CITY OF SUFFOLK

P.O. BOX 1858, SUFFOLK, VA, 23439-1858, T: (757) 514-7520; FAX (757) 514-7524

ADDENDUM NO. 6

City of Suffolk
IFB #20050-AG
March 12, 2020

Purchasing Division
442 W. Washington Street, Room 1086
Suffolk, VA 23434-5237
Phone: (757) 514-7520 / Fax: (757) 514-7524
http://www.suffolkva.us/purchasing

Joint Operations Facility (Police/Parks & Recreation)

The Invitation for Bid (IFB) for Joint Operations Facility (Police/Parks & Recreation) originally issued January 30, 2020 has been amended as follows:

QUESTION:
"Please provide the elevations of the swale that is to be removed."

RESPONSE:
The information shown on the Sheet VF100 is the only topographic data available for the swale. The site is open to inspection. Coordinate with the City..

QUESTION:
"Please provide the locations where the asphalt will need to be removed per the new paving layout on CS101. Please provide the thickness of the asphalt"

RESPONSE:
The pavement sections are provided on sheet CS200 with hatching to show the extents

QUESTION:
"Please provide the locations of the dowel joint per detail CS501."

RESPONSE:
Per CS200 the jointing plan is the responsibility of the contractor.

QUESTION:

"Please verify that the cargo containers will be removed by others and is not part of the contract.."

RESPONSE:

The cargo containers will be removed by others.

QUESTION:

"Please refer to section 010260 3.1 A - D and G - I. These sections refer to division 31. Please provide division 31 specifications. These unit prices will need to be re-evaluated once division 31 specifications have been issued."

RESPONSE:

Division 31 specifications were provided with Addendum 1

QUESTION:

"We have reviewed the wetland permit that was attached as part of addendum 5, and there appears to be a maximum amount of excavation mentioned allowed in the wetland. We will significantly overrun this number to install the water and force main work per plan. The permit and letter also make no mention of the water and force main work. Is there an additional wetland permit that covers that work? If so, please issue that permit for review.."

RESPONSE:

The permit covers sufficient area to install the utilities.

QUESTION:

1. "The architectural plans call for the Sheds to be built with eave elevations set 12' above top of pier, and the top of pier is set at 0-0" or 0-4", which appears to be a constant elevation for each shed. The structural plans say specifically that the footings are 1' depth and top of footing is 1' below finished grade. The piers are set at 16" deep. See Section 4 below.
2. If the slab under each Shed is sloped is the intent to step the footings/piers down with the grade and set each footer at its own individual elevation? That would indicate that the requirement is to vary the length of the PEMB columns to match the elevation of each specific footing/pier. If so, then you cannot hold the dimension of 12' height above the top of pier.
3. Is the intent to step the footings down with the slab slopes, and vary/increase the height and design of the piers from 16" to hold the column elevation and wall panel height at 12' above the pier? If so, do you leave a gap under the wall panels from top of pier down to the slab?
4. If the intent is to hold the top elevation of the piers constant and the length of columns as called for, then it appears that this criteria will expose the footings and piers above grade.
5. Can you have the sheds shown on the civil plans for location?

RESPONSE:

The 4” dimension from top of pier to top of pavement on section 4/S202 has been omitted by this addendum, 1”-0” of coverage from top of pavement to top of footing remains a constant. Top of pier elevations can be found on sheet A-002. Pavement elevations can be found on sheets CG101 and CG102.

QUESTION:

“The rim elevation provided on sheet CU102 for the Oil Water Separator does not match the grades provided on sheet CG102. The plan also does not provide a detail or the size of Oil Water Separator. Could the City provide a detail of this structure with the size and correct rim elevation.”

RESPONSE: The RIM should be revised from 60.49 to read 63.65. Additionally, the RIM for clean out 07 should be revised from 59.59 to read 62.82.
The bidder should assume a 1000 gallon oil/water separator that can handle at least 50 gallons per minute

QUESTION:

“In spec section 095113: Acoustical panel ceilings in on page 386 in the specs, it calls for fire rated grid, tile and hold down clips on all tees.
It also says requirements for protecting lay in lights and HVAC in a fire rated ceiling. The questions are:
1. What is the extent of protection for each device?
2. Is the electrician and HVAC contractor responsible for protection of each of their devices?
3. What is the structure above that ceiling wires are being attached to Barr joist, concrete, wood truss or fire rated drywall lid en closer?
4. Hold down clips are usually required if tile weighs less than 1.00 lb. per sq. The tile being used weighs 1.08 lb. per sq. Will hold down clips still be required?
.”

RESPONSE:

There are no rated ceiling on this job.

QUESTION:

1. “In regards to the radio communications note, what radio freqs need to be enhanced? Radio Reference is a decent source for those but you must validate this with the 1st Responders systems (Police and Fire”

RESPONSE:

Suffolk VA Fire/EMS Frequency: 154.385 MHz. Frequencies must be verified with local first responders by qualified radio communications contractor performing the coverage survey

QUESTION:

"In regards to the radio communications note, which bands are required? 700 MHz 800 MHz 900 MHz Other

RESPONSE:

Verify with City of Suffolk first responders.

QUESTION:

"In regards to the radio communications note, what is the coverage Requirement?"

RESPONSE:

Minimum -95 dBm throughout the coverage area. Refer to attached Specification 28500 - Emergency Radio Communication Enhancement System

QUESTION:

"In regards to the radio communications note, does this design require heatmaps?"

RESPONSE:

"Heatmaps are required to determine the adequacy of coverage."

QUESTION:

"In regards to the radio communications note, what are the ceilings made of?"

RESPONSE:

Gypsum board and ACT

QUESTION:

"In regards to the radio communications note, is there an ideal place to house the booster?"

RESPONSE:

Electrical room or other location approved by AHJ

QUESTION:

"In regards to the radio communications note, does this project require plenum cable?"

RESPONSE:

Yes

QUESTION:

"In regards to the radio communications note, what is the size and routing of conduit required?"

RESPONSE:

See Section 3.1 of attached Specification 28500 - Emergency Radio Communication Enhancement System

QUESTION:

"In regards to the radio communications note, what are the Battery backup requirements?"

RESPONSE:

24 hours

QUESTION:

"In regards to the radio communications note, is there a required System inspection process upfront, and annually?"

RESPONSE:

See Section 3.2 of attached Specification 28500 - Emergency Radio Communication Enhancement System

QUESTION:

"In regards to the radio communications note, how many dry contact alarms are required"

RESPONSE:

Dry contact is required for fire alarm supervisory monitoring.

QUESTION:

"Please refer to the note indicating the location of the bar grating. With the spans shown, it appears that additional intermediate steel will be required to support the spans of the bar grating. Please provide the size and locations of the additional steel."

RESPONSE:

The specified grating is rated to one-way span over 6 ft with deflection of less than 1/4".

QUESTION:

"Please verify that the entire walkway will receive bar grating."

RESPONSE:

The entire area receives bar grating.

QUESTION:

"Please refer to D/S201. This detail shows a rounded column that will be field welded to the channel for framing. Please refer to S102. The note states that all columns are to be HSS4x4x3/8 unless otherwise noted. Please provide the size and thickness of the rounded column located on column line 6."

RESPONSE:

The pipe is not a column and it is called out in section 2 on S201

QUESTION:

"Please refer to all details on A-302. Please note that these details show perimeter insulation. Please refer to sections 1, 2 and 3 on S202. This area does not show any perimeter insulation. Please verify that the perimeter insulation is not required. If it is, please provide the thickness and limits of the installation.."

RESPONSE:

Perimeter insulation is required, see architectural drawings

QUESTION:

"Please refer to note 23 on A-302. Please verify that the rigid insulation is not required and the spray foam will be applied directly to the CMU."

RESPONSE:

Spray foam will be directly applied.

QUESTION:

"Please refer to note 35 on A-302. Please verify the thickness of the rigid insulation that is to be install at every standing seam metal roof connection.."

RESPONSE:

Thickness is per the Metal building manufacturer.

QUESTION:

"Please provide a specification for the sky lights as shown on A-106.."

RESPONSE:

Skylights are per the Metal building manufacturer.

QUESTION:

"Please provide the location of the bituminous damproofing as it is not shown on the drawings."

RESPONSE:

Bid the drawings as provided.

QUESTION:

"Please refer to D/S201. This detail shows a rounded column that will be field welded to the channel for framing. Please refer to S102. The note states that all columns are to be HSS4x4x3/8 unless otherwise noted. Please provide the size and thickness of the rounded column located on column line 6.

RESPONSE:

Bid the drawings as provided.

QUESTION:

"Please provide the locations and details for the dimensional letter signage as it is not shown on the drawings."

RESPONSE:

Bid the drawings as provided.

QUESTION:

"Please provide the location of the shower and dressing compartments as they are not shown on the drawings."

RESPONSE:

Bid the drawings as provided.

QUESTION:

"Please provide the location of snow guards as they are not shown on the drawings."

RESPONSE:

Snow guards are not in the project.

QUESTION:

"What material is to be used in break room 118? The finish schedule A701 shows LVT & RB1 but A702 Finish floor plans show ceramic tile. What installation method do we use on the walls where the glass tile goes Thick-Set or Thin-Set? If it is Thick-Set do all other walls get Thick-Set or Thin-Set?"

RESPONSE:

Ceramic Tile Installation CT1 & CT2: TCNA W211-18; cement mortar bed (thickset) bonded to substrate.

a. Ceramic Tile Type: CT1 & CT2.
b. Bond Coat for Wet-Set Method: Modified dry-set mortar.
c. Bond Coat for Cured-Bed Method: Modified dry-set mortar.
d. Grout: High-performance sanded grout.

QUESTION:

"What installation method do we use for the floors where waterproofing goes Thick-Set or Thin-Set?"

RESPONSE:

Ceramic Tile Installation PT1: TCNA F113-18; thinset mortar.

a. Ceramic Tile Type: Porcelain tile.
b. Thinset Mortar: Modified dry-set mortar.
c. Grout: High-performance sanded grout..

QUESTION:

Please refer to note 29 on A-602. This note is pointing to a steel plate on the jambs of detail J-2, J-2A and H-2 and states to refer to the structural drawings for the size. However the structural drawings do not show the size or details of the plate. Please provide the size, thickness and stud spacing of the steel plate to be installed at the jambs.

RESPONSE:

See **Sketch SKA-602A dated 3.13.20** for changed to the door details that will address this concern.

QUESTION:

Please refer to detail H-2 on A-602. Note 24 states to refer to the structural drawings for the lintel. Please note that the structural drawings do not show a lintel or provide a the locations of the lintel. Please provide a size and location of the lintels. Please note that the pre-engineered metal building suppliers usually do not provide the lintels.

RESPONSE:

See **Sketch SKA-602A dated 3.13.20** for changed to the door details that will address this concern.

SPECIFICATIONS:

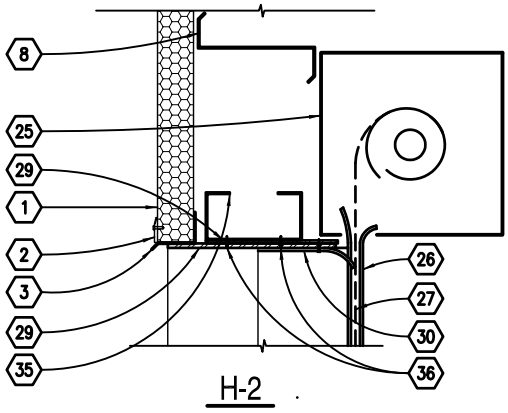
- Spec Section 00300 BID FORM
  - **REPLACE** this section in its entirety.
- Spec Section 012200 UNIT PRICES
  - **REPLACE** this section in its entirety.
- Spec Section 28500 EMERGENCY RADIO COMMUNICATION ENHANCEMENT SYSTEM (BDA SYSTEM)
  - **ADD** this section in its entirety.

Contract Officer: _____Amy Gardner_____

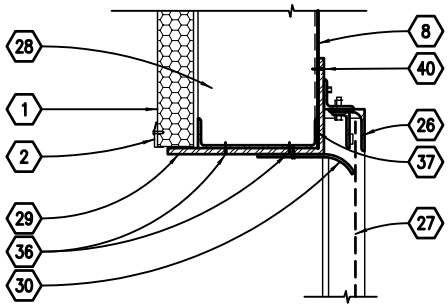
Amy Gardner, CPPB, Senior Buyer

If you have any questions regarding this Addendum, please contact Amy Gardner, Senior Buyer at agardner@suffolkva.us .

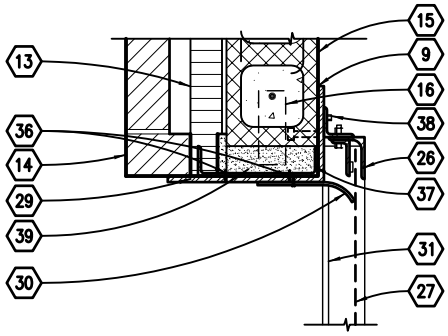
Acknowledged by:_____ **Date:**_____



H-2



J-2



J-2A

SHEET KEYNOTES

1. R-21 (MIN) INSULATED METAL WALL PANEL
2. WALL PANEL CLOSURE TRIM
3. WALL PANEL FLASHING
4. PRE-ENGINEERED METAL BUILDING TRIM
5. BACKER ROD AND SEALANT, CONTINUOUS
6. HOLLOW METAL FRAME, GOUT SOLID
7. DOOR AS SCHEDULED
8. PRE-ENGINEERED METAL BUILDING FRAMING
9. SHIM AS REQUIRED
10. 1/2" GWB OVER 1 1/2" METAL FURRING
11. CORNER BEAD
12. SEALANT, CONTINUOUS
13. R-19 SPRAY ON RIGID INSULATION (AIR BARRIER SYSTEM)
14. RETURN BRICK VENEER TO CMU AND GROUT RESULTING JOINT SOLID
15. 8" CMU, SEE STRUCTURAL DRAWINGS
16. JAMB ANCHOR, 3 PER JAMB
17. NOT USED
18. ADA COMPLIANT THRESHOLD
19. CONCRETE STOOP, SEE CIVIL DRAWINGS
20. 1/2" EXPANSION JOINT FILLER MATERIAL
21. FLOOR FINISH AS SCHEDULED
22. WALL BASE AS SCHEDULED
23. CONCRETE FLOOR SLAB, SEE STRUCTURAL DRAWINGS
24. LINTEL, SEE STRUCTURAL DRAWINGS
25. OVERHEAD COILING DOOR HOUSING
26. OVERHEAD COILING DOOR TRACK
27. INSULATED OVERHEAD COILING DOOR
28. STRUCTURAL JAMB, SEE STRUCTURAL DRAWINGS
29. 1'-1"x8"x3/16" BENT PLATE CONTINUOUS, SEE STRUCTURAL DRAWINGS
30. OVERHEAD DOOR WEATHERSTRIPPING
31. 1/2" EXPANSION JOINT BELOW
32. CONCRETE PAVEMENT, SEE CIVIL DRAWINGS
33. PROTECTIVE ANGLE
34. 8" CMU BOND BEAM, SEE STRUCTURAL DRAWINS
35. C8x4 LG CHANNEL
36. (2) FLATHEAD (#12) TEK SCREWS @ 29" O/C
37. 10x15.3 STEEL CHANNEL JAMB BY PEMB MANUF.
38. 1/2"ø SLEEVE ANCHORS WITH 3-1/2" EMBD @ 16" O/C
39. GROUT SOLID
40. FLATHEAD #12 TEK SCREW (COUNTER SUNK)

JOINT USE OPERATIONS FACILITY SUFFOLK, VA	MODIFIED DOOR DETAILS	DATE ISSUED MARCH 13, 2020	WALLER TODD & SADLER ARCHITECTS
		DRAWN BY: RCS SCALE: 3/4"=1'-0"	
THIS SKETCH MODIFIES SHEET A-602		SKETCH NUMBER SKA-602A	

SECTION 00300 - BID FORM

GENERAL CONTRACT

Each bidder shall use this form for this bid. See Instructions to Bidders and execute this form in compliance therewith.

Date: _____

BID TO: City of Suffolk, Virginia
Finance Department/Purchasing Division
Linda S. Story, Purchasing Agent
Room 105
Municipal Center
441 Market Street
Suffolk, Virginia 23434

BID FROM: _____

_____

_____
Name and Address

GENTLEMEN:

Having examined the Instructions to Bidders, the General Conditions and Supplementary Conditions (if any), the Drawings, the Specifications and the Addenda (if any) prepared by Waller, Todd and Sadler Architects, Inc., entitled:

JOINT OPERATIONS FACILITY – PHASE 2

as well as the premises and the conditions affecting the work, the undersigned proposes to provide all labor, materials, equipment and to perform all work in accordance with the said documents for the

JOINT OPERATIONS FACILITY – PHASE 2

for the following amounts:

PART A - Base Bid:
Price for the entire work, complete in accordance with the contract documents **excluding** all Bid Alternates and Unit Prices.

_____ Dollars ($_____).

PART B – Bid Alternates:
Bid Alternate 1:

Price the vehicle parking lot (including but not limited to subbase, pavement, curbs, gutters) and the connective aprons complete to the Base Bid driveway as indicated on Sheet C-102 and referred and detailed on this and other sheets. Provide site lighting fixtures type "S1", poles, conduit and wire indicated on plan and connect to existing site lighting circuit.

_____ Dollars ($_____).

Bid Alternate 2:

Price the gravel car impound lot (including but not limited to grading, gravel, fencing, gates) complete as indicated on Sheet C-102 and referred and detailed on this and other sheets. Provide site lighting fixture type "S1", pole, conduit and wire indicated on plan and connect to existing site lighting circuit.

_____ Dollars ($_____).

PART C – Unit Prices:

Unit Price No. 1: Undercut of unsatisfactory soil and replacement with satisfactory fill material:
2,000 cubic yards X $ _____ /CY =

_____ Dollars ($_____).

Unit Price No. 2: Undercut of unsatisfactory soil and replacement with Bedding material:
650 cubic yards X $ _____ /CY =

_____ Dollars ($_____).

Unit Price No. 3: Undercut of unsatisfactory soil and replacement with Choker Stone material:
425 cubic yards X $ _____ /CY =

_____ Dollars ($_____).

Unit Price No. 4: Geotextile for subgrade improvement:

1700 square yards X $ _____ /SY =

_____ Dollars ($_____).

Unit Price No. 5: Additional Asphalt pavement 2" mill and overlay:

100 square yards X $ _____ /SY =

_____ Dollars ($_____).

Unit Price No. 6: Additional Heavy-Duty Asphalt pavement full depth:

700 square yards X $ _____ /SY =

_____ Dollars ($_____).

Unit Price No. 7: Undercut of additional unsatisfactory soil and replacement with control fill material for building pad:

4,000 cubic yards X $ 35 /CY = $140,000.

TOTAL BID = PART A (BASE BID) + PART B (BID ALTERNATES) + PART C (UNIT PRICES)

_____ Dollars ($_____).

Where changes or alterations are authorized by the Owner involving cost or where estimates authorized by the Owner are submitted for extra work, the cost to the Owner will be based on provisions of Article 41 of the General Conditions as modified in the Supplementary conditions.

The undersigned Contractor agrees to comply with requirements of Instructions to Bidders with regard to post bid submittals.

The Undersigned acknowledges receiving the following addenda:

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

The undersigned also agrees to begin the work within 10 consecutive calendar days from Notice to Proceed (NTP) to complete the work and to accomplish total substantial completion within 180 calendar days. Final completion shall be in accordance with 017000, "Contract Closeout." The Undersigned further agrees, if awarded the contract, to execute and deliver Performance and Labor and Materials Payment bonds each in an amount equal to 100 percent of the Contract Price.

Bidder acknowledges and agrees to the liquidated damages specified in the General Conditions.

The undersigned also agrees that the unit prices (as listed above and in Section 012200, “Unit Prices.”) for changes in the work (adds or deducts) shall be used in determining the cost of any change of work differing from the requirements of the Base and Alternate Bids during construction relative to the material and/or operation specified as a unit price. Procedures for applying unit prices are specified in Section 012200, “Unit Prices.”

The Undersigned further agrees that the certified check or Bidder's bond, payable to the City of Suffolk, Suffolk, Virginia, accompanying this proposal is left in escrow with the Owner, that its amount is the measure of liquidated damages which the Owner will sustain by the failure of the undersigned to execute the Agreement if he be notified of award or in furnishing the Bonds within ten (10) days after written notification of the award of the Contract to him, then the check, or the amount of the bond, shall become property of the Owner; but if this proposal is not accepted within sixty days after the bid opening, or if the Undersigned executes and delivers said agreement and Bonds, the check or bond will be returned to him upon receipt thereof.

Very truly yours,

_____

Company

_____

Address

_____

City/State/Zip Code

Registered Virginia Contractor No. _____

Signed: _____

Telephone: _____ Fax: _____

SECTION 01 2200 – UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:
   1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
   2. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

C. Quantities will be calculated jointly by Contractor and the Owner's independent testing agency. Quantities shall be calculated by actual area and depth of excavation to be removed and/or filled. All work shall be supervised by the Owner's testing agency. Additional cut and fill measurement shall be length x width x depth of directed cut and fill as determined by the Owner's testing agency to which will be recorded in the site visit reports.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for additional materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased. Unit prices are applicable for all additional work beyond the contractor's initial cut and fill, as required / indicated by the contract documents and for any additional materials as indicated in the unit price descriptions.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, bonds, applicable taxes, overhead, and profit. No additional mark-ups or compensation will be paid by the Owner.

B. Measurement and Payment: Shall be in accordance with this specification section and as referenced elsewhere in the specifications.

C. List of Unit Prices and or quantities: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Undercut of unsatisfactory soil and replacement with satisfactory soil material:

1. Description: Civil Authorized Additional Excavation of Unsatisfactory Soils and disposal off-site and replacement with placed and compacted Satisfactory Soils or Engineered Fill from off-site, as required, according to Section 31 2010 "Earth Moving Civil Site"
2. Unit of Measurement: Cubic yard of soil excavated, based on in-place surveys of volume before and after removal.
3. Units: 2,000 cubic yards.

B. Unit Price No. 2: Undercut of unsatisfactory soil and replacement with Bedding material:

1. Description: Civil Authorized Additional Excavation of Unsatisfactory Soils and disposal off-site and replacement with placed and compacted Bedding Course material according to Section 32 2010 "Earth Moving Civil Site"
2. Unit of Measurement: Cubic yard of soil excavated, based on in-place surveys of volume before and after removal.
3. Units: 650 cubic yards.

C. Unit Price No. 3: Undercut of additional unsatisfactory soil and replacement with Choker Stone material:

1. Description: Civil Authorized Additional Excavation of Unsatisfactory Soils and disposal off-site and replacement with placed and compacted Choker Stone material according to Section 32 2010 "Earth Moving Civil Site"
2. Unit of Measurement: Cubic yard of soil excavated, based on in-place surveys of volume before and after removal.
3. Units: 425 cubic yards.

D. Unit Price No. 4: Geotextile for subgrade improvement:

1. Description: Civil Geotextile fabric placed on subgrade under pavements according to Section 32 1216 "Asphalt Pavement"
2. Unit of Measurement: Square yard of geotextile fabric, based on in-place measurement of area placed.
3. Units: 1,700 square yards.

E. Unit Price No. 5: Additional Asphalt pavement 2” mill and overlay:

1. Description: Additional Civil Asphalt pavement 2” mill and overlay according to Section 32 1216 "Asphalt Pavement"
2. Unit of Measurement: Square yard of asphalt pavement, based on in-place measurement of area placed.
3. Units: 100 square yards.

F. Unit Price No. 6: Additional Heavy-Duty Asphalt pavement full depth:

1. Description: Civil Asphalt pavement full depth replacement, including unclassified removal and disposal off-site of existing, according to Section 32 1216 "Asphalt Pavement"
2. Unit of Measurement: Square yard of asphalt pavement, based on in-place measurement of area placed.
3. Units: 700 square yards.

G. Unit Price No. 7: Undercut of additional unsatisfactory soil and replacement with satisfactory soil material for building pad:

1. Description: building Authorized Additional Excavation of Unsatisfactory Soils and disposal off-site and replacement with placed and compacted engineered fill, as required, according to Section 31 2010 "Earth Moving Civil buildings"
2. Unit of Measurement: Cubic yard of soil excavated, based on in-place surveys of volume before and after removal.
3. Price: $35.00 per cubic yard.
4. Units: 4,000 cubic yards.

END OF SECTION

SECTION 285000 - EMERGENCY RADIO COMMUNICATION ENHANCEMENT SYSTEM (BDA SYSTEM)

PART 1 - GENERAL

1.1 EMERGENCY RADIO COMMUNICATION ENHANCEMENT SYSTEM (BDA SYSTEM)

A. General

1. Provide an in-building radio signal amplification system to provide complete coverage in the building for the public safety agencies as required by the local AHJ (Authority Having Jurisdiction). System users shall receive and transmit radio signals from their portable radio units within the building. This shall be accomplished utilizing the following components:

    a. Bi Directional Amplifiers (Signal Boosters)
    b. Coaxial Cable
    c. Antennas
    d. Cable taps
    e. Connectors
    f. Power dividers
    g. Other components and interconnecting circuitry as required

2. The system shall comply with the requirements of UL2524 In-building 2-Way Emergency Radio Communication Enhancement Systems, NFPA 72 2013 Edition, NFPA 1221 2016 Edition and IFC 2015, as referenced.
3. The entire system shall meet the requirements of the Fire Department, the Building Department and all other agencies and authorities having jurisdiction (AHJ).
4. The work in this section shall include the responsibility for all permit requirements with the AHJ. Where filings require engineer's signature, documents shall be submitted for his review and signature. This responsibility shall include furnishing of required quantities of floor plans, descriptive notes and/or specifications, wiring diagrams, shop drawings and amendment forms.
5. Early completion of the in-building emergency radio communication enhancement system will be required as to permit a Certificate of Occupancy to be obtained in a timely manner
6. Any permits necessary for the installation of the work shall be obtained prior to the commencement of the work. All permit costs and inspection fees shall be included
7. The in-building emergency radio communication enhancement system shall use a UL2524, NFPA 72, NFPA 1221 and IFC 2018 compliant signal booster.

B. Design Requirements

1. In-building emergency radio communication enhancement systems for emergency responders are an integral component of the life safety equipment of a building or structure. The primary function is to provide reliable emergency responder communications at the required signal strength within the specified areas.

2. Critical Areas such as emergency command center, fire pump room, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations and similar critical areas shall be provided with 100% floor area radio coverage.
3. General building areas shall be provided with 95% radio coverage, or as specified by AHJ.
4. The In-building emergency radio communication enhancement systems must provide the following signal strengths:

    a. Downlink - Minimum signal strength of -95 dBm throughout the coverage area.
    b. Uplink - Minimum signal strength of -95 dBm received at the AHJ Radio System.
    c. OR As otherwise required by the AHJ

5. The system shall be complete with all components and wiring required for compliance with all applicable codes and regulations, and for its operations described hereinafter.
6. An approved manufacturer or a qualified and approved vendor shall supply, test and determine locations of components which are required for proper operation as well as to supply, install, test and certify the performance of the complete system. Vendor qualifications must be acceptable to the AHJ.
7. Design shall include iBwave software-simulated radio propagation modeling with heat maps showing predicted signal coverage levels within the building. The iBWave design shall be done by iBWave certified personnel.
8. All tests shall be conducted, documented, and signed by a person in possession of an FCC General Radio Telephone Operators License. All testing personnel shall be certified and authorized by the signal booster manufacturer in the installation and operation of their equipment. Personnel qualifications must be acceptable to the AHJ.
9. Assembly and installation of all components of the Emergency Responder Radio Communication Enhancement System shall comply with all applicable sections of the National Electrical Code.
10. Survivability from attack by fire shall meet requirements of NFPA 72, NFPA 1221, IFC or as required by the local jurisdiction.
11. The system must comply with all applicable sections of the FCC rules. Signal booster shall have FCC certification prior to installation.
12. Antenna isolation shall be maintained between the donor antenna and all inside antennas (D.A.S.) to a minimum of 20dB under all operating conditions.

PART 2 - PRODUCTS

2.1 TECHNICAL SPECIFICATIONS AND PERFORMANCE REQUIREMENTS

A. The system shall be Public Safety UL2524, NFPA72, NFPA 1221, IFC compliant signal boosters

B. The signal booster shall be a Class B Public Safety type as designated by the FCC or as required by the AHJ.

C. The secondary power supplies, battery chargers and system monitoring shall be fully compliant with NFPA 72, NFPA 1221 and IFC. The signal booster shall have both the primary and the secondary power supplies within a waterproof, type-4 approved enclosure.

D. All signal boosters and other active system components must have FCC certification prior to installation. The equipment FCC ID must be shown on the product datasheets and technical submittals. The ID must also be displayed on the product as required by the FCC.

E. The signal booster shall be pre-set by the equipment manufacturer for the frequencies specified by the AHJ. Field tuning of RF filters and duplexers is not allowed.

F. UHF and VHF signal boosters shall be band selective type with a maximum 3dB channel bandwidth of 200KHz (Fc +/- 100KHz) per band. Non-selective wide-band signal boosters shall not be accepted, unless required to cover multiple channels within the same band.

G. Signal Boosters shall have oscillation suppression circuitry to protect the public safety radio system in case of system malfunction or other causes. The oscillation suppression circuit shall not disable the system operation. Systems that automatically disable the signal booster upon oscillation detection shall not be allowed.

H. Signal Boosters shall have uplink noise suppression function to eliminate uplink noise while in standby (i.e. no radio transmission from within a building). Systems that produce any measurable level of uplink noise while in standby shall not be allowed.

I. Signal Booster gain shall be rated at minimum of 80dB and the gain shall be adjustable in a minimum of 30dB range. System gain shall be set and documented at the time of the final system test.

J. Maximum Propagation delay of the signal booster system shall be 14μs (microseconds) or as specified by AHJ.

K. The signal booster system shall include built-in automatic supervision of malfunctions of the signal booster and battery system as per NFPA 1221 NFPA 72 and IFC. Non-OEM equipment add-ons and modifications to comply with this specification shall not be allowed.

L. A dedicated supervised monitoring panel shall be provided within the emergency command center next to the fire alarm panel / annunciator or other location as designated by AHJ to annunciate the status of all signal booster locations. The monitoring panel shall provide visual and labeled indication of the following for each signal booster:

1. Normal AC power
2. Signal booster trouble
3. Antenna Failure
4. Loss of normal AC power
5. Failure of battery charger
6. Low battery capacity

M. The signal booster must contain universal normally open relays for connection to external monitoring modules (fire alarm system).

N. External filters, duplexers, power supplies or other non-OEM additions or modifications of the original equipment shall not be allowed. All duplexers shall be built-in and FCC certified with the signal booster as a complete and fully integrated FCC-certified and UL-Listed unit.

O. All signal booster components shall be contained in a type-4 approved waterproof enclosure. All enclosures shall be painted red with external labeling as required by the AHJ.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Installation of all components of the Emergency Responder Communication Enhancement System shall comply with all applicable sections of the National Electrical Code NFPA-70, NFPA-72, NFPA 1221, IFC or as required by the local AHJ.

B. At least 2 independent and reliable power supplies shall be provided as specified in NFPA 72, NFPA 1221 and IFC.

C. The primary power source shall be supplied from a dedicated twenty (20) ampere branch circuit and comply with NFPA-70 National Electrical Code, NFPA 72 and NFPA 1221 2016 edition.

D. The signal booster shall be equipped with a secondary source of power. The secondary source of power shall be a battery system with a dedicated battery charger powered by a separate, dedicated twenty (20) ampere branch circuit. The secondary power supply shall power on automatically when the primary power source is lost. The secondary source of power shall be capable of operating the emergency responder radio coverage enhancement system for a period of at least 24 hours. The battery system shall automatically charge in the presence of external power input. Battery charger and all other electronic components must be fully enclosed in a waterproof Type-4 approved enclosure. Batteries shall be enclosed in a separate, vented Type-3R approved enclosure. External UPS (Uninterruptable Power Supplies) are not acceptable.

E. RF Coaxial Cable shall be a listed, CMP plenum. Non-plenum cable can be used when installed in a metallic raceway. The cable classification shall be clearly marked on the outer surface of the cable regular intervals.

3.2 ACCEPTANCE AND TEST PROCEDURES

A. Acceptance testing for an in-building radio system is required upon completion of installation.

B. The coverage testing shall be done in accordance with NFPA 72, NFPA 1221, IFC and as required by the local AHJ

C. All tests shall be conducted, documented, and signed by a person in possession of a current FCC General Radio Operator License.

D. All test records along with system diagrams, iBWave design, equipment specifications, user manuals, RF link budget calculations, battery backup calculation and other design data shall be submitted upon completion of the project, and as required by the AHJ.

END OF SECTION 285000