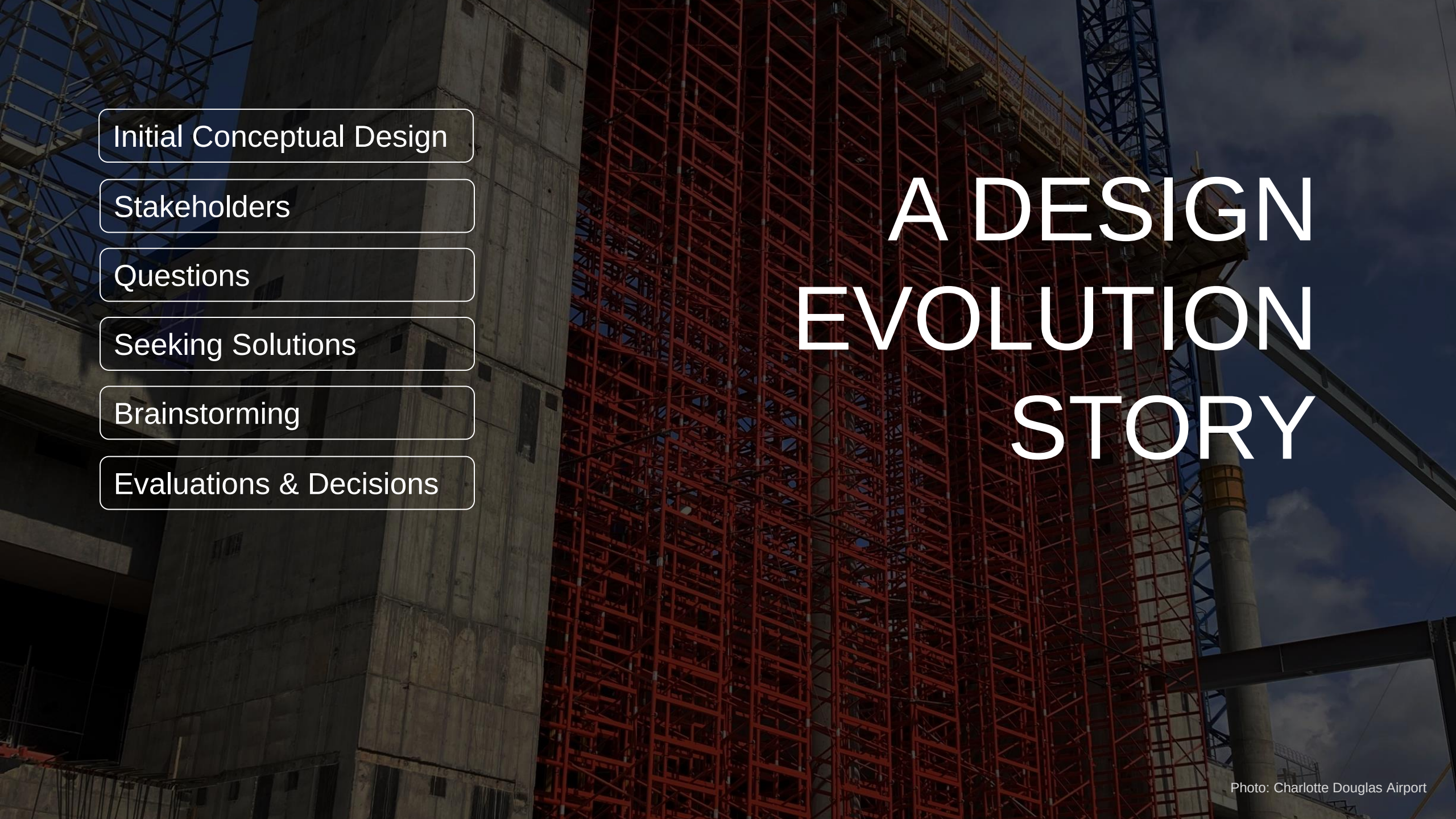
Wayne Brothers COMPANIES

CONSTRUCTABILITY

Streamline The Design

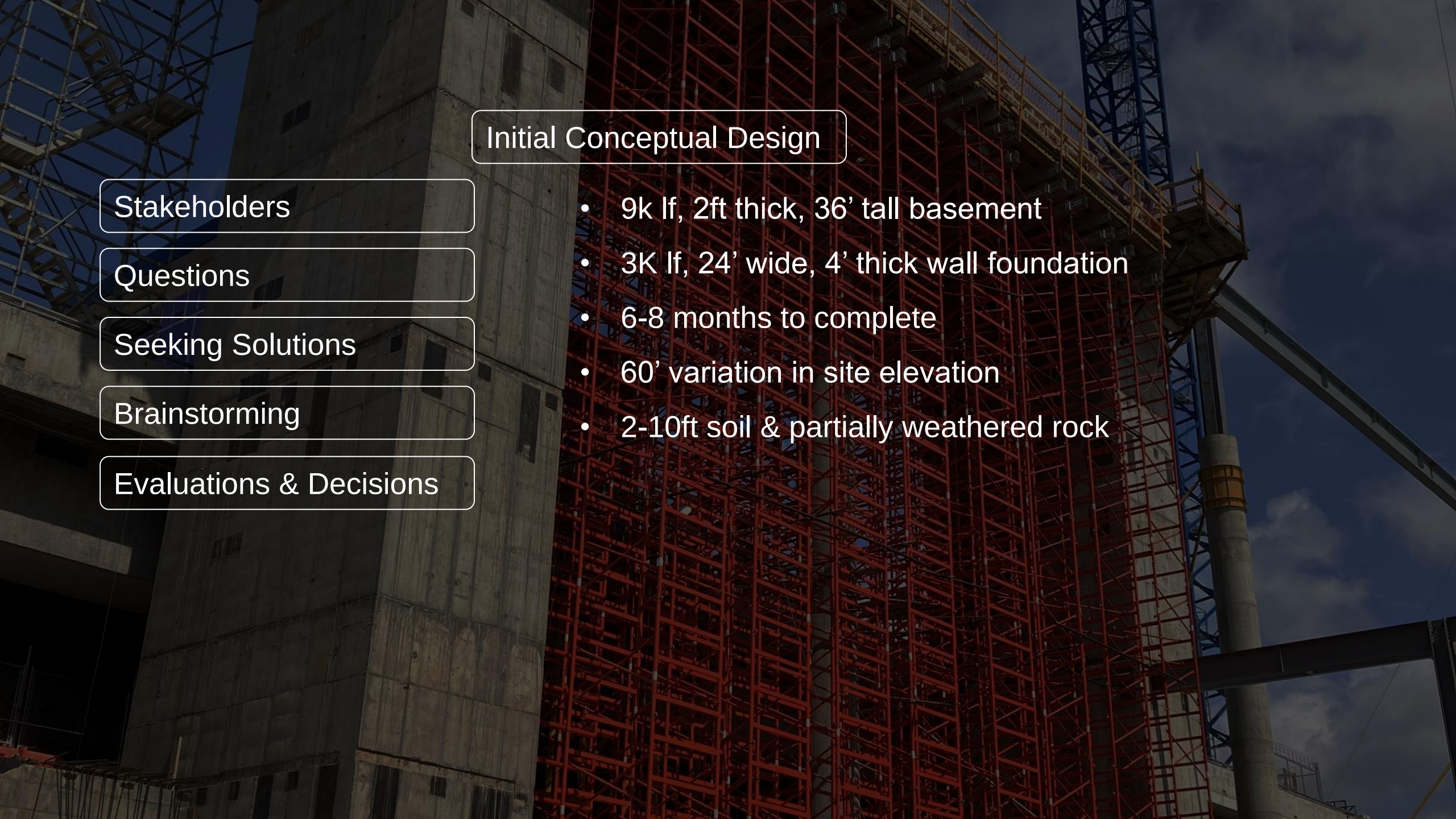
Chad Hensley, PE
EVP of Business Management



A DESIGN EVOLUTION STORY

- Initial Conceptual Design
- Stakeholders
- Questions
- Seeking Solutions
- Brainstorming
- Evaluations & Decisions

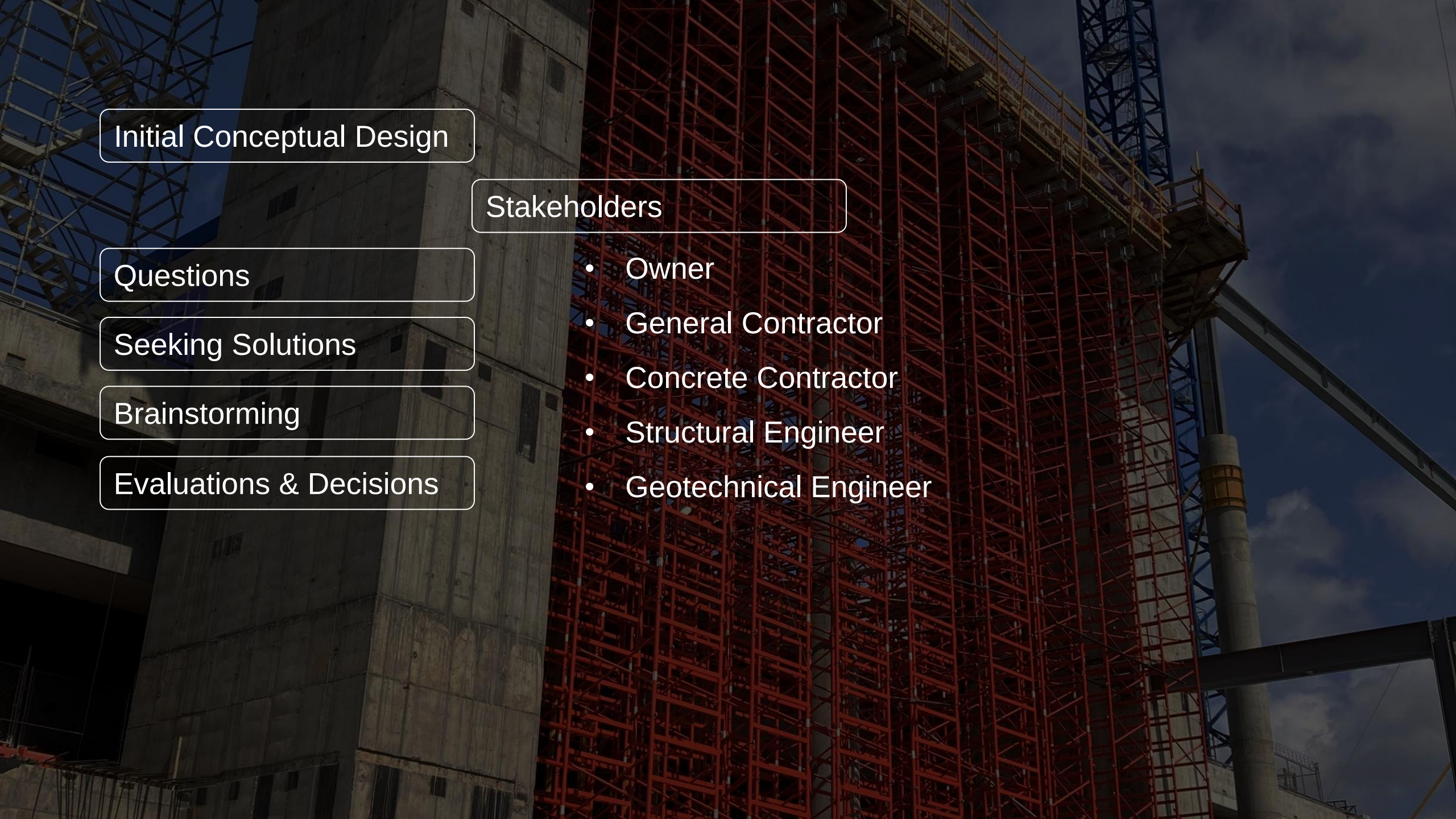
Photo: Charlotte Douglas Airport



Initial Conceptual Design

- Stakeholders
- Questions
- Seeking Solutions
- Brainstorming
- Evaluations & Decisions

- 9k lf, 2ft thick, 36’ tall basement
- 3K lf, 24’ wide, 4’ thick wall foundation
- 6-8 months to complete
- 60’ variation in site elevation
- 2-10ft soil & partially weathered rock



Initial Conceptual Design

Questions

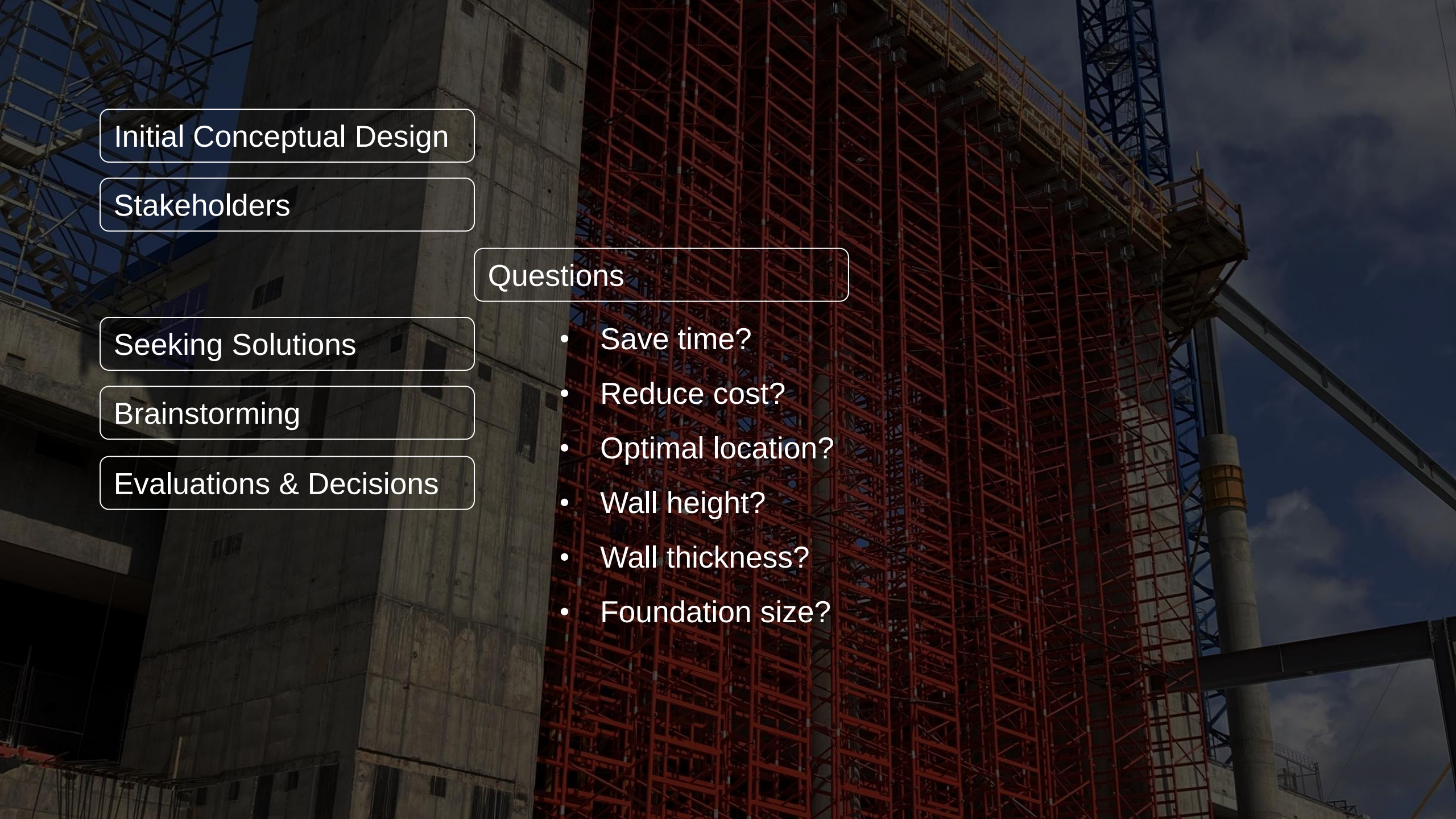
Seeking Solutions

Brainstorming

Evaluations & Decisions

Stakeholders

- Owner
- General Contractor
- Concrete Contractor
- Structural Engineer
- Geotechnical Engineer



Initial Conceptual Design

Stakeholders

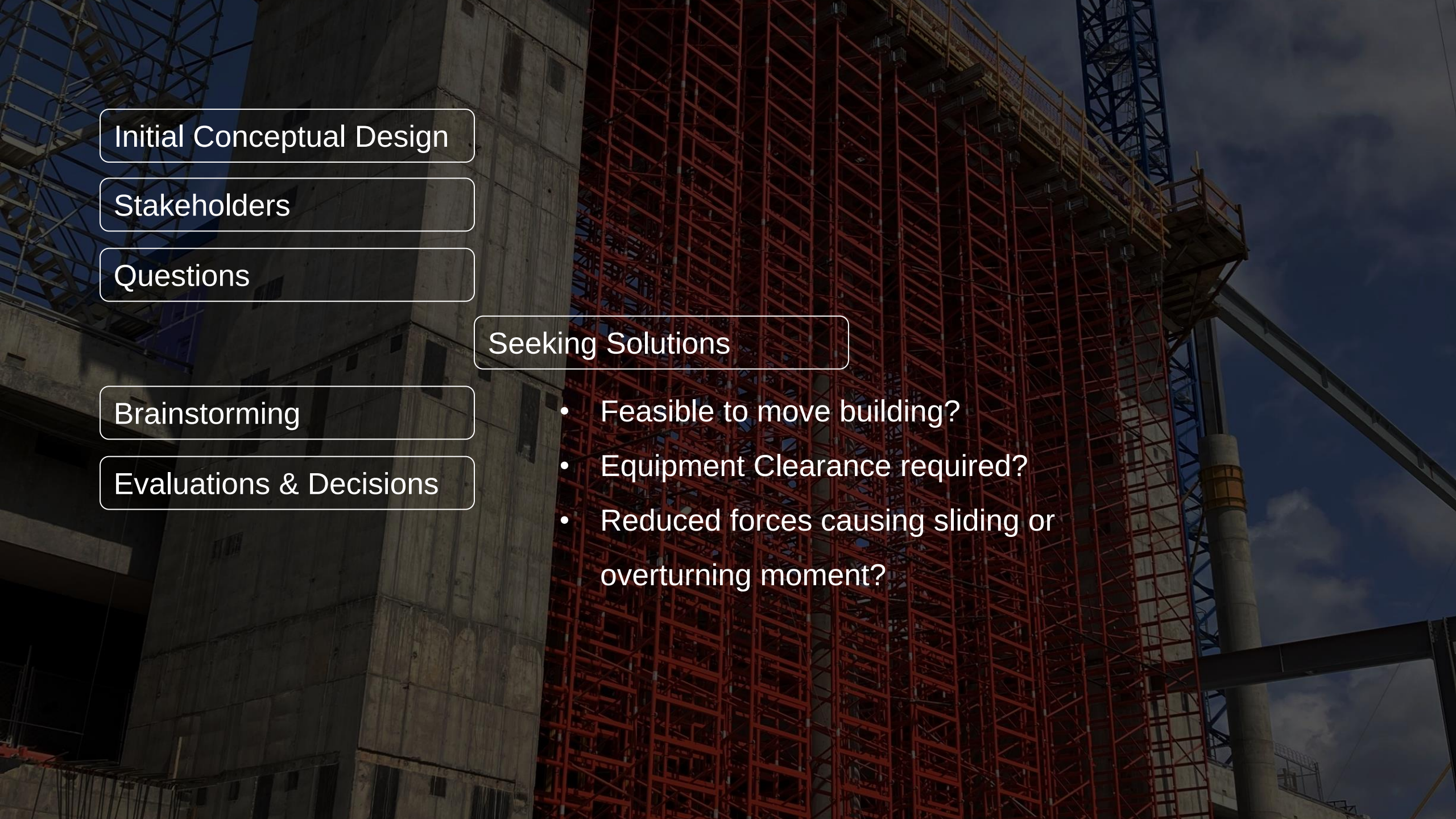
Questions

- Save time?
- Reduce cost?
- Optimal location?
- Wall height?
- Wall thickness?
- Foundation size?

Seeking Solutions

Brainstorming

Evaluations & Decisions



Initial Conceptual Design

Stakeholders

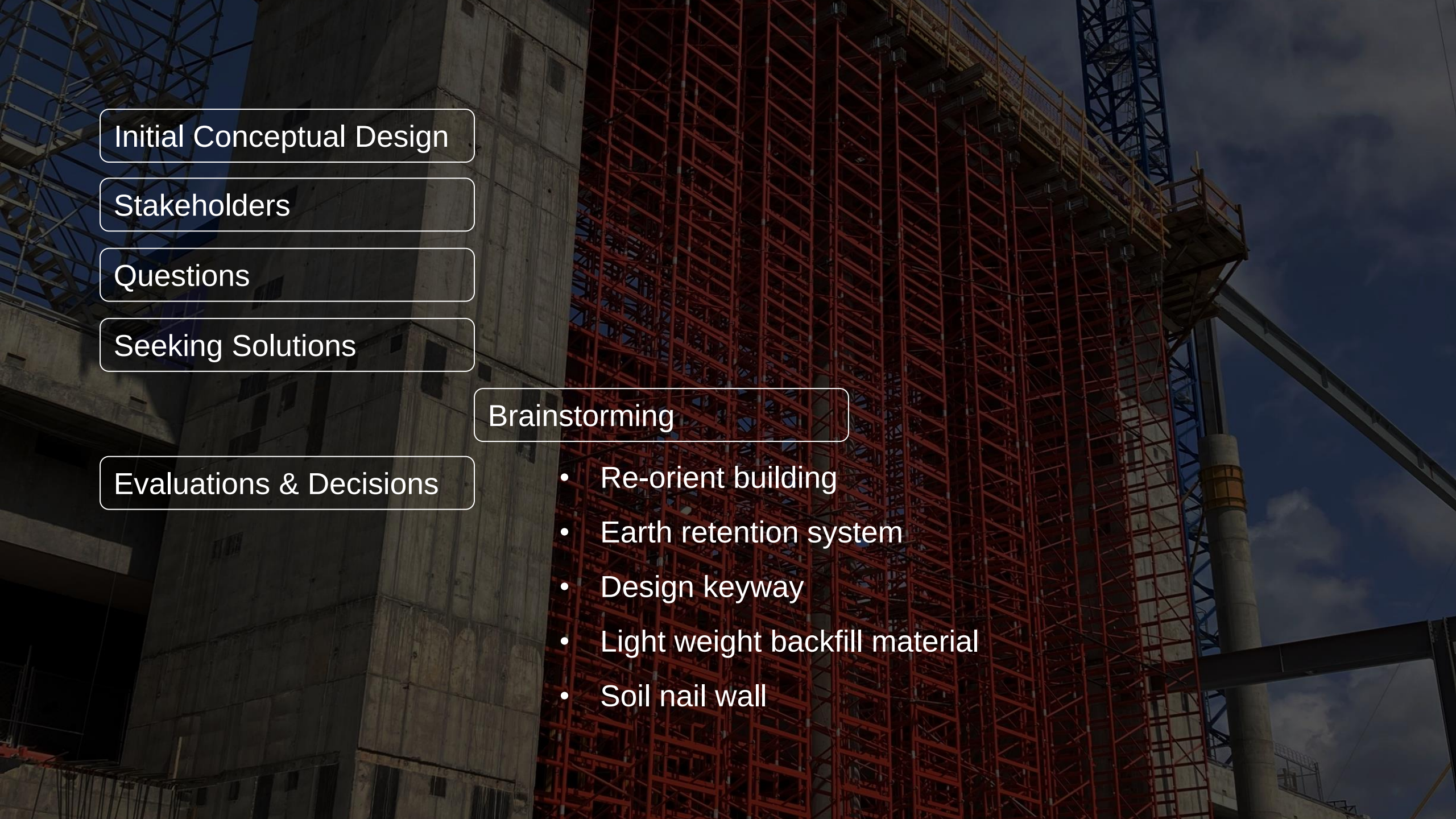
Questions

Seeking Solutions

- Feasible to move building?
- Equipment Clearance required?
- Reduced forces causing sliding or overturning moment?

Brainstorming

Evaluations & Decisions



Initial Conceptual Design

Stakeholders

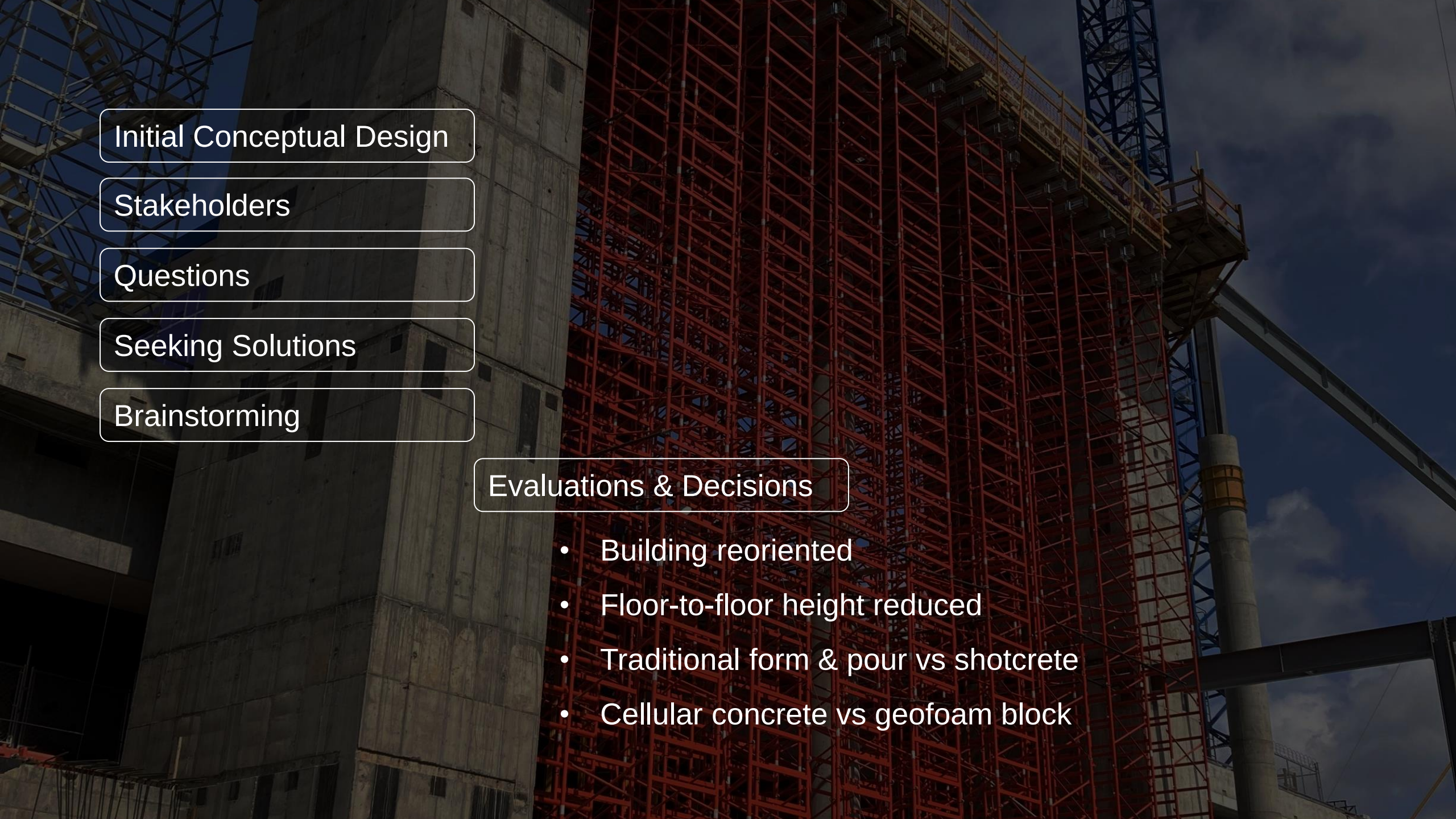
Questions

Seeking Solutions

Brainstorming

- Re-orient building
- Earth retention system
- Design keyway
- Light weight backfill material
- Soil nail wall

Evaluations & Decisions



Initial Conceptual Design

Stakeholders

Questions

Seeking Solutions

Brainstorming

Evaluations & Decisions

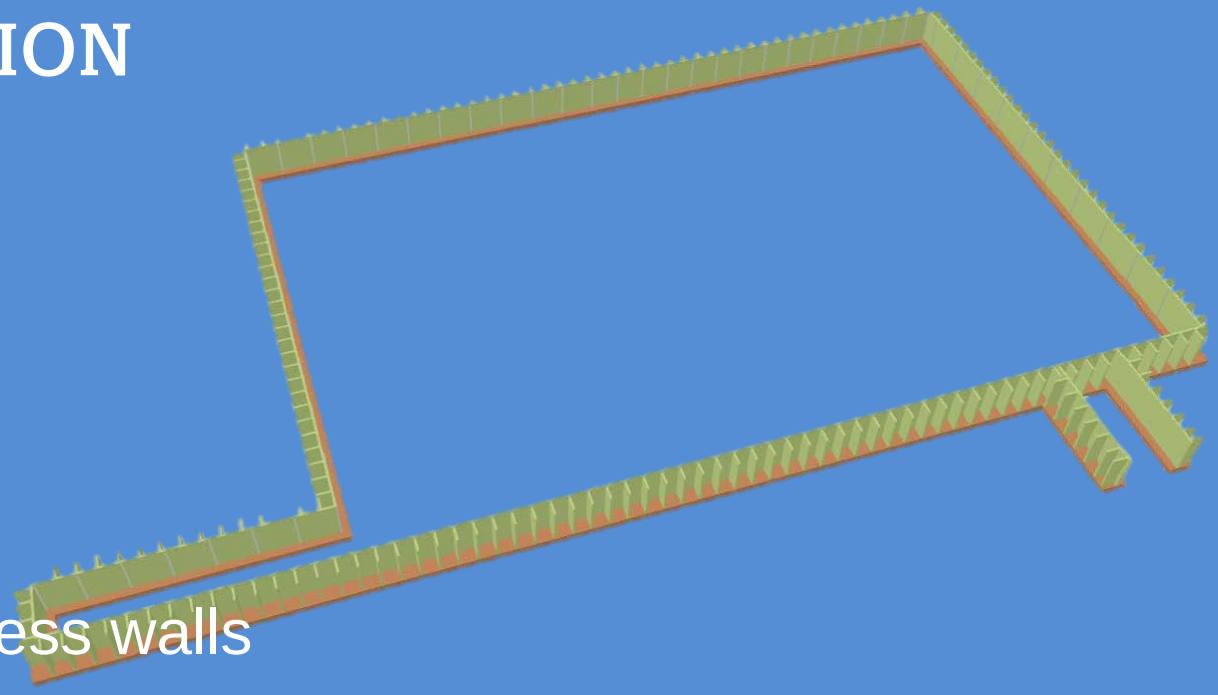
- Building reoriented
- Floor-to-floor height reduced
- Traditional form & pour vs shotcrete
- Cellular concrete vs geofoam block

FOUNDATION

10k cyds
3k lf

WALL

16k cyds
9k lf
207 buttress walls



1ST DESIGN

2ND DESIGN

3RD DESIGN

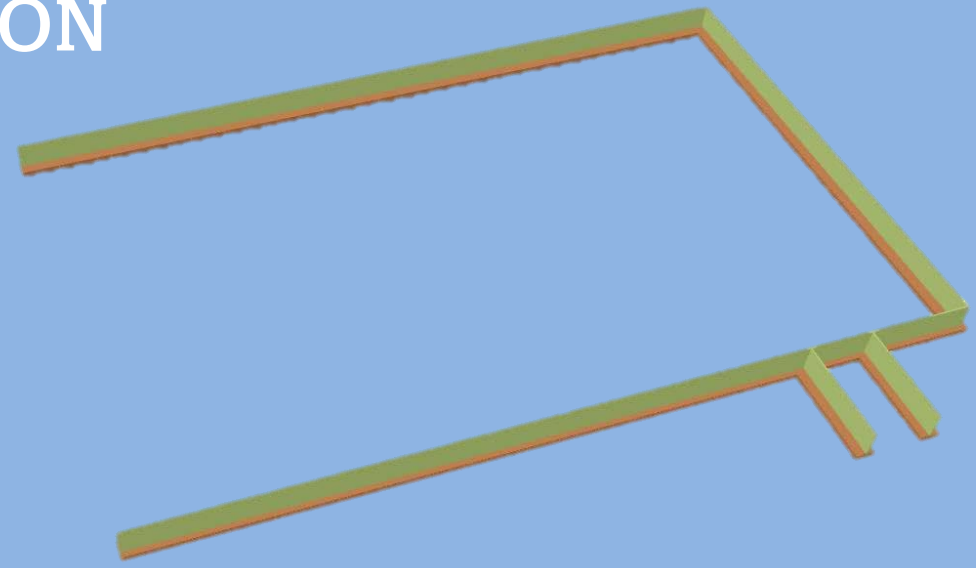
1ST DESIGN

FOUNDATION

6k cyds
2k lf

WALL

3k cyds
2k lf
~~207 buttress walls~~



2ND DESIGN

3RD DESIGN

1ST DESIGN

2ND DESIGN

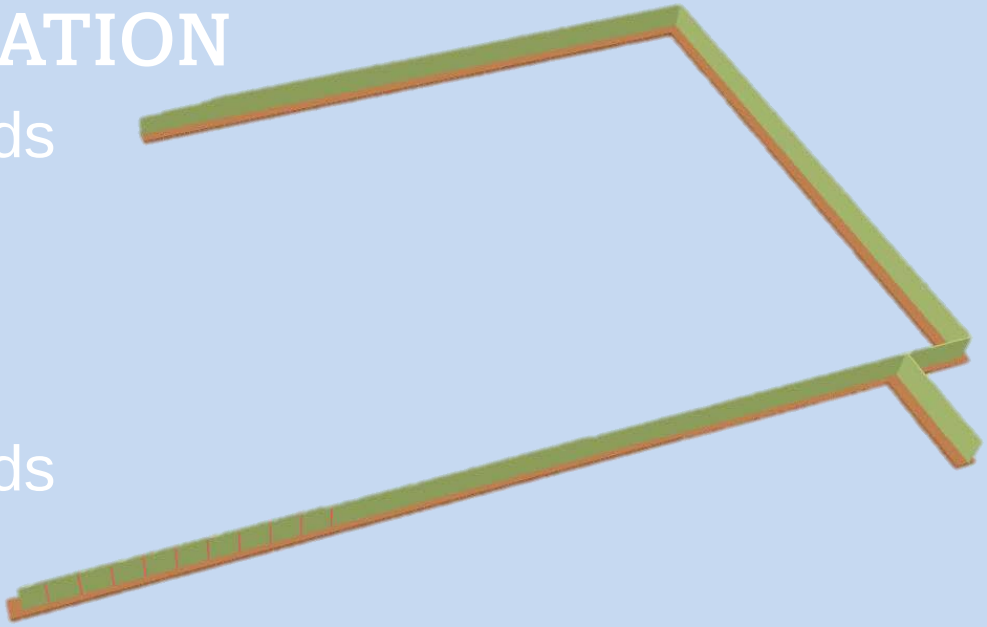
3RD DESIGN

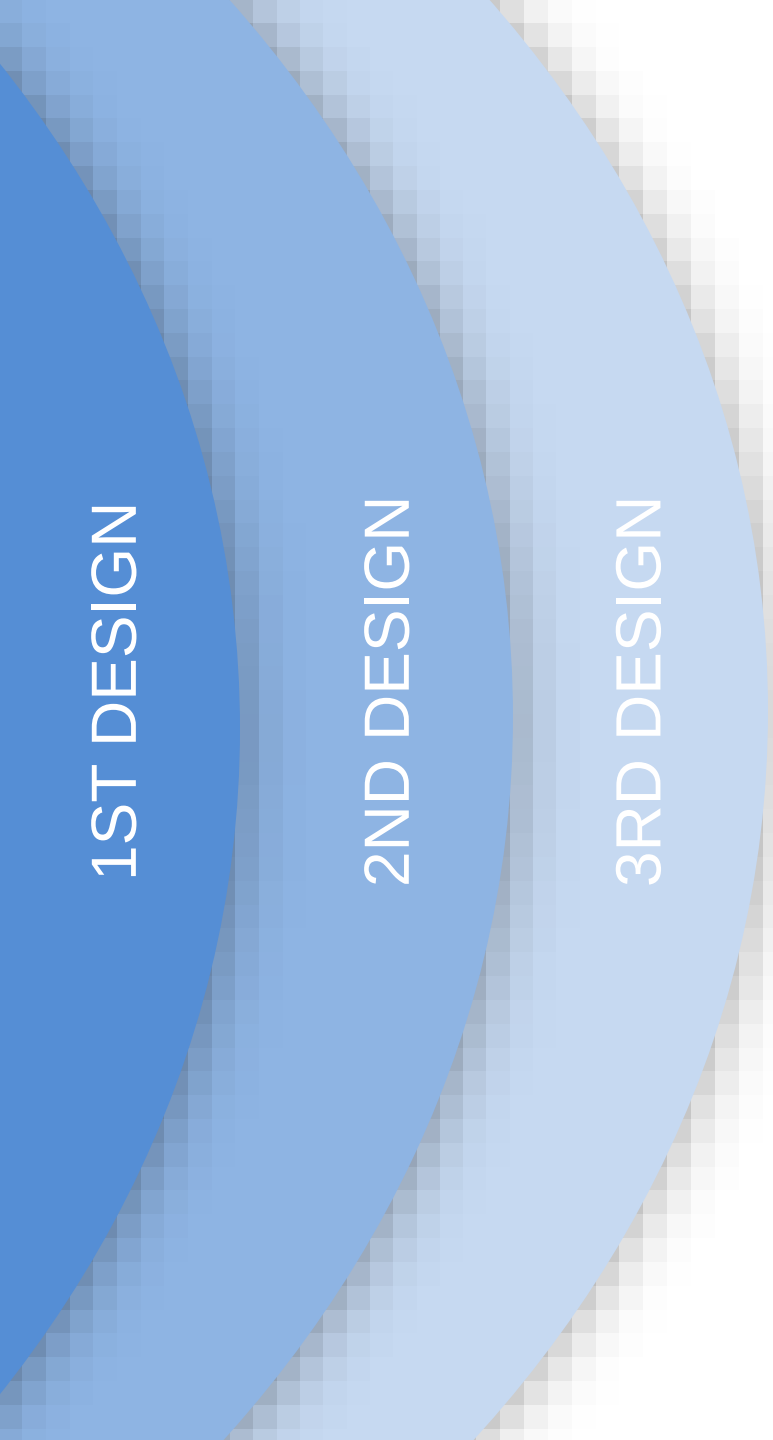
FOUNDATION

5k cyds
2k lf

WALL

3k cyds
2k lf





FOUNDATION

CYDS reduced 10k to 5k
LF reduced 3k to 2k

WALL

CYDS reduced 16k to 3k
LF reduced 9k to 2k
Buttress Walls 207 to 0

MORE REDUCTIONS PENDING

BENEFITS

3 MAJOR BENEFITS

IMPROVED COLLABORATION & EFFICIENCY

Early involvement of stakeholders establishes better communication channels, leading to improved collaboration and better decision-making. This also ensures that all requirements are understood and addressed at an early stage, reducing the risk of costly changes or rework later in the project lifecycle.

3 MAJOR BENEFITS

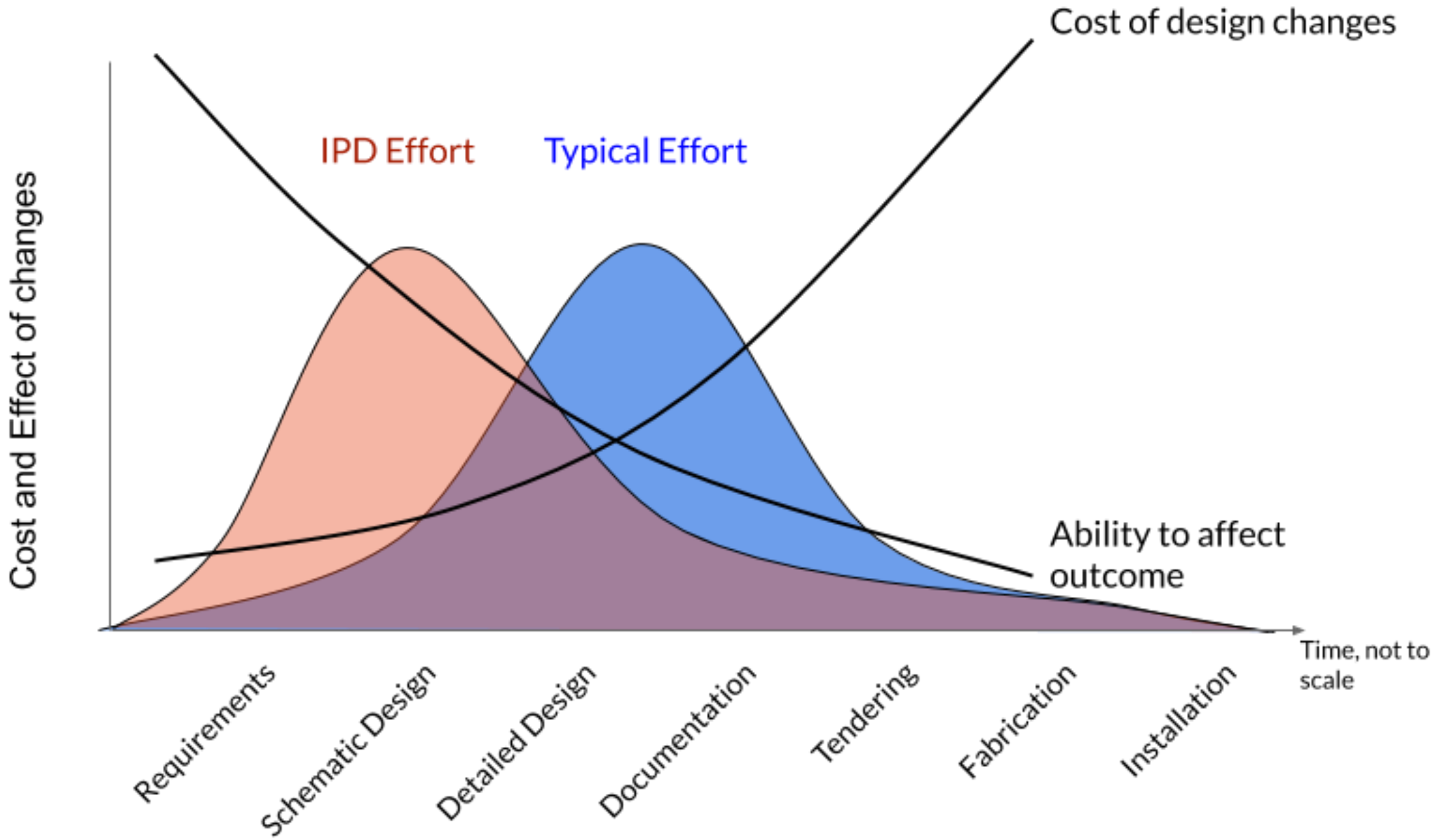
REDUCED RISK & COSTS

Involving all stakeholders early in the design process helps to identify potential challenges, risks, and safety hazards, ensuring that the project is feasible, viable, and designed with safety in mind. Early identification of issues also reduces the risk of costly changes or rework later in the project lifecycle, resulting in reduced costs.

3 MAJOR BENEFITS

BETTER PROJECT OUTCOMES AND STAKEHOLDER BUY-IN

Early involvement of stakeholders ensures that all aspects of the project are considered, leading to a higher quality end product. It also helps to identify potential risks and issues, allowing for early risk management and mitigation. This results in better project outcomes, improved safety outcomes, and better stakeholder buy-in and support throughout the project lifecycle.


Cost of design changes
IPD Effort
Typical Effort
Cost and Effect of changes
Ability to affect outcome
Time, not to scale
Requirements
Schematic Design
Detailed Design
Documentation
Tendering
Fabrication
Installation

KEY TAKEAWAY

Involve all **stakeholders** **early** in the design process

Collaboration & Buy in

Efficiency

Reduced Risk and Costs

Better project Outcomes

Higher Quality