Corp. (Specialties) - $350,000

Singular Course (Flooring) - $85,000

Your task is to confirm final pricing for the impacted trade partners associated with these scopes, draft the change order request and submit it to the Owner. Reference the Vivarium Buildout Drawings (X.3.6) to ensure that all scopes are considered.

PART A: Finalize Subcontractor Cost

The project engineer you work with has already gotten all added MEP costs, you need to cover the framing, specialties, and flooring. The project is already moving into the final phases of construction, so there is no money left to cover missed scope or additional time to build. It is up to you to ensure Subcontractors are only pricing the portion of this change that is deemed 'outside' of their original subcontract scope requirements and the pricing includes all outstanding work leaving no scope gaps. Create an email clearly explaining the change and requesting all cost and schedule impacts.

Change Management PART A Deliverable:

1. Submit your impact request email no later than 12:00PM to **HPCCRENO2020@gmail.com** in order to receive the Trade Partner Pricing. Please use the following as subject reference: *"School Name"* – Change Management Deliverable.

ANSWER: Reference Change Management Email Expectations X.7.1.a.

PART B: Determine Feasibility of Self-Performed Work

Review the Framing, Specialties and Epoxy Flooring proposals received via email, confirm their accuracy, validity and entitlement and input the subcontractor's final costs into the appropriate tabs on the Owner Change Order Request Template (X.7.1).

Hensel Phelps is continually pursuing new opportunities to complete self-performed work. The Specialties scope in the vivarium buildout is a possible opportunity that your Project Superintendent would like to consider. If pursued there will be additional costs to facilitate this added scope of work. Reference the Labor & Material tab within the COR Template (X.7.1) with values provided by your Superintendent to determine total cost for self-performing this scope. Use the Vivarium Buildout Drawings (X.3.6) to complete the necessary takeoff and compile a complete self-performed estimate. Be sure to note the following allowable markups for change order work:

- Sales Tax on Material: 8.75%
- Contractor Bonds and Insurance: 1.1% *(for self-performed work B&I is carried as part of the Prime COR and should not be incorporated into estimate for evaluation against Subcontractor pricing)*
- Allowable Subcontractor Bonds & Insurance: 2%
- Allowable Self-Performed OH&P: 6%
- Allowable Subcontractor OH&P: 15%

Once the estimate for self-performed Specialties is complete and trade partner pricing is populated into the respective tabs, compare the prices and determine which option to pursue. Provide a narrative that explains why you chose to self-perform or not self-perform the Specialties work.

Change Management PART B Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies of your narrative regarding the decision to self-perform or subcontract the Specialties scope of work.

ANSWER: Choice to Self-Perform Specialties

Our biggest job as a General Contractor is the mitigation of risk. In this situation there is a risk when self-performing specialties because it is not scope we have a vast amount of experience with. The risk there is that we could anticipate a certain labor rate, as the superintendent does in the L&M tab, then see that be inaccurate in practice for any number of reasons in the field. We are also expanding the possibility of damaging other work in place or replacing our own errors with money from our pocket.

There are several rewards for doing the specialties work the first of which is that we stand to save a few thousand dollars because we aren't paying a subcontractor their fee for work. This savings can be passed forward to the owner which is always a positive. In this case those savings will be passed on and our fee will be augmented by the additional fee worked into the self-performed scope. This leads to the other reward, the opportunity to build experience in building other scopes. If the specialties install is successful there is now an opportunity to pursue future projects with the similar strategy of enhancing fee while being more price competitive overall. The specialties are a very small portion of the overall contract and the scope is a relatively small quantity of work. We think that the risks of pursuing self-performed specialties are far outweighed by the rewards described above.

Choice to Subcontract Specialties

The end goal of the project is a great building in the sky and a healthy profit for the work in place. If that happens it will be from the successful mitigation of risks to the owner, subcontractors, and us the general contractor. There are some heavy risks to consider here. Although we have experience in this trade elsewhere around the nation, our project team has never performed specialties, what reason do we have to believe our crew can outperform the crew of a contractor with decades of experience in this field. If the crew

falls behind it will be our funds that cover the overtime and additional labor necessary to maintain the schedule. If the crew were to put wall protection in the wrong space or crash rail on the wrong wall, we will be solely responsible for the trade damage. Also, our team must create new relationships with a manufacturer they have never worked with to get our materials out here. The biggest risk of all is the schedule. We are already at the end of the project, there is no time left to make mistakes. The right parts must arrive at the right time and be installed correctly the first time.

The rewards of performing this work are small, but present. If we self-perform specialties our fee will remain pretty close to the subcontracted fee. This will present as a more affordable sticker price to the owner which means owner savings without loss of contractor profits. The other reward of note is getting another trade on our self-perform resume. Higher self-perform capabilities equate to lower price bids to owners which results in more projects won in the future. The problem with both of these rewards is the size of the vivarium. There simply isn't enough work here to truly get a handle on specialties or really track labor metrics for that matter. The money the owner saves is very small, almost too small to even notice on a project like this. For the reasons listed above we have decided to subcontract the specialties as originally planned in this area.

*****Please note that both arguments may be deemed acceptable responses. Points for this problem will be issued based on completeness, reasoning and overall justification of final decision.***

PART C: Submit a Change Order Request (COR) to the Owner

After completing the compilation of the pricing information within the COR spreadsheet, utilize this information to complete the Owner Change Order Requests (X.7.1 Tab 1A & 1B) for review with the Project Superintendent and Project Manager. *(Note: you may change the cells to conform to the requirements listed below but be cautious when doing so.)*

Change Management PART C Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies of the completed COR forms.

ANSWER: Reference COR Answer X.7.2.a.

8. PERSONNEL ISSUES

Written by Zoey Malaluan

(Time Warp to Temporary Hoist Installation Preparation)

RJ is an Area Superintendent for Hensel Phelps at the UCR MRB project. RJ has been an Area Superintendent for three years, and in that role, he has had experience with subcontractor coordination and oversight for the exterior skin and interior buildout. At the UCR MRB, RJ will be responsible for the sitework and concrete, while also training a “red hat” or new-hire Field Engineer, Cal. Cal had interned with Hensel Phelps last summer and has high remarks from other Field Engineers and Office Engineers for his willingness to learn, organization skills, and ability to prioritize his work well.

The concrete crew is currently preparing for its slab on grade pour for the implementation of the temporary material man hoist. For this activity, Cal is in charge of getting the concrete pour card signed off by the carpenter foreman & the structural reinforcement inspector, for providing a material take-off of the rough carpentry, and for ordering the lumber & hardware for the ground-level deck to the man hoist. All the while, Cal also had made it a personal goal to complete the fourth floor, penthouse, and roof lift drawings by the end of the month.

The concrete placement is scheduled to take place in the next week. With the man hoist slated to arrive in the next two and a half weeks, the man hoist deck will need to be completed in the next two weeks. In the last month, RJ and Cal had been meeting together regularly while utilizing the four-week lookahead schedule to prioritize their work properly. RJ can sense that Cal is becoming overwhelmed with having to perform these tasks that he had not done independently before. The concrete pour cards must be signed-off the day before the concrete trucks show up, and the material take-off and procurement of lumber and hardware needs to be done within the next week so that the carpenter crew has enough time to build the man hoist deck. Cal understands his current responsibility on the project but feels the pressure and can’t quite wrap his head around how he will be able to execute his responsibilities in this final week, while also working diligently on his lift drawings so that they don’t all pile up at the end of the month.

Outside of work, Cal has been training for an upcoming cross fit competition which requires him to train with his group three evenings each week. Although cross fit is a passion of Cal’s it has been taking a lot of his energy, even draining him to the point where he has been taking two-hour lunch breaks so that he can get some rest.

There are now two days left until the concrete placement, and RJ has been calling Cal multiple times a day to get updates on his progress. Cal has stopped picking up phone calls from RJ and has even avoided phone calls from the carpenter foreman. Cal has stopped being present on the jobsite altogether, with hopes of avoiding possible confrontation from RJ and Lupe, the Foreman, and has instead started spending more time in the office to chip away at his lift drawings. The afternoon before the concrete placement, RJ had called Cal to schedule a meeting to ensure that the remaining blanks on the concrete pour card was signed-off by the carpenter foreman and structural steel inspector but again had gotten no response. RJ overhears a group of Field Engineers walking into the office sneering at how Cal had left early again to train for his cross fit competition. At this point, RJ is furious, as it seemed that Cal had come so close to wrapping up all of his tasks for this feature of work, but now completely dropped off his work responsibilities, making personal interests’ priority.

Keep in mind that clear expectations and communication must be reciprocated by both the supervisor and employee for the project and project team to succeed.

PART A: Supervisor Role

Hensel Phelps has high expectations for its leaders, as they are responsible for the company's coaching and development. As the Area Superintendent, reflect on your leadership ability to ensure that your Field Engineer is set up for success.

Put yourself in RJ's shoes and explain how you would approach Cal to address his unsatisfactory performance, poor prioritization, and lack of accountability for his responsibilities. Provide a single page narrative describing the steps you would take moving forward.

When formulating your responses for RJ please make sure that you have considered the following:

- What points will you cover when you discussing the facts and stating what you have observed?
- How will you set the tone for this discussion?
- What are the goals and are they measurable for improvement?
- Have you clearly outlined your expectations, more so for more critical features of work in the near future?
- How will you implement work-life balance at the resolution stage of your meeting?

Personnel Issues PART A Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies of your responses.

ANSWER:

As an "old timer" Area Superintendent with Hensel Phelps, I understand that I must embody and exhibit the core standards and values of the company, in order to build the builder within the new Field Engineers.

In approaching Cal to address his recent unsatisfactory performance, poor prioritization, and lack of accountability for his responsibilities, I would first recognize and commend Cal for his what he has done well previously. Cal had been a standout intern for his willingness to learn, organization skills, and ability to prioritize his work well; however, due to his in experience with demanding construction schedules, he had been negatively affected (naturally) by the heavy workloads and looming deadlines which left him stressed and with low motivation and energy levels. It is important to continue the conversation on a positive note, while instilling confidence and expressing appreciation, to ensure that Cal understands how his individual contributions makes a difference to the project, the team, and to Hensel Phelps as a whole, highlighting the meaning behind his work as a Field Engineer.

When it comes to talking about the actual facts and issues that have been observed, it's important to clearly point in an objective manner each individual point (unsatisfactory performance, poor prioritization, and lack of accountability for his responsibilities) to ensure that there's transparency between Cal and I. Once the facts are stated, I want to be sure that I then create a teaching environment by stating what the objectives of the conversation are, provide feedback & expectations that both Cal and I can create agreeable solutions with, and have closure to create realistic and achievable goals with follow-up action items to better both he and I as builders of Hensel Phelps.

For goal setting, it's important to create SMART (specific, measurable, achievable, results-oriented, time-bound) short- and long-term goals. Goals and frequent performance evaluation is imperative in that it assesses strengths and areas for improvement; it opens the avenue to give and receive feedback; it improves overall communication; it identifies personal and performance goals; it focuses on training and development; and finally, it provides recognition and reward. Being that Cal's slip-up had happened during a less-critical scope of work, it is crucial that we dial-in these SMART goals so that we can excel as Area Superintendent and Field Engineer for the upcoming scopes of work, such as slab on deck pours for the entire level. One goal may be to have the concrete pour card signed off by the foremen and inspectors no later than 4 PM and reviewed by the Area Superintendent no later than 5 PM on that same day. Another goal may be to have his lift drawings completed for the fourth floor by the end of the second week of the month, the penthouse by the third week of the month, and the roof by the last week of the month. Early planning through goal setting allows me as the Area Superintendent to set clear objectives and expectations and gives Cal time to better prioritize his work and manageable deadlines. As his coach, I'm learning how vital it is to constantly reflect on how to better myself as a leader and train my replacement.

Lastly, I've always been told by my superiors that "true builders live", so I want to be inviting to ideas such as leaving no later than 4 PM on Fridays or even having a half-staff day on Fridays. Although the demands of schedule and deadlines tend to drive the necessity for working long hours, I want to emphasize Hensel Phelps's efforts to find ways to achieve balance while still trying to meet our obligations to our clients and the company's needs. It's key to develop creative solutions as you approach the challenges of balancing the responsibilities and joys of your multiple roles.

*****Please note that this answer serves as a basic guide for acceptable responses. Points for this problem will be issued based on completeness, reasoning and overall justification of action(s) recommended.***

PART B: Employee Role

Now, put yourself in Cal's shoes and explain to RJ what work-life balance and quality of life mean to you and how you will adapt your working style so that you can meet not only RJ's expectations but Hensel Phelps' standards. Provide a single page narrative describing how you would approach your supervisor regarding this situation.

When developing Cal's response, please make sure that you have considered the following:

- What is your purpose in talking with your Area Superintendent and what will be your opening line?
- How will you give your Area Superintendent an opportunity to share his feelings and demonstrate empathy to him?
- What messages do you want to convey to your Area Superintendent?
- What outcomes are you hoping to achieve?
- What can you do to work toward those outcomes?

Hensel Phelps has an excellent database of extensive resources and training materials. You know that this is the perfect opportunity to utilize those trainings and specifically the ones that address positions in leadership, both as a reminder for yourself and the difficult conversation you need to have with RJ.

You have handouts from previous training that you may use as a reference:

- 'Coaching and Developing People' in Section X.8.1 – This can be used as a guide to help generate ideas when creating your response for RJ.
- 'Communicating Effectively' in Section X.8.2 – This can be used as a guide to help generate ideas when creating your response for Cal.

Personnel Issues PART B Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies of your responses.

ANSWER:

When I accepted the honorable offer to work for Hensel Phelps, I understood that there was an impressive level of commitment and dedication of their hardworking employees to the project, team, and company. I consider one of my strengths my good work ethic, whether it be professionally or personally. I do understand that I have been slacking in the last few weeks at work, but I feel as if the balance with work and life have been offset to the point where it has been stressful and a lot to handle. I'm committed and willing to support both my Hensel Phelps and CrossFit teams one hundred percent, and I'd like to seek advice on how to create a balance between those two worlds of mine.

If you could share how you've gone worked through the Field Engineer position and your perspective on how to balance work and life, I'd be more than happy to listen and understand what has worked for you and how I might be able to implement similar techniques to move forward. I feel like you are a great leader and role model in the company, and I'd like to seek advice from you personally.

I'm hoping that you understand my willingness to learn and better myself as a builder and as a person throughout my career at Hensel Phelps. I'd like to make sure that you see my commitment and support to the team and that I would like to establish goals for us to follow-up on in the next two weeks. Perhaps we could discuss both our career and quality of life goals and hold each other accountable to those ideas to prevent burnout.

My hope is that we are both able to maximize our time and effort in our careers and in our interests outside of work so that there is a balance across our multiple roles and responsibilities. I'd also look forward to frequent follow-ups to ensure we are constantly communicating and to make certain that we are on-track with our goals, in addition to the required annual performance evaluations.

In order to work towards building a work relationship with open communication, I'd like to create short- and long-term goals, so that we are looking at our strengths and areas for improvement and making way for organic mentor-mentee feedback. As a Hensel Phelps employee, we must learn to find and create ways to train our replacement, even starting at entry-level positions.

****Please note that this answer serves as a basic guide for acceptable responses. Points for this problem will be issued based on completeness, reasoning and overall justification of action(s) recommended.***

9. SAFETY

Written by Marvin Perez

PART A: Work Environment Hazards

At Hensel Phelps a clean work environment is a top priority. Effective housekeeping eliminates many workplace hazards and helps get the job done safely. Poor housekeeping on the other hand frequently contributes to accidents and losses in production. Additionally, housekeeping is maintained throughout the day and not just at the end of a shift.

(Time warp to ceiling close in)

You are a field engineer walking with the inspector to sign off overhead for close in. As you walk into the level 2 restrooms the inspector notices that a deck penetration is missing fire caulking (pipe running from level 2 to 3); this room has been your top priority but now it is being delayed over some fire caulking. You immediately call Chris, the foreman for the fire stopping subcontractor, and ask him to be on site at 6 AM to take care of the caulking.

You begin the next day in the trailer at 6 AM, after grabbing coffee and attending your morning field meeting you head out to the jobsite at 7 AM. You decide to go check out the restroom to make sure that the Chris is on site. Walking in you notice metal studs and cast-iron pipe stacked on the floor as well as an 8-foot A-frame ladder on top of a pallet of drywall; this was surprising as you had made sure the area was clean yesterday. Nobody seemed to be working in the restroom and so you begin thinking that maybe Chris already finished. As you light up the ceiling with your iPhone to inspect the penetration you notice that in between pipes and conduits is Chris sitting on ductwork filling in the deck penetration. Immediately you demand that he climb down so that he does not hurt himself. He promptly climbs down and apologizes; he responds that he did not have time to sit around for the material to move and that he needed to go to a different project soon.

In one document, please provide a response to the following:

1. What could have been done differently by the field engineer and subcontractor to prepare for this scope of work? List 5 different ideas (each idea should have a reasoning behind it).
2. What consequence, if any, should the subcontractor receive for performing the work unsafely? Hensel Phelps' Safety Discipline Plan (X.9.1), which is incorporated into all trade partner contracts, has been provided as a reference.

Safety PART A Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies (PDF) of Part A Deliverable: Work Environment Hazards Response with responses to the two questions above.

ANSWER: Question 1

1. ***It seems that the space has been turned into a storage area. The field engineer can create a plan/map where each subcontractor has a space to leave their material. The plan/map should take into consideration work that is remaining to be completed.***
2. ***When calling a subcontractor to schedule work, one should discuss the work that needs to take place as well as any hazards in the surrounding environment. During the phone call ask for suggestions on making them successful. By asking for input the subcontractor might mention that they need the area clear to use their ladder.***

3. ***Many times, a phone call does not paint a clear picture of all the obstructions present in a work environment. In this case the field engineer should request that the subcontractor call him as soon as he arrives so that they may walk, and preplan the work in the field. During this walk the subcontractor can point out the safety concerns.***
4. ***To prevent the area from being used as a storage room, the field engineer can place a sign that asks for the area to stay clear of material. It can also be blocked off with caution tape the day before.***
5. ***Many obstructions in the overhead area are unique and accessing a penetration can be difficult. Before the work takes place, the field engineer and subcontractor should review the AHA and make sure that they have a plan to follow for the specific condition. If the situation is unique, it should be talked about and added to the AHA.***
6. ***The subcontractor clearly noticing the obstruction should give the field engineer or superintendent a call and explain that he has very little time to complete the work and that there is material in the way. It is always best to not compromise someone's safety and to just have them come back later.***

Question 2
As this is the Foreman's first safety violation, we would pursue the Safety Disciplinary Actions for the Breach of Inviolable Rules, first offense based on non-compliance with our Fall Protection requirements. The employee would be recorded in the SAFE database and a written Disciplinary Notice would be issued. Although the Disciplinary Action Plan indicates that this employee should be removed from the project for the remainder of the day and one additional day, this worker does not have additional work to complete on the project. We would note that the completion of the fire caulking work will be suspended until it can be completed in a safe manner and will review the installation plan with the Foreman's Safety Supervisor prior to commencing. We recognize that the situation existed mainly due to lack of communication and would choose to take responsibility for our role in the creation of this environment. We would discuss with the Foreman that all safety concerns should be directly communicated to Hensel Phelps so they can be addressed prior to work progressing. Should there be additional work required by this Foreman in the future, we would require that the employee re-attend the project specific Safety Orientation prior to performing any additional work activities.

*****Please note that this answer serves as a basic guide for acceptable responses. Points for this problem will be issued based on completeness, reasoning and overall justification of action(s) recommended.***

PART B: Accident Prevention

The Heinrich 300-29-1 Model states that for every 1 Major Injury (lost time or worse), there are 29 Minor Injuries, and 300 Near Miss incidents. By reporting all near misses and investigating them, we have the opportunity to take corrective actions and share lessons learned, before a major injury occurs.

(Time warp to after Air Handling Unit Placement)

The mechanical subcontractor's sheet metal workers are currently in a good mood as they have just finished setting the last air handler unit (AHU) of the project. Next, they get to work on connecting the AHU to the main duct of the building. Time flies and it is now 1:55PM, 5 minutes before it is time to go home. They quickly gather up their tools and begin walking towards the material hoist to go home. As the door to the material hoist begins to close, one of the sheet metal

workers looks back at the work area and notices that a 3'x3' piece of ductwork has moved slightly, he thinks that's weird but heads home. The next day the mechanical subcontractor's General Foreman walks the roof and notices that the 3'x3' piece of ductwork is laying by the guardrails of the roof perimeter. Knowing how catastrophic this could have been, if the ductwork would have flown off the roof onto an active college campus, the General Foreman went straight to the Hensel Phelps Project Superintendent to report it as a near-miss.

1. Explain how the Heinrich model can be applied to the ductwork incident above.

Safety PART B Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies (PDF) of Part B Deliverable: Accident Prevention Response

ANSWER: If we were to apply the Heinrich theory to the ductwork incident, the sheet metal worker should have reported the incident immediately after noticing that the ductwork had moved, prior to leaving for the day. Had the incident been reported immediately following the slight movement, the mechanical subcontractor would have had the opportunity to react and plan for the safe relocation of the duct, thus mitigating the possibilities of this situation. By not reporting the slight movement of the ductwork as a near miss, the possibility of further incident grew exponentially. Although, the General Foreman's report of a near miss will help this project and future projects plan for these situations, this incident was not escalated to a minor nor a major injury simply by chance. In the world of construction, we prefer to rely on planning and guarantee rather than coincidence and chance.

*****Please note that this answer serves as a basic guide for acceptable responses. Points for this problem will be issued based on completeness, reasoning and overall justification of action(s) recommended.***

10. SITE UTILIZATION

Written by Richard Franssen

(Time warp to mobilization)

Site utilization plans play an integral role in construction by enabling the pictorial representation of both permanent and temporary facilities on site. Effective plans clearly communicate the flow of vehicles, equipment, and personnel, while allocating adequate space for both material laydown and assembly areas. Conversely, a poorly assembled site utilization plan will yield severe downsides to the schedule and budget due to double handling of materials and crew inefficiencies.

You are the first Area Superintendent assigned to the MRB and have been tasked with developing the site utilization plan for the initial phases of the project. Your Project Superintendent has requested that you prepare a site utilization plan to review with the early trades during your scheduling charette next week. Specific considerations for all early trades (excavation, foundations, slab on grade and Level 1 concrete columns and walls) as well as the campus constraints listed below shall be included in your plan preparation.

Campus Constraints:

- Construction activities shall not impact Aberdeen Drive throughout the duration of the project
- UCR has agreed to provide the area west of the project between the MRB and the soccer field, south of the parking lot with access to both fire lane roads for construction use
- UCR has expressed concerns regarding construction noise impacts to the adjacent facilities; Hensel Phelps has agreed to utilize acoustical blankets where applicable

Plan Requirements as per Project superintendent request:

- Site Fence
- Access to Site & Work Areas (don't block yourself in)
- SWPPP Measures
- Evacuation Areas & Signal
- Site Access points (min of 2)
- Material laydown area (min 8,000 sf)
- Jobsite trailers (office areas & conference room)
- Parking Area (may propose offsite parking request via RFI)
- Break area
- Restrooms
- Dumpsters (LEED requires debris separation)
- Traffic flow
- Temp power skid
- Spoils storage location
- Equipment staging locations
- Assume max placements of:
    - Foundations – 450 CY
    - SOG – 200 CY
    - Columns/Walls – 450 CY

Site Utilization PART A Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies (PDF) of your site utilization map(s).

ANSWER: Reference Site Utilization Plan X.10.1.a; multiple placements will be performed from the same Area setups to accommodate the maximum placement sizes (i.e. Area 3 will be used for multiple placement setups).

11. QUALITY CONTROL

Written by Todd Kobs

(Time warp to award of project, prior to construction start)

Hensel Phelps prides ourselves on our ability to manage and mitigate risk. One such way is within the Quality Control process which has been meticulously refined through decades of experience in building complex projects. A critical component to this process is the "hand-off" of information from the office to the field. This is a critical step to help ensure up-to-date, accurate and effective information is applied in the field. Understanding this importance, Hensel Phelps develops various project specific and company standard procedures to ensure a successful "bridging" of information between the office and field.

PART A: Compatibility Matrix

You are the Office Engineer responsible for all things exterior skin. The complexity of the exterior of this project requires numerous materials to interact with a variety of substrates and other materials. This intermingling of the high number of materials and substrates increases the risk of water intrusion. Your Project Manager has expressed his concern with this and informs you that understanding the compatibility of materials and substrates prior to installation allows you to identify and avoid potential water intrusion risks. Additionally, it helps with recognizing if there is a need for product substitutions, special field or manufacturing testing and/or third-party inspections. He tasks you with preparing a Compatibility Matrix which clearly and easily identifies interactions of materials and substrates on the exterior skin system.

Using the Compatibility Matrix Template (X.11.1), Exterior Skin Details (X.11.2) and Exterior Skin Product Data (X.11.3) identify the following:

- Interacting materials
- Approved material interface and compatibility per the Product Data
- Materials requiring additional testing to confirm compatibility

*** Note order of product installation matters

Quality Control PART A Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies in native format (Excel) of PART A: Compatibility Matrix (X.11.1)

ANSWER: Reference Compatibility Matrix X.11.1.a.

PART B: Initial Inspection Checklist

A useful strategy to ensure the highest quality construction methods are utilized and to reduce any possible risk of re-work, an effective plan should be in place prior to the start of work. Initial Inspections are a critical component of the plan and the Quality Control process. Initial Inspections assist in ensuring specific quality standards are implemented in the field. The objective of an Initial Inspection is to validate that the field has the appropriate approved "spec'd" materials and can correctly install them per contract documents. Initial Inspections focus on one definable feature of work and are done soon after the initial installation.

Using the Initial Inspection Checklist Template (X.11.4) as a guideline, create an Initial Inspection checklist tailored to *Cold Formed Metal Framing*. When creating this checklist keep in mind the following items:

1. Substrate
2. Materials
3. Installation Methods
4. Compatibility
5. Testing Requirements

Review the attached Exterior Skin Details (X.11.2), Cold Formed Metal Framing Specifications (X.11.5) and Cold Formed Metal Framing Product Data submittal (X.11.6) to prepare the list of questions and inspection items that are to be included in the Initial Inspection Checklist (X.11.4).

Quality Control PART B Deliverable:

1. Submit one (1) hard copy and two (2) electronic copies (PDF) of PART B: Cold Formed Metal Framing Initial Inspection Checklist.

ANSWER: Reference Initial Inspection Checklist X.11.4.a.

12. TEAM MEMBERS RESUMES

Provide each team members personal resume (not a resume tailored to this problem). Include mailing address, telephone and email contact information. Photos are encouraged but not required.

VII. COMPETITION SCORING SYSTEM

Item	Description	POINTS
0.1	Early Deliverable - Biographies	0 (note 1)
0.2	Quality of Submitted Proposal	2
0.3	Timeliness of Proposal	0 (note 2)
1.	Financial Status Report	6
2.	Estimate	16
3.	General Conditions	8
4.	Proposal Summary	14
5.	Schedule	20
6.	Coordination of Work	12
7.	Change Management	8
8.	Personnel Issues	6
9.	Safety	6
10.	Site Utilization	10
11.	Quality Control	12
Subtotal		120
Oral Presentation		80
GRAND TOTAL		200 POINTS

Note 1: No points shall be issued in the competition for content of this previously due item; however points may be deducted from the team's score for having failed to comply with this item in a timely and professional manner.

Note 2: **½ point** will be deducted from the total score for **every minute** past the deadline time. Judges reserve the right to "cap" the penalty amount at their discretion; however, no team with a penalty cap will be allowed to place in the competition awards.

As the team placement results often are separated by mere fractions of a point, it is recommended that your team take each point seriously. No points scoring information will be provided to the teams at the conclusion of the competition, but feedback will be provided for each component in an "above-average / average / below-average" format.

VIII. LIST OF JUDGES

Oral Presentation Judges:

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IX. THE 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 solutions to the panel of judges. The following rules apply to the Commercial Division and serve to supplement the ASC Competition Rules.

Rule No. 1 One (1) hard copy and two (2) electronic copies of the proposal must be turned into the judges. Two (2) thumb drives will be provided at the start of the competition for your use. Your final submission must be submitted on the provided thumb drives. No proposals will be formally returned. If you desire a copy for yourself or need one for your oral presentation preparation, please make copies prior to the submission of the proposal. Some proposals may be available for students to re-claim at the conclusion of the competition but may have marks from the grading effort in certain sections.

Rule No. 2 The equipment usage for each team is to be as outlined in the Competition Rules as published by the ASC. Use of the Internet is allowable and may be necessary for certain components of the problem; Hensel Phelps will pay for each team to have one (1) internet connection through the hotel for Thursday only. Wireless access coupons will be distributed at the opening conference. 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.

Rule No. 3 The problems that are used for the competition are drawn from actual construction projects. In the past, there have been situations where student team members have worked on, or have specific knowledge of, the project that is the subject of the problem. This can be perceived as giving the team an unfair advantage in developing a solution. If, upon receiving the problem, any student recognizes the project that is the subject of the problem statement, the student shall notify the problem sponsor to discuss the extent of the student's project or problem knowledge. Alternates may be considered should there be an identified conflict. The judges will have the final decision. Failure to notify the problem sponsor makes the team subject to disqualification.

Rule No. 4 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.

Rule No. 5 A one-half (½) point deduction will be taken for each minute the proposal is turned in past the time it is due. Written proposals are due Thursday at 10:00PM (Midnight Thursday night). Location of proposal delivery will be announced at opening conference. Other deliverable items, if applicable, will be due as specified elsewhere herein.

Rule No. 6 Oral interviews will begin at 7:00 AM on Friday, February 7th. Presentation materials for all teams are to be turned in to the Judges by 6:45 AM. No other presentation material will be allowed into the presentation that is not turned into the judges by this time - NO EXCEPTIONS WILL BE ALLOWED. Teams are encouraged to bring electronic presentation materials on a CD or thumb drive for use on the Hensel Phelps provided presentation computer; this will save on set-up time. Hensel Phelps' computer will utilize Microsoft Office 2013 software; if specialized software is necessary then the team must provide a computer to run their presentation and this computer must be delivered prior to the 6:45 AM deadline.

Rule No. 7 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. Any violations of the above are subject to point penalties or team disqualification, at the Judge's discretion.

Rule No. 8 Due to the sensitive nature of disclosing project information that the Owner and / or design professionals may not wish to be publicly distributed, Hensel Phelps reserves the right to require Confidentially Agreements be signed by each team member prior to distribution of the Problem Statement. This may further require that all or some Contract Documents or other material provided to the team, both electronically and hard copy, be returned to Hensel Phelps at the conclusion of the competition.

Rule No. 9 The premise of the proposal and oral interview is that you are presenting to the upper management of your own company. It is preferred that your team take the identity of Hensel Phelps but other team / company names are acceptable. You are therefore asked to refrain from including extra peripheral information about your company such as safety plans, company profiles or other marketing materials. Our intent is to test you on your knowledge of construction concepts, means and methods, not your ability to make up or compile marketing materials and canned programs. Please limit your responses generally to the information requested, although innovation and enhancement is encouraged.

Any team observed violating these rules may be asked to withdraw from the competition or be assessed point penalties. These Rules are subject to change; and, the final version will be included in the Problem Statement distributed at the opening conference.

X. SUPPLEMENTAL INFORMATION

Note: Documents are provided in electronic format only on thumb drive:

X.0.1	Drawings
X.0.2	Specifications
X.0.3	Request for Information Form
X.0.4	Evaluation Form
X.1.1	Financial Status Report Template
X.1.2	Financial Status Report Narrative
X.2.1	Concrete Estimate Template
X.2.2	Cost Data Sheet
X.2.3	Formwork Quotes
X.3.1	Staffing Plan Matrix
X.3.2	Staff organization Chart Example
X.3.3	Personnel Positions and Responsibilities
X.3.4	GC Estimate Matrix
X.3.5	Vivarium Buildout GC Estimate Template
X.3.6	Vivarium Buildout Drawings
X.3.7	Vivarium Staffing Plan Template
X.4.1	Subcontractor Proposals
X.4.2	Proposal Summary Template
X.6.1	Parapet Install Map
X.6.2	Roofing Shop Drawings
X.6.3	Roofing Build-Up
X.7.1	Change Order Request Template
X.8.1	Coaching and Developing People
X.8.2	Communicating Effectively
X.9.1	Safety Discipline Plan
X.11.1	Compatibility Matrix Template
X.11.2	Exterior Skin Details
X.11.3	Exterior Skin Product Data
X.11.4	Initial Inspection Checklist Template
X.11.5	Cold Formed Metal Framing Specifications
X.11.6	Cold Formed Metal Framing Product Data