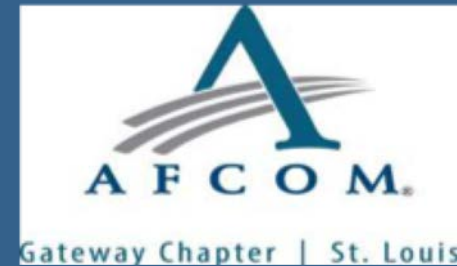




Project Pitfalls - Common Issues IT Should Avoid When Planning and Implementing a New Project



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Introductions

Tad Davies
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Since 1987, Tad has been focused on data center strategies and consults regularly with executive teams. He advises clients nationally on **Business Centric** strategy issues such as consolidation, colocation selection, build vs. buy, cost modeling and **Facility Centric** strategy issues such as risk assessment, new data center programming, owner's representation, and energy improvement. Tad is a board member of AFCOM's Data Center Institute.

Project Pitfalls - Common Issues IT Should Avoid When Planning and Implementing a New Project

Geared to IT centric attendees who have involvement or responsibility for a construction or remodel project, this educational session will take a holistic view of a project from planning through implementation. The focus will be educating the IT centric professional about subjects they may not be entirely comfortable with. Topics will include: understanding the vast number of design, construction, AHJ teams involved and why it matters; setting management expectations early; budgeting; holistic project scheduling vs construction only; and other issues.

Agenda - The Project Process

Knowing the intricacies of project planning and implementation will enable you to insert your influence at the proper time.

Ecosystem and terminology

Project Requirements

Budgeting

Project Implementation Structure

Selecting Providers

Contracts and Language

Design

Pre-Purchase Equipment

Contracts

Construction

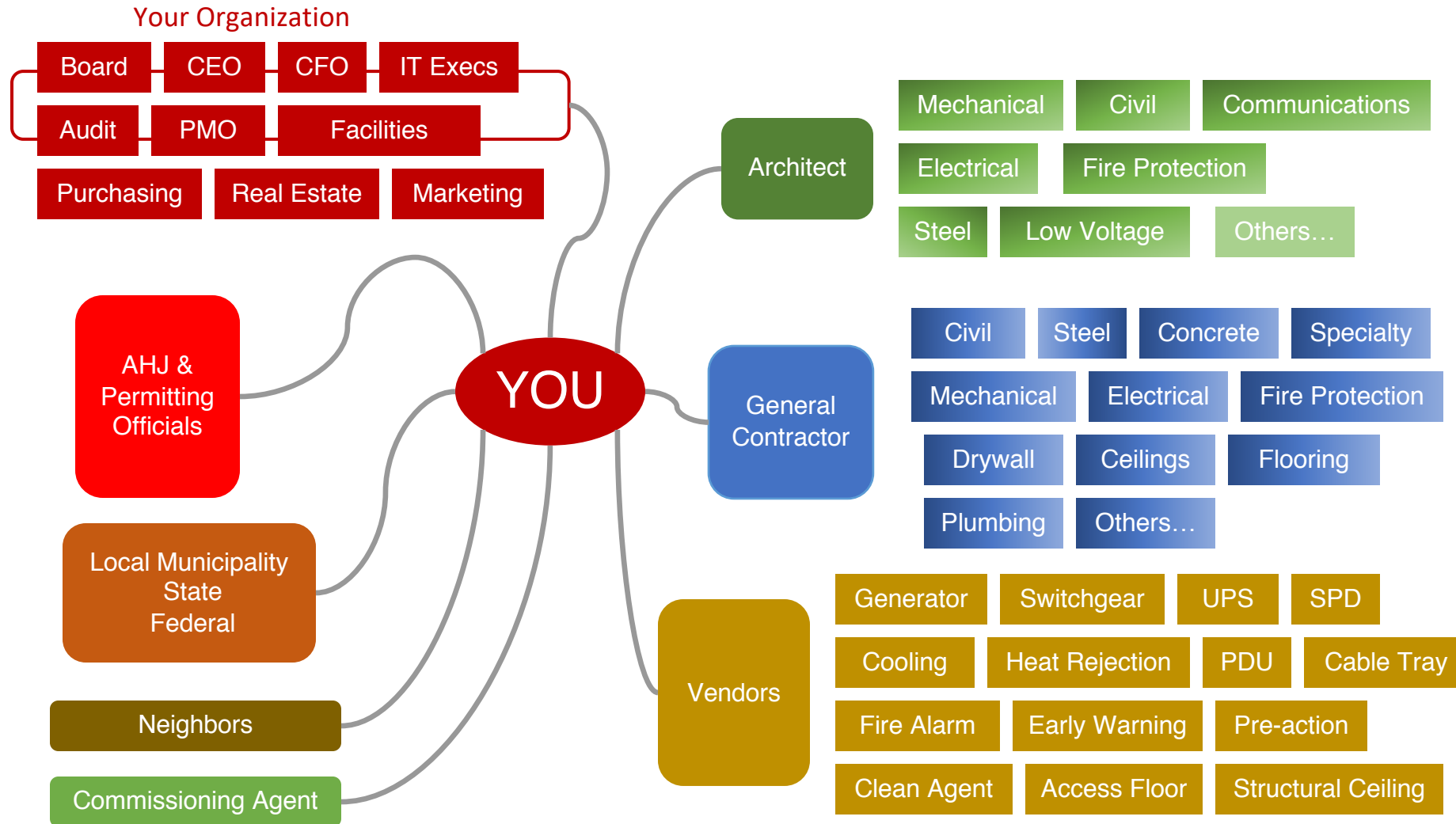
Testing (Commissioning)

Close Out/Quality Assurance



Ecosystem & Terminology

The Ecosystem



The Ecosystem

Invest time upfront to learn the language

AHJ	Commissioning
AIA	General Conditions
ASHRAE	Liquidated Damages
CRAH	Performance & Payment Bonds
CSI	Progress Payments
EPO	Retainage
NEC	Schedule of Values
SPD	Substantial Completion



Deciding Your Requirements

Deciding Your Requirements

Identify requirements upfront. Addressing all aspects:

1. Technical – equipment preferences. Technology, brand, etc.
2. Technical – design, layout, preferences
3. Project Delivery Method – Design-Bid-Build; Design-Build, Construction Manager
4. Project Reporting – do you have unique reporting requirements that your team needs? Can the provider give you reports in a format that minimizes you needing to alter the report to provide to your management? Same for schedule
5. Contract and contract language – yours? contractors? hybrid?
6. Financial – job cost tracking, invoicing etc.

Does your organization create Project Charters?



\$ Budgeting

Budgeting Your Project

1. Budget early and often – these are key financial gate review opportunities with executives and keep you and the project on track.
2. Budget reviews are another way (besides SOW) to verify the scope of your project.
3. After initial budgeting and approval to proceed, consider using CSI (Construction Specification Institute) format for budgeting. Leverage your facilities team and your contractor(s) for guidance. This format will ultimately be the one used for budgeting and subsequently invoicing. [see page 37]
4. Ensure you maintain an audit trail of the budget and associated decisions made that significantly changed it.

Division #	Section Title	Total
Division 01 -- General Conditions		
01 3101	General Conditions, Project Management, Supervision	
Division Sub-Total		400,000
Division 02 -- Existing Conditions		
02 4100	Demolition	
Division Sub-Total		-
Division 09 -- Finishes		
09 2116	Tenant Finish of IT area (4,500 s.f - compute space; and elec/mech/support space)	
09 6900	Structural Ceiling- Data Center	
Division Sub-Total		404,000
Division 21 -- Fire Suppression		
21 0500	Clean-Agent Fire Extinguishing System	
21 0600	Early Warning Air Sampling	
Division Sub-Total		376,000
Division 23 & 26 -- Mechanical & Electrical		
26 0500	Exterior screen for electrical - mechanical equipment	
26 0526	Grounding	
23 8124	Data Center Air Conditioning: In-row units	
23 8124	Chilled water plant - (2) air-cooled chillers & pumps	
23 8124	UPS Room Air Conditioners (4)	
26 0536	Cable Tray	
26 2716	96 racks, rack PDU's, Row PDU's, distribution, doors, temp sensors	
26 2600	Power Distribution Units (PDU)	
26 2701	Electrical Service Entrance	
26 2717	Utility Switchgear Distribution	
26 2923	Secondary Distribution	
26 3213	(2) 1250kW Generators	
26 3353	UPS: (2) 400kW in 500kW frame units	
26 3600	Automatic Transfer Switches (ATS)	
26 3353	Assembly-start up service	
26 4113	Surge Protection Devices (SPD)	
Division Sub-Total		7,760,328
Division 28 -- Electronic Safety and Security		
28 1300	Access Control	
28 2000	CCTV System	
28 4000	Site Monitoring - extend APC system (licensing)	
Division Sub-Total		98,000
Division 82 -- Services		
82 1000	Data Center Owner's Representative	
82 3000	Commissioning	
82 6000	Construction Documents/Design Services	
Division Sub-Total		1,020,000

Sub Total	10,058,328
Contingency	2,011,666
Budget Total	12,069,993

Budgeting

1. Programing budget – high level but include major categories (see example)
2. Contingency – on overall budget
3. This is construction only! Doesn't include:

Migration

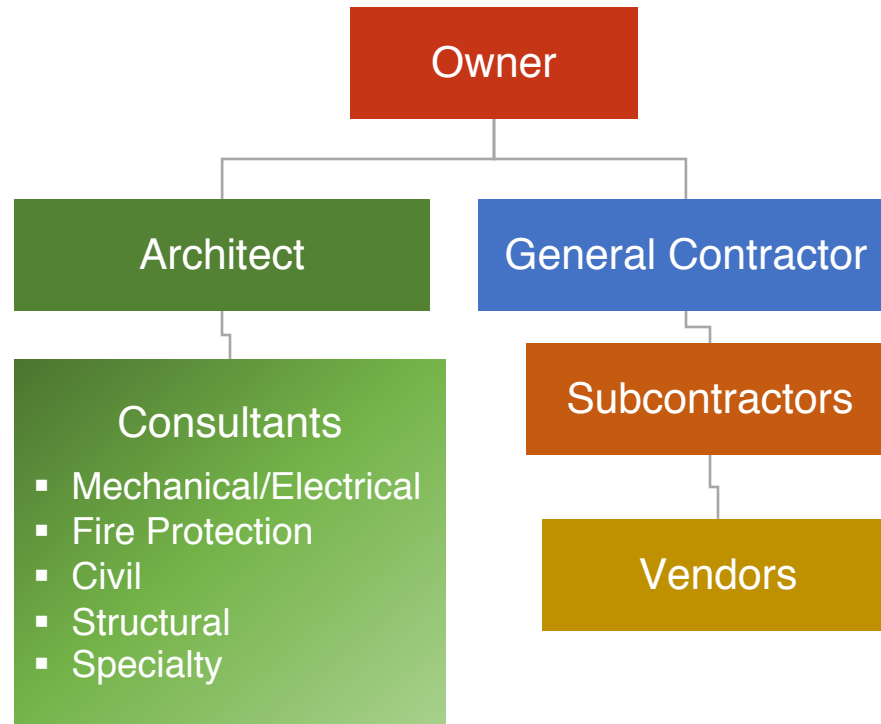
IT Infrastructure- Network, Racks, Refresh

Operating Costs – preventive maintenance costs will likely increase over your current budget if you are deploying more support equipment



Project Implementation Structure

Project Delivery Method: Design – Bid - Build



Project delivery sequence



- Traditional, common approach
- Owner holds contracts with Arch. & GC
- Contract: fixed price
- Longer duration – sequential
- Owner/architect make design decisions without contractor input

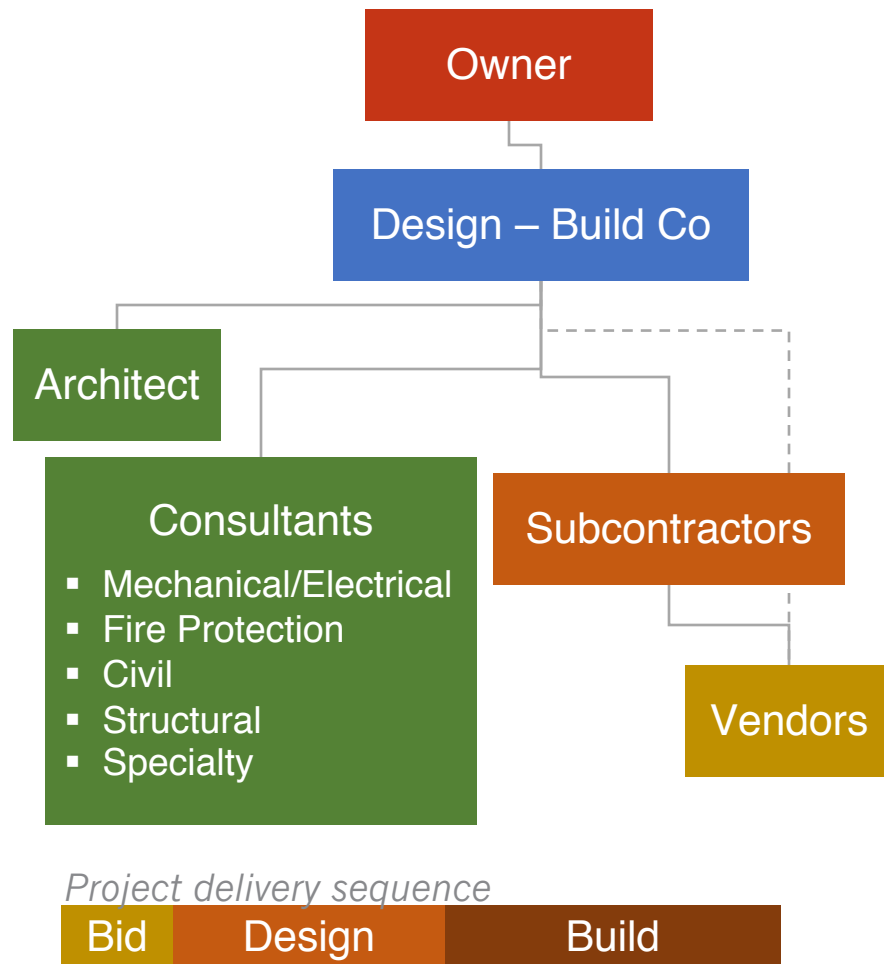
Challenges

- Can be adversarial
- Minimal contractor input – change order
- Reduced owner input for vendors unless specified

Keys to success

- Detailed drawings and specifications
- Reflect YOUR needs and preferences
- Sufficient time

Project Delivery Method: Design – Build



- Owner holds contracts with DB co.
- Contract: often GMP
- Accelerated schedule
- Single source for design & construction
- Sometimes D-B firm procures equipment

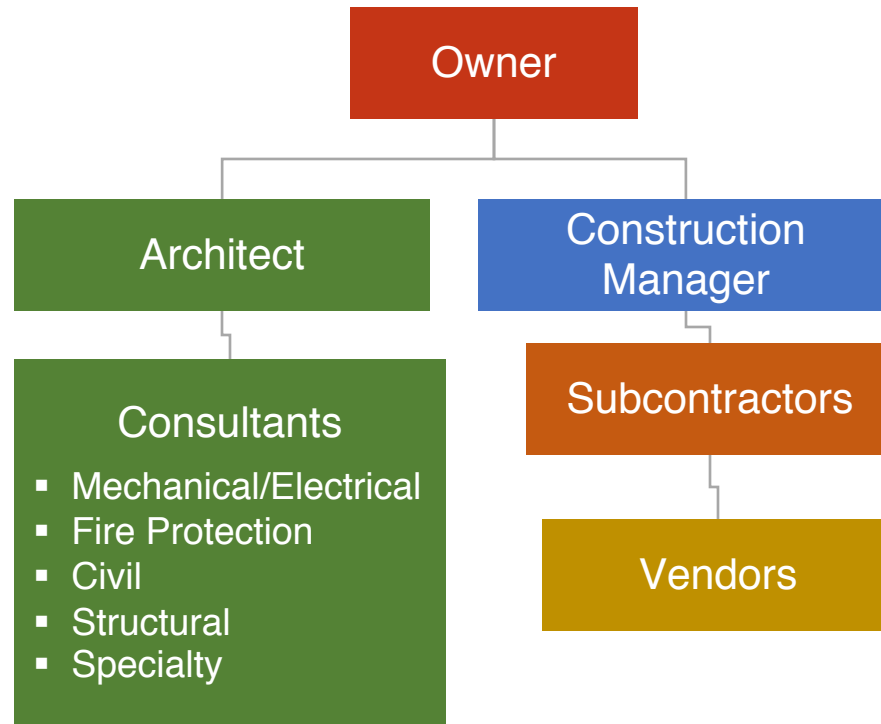
Challenges

- Faster pace requires constant attention – decisions get made without you or you are pressured to make decisions faster
- Project costs may not be fully detailed until after project begins

Keys to success

- Detailed drawings and specifications
- Reflect YOUR needs and preferences
- Constant monitoring of budget
- No decision is made without your input

Project Delivery Method: Construction Manager At Risk



Project delivery sequence



- Owner holds contracts with Arch. & CM
- Contract: fixed price
- Usually faster than Design – Bid - Build
- CM provides construction expertise & cost opinions early in process

Challenges

- Separate contracts with design & construction teams

Keys to success

- Detailed drawings and specifications
- CM must have data center experience
- Good relationship between design & construction teams



Selecting Providers

Selecting Providers – Design Firms

Table stakes:

- Data center experience
- Availability
- Competitive Fees

Additional Information/considerations:

1. Are you comfortable with the team? Do you see yourself working closely with all key team members of that firm for the next 6 – 18 months?
2. Do the team members all have the experience? Or is it the design firm? Have them answer some test questions
3. How will that firm work with other firms? Most will present jointly – Architect + key sub-consultants. Your finalists should present to you at least twice
4. Do they have experience in your industry? Are they working with your competitors? Is that a conflict? Are they contractually prohibited from working with you? Will you ask for that restriction on them.
5. Will you own the design or is it an “instrument of service”?

Selecting Providers – Contractors

Table steaks:

- Data center experience
- Availability
- Competitive Fees

Additional Information/considerations:

1. Are you comfortable with the team? Do you see yourself working closely with all key team members of that firm for the next 6 – 18 months?
2. Do the team members all have the experience? Or is it the company?
3. Do they have experience in your industry? Are they working with your competitors? Is that a conflict? Are they contractually prohibited from working with you? Will you ask for that restriction on them?
4. Does the PM have specific experience? Is it relevant? How much of the meeting is the PM participating? Are you comfortable with the PM? Communication skills that you are comfortable with.
5. What members of the presentation will actually be on this project?
6. Contractual arrangements? Financial health of the company (research D&B)?
7. For design-build teams, how often has the team worked together?

Selecting Providers – Commissioning Firms

Table steaks:

- Same as above

Additional Information/considerations:

1. Are you comfortable with the team? (e.g. same question as contractors)
2. Do the team members all have the experience? Or is it the company?
3. Since commissioning involves multiple disciplines, does the team have sufficient experience in all disciplines?
4. Are there any disciplines that they will not address? Are subcontractors being used?
5. Does the commissioning schedule look accurate? Testing duration seem sufficient?
6. What level of commissioning do they recommend (4 or 5?) and does it fit your requirements?
7. What is the project team structure? Is the PM unique role or one of the disciplines?
8. What aspects are excluded from your scope? E.g. equipment rental.
9. What does your reporting look like? Easy to read, navigate, and understand?
10. Are you a commissioning firm that does design or a design firm that does commissioning? Separate unit with separate staff?

Selecting Providers – Consulting Firms

Table steaks:

- Same as above

Can be on-boarded at various points

- Start of the project. Assist with project requirements
- Selection of providers: design, construction, design-build

Types of Consultants

- Incentives
- Data center
- Real estate
- Third-party auditor
- Construction Oversight
- External council – construction contracts

Additional Information/considerations:

1. Are you comfortable with the consultant? Do you see yourself working closely with him/her for the next 3 – 18 months? A team-player or a pit bull?
2. Can the consultant present in front of executives without embarrassing you?
3. Are there any disciplines that a consultant will not address?
4. What specific activities are important in addition to technical guidance? Financial, invoicing, compliance, etc.
5. Do you have specific reporting requirements for a consultant?
6. Does your consultant have to be local? Is your team a face-to-face culture?

Selecting Providers – Monitoring/Controls Contractor

Monitoring/Controls is a significant investment and highly complex.

Table steaks:

- Same as above

Additional Information/considerations:

1. Provide the contractor specifics about your requirements – facility, IT infrastructure (hardware, security, networking), IT Monitoring & Alerting.
2. Do you have a brand preference? Does the contractor have experience with that brand?
3. Will field installation work be performed by this contractor or the electrical contractor? If the later, then under a single contract by the M/C contractor?
4. Software configuration by contractor or by manufacturer?
5. Have you seen a demonstration that is data center centric? Did you provide a detailed capabilities checklist to the contractor and get sign-off on each?
6. Is the software model purchase + annual maintenance fee? SaaS model?
7. Is your security team comfortable?



Contracts and Language

Why you need to read the contract

Recognizing that you are not a legal expert, why bother to read contract?

1. Your legal and or facilities department will likely not be aware of contracts requirements that are NOT acceptable to you. e.g. “outages to the data center will never exceed 20 minutes” but the contractor has request 5 of those outages that will run concurrently. Or that a 4-hour outage is acceptable if it falls within a certain window. And a 12-hour outage might require CEO or board approval.
2. Contract will specify invoicing process. Make sure you understand it completely as you will be asked to approve.
3. Does the contract specifically address your requirements?

Contract Types – Standard Forms

A standard contract form that has been drafted by an organization addressing various aspects of design and construction arrangements and roles.

Most common:

- AGC Associated General Contractors of America
www.agc.org | www.consensusdocs.org
- AIA American Institute of Architects
www.aia.org
- DBIA Design-Build Institute of America
www.dbia.org

Contract Types – Standard Forms

Why consider using a standard form of contract?

- Commonly used so tend to be more understood by stakeholders – owners, designers, contractors, subs., etc.
- Low cost
- Terms are backed by case law

But keep in mind...

- Standard forms are often modified
- It must reflect your contractual arrangement (DBB, DB, CMR)
- Standard forms typical favor the institution that drafted them

Contract Components

Elements that comprise a complete construction contract package

Component	Description	Comment
Agreement	Overall document – parties, project, pricing, payment, listing of contract documents (below)	--
General Conditions	Provisions of the contract	Long but important. You're not a legal expert but see what you are uncomfortable/uncertain about
Written Supplementary Conditions	Additional provisions to GCs	There should be a specific reason why these exist. By definition they are not part of the normal GCs.
Construction Documents	Specifications and drawings	Specify date/version.
Owner's Project Criteria	Owner's set of requirements	Sometimes contained in a Basis of Design document
Project Schedule	Schedule	Sufficiently detailed? Does it include commissioning
Schedule of Values & Estimated Invoicing Schedule	SoV – breakdown by construction discipline/division of cost of work. EIS – est. monthly billings over life of project	You will use this to determine how much the contractor gets paid. % complete of each discipline Indicates cash flow reqs. Very helpful. Typically looks like a bell curve
Written modifications & change orders	Changes requested during negotiations or during bidding	These could be formal SOWs, or informal emails, etc.

Contracts – Financial Arrangements

Lump Sum (Fixed Fee)	Guaranteed Maximum Price (GMP)	Cost Plus	Time & Materials
Scope of work (SOW) for a fixed price	Contractor agrees to a max price for SOW	Cost of the work + a percentage or fixed fee	Pay the contractor on an hourly basis, plus materials.
<u>Comments</u> <ul style="list-style-type: none"> Min. financial risk for owner Common with DBB 	<u>Comments</u> <ul style="list-style-type: none"> More shared risk Common with DB Sometimes combined with cost plus 	<u>Comments</u> <ul style="list-style-type: none"> Low risk for contractor 	<u>Comments</u> <ul style="list-style-type: none"> Typically for small projects that must be completed asap
<u>Potential concerns</u> <ul style="list-style-type: none"> Contractor might use lower grade equipment/materials to save \$ Change orders 	<u>Potential concerns</u> <ul style="list-style-type: none"> Contractor incentive to keep price down Contractor fees are higher than market 	<u>Potential concerns</u> <ul style="list-style-type: none"> Total project cost not established upfront No limit on cost 	<u>Potential concerns</u> <ul style="list-style-type: none"> Contractor works slow
<u>Mitigation techniques</u> <ul style="list-style-type: none"> Detailed SOW review led by Arch & Owner 	<u>Mitigation techniques</u> <ul style="list-style-type: none"> Open book pricing for subs and vendors Negotiate mark-up 	<u>Mitigation techniques</u> <ul style="list-style-type: none"> Negotiate % Establish a fixed fee, removes incentive to extend work 	<u>Mitigation techniques</u> <ul style="list-style-type: none"> Estab. Not-to-Exceed hours & mark-ups

Contract Terms

Some contracts terms and their potential affect.

Feature	Description	Comment
Retainage	A % of \$ held back from each payment until released. Typically between 5 – 10%	This is your leverage. Make sure that no one approves release until ALL of activities and information is provided; punch list, as-built drawings, warranties, O&M manuals, training, etc. Sometimes contracts have provisions to auto reduce retainage amount when job is 50% complete
Liquidated Damages	\$ penalty for not meeting schedule	Poses risk for contractor(s). Result might be padded schedule or price. Make sure it's needed.
Performance & Payment Bonds	All participants (suppliers, subs, etc.) will be paid should the contractor default & guarantees satisfactory performance of all duties specified in the contract.	Typically required on public sector projects. Some GCs will not give you and P&P bonds but will require it of their subs. This can add 1.5% to a subs contractor. Consider if required for major subs – mechanical and electrical

Contract Terms cont.

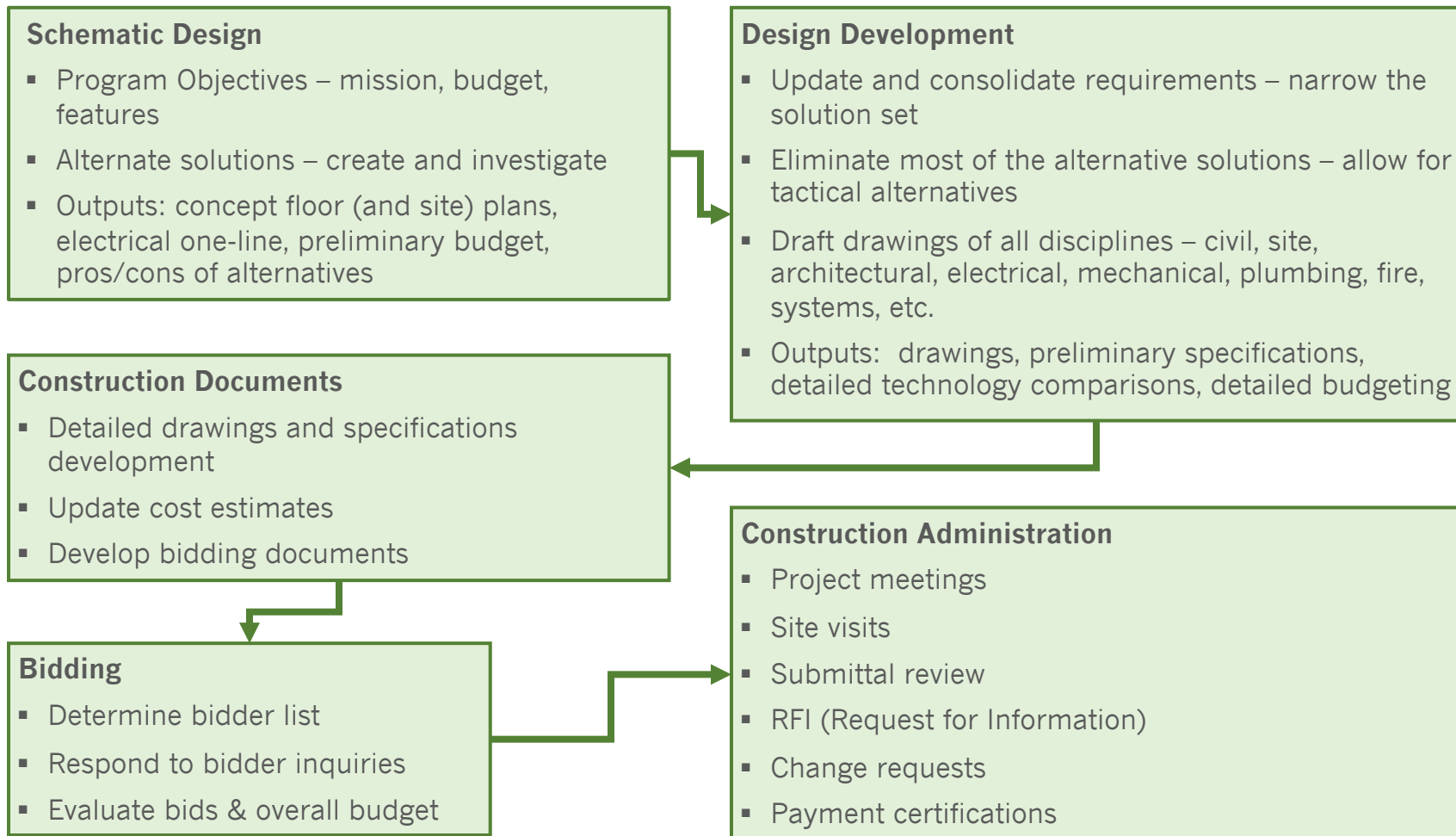
Some contracts terms and their potential affect.

Feature	Description	Comment
Ownership of Work Product	In design or design-build who owns the design.	Typically contract states design is an instrument of service and therefore is owned by the producer. Change that.
Insurance	Insurance	Does the project involve working in live environment? Business interruption insurance? Most contractors don't have. Will be a cost to your project.
Substantial completion	Work is sufficiently complete so Owner can occupy and use the project or a portion thereof	You may need an area quicker. Define upfront. Contractor may ask for a reduction in retainage at this point.



Design

Design Services Process



Design Phase

Things to consider:

1. Design phase will consume a *significant* amount of your time. Assume 10 – 12 hours per week. (IT centric: projected equipment, load, racks, row layouts, fiber/copper port density, etc. + Facility centric: equipment, architectural, mechanical, electrical, fire, etc.)
2. How do you want to address your equipment preferences
 - a. Are you designing solely towards a specific manufacturer?
 - b. Or specified manufacturer with acceptable alternative(s)?
3. Having your requirements defined up-front will speed up the process. But allow for input from the design team.

Design Phase

Things to consider:

4. Have a solid understanding of your current IT load and how it might change going forward. Inquire with your organization's leaders

Load Increaseers

- Consolidation to this site
- Digital transformation initiatives
- Internal business growth
- Acquisitions
- IoT (edge deployments - manufacturing)

Load Decreases

- Application migration to cloud
- Technology refresh
- Business segment spin-off

MasterFormat 2018 Edition Divisions

as defined by the Construction Specifications Institute

PROCUREMENT & CONTRACTING REQUIREMENTS GROUP:

Division 00 — Procurement and Contracting Requirements

SPECIFICATIONS GROUP

General Requirements Subgroup:

Division 01 — General Requirements

Facility Construction Subgroup:

- Division 02 — Existing Conditions
- Division 03 — Concrete
- Division 04 — Masonry
- Division 05 — Metals
- Division 06 — Wood, Plastics, and Composites
- Division 07 — Thermal and Moisture Protection
- Division 08 — Openings
- Division 09 — Finishes
- Division 10 — Specialties
- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Equipment
- Division 15 — RESERVED FOR FUTURE

SPECIFICATIONS GROUP (cont.)

Facility Construction Subgroup (cont.):

- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Equipment
- Division 15 — RESERVED FOR FUTURE
- Division 16 — RESERVED FOR FUTURE
- Division 17 — RESERVED FOR FUTURE
- Division 18 — RESERVED FOR FUTURE
- Division 19 — RESERVED FOR FUTURE

Facility Services Subgroup:

- Division 20 — RESERVED FOR FUTURE
- Division 21 — Fire Suppression
- Division 22 — Plumbing
- Division 23 — Heating Ventilating and Air Conditioning
- Division 24 — RESERVED FOR FUTURE
- Division 25 — Integrated Automation
- Division 26 — Electrical
- Division 27 — Communications
- Division 28 — Electronic Safety and Security
- Division 29 — RESERVED FOR FUTURE

Source: https://en.wikipedia.org/wiki/50_Divisions



Equipment Procurement

Equipment Procurement

Owner versus contractor procurement?

Benefits

1. Leverage – in purchasing and scheduling
2. Have a better line of communication with the vendors
3. Address long-lead time concerns by procuring equipment prior to complete design finalization
4. Eliminate layers of mark-up

Comments/Risks

1. Long lead-time items
2. Requires significant amount of time even if you leverage Purchasing
3. Specifying exact needs is up to you. Work with vendor closely
4. Delays in delivery / damage during shipment are your issue
5. Consider more than one vendor for each area (generators, UPS, HVAC)

Equipment Procurement

Financial considerations

<u>Line#</u>	<u>Description</u>	<u>Budget</u>	<u>Equipment Procured</u>	
1	Architectural			
2	Access Floor (install inc.)	\$ 120,000	\$ 67,655	(note: this product is sold directly to the G.C.)
3	Sub-floor Cleaning & Encapsulation	\$ 14,800		
4	VCT in Check Sorter Room (install inc.)	\$ 6,100		
5		\$ 140,900		
6	Electrical			
7	Generator Equipment- 1250 KW (no insta	\$ 172,600	\$ 172,600	
8	UPS- (2) 300kVA Modules (install inc.)	\$ 137,500	\$ 121,000	\$ 649,070
9	TVSS Equipment (install inc.)	\$ 8,200	\$ 6,000	\$ 97,361
10	PDU- (2) 150 kVA (install inc.)	\$ 23,500	\$ 17,000	\$ 746,431
11	PDU Cables (install inc.)	\$ 39,200	\$ 20,000	\$ 37,322
12	Cable Tray (install inc.)	\$ 50,000	\$ 25,000	\$ 3,383
13	Misc. Install & materials	\$ 80,000		
14		\$ 511,000		
15	CCTV (Install inc.)	\$ 32,600	\$ 15,000	\$ 3,383
16				
17	Mechanical	\$ 200,000	\$ 135,000	\$ 97,361
18				
19	Fire Protection			\$ 37,322
20	Early Warning Air Sampling (Install inc.)	\$ 48,000	see below	
21	FM-200 Suppression (Install inc.)	\$ 196,000	\$ 114,470	
22		\$ 244,000		
23				
24	Site Monitoring (Install inc.)	\$ 49,000	\$ 23,000	
25			\$ 649,070	
26	General Conditions Total	\$ 65,000		
27				

\$ 97,361	← 15% Subcontractor markup
\$ 37,322	← 5% GC markup on subcontractors' equipment
\$ 3,383	← 5% GC markup- access floor
\$ 3,383	← General contractor markup- access floor
\$ 97,361	← Subcontractor markup
\$ 37,322	← General contractor markup on subcontractors
\$ 138,065	Total Markup

Note: markups may differ in your situation

Equipment Procurement

Purchasing warranty/service contracts with equipment!

Consider both extending warranties and requesting multi-year service contracts.

Benefits

- Best possible opportunity to influence pricing
- Best possible opportunity to influence scope – tweak to your needs

Comments/Risks

- Ask for references – check how their contracts have fared and what they paid
- Check market for pricing to avoid over-paying or over-subscribing

Energy Savings Incentives

Utility incentive programs

1. Who will be responsible for leading the effort? Best to have one-party.
 - a. Include in your construction contract
2. Register the project
3. Define from utility: requirements, deadlines and timeframes
 - a. Does the utility have an incentive funds remaining?
 - b. Has your organization consumed its available allotment already?
4. Are all possible aspects included?
 - a. Lighting, whole building, in addition to data center equipment



Construction

Construction - Financial

1. Will you have to be approving invoices? Then establish an understandable method for you and the contractor for billing. Contractors typically bill using CSI categories
2. Construction Cash Flow chart
 - Insight into funding requirements
 - Highest funding months typically during equipment shipments
 - Funding profile – bell shaped

Schedule of Values			Estimated Invoicing Schedule					
Division #	Section Title	Line Item Total	Month 1	Month 2	Month 3	Month 4	Month 5	Totals
Division 01 -- General Requirements								
	Division Sub-Total	118,913	\$ 23,783	\$ 23,783	\$ 23,783	\$ 23,783	\$ 23,783	\$ 118,913
Division 05 -- Metals								
	Division Sub-Total	18,000		\$ 18,000				\$ 18,000
Division 08 -- Openings								
	Division Sub-Total	4,800		\$ 2,400	\$ 2,400			\$ 4,800
Division 09 -- Finishes								
	Division Sub-Total	18,394		\$ 7,357	\$ 9,197	\$ 1,839		\$ 18,394
Division 23 -- Heating, Ventilating, and Air-Conditioning (HVAC)								
	Division Sub-Total	166,664		\$ 41,666	\$ 58,333	\$ 58,333	\$ 8,333	\$ 166,664
Division 26 -- Electrical								
	Division Sub-Total	2,521,186	\$ 25,212	\$ 630,296	\$ 857,203	\$ 882,415	\$ 126,059	\$ 2,521,186
Division 88 -- El Engineering Services								
	Division Sub-Total	158,700	\$ 126,960	\$ 7,935	\$ 7,935	\$ 7,935	\$ 7,935	\$ 158,700
	Total	\$ 3,006,656	\$ 175,954	\$ 731,437	\$ 958,850	\$ 974,304	\$ 166,110	\$ 3,006,656

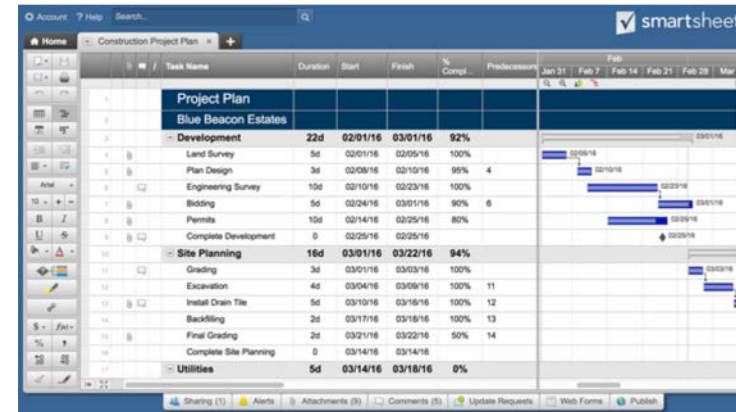
Construction - Financial

- Change Order Management
 1. Each request should have sufficient SOW detailed and financial breakdown.
 2. Is CO due to an Owner request that is outside of established SOW?
 3. If project is design-build, should this work have been included?
 4. "Value Engineering": Discuss early in the design and material selection phase, and review weekly as materials are selected.

- Auditing
 1. Internal
 2. Third-party construction audits: materials purchased – quantity, quality and type [e.g. footings, cement]

Construction - Schedule

1. Sufficiently detailed
2. Addresses all aspects e.g.:
 - a. Equipment testing/commissioning
 - b. Areas of work that need to be ready earlier? e.g. MDF, BEF, Meet-Me Room
3. Available to all stakeholders
4. Two-week look-ahead
5. Tools: MS-Project, Excel, Smartsheet
6. Is your project embedded into a larger project?
 - a. Is your IT project work reflected in sufficient detail?
 - b. Are there aspects of the larger project which might affect IT operations? Power cut-overs, construction work near data center? Might this work need to be alter as to duration and when it is performed?
7. Includes sufficient time for commissioning, punch list remediation, training
8. Post construction schedule for IT addressing: network install/turn-up/testing; IT racks, cabling (power and data); IT equipment; migration –physical and virtual; testing



Construction in an Operating Data Center

Method of Procedure (MOP) – who, what, when, and how in detail

Method of Procedure

The following form must be completed for any vendor/contractor working in Client Data Center. (This does not include site visitors.)

Section I: General Information

Vendor / Contractor Company Name:

Vendor / Contractor Employee:
Please provide the individual name of the person who will be performing the work.

Jeremy Xxxxx

John Xxxxx

Fred Xxxxx

Listed below are individual names of all emergency contacts for the vendor/contractor.

Contact Name

Paul Xxxxxx, Bick

Karl Xxxxx, Bick

Tad Xxxx, Bick

John Xxxxx, XXXX

Jeremy Xxxxx, XXXX

Jerry Xxxxxx, XXXXXX

Description of Work: The scope of work is to provide power to temporary UPS to help relieve the load on the existing UPS. To do this, the main switchboard serving the building will need to be powered down so as to extend normal feeder to existing spare circuit breaker in switchboard. After the temporary UPS is online RPP3 will be relocated from the existing UPS to the new temporary UPS.

Section II: MOP Documentation
List all supporting documentation, such as schematics, checklists, etc.

Section III: MOP Risks and Assumptions
List any potential downtime risks that can occur. List any responsibilities that need to be completed by Data Center Facilities during the MOP.

- Existing main switchboard has never been maintained. The possibility of the existing main circuit breaker not closing/opening may occur. This can extend the time the utility power to the building will be off or delay the outage to another date.
- Temporary UPS and ATS have been tested and are operational at the site. Further testing during the outage will take place to verify device operation.

Section IV: Procedure
Provide a detailed step-by-step description of the work, including estimated time required for each activity.

* To add additional rows, click "Tab" from the last cell in the last row.

#	Time (Estimated)	Description	Initials
1		It should be noted that manufacturers representative for generator, ATS, and UPS will be present during the cutover to verify operation of equipment.	
2	10 minutes	Verification by Facilities that all mechanical equipment is off.	
3	15 minutes	Transfer existing UPS to Generator.	

Section V: Emergency Back-out Procedure
Provide a detailed description of the procedure for backing out any changes.

* To add additional rows, click "Tab" from the last cell in the last row.

#	Time (Estimated)	Description	Initials
1	TBD	Transfer existing UPS to Generator fails.	
2		-If UPS fails, Manufacturer's Representative will analyze system and provide necessary service to equipment to bring back on line.	
3		-If ATS fails, Manufacturer's Representative will analyze system and manually transfer the ATS to generator.	
4	TBD	Main circuit breaker in Main Switchboard fails to open/close.	

How will contractor assure work does not create unplanned results?



Close Out/Quality Assurance

Quality Assurance

1. Commissioning
 - a. Commissioning Agent – separate entity
 - b. Define the extent of CA work- how early in the process
 - c. Scope of testing? Who will participate? Witness? When?
 - d. Duration of testing process? Project schedule contingency for re-tests.

2. Documentation
 - a. Product data
 - b. Equipment start-up
 - c. Operation and maintenance manuals
 - d. As-built drawings
 - e. Warranties
 - f. Testing

Quality Assurance

3. Site inspections and reporting
 - a. Conducted by commissioning agent? Contractor?
 - b. Safety inspections

4. Punch list
 - a. Is there a defined process?

Thank you!!

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President

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