

## addendum

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**addendum no.** 1

**date:** 5/30/2014

**bid date:** Original: 6/5/2014  
Revised to 6/19/2014 per this  
addendum.

**project name:** LPS Security and Technology Ready Facilities Projects - Project C

**project no:** 14062

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This addendum is hereby made a part of the contract documents to the same extent as if it were originally included therein. Contract documents shall be considered modified or revised as hereinafter described.

Attendance list from pre-bid meeting on 5/28/2014 attached.

### Specifications

1. Table Of Contents
  - a. Add specification 271523 - Communication Copper Horizontal Cabling
2. Invitation To Bidders:
  - a. Change Bid Date to June 19, 2014 at 2:00 PM (CST).
3. Instruction To Bidders
  - a. Change Opening of Bids to be on June 19th, 2014 at 2:00 PM (CST).
  - b. General Information, Part 2.16 Project Schedule:
    - i. Change beginning of construction to July 8, 2014.
    - ii. Change substantial completion date to October 14, 2014.
    - iii. Change Final completion date to October 28, 2014.
    - iv. Final addendum date shall be no later than June 13th, 2014.
4. Specification 271523 - Communication Copper Horizontal Cabling
  - a. Add this section in its entirety (attached).
5. Specification 271543 - Communication Faceplates and Connectors
  - a. Part 2.3, C, 1, e - change category 6 outlet color to be gray.
  - b. Part 2.3, C, 2, e - change category 6 outlet color to be gray.
  - c. Part 2.3, C, add item 3 as follows: Data Jack, TIA Category 6A, Pins:8, Termination: T568B, Color: Blue.

### Drawings

1. Cover Sheet:
  - a. Lefler Middle School, add sheet "215.T00 - Overall Tunnel Plan" to sheet list.

2. Sheet C106 - Faceplate Details:
  - a. Refer to detail 8, change 1" slot in ceiling tile to be the following: 1 1/4" x 2 3/8" opening, center on tile.
3. Sheet 154.T01.A - First Floor Plan Telecom Area 'A' - Morley Elementary School:
  - a. Change name of Existing Rack 'A' to be "Existing Rack 'A1' ".
  - b. Change name of Rack 'A1' to be Rack 'A2'.
4. Sheet 154.T21 - Morley Elementary School Telecommunications Details:
  - a. Change name of Existing Rack 'A' to be "Existing Rack 'A1' ".
  - b. Change name of Rack 'A1' to be Rack 'A2'.
5. Sheet 162.T01.A - First Floor Plan Telecom Area 'A' Pyrtle Elementary School:
  - a. Refer to Penthouse Partial Plan New Telecom Rack 'B1', connect new quad receptacles serving rack 'B1' to spare 20 amp, 1-pole circuit breaker in existing 120V emergency panel 'ELC' (located in Room 180F).
6. 215 series drawings: Change flag note 25 to be one 4" conduit in lieu of two 4" conduits.
7. Sheet 215.T00 - Overall Tunnel Plan Lefler Middle School:
  - a. Add this sheet in its entirety (attached).
8. Sheet 215.T01.A - First Floor Plan Telecom Area 'A' Lefler Middle School:
  - a. Room B01F, Rotate data new Data Rack 'B1' 90 degrees such that front of rack faces out into room. Coordinate exact installation location with LPS.
  - b. Room A010, change outlet on west wall of room to be 'W' designation with "0,1" cable identifier for wall-mounted telephone outlet.
  - c. Connect new quad receptacles serving rack 'B1' to spare 20 amp, 1-pole circuit breaker in existing 120V emergency panel "EA" (located in Stor. A180B)
9. Sheet 215.T02.C - Second Floor Plan Telecom Area 'C' Lefler Middle School:
  - a. Partial Penthouse Plan - Area 'C' Telecom - connect new quad receptacles serving rack 'A1' to spare 20 amp, 1-pole circuit breaker in existing 120V emergency panel "EB" (located near B181B).
10. Sheet 215.T02.D - Second Floor Plan Telecom Area 'D' Lefler Middle School:
  - a. Conduit indicated by flag note 24 on sheet not visibly indicated on this sheet. Reference conduit shall extend through chase in corner of room C20 and up to Area 'C' Penthouse cable tray as indicated on flag note 24. Flag note 26 shall apply to chase in corner of room C20.
  - b. Partial Penthouse Plan - Area 'D' Telecom - connect new quad receptacles serving rack 'C1' to spare 20 amp, 1-pole circuit breaker in existing 120V emergency panel 'EC' (Located in C180C).
11. Sheet 215.T02.E - Second Floor Plan Telecom Area 'E' Lefler Middle School:
  - a. Room C04N, move wireless access point to north side of door leading to corridor C04C. WAP shall share same raceway as wall phone as indicated in flag note 47.
12. Sheet 215.T21 - Lefler Middle School Telecommunications Riser Diagrams
  - a. Provide two category 6 cables from patch panel in rack 'A1' to surface mount box in room B181B adjacent to existing rack 'A'. Cables to be utilized by LPS for temporary network connectivity between existing rack 'A' and new rack 'A1'. Test and certify cables.
13. 302 Series Drawings, Sheets T00.B, T01.B, and T02.B:

- a. Provide fire-rated pathway for cables penetrating existing plenum walls above ceiling at areas where plenum rated cabling is required.
14. Sheet 302.T01.F - First Floor Plan Telecom Area 'F' East High School:
- a. Room 147A, Provide new 4' luminaire mounted at +9'-0" AFF above existing data rack 'D'. Luminaire shall be as manufactured by HE Williams (or equal by Lithonia or Cooper), catalog #21-4-232-I-EB2-XX. Chain hang luminaire at height indicated. Provide wall switch on interior of room near door strike to control luminaire. Connect to nearest unswitched lighting circuit serving area, field verify lighting voltage.
15. Sheet 302.T00.A - Ground Floor Plan Telecom Area 'A' East High School:
- a. Connect new quad receptacles serving rack 'C1' to spare 20 amp, 1-pole circuit breaker in existing 120V emergency panel 'EM1' (located in 083C).
16. Sheet 302.T00.B - Ground Floor Plan Telecom Area 'B' East High School:
- a. Connect new quad receptacles serving racks 'B1' and 'B2' to spare 20 amp, 1-pole circuit breaker in existing 120V emergency panel 'EM1' (located in 083C).
17. Sheet 302.T01.I - First Floor Plan Telecom Area 'I' East High School:
- a. Room 169B, delete note 4 from WAP in room (WAP shall utilize patch cords from gear box similar to typical classroom.)
18. Sheet 302.T22 - East High School Telecommunications Riser Diagrams:
- a. Provide new 4 RU fiber shelf in top of rack 'A1'. Terminate all new 12 strand OM3 MM fibers serving IDF's in this 4 RU fiber shelf in lieu of wall mount fiber optic shelf indicated. Shelf shall be Commscope catalog #RFE-SLC-IS-EMT-BK/4U-PNL.
19. Sheet 308.T21 - Bryan Community Telecommunications Details:
- a. Four horizontal wire managements shown in existing rack '1' are existing.

20F2



# Attendance Roster

LPS Security/Technology Ready Classrooms Improvements

Meeting Date: May 28, 2014 Meeting Location: LPS 800 So 24<sup>th</sup> St. - FM-TR

Purpose: Package C - Pre-Bid Meeting

✓	Name	Organization/ Company	Department	Email	Phone No.
	Scott Wieskamp	LPS	Facilities	swieska@lps.org	402-436-1072
	Tim Loseke	LPS	Facilities	tloseke@lps.org	402-436-1072
<del>NP</del>	John Burbach	LPS	Facilities	jburbach@lps.org	402-436-1072
<del>NP</del>	Gordon Hardle	LPS	Facilities	ghardle@lps.org	402-436-1072
<del>NP</del>	Wayne Regnier	LPS	Facilities	wregnier@lps.org	402-436-1072
	Larry Miller	LPS	Facilities	lmiller@lps.org	402-436-1072
	Tom Reynolds	LPS	Facilities	treynolds@lps.org	402-436-1072
	Duane Smid	LPS	Facilities	dsmid@lps.org	402-436-1072
	Don Freeman	LPS	Computing Services	dfreeman@lps.org	402-452-3126
	Kirk Langer	LPS	Computing Services	klanger@lps.org	402-458-3131
	Darin Raguse	LPS	Computing Services	draguse@lps.org	402-458-3132
	Scott Wright	LPS	Facilities	swright@lps.org	402-436-1072
	Joseph Wright	LPS	Security	jwt@lps.org	402-436-1072
✓	Matt Bellamy	LPS	Purchasing		

✓	Name	Organization/ Company	Department	Email	Phone No.
	Jeremy Corrig	LOC	Estimating	Jeremy.Corrig@loc.com	402-253-4390
	John Wickham	Kidwell	Estimating	john.wickham@kidwell.us.com	402-610-3707
	Don Burenz	C.C.C		JBUREN2@CCWUE.COM	402-940-6428
	Jeff Henje	MEI		jeff.henje@mariseposengineering.com	402-741-4144
	BRUCE BEIT RODNEY BANDZART	BAXTER KENNEDY ELKHORN WEST CONSTRUCTION		BRUCE@BAXTERKENNEDY.COM RODNEY@ELKHORNWEST.COM	402-440-8488 402-315- 402-9557
	Brian Trause	Sentrix	Security	btrause@SentrixSecurity.com	402-939-5299



## SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. This Section includes wire, cable, connecting devices, installation, and testing for wiring systems to be used as signal transmission media for voice and high-speed data transmission.
- B. The horizontal cabling includes the installation of jacks, face plates, copper station cable, distribution frame hardware, cross-connect hardware and testing.

#### 1.2 DEFINITIONS

- A. Horizontal Cable: Cable that runs from the telecommunications space to a device location. It may be installed in either a horizontal or vertical plane.

#### 1.3 SUBMITTALS

- A. Preconstruction Submittals:
  - 1. Product Data: Include data on features, ratings, and performance for each cable, component, termination methods and testing criteria for each component specified.
  - 2. Wiring diagrams. Show typical wiring schematics including the following:
    - a. Workstation outlets, jacks, and jack assemblies.
    - b. Patch cords.
    - c. Patch panels.
    - d. Fiber-optic boxes.
  - 3. Samples: For workstation outlets, jacks, jack assemblies, and faceplates for color
    - a. Selection and evaluation of technical features.
  - 4. Product Performance Certificates: For each type of cable, connector, and terminal equipment,
    - a. Signed by product manufacturer.
- B. Post-Construction Submittals:
  - 1. Construction Record Drawings.
  - 2. Field quality control test reports.
  - 3. Documentation of the testing training courses on the test equipment utilized.
  - 4. Documentation of the test equipment, equipment certification and calibration of test equipment utilized.

#### 1.4 QUALITY ASSURANCE

- A. Comply with Section 27 0501 "Common Work Results for Communications".
- B. Comply with Section 27 0553.01 "Identification for Communications Systems".
- C. Comply with TIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1 General Requirements.
- D. Comply with TIA-568-B.2 Commercial Building Telecommunications Cabling Standard Part 2 Balanced Twisted-Pair Cabling Components.
- E. Comply with TIA TSB 67 Transmission Performance Specifications for Field Testing of Twisted-Pair Cabling Systems.
- F. Comply with BICSI Telecommunications Distribution Methods Manual, current edition.

- G. The Contractor shall be responsible for verifying that all conduits and raceways are ready for cable placement

## 1.5 PROJECT CONDITIONS

- A. Coordinate with pathway installer to ensure that TIA distance limits and installation tolerances are maintained. Outlets that are beyond TIA distance shall be brought to the Owner/Engineer s attention as soon as possible. Owner/Engineer shall not be responsible for outlets beyond distance limits as a result of deviation from the plans and/or incorrectly routed sleeves and pathways.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Refer to Section 27 0501 "Common Work Results for Communications" for approved manufacturers.

### 2.2 SYSTEM REQUIREMENTS

- A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.
- B. Expansion Capability: Unless otherwise indicated on the detail drawings, provide spare positions in cross-connect and patch panels, and terminal strips to accommodate 20 percent future increase in active workstations.
- C. Source Limitations: Obtain all structured wiring products twisted-pair through one source from a single manufacturer.
- D. The Information Transport System backbone cabling shall conform to the requirement of TIA-568-B in conformance with this standard, the standard shall be designed in a hierarchical star topology.
- E. Horizontal cabling shall provide interconnections between telecommunications spaces and work area outlets. The horizontal cabling system to consist of all cables, intermediate and main cross-connects, mechanical terminations, patch cords and/or jumpers used for termination or cross-connection.
- F. Horizontal cable shall be installed in a star topology. Each work area outlet shall be cabled directly to telecommunications space serving the area.
- G. All horizontal cabling terminations shall be located in telecommunications spaces. Bridged taps, splitters or other unapproved hardware and facilities not specifically indicated on the detail drawings shall not be used as a part of the backbone cabling.
- H. Multi User Telecommunications Outlet Assemblies (MUTOA) are not allowed unless otherwise specifically detailed in the construction documents.
- I. Consolidation Points and intermediate cross-connects are not allowed unless otherwise specifically detailed in the construction documents.
- J. All cables placed in conduits and cable trays shall not exceed the fill capacities as listed in TIA-569 even though maximum fill quantities as listed in ANSI/NFPA 70 are less strict.
- K. Upon entering the telecommunications space the cabling shall be neatly combed and separated according to service application. All added cables shall consistently follow the same path. Separate system cabling by pathway sleeve where possible.
- L. All cabling shall be new and unused provided, installed, terminated and tested to perform a complete system. Installers shall not deviate from the specified structured cabling system

components and any substitutions not approved via the formal substitution process will be rejected and removed and replaced with the approved products at the Contractor's expense.

- M. CCTV, Wireless Access Point, and IP Device Data Cables:
1. Provide horizontal data cabling to each device outlet location where indicated on the drawings.
  2. Cables and jacks for these devices shall maintain the same coloring scheme as normal work area outlets.
  3. Category 6A Cables will terminate on a separately dedicated and identified patch panel located as indicated on the detail drawings.
  4. Cables will be terminated, tested and warranted utilizing the same criteria as the work area outlet horizontal cabling system.

## 2.3 MATERIALS

- A. Twisted-pair Cables, Connectors, and Terminal Equipment:
1. Cables: Listed as complying with the TIA-568-B Categories listed below.
  2. Conductors: Solid copper.
  3. UTP Cable: Twisted Pair, thermoplastic-insulated, individually twisted pairs of conductors; No. 24 AWG, color-coded; enclosed in PVC jacket.
  4. UTP CMP (Plenum Rated) Cable: Listed for use in air-handling spaces. Features are as specified for cables, conductors, and UTP cable, except materials are modified as required for listing.
  5. Category 6:
    - a. Type: Unshielded Twisted Pair (UTP), UL Listed, Category 6
    - b. Conductors: 24 AWG, copper
    - c. Quantity of Pairs: 4
    - d. Jacket Color: blue
  6. Category 6a:
    - a. Type: Unshielded Twisted Pair (UTP), UL Listed, Category 6a
    - b. Conductors: 23 AWG, copper
    - c. Quantity of Pairs: 4
    - d. Jacket Color: blue
- B. Termination Hardware:
1. Comply with Section "Communications Equipment Room Fittings".

## 2.4 APPROVED TEST EQUIPMENT MANUFACTURERS

- A. Horizontal Copper Test Equipment
1. Agilent Technologies
  2. Fluke
  3. Ideal Industries

## PART 3 EXECUTION

### 3.1 APPLICATION

- A. Horizontal Cable: Use cable identified above for runs between telecommunications spaces and work area outlets for voice and data service.
- B. Horizontal Cable for Wireless Access Points and Cameras: Use UTP Category 6a cable for runs between telecommunications spaces and work area outlets.
- C. Horizontal Cable for Voice and Data Service: Use UTP Category 6 cable for runs between telecommunications spaces and work area outlets.

### 3.2 INSTALLATION

- A. Provide quantity of horizontal cables as indicated on the floor drawings and detail drawings. Install cables continuous from the jack on the communication outlet faceplate to the termination frame serving the area.
- B. Splicing of horizontal cables is not allowed.
- C. Intermediate cross-connect or other termination of horizontal cables is not allowed unless specifically detailed and specified otherwise.
- D. Terminate cables in accordance with TIA-568-B Commercial Building Telecommunications Wiring Standard, observing the industry standards for terminating the various types of color coded cables within a building.
- E. Route cables in a direct path between the termination points. Neatly arrange cables in cable trays and in communication closets. Provide D rings spaced a maximum of 12 inches on center to support cables run on the face of any plywood wall.
- F. Install cables in cable trays, pathways and sleeves provided.
- G. Velcro ties shall be used where appropriate or where specifically indicated in the contract document details. Where required ties shall be spaced at 5 feet to 6 feet in cable tray.
- H. Where cables must be installed between device and primary pathways, continuously support all cables from building structure in such a manner that the cable will not be damaged by normal building use.
- I. Run all cabling parallel and perpendicular to building structural elements unless specifically noted otherwise noted or as necessary where end-to-end lengths would otherwise exceed 290 feet.
- J. Provide strain relief for the cables above suspended ceilings, and where any continuous cable support system is interrupted, using mechanical fasteners such as necessary to maintain cable Category rating of J-hooks and other necessary devices to support cables from the structure or ceiling support. Do not use suspended ceiling support wires or ceiling grid to support telecommunications cabling. Space cable supports 4-5 feet apart. Where cable runs exceed 100 feet, and metallic J-hook supports are utilized, place supports at differential intervals. Even spacing of metallic J-hooks for runs exceeding 100 feet are not permitted.
- K. In suspended ceiling and raised floor areas where duct, cable trays, or conduit are not available, bundle station wiring in groups of 50 or less. Secure with Velcro cable ties snug but not deforming the cable geometry. Support cable bundles via J-hooks attached to the building structure and framework at a maximum of 4-foot intervals.
- L. Do not attach to or support cable by fire sprinkler heads or delivery systems or any environmental sensor located in the ceiling air space.
- M. Plan cable installation and cable routes such that the capacity of the conduit and cable tray is used most efficiently. Fill conduits and sleeves to maximize capacity and to minimize cross-over of future cable installations.

### 3.3 HORIZONTAL CABLES

- A. Provide horizontal cables from each outlet to the nearest telecommunications space as indicated on the drawings.
- B. Route cables from outlets to communication closets so that the maximum cable length is 295 ft. (90 m) is maintained. Install cables parallel or perpendicular to the building structure.
- C. Allow adequate slack for cable termination.

1. Wall outlets: 12 inches.
  2. Systems furniture: as necessary to reach the farthest point on each desktop using the furniture raceways plus 12 inches at the jack location.
  3. Telecommunications Spaces: as necessary to reach the most distant patch panel or punch-down block plus a length equal to 2 times the room height.
- D. Neatly arrange cables in cable trays and in telecommunications spaces.
- E. For areas and locations that are close to TIA distance limits, run a length test on proposed routing to said area or location. Inform Owner and Engineer of any jacks beyond TIA distance limits. Owner and Engineer shall not be responsible for out-of-distance outlets that are not tested prior to installation.

#### 3.4 HORIZONTAL PATHWAYS

- A. In renovation projects, telecommunications cable pathways cannot always be accurately predicted and may need to be adjusted during construction. Direct pathways are needed to maintain cable length as required by this specification.
- B. Horizontal cables between the telecommunications space and the work area outlet shall be no longer than 295 ft. (90 m). If a location is identified which appears to exceed the distance limitation, it shall be the responsibility of the Contractor to field verify the actual distance prior to installing the horizontal cable. Upon discovery of an over-length cable, the Contractor shall cease installation of the cable and immediately notify the Owner and Engineer. The Contractor shall follow this notification with a formal Request for Information (RFI). The Contractor shall consult with the Engineer and Owner to resolve the problem. There shall be no additional payment to the Contractor for rerouting of over-length cables which are discovered after installation.

#### 3.5 PATCH CORDS

- A. Provide one workstation patch cord for each outlet assembly.
- B. Provide one closet patch cord for each outlet assembly.
- C. Final quantities of each length to be determined prior to ordering.

#### 3.6 PERFORMANCE TESTING

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-B.1 when tested according to test procedures of this standard.
- B. Perform Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.
- C. Provide certification reports printed on 8-1/2 inch x 11 inch sheets. Provide one or more three-ring binders as required to contain reports. Provide a separate tab for each group of cables served from a common telecommunications space. Provide an additional tab for backbone cables. Present cable testing results in a sequenced or otherwise orderly matrix format.
- D. Copper Cable Testing:
1. Test horizontal cables from the punch-down blocks, patch panels, or other termination equipment, to the jacks unless otherwise noted.
  2. Utilize cable testing equipment capable of generating a report for each cable tested. Provide a hard copy report per TIA-568-B.
  3. Inspect for physical damage and test each conductor signal path for continuity and shorts. Test for faulty connectors, splices, and terminations.

- E. Field Test Requirements for a 6 Balanced Twisted-Pair Cabling System:
1. Test every cabling link in the installation in accordance with the Telecommunications Industry Association (TIA) Standard TIA-568B, 100-Ohm Twisted-Pair Transmission Performance and Field Test Requirements.
  2. The installed twisted-pair horizontal links shall be tested from the IDF in the telecommunications space to the telecommunications wall outlet in the work area against the "Permanent Link" performance limits specification as defined in TIA-568-B.
  3. Test 100 percent of the installed cabling links. All cable links must pass the requirements of the standards mentioned above and as further detailed below. Any failing link shall be diagnosed and corrected. Follow corrective action with a new test to prove the corrected link meets the performance requirements. Provide the final and passing result of the tests for all links in the test results documentation as specified below.
  4. Tests must be performed by trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof. Appropriate training programs include, but are not limited to, installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals).
  5. The test equipment (tester) must comply with or exceed the accuracy requirements for the Level III field testers as defined in the TIA Cat 6 Document. The tester including the appropriate interface adapter must meet the specified accuracy requirements.
  6. The tester must be within the calibration period recommended by the manufacturer in order to achieve the manufacturer specified measurement accuracy.
  7. The tester interface adapters must be of high quality and the cable must not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. Provide proof that the interface has been calibrated within the period recommended by the manufacturer.
  8. Determine the Pass or Fail condition for the link-under-test by the results of the required individual tests as detailed below. Any Fail or Fail\* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass\*.
  9. Determine a Pass or Fail result for each parameter by comparing the measured values with the specified test limits for that parameter. Mark with an asterisk (\*) the test result of a parameter when the result is closer to the test limit than the accuracy of the field tester. Provide documentation as an aid to interpret results marked with asterisks.
- F. UTP 4-Pair Performance Test Parameters:
1. Test all horizontal copper station cables for Category 6 according to the parameters set for in the TIA-568-B Standard. The test of each Category 6 link must contain the following parameters as detailed below. In order to pass the link test, all measurements at each frequency in the range from 1 MHz through 250 MHz must meet or exceed the limit value determined in the above-mentioned Category 6 standard.
  2. Perform the following tests as defined in TIA-568-B: Wire map, length, insertion loss (attenuation), NEXT loss, pair-to-pair PSNEXT loss, ELFEXT loss, pair-to-pair PSELFEXT loss, return loss, ACR, PSACR, propagation delay and delay skew.
- G. Approved Test Equipment Manufacturers
1. Horizontal Copper Test Equipment
    - a. Agilent Technologies
    - b. Fluke
    - c. Ideal Industries
- H. Test Result Documentation:
1. Record the test results information for each link in the memory of the field tester upon completion of the test.
  2. Transfer the test results records saved by the tester into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. Guarantee that the measurement results are transferred to the PC unaltered, i.e., "as saved

- in the tester”, at the end of each test and that these results cannot be modified at a later time.
3. Store and deliver the database for the completed job on CD-ROM including the software tools required to review, inspect, and print any selection of test reports.
  4. Provide a paper copy of the test results that lists all the links that have been tested with the following summary information:
    - a. The identification of the link in accordance with the naming convention defined in the overall system documentation.
    - b. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number.
    - c. The date and time the test results were saved in the memory of the tester.
  5. Provide the following general information in the electronic database with the test results information for each link:
    - a. The identification of the project site as specified by the end-user.
    - b. The identification of the link in accordance with the naming convention defined in the overall system documentation.
    - c. The overall Pass/Fail evaluation of the link-under-test.
    - d. The name of the standard selected to execute the stored test results.
    - e. The cable type and the value of NVP used for length calculations.
    - f. The date and time the test results were saved in the memory of the tester.
    - g. The brand name, model, and serial number of the tester.
    - h. The identification of the tester interface.
    - i. The revision of the tester software and the revision of the test standards database in the tester.
    - j. The test results information must contain information on each of the required test parameters that are listed above and as further detailed below.
  6. The detailed test results data to be provided in the electronic database for each tested link must contain the results obtained for each parameter in accordance with the description above. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. In this case, the PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software shall also provide and print the summary numeric information for each test parameter as defined and prescribed by the TIA-568-B Standard document.

END OF SECTION

