Division 27 Specifications

What To Include And Look For In Your Next Project
Background

• Kansas State University
  – B.S. in Architectural Engineering
    • Electrical and Low-Voltage Emphasis
Background

• Major Projects
Background

• Research
  – Advanced Telecommunications System Warranties

Image from Flickr user psd
Background

• Research
  – Communications pathway requirements
Background

THE UNIVERSITY OF
TEXAS
AT AUSTIN

ITS Information Technology Services

STATE OF TEXAS
LICENSED PROFESSIONAL ENGINEER

Bicsi
Format

• Owner Design Standards

• Construction Standards/Specifications

• Installation Standards
• Contract with Architect
  – Include telecommunications design services.
  – Include audio/video and security design services (if needed).
  – Define Consultant Scope and Qualifications for each discipline.
Format – Design Standards

• Telecommunications Designer Requirements
  • Designed by BICSI RCDD.
    – Require stamp!
  • Designed by BICSI RCDD & Professional Engineer (PE).

• Audio/Video Designer Requirements
  • Designed by Infocomm’s CTS or CTS-D.
Format – Design Standards

• Security Design
  - Physical Security Professional (PSP) certification by ASIS International.
  - Certified Protection Professional (CPP) certification by ASIS International.
  - Certified Security Consultant (CSC) certification by the International Association of Professional Security Consultants (IAPSC).

• Or Past Design Experience
Format – Design Standards

• Expectations of Designers
  • Attend meetings during:
    – Programming Phase
    – Schematic Design
    – Design Development
    – Construction Documents

• Construction administration:
  – Provide feedback on submitted bids.
  – Evaluate submittals.
  – Attend kick-off & construction meetings.
  – Respond to RFIs and review change orders.
• Expectations of Designers
  • Construction administration (continued):
    – Construction inspections:
      » After conduit rough-in.
      » After cable installation.
      » Final inspection.
    – Review test results, record drawings, and other close-out documents.
**Owner Standard**

- Single document
- Essentials & reactionary
- Disadvantage:
  - For unaddressed issues, Owner might not get what they prefer.

**Designer Specifications**

- Multiple documents
- All-inclusive & pro-active
- Disadvantage:
  - Owner gets exactly what is in specifications, right or wrong.
Format - Specifications

• Specification Sections
  – Based off CSI’s MasterFormat 2004/2010
  – Download Division # and Section Titles: http://csinet.org/numbersandtitles
Format - Specifications

• Specification Sections
  Passive vs. Active

Image from Flickr users dmitrybarsky and br1dotcom
Format - Specifications

• Specification Sections
  – 27 00 00 General Communications Requirements
  – 27 05 xx Common Work Results for Comm
    • 27 05 26 Grounding and Bonding
    • 27 05 29 Hangers and Supports
    • 27 05 33 Conduits and Backboxes
    • 27 05 36 Cable Trays
    • **27 06 37 Firestopping** <- Added
    • 27 05 39 Surface Raceways and Boxes
    • 27 05 53 Identification
• Specification Sections
  – 27 08 00 Commissioning (Testing)
  – 27 11 00 Equipment Room Fittings
    • 27 11 13 Entrance Protection
    • 27 11 16 Cabinets Racks Frames & Enclosures
    • 27 11 19 Termination Blocks and Patch Panels
    • 27 11 23 Cable Management and Ladder Rack
    • 27 11 26 Rack-Mounted Power Requirements
- Specification Sections
  - 27 13 00 Backbone Cabling
    - 27 13 13 Copper
    - 27 13 23 Optical Fiber
    - 27 13 33 Coax
  - 27 15 00 Horizontal Cabling
    - 27 15 13 Copper
    - 27 15 23 Optical Fiber
    - 27 15 33 Coax
Format - Specifications

• Specification Sections
  – 27 20 00 Data Communications
    • Active Network Equipment
    • Configuration of Network Equipment
    • Computers & Peripherals
    • Software
  – 27 30 00 Voice Communications
Format - Specifications

• Specification Sections
  – 27 40 00 Audio-Video Communications
    • 27 41 16 Integrated AV Systems & Equipment
    • 27 41 33 Master Antenna Television Systems (MATV)
  – 27 50 00 Distributed Communications & Monitoring Systems
    • Paging & Public Address Systems
    • Patient Monitoring & Nurse Call Systems
    • Clock Systems
    • Internal Cellular, Paging, and Antenna Systems
General Specification Format

- MasterFormat Organization
  - Part 1 General
  - Part 2 Products
  - Part 3 Execution
General Specification Format

- MasterFormat Organization
  - Part 1 General
    - Summary
    - Related Documents
      - Codes
      - Standards (TIA-569-B)
      - Guidelines (TDMM)
    - Definitions
    - Submittals
      - Product Info and Shop Drawings
      - Unit Price for specific equipment
General Specification Format

• MasterFormat Organization
  – Part 2 Products
    • List out specific products
      Manufacturer and Part #
General Specification Format

• MasterFormat Organization
  – Part 3 Execution
    • General installation instructions
    • Specific instructions per product
• Summary

PART 1 - GENERAL
1.1 SUMMARY
a. Division 27 – Communications governs the infrastructure for the low-voltage information transport systems, which include voice, data, cable TV (CATV), and [audio/video,] [mass notification,] [distributed antenna] systems and their pathways.
• Summary

Description of Work:
• Complete, Functioning System
  • Shall meet performance requirements
• Included components of other systems
  • Category copper cabling for Security (Division 28)
General 27 00 00 Section

• Related Documents
  – Codes
    • ADA
    • NEC
    • NFPA
    • more
General 27 00 00 00 Section

• Related Documents
  – Standards

[Logos of Bicsi, TIA, IEEE, UL]

TIA-569-B
General 27 00 00 Section

• Related Documents
  – Guidelines
    • BICSI TDMM
    • BICSI Information Transport Systems Installation Methods Manual (ITSIMM)
    • [Owner’s installation guideline]
      – Labeling
      – Patching
General 27 00 00 Section

• Definitions
  – Advanced System Warranty
  – Conveniently Accessible
  – Design Engineer
  – Lead Telecommunications Installer
  – Point of Entrance (Building Entrance)
  – Project RCDD
General 27 00 00 Section

• Definitions
  – Telecommunications Subcontractor
  – Audio Video Subcontractor

• Segregation of Work
  – Electrical vs. Telecom
  – Telecom vs. AV
• Quality Assurance (for Telecom Subcontractor)
  – Company requirements
    • [Pre-qualified contractors]
    • Previous projects of similar size (with references)
    • Certified Contractor to provide Advanced System Warranty
General 27 00 00 Section

• Quality Assurance (for Telecom Subcontractor)
  – Personnel Requirements
    • RCDD on full-time staff
      – Based in same state
      – Listed on BICSI’s website:
        https://www.bicsi.org/forms/Verify/CredentialHolder/

• Lead Telecom Installer Requirements
  – ITS Installer 2 Training (for both Copper & Fiber) or equal

• General Telecom Installer Requirements
  – ITS Installer 1 Training or equal
General 27 00 00 Section

• Quality Assurance (for Telecom Subcontractor)
  – Project Warranty (1 year)
  – Advanced System Warranty for Telecommunications
    • 15+ years, held by cabling or connectivity manufacturer
    • Covers both material and performance of system
    • Past presentation:
General 27 00 00 Section

• Submittals to be reviewed by owner/designer
  – Pre-bid
    • Questions
  – With Bid
    • Contractor and personnel qualifications
    • Voluntary alternates and unit pricings
  – Before Construction
    • Product submittals and shop drawings
    • Samples?
General 27 00 00 Section

• Submittals to be reviewed by owner/designer
  – During Construction
    • Change Order requests
    • RFIs
    • CCDs (Construction Change Directives)
  – Post-Construction
    • Record Drawings
    • Warranty certificates/letters
    • Training
General 27 00 00 Section

• Product Substitutions
  – Responsibility of Contractor to show “approved equal” features
  – Preferred by Pre-Bid question deadline
  – With bid... as Voluntary Alternate with significant $ savings
  – Post-bid... as RFI with significant $ savings
General 27 00 00 Section

• Pre-Construction Submittals
  – Updated Personnel Qualifications
  – Product Info (Cutsheets)
    • Cover Page with Telecom Subcontractor and Point of Contact
    • Divided by Section & In Order
  – Shop Drawings (with RCDD Stamp)
    • Grounding & Bonding
    • Communications Pathways
    • Telecom Outlets, Patch Panels, etc. with Port Labels
Shop Drawing Example

This Shop Drawing Covers the Following Sections:
27 05 29 Hangers & Supports
27 05 33 Conduits & Backboxes
27 05 36 Cable Tray
27 05 37 Firestopping
27 05 53 Identification
27 15 13 Copper Horizontal Cabling

EZ-Path Series 33
UL System # W-L-3248

2" Conduit Sleeve

2" x 12" Cable Tray

3C1A01
3C1A02
General 27 00 00 Section

• Post-Construction Submittals
  (Some before Substantial Completion)
  ELECTRONIC VERSIONS!
  – Record Drawings (AutoCAD & PDF)
  – Test Reports
  – Operation & Maintenance Manuals
  – Letter from Project RCDD
  – Point of Contact for Telecom Warranty Claim
  – Troubleshooting Procedure for all systems
General 27 00 00 Section

• Project RCDD Duties
  – Attend all Project Meetings as requested by Architect and/or Owner
  – Review Communications Pathways
    • Shop Drawings
    • During Construction
  – Perform Weekly Site Observations
    • Invite Design Engineer and Owner
    • Notification of any issues
General 27 00 00 Section

- Coordination
  - Cable Tray Clearances
  - “Neat and Workmanlike Manner”
    - Design Team and/or Owner’s opinion is final.
  - Access to Equipment
27 05 33 Conduits & Backboxes

- Keep in Division 27!
  - Conduit bend radius requirements
  - Pullbox requirements
  - Add reference in Division 26 to see this section.
  - Responsibility of Project RCDD
    - To review bends & need for pullboxes
    - Maximum length for horizontal cables
• Conduit routing to be reviewed by Project RCDD:
  – Submittals
  – Installation (Weekly inspections)
  – Record Drawings
27 05 33 Conduits & Backboxes

• Backbox depth
  – Telecom (stud wall): 4-11/16” x 4-11/16” x 2-1/8” with minimum 3/8” deep extension ring.
  • 1” or 1-1/4” knock-outs
    – Example specification:
      RACO 259 or equal

27 05 33 Conduits & Backboxes

• Backbox depth
  – Telecom (CMU wall):
    • Double-gang, 3.5” deep
    • Hand-punched with
      1” or 1-1/4”
      – Example specification:
        RACO 696 or equal

• Backbox depth
  – Audio/Video
    • 2.5” depth (minimum) with 1-1/2” diameter conduit
      – Wiremold Wallsource Service Box
      – Hubbell Multi-Connect Recessed Wall Boxes
      – Extron Junction Boxes
Firestopping for Communications

- Keep in Division 27!
- Specific zero- or low-maintenance assemblies
- Responsibility of Project RCDD
Conclusion

• Recap
  – 27 00 00 General Section
  – Division of labor between Telecom, Electrical, etc.

• Benefits
  – Qualified Contractors
  – Oversight to catch construction issues
Conclusion

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