



Trenton Hansen, Ph.D.
Superintendent

4850 Pedley Road, Jurupa Valley, CA 92509 T (951) 360-4100

Date: November 4, 2024

Re: 24-25-03PD - Jurupa USD Districtwide Exterior Cameras – Addendum #3

TO ALL BIDDERS:

The following changes, omissions, and/or additions to the Bid Documents and/or Project Manual and/or Drawings shall apply to proposals made for and to the execution of the various parts of the work affected thereby, and all other conditions shall remain the same. All parties of interest shall take careful note of the addendum so that the proper allowances may be made in strict accordance with the Addendum.

Bidder shall acknowledge receipt of this addendum in the space provided on the Bid Form. Failure to do so may subject Bidder disqualification.

In case of conflict between Drawings, bid documents and this addendum, this addendum shall govern.

ITEM #1 Response to RFI Questions:

Question: Per addendum #2: Contractor is responsible for scope associated with (N) camera locations with the Blue Dots. The (F) Future Locations are Not in Contract (NIC).

Q: Is the NEW camera represented by the blue dot? or the (N)? Example: Camino RealAdmin/MDF. Blue Dot is at the camera with an "F".

Answer: The cameras in this project scope are represented by the (N). See Revised CAMINO REAL ES_Tech_ADD 03 Plan Sheet for further clarification.

Question: Section 28 23 00 Video Surveillance System (VSS) Part-3 Execution: Section 3.02 Cabling/Conduit Installation, Paragraph-B: Provide all penetrations and all conduits as necessary for complete system installation Provide three-sided pre-finished metal hood and seal to wall where conduit penetrates exterior wall. Sheer/fire wall penetrations shall be pre-approved by OWNER. All pre-approved Sheer/fire wall penetrations shall be properly caulked.

Q: Can you please provide a part number or example of the hood being requested?

Answer: After the Contract is awarded, but prior to proceeding with the work, CONTRACTOR shall submit Shop Drawings or Brochures for the specified item. OWNER will process all submittals back to the Contractor. See Section 27 00 00 Basic Materials and Methods for more information about the Submittal and Review of Materials process.

LEARNING WITHOUT LIMITS

Board of Trustees

Joseph Navarro, *President*, Eric Ditwiler, Ph.D., *Clerk*, Karen Bradford, M.A., Melissa Ragole, *Vacancy*

Question: What type of cameras are going on the Storage building at Jurupa Valley High School? 270, 180 or 90 Degree?

Answer: The cameras going on the Storage Building at Jurupa Valley High School are 180 Degrees.

Question: At the Family Resource and Child Care Center, does the MDF feed both the B & C building?

Answer: See Revised Family Resource and Child Care Center Plan Sheet T1.01 for reduced camera quantities/locations.

Question: On page 231 of the original Bid Docs, Section 2.7 specifies patch cords from Leviton giving a part number for YELLOW cables However, in parenthesis the same item refers to RED patch cables. Please clarify which color is required.

Answer: Red is required. Correct Part Numbers are Leviton H6A10-1R and Leviton H6A10-10R. See Revised Section 27 15 00 with corrected Part Numbers for the parts in question.

Question: In the documents, it states the following, "The Contractor shall warranty his work against defective materials and workmanship for a period of five (5) years from date of acceptance of the job."

According to the California State License Board, contractors are only required to warranty installation work for one year. When searching further, it appears only Roofers are required to provide a minimum 5-year up to 25-year warranty.

Can you please confirm if the 5-year stands or if it will be adjusted to meet the CSLB requirements of 1-year?

Answer: The warranty period shall stand as a 5-year contractor warranty.

Question: For Jurupa Valley High School, the (6) additional cameras at the JUSD Storage Building are not specified as Tupe 1, 2, or 3. Which camera type is intended at these locations?

Answer: The JUSD Storage Building cameras at Jurupa Valley High School shall be 180 degree cameras, or Type 2.

Question: For Nueva Vista High School, Camera Type 2 at the upper right corner of the shaded area within Building A indicates (F) for future. But it is in indicated as "NEW" in the updates and with the blue dot. Is it a future camera to be excluded from the SOW or is it a new camera to be included in the SOW? Please clarify.

Answer: The camera in question is a new camera to be included in the Scope of Work. See Revised NUEVA VISTA HS _TECH_ADD 03 Plan Sheet for further clarification

LEARNING WITHOUT LIMITS

ITEM #2**Revisions to Plans (*Revised Plans attached below*):**

1. Revised Camera Schedule with updated quantities
2. Revised Camino Real ES Plan Sheet T1.01 to clarify one (N) camera location with a blue dot.
3. Revised Children & Family Resource Center/School Readiness Center Plan Sheet T1.01 to remove locations of two (2) (N) cameras - one at Building B and one at Building C. Those two cameras are now noted as (F) cameras.
4. Revised Nueva Vista High School T1.01 Sheet to clarify one (N) camera location.

ITEM #3**Revisions to Specifications (*Revised Specifications attached below*):**

- A. Section 27 15 00 Communications Horizontal Cabling:
 1. 2.7 B (c) - Part Numbers (1) and (2) replaced with Leviton H6A10-1R (1 foot, RED). Patch; and Leviton H6A10-10R (length determined in field condition, RED). Station/Device.

LEARNING WITHOUT LIMITS

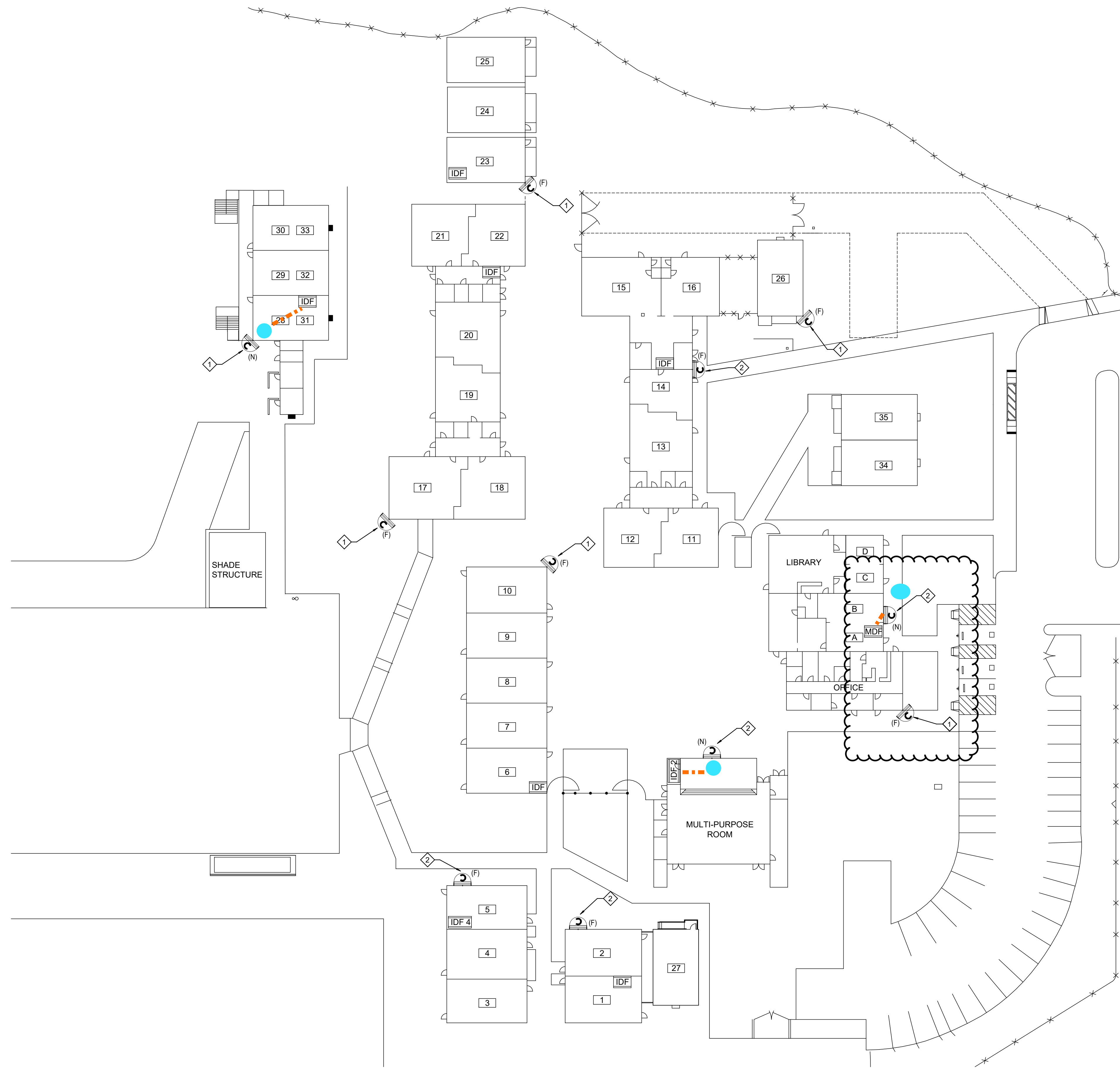
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Jurupa Unified Districtwide Camera Project - Camera Schedule by Site_Addendum 03

Site	Address	Camera Quantity	
Camino Real Elementary	4655 Camino Real	3	
Granite Hill Elementary	9371 Granite Hill	3	
Indian Hills Elementary	7750 Linares	3	
Mission Bell Elementary	4020 Conning Street	3	
Pacific Avenue Academy of Music	6110 45th Street	3	
Pedley Elementary	5871 Hudson Street	3	
Peralta Elementary	6450 Peralta Place	3	
Rustic Lane Elementary	6420 Rustic Lane	3	
Sky Country Elementary	5520 Lucretia	3	
Stone Avenue Elementary	5111 Stone Avenue	3	
Sunnyslope Elementary	7050 38th Street	3	
Van Buren Elementary	9501 Jurupa Road	3	
West Riverside Elementary	5671 42nd Street	7	
Mira Loma Middle School	5051 Steve Street	3	
Mission Middle School	5961 Mustang Lane	4	
Nueva Vista High School	6836 34th Street	4	
Jurupa Valley High School	10551 Bellegrave	19	
Patriot High School	4355 Camino Real	15	
Rubidoux High School	4250 Opal Street	9	
Learning Center (Adult Alternative Education)	4041 Pacific Avenue	6	
School Readiness Center (Listed on Plans as Family Resource & Childcare Center)	5960 Mustang Lane	2	Quantity Updated
Maintenance & Operations	4740 Pedley Road	3	
Education Center & Parent Center	4850 Pedley Road	10	
Professional Development Center	10223 Bellegrave Avenue	3	
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KEY NOTES

- ◇ INDICATES THE LOCATION OF A WEATHER PROOF (IP66) RATED, EXTERIOR SECURITY CAMERA (270 DEGREE) CAMERA SHALL BE POE, IP BASED UNLESS NOTED OTHERWISE. CABLING, CONTRACTOR SHALL PROVIDE AND INSTALL (1) CAT6A CABLE TO EACH LOCATION SHOWN, WIRED BACK TO MDF/IDF IN CURRENT ZONE.
- ◇ INDICATES THE LOCATION OF A WEATHER PROOF (IP66) RATED, EXTERIOR SECURITY CAMERA (180 DEGREE) CAMERA SHALL BE POE, IP BASED UNLESS NOTED OTHERWISE. CABLING, CONTRACTOR SHALL PROVIDE AND INSTALL (1) CAT6A CABLE TO EACH LOCATION SHOWN, WIRED BACK TO MDF/IDF IN CURRENT ZONE.

GENERAL NOTES

- 1 IT'S CONTRACTOR RESPONSIBILITY TO DOUBLE CHECK IF THERE IS AVAILABLE SLOTS FOR THE NEW CAMERAS INSIDE THE MDF/IDF.
 - 2 CONTRACTOR SHALL CONNECT ALL NEW CAMERAS TO THE EXISTING PATCH PANELS/SWITCHES AND PROVIDE FULLY FUNCTIONAL SYSTEMS.
 - 3 ALL CAMERAS HEIGHT TO BE DETERMINE ON FIELD BY CONTRACTOR.
 - 4 COORDINATE INSTALLATION WITH OWNER FOR ALL OWNER PROVIDED EQUIPMENT.
 - 5 CONTRACTOR TO PROVIDE PATCH CORDS PER DEVICE.
 - 6 CONTRACTOR TO FIELD VERIFY AND COORDINATE WITH OWNER EXACT CABLING AND CONDUIT ROUTING PRIOR TO START OF ANY WORK.
- CAMERA LOCATIONS FOR EXISTING PROJECT



RANCHO CUCAMONGA leafengineers.com
8163 Rochester Ave., Ste 100
Rancho Cucamonga, CA 91730
909-987-5909

CAMINO REAL ES SECURITY CAMERAS

JURUPA UNIFIED SCHOOL DISTRICT
4655 CAMINO REAL, JURUPA VALLEY, CA 92509

KEY PLAN

ENGINEER

ARCHITECT

CLIENT	
JURUPA UNIFIED SCHOOL DISTRICT	
PROJECT NUMBER	
DATE:	12/20/23
DRAWN BY:	Author
CHECKED BY:	Checker

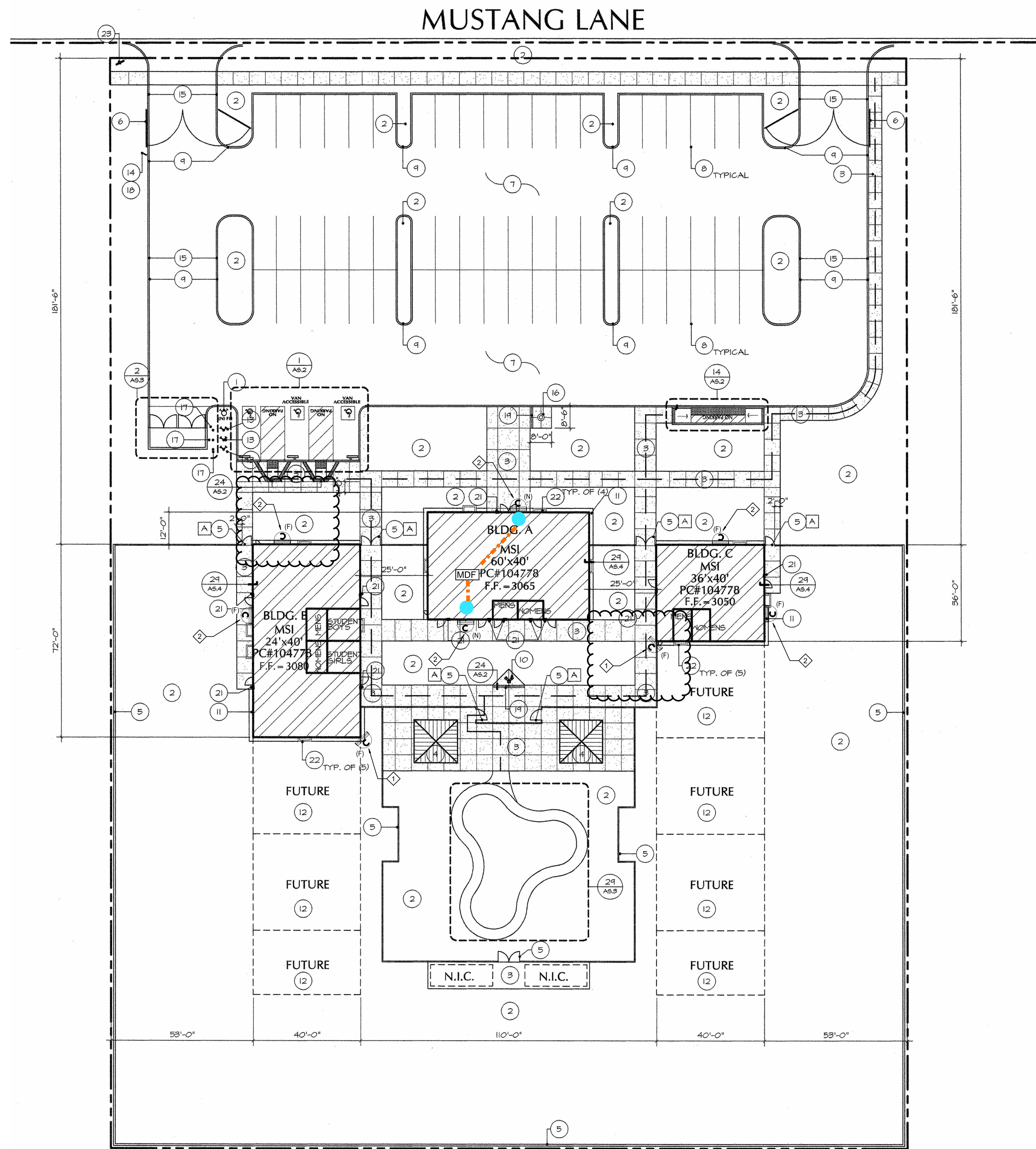
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1	Addendum 1	8/12/24

TECHNOLOGY SITE PLAN

ADDENDUM 03

T1.01CR

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- CAMERA LOCATIONS FOR EXISTING PROJECT



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Rancho Cucamonga, CA 91730
909-987-5909

FAMILY RESOURCE AND CHILD CARE CENTER
JURUPA UNIFIED SCHOOL DISTRICT
5960 MUSTANG LANE, JURUPA VALLEY, CA 92509

KEY PLAN

ENGINEER

ARCHITECT

CLIENT
JURUPA UNIFIED SCHOOL DISTRICT

PROJECT NUMBER

DATE: 12/20/23
DRAWN BY: Author
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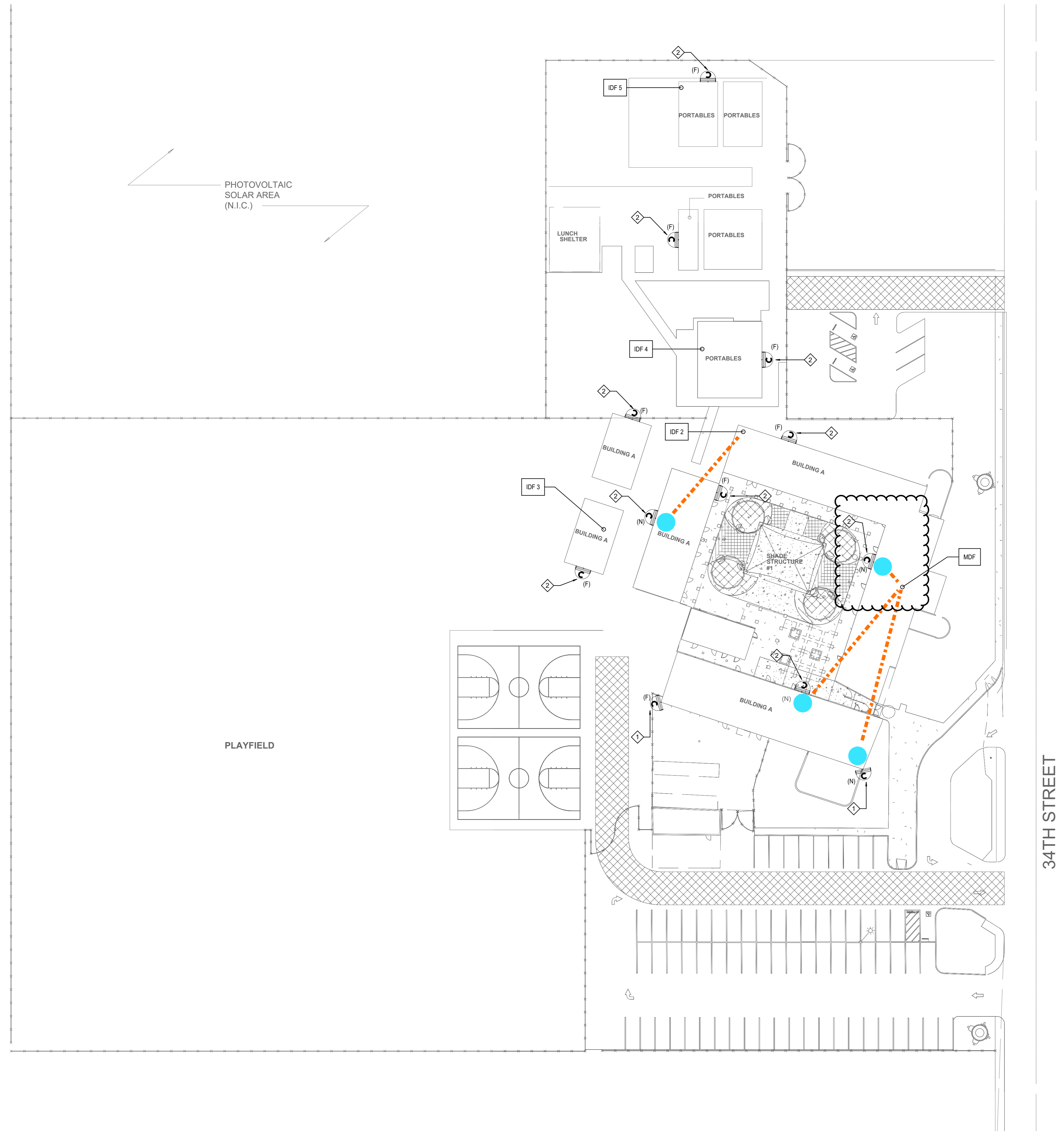
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1	Addendum 1	9/12/24

TECHNOLOGY SITE PLAN
ADDENDUM 03

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KEY NOTES

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- ◇ INDICATES THE LOCATION OF A WEATHER PROOF (IP66) RATED, EXTERIOR SECURITY CAMERA (90 DEGREE). CAMERA SHALL BE POE, IP BASED UNLESS NOTED OTHERWISE. CABLING, CONTRACTOR SHALL PROVIDE AND INSTALL (1) CAT6A CABLE TO EACH LOCATION SHOWN, WIRED BACK TO THE NEAREST MDF/IDF.

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JURUPA UNIFIED SCHOOL DISTRICT
6836 34TH ST, JURUPA VALLEY, CA 92509

KEY PLAN

ENGINEER

ARCHITECT

CLIENT	
JURUPA UNIFIED SCHOOL DISTRICT	
PROJECT NUMBER	
DATE:	12/20/23
DRAWN BY:	Author
CHECKED BY:	Checker

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No.	Description	Date
1	Addendum 1	3/12/24

TECHNOLOGY SITE PLAN
ADDENDUM 03

T1.01

27 15 00 COMMUNICATIONS HORIZONTAL CABLING –
Addendum 3

SECTION 27 15 00 COMMUNICATIONS HORIZONTAL CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Horizontal (distribution) communications wiring and connecting hardware from Telecommunications Room (TR) to Telecommunication Outlets (TO).

1.2 REFERENCE STANDARDS

- A. ANSI/TIA-568.0-D – Generic Communications Cabling for Customer Premises.
- B. ANSI/TIA-568.1-D – Commercial Building Communications Cabling Standard Part 1: General Requirements.
- C. ANSI/TIA 568-C.2 – Balanced Twisted-Pair Telecommunications Cabling and Components Standards
- D. ANSI/TIA-569-D – Commercial Building Standard for Telecommunications Pathways and Spaces.
- E. ANSI/TIA-606-B – Administration Standard for the Commercial Telecommunications Infrastructure.
- F. ANSI/JSTD-607-C – Commercial Building Bonding and Grounding (Earthing) Requirements for Telecommunications.
- G. NFPA 70 – National Electrical Code (NEC).
- H. BICSI – TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual

1.3 PRE-INSTALLATION MEETINGS

- A. Convene pre-installation meeting 2 weeks before start of installation of communications horizontal cabling. Should occur with OWNER representatives, Engineer, and contractor project manager and project foreman.
- B. Review materials, installation, field quality control, labeling, protection, and coordination with other work.

27 15 00 COMMUNICATIONS HORIZONTAL CABLING

1.4 SUBMITTALS

- A. Comply with Section 27 00 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data sheets, including installation instructions verifying that materials comply with specified requirements and are suitable for intended application.
- C. Installer's Project References: Submit installer's list of successfully completed communications horizontal cabling projects, including project name and location, name of architect, and type and quantity of communications horizontal cabling installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Manufacturer regularly engaged, for past 10 years, in manufacture of communications horizontal cabling of similar type to that specified.
- B. Installer's Qualifications:
 - 1. Approved Leviton Optimized Installer or Berk-Tek Oasis Optimized Integrator Optimized before, during, and through completion of the system installation. Supporting documentation will be required as part of the submittal.
 - 2. Responsible for workmanship and installation practices in accordance with Leviton Optimized Installer Program and Berk-Tek Oasis Program.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.
 - 4. Protect materials during storage, handling, and installation to prevent damage

1.7 WARRANTY

- A. The horizontal communications cabling system installed shall be eligible for coverage by a Limited Lifetime Warranty to the end user.
 - 1. Horizontal channels shall be completed with Leviton Network Solutions factory-terminated copper and/or fiber optic patch cords in order to be eligible for the applicable Berk-Tek or Leviton Warranty with channel performance guarantees.
 - 2. Approved product shall be listed on the most recent version of the applicable Berk-Tek Leviton Technologies data sheets for each Berk-Tek Leviton Technologies solution.

27 15 00 COMMUNICATIONS HORIZONTAL CABLING

- B. The horizontal communications cabling system installed shall be eligible for coverage by a Limited Lifetime Warranty to the end user.
 - 1. Horizontal channels shall be completed with Leviton Network Solutions factory-terminated copper and/or fiber optic patch cords in order to be eligible for the applicable Berk-Tek or Leviton Warranty with channel performance guarantees.
 - 2. Approved product shall be listed on the most recent version of the applicable Berk-Tek Leviton Technologies data sheets for each Berk-Tek Leviton Technologies solution.
- C. Optimized Installer/Optimized Integrator shall provide labor, materials, and documentation in accordance with Berk-Tek and Leviton Network Solutions requirements necessary to ensure that the Owner will be furnished with a Limited Lifetime Warranty.
- D. The installed structured cabling system shall provide a warranty guaranteeing installed channel performance above the ANSI/TIA 568-C requirements for Cat 6A cabling systems or ISO 11801 requirements for Class D, Class E, and/or Class E_a.
 - 1. Standards-compliant channel or permanent link performance tests shall be performed in the field with a Berk-Tek Leviton Technologies approved certification tester in the appropriate channel or permanent link test configuration. See 1.8 A.1 above for channel requirements.
- E. Necessary documentation for warranty registration shall be provided to the manufacturer by the installer (within 10 days) following 100 percent testing of cables.
 - 1. Submit test results to Leviton Network Solutions or to Berk-Tek, in the certification tester's original software files. A copy of test results must be submitted to the district.
 - 2. Installer shall ensure that the warranty registration is properly submitted, with all required documentation within 10 days of project completion.
 - 3. Optimized Contractor/Optimized Integrator must adhere to the terms and conditions of the respective manufacturer's warranty programs.
- F. Installer shall ensure that the Owner receives the manufacturer issued project warranty certificate within 60 calendar days of warranty registration.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Leviton Network Solutions, 2222 222nd Street SE, Bothell, Washington 98021. Phone 425-486- 2222. Fax 425-485-3373. Website www.leviton.com.

Berk-Tek, A Nexans Company, 132 White Oak Road, New Holland, PA 17557 Phone: 717-354- 6200. Fax 717-354-7944. Website www.berktek.com.

27 15 00 COMMUNICATIONS HORIZONTAL CABLING

2.2 SYSTEM DESCRIPTION

- A. Horizontal Distribution Subsystem: Intra-building twisted-pair and fiber optic communications cabling connecting Telecommunication Rooms (TRs) to Telecommunication Outlets (TOs) located at individual work areas.
- B. Horizontal Cabling: Combination of the following types of cables from TR to TO:
 - 1. Category 6A, cables from TRs to Surveillance Cameras TOs
 - 2. Category 6, (100-Ohm, 4-pair, unshielded twisted pair) cables from TRs to remaining TOs.
- C. Communications Horizontal Cabling System: Includes cables, jacks, patch panels, connecting blocks, patch cords, jumpers, and necessary support systems, such as cable managers and faceplates.
- D. Cables: Route through conduit, cable trays, spaces below raised floors, open ceiling areas, non-ventilated spaces above ceiling tile, and through plenum air-handling spaces above ceiling tile.
- E. Furnish and install all materials necessary for a complete and working communications horizontal cabling system.

2.3 STATION CABLING

- A. Category 6A Unshielded Twisted Pair: **CX6650 Cat 6A Enhanced UTP System**
 - 1. 100 ohm, Category 6A, 23 AWG, 4-pair unshielded twisted pair, LANmark-10G2, CMP rated.
 - a. Color: Blue.
 - b. Part Numbers: Reel: 10130484 Reel in Box: 11085339
 - c. Electrical Characteristics: Characterized to 750 MHz.
 - d. Cable: Third-party verified by ETL.
 - e. Maximum Cable Diameter: 0.300 inch.
 - f. Berk-Tek LANmark-10G2 CMP
 - g. All category cabling manufacturers must be able to provide documentation from an independent third-party testing agency that verifies through random sampling that cable components perform at or above the levels contained on their product specifications, not simply at or above the standard.
 - 2. Channel margin guarantees for a **CX6650 Cat 6A Enhanced UTP System** (margin vs. ANSI/TIA-568-C.2 and margin guarantees are for a 4-connector channel).
 - a. Insertion Loss 3 %
 - b. NEXT 4 dB
 - c. PSNEXT 5 dB
 - d. ACR-F (ELFEXT) 7 dB
 - e. PSACR-F (PSELFEXT) 8 dB
 - f. Return Loss 3 dB
 - g. ACR-N 6 dB
 - h. PSACR-N 7 dB
 - i. PSANEXT 1 dB
 - j. PSAACR-F 1 dB

2.4 MODULAR JACKS AND FIBER ADAPTERS FOR WORKSTATION OUTLETS

- A. Category 6A Modular Jacks: **CX6650 Cat 6A Enhanced UTP System**,
1. 8-position modular jack, Category 6A, IDC terminals, T568A/B wiring scheme.
 2. The modular connector shall exceed all component performance requirements in the ANSI/TIA-568-C.2 standard for Augmented Category 6 from 1 MHz to 500 MHz to support the IEEE 802.3an standard for 10GBASE-T network performance.
 3. The Modular Connector shall be terminated without the need for any punch down tool or other specialized or proprietary termination tool.
 4. The Connector Module shall feature a termination wire manager that holds individual conductors in place during termination.
 5. The Category 6A Modular Connector termination method shall be consistent with the termination method available for Category 5e and Category 6 UTP modules from the same manufacturer. The same termination method shall also be consistent with Category 5e, 6 and 6A shielded modules from the same manufacturer.
 6. The Modular Connector shall be reusable and support multiple termination and re-termination cycles and be facilitated by simple termination release levers.
 7. The modular connector shall be independently tested and verified by Intertek (ETL) to exceed Category 6A component performance.
 8. The eight-position connector module shall utilize a method of fine tensioning that prevents six-position modular plug insertion from damaging either the cord or the module.
 9. The connector body shall be made of die-cast zinc and all plastic components shall be made of high-impact, fire-retardant plastic rated UL 94V-0.
 10. The connector shall also be in compliance with all National Electrical Codes; compliant with ANSI/TIA-1096-A (formerly FCC Part 68); cULus Listed; and independently tested for component compliance.
 11. In addition to Category 6A component compliance, the connector shall have the ability to support high megabit and shared sheath applications.
 12. Connector wiring shall be universal and will accommodate both T568A and T568B pair/pin assignments.
 13. The connector shall incorporate a triple-stage compensation design with integrated flexible circuit design that enhances link and channel performance.
 14. The modular connector shall fit a range of telecommunications faceplates, outlets, and field-configurable patch panels.
 15. The modular connector shall be available in 13 TIA 606-A compatible colors.
 16. Connector Module shall be supplied with interchangeable icons (voice, data, A/V, and blank, color coded to match the connector face) for easy identification and tracking of data, voice, or other functions.
 17. Additional bulk Icons for the connector shall be available in 13 colors to facilitate a broad range of connector marking/identification options.
 18. Connector Modules shall be available with an internal shutter to protect against dust and debris.
 19. Connector Module shall have a maximum depth of 1.31".
 20. Each connector shall be identified on its face as CAT 6A.
 21. Basis for design: Leviton Atlas-X1 UTP Cat 6A Connector.
 22. Color: blue.
 23. Part Numbers: Standard version: 6AUJK-RL6 (blue).

27 15 00 COMMUNICATIONS HORIZONTAL CABLING

2.5 WORK AREA OUTLETS

A. Faceplates

1. Flush-Mounted Faceplates
 - a. 1-port single-gang plastic wallplate with ID windows.
 - b. Colors: white
 - c. Part Number: Leviton 42080-1WS (white)
2. 2-port single-gang plastic wallplate with ID windows.
 - a. Colors: white
 - b. Part Number: Leviton 42080-2WS (white)
3. 3-port single-gang plastic wallplate with ID windows.
 - a. Colors: white
 - b. Part Number: Leviton 42080-3WS (white)
4. 4-port single-gang plastic wallplate with ID windows.
 - a. Colors: white
 - b. Part Number: Leviton 42080-4WS (white)
5. Flush-Mounted Stainless Steel Faceplates
 - a. 1-port single-gang stainless steel with ID windows.
 - 1) Part Number: Leviton 43080-1L1
 - b. 2-port single-gang stainless steel with ID windows.
 - 1) Part Number: Leviton 43080-1L2
6. Surface-Mounted outlet boxes:
 - a. 1-port QuickPort surface-mount box, plastic, with ID window
 - 1) Color: white
 - 2) Part Number: Leviton 41089-1WP
 - b. 2-port QuickPort surface-mount box, plastic, with ID window
 - 1) Color: white
 - 2) Part Number: Leviton 41089-2WP
7. Cabling that is ran exterior or through underground conduits shall be indoor/outdoor rated CAT6A. Berk-Tek reel P/N: 11142753.

2.6 PATCH PANELS

- a. EXISTING

2.7 PATCH CORDS/JUMPERS

- A. Jurupa Unified School District has a standardized color scheme for all patch and station cords.
- B. High-Flex Category 6A Modular Patch Cords: **CX6650 Cat 6A Enhanced UTP System**
 1. Slim-Line style, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
 - b. Color: 9 colors available.
 - c. Part Numbers:
 - 1) Leviton H6A10-1R (1 foot, RED). Patch
 - 2) Leviton H6A10-10R (length determined in field condition, RED). Station/Device

27 15 00 COMMUNICATIONS HORIZONTAL CABLING

PART 3 EXECUTION**3.1 EXAMINATION**

- A. Examine areas to receive communications horizontal cabling.
- B. Notify OWNER of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION – GENERAL

- A. Install communications horizontal cabling in accordance with manufacturer's instructions, ANSI/TIA-568-C.0, ANSI/TIA-568-C.1, ANSI/TIA-569-C, BICSI TDMM, and NFPA 70.
- B. Field Terminated Copper Patch Cords and Jumpers: Not allowed.
- C. Copper Patch Cords: Manufactured by Leviton Network Solutions.
- D. Install cables after building interior has been physically protected from weather and mechanical work likely to damage cabling has been completed.
- E. Ensure cable pathways are completely and thoroughly cleaned before installing cabling.
- F. Inspect installed conduit, wireway, cable trays, and innerduct.
- G. Clean additional enclosed raceway and innerduct systems furnished.
- H. Provide protection for exposed cables where subject to damage.
- I. Abrasion Protection:
 - 1. Provide abrasion protection for cable or wire bundles which pass through holes or across edges of sheet metal.
 - 2. Use protective bushings to protect cables.
- J. Cable Ties and Other Cable Management Clamps:
 - 1. No more than hand tightened.
 - 2. Fit snugly, but not compress, crimp, or otherwise change physical characteristics of cable jacket or distort placement of twisted-pair components.
 - 3. Replace cables exhibiting stresses due to over tightening of cable management devices.
 - 4. Use plenum-rated cable ties in plenum spaces.
 - 5. Velcro wraps are to be used for cable bundle management. Plenum-rated Velcro wraps are available from Leviton. Nylon cable ties should not be used during installation or for finishing.
- K. Where possible, route cables in overhead cable trays and inside wire management systems attached to equipment cabinets and racks.
 - 1. Use Velcro or ducts to restrain cabling installed outside of wire management systems on racks or in cabinets.
 - 2. Cable Trays: Do not exceed 50 percent fill.
- L. Pull Cord:
 - 1. Nylon, 1/8-inch minimum.
 - 2. Co-install with cables installed in conduit.

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- M. Cable Raceways: Do not fill greater than ANSI/TIA-569-B maximum fill for particular raceway type.
- N. Support horizontal cables at a maximum of 48-inch (1.2 to 1.5-m) irregular intervals, if J-hook or trapeze system is used to support cable bundles.
- O. Do not allow cables to rest on acoustic ceiling grids, plumbing pipes, or electrical conduits.
- P. Bundle horizontal distribution cables in groups of no more than amount of cables designed for by cable support manufacturer, based on cable OD and weight.
- Q. Fire-Sprinkler System:
 - 1. Install cables above fire-sprinkler system.
 - 2. Do not attach cables to fire-sprinkler system or ancillary equipment or hardware.
 - 3. Install cable system and support hardware so that it does not obscure valves, fire alarm conduit, boxes, or other control devices.
- R. Do not attach cables to ceiling grid or lighting fixture wires. Any supports needed above the ceiling shall be independent of the ceiling grid system.
- S. Install appropriate carriers to support cabling, where support for horizontal cables are required.
- T. Replace before final acceptance, cables damaged or exceeding recommended installation parameters during installation.

3.3 INSTALLATION – UNSHIELDED TWISTED-PAIR CABLES

- A. Install unshielded twisted-pair cables in accordance with manufacturer's instructions.
- B. Install cables in continuous lengths from origin to destination, without splices, except for transition points or consolidation points. These locations must be approved in writing, or specified explicitly in construction documents.
- C. Where transition points or consolidation points are allowed, they shall be located in accessible locations and housed in enclosure intended and suitable for the purpose.
- D. Cable Minimum Bend Radius and Maximum Pulling Tension:
 - 1. Do not exceed bend radius for UTP = 4 X Cable OD, FTP = 4 X Cable OD.
 - 2. Install unshielded twisted-pair cables so that there are no bends smaller than 4 times cable outside diameter at any point in the run and at the termination field.
 - 3. Pulling Tension on 4-Pair UTP Cables: Do not exceed 25 ft.lb. for 4-pair UTP cable.
- E. Separation from Power Lines: Provide following minimum separation distances between pathways for copper communications cables and power wiring of 480 volts or less:
 - 1. Open or Nonmetal Communications Pathways:
 - a. Electric motors, fluorescent light fixtures, and unshielded power lines carrying up to 3 kVA: 12 inches.
 - b. Electrical equipment and unshielded power lines carrying more than 5 kVA: 36 inches.
 - c. Large electrical motors or transformers: 48 inches.
 - 2. Grounded Metal Conduit Communications Pathways:
 - a. Electrical equipment and unshielded power lines carrying up to 2 kVA: 2-1/2 inches.
 - b. Electrical equipment and unshielded power lines carrying from 2 kVA to 5 kVA: 6 inches.
 - c. Electrical equipment and unshielded power lines carrying more than 5 kVA: 12 inches.

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- d. Power lines enclosed in grounded metal conduit (or equivalent shielding) carrying from 2 kVA to 5 kVA: 3 inches.
- e. Power lines enclosed in grounded metal conduit (or equivalent shielding) carrying more than 5 kVA: 6 inches.

3.4 INSTALLATION – UNSHIELDED TWISTED-PAIR TERMINATION

- A. Coil cables to house cable coil without exceeding manufacturer's bend radius.
 - 1. In hollow wall installations where box eliminators are used, store excess wire in wall.
 - 2. Store no more than 12 inches of UTP and 36 inches of fiber slack.
 - 3. Loosely coil excess slack and store in ceiling above each drop location, when there is not enough space present in outlet box to store slack cables.
- B. Dress and terminate cables in accordance with ANSI/TIA-568-C.0, ANSI/TIA- C.1, BICSI TDMM, and manufacturer's instructions.
- C. Terminate 4-pair cables on jack and patch panels using T568-B or T568-A wiring scheme.
- D. Pair Untwist at Termination: Do not exceed 12 mm (1/2 inch).
- E. Bend Radius of Horizontal Cables:
 - 1. Not less than 4 times OD of UTP cables.
 - 2. Not less than 4 times OD of FTP cables.
- F. Maintain cable jacket to within 25 mm (1 inch) of termination point.
- G. Neatly bundle cables and dress to their respective panels or blocks.
 - 1. Feed each panel or block by individual bundle separated and dressed back to point of cable entrance into rack or frame.

3.5 FIELD QUALITY CONTROL

- A. Cables and Termination Hardware: Test 100 percent for defects in installation and verify cabling system performance under installed conditions in accordance with ANSI/TIA-568-C.0.
 - 1. Verify all pairs of each installed cable before system acceptance.
 - 2. Defects in cabling system installation, including but not limited to cables, connectors, patch panels, and connector blocks shall be repaired or replaced to ensure 100 percent useable conductors in all cables installed.
- B. Test all cables in accordance with this specification section, ANSI/TIA-568-C.2, and ANSI/TIA- 568-C.3 standards, and Berk-Tek and Leviton Network Solutions instructions
 - 1. If any of these are in conflict, bring discrepancies to the attention of the Construction manager for clarification and resolution.
- C. Cables, Jacks, Connecting Blocks, and Patch Panels:
 - 1. Verify all pairs of each installed cable before system acceptance.
 - 2. Defects in cabling system installation, including but not limited to cables, connectors, patch panels, and connector blocks shall be repaired or replaced to ensure 100 percent useable conductors in all cables installed.
- D. Testing Unshielded Twisted-Pair Cables: **(NOTE: Permanent Link Test results are required.)**
 - 1. Test twisted-pair copper cable links for continuity, pair reversals, shorts, opens, and performance as specified.
 - a. Additional testing is required to verify Category performance.

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- b. Test horizontal cabling using approved certification tester for Category 6A, Category 6, and Category 5e performance compliance in accordance with ANSI/TIA-568-C.2. (NOTE: Appropriate Fluke, Agilent, Ideal, or JDSU certification testers may be used).
 - c. Category 6A shall conform to ANSI/TIA-568-C.2 for augmented Category 6 to 500 MHz
2. Follow ANSI/TIA-568-C.2.
3. Basic Tests Required:
 - a. Wire map.
 - b. Length (feet).
 - c. Insertion loss (dB), formerly attenuation.
 - d. NEXT (Near end crosstalk) (dB).
 - e. Return loss (dB).
 - f. ELFEXT (dB).
 - g. Propagation delay (ns).
 - h. Delay skew (ns).
 - i. PSNEXT (Power sum near-end crosstalk loss) (dB).
 - j. PSELFEXT (Power sum equal level far-end crosstalk loss) (dB).
4. Test Category 6A by auto test to 500 MHz.
 - a. Alien Crosstalk (AXT) testing and AXT test results are NOT required by Leviton or Berk-Tek for warranty of a Category 6A system. (**Note:** AXT testing may be required by the customer, in which case these tests WOULD have to be performed).
5. Test Category 6 by auto test to 250 MHz.
6. Provide test results in approved certification testers original software format on CD, with the following minimum information per cable:
 - a. Circuit ID. Final circuit ID as identified by labeling and as-builts.
 - b. Information from specified basic tests required.
 - c. Test Result: "Pass" or "Fail".
 - d. Date and time of test.
 - e. Project name.
 - f. NVP.
 - g. Software version.
7. An occasional asterisk-Pass (*Pass) will be accepted by Leviton or Berk-Tek at the manufacturer's discretion, but rework of these links should be done in an attempt to achieve clean "Pass" results prior to submission of test results.
8. To receive Manufacturer's Warranty for the project, submit software copy of test results, in original tester software format, to the Owner and to the Manufacturer (either Berk-Tek or Leviton).
9. Submit fully functional version of tester software for use by the Owner in reviewing test results.
10. Report in writing to the Owner immediately, along with copy of test results, failed test results that cannot be remedied through re-termination (as in the case of reversed or split pairs).

3.6 LABELING

- A. All labeling is to be in accordance with ANSI/TIA-606-B and manufacturer's instructions.
- B. Label horizontal cables using machine-printed label at each end of cable at approximately 12 inches from termination point.
 1. Sharpie and handwritten Labels: Not acceptable.
- C. Label patch panel ports and TO ports with cable identifier.
- D. Labels: Denote TO ID and unique cable number for that TO, i.e. 2-A43 for telecommunications zone 2, patch panel A, cable number 43. The MDF is zone 1, IDF 2 is zone 2.
 1. Owner may provide specific labeling requirements. Coordinate with the Owner.

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- E. Note labeling information on shop drawings, redlines, and final as-builts.

3.7 PROTECTION

- A. Protect installed communications horizontal cabling from damage during construction.

END OF SECTION