

METROPOLITAN EXPOSITION-RECREATION COMMISSION

RESOLUTION NO. 03-48

For the purpose of accepting and forwarding on to Metro Council the Oregon Convention Center Expansion CM/GC delivery project report.


WHEREAS, the Metropolitan Exposition Recreation Commission was charged with the responsibility of managing and building the Oregon Convention Center Expansion; and

WHEREAS, the Oregon Convention Center Expansion is now substantially completed on time and under budget; and

WHEREAS, ORS 279.103 requires that a report be submitted to the local contract review board (Metro Council) as to the findings of how the CM/CG process worked.

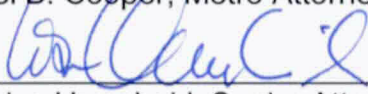
BE IT THEREFORE RESOLVED that the Metropolitan Exposition Recreation Commission accepts the Oregon Convention Center CM/GC Report, attached as Exhibit A, and forwards this report on to the Metro Council per ORS 279.103.

Passed by the Commission on December 17, 2003


Chair


Secretary/Treasurer

Approved as to Form:
Daniel B. Cooper, Metro Attorney

By: 
Lisa Umscheid, Senior Attorney

MERC Staff Report

Agenda Item/Issue: For the purpose of accepting and forwarding on to Metro Council the Oregon Convention Center Expansion CM/GC delivery project report.

Resolution No.: 03-48

Presented By: Jeffrey A. Blosser

Date: December 17, 2003

Background and Analysis: The Oregon Convention Center Expansion used Construction Manager/General Contractor delivery method as approved by Metro Council, to build the expanded Center. There is an ORS statute that requires a final report be generated regarding the success of the use of the CM/GC process for the project. This final report is then submitted to the local contract review board by the entity that built the expanded Center under this delivery method. OCC and construction project staffs have submitted this report and the lessons learned per the state requirement.

Fiscal Impact: None

Recommendation: Staff recommends the Metropolitan Exposition Recreation Commission accept the CM/GC report as submitted and forward the report on to the local contract review board (Metro Council) as required by the Oregon State Statute ORS 279.103

Utilizing CM/GC Contracting for Construction
November 20, 2003
Karl Schulz, Sr. Project Manager, OCC Expansion

Objective:

This report will define the advantages and disadvantages of the CM/GC process for the contracting of construction services for the Oregon Convention Center Expansion. Defined will be the benefits of this process.

Introduction:

The Expansion Project, a \$116 million addition to the Oregon Convention Center, provided 106,000 s. f. of Exhibit Hall, a 34,000 s.f. ballroom, 20 new meeting rooms, concessions, support areas, and an 800-space underground parking structure. The Expansion added approximately 700,000 s.f. of new space. The additions to the existing Oregon Convention Center provide almost 1 million total square feet of facility for convention use.

The stakeholders for this project include Metro, MERC, City of Portland, Multnomah County, the Hotel and Rental Car Industry, Portland Visitors Association, and citizens of Oregon. Their desire was to provide additional Convention Center space to provide more room and flexibility so as to draw additional and larger conventions and events to the Portland area.

Zimmer, Gunsel Frasca Architects (AGF) was selected to provide design services for the Expansion in December 1999. ZGF was also the architect firm for the existing Convention Center building. Their understanding of the project scope and issues defined their abilities which could be utilized in the construction of the project. Upon selection, ZGF immediately began the planning and designing of the Expansion.

Based on successes with previous projects, in 1999 the Metro Council approved the use of the CM/GC process for contracting construction services for the Oregon Convention Center Expansion in lieu of a competitive bidding process. As a result, the Metropolitan Exposition Recreation Commission (MERC), which manages the OCC on behalf of Metro, issued a request for proposals for construction management and general contractor (CM/GC) services.

Selection of the CM/GC was completed in January 2000. Hoffman Construction was selected to complete this project based on their experience with the CM/GC process and other projects of this size.

The most difficult challenge for the Project Team was to complete the Expansion for occupancy by April 15, 2003. This deadline could not be altered since the spaces to be built had already been contracted for events to be held in April 2003. If the schedule was not met, the events would have to be cancelled at an economic loss to the City. It was critical that the Expansion be completed on time to house these national shows that would provide a substantial positive economic impact to the region.

A second major challenge for the Project was the concern that the funding mechanism could be in jeopardy due to a ballot measure that was to be voted on in November 2000. Because of the wording of the referendum, the stakeholders who were managing the funding for the Project determined that the risks were too high to proceed on the construction of the Project until the referendum issue had been resolved. This would mean that the construction and the process for the Project would have to be delayed until after the election in November. Therefore, the design and

construction services were delayed for more than 6 months until the result of the ballot measure was known.

In order to make up the time lost, the design and construction schedule had to be compressed. Therefore, a fast-track delivery process had to be used for the Project. This required multiple bid packages, compressed construction periods, and intense design, construction, and project management efforts. Between January 2001 and February 2003, over ten bid packages were bid on and used for construction.

The Expansion Project construction was successfully completed for occupancy on April 1, 2003, fifteen days ahead of schedule. This success was completed despite design impacts that could not be anticipated. This document will also address how the impacts were managed successfully using management solutions that are available when using the CM/GC process.

History

Metro/MERC had the opportunity to select from a number of construction delivery processes for contracting the construction. Because of the variables and risk associated with the number of issues regarding the complexity of the construction of Convention Center Expansion, it was determined by Metro/MERC that the use of a CM/GC process would be the most appropriate. This decision was based on the fact that the CM/GC process would help reduce the risk of exposure on a number of the issues that will be defined in this document.

The selection process for the CM/GC was completed at the beginning of the project in 1999. Request for Proposals (RFP) for the CM/GC selection was advertised both locally and nationally. Six teams provided proposals. A number of the teams were joint-ventures. Of the six teams, three were short listed. Metro/MERC completed interviews with the utilization of an Advisory Committee consisting of individuals who had completed CM/GC processes for other projects in the region.

Hoffman Construction of Oregon was awarded the contract to provide CM/GC services for the Expansion. The selection was based on their experience and fee proposed to complete this work. Contract negotiations were entered into and agreed upon, and a contract for their CM/GC services was executed on January 31, 2001. The execution of the contract was delayed one year due to the referendum as previously discussed.

The impact of this delay was the Project had to move from a conventional design-build to a fast-track delivery process in order to meet the April 15, 2003 deadline for the first convention. Fast-track is a process utilized to shorten the overall length of a project. This requires the design team to distribute bid packages early before the final design of the building has been completed. Bid packages are released as they are designed and coordination of this must take place by the design team and the contractor to make sure that all components are properly designed and constructed. This requires an extensive amount of sophistication in both coordination and bidding to make sure that everything is provided. The CM/GC process allows for the bidding of bid packages as they are needed to meet schedule deadlines. A conventional design/build construction process would have required that all the design be completed before the bids could have been sought.

Execution of the CM/GC Process

By utilizing the CM/GC process, the owner, design team, and contractor could coordinate a fast-track schedule. The CM/GC process allows that a guarantee maximum price be developed by estimates on which a maximum cost contract can be executed. The next step is the coordination by the Project Team to make sure that the bid packages are developed, bid, and transferred into the contract of the CM/GC. In the execution of the Oregon Convention Center Expansion Project, over

ten bid packages totaling approximately \$93 million were bid and incorporated into the Project. The bid packages were released over approximately 1-1/2 years starting in December 2000 with the last bid packages being released in August 2002. This process allowed the design team to complete designs as required and to start construction as early as possible to shorten the amount of time needed for the completion of the overall project.

With the utilization of the CM/GC process's multiple bid packages, fast-track construction, and the flexibility that the CM/GC process allows for managing construction, the actual construction of the Oregon Convention Center Expansion was completed 15 days ahead of schedule. This allowed the building to be occupied by the national conventions after April 15th. Ultimately, the success of the Project has been defined by the ability to utilize the CM/GC process to compress the schedule and have the work completed at the high quality level designed.

Costs and Adjustments

The actual cost adjustments are defined below:

\$ 98,500,000	Original GMP
\$ -0-	Change Order 1 – Owner request to increased scope of work with savings to build tenant improvements
\$ 3,570,981	Change Order 2 – Owner request and funded to increase scope of work for CIP projects
\$ 1,100,500	Change Order 3 – Owner funding of improvements due to design errors
\$ -0-	Change Order 4 – Scope reduction to provide contingency for GMP until final determined
\$ (1,500,000)	Change Order 5 – Transfer of savings from GMP to owner
\$ (1,196,349)	Change Order 6 – Transfer of savings from GMP to owner

\$100,475,131 Final GMP

Findings

Metro has determined the following features were provided in the construction of the Expansion utilizing the CM/GC process:

- Provided budget management flexibility
- Provided the ability to open the parking garage for use by the public prior to the completion of the facility thus providing additional revenue to the Oregon Convention Center.
- Allowed the project to be fast-tracked to meet its critical schedule after a delay in notice to proceed was required.
- Provided the ability to incorporate changes in scope of work based on funding availability.
- Allowed for additional incorporation of scope without additional economic surcharge.
- Provided a process to deal with design documents deficiencies at the most economical costs.
- Provided a construction cost saving of \$2.5 million dollars under the designer estimate and Project construction budget. Final project change orders document this savings.
- Lessons Learned Report – Attached.

The CM/GC process, as opposed to the traditional low-bid process, allowed the Project to be completed at an accelerated rate using multiple bid packages and fast-track construction process. This saved approximately six months of construction time compared to a traditional design-bid-build delivery system. This also allowed the Project to make the needed adjustments when the Project

was delayed. A shorter Project schedule ultimately resulted in a cost savings of approximately \$121,000 of General Conditions costs. An additional \$250,000 of staff time to manage the Project was also not required.

Staffing demands for MERC were reduced since the CM/GC provided additional management and cost verification and tracking. The previous management team of the original Convention Center required 4 additional staff at an average cost of \$45,000 per year. The total cost of the additional staff of 4 employees for three years would have been \$540,000. Costs savings of \$911,000 was achieved for reduced management staff and time.

The shorter CM/GC project schedule allowed MERC to open the expanded OCC to the public earlier than would have been possible with a traditional bid-build process. It is estimated that the opening of the OCC Expansion by April 15, 2003 by using the fast-track system resulted in an economic impact and revenue for additional hotel room rentals, food and beverage purchases and approximately \$1.5-\$2.0 million.

Using the CM/GC process to meet the critical schedule prevented the Oregon Convention Center from having to cancel events. The direct cost of loss of shows would have been approximately \$75,000 for the shows that would have been relocated due to delays. This cost does not include legal cost exposure or long term negative impact to the convention business in Portland.

An accelerated Project schedule made available by the CM/GC process allowed for the completion of the new parking structure by April 15, 2002, one year earlier than the completion of the remaining components of the building. This required sophisticated coordination including temporary exiting tunnels, temporary use of elevators and stairwells. In addition, code-compliant issues had to be addressed. The early opening of the parking garage allowed for additional parking revenues for Metro/MERC of over \$300,000. In addition, this provided additional commercial flexibility for the Oregon Convention Center to provide on-site parking for events during construction.

The CM/GC process reduced the amount of change orders than would have been claimed with the traditional low bid process. During the preconstruction phase, the CM/GC and the architect collaborated and completed constructability reviews through the design phase. The CM/GC reviewed documents to make sure all the information provided was clear and correct, reducing the number of changes.

Secondly, the CM/GC contract limits the amount of mark up that can be assessed on a change order. A typical low-bid contractor may markup the process as much as 20% for work required by change order. In contrast, the CM/GC process of markups for change orders was included in the fee specified in the contract. No additional changes were allowed by the CM/GC for coordination of changes to their contract. The estimated cost savings of this feature was approximately \$1,517,000.

With the fast-track process, design and construction coordination were carried out simultaneously. Therefore, up-to-date cost reviews were completed by the contractor to verify that the Project was within budget. When items exceeded the budget, these items were V.E.'d (value engineered) to reduce the cost to meet the budget requirements. In a traditional bid-build process, estimated cost overruns would require that the Project be stopped, re-designed, and then re-bid. By utilizing the CM/GC method, the VE process can take place concurrently with the design. The value engineering process provided approximately \$8,202,146 worth of proposed savings for the Project during a design process that took a year and a half to complete. Not only were the costs that were identified saved, but the Project schedule was not impacted. Adjustments to the Project design schedule, if the

Project had come in over budget, would have been approximately four months. This type of delay would have had a financial impact to the Project of approximately \$550,000.

Conclusions:

The CM/GC provided two major benefits to Metro/MERC for this Project. The most critical was the on-schedule delivery of a complex building with multiple impacts to be resolved. If utilizing the conventional bid-build process, the Project would have been approximately six months to a year delayed from the necessary completion date of April 15, 2003. Second, the total cost of savings defined in this document equals over \$16 million worth of estimated savings for this Project. This is over 15% of the actual Project budget.

Ultimately the CM/GC process provided the best construction delivery process that allowed the Project to be completed on schedule and within budget, making this a successful project for Metro/MERC and the region.



LESSONS LEARNED
OREGON CONVENTION CENTER



Lessons Learned for the Planning and Construction
of the
Oregon Convention Center Expansion

2003

Submissions:
Zimmer Gunsel Frasca Partnership
Hoffman Construction Company
Oregon Convention Center
Expansion Project Office Staff

Prepared by Members of the Expansion Project Team

Edited by the Expansion Office



LESSONS LEARNED

OREGON CONVENTION CENTER



INTRODUCTION..... 4

1.0 PLANNING AND MANAGEMENT 6

1.1 Co-Director Leadership 6

1.2 Preplanning 6

1.3 Selection Process 7

1.3.1 Owner’s Project Management Team - Selection 7

1.3.2 CM/GC - Selection 8

1.3.3 Design Team - Selection..... 8

1.3.4 Construction Team..... 9

1.3.5 Expansion Office 10

1.4 Multi-Agency Stakeholders 11

1.5 Funding 12

1.6 CM/GC Process 12

2.0 DESIGN PHASE 13

2.1 Process 13

2.2 Verification of Design Requirements 14

2.2.1 Documentation 15

2.2.2 Owner-Furnished Equipment..... 15

2.3 Sustainability..... 16

2.3.1 Identify and Allocate Resources For Sustainability Goals. 16

2.3.2 How Will Sustainable Features Be Marketed? ..Error! Bookmark not defined.

2.3.3 Establish Goals.....Error! Bookmark not defined.

2.3.4 Reporting Sustainability FeaturesError! Bookmark not defined.

2.4 Factory Mutual (FM) 17

2.5 ADA 18

2.5.1 ADA Review.....Error! Bookmark not defined.

2.5.2 ADA vs. Structural Elements.....Error! Bookmark not defined.

2.5.3 ADA Design Issues.....Error! Bookmark not defined.

2.5.4 ADA Signage Requirements.....Error! Bookmark not defined.

2.5.5 Risk Management vs. ADA requirementsError! Bookmark not defined.

2.6 Budget 19

2.6.1 Development 19

2.6.2 Tracking 20

2.6.3 Management..... 21

2.7 Design Regulatory 22

2.7.1 Permitting..... 25

3.0 CONSTRUCTION PHASE 29

3.1 Quality Management..... 29

3.2 Construction Management..... 31

3.2.1 Fast Track..... 31



LESSONS LEARNED

OREGON CONVENTION CENTER



3.3	Design Issues	33
3.4	Schedule	33
3.5	Safety Program	34
3.6	Travel by Team	35
3.7	Construction Regulatory	36
3.8	Workforce Program	36
3.9	OCIP	37
3.10	Commissioning	39
4.0	RESULTS / MISCELLANEOUS	41
4.1	Audit	41
4.2	Project Management Plan	42
4.3	Advisory Committee	43
4.4	1% for Art Program	43
4.5	Evaluations	44
4.6	Successes	45
4.6.1	Architectural - Design Team	46
4.7	Areas for Improvement	46
4.7.1	Architectural - Design Team	47
5.0	CONCLUSION	48



LESSONS LEARNED OREGON CONVENTION CENTER



INTRODUCTION

This document is intended to record the successes and the less successful processes used in the management and construction of the Oregon Convention Center Expansion from January 2000 thru April 2003. This document is a compilation of information and documents prepared by members of the Design, Construction, and Project Management team members based on their experiences for this Project. It is the goal to document the processes and apparent results for use as reference and educational tools for future projects to be completed by MERC and Metro.

The Expansion Project, a \$116 million addition to the Oregon Convention Center, provided 106,000 s.f. of Exhibit Hall, a 34,000 s.f. Ballroom, 20 new meeting rooms, concessions, support areas, and an 800-space underground parking structure. The Expansion added approximately 700,000 s.f. of new space. The additions to the existing Oregon Convention Center provide almost 1 million total square feet of facility for convention use.

The stakeholders for this project include Metro, MERC, City of Portland, Multnomah County, the Hotel and Rental Car industry, Portland Visitors Association, and citizens of Oregon. Their desire was to provide additional Convention Center space to provide more room and flexibility so as to draw additional and larger conventions and events to the Portland area.

Zimmer Gunsul Frasca Architects (ZGF) was selected to provide design services for the Expansion in December 1999. ZGF was also the architect firm for the existing Convention Center building. Their understanding of the project scope and issues defined their abilities which could be utilized in the construction of the project. Upon selection, ZGF immediately began the planning and designing of the Expansion.

The method of contracting construction services using Construction Management / General Contractor (CM/GC) was determined by Metro and MERC based on successes with previous projects. Selection of the CM/GC was completed in January 2000. Hoffman Construction was selected to complete this project based on their experience with the CM/GC process and other projects of this size.

The challenge for the Project Team was to complete and receive building occupancy by April 15, 2003. This deadline could not be altered since the spaces to be built had already been sold for events to be held in April 2003. If the schedule was not met, the events would have to be cancelled at an economic loss to the City. In addition, the Project start was delayed due to a concern that the funding mechanism was in jeopardy due to a ballot measure that could have been passed in November 2000. Therefore, the full effort of the team was delayed for 6 months until the result of the ballot measure was known.

In order to make up the time lost, the design and construction schedule had to be compressed.



LESSONS LEARNED OREGON CONVENTION CENTER



Therefore, a fast-track delivery process had to be used for the Project. This required multiple bid packages, compressed construction periods, and intense design, construction, and project management efforts. Between January 2001 and February 2003, over ten bid packages were bid on and used for construction.

The Expansion Project construction was successfully completed for occupancy by the Oregon Convention Center on April 1, 2003, fifteen days ahead of schedule. The completion of the Expansion Project on schedule was a challenge due to a number of impacts during the design and construction process. The Team was required to make a number of decisions caused by these impacts in order to minimize the effects and to facilitate the on-scheduled completion of the Project. The impacts have been recorded in this document.

Final costs auditing was completed for the GMP and the project soft costs. The GMP final costs provided \$2.5 million in savings. GMP savings was realized when allowance budgeted for potential claims and potential delays were not needed due to resolution of all contracts issues and completion of all construction issues. OCC was able to add over \$1.0 million in additional construction work and return the remaining funds to MERC. The successful budget management for this project confirms the success of this project, which was completed ahead of schedule and under budget.

At the request of Metro and the Expansion Advisory Committee, this document will provide opinions and recommendations on successes that took place during the planning and construction of the Expansion. Also incorporated in this report are suggestions on processes that could have been approved. It is hoped that the information can serve as a tool to improve the methods or processes in the planning and construction of future major public works projects.



LESSONS LEARNED OREGON CONVENTION CENTER



1.0 PLANNING AND MANAGEMENT

1.1 Co-Director Leadership

- Worked successfully in this project.
- Provided a check and balance.
- Help resolve issues between agencies.

. When establishing Co-Directors, it is critical that the Co-Directors have a working relationship that allows them to work with conflicts and resolve without impacting the success of the project.

*"The Co-Director Leadership was successful because both directors had an excellent working relationship. Their communication skills helped to keep their agencies informed and provide direction when needed on difficult issues. However, this process could also fail very easily if the directors do not communicate. This issue has to be carefully addressed when setting up a team since there could be conflicts relating to interaction with the co-directors."*¹

1.2 Preplanning

- Determine at start of project that the stakeholders are.
- Confirm project goals.
- Prepare a risk study of potential risks that might impact the project.
- Establish the correct program based on users needs.
- Verify program with stakeholders.
- Complete a schematic design to verify program works.
- Prepare more detailed budget estimate based on schematic design.
- Have stakeholders approve schematic design and associated budget.
- Budget for programs such as LEED and Art programs needs to be anticipated.
- Prepare detailed project budget including soft costs.

"Preplanning was completed for the Expansion. However, programming did not incorporate or account for circulation mechanical spaces that had to be provided for this specific site.

"Once the Project Team began to assemble information and review schematic plans, it was determined that the amount of square footage needed to complete the building exceeded the original program. In addition, soft costs were not in line with the overall project costs and impacts. A new budget had to be developed that was different than the original pre-programmed budget.

"The solution for the Project Team was the reduction of the amount of area for the parking structure. Approximately 400 spaces were traded for additional space in the

¹ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



Expansion. This trade allowed for the Expansion to function as desired by the OCC. This resolved this conflict.

"Priorities of the project is another area that preplanning needs to establish. This includes whether the project should meet LEED or sustainability requirements, should provide other features such as 1% Art and electronic systems to be incorporated into the building. This is critical so that the correct budget can be established.

"One area that the preprogramming planning didn't define was sustainability. Additional funds should have been considered to fund not only sustainability features, but the process in coordinating and execution of programs desired by the stakeholders." ²

1.3 Selection Process

- Make sure the documents for the RFP's have the correct information to be incorporated into the project.
- Make sure the project schedule is realistic.
- Determine the selection team.
- Establish selection criteria and comparison procedure.

"The use of a committee made up of a variety of professionals within the construction industry was successful for the selection process. The selection committee, who evolved into the Expansion Advisory Committee, had the experience and understanding of the selection process for major projects. Having this experience was critical in the success of selecting a design and construction team.

"The most critical item of the selection process is to prepare correct RFP's. The RFP must include as many of the known factors in the project as possible. This includes schedule, budget, and program. In addition, the contract information needs to be included defining what requirements the selected team must meet. This is critical for the success and management of any project." ³

1.3.1 Owner's Project Management Team - Selection

- Select before the other selection processes.
- Select persons with experience to handle project.
- Have Project Team staff confirm what requirements should be incorporated into the contracts for designer and contractor.

"The Owner's project management team needs to be selected as early as possible so that their experience can be incorporated into the selection of the design and construction teams. In addition, their experience may help in defining the contract language needed to manage the job. Ultimately, it's important that the project management team assist in

² Karl Schulz, Sr. Project Manager, Expansion

³ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



making decisions on the contractual relationships and requirements for the project since they will be responsible for its management.

"In addition, the project management team should be selected to help define the project budget and schedule. Their experience will help in making sure that both are correct for the project being undertaken."⁴

1.3.2 CM/GC - Selection

- Use of an Advisory Committee to select CM/GC is recommended.
- Provide a more specific schematic plan to incorporate in the drawings.
- Provide a detailed program.
- Define a realistic schedule.
- Provide specific requirements regarding the general conditions on manpower and other services to be incorporated in the General Conditions for easier comparison of proposals.
- Complete General Conditions and contract language draft before selection.
- Determine insurance requirements.
- Overall the selection process for the CM/GC process was successful and provided the outcome that was successful.
- Define if self-perform services shall be used.

"As in the case of the selection of the design team, a clear understanding of what features are to be incorporated into the project including sustainability, commissioning, and any other service or management requirements need to be defined and incorporated into the contract."⁵

"The use of an Advisory Committee to help in the selection process made the selection process more accountable. With the diversity of the Committee, all aspects of selection criteria were properly addressed. In the end, it seems that the correct team was selected to complete this building. This was verified with an inspection of the Austin Convention Center completed by Jeff Blosser and Karl Schulz in May 2002. That project, constructed by Gilbane, was completed behind schedule. At its dedication the building required at least three more months of construction work to complete."⁶

1.3.3 Design Team - Selection

- Prepare a detailed RFP on project goals and description.
- Be specific on services to be provided.
- Incorporate contract language in the RFP.
- Establish a method of negotiating costs for services that are yet to be determined based on design investigation.

⁴ Karl Schulz, Sr. Project Manager, Expansion

⁵ Karl Schulz, Sr. Project Manager, Expansion

⁶ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



- Require the design team to present subconsultants' experience.
- Provide a selection process that allows the best subconsultant team to be selected for the project, not solely by the lead design team.

"As in the selection of the CM/GC, the correct team was selected and the process went well. Disappointment during this period of time was due to the limited number of design teams that submitted proposals. However, in the end the right team was selected for completion of the building.

"The use of the Task Authorization process for clarification of the scope of work for the Expansion worked very well for managing the Design Team services. In some cases it wasn't known if certain design requirements would have been incorporated into the Project until more detailed work was completed. It is important that when selecting a design team or contractor that a clear understanding of the scope of work, the features to be provided, and a schedule is incorporated into the project.

*"One issue that needs to be addressed is the selection of sub-consultants. A critical component to any project is that all the consultants provide the services needed. For future large Metro projects, it should be critical that the design team provide options in the selection of sub-consultants so that the Owner can ensure that the correct sub-consultant is provided."*⁷

*"From the project management side, I would have added a person to the team specific to MEP issues. It seemed throughout, this was lacking and we were too dependent on the design team subs without any third party continuous review and owner representation. Karl Schulz was far too busy with other aspects and had to be dependent on the contractor's design until it did not work. I believe the whole management team would have been more effective and would have potentially headed off or corrected the design shortfalls in the design process. We opted for cost savings and budget and in hindsight; we probably would have saved money with this person as part of the team. I take the responsibility for not making this happen and for any future large scale projects, it's my recommendation to have this person on the management team."*⁸

1.3.4 Construction Team

- Prepare RFP that weighs the team experience as a priority.
- Establish and verify that adequate staff for a major project is provided by the proposer.
- Verify at the bid selection process that the contractor can provide the services proposed.
- Seek companies with experience in the type and size of project.

⁷ Karl Schulz, Sr. Project Manager, Expansion

⁸ Jeff Blosser, Director, OCC



LESSONS LEARNED OREGON CONVENTION CENTER



"Make sure the construction office has a clear understanding of responsibility of staff. In the case of the Expansion Project, the Construction Team was experienced and had the skill levels required to coordinate this Project. However, some staff was delayed in starting work because of other commitments. As in the situation with the Expansion Office staff, if some staff could have been involved earlier, there would have been more opportunities to provide quality control in contract document review.

"Another area that would have been helpful would have been that all members of the Construction Team were incorporated in the same offices. This includes the field staff and the major contractor's representatives. If all of the major managers of the team had been in the same office, this would have provided a lot more clarity and ability to complete work more efficiently.

*"One issue that ultimately could have been corrected is if the Design Team representatives had also been on-site. By having the architects and Design Team staff located off-site, they were not kept aware of all the critical issues in a timely manner which could have helped to facilitate answers more easily by having them in the same office area."*⁹

1.3.5 Expansion Office

- Hire all pertinent staff and have in place prior to on-set of construction.
-
- Provide enough staff to handle the different projects with construction (e.g. 1% Art, Commissioning, etc.).
- Establish compatibility of documents and electronic systems with construction and design teams.
- Establish record-keeping process early.

"The establishment of the Expansion Office was delayed because of the bond measure issue. This prevented Expansion Office staff from working with the Design Team during planning to understand the building. Once certain team members of the Expansion Office were finally allowed to be hired, a lot of design work had transpired, therefore requiring a steep learning curve by the new staff.

*"Another issue to consider is making sure there is enough staff to adequately coordinate different specialized projects to be incorporated, for example, 1% Art, commissioning, and sustainability features. These projects require an extensive amount of time and require one liaison person to deal with them on a fairly regular basis."*¹⁰

⁹ Karl Schulz, Sr. Project Manager, Expansion

¹⁰ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



1.4 Multi-Agency Stakeholders

- Determine early how many stakeholders will be involved in the project.
- Determine strategy to communicate and interact with the stakeholders.
- Allocate a proper amount of staff to complete reports and attend meetings that are needed for stakeholders.
- Determine streamlining of processes to communicate with stakeholders.
- Establish proper schematic plan and budget.
- Obtain stakeholders' approval through each step of planning.

"It would be more efficient if there were a limited number of stakeholders on any type of design project. However, this is an impossibility for a major public works project. It is felt that the handling of the numerous stakeholders on this Project was done successfully. This was done by identifying the stakeholders, establishing monthly meetings to communicate with the stakeholders, and the completion of monthly reports to share and update the stakeholders on the Project's development and issues. It is felt that the process utilized in the Expansion Project was successful in its communication. However, the difficulty with a large number of stakeholders was the management of time resources.

"One area where the stakeholders could have had a detrimental impact to the success of the Project was regarding the parking structure design. A situation developed by the identification that the size and areas of the building did not match the base program for the Project [see discussion on "Pre-Planning"]. Costs and budget solutions had to be developed to try to meet the established budget. The solution identified by the stakeholders was the revision of the parking structure to be a 2-level underground structure. The solution originally developed of having one level underground and an open structure on the South Lot would have been more cost effective. However, the stakeholders felt that the parking needed to be fully underneath the building. In hindsight, the Team was able to work through this issue through hard work and coordination.

"However, this could have been a major impact if the Team had not been able to so effectively manage through this issue. This change of direction by the stakeholders could have had a long-term impact on the success of the Project. A solution to resolve this type of issue is to make sure to establish a proper schematic plan and budget, and to get approval from the stakeholders at every step to ensure that there is not a change in direction in the development and completion of the design." ¹¹

¹¹ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



1.5 Funding

- Establish funding method before work begins.
- Include interest projections into the total project budget.
- Agree to accounting and budget procedures for funds.
- Assign a person to manage the establishment and transfer of funding into the project account.

"The complexity of the funding mechanism for the Project made the coordination of the budget difficult. It was not clear when the funding would be available and then the amount. This created some difficulty in the planning and budgeting of this Project.

"In future projects, it should be clear what amount of money is required to be funded, that way the Team can establish a correct budget early and not back-track on budget changes in order to meet funding requirements.

"To facilitate the process, especially with the complexity of the Oregon Convention Center funding mechanism, a person should be designated to be responsible for coordinating and organizing the funds to be provided. In addition, this person should be responsible for making sure the funds are transferred into the project budget. On future projects, it would reduce the amount of time needed by the Project Team to verify that funding is available." ¹²

1.6 CM/GC Process

- Provided budget management flexibility.
- Allowed the Project to be fast-track.
- Provides ability to incorporate different scope of work based on funding availability.
- Allows management of schedule.
- Allows for incorporating additional scope of work without extensive surcharge.
- Allowed for resolving signed document deficiency.

"Because of the complexity of this Project including fast-track construction, fast-track design incorporation, and expansion into an existing building, if a hard bid process had been elected for this Project the Project would have taken approximately another year to complete. This would have been due to the fact that the documents were not completed until approximately August of 2001. By that time half of the parking garage had already been constructed. The CM/GC system allowed multiple bid packages to be bid as the documents were completed. Therefore, the overall project schedule was compressed saving Metro/MERC hundreds of thousands of dollars.

"The major success of the CM/GC process was the completion of the Project on schedule. This would not have been achieved based on the actual circumstances of this

¹² Karl Schulz, Sr. Project Manager, Expansion



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Project. Contract documents were not completed at time of bid. Therefore, the CM/GC process had to make adjustments to incorporate the added work for construction.

"If the hard bid situation had been utilized, it would have required extensive change orders and/or re-bidding of the work. With the CM/GC process, the Team could incorporate the scope of work.

"The other advantage of the CM/GC process was as funding became available through Metro/MERC, the added work could be incorporated into the Project. This included CIP program work established by OCC for upgrade of the existing building. The best example is the replacement of the existing carpet. If this had been a hard bid job, the carpet would have had to have been bid twice with the potential of the second bid being awarded to a different carpet manufacturer. Therefore, the carpet may not have matched and provided the seamless approach that is now seen. With the use of the CM/GC process, one carpet manufacturer was selected that provided carpet for both the Expansion and the existing building to provide the seamless look. This CM/GC solution was extremely successful for the long-term operation and maintenance of the facility." ¹³

"I believe strongly that the CMGC process worked very well for us due to all of the issues throughout. The partnership established early, as a result of the CM/GC, really was helpful in keeping the group together and getting through all issues. I would definitely recommend keeping this type of management process for future Metro projects." ¹⁴

2.0 DESIGN

2.1 Process

- Incorporate users' knowledge of systems and needs into design documents.
- Establish documentation process to track design issues requested by Owner.
- Follow up and verification of Owner-requested design issues is critical.

"A unique situation for this Project was utilizing the experience that the users of the building provided into this design process. The OCC Operation staff was familiar with the systems and features needed to operate the facility in an efficient manner. Their experience after ten years of operating the existing building provided understanding of what design features needed to be incorporated into the Expansion. I believe that these specific requirements helped to clarify what features needed to be in the design.

"Based on the process, it's my feeling that the Design Team and a majority of their sub-consultants did not always take advantage of this information in a timely manner. The Project Team established meetings with the users to try to incorporate as much

¹³ Karl Schulz, Sr. Project Manager, Expansion

¹⁴ Jeff Blosser, Director, OCC



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information as possible from the users. However, in a number of cases the information wasn't incorporated into the documents as requested.

"Based on this, a better documentation process needs to be incorporated into future large projects. This includes the tracking of design issues requested by the Owner. This includes making multiple copies of design notes or documents given to the design team for verification of systems needed. In addition, the teams need to review all systems and make sure that all design features are being developed to meet the users' needs. By having a tracking system, verification of what decisions had been made would have assisted in minimizing changes in the design documents.

"Overall, the right questions need to be asked by the design team, the users need to define their desired features, and that information needs to be clearly defined and substantiated. Follow-up and verification that the requested work is provided is critical for the success of the project. In the case of this Project, the process could have been improved regarding tracking of design features and incorporation into the Project."¹⁵

2.2 Verification of Design Requirements

- Designate personnel responsible for coordination of MEP.
- Establish documentation processes: revisions, e-mail correspondence, meetings.
- Provide clear communication regarding Owner-furnished equipment.

"Design requirements and their incorporation into contracts has become an emotional issue for the Team. The most difficult aspect for the success of this Project has been the defining of the Owner's needs for the Project, the incorporation of those needs into the design documents and the completion of the design based on the issues that took place. The coordination of design requirements was not successful.

"The Design Team was frustrated by the fact that many of the equipment issues for the Project were not purchased until late in the Project based on budget impacts during the construction. Equipment purchases had to be tabled until funds were available. Therefore, the equipment that was identified two years ahead of purchasing was not always coordinated into the contract documents. This is not unfamiliar in large projects where equipment isn't purchased until long after the design is completed.

"It is clear that improvements are needed in the verification of design requirements. It is the responsibility of both the Design Team and the users to establish a process that identifies the needs of the users, coordinates with design requirements established, and provides an efficient process that does not require the Design Team to spend extra time to be working and/or changing designs. This process is the responsibility of all parties and therefore requires cooperation and effort. The Design Team, however, must take the

¹⁵ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



leadership role since they are the ones that understand what information must be incorporated into the documents to provide a clear and concise bid set. ”¹⁶

2.2.1 Documentation

- Consider using electronic documentation for information distribution
- Establish document flow process for project team to use.
- Set up tracking processes for design issues to verify design issues are addressed.

“Often times there were many versions of one document as it was fine tuned and evolving. This creates the question of do you file every version or just the final version? Master-filing has become a huge undertaking, and finding information can be frustrating and confusing due to the sheer number of items there. Better safe than sorry is still the best plan, but perhaps electronic filing of early documents with a follow up of final hardcopy to file is better to provide an easier search. ”¹⁷

“The majority of correspondence between the team occurred through email. Keeping a string going by replying to the same email instead of starting over is the best way to track an issue, then the final decision with background information can be filed. ”¹⁸

“Working meetings – when all participants in a meeting are sketching, talking, reviewing, discussing, there needs to be a method for recording decisions and final responsibilities. Recording meetings for transcriptions is tedious and would be difficult to go back and find the information. Some type of summary is necessary. ”¹⁹

2.2.2 Owner-Furnished Equipment

- Determine owner equipment as early as possible
- Purchase equipment early to determine rough in requirements
- Confirm contract documents are coordinate with equipment and furniture.

“The Owner coordinated and ordered all equipment and furniture for the project. For the most part, coordination went well, but final arrangements for power needs, floor drains, and start up requirements were often times rushed through in an RFI format.

“Major equipment, in particular the trash compactor, was a different issue. The Owner did not recheck dimensions provided by the Contractor in RFI format. A smaller

¹⁶ Karl Schulz, Sr. Project Manager, Expansion

¹⁷ ZGF Architects

¹⁸ ZGF Architects

¹⁹ ZGF Architects



LESSONS LEARNED OREGON CONVENTION CENTER



compactor was ordered, and the Architect was blamed for not providing the correct area for the equipment. Joint responsibility for equipment size requirements should be taken."²⁰

2.3 Sustainability

- Determine in programming the sustainability goals.
- Incorporate goals in RFP process.
- Establish marketing plan for features.
- Budget for features to be provided.
- Establish clear reporting and tracking procedures.

2.3.1 Identify and Allocate Resources For Sustainability Goals.

"One of the most important solutions in any project is to identify and allocate resources to the goals of the project. The obvious goals of any project are to provide a space that is needed by the users. However, features and other systems to be incorporated into a project must be identified early so that the efficient management and incorporation of those systems can take place. Sustainability is one of those goals.

*"The original RFP and budgets for this Project did not incorporate sustainability goals. Immediately the Team needed to catch up in order to incorporate these features into the Project. Sustainability goals must be identified in the RFP for both the design team and the contractor selection. This allows all teams to plan accordingly. This includes the selection of consultants that have experience in sustainability, establishment of proper budgeting amounts, and a contractor who is educated in incorporating those features into a project."*²¹

*"Determine client financial commitment early. Early on we discussed elements of sustainable design with the Owner, however, early estimates of the costs of these design elements quickly scared everyone off. There also seemed to be a bit of concern from the Contractor about the costs of these elements."*²²

"

*"Public outreach for the Rain Garden is seeing a lot of success. Another element that would have had great success was the Green Roof. Structural support and appropriate roofing materials are in place, but if the Green Roof is added later, it won't have as much public outreach impact."*²³

²⁰ ZGF Architects

²¹ Karl Schulz

²² ZGF Architects

²³ ZGF Architects



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*"Yes, it would have been a difficult push to gain LEED certification with the existing chillers on line, but given the opportunity to pursue the options available through negotiation may have assisted in laying the groundwork for an exception, CFC phase out, or LEED EB Certification."*²⁴

*"Spreadsheets were a great way in early going to set priorities and review possible credits available in each category. This assisted in sorting through elements that the layperson may not understand in discussions, but laid the information out in an organized manner. The spreadsheet that Johanna has completed to summarize the project will help to set the groundwork for future planning and negotiation for LEED EB."*²⁵

2.4 Factory Mutual (FM)

- Verify FM-required features are cost effective for the insurance policies of the project.
- Have all consultants understand the requirements of FM.
- Determine FM requirements to be used on the project with the Owner.
- Establish a relationship with FM for document review and inspection.
- Require consultants be aware and can incorporate FM requirements.
- Complete FM updates and inspections on a regular basis.
- Make sure FM attends all required inspections, even if conflicting with the schedule.

"Incorporation of FM requirements into the Project established another level of coordination that had to be completed by the Design Team. Because of the complexity of some issues, not all the design features addressed FM needs. This had to be verified and reviewed on a couple of occasions to make sure they were incorporated."

"The most difficult part of FM coordination is availability of FM to review and coordinate issues regarding their requirements. Documents were sent to FM for review, however, based on their availability and timing, information regarding their evaluations was not readily available. Ultimately it's helped the Design Team to provide all the features that FM needs, however, this was not always possible due to some areas of interpretation being needed by FM."

"Another concern about FM was that at times when they were needed on site they were not available. Unfortunately, with construction on a critical path delaying or putting off

²⁴ ZGF Architects

²⁵ ZGF Architects



LESSONS LEARNED OREGON CONVENTION CENTER



issues that FM needed to address was not possible. Cost impacts and effort negatively affected the success of meeting these needs.

*"For the next project, additional staff needs to be allocated to coordinate the issues of Factory Mutual. Secondly, Metro needs to make sure that the features being requested by FM are cost effective for the long-term of the insurance policies for the project. This can be difficult to determine based on the ramification of features that are subtle requirements but are very expensive to incorporate."*²⁶

2.5 ADA

- Establish peer review process for ADA issues.
- Have ADA peer review complete document review.
- Schedule ADA peer review at regular intervals to review construction.
- Complete documentation of inspections and decisions made.

*"A decision was made to incorporate a consultant to review ADA issues for the Project. This was a second peer review function in order to hopefully reduce the number of potential conflicts with ADA in respect to the design. In the case of this Project, the ADA review was provided as consultation but did not really establish its value until the final walk through during substantial completion and punch list work. At that point a majority of the issues identified as conflicting with ADA requirements were defined. Overall the process did help provide a better product, but in future projects it is hoped that a more thorough peer review can be provided with the Design Team to prevent impacts at the end of the project. Again, this is a complex issue with a number of items to look at on this Project, and thorough document review probably will not catch every issue."*²⁷

*"The Owner hired an ADA consultant for this project. The consultant, rather than carefully reviewing documents and providing guidance on current ADA policy, reviewed the project after construction and discussed changes that needed to be made. ZGF still did a thorough ADA review, and there were few items on the checklist that needed to be changed, however, the cost of the consultant was most likely not necessary. In the future, an invitation to this person for a site visit and ADA review would suffice."*²⁸

"One area where ADA guidelines were missed was in structural elements – particularly the cross bracing at the curtain wall on the interior and the structural fins at the curtain wall exterior. We placed movable furniture at the base of interior cross bracing to

²⁶ Karl Schulz, Sr. Project Manager, Expansion

²⁷ Karl Schulz, Sr. Project Manager, Expansion

²⁸ ZGF Architects



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prevent a visually impaired person from caning into the structure. The exterior fins were not an area of concern to the consultant but do not meet the letter of ADA guidelines.”²⁹

“One recommended change is to establish a procedure or risk management process that reviews for risk an ADA issue or one that’s considered to require interpretation from ADA. The Project Team must determine if the cost to correct and/or change requirements for the construction is offset by the actual risk of conflict with the interpretation of ADA. In this Project, the Team reviews did assist in establishing the items that could be interpreted to be in conflict with ADA but were decided to remain unchanged based on a minimal risk.”³⁰

“Risk management versus ADA requirements was a fine line for us to walk. In several cases, the Owner requested additional railings be added where not required by ADA guidelines and building code. These were purely for risk management issues that came from general issues they had run into over the years of experience they’d had on the original project.”³¹

2.6 Budget

2.6.1 Development

- Establish the correct budget from the beginning.
- Provide details of the budget assumptions.
- Base budget development on more thorough programming and schematic design.
- Verify soft cost needs.
- Determine interest revenue.
- Determine excise and/or agencies desiring funds from the budget.

“The Project budget was established based on the best information at the time the Project was being developed. However, a little more effort would have been helpful in establishing a project size and features for better budget planning. One of the difficulties of the early budget development was identifying the correct funding for the actual size of the design.

²⁹ ZGF Architects

³⁰ Karl Schulz, Sr. Project Manager, Expansion

³¹ ZGF Architects



LESSONS LEARNED

OREGON CONVENTION CENTER



"In addition, soft costs need to be established to provide the funds needed for all the different features incorporated with the project development. This can be difficult to determine, however, there are processes that need to be utilized to make sure that the soft cost budget is adequate for the complete design and construction process.

"Another feature that needs to be incorporated into the budget planning is the interest revenue. This cannot always be determined until the funding mechanism is established. However, the development of a construction budget needs to define what interest revenue can be utilized for the completion of the job.

"The Project Team was able to establish a budget early enough in the design process that adjusted for the actual design and soft cost requirements.

2.6.2 Tracking

- Establish a tracking system that is based on building construction and not corporate budget management.
- Allow staff to establish internal budget control and forecasting systems for detailed tracking and to allow for effective translation of data from the corporate budget management system.
- Establish budget tracking system that can be agreed upon by all parties.
- Simplify program codes for ease of tracking.
- Allow Project Team to manage budget forecasting utilizing the system that's specifically for construction.
- Allow Project Team to track costs on real time based on their needs and not on a system that's delayed due to fiscal policies.
- Provide a process that allows all costs to be verified and cross-checked. Coding of costs was not perfect.
- Metro's fiscal year-end processing to be clarified for accurate reconciliation of all closings.

"The biggest drawback to this Project was the fact that an extensive amount of program codes were incorporated into the staff system in order to track specific work. This became very bulky for management and coordination with Metro. It is recommended that next time it become a simpler system when tracking costs using the Metro system.

"However, the Project Team must continue to track an extensive amount of detail on costs and expenditures to properly manage those items for the project. Therefore, the Project Team should be allowed to setup a tracking system that is the best tool for them to track the project budget. Therefore, they need to be allowed to utilize their own budget control system and forecasting process."³²

³² Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



2.6.3 Management

- Clarify and establish permanent rules for defining what line items in the construction budget are capital and what are non-capital or personal services.
- Establish clear, concise, and flexible budget management practices to maximize utilization of project funds.
- All expenditures, including interfund transfers, should be pre-approved following pre-established expenditure authorization protocol for the project.
- Establish clear and efficient policies for contracting that allows for a timely approval process, pre-approval, or waiver by the MERC Commission of pre-identified larger dollar contracts.
- Provide project staff with adequate authorization and training for more efficient understanding and utilization of Metro system reports, direct purchase order processing, Metro/MERC's fund management policies, etc.
- Staff should establish early relationship with primary accounting and budget staffs in both Metro and MERC.

"The biggest time-consuming issue that addressed the budget management was the changing of the account coding two times during the Project. This was based on the lack of clear interpretation of fund management coding for the Project. A clear policy for this needs to be defined and established before the next project is undertaken. Requirements and regulations of capital vs. services needs to be weighed for construction or altered so there is more budget flexibility in the tracking of programs.

"The present methodology utilized penalizes the project from efficiently accessing savings in certain accounts for the completion of construction. The inflexibility of incorporating savings between capital, personal services, materials and services, and interfund transfer accounts which are forecasted and established a year prior becomes a hindrance to effective cash flow management, particularly as the project nears its completion.

This regulatory process conflicts with the ability to utilize all the funding to maximize the results of the project. Ultimately it is critical that at the beginning of a project budget, clear, concise, and flexible management practices be established specifically for construction. The processes established for corporate management are not necessarily the same for construction. As example, it was discovered that project funds designated to Metro's "contingency" account for the first two years of the Project were not accessible for Project use without submitting an amendment to the budget which involves a complex, lengthy and time consuming approval process.

In construction budget management, "contingency" funds are not specifically allocated, but are funds easily accessible for expenditures that might arise which had not previously been identified in the budget. In the end, accounting can still be completed to verify that



LESSONS LEARNED OREGON CONVENTION CENTER



the funds were adequately used for the completion of the project, including whether it was used for capital or services.”³³

“The Project budget for FY99-00 had been pre-established as a non-capital account incorporating both non-capital and capital coding. In the fall of 2000, Metro declared that the entire budget was, in fact, considered capital and that all the codes needed to be changed to an all-capital coding system

If this type of situation should arise again, that any full-scale change to a project budget be done only at the end of a fiscal year when one direct journal entry transfer can be done and ONLY if all expenditures can be incorporated. This would significantly reduce the hours of staff effort to accomplish the task, and it keeps a much cleaner audit trail available for any future reviews.”³⁴

“Metro’s practice of charging interfund transfers to the Project budget without the Project’s knowledge or approval, and without supplying appropriate backup when requested was of concern and frustration throughout the course of the Project. Monthly and yearly expenditures including Metro’s indirect costs, direct costs, insurance and miscellaneous administration expenses, banking expenses, etc. totaling tens of thousands of dollars would often be processed without prior notice to the Project staff and without signature authority given by the Senior Project Manager or other pre-authorized persons approved to expend from the fund”³⁵

2.7 Design Regulatory

- Establish single contact person early to establish early and continuing communication with regulatory agencies.
- Identify proper protocol required by regulators.
- Complete pre-design planning review and meetings with regulators.
- Review schedule of review of documents, especially fast-track, with regulators.
- Be willing to take extra steps to increase communication between design and regulators.

“It is critical that the system established for working with regulators satisfy both the Owner and the regulatory agencies. The regulators and the Owner need to define a schedule that works for the project. Determine if compromise in the schedule is needed to provide design review and regulatory review necessary for the Owner to make a successful project. Schedule is critical to the success of any project.

³³ Karl Schulz, Sr. Project Manager, Expansion

³⁴ Vicki Baker, Admin. Asst., Expansion

³⁵ Vicki Baker, Admin. Asst., Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



"In addition, regarding design requirements and design commission, the involvement of the design planning needs to be continuously evaluated to make sure that the freedom to complete a design is not compromised by the regulatory agencies. This includes dictating the type of design to be utilized on a project. Because of the economic impacts of requiring or correcting design features that add cost to the project, this issue has become a dilemma for owners for a design that can be completed within budget.

"It is becoming very difficult for the Owners to budget what design requirements will be required by the regulatory agencies for a major project. Establishing a budget is difficult enough, but to not know where the regulatory agencies will require additional work is becoming more difficult.

In the case of the Oregon Convention Center Expansion, it was not anticipated that over 60% of the site would have to be renovated with additional work being required along Oregon Street, which was not directly adjacent to the Project site. It was anticipated that only a portion would be required to be renovated around the Expansion itself. This was a budget dilemma for the Team.

"In addition, in order to complete the Design Review, the Design Teams are required to present more and more documentation. This is difficult for the Project Team to anticipate how much information needs to be presented. In the case of the Expansion, 3-D modeling, multiple boards, and sophisticated documents had to be provided. This was an extensive cost to the Owner and the Design Team.

"Another issue that needs to be addressed is the process of schematic design review vs. actual concluded design. In the case of the Convention Center, a schematic design showed mullions for curtain wall system intersecting midway up the curtain wall. When the system was finally designed, it was determined that this would be unsafe and that the intersection of the mullions had to be at the intersection of the mullions different from the schematic design. This became an issue with the City since it was different than the preliminary schematic design. A formal process had to be completed for a very minor issue. This required re-submittal of drawings and a new presentation to the Design Commission. This seemed to be very bulky based on what the actual ramifications of this issue were.

"It is understood that Design Review is ultimately responsible to make sure that designs improve the livability of the City of Portland. However, the details and issues that are now being reviewed or required to be changed are difficult to coordinate. Schematic design provides a rough idea of what the final design is to look like. Not until contract documents are completed can the actual details of the design be completed. It is recommended that the City review the Design Review requirements so as not to demand as much detail for approval as is now being required.

"One of the success of the Design Review process was the Project Team meeting with the structural review group to outline the fast-track process of the Project. By meeting early



LESSONS LEARNED OREGON CONVENTION CENTER



and establishing what information and criteria needed to be provided, the Project Team and the regulatory agencies coordinated the information needed for the permit review. The willingness of the structural department to meet with us and the team effort provided by all parties led to a successful and on-schedule review of the structural documents.

"Another area that was successful was the design review staff who worked diligently to coordinate issues for the design of the Expansion. Certain design staff individuals took it upon themselves to work hard with the Design Team to coordinate needs and requests by the Design Commission and other staff for the Project. Their efforts to try to mitigate and resolve issues ultimately helped to successfully complete the Design Review process.

"A number of the features that have been established in the plan review were found to be excellent solutions. The electronic status report for the Plan provided a timely update on the status on plan reviews. This allowed the Project Team to focus on what issues needed to be completed as requested by the City.

"Another area that was appreciated was the use of credit cards in the payment of permits. In the case of a public agency, a check request must be processed and this can delay the checks from being provided for multiple days. The use of credit cards for payment of a number of permits was carried out without any delay.

"A success for the Project is to have an appeal process that reviews issues that are not clearly defined by code or provide opportunities for minor adjustments. Based on previous experience with other City building department, the appeal process is not utilized at all. The City of Portland, by providing this appeal process, allows more flexibility and creativity in the execution of design.

"The only negative issue regarding the appeal process was the direction provided by the Plan Review for minor issues. The Team felt that a number of issues could have been addressed in one appeal addressing multiple issues as a single item. The City should consider setting a standard between all the plan reviewers regarding appeals so that multiple appeals are not needed if one could suffice.

"Another success of the Plan Review process was the ability for the Owner and the Design Team to meet with the City on critical issues. City staff demonstrated a willingness to meet on critical issues if needed in order to expedite the permit process. Once a meeting was established to help resolve an issue, majorities of the staff were willing to sit down and work through the analytical resolution of the outstanding issue. It is recommended that staff continue to use communication through an open process instead of a closed process.

³⁰ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



2.7.1 Permitting

*"The permitting process for the Oregon Convention Center was a challenge, one in which we had to invest significant additional effort to make successful. Like our industry, the permitting process is dynamic and changing. There is a concern in the building community that the City's permitting process does not adequately support the fast track process. At this point, it would be very easy to cast blame and align ourselves on one side or the other of this issue. Or, we could recognize we are dependent on one another and work toward productive solutions. To that end, here are some solutions we are offering."*³⁷

2.7.1a Fast Track:

"The City needs to have an open forum on this issue with contractors, developers and architects so each side can air their concerns. From the architect's perspective, the documentation required for permitting limits the fast track first submission to the beginning of the Construction Documents phase. Ideally, it would begin in Design Development.

"Establish a contact person early – OPDR, ZGF and for each primary consultant, such as mechanical and electrical, meet regularly before submissions begin to assure schedules have not changed and review time is still available.

"All parties must recognize that the fast track approach is complex, challenging and ever-changing, and does not accommodate the inexperienced on either side.

2.7.1b Coordination:

"The primary reviewer is central to this process. We must assure their experience level is appropriate.

- Length of tenure at OPDR
- Plan review experience overall
- Project specific experience – project type

- Specific to OCC – Reviewer required significant amounts of information that might be viewed as excessive, particularly when content was being changed to respond economically to the bid environment. Reviewer required information other reviewers have never required (specific examples: 1) colored life safety drawings; 2) reviewer specified colors required for elements on Life Safety drawings; 3) Life Safety drawings were required to have the same level of detail as contract documents – a labor intensive process, to say the least). OPDR needs to establish guidelines that everyone can follow.

³⁷ ZGF Architects



LESSONS LEARNED OREGON CONVENTION CENTER



- *Maintaining notebooks for each bid package was important. Each bid package had multiple reviews that generated multiple check sheets.*
- *Maintaining a notebook for appeals helped keep track of which appeals had been granted or denied, and which had been heard several times before finally being granted. It was important to keep record of appeals by date and by hearing number. It was also important to have a table of contents that summarized appeals granted, denied and by topic. This will be a good resource for others in the office working on projects in the City of Portland.*

2.7.1c Department Communications:

"Obtain protocol and information on interdepartmental communication at OPDR

- *Water/BES/Plumbing*
- *Planning/Design Review*
- *Life Safety/Fire Marshal*
- *Mechanical/Life Safety*

- *Specific to OCC – Plumbing won't look at drawings until BES signs off. BES won't review until water signs off. If any of these departments is behind in their review, it throws the system off. Also, plumbing follows the letter of the code, even if BES wants to see more environmentally progressive design – counterproductive if BES has already bought off on design if you have to go back and redesign to code for plumbing. Planning goes back and reviews everything that Design Review decided to verify that the construction documents follow the decision – this review needs to happen early in the process, but never does. The fire marshal and life safety reviewer look at the documents together and combine their check sheet, so often times you don't know which comment came from which reviewer – saves a check sheet, but adds to confusion. Our reviewer elected to review mechanical drawing for permit, which created confusion with the mechanical department reviewer because there was not agreement on content.*

2.7.1d Communication with Design Team:

"The fast track process, once initiated, is inundated with changing documents. Handling everything by paper, particularly small issues can slow the process down. In general, don't hold up a permit for want of a single sentence on one sheet of 20. The system needs to allow direct verbal communication as a means of moving the process forward.

- *Check sheets versus meetings/phone calls*
- *Updates from coordinator*



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- *Specific to OCC – Check sheets were issued every time there was an additional issue or question, where other reviewers were comfortable with calling to ask a question or to get a clarification – this added a great deal of time and paperwork.*

“Cost of plan review to architect/owner/contractor was expensive due to the request to provide continuous updates of drawings.

- *Fire/Life Safety – requirements for reprints and replacements, number of check sheets*
- *Planning – cost of fast track bid packages (cost per permit) versus one package*
 - *The printing cost for replacement sheets every time we made changes to the documents was unanticipated. Analyses after all permits were in shows that we paid markedly more than we would have if we had gone for one building permit.*

2.7.1e Miscellaneous:

“Deferred submittals: What is required as a deferred submittal is subjective depending on the reviewer. The City should consider standardation.

- *Specific to OCC – Our reviewer required a list of deferred submittals that included UL listings for wall types and fire system information. Subcontractors change products from those specified for economic reasons before submitting. Therefore, UL listings approved on deferred submittals are often different.*

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2.7.1f Architect’s Design Review Fees:

“Design review, permitting and other plan reviews should be a separate line item within a fee structure. This should be negotiated as a separate fee or should be included as a reimbursable cost. There is no way to anticipate what a reviewer will require for the hearing, or how many hearings will be needed for final approval. There were also several different reviews – the main Type III, the signage, miscellaneous Type II reviews for changes to the site or façade.”³⁸

2.7.1g Appeals:

“Establish a database for appeals that have been written to the City of Portland in recent years – no need to reinvent the wheel when writing an appeal. Has the appeal been approached before? Was it accepted, and on how many tries?

“Appeals had to be written to the “letter of the law”. A concept could not be appealed, but each code issue had to be appealed. There was very little room left for

³⁸ ZGF Architects



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interpretation. What would have been written up as one appeal in the past for a revision to an exiting path, turned into four or five written appeals. Not only is this expensive, but time consuming.”³⁹

³⁹ ZGF Architects



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3.0 CONSTRUCTION PHASE

3.1 Quality Management

- Invest more time in peer review or document quality.
- Establish Special Inspection program; coordinate with all members.
- Hire an experienced construction team who understands major construction.
- Provide additional Operations staff to help complete quality control.

"Design teams need to incorporate DCVR's, ASI's, and PI's into contract documents, including multiple bid packages to make sure that the information is documented and coordinated.

"Some of the successes in the construction was to provide full height construction barriers and sound walls. This prevented dust and dirt from impacting the shows. In addition, construction was completed at night and at off-hours to make sure it did not disrupt shows. The Team did establish the use of signage, temporary lighting, temporary HVAC to make sure that the construction could continue while the facility operated. This was an investment of significant cost that needs to be budgeted for construction projects, but did provide the ability to keep shows running and construction going.

"The Construction Team also provided a successful plan of recycling existing materials. This was due to the creativity and the investment by the construction team to manage sustainability issues.

"It was critical for the coordination and design documents for the control systems for HVAC be determined before bidding. This was not done, and required that more effort be provided during construction to coordinate control features and to satisfy the Owner's needs.

One of the features that was successful was the installation of black monocoat. This reduced the amount of painting that had to be required to hide the structural systems.

"A major issue for the Design Team on the fast-track was the coordination of structural loading for mechanical spaces. A solution needs to be determined to make sure that the roof loads are not over-designed, but have enough strength to hold the actual load of the mechanical systems.

"The Construction Team recommends that the AV, telecom, security, and lighting consultants be sub-consultants to electrical, not the architects. This is in response to coordination of their work that's electrical. This was not facilitated in this Project and caused coordination issues. Another solution proposed is to have a staff member from the design team coordinate all the different sub-consultants, if they're not under the electrical. This staff member would be responsible to control the sub-consultants and to coordinate between them, especially electrical systems. It is also recommended that



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more detailed language be provided in the bid package contracts to require coordination of earlier bid packages. Even if the drawings don't show or are missing, the earlier bid packages need to be part of the bid package that's being built.

"Require that the Owner equipment be on site earlier and to meet critical deadlines for submittal information. Their products always seemed to arrive late and not be fully coordinated.

"Seek permits months in advance of when it's needed. This provides the flow time needed in case there are delays in the regulatory process.

"A success was providing commissioning staff members early in the job. Bringing Pat Ward and Ken Hettinger into the Project by HCC was a good decision. HCC's evaluation of MEP challenges and importance of a strong finish and coordination of system installation was key.

"Taking time to evaluate scope in November was also an important solution. With late decisions for signage, concessions, operations, and other items of work, evaluating what the team could and could not do was key. The contractor knew only so much work could fit into the time schedule allowed. Hoffman's evaluation of the work along with ZGF's input proved key to understanding how much work to be added and when to stop.

"Another success was the evaluation of certain work bid. In the case of the airwalls, extra time was spent to make sure that the system had all the desirable features and that it would be constructed correctly.

"The Team worked great in addressing impacts head on. No one on the team waited and the designers provided invaluable with their assistance in finding solutions and working with ideas generated from the Team to help find solutions. Change Orders 2, 3, and 4 addressed these items without taking value out of the Project." ⁴⁰

"A number of steps should be focused on in providing quality control of construction. In the case of the Convention Center Expansion, the major step that was corrected was the hiring of staff that was experienced in construction. The original construction inspector did not have the experience for major construction projects. A new construction coordinator was hired who had a more thorough knowledge of construction methods and technology. This was a great asset.

"As defined in other locations in this document, peer review and document quality is essential to allow the Team to concentrate on quality control. As in the case of the Expansion a lot of staff time was utilized during construction to correct or facilitate the completion of contract document information. This reduced the ability for staff to be on-site to complete quality control. If this had been known at the beginning of the Project, additional staff would have been hired; one to focus on the coordination of contract

⁴⁰ Hoffman Construction, edited by Karl Schulz.



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documents and another to work on quality control. In a typical project, hopefully the documents can be provided which require only minimum coordination and therefore less staff to focus on quality control.

"The last area that would be recommended for improvement is the hiring of additional staff from Operations to help inspect the building. This is a financial issue that must be addressed by the Management Team. However, if possible, staff should be hired early so they can help provide additional eyes in the inspection of construction. This would also help coordinate and provide additional training and education. Ultimately the more eyes that can be afforded to provide inspection, the higher the quality of the construction." ⁴¹

3.2 Construction Management

- Establish fast-track guidelines for packages, outlines, schedules
- Have experienced personnel in construction management.
- Team needs to be willing to work with impacts and finding resolutions.
- Assign the correct number of staff for the project.
- Have staff specialized in areas of responsibility.
- Provide cost control-experienced staff.

"The success of this Project can be attributed to the quality of the Construction Management Team. The staff provided by Hoffman Construction was able to facilitate their responsibilities even though the documents for construction required additional coordination work. Because certain Construction Management staff had experience in mechanical and electrical systems, they were able to facilitate and coordinate issues so the work could be completed on schedule.

"The only area of concern regarding construction management staff was the cost control staff. The staff originally assigned to the Project were unable to manage the cost control for the Project. Because of the complexity of the job and the number of changes, one staff member was needed just to coordinate and manage those cost controls.

"The success came when the right person was found to facilitate the cost controls. This person understood the system and was able to catch up with all the outstanding issues and provide the cost control management needed for this Project." ⁴²

3.2.1 Fast Track

- Full team buy-in
- Team members meet their committed dates for completion of documents
- Owner should establish realistic schedule goals.

⁴¹ Karl Schulz, Sr. Project Manager, Expansion

⁴² Karl Schulz, Sr. Project Manager, Expansion



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"Fast track is always a complex and difficult methodology for delivering construction of a project. However, in this modern era, fast track is considered fairly typical of large major projects. Team members need to learn to work within the parameters of fast track. Fast track requires all team members to have the skills and abilities to coordinate their multiple issues. They must base their decisions on experience.

"With the complexity of this Project and the requirement to release in early bid packages, some of the lines got blurred regarding what information was in what packages. Again, there's not a fail-safe solution on this situation. This issue needs to be worked out with the team in hopes that everyone can anticipate and work around the issues.

"A major fault of the fast track system is when one group does not complete their work. Whether it's the correct design or in-time issue, the other trades are impacted. It is almost impossible to complete a job successfully if a particular design team does not meet the requirements needed for the project. Therefore, for a successful fast track project, all design teams must complete their work correctly in the time allotted." ⁴³

3.2.1a Guidelines for packages – outlines, schedules

- Define packages scope and expectations
- Schedule packages early so design team can react.

"Very early on in the process, be specific about the expectations for each bid package with all parties involved – especially the City for permitting coordination. We had quite a bit of confusion regarding where the line was drawn for package contents and responsibilities.

"For BP 3 Steel, the contractor wanted to see as much steel as possible in the package, not just structural steel, for a more competitive bid. We had to step up our efforts for detailing other steel elements that we considered architectural and not structural. This required special detailing out of sequence, which forced early decisions and late changes in the field.

"Floor boxes – being on the 83'-0" level were also stuck between bid packages. Fortunately, the floor box layout was such a driver for the Exhibit Hall design, that this had a lot of early attention. Review of their design in earlier bid packages assisted the team when having to write several appeals to accommodate the specific design parameters the Convention Center was looking for." ⁴⁴

⁴³ Karl Schulz, Sr. Project Manager, Expansion

⁴⁴ ZGF Architects



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3.3 Design Issues

- Begin with the correct program and schematic plans.
- Establish the correct budget.
- Establish a correct schedule that provides enough time.
- Have a design team that completes their tasks responsibly.

"Overall the design team and the design process had a great number of factors influencing the process. However, as understood from reading this document, one certain design consultant did not complete their services as the schedule required and/or follow the quality control principles.

"If the contract documents are not been completed correctly, the design of the facility will be impacted. Ultimately this did take place on this Project, however, the impacts were worked out.

"One of the main concerns of design was the coordination of Owner's issues. The Expansion Office worked hard to try to establish meetings and coordination of information. At times there was a disconnect in what information was provided and what information was actually put on the documents.

"The other area of design is the communication aspect. Many of the design issues were not properly communicated whether it was from the Owner to the designer, or designer to Owner. Extra effort needs to be vested by both sides in order to make sure that everyone understands the features and desires of the project.

"Ultimately the design did work out and an excellent product was provided which works well for the Owner. Therefore, the design was successful and that's the intent of the Owner." ⁴⁵

3.4 Schedule

- Establish logical schedule.
- Do not let the schedule get squeezed.
- Provide adequate float for contingency to deal with unexpected issues.

"The major impact to the Project schedule was the bond measure that delayed the start of full project development. This was out of the control of all team members. The government issue was a voting issue and the work on this Project could not be fully engaged until after this issue was resolved. This squeezed the Project and created more issues requiring the Team to work with less time.

⁴⁵ Karl Schulz, Sr. Project Manager, Expansion



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"However, the schedule was established and the Team did work together and agreed on what areas were to be completed and what phases of the Project. This buy-off from the Team allowed the Project to meet many of the goals required.

"During the course of design, budget constraints also had impact on the schedule. The design of the Project had to be revised in order to meet budget constraints. This was due to a number of issues including request by the Owners to have certain features that had not been identified in programming and design issues incorporated by the Design Team. This impact needs to be avoided during future project so that there can be a consistent design path without changes in direction on the overall intent of the design.

"The construction phase of the Project was managed aggressively. Staff was responsible to provide information quickly and at times inconveniently in order to keep the Project on schedule. Ultimately with the number of changes incorporated into the Project, it is a tribute to the Team that the Project was completed on time. Pushing the schedule did create negative impacts with Team members. At times the Design Team felt like they were being unfairly pressured to provide information. However, this pressure ultimately led to the success of the Project since the schedule was the most critical priority for the Expansion Project."⁴⁶

3.5 Safety Program

- Use team approach.
- Rely on the excellent safety programs already established by experienced team members.
- Incorporate concept that all staff are responsible for safety in safety procedures.
- Provide safety incentives.
- Manage on a daily basis.

"The most important decision made on this Expansion Project was to rely on an already successful safety program. Hoffman Construction has proven that its safety program has been successful which can be documented in their mod rate for safety.

"The Expansion Team immediately established the fact that Hoffman Construction's safety program would be utilized during the course of this Project. By utilizing a team approach already established and successful, major changes were not needed. With the program in operation, the Team worked together with Metro and the insurance agencies to verify that all effort was being made to provide the safest site possible.

"Throughout the course of the Project the Team continued to monitor and look for more improvements for safety on the job site. Ultimately there were some issues regarding safety that needed to be addressed.

⁴⁶ Karl Schulz, Sr. Project Manager, Expansion



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"There were a number of injuries early in the Project. The Team got together to address this issue. Through review of the types of injuries and to whom they took place, it was established that the apprentices being utilized on the Project had a higher injury rate than journeymen. This was documented in the number of injuries that took place to apprentices. The Expansion Team began to study how this could be corrected. Education of apprentices was increased regarding safety. All staff was asked to make sure that apprentices learned to manage their issues more pro-actively to reduce their safety incidents. Ultimately there was a reduction in injuries that aren't clearly defined but could be related to the fact that apprentices were given increased training and monitoring and that the work being completed by the trades was not as dangerous.

"In the next safety program it is recommended that if there's a requirement of a 20% apprentice program that specific education or additional education be provided to apprentices to make sure that they meet the additional safety issues." ⁴⁷

3.6 Travel by Team

- Verification that production is being completed on schedule.
- Provide additional quality control.
- Establishing relationships to verify that services will be provided.

"The Project Team elected to make a number of trips to verify quality and materials, and verification that products were being made properly. This was part of the quality control program and also a process needed to make sure that funds being spent on product materials were being properly allocated. The Expansion Team made a number of decisions to travel to inspect facilities where construction was being completed. This included steel, carpet, signage, and other systems. Because of the size of the Project and the diverse locations where products were being manufactured, travel was extensive for this Program. Ultimately these travels did address issues that helped guarantee there were no major glitches in supplying these products.

"A travel policy needs to be established at the beginning of any major project identifying that travel to inspect sites of major product production is a pro-active way of managing construction. This travel is to ensure and verify that the products are built and/or constructed to appropriate quality requirements and will be delivered on schedule. Without these verification features, confirmation of a product being completed must be relied upon the supplier whose interests may be to protect themselves and not the project schedule. The only methodology known by the Project Team at this point is to conduct an actual site visit of those facilities to make sure that the products are being constructed to meet the necessary quality and time constraints of the project." ⁴⁸

⁴⁷ Karl Schulz, Sr. Project Manager, Expansion

⁴⁸ Karl Schulz, Sr. Project Manager, Expansion



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3.7 Construction Regulatory

- Provide staff for on-site inspection verification that work is being completed to meet code.
- Inspect work and address issues for an active facility.
- Establish early communication with regulatory agencies involved in inspection.

"The regulatory agencies for this Project included the City of Portland, Multnomah County, State of Oregon. Ultimately the regulatories were helpful in the success of this Project. From the beginning, the Project Team established a strong line of communication with the regulatories involved in the Project. Meetings were held early with the staff who would be involved in the Project to communicate the needs of the Project and the requirements of the regulatories. This communication continued throughout the construction.

"This was very advantageous to have a line of communication with the regulatories with the existing building expansion. Impacts from the existing building had to be reviewed and discussed with the regulatory inspectors to make sure that all Fire Life Safety precautions were being utilized. Therefore, the Team's efforts to establish communication with the regulatories ended up being a successful practice.

"The construction regulatories also provided the flexibility needed for a major construction project. They were able to meet and discuss issues with the construction team. Again, I believe this was successful because of the Team members' willingness to communicate with the regulatories and establish a line of communication and documentation satisfying both parties.

"The one issue that needs to be addressed by the City of Portland is the requirement of Special Inspection. These Special Inspection issues continue to grow and change and it's difficult for the owners to understand all the requirements. In addition, the owner must be given the freedom to competitively bid Special Inspection services. In some cases, the Special Inspection services need to be provided by multiple inspection agencies. This is based on competitive bidding, especially for fast track projects. Fast track projects do not always have quantities and amounts established at the time of the first phase of the fast track. Therefore, inspection services cannot be contracted until later. With government agencies such as Metro/MERC, competitive bidding is required and a contract cannot be given to one special inspection agency. The conflict between the desires of the City's Special Inspection and what is legally allowable by the government agency for bidding must be studied. This issue needs to be addressed and resolved so that the owner has the ability to properly bid Special Inspection services at the most economical cost for services."⁴⁹

3.8 Workforce Program

- Establish goals before RFP for Contractor.

⁴⁹ Karl Schulz, Sr. Project Manger, Expansion



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- Determine how to facilitate Workforce program.
- Track Workforce program at minimal costs.

"Establishment of a 20% Workforce requirement did impact the Project. As established earlier, there seems to be a higher rate of injuries to apprentices and therefore a higher injury rate overall for the Project. This means that the apprentices must have increased training in order to prevent additional injuries. This is a major lesson learned when requiring the incorporation of a certain level of workforce.

"The other area of workforce management to consider is the tracking. Hoffman Construction is experienced in documenting and tracking workforce requirements. Their documentation was the basic method of tracking the workforce for the entire Project. The City of Portland was contracted to help with the workforce tracking, but they relied mostly on the tracking and documentation provided by Hoffman Construction. Their services did not provide an extensive additional level of management, based on the observation of the Project Team.

"In order to properly manage and understand the workforce impacts on a project, the contractor must have a system in place that allows them to track the employees to make sure that they are meeting the goals. In addition, throughout the course of the project the goals must be reviewed and checked to make sure that each subcontractor does address and incorporate the appropriate number of employees to meet the criteria. The CM/GC must be pro-active in tracking and notifying sub-contractors when they do not meet the requirements. This requires the CM/GC to have the resources to document this issue." ⁵⁰

3.9 OCIP

- Establish OCIP program before RFP for CM/GC.
- Define insurance coverage to incorporate into the RFP.
- Require contractor to define differences in coverage during RFP phase.
- Define who's to manage the safety program.
- Make sure tracking of OCIP has a clear and established process.

"It is recommended that if a project is determined to utilize OCIP, that the OCIP requirement and process be established before the selection of the contractor and the design team. By defining the OCIP program early, the proposals for costs and management can be defined in the RFP selection to verify that the contractor has the skills to participate in the OCIP program. In the case of this Project, it was fortunate that the CM/GC was experienced with OCIP and therefore could incorporate the process into the Project once it was determined that OCIP would be used.

"When evaluating whether an OCIP should be utilized for a Project, it is important to verify the advantages of the OCIP program. Size and complexity of a project need to be considered. The use of OCIP in the Oregon Convention Center was adequate. The size of

⁵⁰ Karl Schulz, Sr. Project Manager, Expansion



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the Project was almost marginal regarding the use of conventional vs. OCIP. However, the use of the OCIP in this Project did provide an education for Metro, MERC, and the Project Team to understand how the OCIP has advantages and disadvantages in the completion of a major construction project.

"The Project Management Team and the staff managing the OCIP program must communicate and be educated on the use of OCIP. There are a number of differences with OCIP that require that the Project Team have the understanding of what needs to be completed in the coordination of the OCIP program. This will allow more efficient use of OCIP and to provide better return to the Owner.

"One of the difficulties of the OCIP program at this point is the negotiation of differences in charges and the differences in coverage for insurance between the contractor and the OCIP program. This requires extensive negotiation and understanding. Ultimately there is no clear formula for determining what the differences in coverage costs will be and this has to be negotiated out. A more efficient way needs to be determined if coverage is needed between the CM/GC and the OCIP program.

"Another area to be reviewed is the establishment of the safety program. In the case of this Project, Hoffman Construction had an extensive safety program already incorporated in their company. Instead of trying to develop a new safety program, Metro utilized the program already established by Hoffman for the completion of this job. This was successful since Hoffman's program was well organized and managed. However, if OCIP is utilized in another project, careful evaluation of the safety program and who is to manage it needs to be studied. Without the most efficient safety program, the OCIP would be impacted and the cost to the OCIP would be higher.

"It is important to establish a team approach to the management of the OCIP. Staff that are familiar with insurance are not necessarily familiar with construction requirements and vice versa. Therefore, multiple people must be involved in the management of the OCIP to represent both the insurance requirements and the construction requirements. The team approach was utilized for this Project and helped to manage the overall OCIP and the day to day issues.

"There was a higher injury rate at the beginning of the Project. It was determined based on statistics that a majority of injuries were to apprentices. Therefore, additional effort was spent to educate apprentices regarding safety. The requirement to have 20% apprentice workforce on this Project established, based on statistics, a higher injury rate. Therefore, the OCIP had a greater impact. When establishing an OCIP program, verification of the workforce apprentice program needs to be considered in understanding what rates are probable for determining what the funding for OCIP will be.

"Two areas of the OCIP language need to be reviewed and adjusted for future projects. These were found during the course of the management of the OCIP. The first was the



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State of Washington's workers' comp requirements. Washington State requires that workers comp be paid in Washington State, not Oregon. This conflict was not found until late in the Project. A couple of contractors out of Washington State have been impacted by this issue which may require them to pay for workman's comp for two different states at twice the cost.

"Another area of contract language that needs to be adjusted is defining of what is a claim or multiple claims. Claims were submitted on damage to work. This was not an issue unless the type of damage was repeated over and over again. An example on this Project was the impact to conduits sticking through the slab. It was determined that a number of conduits were run over by trucks. However, they were run over by trucks on a number of occasions. This needed to be defined in order to clarify the claim. To make costs deductible for that claim, the issue has to be evaluated if the damage is all at the same time and therefore using one deductible or was it multiple impacts requiring multiple deductibles for those impacts. The ultimate goal is to prevent contractors from repeatedly damaging materials and packaging it as one major claim instead of multiple minor claims. This needs to be clearly defined for OCIP."⁵¹

3.10 Commissioning

- Determine Commissioning program.
- Establish a peer review process.
- Verify that commitment of staff to complete Commissioning process is available; have all parties buy in.

"The Commissioning program for any project is complex. It needs to be established early in the project to know how it's going to be facilitated. There are still a number of methodologies for the delivery of a Commissioning program. This must be identified and incorporated early. Once the decision has been made on the process of Commissioning, this must be incorporated into every phase of the project. Therefore, the decision on Commissioning must be done early. Once the process is established, the information should be incorporated into the RFP if possible, or contract documents.

"In the case of the Expansion, the Commissioning process was to incorporate staff from Operations. Ultimately they have the most interest in making sure the project is properly commissioned and works. By incorporating the Operations staff into the process they can also learn how the systems work while they're verifying that they do operate properly. Documentation of the process is critical to make sure that all features have been tested to the satisfaction of Operations.

"The area of improvement needed in regards to the Expansion was the establishment of testing procedures earlier for the Project. Because of a lack of time by all parties, the proper testing protocols, i.e. functional acceptance tests, were not all defined and/or

⁵¹ Karl Schulz, Sr. Project Manager, Expansion



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established early enough in the process. This impacted the ability for the work to be tested properly in a more constructive schedule.

"In addition, this process relies extensively on the utilization of Operations staff. Additional staff should have been hired early in the Project to allow staff responsible for Commissioning to complete the Commissioning process. If the Owner-managed Commissioning process is utilized again, Operation staff time must be allocated to provide the services needed in order to complete the documentation and the functional testing of the systems.

"However, even though the OCC staff was not available to complete the testing in the manner desired, Hoffman Construction staff, utilizing two staff members responsible for Commissioning, provided a successful process for this Project. With their responsibility focusing on Commissioning verification of systems, they were able to discover and resolve a number of issues related to the construction to make sure the systems did function as needed. Their efforts provided the success that most of the systems did operate correctly from the beginning of the Project." ⁵²

⁵² Karl Schulz, Sr. Project Manager, Expansion



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4.0 RESULTS / MISCELLANEOUS

4.1 Audit

- Establish requirements early.
- Learn from previous audit reports.
- Meet with auditor to review issues.
- Document responses.

"The Expansion Team worked extensively to establish audit procedures and policies. Through review of previous audit reports and utilization of experienced staff, a process was established to verify that audit issues were being met. Ultimate, I believe that this reduced the number of issues that the audit team had. The number of issues that would need to be addressed is as follows.

"The auditor has insisted that there are a number of policies and procedures that need to be incorporated into the project. One of the items that they raised repeatedly is a construction management plan that includes documentation of risk and other features. Such documentation is difficult since many of the requirements requested are part of the daily concepts and work that must be completed by the Project Management Team. Documenting the volumes of issues on a construction project beyond those which are documented in Advisory and Management Team committee minutes would be labor intensive and prohibitive to efficient management of the multitude of construction issues that arise.

"Metro must establish a clear direction on what documentation and systems must be incorporated by the Project Management Team for the project. Until this is established, the auditor can continue to raise issues that must be managed without the ability for the Project Team to understand clearly what those issues are.

"The second item that needs to be addressed is the response and the process used by the auditor for researching information. An informal process was utilized. This included e-mails that asked questions, however were not numbered or trackable. The Project Team had to respond to each question and establish a protocol in documentation to address those issues. A more detailed and formalized process should be utilized so that when the Project Team does have to respond, they can coordinate their information with the questions raised by the auditor.

"The timing of issues must also be considered by the auditor. The Project Team was distracted from focusing on the management of final issues for the Project prior to opening by questions raised by the auditor which required responses. Time to research and respond to the auditor's questions would have meant that the Project Team had to abandon their main responsibility of managing the construction at a critical phase of the Project. Again, a clear process needs to be established so that the Project Team can



LESSONS LEARNED OREGON CONVENTION CENTER



focus on the main responsibility of management of the construction, and then respond to the auditor in a method or at a time that does not create a negative impact to the project.

"There also seemed to be a belief by the auditor that any of the information provided could be provided in a very short period of time. But, with the complexity of such a large job, answering questions required research and verification. Obviously information needs to be available for basic issues. However, for a detailed question of something that took place a year ago, file systems need to be researched which can take an extensive amount of time."⁵³

4.2 Project Management Plan

- Establish goals of the project.
- Require the design team to provide narratives.
- Complete monthly reports updating project status based on a number of project issues.
- Utilize project management plan established by Metro.

"The major with the project management plan for this Project was a conflict between Metro, MERC, and the auditor. There was not one agreed upon project management plan to be utilized for this Project. This caused conflicts between what method of management should be established for the Project.

"It is recommended that Metro setup and approve a project management plan for their projects. This can be used as a reference by the project manager to complete tasks needed to manage the job which are unique to Metro/MERC projects.

"However, difficulty can arise in this. Project management plans are time consuming and require an extensive amount of work beyond what is needed to complete the construction of the project. Additional staff must be considered to complete the proper documentation and coordination of the project management plan.

"A major issue that needs addressing is when certain requirements which are not possible to provide are requested. In the case of this Project, the auditor's office asked for a risk assessment plan. This is difficult to document since levels of risk were always changing and never consistently known for the Project. An extensive amount of time would have had to have been utilized if a plan had to be written for every time an item of risk was identified. Staff would have had to work fulltime documenting the multitudes of decisions of risk for the Project.

"Ultimately it is very difficult for a project management team to document every step they are taking on the project. Their job is to make sure that the construction and other issues

⁵³ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



are kept on schedule and not spend time trying to document what should or what has taken place.”⁵⁴

4.3 Advisory Committee

- Establish committee early in the project.
- Utilize members who are familiar with construction.
- Provide monthly report

“The Expansion Advisory Committee was a very successful feature for the Expansion Project. By having an educated advisory committee providing information to the Team throughout the Project, their knowledge and experience helped guide the Team regarding decisions made for the Project. Generally, the Advisory Committee could be considered an additional element of work that needed to be provided for this Project. However, based on the experience of this Project, their involvement provided an additional resource to help successfully manage this Project.

“The only issue that needs to be addressed with an advisory committee is how much information is appropriate to be shared at the advisory committee level. This needs to be continued to be monitored and adjusted during the construction of a project since it’s not always clear what information needs to be shared with the advisory committee during the course of a project.

“Ultimately the Expansion Advisory Committee was a critical member to the success of this Project and should be considered for all major projects for Metro.”⁵⁵

“The Construction Advisory Committee was another area that served the management group well. These folks’ expertise, knowledge and commitment were beneficial for the entire project. Management team valued their comments, decisions, questions, advice and help throughout. I am so grateful for their help and would again recommend such a committee for future large projects.”⁵⁶

4.4 1% for Art Program

- Competitively bid art coordination services.
- Have the Art Committee established by the Owner instead of the art coordinator to provide diverse opinions on art.
- Define and contract who is responsible for budget.
- Define responsibility of Art Committee to remain within budget.
- Define early what specifically is included and not included for funding within the definition of “1% for Art.”

⁵⁴ Karl Schulz, Sr. Project Manager, Expansion

⁵⁵ Karl Schulz, Sr. Project Manager, Expansion

⁵⁶ Jeff Blosser, Director, OCC



LESSONS LEARNED OREGON CONVENTION CENTER



- Include within budget for art project associated costs of construction and maintenance.
- Update and establish artists' contracts that are approved by Metro.
- Establish who is responsible for approving proposed art.

"The major difficulty with managing the art project for the Expansion was the responsibility of the budget. The Art Committee and RACC had no fiscal responsibility on setting or maintaining the budget. Therefore, they continued to require requests that work exceed the Project budget. This required the Project Manager and OCC to have to document their objection to overspending of the 1% for Art budget.

"In the case of the Ming Fay artwork, a budget had been established that included the commission for the artist and additional lighting. The RACC administrator chose to increase the budget for the commission. This took away the money that could have been utilized for lighting of the art. Now funding for lighting of the art could not be provided since it was utilized by RACC for the artists' commission.

"It is critical that contracting language for art needs to be carefully reviewed by Metro. In case the art has to be changed or moved at a future time, the contracts with the artists should not require payment to the original artist. This was an expensive impact to the Project in order to relocate two existing pieces of art. A substantial amount of money had to be paid to the existing artists for the relocation of their artwork.

"The selection of the art management group should be reconsidered. This service could be provided by a number of sources. Like other services, the coordination of artwork for a project should be in the best interest of the Owner, not in the best interest of another organization.

"It is also recommended that the Art Committee be comprised of members who are selected by MERC and Metro. This would provide a diverse selection process. In the case of the Expansion, the art coordinator selected the committee members which did not meet the interests of MERC and Metro.

"Contracts should include language to fund long-term operation costs of the art. Many artworks could require additional costs to operate and manage in years to come. Therefore, budgets need to be established or criteria defined that addresses the impacts of maintenance costs for artwork that can be extensive."⁵⁷

4.5 Evaluations

- Establish evaluation criteria early in the project and use it repetitively.
- Determine a fair grading system for the project.

⁵⁷ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



"The evaluation system for the Project was helpful to identify issues that were being well managed and others that needed to be improved. In addition, it provided a way for the Team to understand their successes.

"By having the Expansion Advisory Committee provide an evaluation every 6 months, the Team could understand if they were completing their services in an acceptable manner. This process should be used on all projects to make sure that the project management team is completing their work correctly.

"The evaluation process may be further enhanced by completing a review process of specific staff for the design, construction, and project management teams. This includes the services provided by sub-consultants and sub-contractors. In addition, Owner representatives including user staff could provide evaluations to define what areas are being provided the services needed to help in the success of the project and where services or information needs improvement. By being more specific, adjustments could be made to help manage the project more smoothly." ⁵⁸

4.6 Successes

- Task Authorizations
- Schedule
- Construction Budget Management.
- Quality Project Design.
- Intern Program

"The Project did meet the required schedule for completion. Even with early delays in the completion, a solution was found to keep the Project on schedule. Utilizing the process for the construction management, the Construction, Design and Project Management Teams were able to complete a very complex project without being affected by a number of major impacts. The success of this was based on continuing pressing for answers out of the Design Team responses, answers from the Owner, and execution of construction work by the contractor. All three members of the Team had to work together to make sure that the Project could be completed on schedule." ⁵⁹

"The intern program was established to assist the Expansion Team with work and to provide an educational platform for students desiring to enter the architectural and construction industry. Over the three years of the Expansion Project, ten interns were hired to assist the Project Team from both high school and college.

These interns were able to provide a number of services that were helpful to the Expansion Project. Basic services included filing, organizing paperwork systems, and serving as general assistance in the office. However, a major function of the interns was

⁵⁸ Karl Schulz, Sr. Project Manager, Expansion

⁵⁹ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



the utilization of their AutoCAD and Power Point skills. With their computer training, the Project Team utilized interns to complete a number of tasks including evacuation maps, signage, location drawings, transfer of architectural documents to event staff for planning documents, occupancy drawings, contract documents for minor phases of the Project, and the development of a PowerPoint presentation utilized by the OCC to provide Project information to a variety of groups. By utilizing interns who have specialized computer skills, the Project Team was able to save a significant amount of money by not having to outsource those tasks.

"Coordination of furniture needs for the Expansion was another service which was delegated to a specifically-selected intern majoring in interior design. This intern was chosen to coordinate and assist with the purchasing of furniture for the Expansion. Ultimately the intern program provided a diverse group of students whose desires were to partake in the construction and architectural design industry. It is felt that the program was successful by providing the interns the opportunities to improve their skills and by providing much needed service to the Expansion Team." ⁶⁰

4.6.1 Architectural - Design Team

4.6.1a Task Authorizations

"The successes included the use of the Task Authorization system for contract with ZGF. This outlined the number of features that were needed or proposed to be incorporated into the project. By having set fees against specific and anticipated tasks, actual numbers could be tracked on the fee. These services could be authorized based on need and the fair allocations of funds were assigned.

The Task Authorization is critical if, during the preplanning process, not all design issues that need to be incorporated into the Project had been identified. With the complex remodel and expansion project, until detail phase could be completed, the Project Team could not determine specifically what scope of services were needed. Therefore, flexibility was necessary regarding what services would need to be provided.

The success for the architectural design team selection process was the establishment of a task system that allowed the flexibility to incorporate design services and/or not use them based on what was actually determined in the field and what design features were needed for the Project." ⁶¹

4.7 Areas for Improvement

- Architectural Subconsultants.
- Establishing Design Team Fees.

⁶⁰ Karl Schulz, Sr. Project Manager, Expansion

⁶¹ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



- Design Team accountability.
- Tracking Owner needs in design.
- Establishing project budget and program.
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"The disappointment of the Project is that not all Team members are happy with the process the Project used to be completed. Many of the Design Team members feel that they were not treated fairly during the construction phase of this Project. There are a number of issues that need to be addressed by the Design Team on their satisfaction on how things were carried out. They would need to address this issue in detail to clearly resolve this issue.

"Ultimately the Project did become difficult because issues were not fully addressed in the design documents. This required additional time being spent by the Design Team, the contractor, and the Owner's representation. Without the complete design, all construction members had to participate in additional re-design and/or seek solutions to the items that were not completely designed. By requiring additional time by all team members, efforts were compromised in other areas causing more stress which was compounded throughout the construction phase of the Project.

"In addition, the fiscal resolution of this item entailed impacts to many of the team members. This impact would have been reduced if the effort had been spent early in the Project to make sure that all the design had been completed as needed." ⁶²

4.7.1 Architectural – Design Team

4.7.1a Sub-consultants

Based on the experience with the Design Team and their sub-consultants' interaction, more emphasis needs to be placed on the Team. It was evident that ZGF was the best architectural design firm for this Project.: Incorporate a process where not only is the main design team selected for their skills, but that a selection process that allows the sub-consultants to also be identified and approved based on experience that meets the needs of the Project.⁶³

4.7.1b Establishment of Design Team Fees

"The original fee estimate was based on a maximum of four bid packages. The final tally came out to ten, however, our direct involvement was in eight of those. The larger number of bid packages required a greater amount of coordination and spread our personnel thin to cover and coordinate all of them.

⁶² Karl Schulz, Sr. Project Manager, Expansion

⁶³ Karl Schulz, Sr. Project Manager, Expansion



LESSONS LEARNED OREGON CONVENTION CENTER



"Our time spent at the City of Portland coordinating permits for each bid package was not accounted for in our original fee. Granted, there was no way we could have anticipated the level of scrutiny we'd receive from the reviewers and the amount of time each bid package review would take, but having more bid packages go through the process greatly escalated the amount of handholding required at the City.

"Reimbursable costs – the printing budget was used up early on with check sets for extra bid packages and additional copies for the City to review." ⁶⁴

5.0 CONCLUSION

Ultimately any project undertaken has its own unique circumstances and issues to be addressed, managed, and completed. The Oregon Convention Center Expansion was a unique project based on its size, funding process, use of fast-tracking, and the tight schedule requirements. Its high profile entailed additional work to make sure that all stakeholders' issues were satisfied. Coordinating and meeting the majority of all issues has to be considered a success in any project.

The completion of the Oregon Convention Center was managed to meet the major objective: complete the Expansion on schedule so that the economic impact of additional space could be felt as soon as possible. This main objective was met, and all decisions that were made during the construction of this Project that were driven by meeting the schedule were the right choices.

The satisfaction of the users is fairly high. There are a number of minor issues that will never be satisfied. However, ultimately the overall impression to the public has been very positive and successful. Rarely have there been comments regarding disappointment of the design and the imagery that has been provided. By completing a project that looks good to the public, another criteria have been successfully completed.

All major construction projects can be managed in a number of different ways. During the course of this Project decisions could have been made that were more aggressive regarding impacts to the Project. However, the teamwork approach was utilized throughout the Project to resolve issues. It cannot be determined if a different management technique would have helped to meet the goals that were eventually met using the teamwork approach.

The final solution for the success of this Project was communication and teamwork. By having the factions that knew how to complete a construction project working closely together on a daily basis provided the communication links needed to make sure that all issues were addressed. Ultimately the success of the Expansion of the Oregon

⁶⁴ ZGF Architects



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Convention Center can be pointed to one factor: the people who managed it were the right people for the job, and ultimately found solutions to make this Project a success. This Project would not have been successful based on the known issues that were addressed during the Project unless the people that completed the Project had talent and resources to get it done.”⁶⁵

END OF DOCUMENT

⁶⁵ Karl Schulz, Sr. Project Manager, Expansion



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NOTES

OTHER ZGF DISCUSSION PENDING

Project Budget/Contingency

Not enough contingency

Not enough fees

Construction Administration

Digital camera

Involvement of all parties

Problem resolution

Lesson Learned

Successes

Early approval of evaluation criteria

Construction committee of technical experts and union representation

Hiring and paying for the 'right' project manager & staff

Co-directors representing owner & operator w/operator having significant decision making

Selecting a local architect and contractor interested in community and local reputation

CM/GC process - RFP selections

Pushing for sustainability but balance with budget

Art committee

Quality management program

Strong safety program with technical experts & rewards

Travel for quality control is necessary even if against Metro's culture

Developed standard art contracts

Need additional attention

Permits

Workforce program

OCIP projections & consultants & coverage questions

Clarify one-percent for art program



LESSONS LEARNED

OREGON CONVENTION CENTER



SUMMARY:

Successes and Improvements Needed

SUCSESSES	IMPROVEMENTS NEEDED
<ul style="list-style-type: none"> ▪ Co-Director leadership. 	<ul style="list-style-type: none"> ▪ Invest time up front to develop correct program and budget.
<ul style="list-style-type: none"> ▪ Design Team selection process. 	<ul style="list-style-type: none"> ▪ Establish sustainability requirements during programming and funding.
<ul style="list-style-type: none"> ▪ CM/GC selection. 	<ul style="list-style-type: none"> ▪ Determine method to select sub-consultants to get better services.
<ul style="list-style-type: none"> ▪ Task Authorization for Design Team contract management. 	<ul style="list-style-type: none"> ▪ Select Owner representative before RFP for architect and contractor services.
<ul style="list-style-type: none"> ▪ Design Team experience with OCC building. 	<ul style="list-style-type: none"> ▪ Incorporate OCIP requirements into CM/GC RFP.
<ul style="list-style-type: none"> ▪ CM/GC MEP Coordinator on Team. 	<ul style="list-style-type: none"> ▪ MEP Coordinator for Design Team.
<ul style="list-style-type: none"> ▪ CM/GC experience with major projects. 	<ul style="list-style-type: none"> ▪ Strong cost control team for GMP changes from the beginning.
<ul style="list-style-type: none"> ▪ Project budget management of losses when interest rates dropped. 	<ul style="list-style-type: none"> ▪ Require Design Team members to have office and work on site a majority of time.
<ul style="list-style-type: none"> ▪ CM/GC process allowed for adjustments when documents were not complete. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ CM/GC allowed for the addition of CIP funds to complete added work more effectively. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ Construction crisis management plan. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ Determining sustainability goals once design began and identifying funding without major impact to budget. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ ADA Peer Review process. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ Single point of contact for regulatories. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ City structural review of concrete and steel package. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ City status reports available electronically. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ Appeal process. 	<ul style="list-style-type: none"> ▪
<ul style="list-style-type: none"> ▪ Access to City staff. 	<ul style="list-style-type: none"> ▪
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