Design Review Best Practices & Design Standard Updates

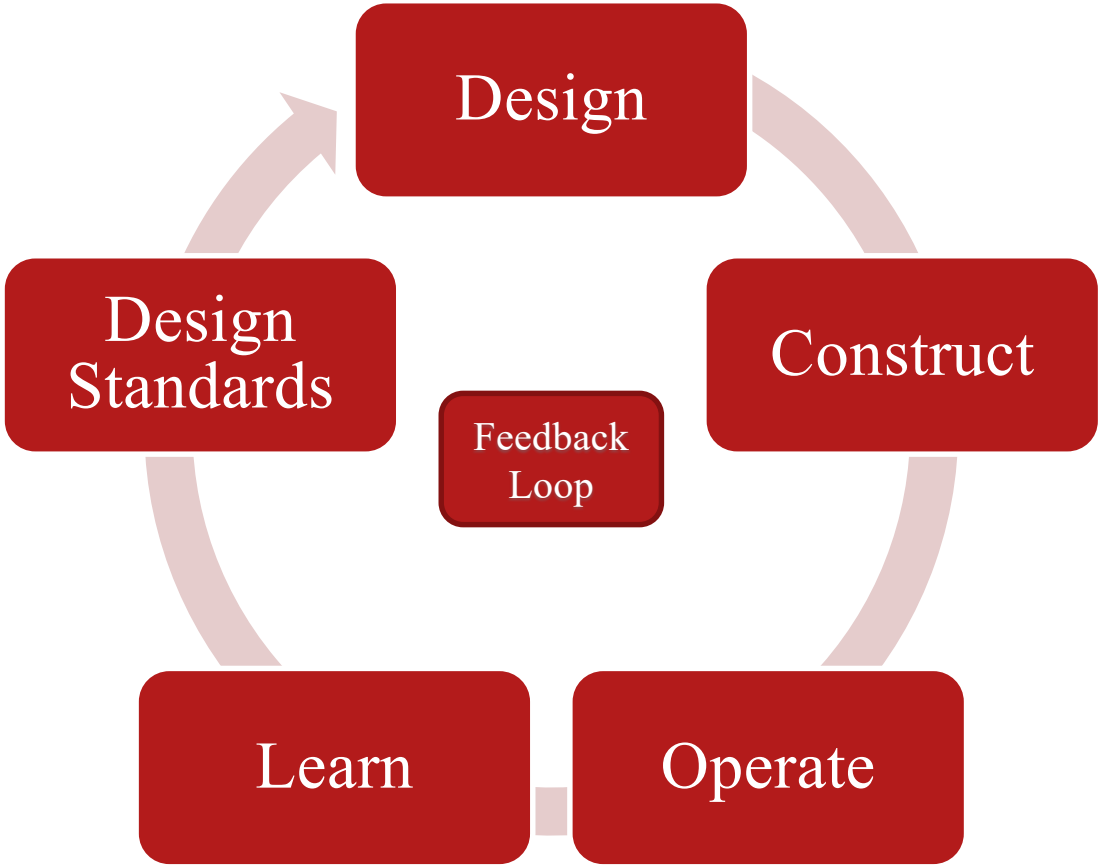
Outline

- Purpose of Design Reviews & Standards
- Design Review Process & Resources
- Design Review Best Practices
- Construction Quality Assurance
- Lessons Learned – Standards & Guidance Documents
- Recently Updated Standards

Why do we need design reviews and standards?

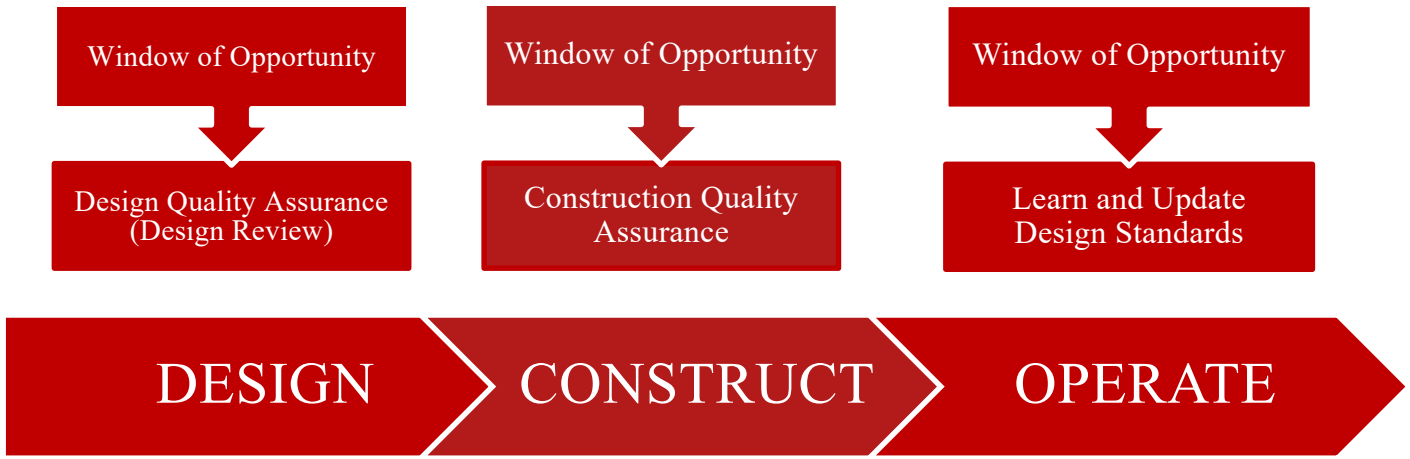
Cornell is a high-tech city

Design-Construct-Operate Feedback Loop



Integrated Quality Management

Project Managers, Construction Managers, Facilities Engineering, and Facilities Management collaborate to infuse quality management throughout the life cycle of a project.

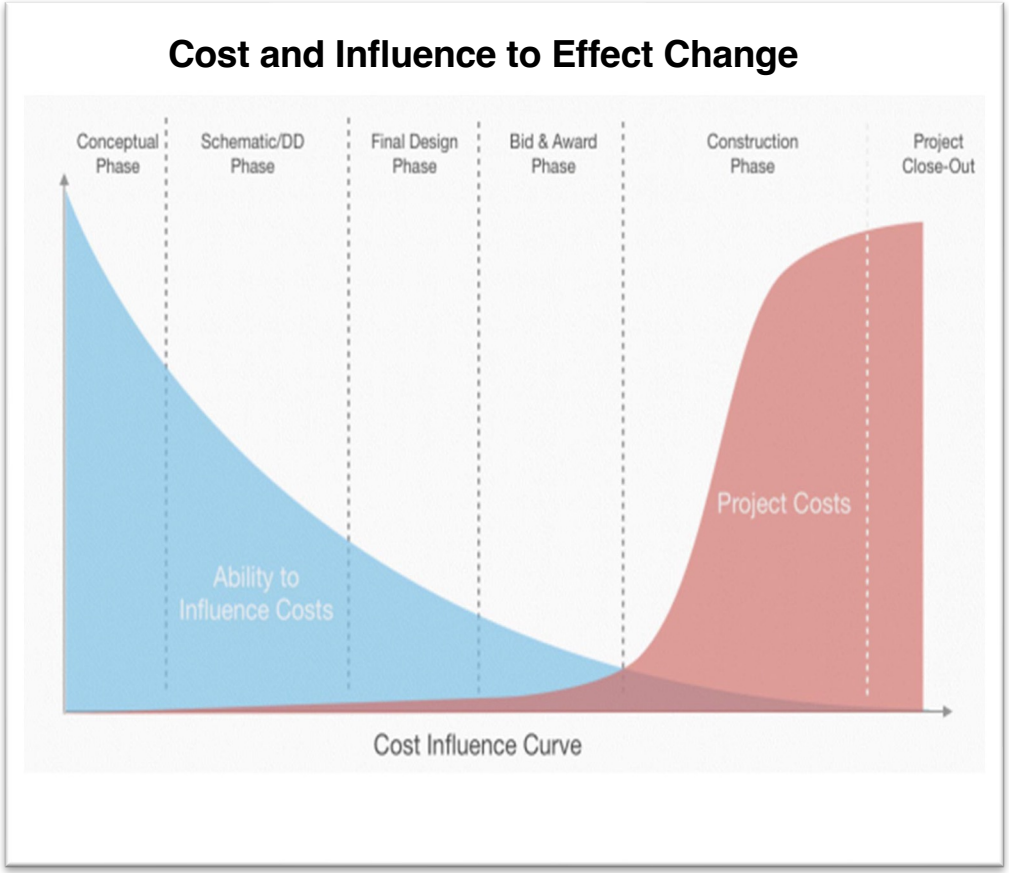


Goal of Design Reviews:

To Deliver High-Quality, High-Performance & Maintainable Facilities

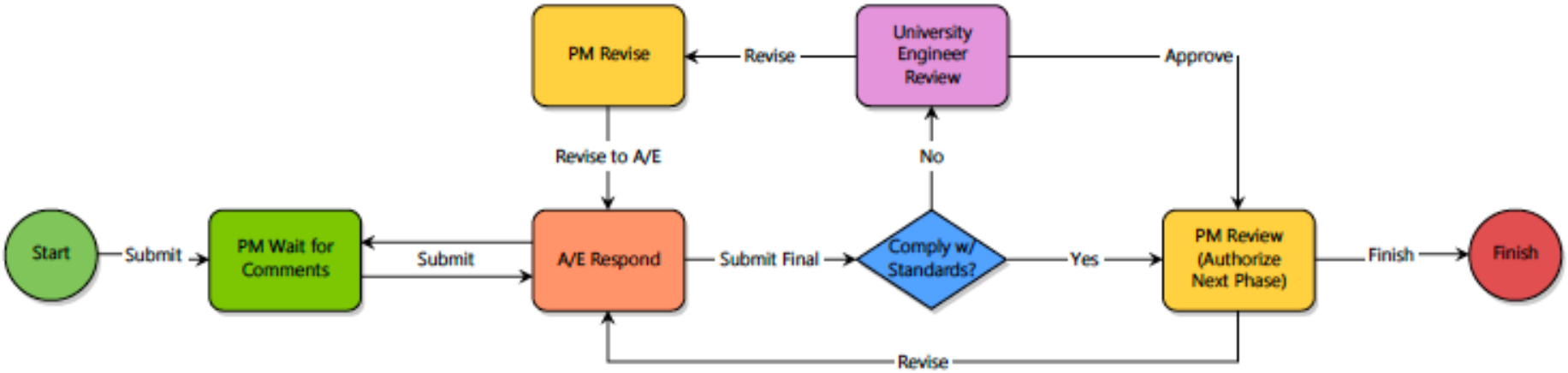
Engage and Leverage Cornell Subject Matter Experts (SME's)

Optimize Engagement of SME's Through Collaboration, Tools & Timing



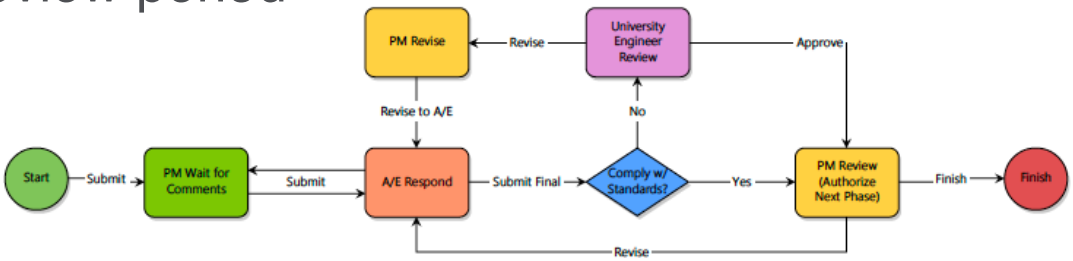
Design Review Process

1. PM schedules design reviews at design phase milestones within eBuilder schedule (SD, DD, CD phases). This is project specific.
2. PM schedules 10 business days to complete each design review
3. PM initiates the design review in eBuilder



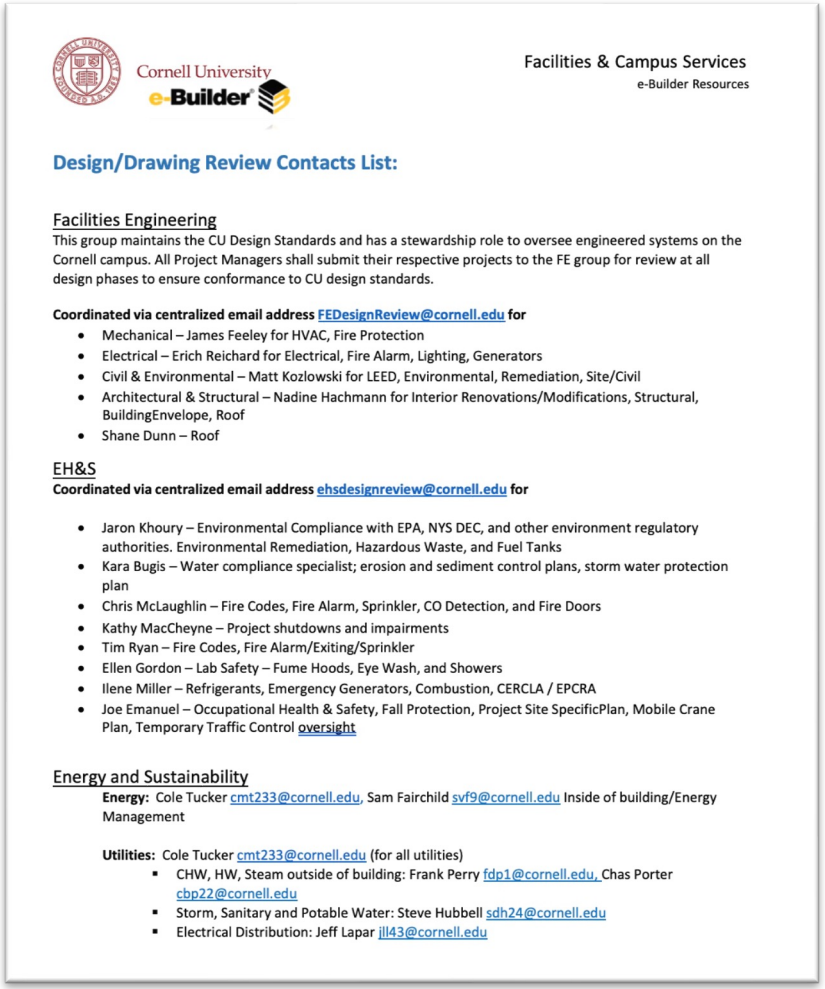
Design Review Process

4. Design review coordinators receive the design review request and download documents to review. Review organization specific.
5. Reviewer can designate in the review spreadsheet if the item they are reviewing does not comply w/ CU published standards
6. Design Review coordinator or individual then posts comments back to eBuilder by the last day of the 10 business day window
7. Reviewers should obtain responses from the consultant 30 days after the close of the review period



Design Review Resources

- eBuilder Resources - Documents \ User Resources \ DR - Design Review Process Help
- Refer to eBuilder Resources for Design Review Contacts List to determine your design review participant list
- The PM should always include certain Stewards but the participants are project specific
- Many steward groups have a centralized email address



Cornell University e-Builder

Facilities & Campus Services
e-Builder Resources

Design/Drawing Review Contacts List:

Facilities Engineering

This group maintains the CU Design Standards and has a stewardship role to oversee engineered systems on the Cornell campus. All Project Managers shall submit their respective projects to the FE group for review at all design phases to ensure conformance to CU design standards.

Coordinated via centralized email address FEDesignReview@cornell.edu for

- Mechanical – James Feeley for HVAC, Fire Protection
- Electrical – Erich Reichard for Electrical, Fire Alarm, Lighting, Generators
- Civil & Environmental – Matt Kozlowski for LEED, Environmental, Remediation, Site/Civil
- Architectural & Structural – Nadine Hachmann for Interior Renovations/Modifications, Structural, BuildingEnvelope, Roof
- Shane Dunn – Roof

EH&S

Coordinated via centralized email address ehsdesignreview@cornell.edu for

- Jaron Khoury – Environmental Compliance with EPA, NYS DEC, and other environment regulatory authorities. Environmental Remediation, Hazardous Waste, and Fuel Tanks
- Kara Bugis – Water compliance specialist; erosion and sediment control plans, storm water protection plan
- Chris McLaughlin – Fire Codes, Fire Alarm, Sprinkler, CO Detection, and Fire Doors
- Kathy MacCheyne – Project shutdowns and impairments
- Tim Ryan – Fire Codes, Fire Alarm/Exiting/Sprinkler
- Ellen Gordon – Lab Safety – Fume Hoods, Eye Wash, and Showers
- Ilene Miller – Refrigerants, Emergency Generators, Combustion, CERCLA / EPCRA
- Joe Emanuel – Occupational Health & Safety, Fall Protection, Project Site SpecificPlan, Mobile Crane Plan, Temporary Traffic Control oversight

Energy and Sustainability

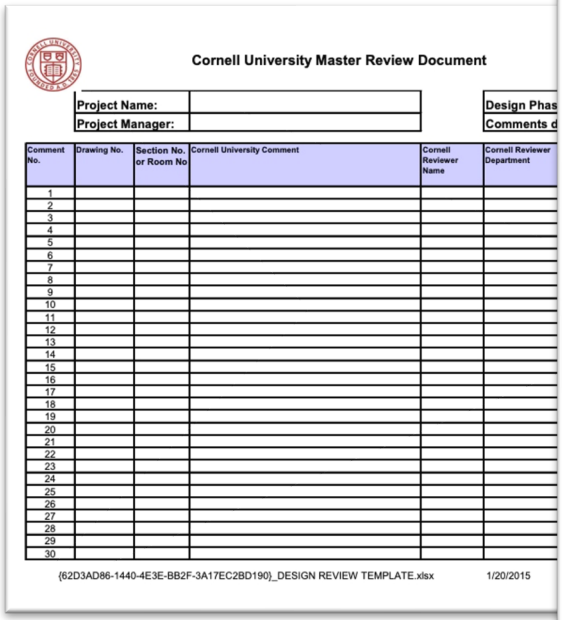
Energy: Cole Tucker cmt233@cornell.edu, Sam Fairchild svf9@cornell.edu Inside of building/Energy Management

Utilities: Cole Tucker cmt233@cornell.edu (for all utilities)

- CHW, HW, Steam outside of building: Frank Perry fdp1@cornell.edu, Chas Porter cbp22@cornell.edu
- Storm, Sanitary and Potable Water: Steve Hubbell sdh24@cornell.edu
- Electrical Distribution: Jeff Lapar jll43@cornell.edu

Design Review Resources

- Design Review Comment Template – PM will add project information – eBuilder Resources
- Design Review Guidance Document – eBuilder Resources
- Design Review Checklists – Linked off the FCS Website



Cornell University Master Review Document

Project Name:

Project Manager:

Design Phas

Comments d

Comment No.	Drawing No.	Section No. or Room No	Cornell University Comment	Cornell Reviewer Name	Cornell Reviewer Department
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Design Review TOC

Design Review Best Practices - For Reviewers

- Comments should be succinct and concise (Get to the point)
- Comments should be actionable (Avoid comments in the form of a question?)
- Comments should reference standards or codes - where to find the answer based on the requirement (Document name, pages, code, design standard, etc.)
- Tag general comments for the entire project to the first drawing sheet or first page of a specification.

Design Review Best Practices - For Project Managers

- Work with your director to schedule the appropriate number of design reviews for your project. This will depend on the scale and complexity of the project.
- Make sure design reviews are in your eBuilder project schedule. The Design Review Tableau report only tracks future design reviews in your schedules.
- Make sure your design team provides an actionable response to comments. (Will comply or will not comply is not enough)
- Follow up on comments that are marked as non-compliant with CU Design and Construction Standards. Schedule a meeting with FE.

Integrated Quality Management

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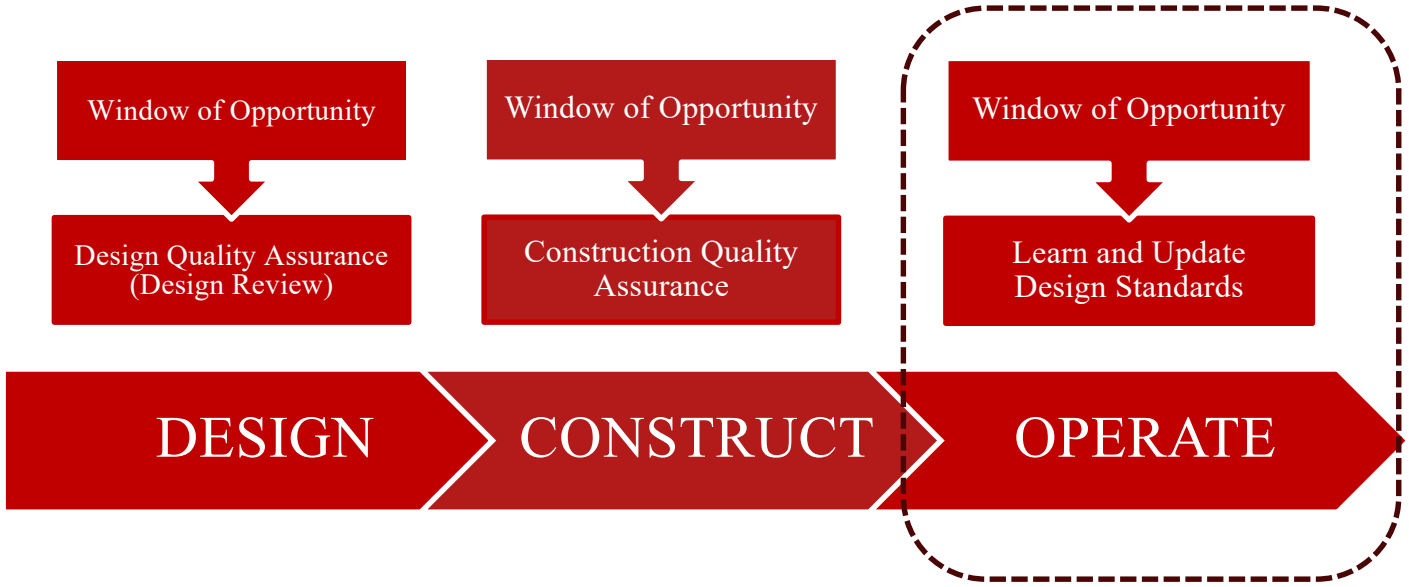
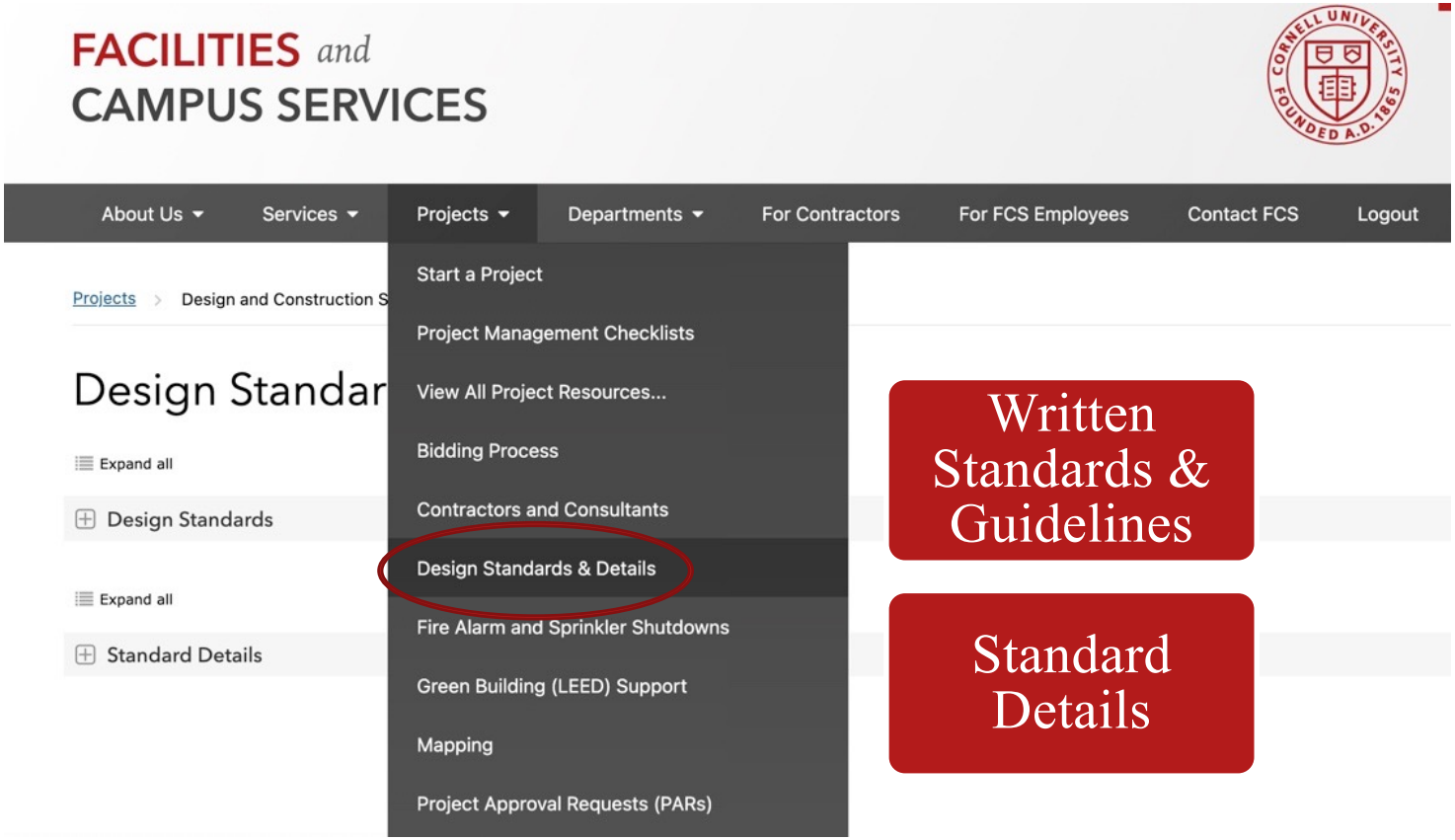
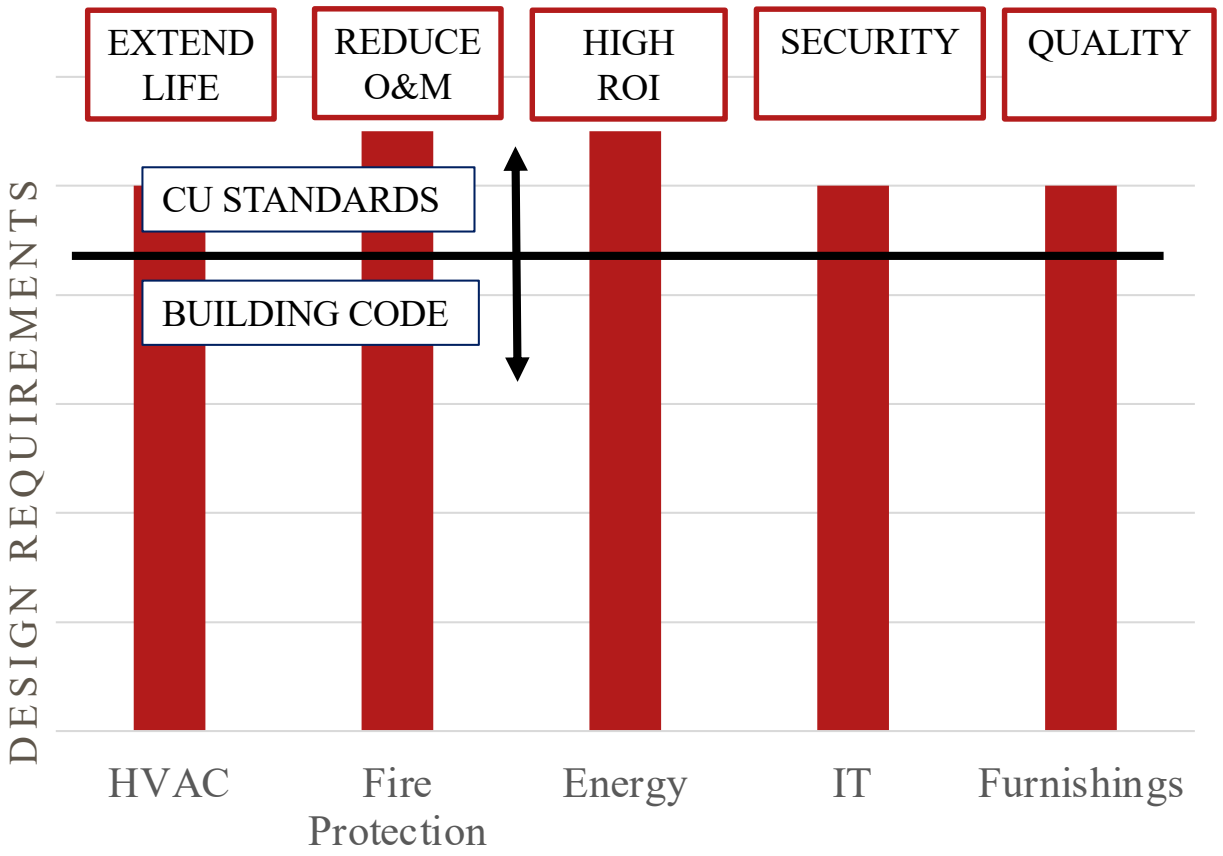


What are Design Standards & Details?



Standards are a contractual requirement for architects and engineers to incorporate in CD's

Philosophy of Design Standards



Example Standard
033000 Cast-In-Place Concrete

033000 CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.01 REACTIVE AGGREGATES

A. The Architect/Engineer should be aware that local aggregates have the potential for AAR (alkali aggregate reaction) which is a concern for concrete exposed to moisture. Cornell University prefers that concrete with the potential for moisture exposure be designed using strategies to reduce AAR, such as substituting 15% to 20% of cementitious material with class F fly ash conforming to ASTM C-618.

1.02 CONCRETE EXPOSURE CATEGORIES

A. The Architect/Engineer shall designate concrete exposure categories and classes in accordance with ACI 318-14 Table 19.3.1.1 durability requirements. Designate exposure category for each type of concrete used on the project in the concrete section of the general notes sheet.

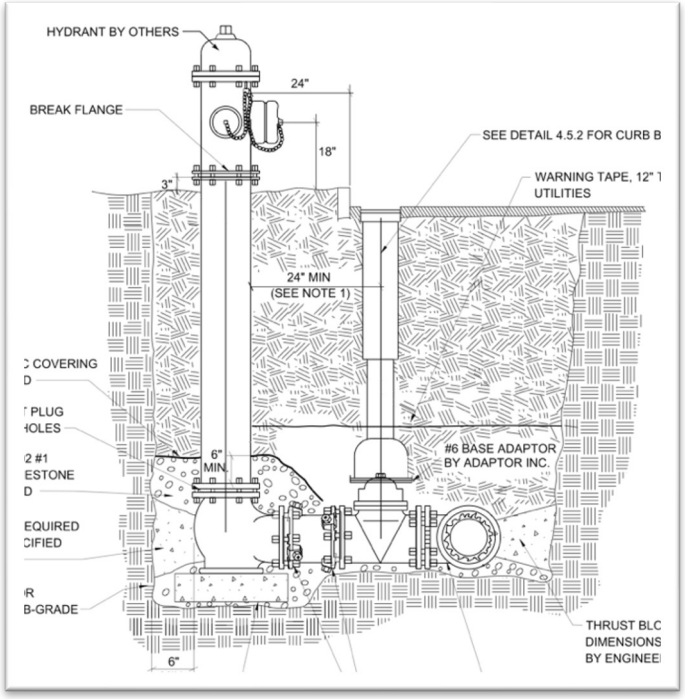
1.03 SHRINKAGE DESIGNATION AND TESTING

A. The Architect/Engineer shall designate concrete applications sensitive to cracking in the concrete section of the general notes sheet. These applications could include exposed architectural concrete, polished concrete, watertight applications, large slabs, tall columns, long walls, etc. In these areas, proportion all concrete and provide shrinkage testing for a maximum allowable length change of 0.04% measured at 28 days after curing in lime-saturated water for seven days in accordance with ASTM C157 (using air storage thereafter). Engineer shall determine and include an allowance in the construction documents for a set length of reinforcement to be added to the rebar layout at their discretion once the construction sequence is determined. Critical areas for additional reinforcement include overly restrained areas such as at dowels between foundation and wall, construction joints, re-entrant corners, change in support conditions, change in member thickness such as drop panels.

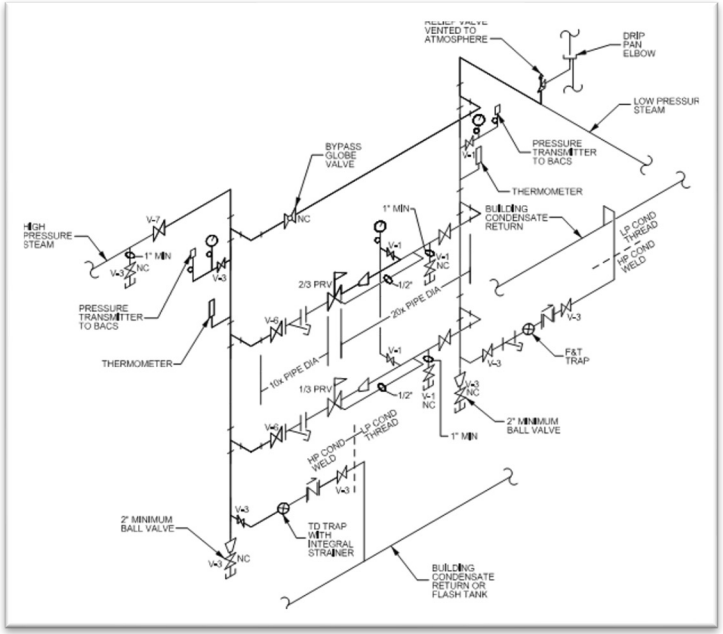
1.04 CHLORIDE LIMITS

A. Concrete producers shall provide verification that submitted concrete mixes do not exceed maximum water-soluble chloride ion (Cl^-) limits per exposure class as stated in ACI 318-14 Table 19.3.2.1.

Example Details



Hydrant Detail



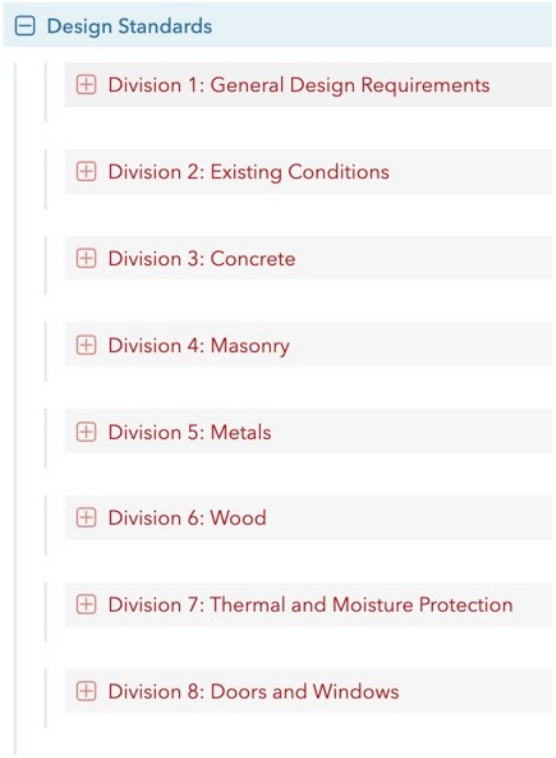
High Pressure Steam Schematic

Approach

Organized by CSI Division

- Division 1 – General Design
  - Spaces
  - Accessibility
  - Safety
  - Energy
  - Programming

- Division 2-43 – Technical Divisions
  - Materials
  - Systems
  - Assemblies



Statistics

- Design Standards – 105 Total
  - Informs design and construction documents
- Standard Details – 199 Total
  - Starting point for construction documents
- Review Period
  - Goal to review once every two years
    - Standards are reviewed, revised or removed
  - Standards are added as a need is identified

Standards Recently Updated

Date	Standard	Standard Title	Updates
4/30/24	331000	Water Distribution	Added language on trench compaction at the end of the document. The added section is to address past issues with waterline work in roadways.
2/19/24	018110	Energy Efficiency and Sustainable Design	Increased the threshold for requiring LEED Silver certification to > $10M total project cost. Approved at 02/15/2024 CF&PC committee meeting.
2/12/24	70000	Roofing	Standard was updated to include specific expectations for roof protection.
2/6/24	230520	Heat Generation	Updated standard to coordinate with Section 018110 – Energy Efficiency and Sustainable Design, to reflect Ramboll study and lessons learned. Revised Standards and manufacturers for vertical shell and coil heat exchangers.
2/6/24	336113	District Hot Water Distribution	* New Standard * generated to reflect Ramboll study and lessons learned from recent projects.
2/2/24	220500	Plumbing Basic Materials and Methods	Revised Standards for Plumbing Ball Valves. Eliminated gpf on water closets and urinals. Standardized to touch-free with hard wired infrared sensor with acceptable manufacturers.


Thank you