First 5 LA

CAPITAL IMPROVEMENT PROJECT (CIP) – Phase 1

100% DD Basis of Design for Design Builder

IMEG #19002647.00

March 23, 2021

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For
First 5 LA - Capital Improvement Project (CIP)
Los Angeles, CA

IMEG #19002647.00
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A. INTRODUCTION

1. Purpose

a. The primary purpose of this report is to describe and provide a record of the building systems design build scopes for the First 5 LA office building CIP project, located at 750 North Alameda Street, Los Angeles, California. In addition to describing the systems, the fundamental assumptions used for the design are outlined.

2. Project Description

a. The intent of the project is to renovate systems and add new solar panels on the roof.

b. The building's existing roof gravity load bearing system shall be evaluated based on the as-built drawings review and performing site observations of the existing conditions to verify the respective elements capacities in order to accommodate the new HVAC and solar panels load.

c. This project is to provide structural support for the HVAC unit replacement, new electrical devices, generator, new solar panels installation, and seismic anchorage system. The scope shall include review of the architectural and MEP drawings, as well as provide structural input information on structurally-oriented details.

d. The building is currently served by three (3) cooling only air conditioning units on the roof, with one AC unit dedicated for each floor, along with a heating hot water boiler for the heating system. Digital variable air volume boxes allow for zone distribution coupled with heating coils for winter months which are controlled by the building energy management system (EMS).

1) The AC units and the space heating hot water boiler system are approaching their life expectancy. It is recommended that the AC units and the space heating hot water boiler system, located on the roof, be replaced.

e. The building is currently being served from two (2) separate electric services by LADWP. The utility transformer and two (2) main switchboards, MSA and MSB, are in the parking lot electrical yard. Main switchboard MSA feeds switchboard DB1 into the first-floor electrical room, which serves the building's sub-panels for receptacles and lighting. Main switchboard MSB feeds the switchboard DB2 in the third-floor electrical room which serves the building's HVAC equipment and elevators.

1) Phase 1 package will include a new solar PV system on the roof and interconnection to switchboard DB2 on the third floor. Inverters will be sized for a total of 100kW. There will be approximately 258 panels with a tilt of 5° and an azimuth of 180° facing south. Combiner boxes and disconnect switches will be provided as required.

2) HVAC units on the roof top are to be replaced and the existing connections are to be reused for new equipment.

f. The building is provided with male and female restrooms at each level.

g. The building owner is a proponent of sustainable design, especially in EPA designated products.

h. New underground utilities routes should be surveyed and detected before construction begins. Building utilities, including data service, cannot be interrupted.

B. GENERAL BUILDING DESIGN CRITERIA AND ASSUMPTIONS

1. Codes

a. 2019 California Building Code

b. 2019 California Building Standards Administrative Code

c. 2019 California Electrical Code (CEC)

d. 2019 California Energy Code

e. 2019 California Fire Code (CFC)

f. 2019 California Green Building Code

g. 2019 California Mechanical Code

h. 2019 California Plumbing Code

i. 2019 California Referenced Standards Code

j. California Energy Commission Title-24 Energy Efficiency Requirements

k. AISC 341 current edition.

l. AISC 360 current edition.

m. ASCE 7 current edition.

n. ASHRAE - American Society of Heating, Refrigeration, and Air Conditioning Engineers

o. AWS D1.1

p. NDS current edition.

q. NFPA 13, NFPA 2001, NFPA 72, NFPA 101

r. SMACNA – Sheet Metal and Air Conditioning Contractors National Association

C. ARCHITECTURAL

1. Roof

a. The perimeter area of the non-structural roof will receive solar panels, which will require additional structural support to carry the load of the panels and their associated supporting structure. The existing multi-ply cap sheet roof is installed over tapered rigid insulation boards on top of a metal deck (non-concrete filled).

b. The existing roof will be replaced with the new adhered thermoplastic polyolefin (TPO) membrane roofing system manufactured by Johns Manville or similar. The existing tapered insulation board shall be replaced with polyisocyanurate board insulation with a minimum R value of R-30.

2. Building Envelope

a. The exterior skin of the building is comprised of aluminum storefront glazing and smooth cement plaster.

b. There are many cracks (1/16" to 1/8") on the cement plaster along the metal control joints which are likely a result of basic building stresses and minor movements over the last 15 years. These cracks are cosmetic in nature and do not seem to indicate any damage to the building structure.

c. These cracks require caulking, patching, and painting to prevent moisture from penetrating inside the exterior walls.

d. The exterior window glazing gaskets have shrunk over time due to the sun and weather and large gaps (1 inch to 2 inches) have appeared at the corners. All shrunken gaskets require replacement - approximately 20% to 25% of the windows.

3. Building Re-Entry

a. Based on COVID-19 pandemic protection requirements, plastic shields will be installed at the Lobby reception desk, built-in furniture in the Multi-Purpose Room (MPR), tables in conference rooms, and workstations in open office areas. Plastic shields will provide physical separation between persons seating closer than 6 feet from each other.

b. In all restrooms, manually operated sink faucets, soap dispensers, and toilet / urinal flush valves will be retrofitted with touch-free automatic devices.

c. Doors located in high traffic areas like the multi-purpose room (MPR), corridors, and restrooms will be replaced with automatically activated doors for touch-free operation.

D. STRUCTURAL

1. Structural Design Basis

a. Risk category: II

b. Live loads
   1) Roof: 20 psf.

c. Solar Panels
   1) Dead loads: Per manufacturer specification

2. Seismic Design Parameters

a. Site Class: D

b. Seismic Design Category (SDC): D

c. SDS: 1,585

d. Seismic Importance Factor: 1

e. ap= 2-1/2 $R_p = 6$ $\Omega_0 = 2$

3. Wind Design Parameters

a. Basic Wind Speed: 110 MPH

b. Exposure: C

E. MECHANICAL

1. Ambient Design Conditions

a. General:
   1) Weather Data: Los Angeles USC Campus, CA (WMO: 722874)
   2) CEC Climate Zone: 9
   3) Latitude: 34.0 N
   4) Longitude: 118.2 W
   5) Elevation: 3553 ft.

b. Dry Bulb Summer (0.5%): 91°F, MCWB 65.6°F

c. Dry Bulb Winter: 44.9°F

2. Existing Cooling System and Distribution

a. The building is currently served by three (3) cooling only AC units (AC's) located on the roof. The AC's are serving variable air volume boxes with hot water re-heat.

b. Existing Trane Air Handling Units are:
   1) AC– 1 (serves 1st floor): 75 tons
   2) AC – 2 (serves 3rd floor): 50 tons
   3) AC – 3 (serves 2nd floor): 50 tons

3. Existing Heating System and Distribution

   a. Existing space heating hot water boiler provides the hot water to the re-heat boxes.
      1) Raypak heating hot water boiler system, B-1; Natural Gas Input; 1,262 MBTUH; Natural Gas Output: 1,058 MBTUH.

   b. Existing hot water space heating distribution pump, P-1 associated with B-1.
      1) Bell and Gossett 1510 BF Pump rated for 71 GPM.

4. Replacement of Rooftop AC Units (Fit to Existing Curb)

   a. Existing DX cooling only VAV Air Handling Units will be replaced with new AHU's with like for like cooling capacities and air flows.
      1) New AC, AC-1: TRANE Packaged Rooftop Intellipak Air Conditioners.
         a) 75 Ton Unit, DX Cooling only, R-410A Refrigerant.
         b) 22,000 CFM Supply Air, 17,600 CFM Return Air
         c) Pre Merv 8 throwaway filter and Final Merv 16 throwaway filter.
         d) VAV supply and exhaust/return VFD w/ bypass. 0-100% Economizer with Traq OSA measurement and DCV Economizer control w/ dry bulb.
         e) Ultra-low leak dampers.
         f) BACnet communication interface module.
         g) Steril Aire High Output UVC – Eliminates biofilm and reduces airborne microbial contaminants. Separate 120V power source required.
      2) New AC, AC-2: TRANE Packaged Rooftop Intellipak Air Conditioners.
         a) 50 Ton Unit, DX Cooling only, R-410A Refrigerant.
         b) 17,000 CFM Supply Air, 13,600 CFM Return Air
         c) Pre Merv 8 throwaway filter and Final Merv 16 throwaway filter.
         d) VAV supply and exhaust/return VFD w/ bypass. 0-100% Economizer with Traq OSA measurement and DCV Economizer control w/ dry bulb.
         e) Ultra-low leak dampers.
         f) BACnet communication interface module.
         g) Steril Aire High Output UVC – Eliminates biofilm and reduces airborne microbial contaminants. Separate 120V power source required.
      3) New AC, AC-3: TRANE Packaged Rooftop Intellipak Air Conditioners.
         a) 50 Ton Unit, DX Cooling only, R-410A Refrigerant.
         b) 17,000 CFM Supply Air, 13,600 CFM Return Air

c) Pre Merv 8 throwaway filter and Final Merv 16 throwaway filter.
d) VAV supply and exhaust/return VFD w/ bypass. 0-100% Economizer with Traq OSA measurement and DCV Economizer control w/ dry bulb.
e) Ultra-low leak dampers.
f) BACnet communication interface module.
g) Steril Aire High Output UVC – Eliminates biofilm and reduces airborne microbial contaminants. Separate 120V power source required.

5. Replacement of the Space Heating Hot Water Boiler System

a. Existing space heating hot water boiler will be replaced with like for like capacity and efficiency.
1) New Boiler, B-1: Raypak, Hi Delta; Natural Gas Input; 1,262 MBTUH / Output: 1,058 MBTUH.
2) 84% Thermal Efficiency. Copper finned tube heat exchanger, and glass lined cast iron headers. Boiler less than 20 ppm NOx, pre-certified to SCAQMD rule 1146.2.
3) Outdoor construction.

b. Existing hot water space heating distribution pump, P-1 will be replaced like for like.
1) New Hot Water Pump, P-1: Bell and Gossett End-Suction 1510 BF Pump rated for 71 GPM, 5 HP, 85 Ft. Hd.
2) Concrete Inertia Base with Isolators.

c. Existing horizontal expansion tank will be replaced with a new horizontal bladder type, ET-1; Bell & Gossett, Series "D" ASME Pressure Expansion Tank, Horizontal, 33.4 Gallon Tank, with 11.3 Gallon Acceptance.

d. Existing chemical pot feeder will be replaced like for like.
1) New Chemical Pot Feeder, PF-1; Neptune VTF-2HP, 2 Gallons.

6. IT and Data Rooms Located on the First Floor, Second Floor and Third Floor Levels

a. 1st floor and 2nd floor split units, indoor unit power is from outdoor condensing unit. 3rd floor VRF units, indoor fan coil powered separately from the floor.

b. Provide ductless wall mounted split systems, cooling only serving the IT Rooms. Each fan coil unit will have its own condensing unit or shared condensing unit.
   1) External mounted condensate pump. Power for the condensate pump will come from the fan coil unit.

c. Provide ductless wall mounted split systems, cooling only. Multiple fan coil units will be served by one condensing unit.
   1) Each fan coil and condensing unit will have its own power source.
   2) External mounted condensate pump. Power for condensate pump will come from the fan coil unit.
   3) Data Rooms will have N+1 split system equipment redundancy.

F. PLUMBING

1. Storm Drainage

   a. The existing storm drainage piping system is to remain.

2. Sanitary

   a. The existing sanitary waste and vent piping system is to remain.

3. Domestic Cold Water

   a. The existing domestic cold-water system is to remain. Existing faucets and rough-in utilities connections to the water closets, urinals, under sinks, drinking fountain, and counter lavatories will be removed and replaced with new faucets and rough-in connection.

4. Domestic Hot Water

   a. The existing domestic hot-water system is to remain. Existing faucets and rough-in utilities connections to sinks and counter lavatories will be removed and replaced with new faucets and rough-in connections.

5. Natural Gas

   a. The existing natural gas system is to remain. The existing natural gas shut off valve, a portion of the existing natural gas piping and existing rigid connection to the existing mechanical boiler at the roof will be removed and replaced with new natural gas shut-off valve and stainless steel flexible hose connection to the new mechanical boiler on the roof.

6. Plumbing Fixtures

a. The existing plumbing fixtures are to remain except the existing electric drinking fountains water coolers are to be removed and replaced with new electric drinking fountains water coolers. The existing manual faucets and valves serving the existing plumbing fixtures to remain are to be removed and replaced with new touchless sensor faucets with rough-ins to existing water closets, urinals, sinks, and countertop lavatories. These new touchless faucets will be operating with battery sensors and will be incompliant with the ADA requirements and water conserving measures as regulated by the State and CALGreen Building code.

7. Sustainable Measures

a. Accessible existing water closets will be with new flush valve battery sensor type with a flow rate of 1.28 GPF in public restrooms.

b. Accessible existing lavatories will be provided with new touchless faucets battery sensor operating type with flow restrictors to limit water flow to 0.5 GPM.

c. Accessible existing sinks are provided with touchless faucets battery sensor operating type with flow restrictors to limit water flow to 1.5 GPM.

G. FIRE PROTECTION

1. Pre- Action Double Interlock

a. Remove a portion of existing wet sprinkler branch piping, fitting, flexible hoses, and two (2) pedant semi conceal sprinkler heads in the Service Room located at the 3rd level.

b. Add two (2) new dry semi pendent sprinkler heads, piping, and fittings in the Service Room located at the 3rd level.

c. Add new pre-action double interlock with a cabinet and complete assembly with compressor, controls, 2" drain, 2" discharge dry piping, fitting and valves. Add a new portion of the 2" wet sprinkler branch line from the existing 3" fire main located nearby at the ceiling close to the Storage Room where the pre-action cabinet will be located at the 3rd level.

d. Add a new 2" drain line from the new pre-action cabinet and drop below the floor to connect to a new 2" standpipe at the 2nd level breakroom undercounter next to the existing kitchen sink countertop.

e. Add a new zone control fire alarm panel with accessories interconnected with a pre-action system cabinet and fire alarm system.

2. Clean Agent System

a. Add a new clean agent fire suppression system, non-toxic clean agent gas, with control panel, six (6) sensors, six (6) nozzles, control panel, conduits and wires in the Service Room located at the 3rd level.

H. ELECTRICAL

1. General

a. The scope of work includes providing a new solar PV system on the roof. In addition, there will be coordinated work with mechanical and plumbing for the upgraded boiler and HVAC units. There will be some replacement switches for the existing IT equipment including a new UPS for the 2nd and 3rd floors. A new 60kW/75kVA generator and ATS will be installed to support the IT equipment as well as IT room cooling, egress lighting, and security access. A new 100A, 277/480V panelboard will be installed to serve as an emergency panel, and existing 45kVA transformer "X3A" and panelboard "A" will be repurposed to serve the emergency loads.

b. The existing main service switchboards MSA and MSB located in the parking lot will remain as is. However, modifications will be made to switchboard DB1 in the first-floor electrical room for interconnection with the new PV equipment. Additional disconnect switches, monitoring panel, and other associated equipment will be provided as required to comply with code. In addition, power will be provided to the new automatic doors, new AV equipment, and UV lights for the AC units. There will be no additional changes to the existing power, lighting, and fire alarm systems.

2. Utilization Voltages

Primary	
Normal	480Y/277V, 3-Phase, 4-Wire
Secondary	
Normal	208Y/120V, 3-Phase, 4-Wire
Branch Circuits	
General Use Receptacles	120V
Special Purpose Receptacles	208V, 1-Phase & 208V, 3-Phase
LED Lighting	277V
Motors 1/3 HP and Smaller	120V
Motors ½ HP and Larger	208V, 3-Phase

3. Electrical Service

a. The facility is served from an existing 4160V utility transformer located in the parking lot electrical yard along with two (2) existing switchboards MSA and MSB, both 480/277V 800A, 3Ø, 4W. The two (2) main switchboards feed DB1 and DB2 for the building.

b. The remainder of the normal power distribution system inside the building consists of existing distribution panelboards and branch circuit panelboards.

c. The existing main switchboards MSA and MSB rated at 800A MCB, 277/480V, 3ph, 4w are adequate.

FIRST 5 LA
PHASE 1 PACKAGE - ELECTRICAL LOAD CALCULATION

1. CALCULATED LOADS

A. MSA EXISTING DEMAND, METER APMYV00222-00025980

1. EXISTING MAXIMUM DEMAND PER LADWP ONE YEAR UTILITY BILLS

			=	72.0 KW

2. AT 0.85 PF EXISTING MAXIMUM DEMAND KVA (UTILITY BILL KW/PF CONVERSION TO KVA)

72.00 KW	÷	0.85 PF	=	84.7 KVA

3. PER CEC 220.87

84.7 KVA	x	1.25	=	105.9 KVA

EXISTING DEMAND LOAD	=	**105.9 KVA**
FEEDER CURRENT @ 480/277V, 3PH, 4W	=	**127.4 AMPS**

B. MSB EXISTING DEMAND, METER APMYV00222-00025559

1. EXISTING MAXIMUM DEMAND PER LADWP ONE YEAR UTILITY BILLS

			=	149.6 KW

2. AT 0.85 PF EXISTING MAXIMUM DEMAND KVA (UTILITY BILL KW/PF CONVERSION TO KVA)

149.60 KW	÷	0.85 PF	=	176.0 KVA

3. PER CEC 220.87

176.0 KVA	x	1.25	=	220.0 KVA

EXISTING DEMAND LOAD	=	**220.0 KVA**
FEEDER CURRENT @ 480/277V, 3PH, 4W	=	**264.6 AMPS**

2. TOTAL DEMAND LOAD

A. MSA EXISTING DEMAND, METER APMYV00222-00025980	(EXISTING)	=	105.9 KVA
B. MSB EXISTING DEMAND, METER APMYV00222-00025559	(EXISTING)	=	220.0 KVA
TOTAL EXISTING DEMAND LOAD (A + B)		=	**325.9 KVA**
FEEDER CURRENT @ 480/277V, 3PH, 4W		=	**392.0 AMPS**

4. Switchboards/Panelboards

   a. All switchboards and panelboards shall be specified with copper busses. All panelboards not located in the same room as their feeding distribution switchboard shall be provided with a main circuit breaker.

5. Wiring Devices

   a. Wiring devices shall be identified by system with plate finish matching device color. All devices shall have the feeding panel and circuit identified on the plate.
      1) All emergency devices (where used) shall be red.
      2) All UPS devices (where used) shall be orange.
      3) All isolated ground (where used) shall be white with orange triangle on face.
      4) All other devices shall be white, stainless steel in food service areas unless otherwise specified by the Architect on special finishes.
      5) All receptacles shall be installed with the ground prong facing up.

6. Identification

   a. The preferred identification method for device plates is black ¼" lettering on clear ½" labelling tape. All branch circuit panels, switchboards, distribution boards, and other major electrical equipment shall be on permanently engraved black (normal power) and red (emergency power) laminated plastic plates with white lettering and attached with screws. Nameplates shall be 3/8" high lettering.

   b. Nameplate colors shall be as follows:
      1) Over 600V: Brown letters on white plate
      2) 277V thru 600V: Orange letters on white plate.
      3) 120V thru 240V: Black letters on white plate
      4) Emergency: White letters on red plate
      5) Devices ahead of mains and substation secondary mains, color as per switchboard designation on yellow plate.
      6) Fire Alarm System Equipment: Black letters on red plate.

7) Communication or Signal Systems: White letters on black plate. Identify system and Voltage.
8) Building Control System: White letters on green label.

c. Provide all labels, stencils, signage, circuit designators panel schedules, and warning signs.

7. Feeders/Conductors

a. All conductors in this facility are to be single copper conductors routed in conduit.

b. Conductors 600V and below shall be copper solid conductors up to #12 AWG and stranded larger than #12 AWG as follows:
1) Service Entrance: Type THW-2 or XHHW-2
2) Feeders 100A and smaller: Type THHN/THWN
3) Feeders Larger than 100A: Type THW or XHHW-2
4) Exposed Runs, concealed in concrete, below slabs on grade and all underground feeders shall be type: Type THW or XHHW-2
5) Branch Circuits: THHN/THWN
6) Expose runs, concealed in concrete, below slabs on grade and underground: Type THWN-2
7) Cord drops: Type SO cord, NSF-listed cord reels in kitchen
8) Class 1 or 2 control circuits: Type THHN/THWN

c. All conductors shall be color coded. Color shall not change from source circuit to last load. Conductors shall be identified and color coded at every accessible location on conductor's entire route. Conductors #6 AWG and smaller shall have integral insulation pigmentation of the required colors.

System	Conductor	Color
All systems	Equipment Ground	Green
208Y/120V 3PH, 4W	Grounded Neutral	White
	Phase A	Black
	Phase B	Red
	Phase C	Blue

I. AUDIO VIDEO SYSTEM

1. Demolition

a. Demo all existing AV equipment and coordinate with owner for disposal.

2. Infrastructure

   a. Utilize existing infrastructure where possible including gang boxes and conduit. Where not possible, coordinate with Electrical Contractor and Architect to provide appropriate rough-in.

   b. Provide new mounting equipment for all audio video equipment.

3. Rooms

   a. The multipurpose room includes two (2) individual rooms (Labeled Room A and Room B) that can be configured into a combined and/or un-combined state. The rooms are divided by a manual partition that is stored in an in-room storage room. The room will be primarily used in a combined state to allow for various meetings and will be flexible to allow for the re-arranging of furniture.

   b. The conference room will be used to collaborate with the people in the room or be able to initiate a voice and/or video conference call with people in a remote location. The space will include integration with Microsoft Teams and provide a one-touch setup of the room if a user decides to initiate a conference call. The construction of the room is an 8-10 seat conference table with a display at one end to allow for a visual display of the content within the space for both the far end and near end participants.

4. Network (AV related)

   a. All systems will be network based and routed over CAT6A cabling. This cabling will be routed back to the central IT closet. The AV devices will be converged onto the owner IT network. Network coordination with the owner is required. The owner will provide network switches.

5. Systems

   a. The following are basis of design and maybe substituted with approved equals.
      1) Crestron NVX for audio and video signal routing.
      2) Crestron XIO Cloud for monitoring and management of devices
      3) Crestron for control of devices
      4) Crestron flex for Unified Communications
      5) Shure ULX for wireless audio.
      6) Listen Technologies for assistive listening.
      7) NDI for camera signal transmission
      8) Dante for audio routing.

J. BUILDING IT NETWORK AND HARDWARE

1. Design builder should include an allowance to cover the installation cost of scope of rough-in and cabling of building IT network systems. The interconnections include fiber and CAT-6A cables/conduits links among the 1st floor, 2nd floor and 3rd floor IT rooms.

2. Network hardware will be provided by a 3rd party selected by the Owner.

3. Network coordination with the owner is required. The owner will provide network switches.

Prepared by Paul Q. Dong

PQD/ JH: AK
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