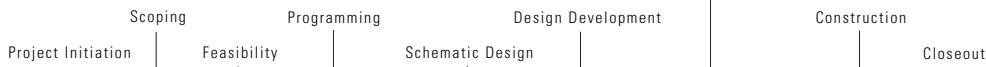




### CONSTRUCTION DOCUMENTS



## Objective

Construction Documents is the final design phase within the project delivery model. This phase focuses upon finalizing all drawings and specifications for building systems, site utilities, and components that will form the basis for the project's Construction Documents. A final set of comprehensive Construction Documents provides specifications and drawings sufficiently complete to support the Contractor's GMP, obtain necessary permits, and construct the project.

When the construction documents are 95% complete, a Technical Group review is performed, obtaining review comments from departments designated in UM Appendix X. Changes to scope or program in this phase will significantly impact the budget and schedule.

## Tasks

- Project Team
- Prior Phase Review Comments
- Project Delivery Method
- External Peer Review
- Constructability Review
- Project Schedule
- Sustainability Components
- Site Logistics Plan
- Site and Building Design
- Coordination of Systems
- Information Provided to Contractors
- Commissioning Plan
- Community Outreach Plan
- Public Art
- Budget Review
- Jurisdictional Review
- Communications Plan
- Procedures and Administration

## Deliverables

- Coordinated Drawings
- Completed review comments
- Exception to Standards
- MN B3 documentation
- Project Delivery Readiness Index
- Benchmark Report
- CM-GMP
- Final Project Budget
- Final Work Plan
- Progress Meeting Minutes
- Project report for COG and Project Executive Committee ratification
- Board of Regents notification of construction awards over \$5,000,000

## Approvals

- Project Team (review only)
- CPPM Management (review and approval)
- COG and Project Executive Committee

## Construction Documents Phase Checklist

### Project Team

Task	Task Notes
Determine if additional project team members should be added during Construction Documents.	

### Prior Phase Review Comments

Task	Task Notes
Satisfactorily resolve and finalize all review comments from prior design phases.	

### Project Delivery Method

Task	Task Notes
Finalize project delivery method previously selected in Schematic Design.	
Finalize contract provisions and insurance requirements for project delivery method selected.	

### External Peer Review

Task	Task Notes
Forward final external peer review comments to design professionals for action and written response.	

### Constructability Review

Task	Task Notes
Confirm constructability review in projects where CM is under contract and where a constructability review is required in the RFP response.	





### Project Schedule

Task	Task Notes
Confirm status of long-lead items.	
Confirm detailed construction schedule in Master Project Schedule (refer to Design Development project schedule for task detail).	
Confirm buy-out strategy.	
Finalize approval steps.	

### Sustainability Components

Task	Task Notes
Finalize sustainability goals and objectives. See: <a href="http://www.userservices.umn.edu/sustainableu/future.html">www.userservices.umn.edu/sustainableu/future.html</a> .	
Finalize status of project's energy consumption analysis, code compliance, and efficiency goals. See MN state B3 guidelines at <a href="http://www.csbr.umn.edu/B3/">http://www.csbr.umn.edu/B3/</a> .	
Finalize energy asset program with utility company.	
Review solutions and treatments for sustainability components.	

# Construction Documents Phase Checklist

## Site Logistics Plan

Task	Task Notes
Review site boundaries/construction limits.	
Review and finalize items listed below into a fully coordinated construction site plan:	
<input type="checkbox"/> Crane location(s)	
<input type="checkbox"/> Security/safety requirements	
<input type="checkbox"/> Site preservation	
<input type="checkbox"/> Traffic re-routing (vehicular and pedestrian)	
<input type="checkbox"/> Mitigate environmental and noise pollution	
<input type="checkbox"/> Delivery access	
<input type="checkbox"/> Emergency vehicle access	
<input type="checkbox"/> Pedestrian access and safety flow	
<input type="checkbox"/> Laydown area	
<input type="checkbox"/> Campus parking	
<input type="checkbox"/> Construction parking	
<input type="checkbox"/> Fencing location	
<input type="checkbox"/> Trailer location(s)	
<input type="checkbox"/> Temporary services	
<input type="checkbox"/> Construction Sign Plan	

## Site and Building Design

Task	Task Notes
Finalize elements in site and building design described in Design Development.	

## Coordination of Systems

Task	Task Notes
Finalize coordination of all systems relating to items listed in Building Design, section E of the Design Development checklist.	

## Information Provided to Contractors

Task	Task Notes
Commissioning Plan	
Hazardous Material Information	
Soils Report	
Site Survey	







### Commissioning Plan (if required)

Task	Task Notes
<p>Confirm systems to be commissioned:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Mechanical HVAC: <ul style="list-style-type: none"> <li>* Temperature controls</li> </ul> </li> <li><input type="checkbox"/> Other Equipment: <ul style="list-style-type: none"> <li>* High voltage</li> <li>* Low voltage</li> <li>* Security</li> <li>* Fume hood</li> <li>* Process piping</li> <li>* AV equipment</li> <li>* Telecommunications</li> <li>* Electrical and plumbing (including fire protection/life safety sprinklers)</li> </ul> </li> </ul>	
Verify that the scope of the commissioning plan and process matches design intent.	
Finalize roles and responsibilities of FM personnel and Design Consultant.	
Develop project specific equipment forms.	
Estimate schedule for required off-hour and deferred (off-season) testing.	
Reconfirm project specific training has been developed for each area of the building and that training requirements have been included in the specifications.	

### Community Outreach Plan

Task	Task Notes
Complete review of Construction Impact checklist.	
Reconfirm process for construction site notifications.	
Finalize outreach requirements.	

# Construction Documents Phase Checklist

## Public Art

Task	Task Notes
Review and update public art tasks defined in prior design phases.	

## Budget Review

Task	
Finalize budget originally developed in Programming phase and revised and confirmed in prior design phases.	
Finalize budget variances.	
Finalize proposed add/deduct alternate items, if over budget.	
Confirm final strategy and reconcile for final variances.	
Finalize Contractor's GMP for the following costs (if not obtained in prior phases): <input type="checkbox"/> Construction costs (labor and materials) <input type="checkbox"/> Allowances <input type="checkbox"/> Construction contingency <input type="checkbox"/> Bond cost <input type="checkbox"/> Insurance cost <input type="checkbox"/> Contractor fee <input type="checkbox"/> Labor burden <input type="checkbox"/> General conditions	
Reconfirm internal service agreements.	
Finalize financing agreement.	





### Jurisdictional Review: (review goals established in Schematic Design for each entity)

Task	Task Notes
City and county governments	
Code Office and DEHS	
Elevators	
High-pressure steam	
MN Department of Health	
MPCA:	
<input type="checkbox"/> Air	
<input type="checkbox"/> Environmental	
<input type="checkbox"/> Sewer/water	
MetCouncil—storm water	
NIH	
Other civic groups	
Park Board	
SHPO review	
Utility providers: power, sewer, water and gas	

### Communications Plan

Task	Task Notes
Reconfirm and continue communication steps developed in Predesign.	

# Construction Documents Phase Checklist

## Procedures and Administration

Task	Task Notes
If a project labor agreement (PLA) has been entered into for the project, ensure that only union personnel are employed at the construction site while the Contractor is present. Review and ensure compliance with provisions of PLA during the project.	
Execute internal service level agreements.	
Maintain project in CPPM project management information system.	
Provide monthly project report to CPPM management.	
Provide active project updates for CPPM Web site. See: <a href="http://www.cppm.umn.edu/active-projects.html">http://www.cppm.umn.edu/active-projects.html</a> .	

## Deliverables

Task	Task Notes
Coordinated Drawings: <input type="checkbox"/> Project Manual <input type="checkbox"/> Drawings, sketches, and other graphic presentation materials <input type="checkbox"/> E-files	
Completed review comments	
Exceptions to Standards	
MN B3 documentation	
Project Delivery Readiness Index (as needed)	
Benchmark Report: <input type="checkbox"/> Program elements by GSF <input type="checkbox"/> Budget <input type="checkbox"/> Schedule <input type="checkbox"/> Funding <input type="checkbox"/> Quality	
CM—GMP (as needed on a project by project basis)	
Final project budget	
Final Work Plan	
Progress meeting minutes	
Project report for COG and Project Executive Committee ratification	
Board of Regents notification of construction awards over \$5,000,000	





### Review and Approvals of Deliverables

Task	Task Notes
Project Team: (review only) <input type="checkbox"/> Client contact <input type="checkbox"/> Facilities Management <input type="checkbox"/> DEHS <input type="checkbox"/> Building Code Division <input type="checkbox"/> Office of Classroom Management <input type="checkbox"/> CPPM Project Manager	
CPPM Management: (review and approval)	
Ratification by COG and Project Executive Committee	

# Construction Documents Guidelines

## General Information

### Applicable References (current editions)

1. University of Minnesota Campus Master Plan
2. University of Minnesota Standards and Procedures for Construction<sup>1</sup>
3. University of Minnesota Exterior Design Standards<sup>1</sup>
4. University of Minnesota Historic Preservation Plan<sup>1</sup>
5. University of Minnesota CAD Data Standards
6. University of Minnesota Building Code Division Policies and Procedures Manual with Appendix
7. American Institute of Architects (AIA) CAD Layer Guidelines
8. Construction Specifications Institute (CSI) Uniform Drawing System and Master Format

### Required For All Sheets

1. University Project Name and University Number
2. Project Team including contact information (also insert team member titles)
3. Drawing issue date
4. Signature certification block
5. Key Plan
6. North arrow for plans
7. Scale, Notes, Symbols, and call-out identification systems
8. CAD Layer Matrix for large or complicated projects
9. Plotting information

## Civil Engineering

### Civil Survey

1. Civil survey with confirmed benchmarks, right-of-ways, easements, property lines, required setbacks, bearing and distance labels, and construction controls

### Environmental Site Plan

1. Coordinated environmental containment and mitigation plan

### Grading Plan

1. Proposed contour lines and building footprints

### Roads and Topography Plan

1. Proposed pedestrian and vehicular circulation and parking lot plans

### Utility Plan

1. Coordinated fire protection and utilities plan





## Landscape Architecture

### Landscape Site and Planting Plan

1. Coordinated landscape site plan as applicable

### Plant and Landscape Materials

1. Existing trees to remain
2. New trees
3. Trees to be removed
4. Other plant materials
5. Rock, bark, mulch
6. Lawn areas

### Irrigation System

1. Sprinklers
2. Piping
3. Equipment
4. Coverage
5. Controls

### Site Improvements

1. Walks and Steps
2. Fencing
3. Walls
4. Decks and Plazas
5. Site furnishings
6. Other structures
7. Scaled layouts, elevations, sections, details, and coordination plans for individual landscape items as applicable

## Structural Engineering

### Foundation Plan

1. Piles and drilled piers
2. Foundation layout and reinforcing
3. Slab layout, reinforcing, and control joints

### Framing Plan

1. Grid pattern, dimensions, and key tags
2. Framing Plan (columns, beams, and joists)
3. Structural bearing and shear walls
4. Scaled layouts, elevations, sections, details, and coordination plans for structural systems as applicable



# Construction Documents Guidelines

## Architectural

### Title Page

1. Project building name, University number, and official street address
2. Sheet Index
3. University Project Number (all sheets)
4. Project Team (all sheets)
5. Drawing issue date (all sheets)
6. Signature certification block (all sheets)
7. Location Plan
8. Key Plan (all sheets)
9. Scale, Notes, Symbols, and call-out identification systems (all sheets)
10. Materials, hatching, and other pattern identification symbols key
11. CPPM project Web address: <http://www.cppm.umn.edu/active-projects.html>
12. Comprehensive Code Data Block:
  - a. List all applicable current codes
  - b. Occupant groups and loads
  - c. Plumbing fixture analysis (actual and minimums)
  - d. WAC/SAC analysis
  - e. Required separation of occupancies
  - f. Floor area and height/number of stories
  - g. Allowable square footage and actual square footage
  - h. Types of construction
  - i. Fire-resistive rated construction
  - j. Design loads
  - k. Frost depth
  - l. Interior wall and ceiling finish (sprinklered/unsprinklered)

### Coordinated Architectural Site Plan

1. Confirmed property lines and required setbacks
2. Comprehensive utility plans
3. Emergency apparatus access and staging plan
4. Life Safety Plan with egress routes and ADA accessibility
5. Construction access, loading, and circulation
6. Construction staging and storage areas
7. Crane and other equipment locations
8. Temporary fencing
9. Storm water and silt controls





10. Construction parking types and locations (obtain Parking and Transportation approval)
11. Landscaping coordination plan
12. Permanent access, loading, and circulation
13. Site lighting coordination plan
14. Permanent fencing coordinated with Landscape Plans
15. Retaining walls coordinated with Landscape Plans
16. Permanent parking stall types and locations (obtain Parking and Transportation approval)
17. Enlarged site details and sections
18. Site signage

### Building Plans

1. Demolition plans and details (where required)
2. Selective demolition plans and details (where required)
3. Testing/investigative location plans (where required)
4. Structural plan with column spacing and shear wall locations
5. Scaled floor and roof plans with appropriate dimensions and University room numbers
6. Utility main and entrance locations
7. Mechanical, Electrical, and Telecom Room layouts and coordination plan
8. Recycling Room(s)
9. Janitor Room(s)
10. Door locations with swings
11. Vertical circulation locations and sizes
12. Reflected ceiling plans
13. Show fire separation rated walls on reflected ceiling plans
14. Room materials, casework, and equipment layouts
15. Furniture Plan
16. Lab Equipment Plan
17. Kitchen and Specialty Equipment Plan
18. Classroom requirements and specifications

### Elevations

1. Exterior elevations indicating:
  - a. location of fixed and operable windows
  - b. curtain walls and specialty partitions
  - c. doors and access panels
  - d. overall dimensions and floor-to-floor heights
  - e. air intakes and exhausts
  - f. fire apparatus connections and hose bibs
  - g. utility connections and meters

# Construction Documents Guidelines

2. Exterior cladding systems, finish materials, and colors
3. Exterior architectural lighting and locations
4. Roof profile and finish material(s)
  - a. roof top equipment and screening
  - b. roof access and safety barriers
  - c. rainwater distribution systems
5. Interior elevations of restrooms, major/complicated spaces (e.g. auditoriums, classrooms)

## Sections

1. Building sections showing floor-to-floor heights and space relationships (including instructional space elevations)
2. Exterior wall sections
3. Stair, elevator, and shaft sections
4. Sections of major complicated spaces
5. Tunnels

## Scaled Details and Schedules

1. Exterior wall details
2. Roof details
3. Floor and floor finish details
4. Wall types
5. Casework details
6. Ceiling details
7. Interior details
8. Significant structural details
9. Door and door frame types
10. Window types
11. Door and window details
12. Door and window schedule
13. Room finish schedule
14. Restroom and plumbing fixture details
15. ADA-required details
16. Specialty walls
17. Specialty equipment





## Mechanical

### Mechanical Site Plan

1. Coordinated mechanical site plan where applicable

### Controls and Instrumentation Plan

1. Control/Energy Management system equipment layout plan
2. Thermostats and low-voltage wiring

### HVAC Plan

1. HVAC Equipment Plan
2. HVAC Ductwork Plan
3. HVAC Piping Plan

### Dust and Fume Collection Systems

1. Dust and Fume Collection Equipment Plan
2. Dust and Fume Ductwork Plan

### Steam Systems

1. Steam systems equipment
2. Steam systems condensate piping
3. Steam systems low-pressure piping
4. Steam systems high-pressure piping

### Refrigeration Systems

1. Refrigeration equipment
2. Refrigeration piping

### Electric Heat and Other Specialty Equipment

1. System description, layout, and coordination plans for specialty systems

### Elevations, Sections, Details

1. Scaled layouts, elevations, sections, details, and coordination plans for individual mechanical systems as applicable

# Construction Documents Guidelines

## Plumbing

### Site Plan

1. Coordinated plumbing site plan where applicable

### Plumbing Plan

1. Acid, alkaline, and oil waste systems
2. Domestic hot and cold water systems
3. Sanitary drainage
4. Storm drainage system
5. Miscellaneous plumbing equipment
6. Plumbing fixtures
7. Scaled layouts, elevations, sections, details, and coordination plans for individual plumbing systems as applicable
8. Medical gases and tanks
9. Laboratory services

## Electrical

### Electrical Site Plan

1. Coordinated electrical site plan where applicable

### Communication Plan

1. Auxiliary systems (e.g. bell, call, clock, paging, intercom, security, etc.)
2. Sound systems, AV equipment, TV, and other classroom equipment schedules and plans

### Grounding Plan

1. Lightning protection systems

### Lighting Plan

1. Special, emergency, and exit lighting plans
2. Ceiling, wall, and floor-mounted lighting plans
3. Luminaire identification and schedules
4. Lighting, switching, and circuiting plans

### Power Plan

1. Site power plan
2. Power panels and grounding system
3. Power equipment
4. Power switchboards
5. Power circuits, floor raceways, under-carpet, and other power distribution
6. Cable trays, feeders, and bussways
7. Wall, ceiling, special receptacle, and device plans
8. Emergency power systems





## Telecommunications

### Site Plan

1. Coordinated telecommunications site plan where applicable

### Data Plan

1. Data equipment, distribution, and outlet plan

### Telephone Plan

1. Telephone equipment, distribution, and outlet plan

## Fire Protection

### Sprinkler Plan

1. CO2 system
2. Halon system
3. Standpipe system
4. Sprinkler head and piping system
5. Fire system equipment (hoses and extinguishers)
6. Fire alarm system (including detectors and sensors)
7. Scaled layouts, elevations, sections, details, and coordination plans for individual fire protection systems as applicable

## Project Manual

### Project Manual

1. University Project Name and Number (all pages)
2. Project Team (all pages)
3. Contract Document issue date (all pages)
4. Signature certification block by professional discipline
5. CPPM Consultant Instructions for "Front End" Documents (see <http://www.cppm.umn.edu/aedocs/Instructions.doc>)
6. General Requirements with Bidding Documents
7. Owner provided information available to bidders/proposers where applicable
8. Design Intent Statements for all disciplines (C/S/A/M/E/P/FP etc.)
9. Specifications by current CSI divisions and format
10. Appropriate language for project labor agreement (if necessary)

