Architectural Registration Examination

Construction Document & Services

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Covering the Nation

Construction Documents & Services

OVERVIEW

DIVISION STATEMENT

- Apply project management and professional practice knowledge and skills (***), including
- the preparation of contract documents and
- Contract administration.

Content Areas

1. CODES & REGULATIONS (5-8 %)
2. ENVIRONMENTAL ISSUES (4-9 %)
3. CONSTRUCTION DRAWINGS & PROJECT MANUAL (41-46 %)
4. PROJECT & PRACTICE MANAGEMENT (41-46%)

Vignettes

BUILDING SECTION

Delineate a building section that integrates

- structural,
- mechanical, and
- lighting systems and
- Incorporates life safety considerations.

KNOWLEDGE / SKILLS

The division has been broken down into a listing of knowledge and skills **** directly related to each major content area.

1. CODES & REGULATIONS (5-8 %)

A. Incorporate

- building codes,
- specialty codes,
- zoning, and
- other regulatory requirements in construction documents and services.

1. Government and Regulatory Requirements and Permit Processes

Conduct code analysis to ensure compliance with

- all building codes,
- zoning ordinances and
- other regulations and document code compliance in the contract documents.

2. Specialty Codes and Regulations including

- Accessibility Laws,
- Codes, and
- Guidelines Conduct code analysis to ensure compliance with all specialty codes, such as
  - seismic,
  - life safety,
  - historic preservation,
  - accessibility,
  - universal design,
  - energy, or
  - other specialty regulations.

3. ENVIRONMENTAL ISSUES (4-9%)

- Incorporate sustainable design principles, universal design, adaptive reuse concepts, alternative energy systems, new material technologies, and hazardous material mitigation in construction documents.

1. Hazardous Conditions and Materials

Examine hazardous materials discovered during preparation of contract documents or during the construction process. Determine the impact on the program, scope, phasing, and budget of the project and revise as necessary.

2. Indoor Air Quality

Develop contract documents and procedures to ensure indoor air quality. Document compliance with codes and coordinate with regulatory officials and consultants.

3. Sustainable Design

Incorporate sustainability concepts into the contract documents minimizing the environmental impact. Select sustainable materials.

3. CONSTRUCTION DRAWINGS & PROJECT MANUAL (41-46 %)

A. Prepare and coordinate construction drawings and review general and supplementary conditions and technical specifications including building systems, product selection, and constructability.

1. Site Design

Develop contract documents related to site elements and coordinate with regulatory agencies to obtain approval of site design.

2. Building Design

Manage the coordination of consultants, prepare and coordinate building design and contract documents, pursue regulatory and approval processes, and conduct quality control and constructability reviews.

3. Building Systems and their Integration

Coordinate details and resolve conflicts between building systems.

4. Specifications

Develop specifications and coordinate with the drawings.

5. Construction Details and Constructability

Prepare contract documents and review for constructability.

4. PROJECT & PRACTICE MANAGEMENT (41-46%)

A. COST

Prepare estimates of probable construction cost and consider cost effect on design decisions.

1. Implications of Design Decisions

Evaluate and prepare cost estimate. Revise contract documents as required reflecting cost modifications.
Manage the project budget.

B. SCHEDULING & COORDINATION

Prepare and manage project schedule and coordinate all contract documents including those of consultants.

1. Construction Sequencing

Assist the owner in preparing phasing plans for the project.

2. Project Schedule Management

Prepare the project schedule and obtain client approval. Determine project staffing needs and consultant deadlines to ensure conformance with project schedule.

C. PROJECT DELIVERY (including Submittals)

Establish project delivery method and provide contract administration documentation and services.

1. Project Delivery Methods

Assist the owner in choosing appropriate project delivery methods.

2. Construction Procurement Processes

Develop bidding documents and evaluate alternate methods for construction procurement.

3. Product and Material Substitutions

Establish procedures for handling substitutions and render decisions on compliance with the contract documents.

4. Construction Records Management

Prepare and maintain project records during design and construction.

5. Shop Drawing Review

Review shop drawings or other submittals for compliance with the contract documents.

6. Site Observation / Construction Contract Compliance

Provide construction administration services to ensure compliance with contract documents. Interpret contract documents and observe construction site. Review and approve the contractor application for payment and administer project closeout procedures.

7. Change Order Process

Evaluate change orders to determine validity and process as required.

8. Construction Conflict Resolution

Resolve construction conflicts between members of the project team.

9. Post-Occupancy Studies

Conduct post-occupancy evaluations with owner and consultants.

D. CONTRACTS & LEGAL ISSUES

Provide professional services and review construction contracts considering issues pertaining to practice including risk management and professional and business ethics.

1. Contracts for Construction

Assist in the preparation of contracts and in “partnering” efforts with the project team.

2. Contract Negotiation

Manage and coordinate contracts between the owner and the contractor.

3. Legal Issues Pertaining to Practice and Contracts

Interpret and render decisions related to contracts and practice issues.

4. Risk Management

Establish risk management procedures and assess professional and general liability related to building design.

5. Professional and Business Ethics

Deliver services and render decisions with professionalism applying professional and ethical standards of care.

SAMPLE MULTIPLE-CHOICE QUESTIONS

Which Code deals with what?

Sprinklers?

What does each Code do?
What is a standard?
What is a guideline?
What about manufacturer's installation?
….

1. The architect informs the owner that because of budget constraints and ceiling heights, the sprinkler piping must be exposed. The owner directs the architect to delete the sprinkler system. Prior to deleting the system, the architect should check the requirements for sprinklers in
   - o the building code
   - o the plumbing code
   - o ASTM
   - o ACI

1. CODES & REGULATIONS (5-8 %)
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Funding related contracts?

- o Direct
- o Negotiated
- o Invited
- o Public

2. Which of the following methods of bidding is required on most projects for which government funds are to be used?
o Direct
o Negotiated
o Invited
o Public

Delivery methods of the design and build
- o Design-bid-build
- o Fast track
- o Design-build
- o Turnkey
- o Cost plus
- o Owner Builder
- o Owner Assist
- o Design Assist
- o Cost-plus-fee
- o Cost-plus-fee with a guaranteed maximum price
- o Stipulated sum
- o Unit price
- o ????????

Which of the following project delivery methods always requires preparation of several individual bid-document packages?

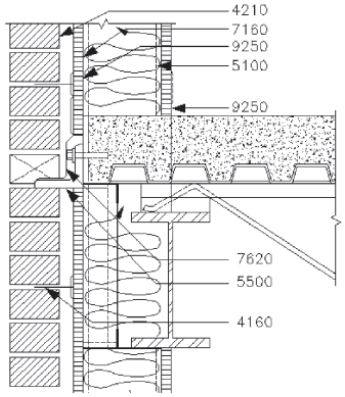
- o Design-bid-build
- o Fast track
- o Design-build
- o Turnkey

3. Which of the following methods of contractor compensation would an owner be more likely to choose when the construction time is limited and the design criteria or construction cost is secondary to meeting the deadline for completion?

o Cost-plus-fee
o Cost-plus-fee with a guaranteed maximum price
o Stipulated sum
o Unit price

Definitions?

o detail numbers
o finish schedule
o specifications
o construction sequencing



4. The numbered keynotes in the detail above are referenced to the
- o detail numbers
- o finish schedule
- o specifications
- o construction sequencing

Role of Actors in theater during bidding, construction, etc.

Architect's role
Engineer's role
Owner's role
Government's role as AHJ
Government's role as owner
Construction Management
Construction Observation

Multi Stage Bidding

5. In developing a list of bidders for a private project, the architect's role is to
o select the contractor
o recommend qualified contractors
o rank the contractors in order of preference
o discourage owner-recommended contractors

Financial Capabilities

- O Owner
- O Architect
- O Contractor

Abilities

- o owner
- o architect
- o contractor
- o surety

6. A contractor's ability to obtain a performance bond for a specific construction contract is determined by the
o owner
o architect
o contractor
o surety

Construction Documents & Services portion of the examination, and is not intended to be an exhaustive list of all possible references for this division of the examination.

Conventional Family
A101-2007 Standard Form of Agreement between Owner and Contractor where the basis of payment is a Stipulated Sum
A201-2007 General Conditions of the Contract for Construction – Fixed price??
A701-1997 Instructions to Bidders
B101-2007 Standard Form of Agreement between Owner and Architect
C401-2007 Standard Form of Agreement between Architect and Consultant

Contract Administration and Project Management Forms
A305-1986 Contractor's Qualification Statement- Financial statement….
G701-2001 Change Order- irregularities and owners' responsibility
G702-1992 Application and Certificate for Payment
G703-1992 Continuation Sheet
G704-2000 Certificate of Substantial Completion

AIA Document A, B, C, D

7. AIA Document A305, Contractor's Qualification Statement, includes a
- o financial statement
- o list of subcontractors
- o list of proposed consultants
- o list of proposed material suppliers

8. After considering all bids, the owner favors a bid with irregularities. According to AIA Document A701, Instructions to Bidders, the owner
o has the right to waive irregularities and accept the bid
o has the right to extend the bidding period for corrections
o must informally request corrections from the bidder
o must only consider bids without irregularities

9. A local bank has a budget of $30,000,000 to construct a new main office. The bank wants to use contractors who are customers of the bank; however, none of the bank's contractor/ customers can bond the entire amount of the contract. Which of the following is a possible option?

o Design-build
o Fast-track
o Multiple prime contractors
o Additive change orders

Do you know What these mean?

- o Occupancy-permit procedures
- o Notification of future addenda
- o Pre-commissioning procedures
- o Status of change orders

10. Which of the following is an appropriate agenda item for the pre-bid conference?

o Occupancy-permit procedures
o Notification of future addenda
o Pre-commissioning procedures
o Status of change orders

11. An occupancy permit is

o an agreement by the authorities that the building complies with fire, safety, and health regulations

o certification by the architect that the building is substantially complete and may be occupied by the owner

o legal acceptance of the building by the owner

o the act of taking possession of the building

Did not follow contract….

12. A contractor under a fixed-price construction contract has allowed the electrical subcontractor to install lighting fixtures other than those stated in the contract documents. The electrical subcontractor and the contractor both believe the substituted fixtures to be of equal value. The construction is substantially completed [substantially performed] and the architect rejects these fixtures. According to AIA Document A201, General Conditions, which of the following is true?

o The architect must accept the lighting fixtures as installed without a cost credit to the owner.

o The architect must accept the lighting fixtures as installed but with a cost credit to the owner.

o The contractor is required to replace the lighting fixtures with the fixtures specified without reimbursement.

o The contractor must replace the lighting fixtures with the fixtures specified but is entitled to reimbursement for labor costs for the replacement.

Dollar Tree….. Riverside

- Known change order sums
- The bidding climate
- The amount of monthly certificate of payment
- The amount of retainage

13. Architect estimates of construction costs based on final documents should consider which of the following?

o Known change order sums

o The bidding climate

o The amount of monthly certificate of payment

o The amount of retainage

o review bonds and affidavits
o determine whether a performance bond and a payment bond are required
o discuss changes to completed work
o clarify responsibilities and operating procedures

14. A preconstruction conference is generally held in order to

o review bonds and affidavits

o determine whether a performance bond and a payment bond are required

o discuss changes to completed work

o clarify responsibilities and operating procedures

Discrepancy in shop drawing Who is responsible for what?

- o The architect
- o The manufacturer
- o The distributor
- o The contractor

Shop drawings for dormitory windows have been prepared by the manufacturer, checked by the local distributor, and reviewed and approved by the contractor and the architect. During installation, it is discovered that the quantity of windows as indicated on the shop drawings is one less than that shown in the contract documents. Who is responsible for the discrepancy?

- o The architect
- o The manufacturer
- o The distributor
- o The contractor

Architects rose on site visits

o A. The progress and quality of the work
o B. The amount work completed for progress payment
o D. Whether the work is being performed according to contract documents
o
o
o
o

Not:
o E. Whether the contractor is following the proper sequence of installation
o F. Whether the contractor is following proper safety procedures
o C. The techniques of the construction being utilized
o
o
o
o
No Baby Sitting. No recommendation. Liability Distribution

15. On- site field observations by the architect are made to determine which of the following? Check the three that apply.

o A. The progress and quality of the work
o B. The amount work completed for progress payment
o C. The techniques of the construction being utilized
o D. Whether the work is being performed according to contract documents
o E. Whether the contractor is following the proper sequence of installation
o F. Whether the contractor is following proper safety procedures

Deviation from Shop Drawings???????????
Equipment without shop drawings?????
Education of the General Contractor????

16. The contractor for a project submits to the architect shop drawings that contain deviations from the contract documents not noted as deviations on the shop drawings. The drawings are then approved and returned to the contractor by the architect. According to AIA Document A201, which of the following is true in this situation?

o The contractor assumes responsibility for deviations from the contract documents.

o The contractor is allowed to build according to the approved shop drawings containing deviations.

o The architect assumes responsibility for deviations from the contract documents because the architect approved the shop drawings.

o The owner must be informed of all deviations from and alterations to the contract documents.

17. At a project site, the architect notices the mechanical subcontractor unloading equipment for which shop drawings have not been received. The architect's most appropriate first course of action is to

o stop the unloading at once and report the incident to the owner

o advise the general contractor that the equipment is subject to rejection pending the architect's review

o ask whether the shop drawings are in the subcontractor's possession

o inspect the equipment to determine whether it meets the requirements set forth in the project specifications

When do you paint?
What are the precautions of the paint?
LEED, Green issues, ….

18. Which of the following conditions should be met before the start of interior painting?

o The permanent heating system is operational.

o Exterior openings are sealed.

o The exterior temperature is above 50° F.

o Sidewalks have been completed for dirt control.

Failure or collapse during the job….

19. During a concrete pour, a portion of the third floor of a project collapses because of inadequate shoring. The architect informs the contractor that work in the area of the collapse will not be approved until the architect can fully evaluate the impact of the failure on adjacent work in place. The contractor states that the architect will be held responsible for the cost of delays unless the analysis is performed within 24 hours. The architect should

o perform as complete and thorough an analysis as possible within 24 hours

o perform a complete analysis in a timely manner and make it clear that the contractor will be responsible for the schedule

o put the owner on notice that the owner may have to pay additional costs for an extended completion date

o allow the contractor to proceed with work in the adjacent area so that no time is lost

Who Pays Whom???

GC to …

Architect to …

Owners to ….

Commissioning ….

Third Party ….

20. In accordance with AIA Document A201, General Conditions, the obligation to pay or to see to the payment of money to a subcontractor, except as may otherwise be required by law, rests with the

o contractor alone
o architect alone
o owner alone
o contractor, the architect, and the owner

Change orders….
How do they initiate?
What is fair?
Research during job?
Means and methods?
Unknowns?
Read my lips …. No Change Order!

21. When delivering brick to the site, the supplier offloaded the bricks at a point very distant from where they are needed. The contractor requests an extra for relocating the brick. The architect should

o reject the request for an extra on the grounds that it is the contractor's responsibility

o require the brick supplier to relocate the brick

o prepare an appropriate change order giving the contractor a contract increase for relocating the brick

o prepare an addendum to the contract outlining the responsibility of the brick supplier in the delivery of brick

22. The contractor decided not to purchase a specific material for a project near the time of bidding because there was no place on site to store the material and it would not be needed until months later after construction had progressed. When the contractor did purchase the material, the price had risen by 30 percent compared to the price at the time of the bid. Which of the following is true?

o The contractor is entitled to a change order for the price increase.

o The contractor is entitled to a change order for half of the price increase.

o The contractor is entitled to a change order for the difference between the added cost of the material and the estimated value of appropriate storage space for the intervening months.

o The contractor is not entitled to a change order.

23. A contractor unbound the specifications for a project and gave specific sections to subcontractors for bidding. The contractor later discovered gaps in the overall coverage of the bids. In this situation, which of the following statements is true?

o The subcontractors should be forced to absorb the cost of the work.

o The owner should sign a change order for the omitted work.

o The architect or its insurer should pay for the cost of a change order.

o The contractor is not entitled to a change order.

24. An architect is providing full architectural and engineering design services for a new detention center. The construction contract has been signed and the contractor informs the architect that the fire-sprinkler contractor does not have the fire line from the city main to the building in the price because it was not on the drawings or in the specifications. According to AIA Document A201, which of the following should be done?

o The contract amount should be adjusted by a change order.
o The fire protection subcontractor should install the fire line at no additional cost.
o The fire protection engineer is required to pay for the installation of the fire line.
o The architect should issue supplementary instructions directing the contractor to install the fire line.

25. During the construction phase, the owner and the contractor have a difference of opinion about the quality of the erection of the steel frame and the progress of the work. The first step that should be taken to resolve the problem is for the owner and/or the contractor to

o stop the project
o request arbitration
o consult with the steel fabricator
o request the architect's interpretation

After Commissioning
After Opening
Leverage
Retainer
…

26. Six months after final payment, the building manager notifies the architect that operating and maintenance manual for a key piece of equipment was never received. The architect should do which of the following?

o Instruct the contractor to provide the manual.

o Withhold an amount of retainage necessary to provide for the manual.

o Suggest the building manager contact the manufacturer directly for the manual, since final payment has been made to the contractor.

o Contact the manufacturer directly to obtain the manual.

Left over punch list.
The delineation line
How long am I responsible?

27. After occupying a portion of a building, the owner notices a dent in a wall. The dent was not noted on the punch list prepared by the contractor and reviewed by the architect. What determination should the architect make?

o The contractor is responsible for the repair even though it was not on the original punch list.

o The owner has taken occupancy and is therefore responsible because the cause of the damage cannot be established.

o The contractor is responsible because only a portion of the building is occupied and other construction activities continue.

o The architect is responsible because he/she missed the damage during the original punch list walk-through.

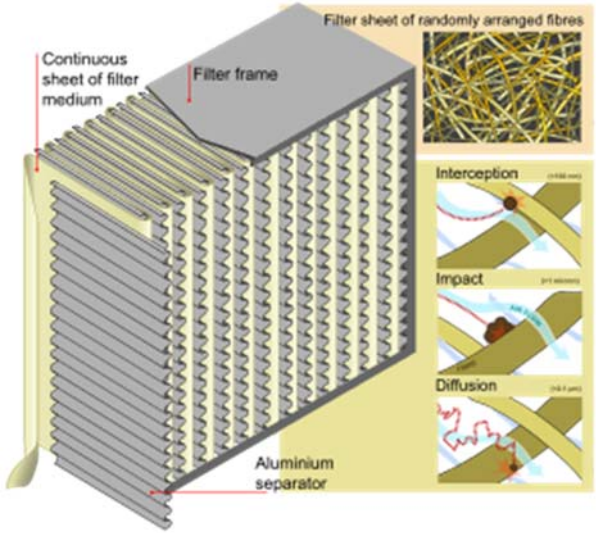
Punch list is complete and they missed it …

Then what?

28. A contractor omits an item of incomplete or incorrect work from the punch list accepted by the architect. Who is liable for the cost of completing or correcting that item when the omission is discovered?

o The architect
o The surety
o The owner
o The contractor

Air infiltration… test



High-efficiency particulate air or HEPA

29. Which of the following types of test equipment is used to check for air infiltration on an already constructed exterior wall system?

o A smoke pencil

o A cylinder

o An HEPA filter

o An ultrasonic detector

Acronyms

A

3-A	3-A Sanitary Standards, Inc.
AA	Aluminum Association
AAMI	Association for the Advancement of Medical Instrumentation
AAMVA	American Association of Motor Vehicle Administrators
AARST	American Association of Radon Scientists and Technologists
ABMA	American Brush Manufacturers Association
ABMA	American Bearing Manufacturers Association
ABYC	American Boat and Yacht Council
ACC	American Chemistry Council
ACCA	Air Conditioning Contractors of America
ACCT	Association for Challenge Course Technology
ACDE	Association of Commercial Diving Educators
ACI	American Concrete Institute

ACMA	American Composites Manufacturers Association
ACMI	Art & Creative Materials Institute
ADA	American Dental Association
AEM	Association of Equipment Manufacturers
AENOR	Standards developer, Spain
AFNOR	Standards developer, France: Assoc. Française de Normalisation
AFPA	American Forest & Paper Association
AGA	American Gas Association
AGMA	American Gear Manufacturer Association
AGRSS	Automotive Glass Replacement Safety Standards Committee, Inc.
AHAM	Association of Home Appliance Manufacturers
AHRI	Air Conditioning, Heating, and Refrigeration Institute
AIAA	American Institute of Aeronautics and Astronautics
AIHA	American Industrial Hygiene Association
AIM	Automatic Identification Manufacturers, Inc.
AIIM	Association for Information and Image Management
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute

ALI	Automotive Lift Institute
ALI	American Ladder Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
AMCI	AMC Institute
AMT	Association for Manufacturing Technology
ANLA	American Nursery & Landscape Association
ANS	American Nuclear Society
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
APCP	Association of Public Safety Communications Officials-International
API	American Petroleum Institute
APSP	Association of Pool and Spa Professionals
ARMA	Association of Records Managers and Administrators
ASA	Acoustical Society of America
ASABE	American Society of Agricultural and Biological Engineers
ASB (ASC Z50)	American Society of Baking

ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
ASC X9	Accredited Standards Committee X9
ASCE	American Society of Civil Engineers
ASIS	ASIS International
ASME	American Society of Mechanical Engineers
ASQ	American Society for Quality
ASNT	American Society for Nondestructive Testing
ASSE	American Society of Safety Engineers
ATCC	American Type Culture Collection
ASTM	American Society for Testing and Materials
ATIS	Alliance for Telecommunications Industry Solutions
AWWA	American Water Works Association
AWS	American Welding Society
AWEA	American Wind Energy Association
AWPA	American Wood Protection Associatio

B

BHMA	Builders Hardware Manufacturers Association
BICSI	Building Industry Consulting Service International
BIFMA	Business & Institutional Furniture Manufacturers Association
BOMA	Building Owners and Managers Association
BS	British Standards Institution
BV	Bureau Veritas

C

CAGI	Compressed Air and Gas Institute
CAP	College of American Pathologists
CAPA	Certified Automotive Parts Association
CCPA	Cemented Carbide Producers Association
CEA	Consumer Electronics Association
CECC	CENELEC Electronic Components Committee
CEI	Comitato Elettrotecnico Italiano
CFR	Code of Federal Regulations
CGA	Canadian Gas Association

CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CA	Consumer Electronics Association
CEMA	Conveyor Equipment Manufacturer's Association
CFPMI	Cold Formed Parts & Machine Institute
CISPR	International Electrotechnical Commission
CI	Cordage Institute
CLMA	Composite Lumber Manufacturers Association
CLSI	Clinical and Laboratory Standards Institute (formerly NCCLS)
CPA	Composite Panel Association
CRSI	Concrete Reinforcing Steel Institute
CS	UK Ministry of Defence standards
CSA	Canadian Standards Association
CSAA	Central Station Alarm Association
CSPA	Consumer Specialty Products Association
CTI	Cooling Tower Institute

D

DAST	Stahlbau-Verlagsgesellschaft mbh
DEF	UK Ministry of Defence standards
DEFCON	UK Ministry of Defence standards
DEFSTAN	UK Ministry of Defence standards
DGFDB	Deutsche Gesellschaft für Badewesen e. V.
DGO	Deutsche Gesellschaft für Galvano und Oberflächentechnik
DGQ	Deutsche Gesellschaft für Qualität
DGZFP	Deutsche Gesellschaft für Zerstörungsfreie Prüfung e.V.
DIN	Deutsches Institut für Normung
DISA	Data Interchange Standards Association
DKD	Deutscher Kalibrierdienst
DKI	Deutsches Kupferinstitut e.V.
DKIN	Deutsches Komitee Instandhaltung
DNV	Det Norsk Veritas
DOD	US Department of Defense Standards

DQA/TS	Ministry of Defence (UK) Standards
DMSC, Inc.	Dimensional Metrology Standards Consortium, Inc.
DS	Danish Standards
DSCC	Defense Supply Centre Columbus
DTD	Ministry of Defence (UK) Standards
DTU	Association Française de Normalisation
DVGW	Wirtschafts und Verlagsgesellschaft Gas und Wasser
DVS	DVS-VERLAG GmbH, Verlag für Schweissen und verwandte Verfahren
DVWK	Deutscher Verband für Wasserwirtschaft und Kulturbau e.V.

E

EAL	Deutscher Kalibrierdienst
EASA	Electrical Apparatus Service Association
EATS	Electricity Association Standards
ECA	European Co-operation for Accreditation
ECMA	European Computer Manufacturers Association
EEMUA	Engineering Equipment Material Users Association

EI	Energy Institute (formerly Institute of Petroleum)
EIA	Joint Electronics Device Engineering Council (JEDEC)
EIA	Electronic Industries Association
EIA	Environmental Industry Association
EIMA	EIFS Industry Members Association
EN	European Standards (CEN/CENELEC)
EOANL	DIN (Deutsches Informationszentrum für technische Regeln)
EOS/ESD	ESD Association, Inc.
ESD	Electrostatic Discharge Association
ESI	Electricity Association Standards
ESTA	Entertainment Services and Technology Association
ETR	European Telecommunications Standards Institute
ETSI	European Telecommunications Standards Institute
EURONORM	European Committee for Iron & Steel Standardization

F

FA	Telcordia Technologies
FAA	Federal Aviation Administration
FCI	Fluid Controls Institute
FDBR	Fachverband Dampfkessel-, Behälter- und Rohrleitungsbau e.V.
FED	Federal Specs/Standards/Handbooks
FGSV	FGSV Verlag, Forschungsgesellschaft für Straßen - Verkehrwesen
FIPS	Federal Information Processing Standards
FORD	Ford Motor Company
FQS	Beuth Verlag GmbH
FM	FM Approvals
FR	Telcordia Tehnologies
FSA	Fluid Sealing Association

G

GBI	Green Building Initiative
GEI	Greengaurd Environmental Institute
GEIA	Government Electronics & Information Technology Association

GISC	Glazing Industry Secretariat Commitee
GL	Germanischer Lloyd
GEIA	Government Electronics & Information Technology Association
GOST	Interstandard (Russia)
GR	Telcordia Technologies
GS1 US	GS1 US
GTEEMC	Georgia Tech Energy and Environmental Management Center
GUV	Bundesverband der Unfallkassen e.V.

H

HD	Harmonization Documents
HELP	Hydrogen Executive Leadership Panel
HFES	Human Factors & Ergonomics Society
HHGFAA	Household Goods Forwarders Association of America, Inc.
HI	Hydraulic Institute
HIBCC	Health Industry Business Communications Council
HL7	Health Level Seven
HTI	Hand Tools Institute

HPS	Health Physics Society
HPVA	Hardwood Plywood & Veneer Association
HVBG	Hauptverband der gewerblichen Berufsgenossenschaften

I

IACET	International Association for Continuing Education and Training
IAPMO	International Association of Plumbing & Mechanical Officials
ICC	International Code Council
ITI (INCITS)	InterNational Committee for Information Technology Standards
ICEA	Insulated Cable Engineers Association
IEC	International Electro technical Commission
IEEE	Institute of Electrical & Electronics Engineers
IES	Illuminating Engineering Society
IESO	Indoor Environmental Standards Organizations=
IESNA	Illuminating Engineering Society of North America
IEST	Institute of Environmental Sciences and Technology

IET	Institution of Engineering & Technology
IFI	Industrial Fasteners Institute
Institute for Triple Helix Innovation	Institute for Triple Helix Innovation
IIAR	International Institute of Ammonia Refrigeration
IICRC	Institute of Inspection, Cleaning and Restoration Certification
IIE	Institute of Industrial Engineers
INCITS	InterNational Committee for Information Technology Standards
INMM	Institute of Nuclear Materials Management
IP	Institute of Petroleum UK (now Energy Institute)
IPC	Institute of Printed Circuits
ISA	Instrument Society of America
ISA	International Society of Arboriculture
ISANTA	International Staple, Nail and Tool Association
ISDSI	Insulated Steel Door Systems Institute
ISEA	Safety Equipment Association
ISO	International Organization for Standardization
ISTA	The Association for Transport Packaging

ITE	Institute of Transport Engineers
ITSDF	Industrial Truck Standards Development Foundation, Inc.
ITU	International Telecommunications Union
ITU-R	International Telecommunications Union (CCIR)
ITU-T	International Telecommunications Union (CCITT)
IWCA	International Window Cleaning Association
I3A	International Imaging Industry Association

J

JAGUAR	Jaguar Standards
JCSEE	Joint Committee on Standards for Educational Evaluation
JIS	Japanese Industrial Standards
JSAE	Society of Automotive Engineers of Japan Inc.

K

KCMA	Kitchen Cabinet Manufacturers Association
KTA	Kerntechnischer Ausschuss

L

LAWA	Länderarbeitsgemeinschaft Wasser
LEO	Leonardo Academy, Inc.
LIA	Laser Institute of America
LN	Luft-und Raumfahrt
LR	Lloyds Register of Shippin

M

MedBiq	MedBiquitous Consortium
MHI	Material Handling Industry
MIL	US Military Specs/Standards/Handbooks
MS	Military Standards (US)
MSS	Manufacturers Standardisation Society
MTS	Institute for Market Transformation to Sustainability

N

NAAMM	National Assoc. of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NADCA	National Air Duct Cleaners Association
NAHBRC	NAHB Research Center, Inc.
NASA	National Aeronautics and Space Administration
NAS/NASM	Aerospace Industries Association of America
NAVSEA	Naval Sea Systems Command
NBN	Belgian Standards
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors
NBFAA	National Burglar & Fire Alarm Association
NBR	Brazilian Standards
NCCLS	National Committee for Clinical Laboratory Standards
NCEES	National Council of Examiners for Engineering and Surveying
NCPDP	National Council for Prescription Drug Programs
NCSL	National Conference of Standards Laboratories

NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NEN	Netherlands Standards
NES	Naval Engineering Standards (UK Ministry of Defence)
NETA	InterNational Electrical Testing Association
NF	Association Française de Normalisation (AFNOR)
NFPA	National Fire Protection Association
NFPAS	National Fluid Power Association
NFSI	National Floor Safety Institute
NFPA2	National Fluid Power Association
NGA	National Glass Association
NGCMA	National Golf Car Manufacturers Association
NGWA	National Ground Water Association
NIMS	National Institute for Metalworking Skills
NISO	National Information Standards Organization
NIST	National Institute of Standards and Technology
NIST/ITL	National Institute of Standards and Technology/Information Technology Laboratory

NMA	National Management Association
NPES	Association for Suppliers of Printing, Publishing, and Converting Technologies
NPPC	National Pork Producers Council
NS	Norwegian Standards (Norges Standardiseringsforbund)
NSC	National Safety Council
NSF	National Sanitation Foundation
NSAI	National Standards Authority of Ireland
NWWDA	National Wood, Window and Door Association

O

OASIS	Organization for the Advancement of Structured Information Standards
ÖNORM	Austrian Standards
OPEI	Outdoor Power Equipment Institute

P

PIA	Parachute Industry Association

PMI	Project Management Institute
PRETS	European Telecommunications Standards Institute
PTB	Physikalisch Technische Bundesanstalt

Q

QPL	Qualified Products List (US)

R

RAC	Reliability Analysis Center
RKW	RKW Verlag
RMA	Rubber Manufacturers Association
RTCA	Radio Technical Commission for Aeronautics

S

SAAMI	Sporting Arms & Ammunition Manufacturers Association
SAC	Standardization Administration of China

SAE	Society of Automotive Engineers
SAE AMS	Aerospace Materials Specification (SAE AMS)
SAMA	Scientific Apparatus Makers Association
SBAC	Society of British Aerospace Companies
SDI	Steel Door Institute
SE	Verlag Stahleisen GmbH
SEB	Verlag Stahleisen GmbH
SEL	Verlag Stahleisen GmbH
SEMI	Semiconductor Equipment & Materials Institute
SEN	Swedish Standards
SEP	Verlag Stahleisen GmbH
SEW	Verlag Stahleisen GmbH
SIS	Swedish Standards
SNIP	Federal Registry of National Building Codes & Standards
SNV	Swiss Standards
SMA	Screen Manufacturers Association
SMPTE	Society of Motion Picture and Television Engineers
SMS	Swedish Standards

SPI	Society of the Plastics Institute
SR	Telcordia Technologies
ST	Telcordia Technologies
STANAG	NATO Standardization Agreements — MoD
STG	Schiffbautechnische Gesellschaft E.V.
STLB	Deutsches Institut für Normung

T

TA	Telcordia Technologies
TAPPI	Technical Association of the Pulp & Paper Industry
TBR	European Telecommunications Standards Institute
TEMA	Tubular Exchanger Manufacturers Association
TR	Telcordia Technologies
TRAC	Verband der Technischen Überwachungs-Vereine e.V.
TRB	Technische Regeln zur Druckbehälteverordnung Druckbehälter
TRD	Verband der Technischen Überwachungs-Vereine e.V.
TRG	Verband der Technischen Überwachungs-Vereine e.V.

TRGL	Verband der Technischen Überwachungs-Vereine e.V.
TRGS	Technische Regeln fuer Gefahrstoffe
TRR	Technische Regeln zur Druckbehälteverordnung Rohrleitungen
TS	Ministry of Defence (UK) Standards

U

UL	Underwriters Laboratories
UNE	Asociacion Espanola de Normalizacion, AENOR (Spain)
UNI	Italian Standards
UTEC	Assoc. Française de Normalisation (AFNOR

V

VBG	Hauptverband der gewerblichen Berufsgenossenschaften
VDA	Verband der Automobilindustrie e.V.
VDE	Verband Deutscher Elektrotechniker
VDG	Verein Deutscher Giessereifachleute
VDI	Verlag des Vereins Deutscher Ingenieure

VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V.
VDS	VDS Schadenverhütung GmbH
VDTUEV	Verband der Technischen Überwachungsvereine e. V.
VDV	Verband Deutscher Verkehrsunternehmen
VGB	VGB Power Tech Service GmbH

W

WDK	Kautschuk-Wirtschaftsförderungs-Gesellschaft mbH

X

Y

Z

ZH	Hauptverband der gewerblichen Berufsgenossenschaften

30. Which of the following is commonly used as a reference for testing materials?

o ANSI
o ASTM
o OSHA
o NAAB

AB Animal breeders?
Architectural accreditation board
Natural antibodies?

Concrete Curing:

- a satisfactory moisture content and
- temperature (between 50°F and 75°F) must be maintained
- vital to quality concrete (durability, strength, water tightness, abrasion resistance, volume stability, and resistance to freezing and thawing and deicer salts)
- Exposed slab surfaces are especially sensitive to curing.
- If curing not effective: Surface strength development can be reduced significantly
- chemical reaction , hydration: any appreciable loss of water by evaporation or otherwise will delay or prevent hydration. If temperatures are favorable, hydration is relatively rapid the first few days after concrete is placed;
- retaining water during this period is important.
- Good curing means evaporation should be prevented or reduced.

Liquid membrane-forming compounds sprayed onto the surface are effective, economical moisture barriers for moist-curing concrete.

Polyethylene sheets are effective, economical moisture barriers for moist-curing concrete.

Burlap kept saturated with water is an effective medium for moist-curing concrete.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31. What procedure is taking place on the concrete footing pedestal at the project construction site in the illustration above?

o Rebars are being placed by hand.

o Concrete is being placed by hand.

o Concrete is being covered to retain heat.

o Concrete is being covered to prevent the rebars from rusting.

Property Damage during construction …

32. Existing mature vegetation on a property line was inadequately protected and, consequently, damaged by a subcontractor's excavation equipment. The owner should require which party to remedy the damages?

o The owner's own forces

o The subcontractor

o The contractor, with no additional compensation

o The contractor, with compensation for additional work administered in a change order

Sequence of construction

33. After excavation, which of the following construction sequences would be likely to be the most productive?

o Footings, walls, toilet partitions, roofing, carpet, painting

o Concrete, structural steel, roofing, drywall, painting, carpet

o Structural steel, concrete, walls, millwork, roofing, painting

o Grade beams, walls, drywall, roofing, millwork, site work

Incomplete Work

34. Which of the following is true of the list of incomplete work and work to be corrected?

o It is prepared after the start of the warranty period.
o Work listed must be completed prior to occupancy by the owner.
o It is limited in value to one percent of the contract.
o It is prepared to cover all trades.

Cost Overrun
Cost Under Budget
Extras

35. A contract allowance for building signage is established at $50,000. The signage chosen during construction costs only $45,000. In accordance with AIA Document A201, the contractor should offer a credit change order for

o $5,000

o $5,000 minus the contractor's expense of processing the credit

o $5,000 minus the cost of installation, overhead, and profit

o the cost of installation, overhead, and profit

Financial Security of the Job ..

36. Which of the following are considered security for a project? Check the two that apply.

- o A. Bid Bond
- o B. Payment Bond
- o C. Completion Bond
- o D. Performance Bond
- o E. Certified check

OOPS We forgot the Cost?!

37. During construction, the architect realizes that the specifications did not include requirements for some nondestructive testing of welds on some of the structural steel. The city inspection department requires the contractor to perform these tests. The individual responsible for paying for the tests is the

o structural engineer
o architect
o owner
o contractor

Ad Services by Architect

38. Separate [other] contracts by the owner generally require

o more extensive services by the architect

o coordination of all separate contractors by the surety

o these separate contracts to be subcontracts of the contractor

o a special consultant to assume overall responsibility for compliance with the applicable health and construction safety legislation at the place of work

Liquidated damages: Who Pays for it?

39. Final completion [total performance] of a commercial building occurred 2 weeks behind schedule. The contract contained a liquidated damages clause that required deduction of monetary damages from the final payment to the contractor. Deductions from the architect's compensation should

o be a percentage of the amount deducted from the payment to the contractor

o be an amount agreed to by the owner and the architect

o not be greater than 10 percent of the architect's total compensation

o not be made

Differences?

o the bidding requirements
o the owner-contractor agreement
o the supplementary conditions
o Division 1, General Requirements

40. Matters affecting the basic legal rights and responsibilities of the parties to the contract, but which may vary from one project to another, should be handled in
o the bidding requirements
o the owner-contractor agreement
o the supplementary conditions
o Division 1, General Requirements

Construction Documentation Quality Control?

Maintain documentation standards
Provide detailed cost estimate.
Have contractor check documents

Not
Provide for thorough review and checking procedures
Use an approved set of design development documents
Review documents with local code officials.

41. Before starting the construction documents phase, which of the following procedures would help assure quality control in preparing the construction documents? Check the three that applies

- o A. Maintain documentation standards
- o B. Review documents with local code officials.
- o C. Provide detailed cost estimate.
- o D. Provide for thorough review and checking procedures
- o E. Use an approved set of design development documents
- o F. Have contractor check documents

Decrease the amount of construction waste

- Designing a materials flow plan for the contractor and user
- Specifying recycled materials and products
- Specifying masonry construction over wood construction
- Assisting the owner and contractor in a waste management plan

Not

- Requiring recycled product packaging.
- Specifying a single dumpster on site.

42. The architect can decrease the amount of construction related waste by doing which of the following? Check the four that apply.

- o A. Designing a materials flow plan for the contractor and user
- o B. Specifying recycled materials and products
- o C. Requiring recycled product packaging.
- o D. Specifying a single dumpster on site.
- o E. Specifying masonry construction over wood construction
- o F. Assisting the owner and contractor in a waste management plan

Waste management plan: Architectural services

- Means and methods to be used in construction
- Programming services
- Insurance requirements

Not

- Description of reimbursable expenses
- Name of the general contractor
- Additional services that may be provided by the architect

43. Assisting the owner and contractor in a waste management plan. Which of the following should be included in the written contract for architectural services? Check the two that apply.

- o A. Means and methods to be used in construction
- o B. Programming services
- o C. Description of reimbursable expenses
- o D. Name of the general contractor
- o E. Insurance requirements
- o F. Additional services that may be provided by the architect

Substitution

Accepted

- if they replace unavailable products.
- if they replace unsuitable products,
- They may be included in the shop drawings without official written notice

Maybe accepted

- if the contractor forgot to order the product.
- by oral agreement between architect and contractor

Rejected

- as defective work if they lack proper approval or authorization.

44. Which of the following is a true statement about substitutions during construction phase? Check the three that apply.

o A. They may be accepted if they replace unavailable products.
o B. They may be accepted if they replace unsuitable products,
o C. They may be accepted if the contractor forgot to order the product.
o D. They may be accepted by oral agreement between architect and contractor
o E. They may be rejected as defective work if they lack proper approval or authorization.
o F. They may be included in the shop drawings without official written notice

Budget Increase from Original Estimate: AIA document B141

- Give written approval for an increase in the budget
- Authorize rebidding or renegotiation of the project
- Cooperate in revising the scope or quality of the work
- Require the architect to modify the documents without additional compensation once the scope is reduced

Not

- Require the architect to compensate the owner for the difference between the budget and the bid
- Terminate the agreement without paying full for the bid documents

45. The bids for a new office building exceed the owner's budget. According the AIA document B141, options available to the owner include which of the following? Check the four that apply.

o A. Give written approval for an increase in the budget

o B. Authorize rebidding or renegotiation of the project

o C. Cooperate in revising the scope or quality of the work

o D. Require the architect to modify the documents without additional compensation once the scope is reduced

o E. Require the architect to compensate the owner for the difference between the budget and the bid

o F. Terminate the agreement without paying full for the bid documents

Construction phase, the architect is responsible:

- Evaluating the change orders
- Endeavoring to guard against defects in the work
- Determining if the work is in general conformity with the contract documents

Not

- Verifying that the contractor's construction methods and procedures are adequate
- Assisting the contractor in the development of safety programs and reporting methods
- Conducting continuous in-site inspections

46. During the construction phase, the architect is responsible for which of the following. Check the three that apply.

o A. Evaluating the change orders

o B. Endeavoring to guard against defects in the work

o C. Conducting continuous in-site inspections

o D. Determining if the work is in general conformity with the contract documents

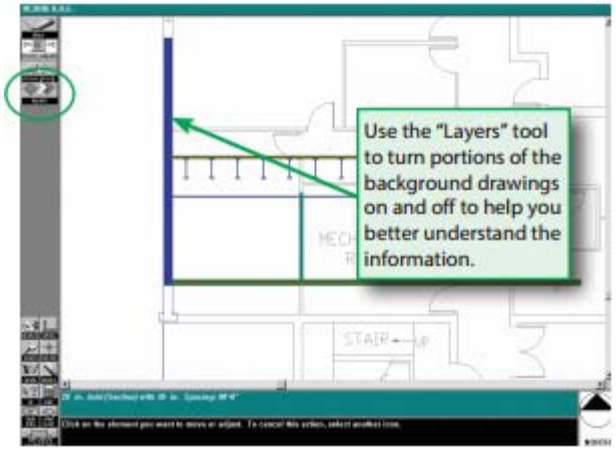
o E. Verifying that the contractor's construction methods and procedures are adequate

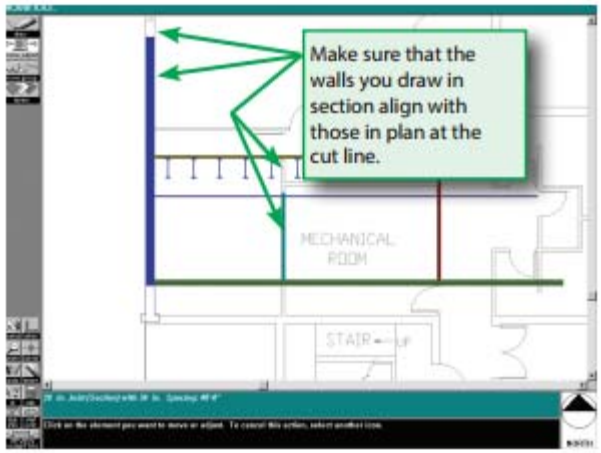
o F. Assisting the contractor in the development of safety programs and reporting methods

Construction Documents & Services

BUILDING SECTION VIGNETTE

General Tips for Taking Building Section


Use the "Layers" tool to turn portions of the background drawings on and off to help you better understand the information.
STAIR


Make sure that the walls you draw in section align with those in plan at the cut line.
MECHANICAL ROOM
STAIR

Directions

On the work screen, locate a grade line and draw a schematic building section corresponding to the section cut line shown on the floor plan. You will be asked to draw elements such as a slab on grade, finished ceilings, interior partitions, ducts, etc. You are required to draw only the elements that are cut by the cut line as well as joists in elevation immediately adjacent to the cut line. A 4 in [100 mm] deck will be drawn automatically on top of the joists you select. The left side of your section should be placed along the line that is designated “exterior face of section.”

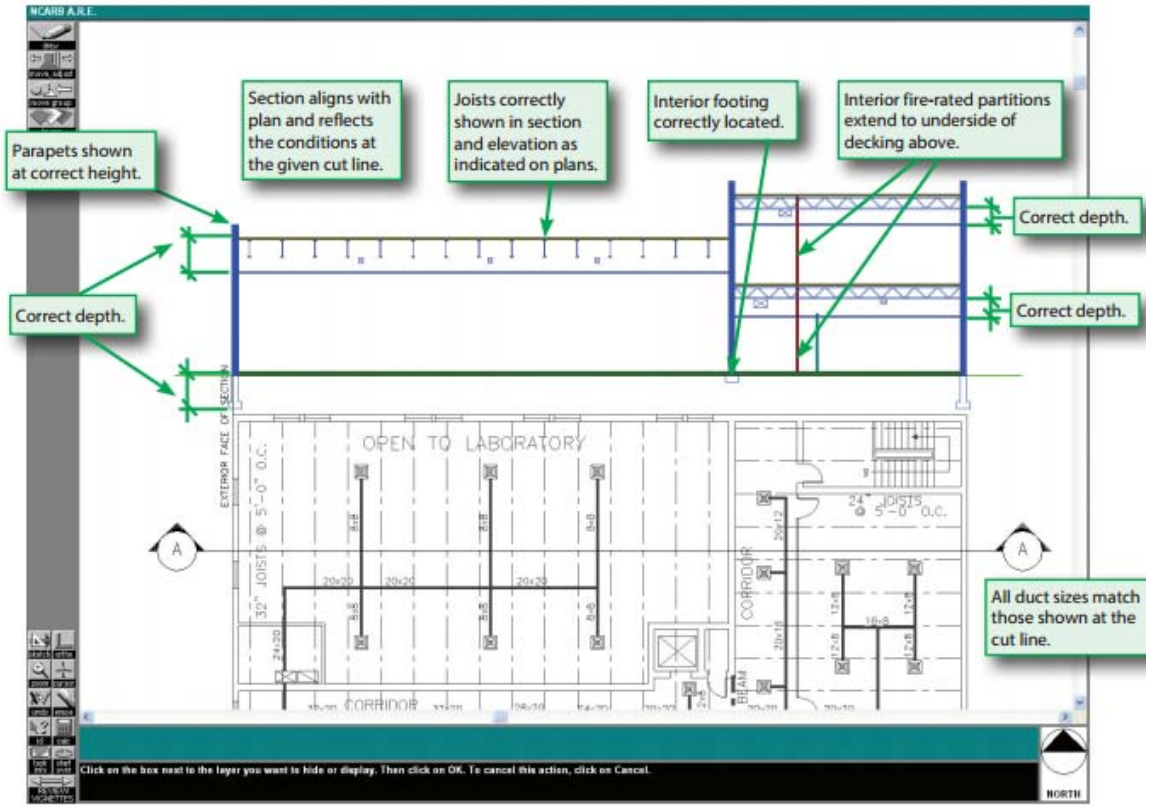
Your section should include all required sectional components and should reflect accurately the dimensions, structural relations, and spatial relations indicated in the program and the plans. Vertical clearances not explicitly stated in the program or vignette directions must be accurately interpreted and indicated on your solution.
Before beginning your solution, you should review the program information that can be accessed through the Vignette Index screen and the architectural, mechanical, and structural layers of the floor plans on the work screen.

Program

The structural system consists of top chord bearing steel joists on masonry bearing walls with continuous concrete spread footings and a concrete slab on grade.

1. All ceilings and roofs are flat.
2. Non-bearing corridor and lobby walls have a one-hour (minimum) fire-resistance rating.
3. Exterior and bearing walls have a two-hour (minimum) fire-resistance rating.
4. The ceiling height of the laboratory is 15’-0”, the ceiling height of the remaining first floor spaces is 8’-4”, and the ceiling height of the second floor spaces is 9’.
5. Ceilings are used as return air plenums. All ceilings are non-rated.
6. Assume fire/smoke dampers and transfer grilles are provided as needed.
7. The space between each ceiling and floor or roof slab must be held to the minimum dimension required to accommodate light fixtures and the structural and mechanical components shown on the plans.
8. All ducts are placed below the joists.
9. Provide 8” of clearance between the bottom of all the ducts and the finished ceiling to accommodate light fixtures.
10. Parapets must extend 2’-0” above the top of adjacent roof decks.
11. The frost depth is 5’-0” below grade.

BUILDING SECTION VIGNETTE - Sample Passing Solution



A first check of this solution shows that it is lined up horizontally with the floor plans and the grade line has been drawn. It is important to establish all the information for your section from the given cut line, and not from where you place the grade line. In this solution, the slab rests on grade while the footings are deep at the perimeter and just below the slab at the interior bearing wall. All ceiling heights are

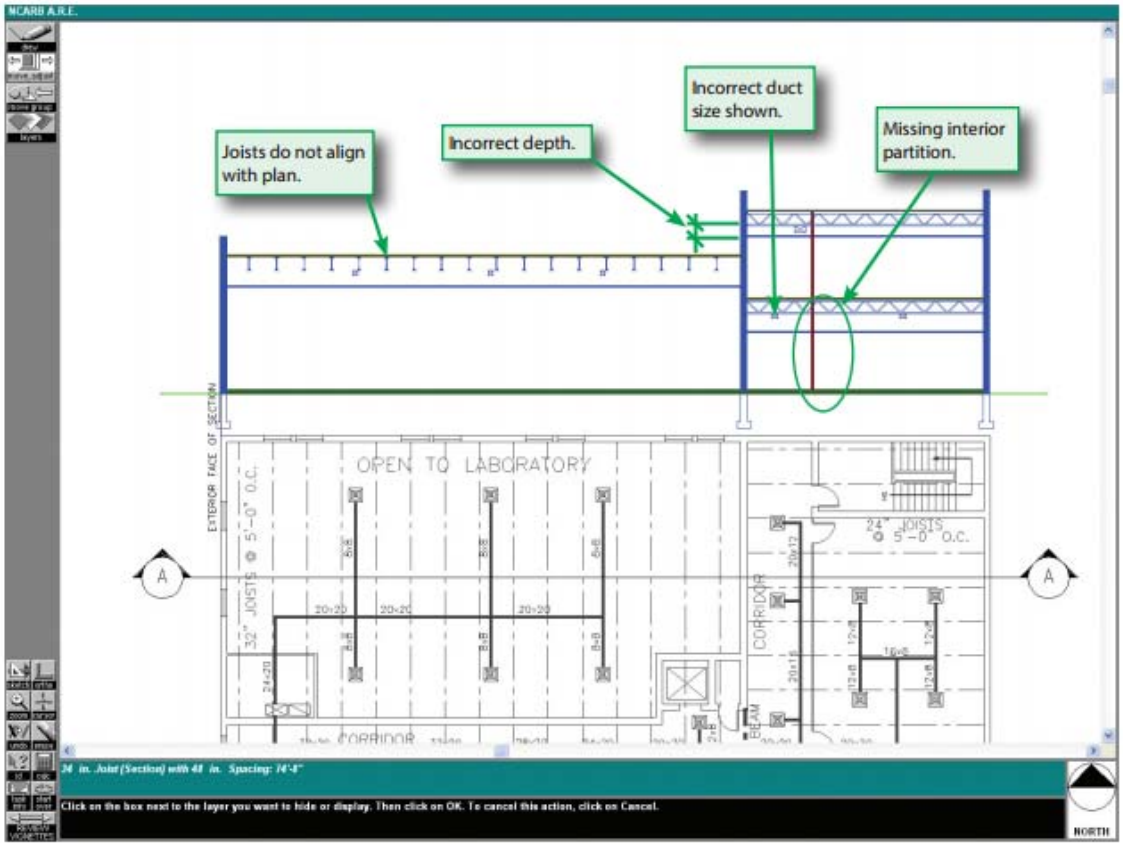
correct, and the parapets are correctly sized. The interstitial spaces have the eight-inch clearance for lighting and can accommodate the largest duct on the floor. The ducts are sized and located per the section cut line. The joists are drawn as shown on the plan and are the proper size and span the appropriate direction.

Procedural Tips

- Familiarize yourself with the contents of each layer by turning the layers on and off.
- You may find it useful to start by laying out a rough drawing and adjusting the elements later.
- To draw joists, select the joist depth and spacing you desire. When allocating room for structure, be aware that a 4 in [100 mm] deck will be drawn automatically on top of your joists.
- Use move group to relocate the entire joist run. Using move, adjust will change the location of the joists within the joist run.
- Zoom in quite closely to adjust elements and to read small text.

- When elements overlap, you may have trouble selecting a particular element. If this happens, keep clicking (without moving the mouse) until the desired element highlights.

BUILDING SECTION VIGNETTE - Sample Failing Solution



In this solution, there are multiple errors. As drawn, the largest duct on the second floor will not fit between the lights and the joists above. On the first floor, there is a duct that is incorrectly sized and an interior partition cut by the section line is missing.

Warnings

- You must draw a grade line in order for your solution to be scored.

Tools You Might Find Useful

- Layers to turn off and on in order to view base drawings more clearly
- Zoom to achieve the greatest accuracy in your drawing
- Full-screen cursor to align elements
- Sketch tools to establish heights and clearances

REFERENCES

The following references are presented to assist candidates in preparation for the examination. This list represents texts that have content covered in this division of the examination. This is not intended to be an exhaustive list of all possible reference materials for the subject area. NCARB makes no guarantee that the various references are currently in print.

The Architect's Handbook of Professional Practice
Joseph A. Demkin, AIA, Executive Editor
The American Institute of Architects
John Wiley & Sons, latest edition

Architectural Graphic Standards
Charles G. Ramsey and Harold R. Sleeper
The American Institute of Architects
John Wiley & Sons, latest edition

Building Construction Illustrated, Third Edition
Francis D. K. Ching and Cassandra Adams
John Wiley & Sons, latest edition

CSI Manual of Practice
Construction Specifications Institute, latest edition

Rules of Conduct

National Council of Architectural Registration Boards, latest edition
This list represents the significant AIA documents that have content covered in the

Construction Documents & Services portion of the examination, and is not intended to be an exhaustive list of all possible references for this division of the examination.

Conventional Family
A101-2007 Standard Form of Agreement between Owner and Contractor where the basis of payment is a Stipulated Sum
A201-2007 General Conditions of the Contract for Construction
A701-1997 Instructions to Bidders
B101-2007 Standard Form of Agreement between Owner and Architect
C401-2007 Standard Form of Agreement between Architect and Consultant

Contract Administration and Project Management Forms
A305-1986 Contractor's Qualification Statement
G701-2001 Change Order
G702-1992 Application and Certificate for Payment
G703-1992 Continuation Sheet
G704-2000 Certificate of Substantial Completion