

# **REDUCING PROJECT COSTS THROUGH EFFECTIVE CONSTRUCTABILITY REVIEWS**

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## **A Pre-Construction Best Management Practice**

NWCCC Conference - November 8, 2006

### **Presenters:**

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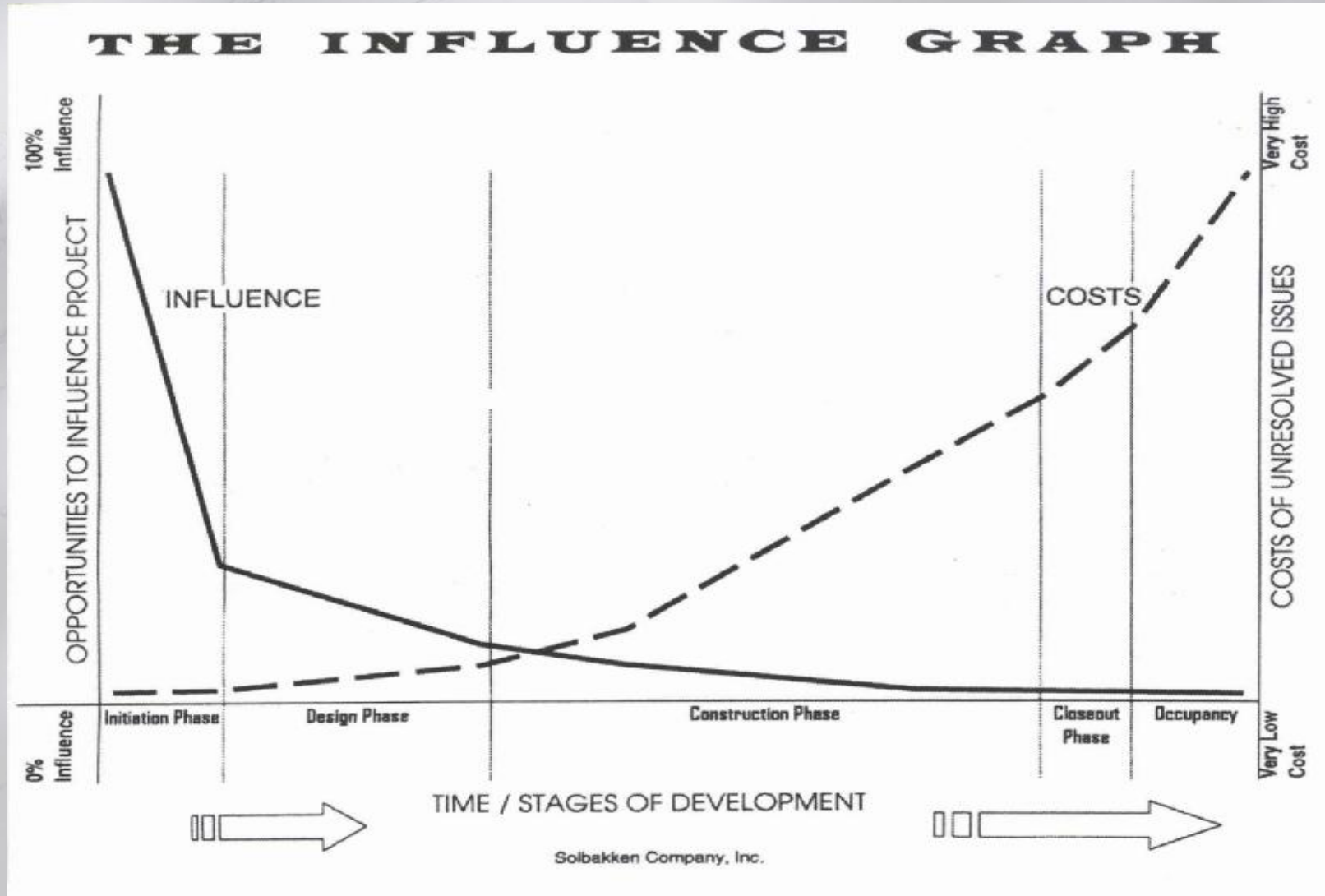
## Reducing Project Costs Through Effective Constructability Reviews

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### OVERVIEW

- Experience has shown that the ability to reduce project cost is much greater early in the life of a project
- Much of the opportunity is past once the project is out for bid.
- Constructability review during the design phase is a key to project success.

# Reducing Project Costs Through Effective Constructability Reviews



# WHAT IS A CONSTRUCTABILITY REVIEW?

- A *structured* review of the project and design documents to ensure:
  - Feasibility of construction
  - Design as represented in the plans and specifications is biddable and constructible

# TWO TYPES OF REVIEWS

## Feasibility Review – Early In Design

- **Site Constraints**
  - Access
  - Lay down areas
  - Availability of utilities
  - Height restrictions
- **Schedule Constraints**
  - Duration
  - Allowable work hours
  - Sequencing
  - Time of year
  - Weather impacts

# TWO TYPES OF REVIEWS

## Feasibility Review (cont.)

- **Resource Constraints**
  - **Materials**
  - **Labor**
  - **Equipment**



# TWO TYPES OF REVIEWS

## Detailed Document Review – Later In Design

- **Bidable & Buildable**
- **Looking for**
  - errors
  - omissions
  - ambiguities
  - conflicts
- **Coordination**
- **Complete instructions**
- **Inclusion of:**
  - Permit requirements
  - Geotechnical study recommendations
  - *LEED* analysis
  - Hazmat report

Sometimes referred to as a Bidability Review

### CLARIFICATION

- **Constructability Review**
  - Looks at how the design is represented to the contractor
  - Is the contractor provided complete and unambiguous instructions on what to build?
- **Design / Peer Review**
  - Looks at the design per se
  - Is the design correct per engineering, architectural, regulatory, and code standards & requirements?
- **Coordination Review**
  - Coordination of disciplines only



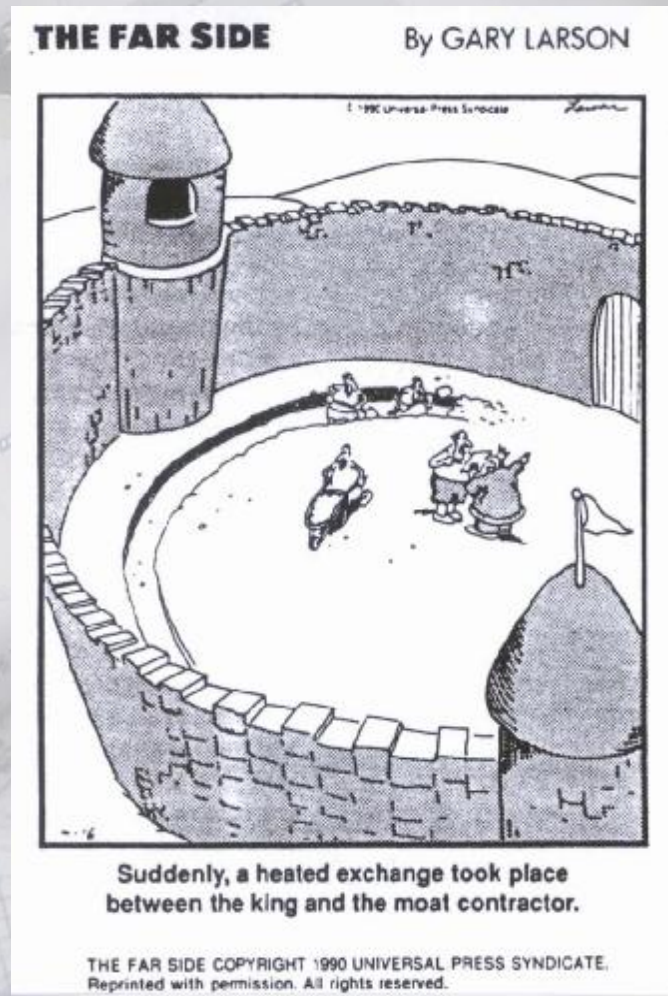
### WHY DO CONSTRUCTABILITY REVIEWS?

A design is a unique, one time endeavor requiring scores of individuals making hundreds of decisions on thousands of building components. It does not have the benefit of product testing. A perfect design will not result.

**A third party review will help!**

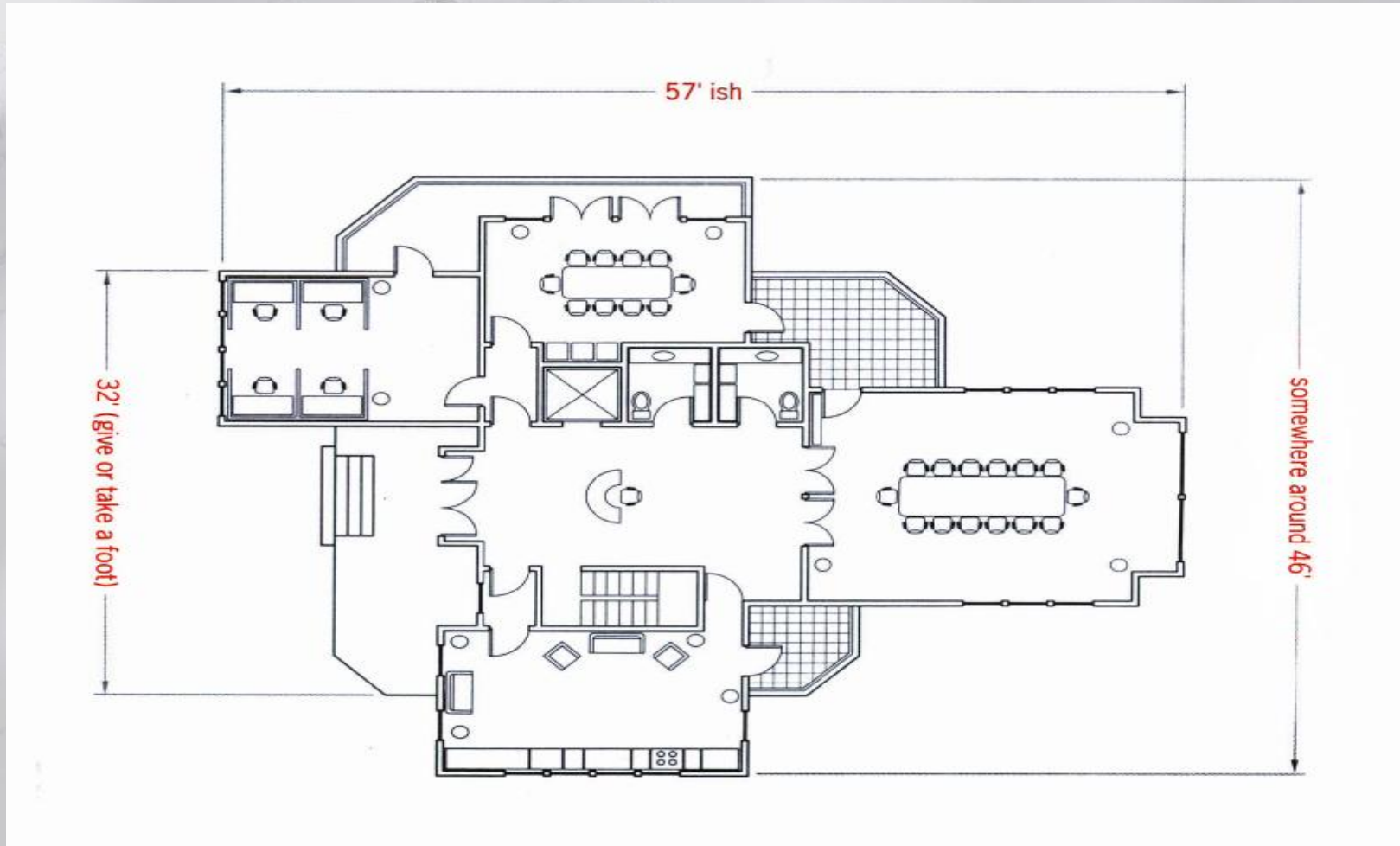
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## WHY DO CONSTRUCTABILITY REVIEWS?



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# WHY DO CONSTRUCTABILITY REVIEWS?



# WHY DO CONSTRUCTABILITY REVIEWS?

## Primary Benefits

- **Reduces RFIs**
- **Reduces change orders**
- **Reduces likelihood of impact claims**
- **Reduces impossible and impracticable requirements**

Savings = \$6 to \$27 for each \$1 invested in the review

# WHY DO CONSTRUCTABILITY REVIEWS?

## Primary Benefits (cont.)

- **Cleaner contract documents =**
  - **More attractive project**
  - **More bids**
  - **Lower bids – less contingency**

**More Savings!!**



# WHY DO CONSTRUCTABILITY REVIEWS?

## Side Benefits

- **Less RFIs and Changes =**
  - **More management on construction**
  - **Better relationships**
  - **Better attitudes**
- **Better quality**
- **Better schedules**
- **VE suggestions**



### REVIEW FORMATS

- **Workshop**
  - Better for VE
  - May catch big issues
- **Independent Study**
  - More detailed
  - Will find more issues

### REVIEW PROCESS

- **Compile documents**
- **Team orientation**
- **Site visit**
- **Document review**
- **A/E Review and Respond**
- **Reconciliation Meeting**
- **Back Check**
- **Final Report**

### EXAMPLE CONSTRUCTABILITY ISSUES

- **Three sizes of generators**
- **Leland Stanford's tree**
- **Overhead power line interference**
- **Backflow preventer**
- **Wrong soil elevation**
- **Conflicting permits**

### EXAMPLE CONSTRUCTABILITY ISSUES

- **Civil pad elevations**
- **Civil utility plans/plumbing site plans**
- **Civil utility plans/landscape plans**
- **Structural beams/HVAC ducts**
- **Structural top of steel elevations**
- **Structural/architectural**
- **Gridlines & dimensions**

### LESSONS LEARNED

- **Site visit critical**
  - As-builts poor
  - Designer & constructor perspectives differ
- **Say it once – Say it right**
- **Need to budget & schedule the review**
- **Don't hide the results**

### LESSONS LEARNED (con't)

- **Back check to get maximum value**
- **Need qualified reviewers**
- **Need a developed Review Methodology**
- **Review with “eyes of a contractor”**
- **Review team needs all disciplines**



### LESSONS LEARNED (con't)

- **Benefits designer**
- **Quality of documents is decreasing**
  - Less principal involvement
  - Cut and paste details
  - Workload too high
- **There is no industry standard definition of “constructability review”**

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### FAQs

- **Why do a constructability review? I'm already paying the designer for good plans and specs.**

## Reducing Project Costs Through Effective Constructability Reviews

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### FAQs

- **Should owner pay to have the designer make the corrections?**

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## FAQs

- **How much does a constructability review cost?**

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## FAQs

- **How long does a constructability review take?**

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### FAQs

- **Can't you just do a quick review and find all the big problems?**



# Reducing Project Costs Through Effective Constructability Reviews

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## FAQs

- **When is the best time to do a review?**

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### FAQs

- **Our change order rate is only 10%, so why should we do constructability reviews?**

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### FAQs

- Do you spell it “constructability” or “constructibility”?

### CONCLUSIONS

- **While there will never be a perfect set of plans and specs, a constructability review will help improve the quality.**
- **A constructability review should be viewed as an investment, not an expense.**

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## QUESTIONS

